



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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**Title**

Knowledge, Attitude and Practice towards COVID-19 Infection  
Among Physicians and Nurses in Al-Banjadeed Hospital, Khartoum  
Sudan 2021-2022.

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## **DEDICATION**

This work is a fruit of countless and arduous sacrifices, through the researcher's effort, this work is whole heartedly dedicated to our beloved parents and guardians who have been our source of inspiration and gave us strength when we thought of giving up, who continually provide their moral, spiritual, emotional and financial support.

To our brothers, sisters, relatives, friends, mentors and classmates who shared their words of advice and encouragement to finish this project. Lastly to our outstanding physician and nurses who sacrifice their life and dedicate their time in battling the horrendous COVID-19infection.

## **ACKNOWLEDGEMENT**

First and foremost, praises and salutations to God Almighty for His endless showers of blessings throughout our research journey, towards a successful completion.

We would like to express our deep and sincere gratitude to our research supervisor Dr. Abdalla Abdul-Wahid Saeed for giving us the opportunity to complete this task and providing invaluable guidance throughout this research. His dynamism, vision, sincerity and motivation have deeply inspired us. He taught us the methodology to execute the research to its fullest and to present it as clearly as possible. It's a great privilege and honor to work and study under his remarkable guidance. We are extremely grateful for what he has offered us, we also like to thank him for his friendship and empathy. We are extending our heartfelt and uncountable appreciation to his family for their understanding and patience during the discussion we had with him in executing this herculean mission.

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## **ABSTRACT**

**BACKGROUND:** Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) is a contagious viral pathogen, creating a public health emergency, and affecting lives and livelihood of millions of populations globally. Good knowledge, attitude, and practice are essential to prevent and stop the widespread transmission.

**Aim of the study:** The aim of this research project was to assess the knowledge, attitude and practice regarding COVID-19 infection among physicians and nurses in Al-Banjadeed hospital.

**Methods & materials:** This descriptive cross sectional study was conducted among 88 participants 31 were physicians and 57 were nurses at Banjadeed hospital, El-hajj Yousif Khartoum North, from May 2022 to September 2022. Data were collected through a self-administered questionnaire distributed to the physicians and nurses.

**Results:** A total of 88 participants completed the questionnaire with a response rate of 100%. The result showed 68.2% of the participants were female, 86.4% of the participants were aged 20 to 40 years, 83% were bachelor degree holders and 65.9% were nurses. Majority of the participants were from pediatric department and highest working experience is less than 2 years for 70.5% of them. Official websites (ministry of health, WHO, and CDC) were the primary source of information for 36.4% of the participants. Most of the participants have good knowledge, good attitude and better practice. There were no significant difference of knowledge with gender ( $P > .05$ ). However there was significant difference of practice with profession (physician and nurses) ( $P < .05$ ).

**Conclusions:** the findings demonstrated that the physicians and nurses have good knowledge, attitude and better practice towards COVID-19 infection. There was significant difference of practice with profession.

## نبذة مختصرة

**خلفية:** مرض الالتهاب الرئوي الحاد فيروس كورونا هو مرض فيروسي معدي , خلق حالة طوارئ صحية عامة , ويؤثر على حياة ومعيشة ملايين السكان على مستوى العالم . المعرفة , والمواقف والممارسة الجيدة ضرورية لمنع ووقف انتقال العدوى على نطاق واسع .

**الهدف من الدراسة:** كان الهدف من هذا المشروع البحثي هو تقييم مواقف ومعرفة وممارسة الاطباء والممرضات فيما يتعلق بعدوى فيروس كورونا في مستشفى البان جديد .

**الطريقة والمواد:** اجريت هذه الدراسة المقطعية على 88 مشاركا , 31 من الاطباء و 57 من الممرضين في مستشفى البان جديد , الحاج يوسف شمال الخرطوم , في فترة من مايو 2022 والى سبتمبر 2022 . تم جمع البيانات عن طريق الاستبيان الذاتي , ووزع على الاطباء والممرضين العاملين في مستشفى البان جديد .

**النتائج:** اكمل مجموع 88 مشاركا في البحث الاستبيان بمعدل 100% . وكان اكثر من 66.2% من المشاركين من الاناث , 86.4% من المشاركين تتراوح اعمارهم من 20 الى 40 سنة , 83% كانوا يحملون درجة البكالوريوس , و 65.9% كانوا من الممرضين , وكانت غالبية المشاركين من قسم طب الاطفال واعلى خبرة عمل اقل من عامين بنسبة 70% . كانت المواقع الرسمية (وزارة الصحة , منظمة الصحة العالمية , ومراكز مكافحة الامراض) المصدر الرئيسي للمعلومات ل36% من المشاركين . كان لدى معظم المشاركين معرفة جيدة وسلوك جيد وممارسة افضل . لم يكن هناك فرق كبير في المعرفة مع الجنس ( $P>0.05$ ) . ومع ذلك كان هناك اختلاف كبير في الممارسة مع المهنة (الاطباء و الممرضين) ( $P<0.05$ ) .

**الاستنتاجات:** اظهرت النتائج ان الاطباء والممرضين لديهم معرفة جيدة وسلوك جيد وممارسة افضل تجاه عدوى فيروس كورونا . وكان هناك اختلاف كبير في الممارسة مع المهنة .

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## LIST OF ABBREVIATIONS

ARDS	Acute Respiratory Distress Syndrome
CDC	Centers for disease control and prevention
COVID-19	Corona virus disease 2019
CT SCAN	Computed Tomography Scan
HCP	Health Care Profession
KAP	Knowledge, attitude and practice
MERS-COV	Middle East Respiratory Syndrome Coronavirus
PHEIC	Public Health Emergency of International Concern
PPE	Personal Protective Equipment
RTD	Rapid Diagnostic Test
RT-PCR	Reverse Transcriptase Polymerase Chain Reaction
SARS-COV-2	Severe Acute Respiratory Syndrome Coronavirus
SPSS	Statistical Package For Social Sciences
TV	Television
WHO	World health of organization

## CHAPTER ONE

## **CHAPTER 1: INTRODUCTION AND BACKGROUND**

### **1-1. BACKGROUND:**

The Novel 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 [1]. The World Health Organization declared COVID-19 outbreak a public health emergency of international concern (PHEIC-Pandemic) on January 30, 2020. Currently, COVID-19 has spread to over 200 countries and territories, with over 7.5million cases and 4,019,568 deaths globally [2, 3]. First infections of COVID-19 in Sudan was detected among international travelers and returnees who arrived in the country between February and March 2020 [4].

As of June 9, 2021, Sudan had recorded 36,004 proven infections and 2,711 deaths [5]. Moreover, 109 deaths were reported in doctors between January 14 2020 to March 12 2021 [6]. In some countries as much as 10% of health care workers were infected with SARS-CoV-2 and the WHO has outlined the need for training of health care workers in order to reduce the rates of infection [7].

Globally, healthcare workers are at the forefront in the containment of COVID-19 outbreak, diagnosis, and management of infected patients. Unfortunately, healthcare workers had also been the source and means of nosocomial and community transmission [8].

There is possibility of spreading Coronavirus infection in the absence of symptoms [9]. For health care professionals (HCPs), there is a serious occupational health risk due to their exposure to infected individual [10]. Protection of HCPs and prevention of intra-hospital transmission of infection are important aspects in epidemic response [11].

Lack of knowledge and misunderstanding among HCPs lead to delayed diagnosis, spread of disease and poor infection control practice [12]. Also improper attitudes and practices directly increase the risk of infection [13].

The aim of this research is to find out knowledge, attitude and practice towards COVID-19 among physicians and nurses in Al-Banjadeed hospital.

**1-2. STATEMENT OF THE PROBLEM:**

Physicians and nurses are among the primary stakeholders and front liners in the fight against COVID-19 infection. They are in direct contact with the patients as primary caregivers and, therefore, are at a higher risk of infection. A poor understanding of the disease among physicians and nurses might lead to delayed treatment and result in the rapid spread of the infection. The risk of transmission decreases with adequate knowledge, attitude and practice methods. Physicians and nurses reportedly lack a proper knowledge, attitude and practice of different viral outbreaks.

**1-3. RATIONALE:**

Physicians and nurses are more susceptible to COVID-19 infection than other healthcare workers due to frequent contact with infected individuals. Therefore, are at a higher risk of infection, and can be the source to their parents, family and community members, so it is important to assess physicians and nurses' knowledge, attitude, and practice as they are the front liners in the fight against COVID-19 infection in the hospital.

**1-4. STUDY OBJECTIVES:**

**1-4-1. GENERAL OBJECTIVES:**

To assess the knowledge, attitude and practice towards COVID-19 infection among physicians and nurses in Al-Banjadeed hospital.

**1-4-2. SPECIFIC OBJECTIVES:**

1. To measure the knowledge of physicians and nurses towards COVID-19 infection.
2. To identify the attitude of physicians and nurses towards COVID-19 infection.

3. To assess the practice of physicians and nurses towards COVID-19 infection.

1-5. **VARIABLE:**

INDEPENDENT VARIABLES	DEPENDENT VARIABLE
Gender	Knowledge about COVID-19 infection
Profession	Attitude towards COVID-19 infection
Specialty	Practice about COVID-19 infection
Department	
Years in practice	
Educational background	
Source of information on COVID-19 infection	

## CHAPTER TWO

## CHAPTER 2: LITERATURE REVIEW

### **GLOBALLY:**

A research was conducted to assess the knowledge, attitude and practice of healthcare providers regarding COVID-19 infection in Pakistan, the results showed majority of the healthcare providers had adequate knowledge, moreover 59.2% demonstrated positive attitude and 57.2% showed appropriate practice [14].

A research was conducted on knowledge, attitude and practice regarding COVID-19 among healthcare workers in public health facilities in eastern Ethiopia. The result showed 73.3% of the participants had sufficient knowledge, 54.8% of the participants had a good attitude and 61.5% of the participants practiced precautionary measures to prevent COVID-19 infection [15].

A research was done on knowledge attitude and practice among healthcare workers towards COVID-19 outbreak in Nigeria, the results showed that healthcare workers in Nigeria had excellent knowledge, positive attitude and good practice towards COVID-19 [16].

A research conducted in Henan, China, among 1357 health care workers reported that 89% had sufficient knowledge about COVID-19 infection with doctors and nurses having higher knowledge score than other health care workers [17].

A research was conducted on knowledge, attitude and practice regarding COVID-19 infection among doctors and nurses at tertiary care maternity hospital in Nepal, where positive attitude and practice regarding COVID-19 infection among physicians and nurses were found [18].

**REGIONALLY:**

A research was conducted in eight teaching and referral hospitals among healthcare workers on knowledge, attitude and practice towards COVID-19 infection and its prevention in Ethiopia. The research revealed that 88.2% of the participants had good knowledge about COVID-19 infection, 94.7% participants had a positive attitude towards COVID-19 infection and 63.5% of the participants had good practice towards COVID-19 infection and its prevention [19].

A study was conducted to evaluate the knowledge, attitude and practice regarding COVID-19 in primary health centers in Dubai among healthcare workers, which showed 57.4% of the participants had sufficient knowledge with physicians having higher score compared to nurses. While only 33% of the participants had a sufficient overall attitude score with nurses having higher score than physicians. And majority of the participants had a good practice with nurses having higher score for practice compared to physicians [20].

A research was conducted on knowledge, attitude and practice towards COVID-19 infection among healthcare workers in multiple hospitals affiliated to Shiraz University of medical sciences, in Shiraz, Iran, which revealed that 72.2% of healthcare workers had sufficient knowledge, 66.65% had positive attitudes and 67.72% possessed adequate practical skills [21].

**LOCALLY:**

A research was conducted on knowledge, attitude and practice of healthcare professionals towards COVID-19 infection in Omdurman military hospital, the result showed 93.8% of the study participants showed good knowledge about the disease with doctors and nurses having the higher score. And 81.3% had a positive attitude towards preventive measures [22].

## CHAPTER THREE

## CHAPTER 3: METHODS AND MATERIALS

### 3-1. STUDY DESIGN:

Descriptive cross-sectional study on physicians and nurses in Al-Banjadeed Hospital.

### 3-2. STUDY POPULATION:

#### A. INCLUSION CRITERIA:

1. Physicians
2. Nurses

#### B. EXCLUSION CRITERIA:

1. Physicians and nurses who are not in contact with patients including radiologist
2. Resident doctors
3. Intern doctors
4. Newly employed

### 3-3. STUDY AREA:

Al-Banjadeed Hospital is a government hospital located in El-haj Yousif Khartoum North, it has 40 physicians and 73 nurses, consisting of various departments such as internal medicine, pediatric, emergency, surgery and obstetrics & gynecology.

### 3-4. SAMPLING DESIGN:

#### 3-4-1. SAMPLE SIZE:

$$n = \frac{NZ^2P(1-P)}{d^2(N-1) + Z^2P(1-P)}$$

**n:** is sample size.

**N:** is the total population.

**Z:** ( 1.96) is the value of normal curve corresponding to level of confidence 95%.

**P:** is the probability of target group having the problem or prevalence rate.

**1-p:** is the probability of target group not having the problem.

**d:** is the desired margin of error.

### **3-4-2.SAMPLE VALUE:**

Number of physicians=40

Number of nurses=73

Total number of physicians and nurses (N) =113

$$n = \frac{113 \times 1.96^2 \times 0.5(1 - 0.5)}{0.05^2 \times (113 - 1) + 1.96^2 \times 0.5(1 - 0.5)}$$

n= 88 physicians and nurses

$$\text{Physicians (n)} = \frac{40}{113} \times 88 = 31$$

$$\text{Nurses (n)} = \frac{73}{113} \times 88 = 57$$

### **3-4-3.SAMPLE TECHNIQUE:**

The sampling technique used in this research was Systemic random sampling using the interval of 5, such as 1-5-10-15-20 e.t.c, till the required sample number are selected for physicians and nurses.

### **3-5. DATA MANAGEMENT:**

#### **3-5-1. DATA COLLECTION TOOL:**

A structured self-administered questionnaire was used to collect the data from previous COVID-19 K.A.P survey [23]. The questionnaire was pre-tested among 7 participants to ensure the clarity of questions and to eliminate any ambiguity. Minor changes were made before it was finalized and deployed for the main survey. The questionnaire consists of 7 demographic characteristics questions, such as gender, age e.t.c. 10 questions on knowledge were scored, marked as 1 for correct and 0 for incorrect, such as the virus causing the COVID-19 is... etc. 5 questions on attitude were rated on 5-point Likert scale as follows 1 (strongly disagree), 2 (Disagree), 3 (Neutral), 4 (Agree) and 5 (Strongly agree) example I believe that an asymptomatic patient can transmit the virus to others, and more. 5 questions on practice were scored on a 5-point scale from 1 (never), 2 (Rarely), 3 (Sometimes), 4 (Often), and 5 (Always) for example I wear Personal Protective Equipment (PPE) while caring patient, etcetera.

#### **3-5-2. DATA ANALYSIS:**

After collecting the data collection, each questionnaire was thoroughly reviewed for completeness and consistency. The data obtained were coded and validated using Microsoft excel and analyzed using statistical package for social science (SPSS) version 16. Descriptive analysis was applied to calculate the frequency and percentage for Demographic characteristic and the dependent variables (knowledge, attitude and practice). Chi-square test was used to test the relationship between knowledge, attitude and practice and with gender and profession. A P-value of less than 0.05 was considered the cut-off value for statistical significance.

### **3-6. ETHICAL CONSIDERATION:**

- Permission was taken from the medical director of Al-Banjadeed hospital.
- The purpose and importance of the research to the study participants was explained through written informed consent form.
- Confidentiality of information was maintained by keeping anonymous personal identifiers.

## CHAPTER FOUR

## **CHAPTER 4: RESULTS**

A total of 88 participants were included in the study, 31 are physicians while 57 were nurses with the response rate of 100%. Table no. (1) shows demographic characteristic of study participants. Out of the 88 study participants 31 were physicians and 57 were nurses. 86.4% of the participants were aged 20 to 40 years, the vast majority of the participants were from pediatric department. The highest working experience is less than 2 years which is 70.5%. The primary source of information on COVID-19 infection was obtained through various sources, the most being official websites (ministry of health, WHO, and CDC) with 36.4%.

Table 1: Demographic characteristics of the study participants

<b>Characteristics</b>	<b>Frequency</b>	<b>Percent</b>
<b>Age</b>		
<20 years	3	3.4
20 to 40 years	76	86.4
>50 years	9	10.2
<b>Department</b>		
Internal medicine	27	30.7
Obstetrics & Gynecology	7	8.0
Pediatric	49	55.7
Surgery	5	5.7
<b>Years of working experience</b>		
<2 years	62	70.5
2 to 5 years	9	10.2
>5 years	17	19.3
<b>Primary source of information on COVID-19 infection</b>		
1.Social media (WhatsApp and Facebook)	15	17.0
2.News media (TV, radio, and newspaper)	14	15.9
3.Official websites (Ministry of Health, WHO, and CDC)	32	36.4
4. 1 and 2	2	2.3
5. 2 and 3	6	6.8
6. 1 and 3	9	10.2
7. 1,2,and 3	10	11.4
Total	88	100.0

Figure (1): Gender distribution of the participants

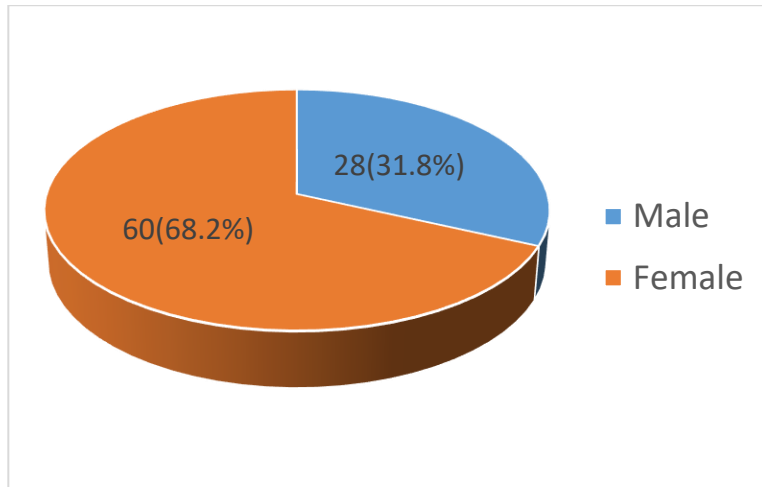


Figure no. (1) shows gender distribution of study participants were Female constitute 68.2% while male 31.8% as shown above.

Figure (2): Educational level of the participants

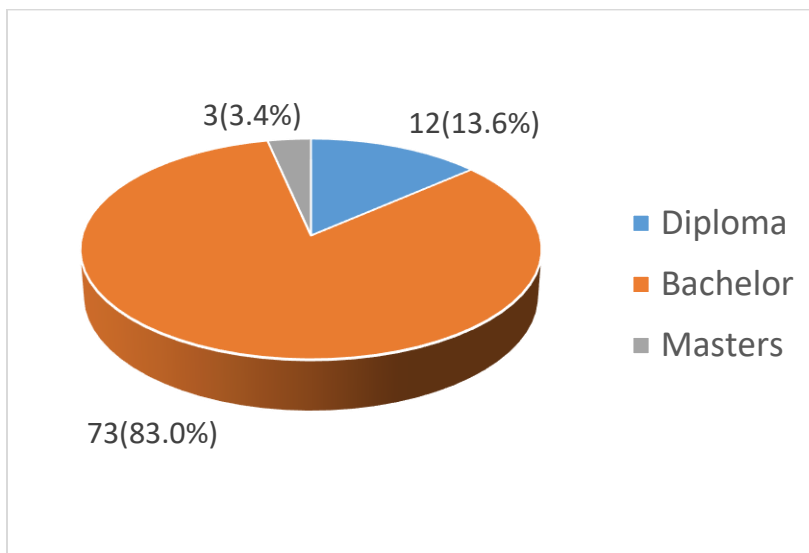


Figure no (2) shows educational level of study participants. More than half of the participants 83.0% were bachelor degree holders.

Figure (3): profession of the participants

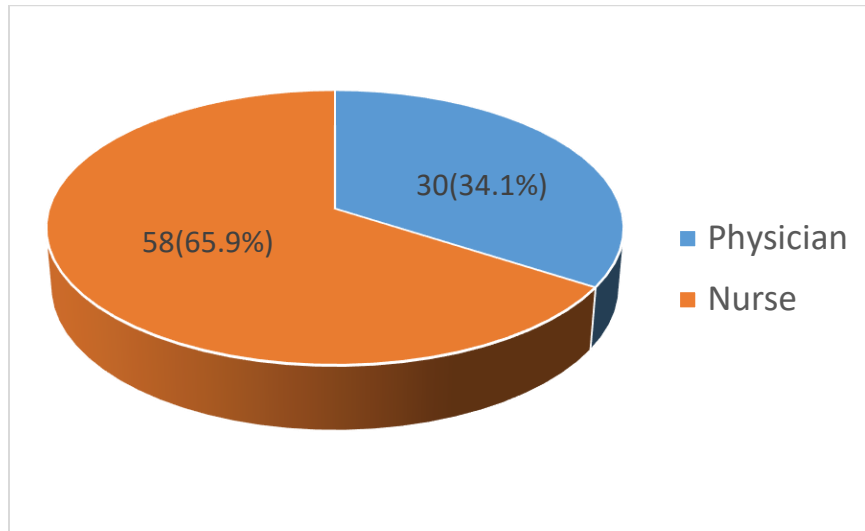


Figure no (3) shows profession of study participants. As shown above nurses were 65.9% while physicians were 34.1%.

Table no (2) shows knowledge of study participants towards COVID-19 infection. The virus causing the COVID-19 infection 55.7% is SARS-Cov-2, the incubation period of the COVID-19 infection is 2 to 14 days with 63.6% , majority of the participants 79.5% choose all of the above (Respiratory droplet, Direct (infected person) & Indirect Contact (surface, objects such as thermometer), and Airborne Transmission (Aerosol)) as the mode of transmission for COVID-19 infection, 85.2% of the participants choose all of the above (High-Grade Fever, Dry Cough, and Shortness of Breath) as the main symptom of COVID-19 infection, majority of the participants 76.1% chose reverse transcriptase polymerase chain reaction (RT-PCR) as the confirmatory diagnosis of COVID-19 infection.

The high-risk individual of COVID-19 infection who develop severe complication are (Elderly (over 65years) & People with underlying medical conditions such as; Diabetes, Heart disease, Kidney disease, Asthma, Cancer, etc.) with 37.5% while majority chose all of the above (Children, Pregnant Women, and Elderly (over 65years) & People with underlying medical conditions such as; Diabetes,

Heart disease, Kidney disease, Asthma, Cancer, etc.) with 59.1%, the participants chose all of the above (Hand-washing with soap & water, Social distancing and isolation of suspected & confirmed cases, and Wearing of Personal Protective Equipment (PPE) while caring for infected patients). As the best preventive measures for COVID-19 infection with 88.9%, as chosen by the participants 60.2% chose supportive & symptomatic management as the best management option for COVID-19 infection, all of the above (ARDS, Shock, and Organ dysfunctions (Acute Kidney Injury, Acute Lung Injury, Acute Liver Injury, Acute Cardiac Injury, etc.) 78.4% was chosen by participants as the most common complication of the COVID-19 infection. Staying apart from other people when you have been exposed to corona virus disease is quarantine with 36.4% as chosen by the participants.

Table 2: Knowledge of the participants towards COVID-19 infection

Knowledge question	Frequency	Percent
1. The virus causing the COVID-19 is...		
1. SARS-CoV	26	29.5
2. MERS-CoV	13	14.8
3. SARS-CoV-2	49	55.7
4. Ebola Virus	0	0
2. The incubation period of the COVID-19 is...		
1. 2 to 14 days	56	63.6
2. 2 to 11 days	9	10.2
3. 2 to 21 days	14	15.9
4. 7 to 21 days	9	10.2
3. The mode of transmission for COVID-19 is...		
1. Respiratory droplet	11	12.5
2. Direct (infected person) & Indirect Contact (surface,	5	5.7

objects such as thermometer) <b>3. Airborne Transmission (Aerosol)</b>	2	2.3
4. All of the above	70	79.5
4.The main symptom of COVID-19 is ...		
1. High-Grade Fever	2	2.3
<b>2. Dry Cough</b>	2	2.3
3. Shortness of Breath	9	10.2
4. All of the above	75	85.2
5.The Confirmatory diagnosis for COVID-19 is ...		
1. Rapid Diagnostic Test (RTD)	1	1.1
<b>2. Reverse Transcription - Polymerase Chain Reaction (RT-PCR)</b>	67	76.1
3. Chest Computed Tomography (CT) Scan	3	3.4
4. All of the above	17	19.3
6. The high-risk individual of COVID-19 infection who develop severe complication are...		
1. Children	0	0
<b>2. Pregnant Women</b>	3	3.4
3. Elderly (over 65years) & People with underlying medical conditions such as; Diabetes, Heart disease, Kidney disease, Asthma, Cancer, etc.	33	37.5
4. All of the above	52	59.1

7.The best Preventive measures for COVID-19 infection is ... 1. Hand-washing with soap & water	3	3.4
2. Social distancing and isolation of suspected & confirmed cases	5	5.7
3. Wearing of Personal Protective Equipment (PPE) while caring for infected patients	2	2.3
4. All of the above	78	88.9
8.The best management option for COVID-19 is ... 1. Supportive & Symptomatic Management	53	60.2
2. Rehabilitative Management	5	5.7
3. Palliative Care	11	12.5
4. Anti-viral Therapy	19	21.6
9.The most common Complications of COVID-19 is ... 1. ARDS	9	10.2
2. Shock	1	1.1
3. Organ dysfunctions (Acute Kidney Injury, Acute Lung Injury, Acute Liver Injury, Acute Cardiac Injury, etc.)	9	10.2
4. All of the above	69	78.4

10. Staying apart from other people when you have been exposed to coronavirus disease is called ...		
1. Physical distancing	1	1.1
2. Isolation	16	18.2
3. Quarantine	32	36.4
4. All of the above	39	44.3
TOTAL	88	100.0

Table no. (3) Shows attitude of study participants towards COVID-19 infection. Most participants 63.6% strongly agreed being a frontline healthcare worker (F-HCW), having a high possibility of exposure, I am always worried about transmitting the virus to my family, friends & society. 39.8% strongly agree that a symptomatic patient can transmit the virus to others, 25% participants disagree that hand washing with soap & water is sufficient for infection prevention, 42.2% strongly agree that the vaccine for COVID-19 infection help in reducing spread of the disease and 36.4% of the participants neutrally believed that COVID-19 will be eliminated completely.

Table 3: Attitude of the participants towards COVID-19 infection

Attitude question (N=88)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	N (%)	N (%)	N (%)	N (%)	N (%)
1. Being a frontline healthcare worker (F-HCW), having a high possibility of exposure, I am always worried about transmitting the virus to my family, friends & society.	56(63.6)	26(29.5)	4(4.5)	1(1.1)	1(1.1)
2.I believe that an asymptomatic patient can transmit the virus to others	35(39.8)	32(36.4)	13(14.8)	5(5.7)	3(3.4)
3.I believe that hand-washing with soap & water is sufficient for infection prevention	15(17.0)	18(20.5)	17(19.3)	22(25.0)	16(18.2)
4.I believe that the vaccine for COVID-19 help in reducing spread of the disease	38(43.2)	27(30.7)	14(15.9)	8(9.1)	1(1.1)
5.I believe that COVID-19 will be eliminate completely	8(9.1)	24(27.3)	32(36.4)	19(21.6)	5(5.7)
<b>Total</b>	<b>88(100)</b>	<b>88(100)</b>	<b>88(100)</b>	<b>88(100)</b>	<b>88(100)</b>

Table no (4) shows practice of study participants towards COVID-19 infection.38.6% of participants always follow 5 moments of hand hygiene with 7 steps, most participants 36:4% always use 70% alcohol-based hand sanitizer in the absence of soap &water, majority of the participants 35.2% always wear personal protective equipment (PPE) while caring patient, 53.4% always carefully remove personal protective equipment (PPE) and discarding in the proper place and 63.6% always isolate the suspected and/or infected patient.

Table 4: Practice of the participants towards COVID-19 infection

Practice question (N=88)	Always	Often	Sometimes	Rarely	Never
	N (%)	N (%)	N (%)	N (%)	N (%)
1.I am following 5 moments of hand hygiene with 7 steps	34(38.6)	17(19.3)	24(27.3)	4(4.5)	9(10.2)
2.I use 70% alcohol-based hand sanitizer in the absence of soap & water	32(36.4)	27(30.7)	20(22.7)	6(6.8)	3(3.4)
3. I wear Personal Protective Equipment (PPE) while caring patient	31(35.2)	19(21.6)	18(20.5)	4(24.5)	16(18.2)
4. I carefully remove Personal Protective Equipment (PPE) and discarding in the proper place	47(53.4)	7(8.0)	14(15.9)	5(5.7)	15(17.0)
5.We do isolate of the suspected and/or infected patient	56(63.6)	9(10.2)	19(21.6)	3(3.4)	1(1.1)
<b>Total</b>	<b>88(100)</b>	<b>88(100)</b>	<b>88(100)</b>	<b>88(100)</b>	<b>88(100)</b>

Table 5 shows knowledge of participants according to gender. There are no significant relation of knowledge according to gender ( $P>.05$ ).

Table 5: Knowledge of study participants according to their gender

Knowledge question	Male N (%)	Female N (%)	Total N (%)	P value
1. The virus causing the COVID-19 is...				0.720
1. SARS-CoV	8 (28.6)	18 (30.0)	26 (29.5)	
2. MERS-CoV	3 (10.7)	10 (16.7)	13 (14.8)	
3. SARS-CoV-2	17 (60.7)	32 (53.3)	49 (55.7)	
4. Ebola Virus	0 (0.0)	0 (0.0)	0 (0.0)	
2. The incubation period of the COVID-19 is...				0.293
1. 2 to 14 days	15 (53.6)	41 (68.3)	56 (63.6)	
2. 2 to 11 days	5 (17.9)	4 (6.7)	9 (10.2)	
3. 2 to 21 days	4 (14.3)	10 (16.7)	14 (15.9)	
4. 7 to 21 days	4 (14.3)	5 (6.3)	9 (10.2)	
3. The mode of transmission for COVID-19 is...				0.669
1. Respiratory droplet	3 (10.7)	8 (13.3)	11 (12.5)	
2. Direct (infected person) & Indirect Contact (surface, objects such as thermometer)	1 (3.6)	4 (6.7)	5 (5.7)	
3. Airborne Transmission (Aerosol)	0 (0.0)	2 (3.3)	2 (2.3)	
4. All of the above	24 (85.7)	46 (76.7)	70 (79.5)	
4. The main symptom of COVID-19 is ...				0.803
1. High-Grade Fever	1 (3.6)	1 (1.7)	2 (2.3)	
2. Dry Cough	1 (3.6)	1 (1.7)	2 (2.3)	

3. Shortness of Breath	2 (7.1)	7 (11.7)	9 (10.2)	
4. All of the above	24 (85.7)	51 (85.0)	75 (85.2)	
5. The Confirmatory diagnosis for COVID-19 is ...				0.233
1. Rapid Diagnostic Test (RTD)	1 (3.6)	0 (0.0)	1 (1.1)	
2. Reverse Transcription - Polymerase Chain Reaction (RT-PCR)	23 (82.1)	44 (73.3)	67 (76.1)	
3. Chest Computed Tomography (CT) Scan	0 (0.0)	3 (5.0)	3 (3.4)	
4. All of the above	4 (14.3)	13 (21.7)	17 (19.3)	
6. The high-risk individual of COVID-19 infection who develop severe complication are...				0.325
1. Children	0 (0.0)	0 (0.0)	0 (0.0)	
2. Pregnant Women	0 (0.0)	3 (5.0)	3 (3.4)	
3. Elderly (over 65years) & People with underlying medical conditions such as; Diabetes, Heart disease, Kidney disease, Asthma, Cancer, etc.	9 (32.1)	24 (40.0)	33 (37.5)	
4. All of the above	19 (67.9)	33 (55.0)	52 (59.1)	
7. The best Preventive measures for COVID-19 infection is ...				
1. Hand-washing with soap & water	0 (0.0)	3 (5.0)	3 (3.4)	

2. Social distancing and isolation of suspected & confirmed cases	1 (3.6)	4 (6.7)	5 (5.7)	0.402
3. Wearing of Personal Protective Equipment (PPE) while caring for infected patients	0 (0.0)	2 (3.3)	2 (2.3)	
4. All of the above	27 (96.4)	51 (85.0)	78 (88.6)	
8.The best management option for COVID-19 is ...				0.118
1. Supportive & Symptomatic Management	20 (71.4)	33 (55.0)	53 (60.2)	
2. Rehabilitative Management	3 (10.7)	2 (3.3)	5 (5.7)	
3. Palliative Care	2 (7.1)	9 (15.0)	11 (12.5)	
4. Anti-viral Therapy	3 (10.7)	16 (26.7)	19 (21.6)	
9.The most common Complications of COVID-19 is ...				0.105
1. ARDS	2 (7.1)	7 (11.7)	9 (10.2)	
2. Shock	0 (0.0)	1 (1.7)	1 (1.1)	
3. Organ dysfunctions (Acute Kidney Injury, Acute Lung Injury, Acute Liver Injury, Acute	0 (0.0)	9 (15.0)	9 (10.2)	

Cardiac Injury, etc.)				
4. All of the above	26 (92.9)	43 (71.7)	69 (78.4)	
10. Staying apart from other people when you have been exposed to coronavirus disease is called ...				0.639
1. Physical distancing	0 (0.0)	1 (1.7)	1 (1.1)	
2. Isolation	6 (21.4)	10 (16.7)	16 (18.2)	
3. Quarantine	8 (28.6)	24 (40.0)	32 (36.4)	
4. All of the above	14 (50.0)	25 (41.7)	39 (44.3)	

Table 6 profiles the attitudes of participants towards COVID-19 according to their professions. As seen no significant differences were detected in attitudes according to profession except for statement that "I believe that an asymptomatic patient can transmit the virus to others" where about 27% of physicians were neutral compared to less than 15 % for other professions.

Table 6: Attitudes of study subjects according to profession

Attitude question	Physician N (%)	Nurse N (%)	Total N (%)	P value
1. Being a frontline healthcare worker (F-HCW), having a high possibility of exposure, I am always worried about transmitting the virus to my family, friends & society.				0.795
1. Strongly Agree	20 (66.7)	36 (62.1)	56 (63.6)	
2. Agree	8 (26.7)	18 (31.0)	26 (29.5)	
3. Neutral	2 (6.7)	2 (3.4)	4 (4.5)	
4. Disagree	0 (0.0)	1 (1.7)	1 (1.1)	
5. Strongly Disagree	0 (0.0)	1 (1.7)	1 (1.1)	
2. I believe that an asymptomatic patient can transmit the virus to others				0.049
1. Strongly Agree	12 (40.0)	23 (39.7)	35 (39.8)	
2. Agree	8 (26.7)	24 (41.4)	32 (36.4)	
3. Neutral	8 (26.7)	5 (8.6)	13 (14.8)	
4. Disagree	0 (0.0)	5 (8.6)	5 (5.7)	
5. Strongly Disagree	2 (6.7)	1 (1.7)	3 (3.4)	
3. I believe that hand-washing with soap & water is sufficient for infection prevention				
1. Strongly Agree	6 (20.0)	9 (15.5)	15 (17.0)	

2. Agree	7 (23.3)	11 (19.0)	18 (20.5)	0.302
3. Neutral	5 (16.7)	12 (20.7)	17 (19.3)	
4. Disagree	4 (13.3)	18 (31.0)	22 (25.0)	
5. Strongly Disagree	8 (26.7)	8 (13.8)	16 (18.2)	
4.I believe that the vaccine for COVID-19 help in reducing spread of the disease				0.566
1. Strongly Agree	12 (40.0)	26 (44.80)	38 (43.2)	
2. Agree	12 (40.0)	15 (25.9)	27 (30.7)	
3. Neutral	3 (10.0)	11 (19.0)	14 (15.9)	
4. Disagree	3 (10.0)	5 (6.6)	8 (9.1)	
5. Strongly Disagree	0 (0.0)	1 (1.7)	1 (1.1)	
5.I believe that COVID-19 will be eliminate completely				0.193
1. Strongly Agree	2 (6.7)	6 (10.3)	8 (9.1)	
2. Agree	6 (20.0)	18 (31.0)	24 (27.3)	
3. Neutral	9 (30.0)	23 (39.7)	32 (36.4)	
4. Disagree	10 (33.3)	9 (15.5)	19 (21.6)	
5. Strongly Disagree	3 (10.0)	2 (3.4)	5 (5.70)	

Table 7 shows practice of participants according to profession. There are significant differences in all practice areas according to profession.

Table 7: Practice of participants according to their profession

Practice question	Physician N (%)	Nurse N(%)	Total N (%)	P value
1.I am following 5 moments of hand hygiene with 7 steps				0.000
1. Always	7 (23.3)	27 (46.6)	34 (38.6)	
2. Often	1 (3.3)	16 (27.6)	17 (19.3)	
3. Sometimes	11 (36.7)	13 (22.4)	24 (27.3)	
4. Rarely	4 (13.3)	0 (0.0)	4 (4.5)	
5. Never	7 (23.3)	2 (3.4)	9 (10.2)	
2.I use 70% alcohol-based hand sanitizer in the absence of soap & water				0.001
1. Always	5 (16.7)	27 (46.6)	32 (36.4)	
2. Often	10 (33.3)	17 (29.3)	27 (30.7)	
3. Sometimes	9 (30.0)	11 (19.0)	20 (22.7)	
4. Rarely	6 (20.0)	0 (0.0)	6 (6.8)	
5. Never	0 (0.0)	3 (5.2)	3 (3.4)	
3. I wear Personal Protective Equipment (PPE) while caring patient				0.000
1. Always	4 (13.3)	27 (46.6)	31 (35.2)	
2. Often	2 (6.7)	17 (29.3)	19 (21.6)	
3. Sometimes	9 (30.0)	9 (15.5)	18 (20.5)	
4. Rarely	3 (10.0)	1 (1.7)	4 (4.5)	
5. Never	12 (40.0)	4 (6.9)	16 (18.2)	
4. I carefully remove Personal Protective Equipment (PPE) and discarding in the proper place				0.001
1. Always	8 (26.7)	39 (67.2)	47 (53.4)	
2. Often	2 (6.7)	5 (8.6)	7 (8.0)	
3. Sometimes	7 (23.3)	7 (12.1)	14 (15.9)	
4. Rarely	2 (6.7)	3 (5.2)	5 (5.7)	

5. Never	11 (36.7)	4 (6.9)	15 (17.0)	
5. We do isolate of the suspected and/or infected patient				0.005
1. Always	14 (46.7)	42 (72.4)	56 (63.6)	
2. Often	1 (3.3)	8 (13.8)	9 (10.2)	
3. Sometimes	12 (40.0)	7 (12.1)	19 (21.6)	
4. Rarely	2 (6.7)	1 (1.7)	3 (3.4)	
5. Never	1 (3.3)	0 (0.0)	1 (1.1)	

## CHAPTER FIVE

## **CHAPTER 5: DISCUSSION, CONCLUSION, RECOMMENDATION AND LIMITATION**

### **5-1. Discussion:**

This study aimed to assess knowledge, attitude and practice towards COVID-19 infection among physicians and nurses in Banjadeed hospital among 88 participants involving 31 physicians and 57 nurses. To the best of our knowledge, this is the first study investigating KAP towards COVID-19 among physicians and nurses in Banjadeed hospital. The vast majority of the participants were female, nurses, similar to previous study conducted in Nepal [23], female nurses represent the larger proportions in Banjadeed hospital. The greater number of females than males is due to higher female's enrollment in education and health profession. As seen in this study majority of the participants, 86.6% were aged 20 to 40 years. This differs from previous study [23] where majority of the participants were aged 18 to 29 years. More than half of the participants 83% were bachelor degree holders, this is a bit higher compared to the rate of 50.9% from the study [23] this study showed that the highest working experience is less than 2 years which is 70.5% unlike previous study [23] who noted 36.3% participants had less than 5 years of working experience. This study revealed that the primary source of information on COVID-19 infection were from official websites (ministry of health, WHO, and CDC), this differs from previous study where the social media is the main source of information [24]. We think information on official websites is more accurate than information on social media this could misguide physicians and nurses due to public misconceptions regarding COVID-19. Our findings revealed that physician and nurses had good knowledge, attitude and better practice

The study showed that the female participants have a higher knowledge, similar to previous study conducted in Henan, China [25]. Also nurses were reported to have better practice equivalent to previous study [26]. The incubation period of COVID-19 has been reported to be 2-14 days, and this is also agreed by center for disease control and prevention [27]. Most of the participants (85.2%) knew the main symptoms of COVID-19 this is almost similar compared to a rate of 93.7% from previous study [28]. This reflect good knowledge about COVID-19 infection. This study found that

37.5% were aware of high-risk individuals that could develop severe complications which is lower compared to the rate of 90% from study [28].

Most of the participants always fear infecting others, including their family, friends and society [29, 30]. Similarly according to our study most of the participants are having fear of infecting others when asked if they were worried about transmitting the virus to their family, friends and society. However such fear is entirely normal and acceptable. Saqlain et al [31] reported that hand-washing is one of the efficient barriers to disease transmission. In this study we asked the participants if they believed that hand-washing with soap and water was sufficient for infection, 37.5% of the participants chose strongly agree and agreed.

We found that only 35.2% of the participants were using PPEs, which is a bit lower compare to the rate of 56.4% from study [23]. It is due to failure of government to provide available personal protective equipment. It is essential to wear PPE throughout when caring of patients, especially when performing aerosol-generating procedures such as intubation, bagging, and cardio pulmonary resuscitations. Upon further asking if they were following 5 moments of hand hygiene with 7 steps 57.9% of the participants reported always or often. This differs from previous study were 88.4% of participant reported always or often. This results means that our participants have low appropriate hand hygiene practice. However we still believe that hand hygiene is practically the most neglected procedure and usually physicians and nurses do not follow all the moments and steps. Due to negligence some Physicians and nurses failed to follow the standard procedure.

Statistically significant difference regarding knowledge among participants were not observed with gender, this differs from previous study conducted in Nepal where significant difference regarding knowledge among participants were observed with gender [23] our findings showed practice of participants was found to be significantly associated with profession. A similar result was reported by a previous study carried out on KAP among frontline healthcare workers in Nepal [23]

## **5-2. Conclusion:**

- The present study assessed the KAP of physicians and nurses towards COVID-19 infection in Banjadeed hospital. Where majority of the participants were female and nurses.
- Knowledge regarding incubation period of COVID-19 infection, mode of transmission and best preventive measures for COVID-19infection was generally satisfactory.
- Most participants believe that the vaccine for COVID-19 infection helped in reducing spread of the disease.
- Most participants neutrally believe that COVID-19 infection will be eliminate completely.
- Most participants always carefully remove personal protective equipment (PPE) and discarding in the proper place.
- Most of the participants always fear infecting others including their family, friends and society.
- Our findings show that there was significant difference of practice with profession.

### **5-3.Recommendation:**

- We recommend larger sample size when conducting similar research.
- More personal protective equipment should be provided by the government.
- More training and awareness regarding the use of PPE should be arranged on a regular basis to improve practice among physicians and nurses.
- Health authorities should support the COVID-19 infection, raising awareness and create campaign for medical staff and conduct training programs to address any lapses between knowledge, attitude, and practice towards COVID-19 infection.

### **5-4.LIMITATION**

This research is limited to physicians and nurses, the study was conducted in government hospital.The sample size for the study was small. Due to difficulties to acquire similar published literature in Sudan, we depend mainly on researchers from other countries. It's a cross sectional study, so we could not assess the changes.

### **LIST OF REFERENCES**

- 1 Wang C, Horby PW, Hayden FG, Gao GF (2020) A novel coronavirus outbreak of global health concern. *Lancet* 395: 470-473.
- 2 Shigemura J, Ursano RJ, Morganstein JC, Kurosawa M, Benedek DM. Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. *Psychiatry Clin Neurosci* 2020;74:281-282.
- 3 Adhikari SP, Meng S, Wu YJ, Mao YP, Ye RX, Wang QZ, et al. Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: A scoping review. *Infect Dis Poverty* 2020;9:29.
- 4 Aljak ER, Eldigail M, Mahmoud I, Elhassan RM, Elduma A, Ibrahim AA, et al. The first laboratory-confirmed imported infections of SARS-CoV-2 in Sudan. *Transactions of the Tropical Medicine and Hygiene* [internet]. 2020 Dec 15 [cited 2020 Dec 28]; (traa151). available from: <http://doi.org/10.1093/trstmh/traa151> page 22/25.
- 5 John Hopkins University & Medicine. (n.d.). John Hopkins University corona virus resource center - regional data (Sudan). Retrieved from: <https://coronavirus.jhu.edu/region/sudan>
- 6 Ibnouf, M. A. M. (2021). University staff and student protection from COVID-19: strategic measures for teaching and learning in resource-limited setting. *Sudan Journal of Medical Sciences*, vol. 16, no. 1, pp. 1-4.
- 7 Centers for Disease Control and Prevention Coronavirus. [(accessed on 29 March 2020)]; Available online: <https://www.cdc.gov/coronavirus/about/index.html>.
- 8 Wu Y.C., Chen C.S., Chan Y.J. The outbreak of COVID-19: an overview. *J. Chin. Med. Assoc.* 2020;83:217-220. [PMC free article][PubMed] [Google Scholar]
- 9 Gan WH, Lim JW, Koh D. Preventing intra-hospital infection and transmission of Coronavirus disease 2019 in health-care workers. *Saf Health Work.* 2020;11(2):241-3. DOI | PubMed | GoogleScholar | PDF | Weblink.
- 10 Nemati M, Ebrahimi B, Nemati F. Assessment of Iranian nurses' knowledge and anxiety toward COVID-19 during the current outbreak in Iran. *Arch Clin Infect Dis.* 2020;15(COVID-19). DOI | GoogleScholar | PDF | Weblink

- 11 Omrani AS, Shalhoub S. Middle East respiratory syndrome Coronavirus (MERS- CoV): what lessons can we learn? *J Hosp Infect.*2015;91(3):188-96. DOI | PubMed | GoogleScholar | Weblink.
- 12 McEachan R, Taylor N, Harrison R, Lawton R, Gardner P, Conner M. Meta-analysis of the reasoned action approach (RAA) to understanding health behaviors. *Ann Behav Med.* 2016;50(4):592-612. DOI | PubMed |GoogleScholar | Weblink.
- 13 Saqlain M, Munir MM, Rehman SU, Gulzar A, Naz S, Ahmed Z, Tahir A H, Mashhood M. Knowledge, attitude, practice and perceived barriers among healthcare professionals regarding COVID-19: a cross-sectional survey.
- 14 Ali AA, Haq N, Rafiq M, Hussain A, Ismail M, Ahmed T, Ishaque M, Yasmin S. Knowledge, Attitude And Practice Of Health Care Providers Regarding COVID-19In Pakistan. [Pak.j.rehabil.2021;10(1)9105]DOI;10.36283/pjr.zu.10.1/013.
- 15 Farah AM, Nour TY, Obsiye M, Aden MA, Ali OM, Hussein MA, Budul AB, Omer M, Getnet F Knowledge, Attitudes, and Practices Regarding COVID-19 Among Health Care Workers in Public Health Facilities in Eastern Ethiopia: Cross-sectional Survey Study *JMIR Form Res* 2021;5(10):e26980 doi: 10.2196/26980 PMID: 34477559 PMCID: 8489564.
- 16 Francis EnencheEjea, Adamu Saleh Adamu, Samuel Owoicho, Nansen Abraham Maurice, Solomon Jairo, Laura Madukaji, Kenneth O.Okon. Knowledge, attitude, and practice among healthcare workers towards COVID-19 outbreak in Nigeria. <https://doi.org/10.1016/j.heliyon.2020.e05557>.
- 17 Zhang M, Zhou M, Tang F, Wang T, Nie H, Zhang L, et al. Knowledge, attitudes, and practices regarding COVID-19 among health care workers in Henan, China. *J Hosp Infect.* 2020;105(2):183 - 187. [PMC free article] [PubMed] [Google Scholar].
- 18 ShaheenNaaz Ansari, Imran Ansari, MeenaJha, RakshyaUpreti. Knowledge, attitude and practice towards COVID-19 outbreak in doctors and nurses at a tertiary care maternity hospital in Nepal. *Journal of Patan Academy of Health Sciences.* 2020Aug;7(2):23-31.

- 19 Getahun Fetansal<sup>1</sup>, Belachew Etana<sup>2</sup>, Tadesse Tolossa<sup>2</sup>, Melkamu Garuma<sup>3</sup>, Tariku Tesfaye Bekuma<sup>2</sup>, Bizuneh Wakumal, Werku Etafal<sup>1</sup>, Ginenus Fekadu<sup>4,5</sup> and Alemnesh Mosisal. Knowledge, attitude, and practice of health professionals in Ethiopia toward COVID-19 prevention at early phase: [sagepub.com/journals-permissions](http://sagepub.com/journals-permissions).  
<http://dx.doi.org/10.7111/2707/520351032121121010112220> [journals.sagepub.com/home/smo](http://journals.sagepub.com/home/smo).
- 20 Abdulaziz Hussain Albahri, Shatha Ahmed Alnaqbi, Shahad Ahmed Alnaqbi, Asma Obaid Alshaali, and Shaikha Mohammad Shahdoor. Knowledge, Attitude, and Practice Regarding COVID-19 Among Healthcare Workers in Primary Healthcare Centers in Dubai: A Cross-Sectional Survey, 2020. *Front Public Health*. 2021; 9: 617679. Published online 2021 Jul 28. doi: 10.3389/fpubh.2021.617679. PMID: 34512345
- 21 Kamali Haghghi F, Kouhi P, Amini M, Mohammad karimi V, Sepehrpoor M, et al. Knowledge, Attitude, and Practice Toward COVID-19 Among Healthcare Workers in Shiraz, Iran. *Shiraz E-Med J*. 2020;21(12):e108872. doi: 10.5812/semj.108872.21.
- 22 Hussein M, Tahir R.M and Hashim A. Knowledge, attitude and practice of healthcare professionals towards COVID-19 in Omdurman military hospital, Khartoum Sudan. *Journal of medical and biological science research* vol.6 (3), pp.25-28, June, 2020.
- 23 Tamang, N., Rai, P., Dhungana, S. et al. COVID-19: a National Survey on perceived level of knowledge, attitude and practice among frontline healthcare workers in Nepal. *BMC Public Health* 20, 1905(2020). <https://doi.org/10.1186/s12889-020-10025-8>
- 24 Huynh, T. L. (2020). The COVID-19 risk perception: A survey on socioeconomics and media attention. *Economics Bulletin*, 40(1), 758 - 764. Retrieved from
- 25 Zhang M, Zhou M, Tang F, Wang Y, Nie H, Zhang L, et al. Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China. *J Hosp Infect*. 2020;105:183-7
- 26 Anargh V, Singh H, Kulkarni A, Kotwal A, Mahen A. Hand hygiene practices among health care workers (HCWs) in a tertiary care facility in Pune. *Med J Armed Forces India*. 2013;69:54-6.

- 27 Center for Disease Control and Prevention. Symptoms of coronavirus. Available: <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html> Accessed: 18 Mar 2020
- 28 Muhammad Salman, Zia Ul Mustafa, Noman Asif, Haider Abbas Zaidi, Naureen Shehzadi, Tahir Mehmood Khan, Zikria Saleem, Khalid Hussain. Knowledge, attitude and preventive practices related to COVID-19 among health professionals of Punjab province of Pakistan. *J Infect Dev Ctries* 2020; 14(7):707-712. doi:10.3855/jidc.12878
- 29 Asaad A, El Sokyary R, Alzamanan M, El Shafei M. Knowledge and attitudes towards Middle East respiratory syndrome-coronavirus (MERS-CoV) among health care workers in South-Western Saudi Arabia. *East Mediterr Health J.* 2020;26:435-42
- 30 Khan MU, Shah S, Ahmad A, Fatokun O. Knowledge and attitude of healthcare workers about middle east respiratory syndrome in multispecialty hospitals of Qassim, Saudi Arabia. *BMC Public Health.* 2014;14:1281.
- 31 Saqlain M, Munir MM, Rehman SU, Gulzar A, Naz S, Ahmed Z, et al. Knowledge, attitude, practice and perceived barriers among healthcare workers regarding COVID-19: a cross-sectional survey from Pakistan. *J Hosp Infect.* 2020;105:419-23. <https://www.accesscon.com/Pubs/EB/2020/Volume40/EB-20-V40-I1-P64.p>

## ANNEXES

### 1. QUESTIONNAIRE:

#### **Knowledge, Attitude, and Practice Regarding COVID-19 infection among Physicians and nurses in Al-Banjadeed hospital, Khartoum Sudan 2021-2022**

This study aims at evaluating your knowledge, attitude, and practice towards COVID-19 infection. It comprises 4 sections: demographic information, knowledge, attitude, and practice regarding COVID-19 infection. Try answering them to the best of your knowledge. Your participation in this survey is anonymous and all information will be kept confidential.

#### **Part I: Demographic Characteristics of the Participants**

**1. Gender:**

- 1. Male
- 2. Female

**2. Age (years):.....**

**3. Level of Education :**

- 1. Diploma level
- 2. Bachelor degree
- 3. Master's degree or above

**4. Profession:**

- 1. Physician
- 2. Nurse

**5. Department:.....**

**6. Year of working experience:**

- 1. Less than 2 years
- 2. 2 to 5 years
- 3. More than 5 years

**7. Source of information (*multiple answers are possible*):**

- 1. Social media (WhatsApp and Facebook)
- 2. News media( TV, radio, and newspaper)
- 3. Official websites (Ministry of Health, WHO, and CDC)

**Part II. Knowledge, Attitudes & Practices (KAP) of Participants regarding COVID-19**

**Knowledge** (Best single answer is possible): -

- 1. The virus causing the COVID-19 is...**
  - a. SARS-CoV
  - b. MERS-CoV
  - c. SARS-CoV-2
  - d. Ebola Virus
- 2. The incubation period of the COVID-19 is...**
  - a. 2 to 14 days
  - b. 2 to 11 days
  - c. 2 to 21 days
  - d. 7 to 21 days
- 3. The mode of transmission for COVID-19 is...**
  - a. Respiratory droplet
  - b. Direct (infected person) & Indirect Contact (surface, objects such as thermometer)
  - c. Airborne Transmission (Aerosol)
  - d. All of the above
- 4. The main symptom of COVID-19 is ...**
  - a. High-Grade Fever
  - b. Dry Cough
  - c. Shortness of Breath
  - d. All of the above
- 5. The Confirmatory diagnosis for COVID-19 is ...**
  - a. Rapid Diagnostic Test (RTD)
  - b. Reverse Transcription - Polymerase Chain Reaction (RT-PCR)
  - c. Chest Computed Tomography (CT) Scan
  - d. All of the above
- 6. The high-risk individual of COVID-19 infection who develop severe complication are ...**
  - a. Children
  - b. Pregnant Women
  - c. Elderly (over 65years) & People with underlying medical conditions such as; Diabetes, Heart disease, Kidney disease, Asthma, Cancer, etc.
  - d. All of the above

- 7. The best Preventive measures for COVID-19 infection is ...**
  - a. Hand-washing with soap & water
  - b. Social distancing and isolation of suspected & confirmed cases
  - c. Wearing of Personal Protective Equipment (PPE) while caring for infected patients
  - d. All of the above
- 8. The best management option for COVID-19 is ...**
  - a. Supportive & Symptomatic Management
  - b. Rehabilitative Management
  - c. Palliative Care
  - d. Anti-viral Therapy
- 9. The most common Complications of COVID-19 is ...**
  - a. ARDS
  - b. Shock
  - c. Organ dysfunctions (Acute Kidney Injury, Acute Lung Injury, Acute Liver Injury, Acute Cardiac Injury, etc.)
  - d. All of the above
- 10. Staying apart from other people when you have been exposed to coronavirus disease is called ...**
  - a. Physical distancing
  - b. Isolation
  - c. Quarantine
  - d. All of the above

**Attitude** (*Best single answer is possible*): -

1. **Being a frontline healthcare worker (F-HCW), having a high possibility of exposure, I am always worried about transmitting the virus to my family, friends & society.**
  - a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree
2. **I believe that an asymptomatic patient can transmit the virus to others**
  - a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree
3. **I believe that hand-washing with soap & water is sufficient for infection prevention**
  - a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree
4. **I believe that the vaccine for COVID-19 help in reducing spread of the disease**
  - a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree
5. **I believe that COVID-19 will be eliminated completely**
  - a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree

**Practice** (*Best single answer is possible*): -

1. **I am following 5 moments of hand hygiene with 7 steps**
  - a. Always
  - b. Often
  - c. Sometimes
  - d. Rarely
  - e. Never
2. **I use 70% alcohol-based hand sanitizer in the absence of soap & water**
  - a. Always
  - b. Often
  - c. Sometimes
  - d. Rarely
  - e. Never
3. **I wear Personal Protective Equipment (PPE) while caring patient**
  - a. Always
  - b. Often
  - c. Sometimes
  - d. Rarely
  - e. Never
4. **I carefully remove Personal Protective Equipment (PPE) and discarding in the proper place**
  - a. Always
  - b. Often
  - c. Sometimes
  - d. Rarely
  - e. Never
5. **We do isolate of the suspected and/or infected patient**
  - a. Always
  - b. Often
  - c. Sometimes
  - d. Rarely
  - e. Never

**Thank you for taking the time to complete this survey. We are extremely grateful for your contributing your valuable time, your honest information, and your thoughtful su**

**2. ENGLISH INFORMED CONSENT:**

**Informed consent**

**Research conducted by students of Nile University Sudan**

Please read this consent document carefully before you decide to participate in this study. The researchers will answer any questions before you sign this form.

**STUDYTITLE:** Knowledge, Attitude, and Practice Regarding COVID-19 infection among physicians and nurses in Al-Banjadeed hospital, Khartoum Sudan 2021-2022.

**PURPOSE:** To evaluate the knowledge, attitude and practice regarding COVID-19 infection among physicians and nurses in Al-Banjadeed hospital.

**PROCEDURE:** using questionnaire to take information.

**CONFIDENTIALITY:** the records of this research will be kept as confidential as possible. We will not include any information that will make it possible to identify a subject in any paper or presentation we make based on this research. Research records will be stored securely and only researchers and research ethics committee will see them.

**VOLUNTARY PARTICIPATION:** your participation in this study is completely voluntary. There is no penalty for not participating. You may also refuse to answer any of the questions asked.

**RIGHT TO WITHDRAW FROM THE RESEARCH:** you have the right to withdraw from the study at any time without consequences.

**AGREEMENT:** I clarify that the nature of the research has been fully explained to me, that I fully understand the details of my participation and that this consent has been made freely, voluntarily, after a fair and understandable explanation of the nature of the research.

**PARTICIPANT:**.....

**DATE:**.....

### 3. ARABIC INFORMED CONSENT:

#### الموافقة المسبقة

#### بحث اجراه طلاب جامعة النيل

يرجى قراءة وثيقة الموافقة هذه بعناية قبل أن تقرر المشاركة في هذه الدراسة. سيقوم الباحثون بالاجابة على أي أسئلة قبل التوقيع على هذا النموذج.

**عنوان الدراسة:** المواقف والمعرفة والممارسة فيما يتعلق بعدوى فيروس كورونا بين الاطباء والممرضات في مستشفى البان جديد, الخرطوم السودان 2021-2022.

**الهدف:** لتقييم الموقف المعرفي والممارسة فيما يتعلق بعدوى فيروس كورونا بين الاطباء والممرضات في مستشفى البان جديد.

**الطريقة:** باستخدام الاستبيانات لأخذ المعلومات.

**السرية:** سيتم الاحتفاظ بسجلات هذا البحث بسرية قدر الإمكان. لن نقوم بتضمين اي معلومات من شأنها ان تجعل من الممكن تحديد موضوع ما في اي ورقة او عرض تقديمي نقوم به بناء على هذا البحث. سيتم تخزين سجلات البحث بشكل امن ولن يراها سوى الباحثين ولجنة اخلاقيات البحوث.

**المشاركة الطوعية:** مشاركتكم في هذه الدراسة هو طوعي تماما. لا توجد عقوبة لعدم المشاركة. يمكنك ايضا رفض الاجابة على اي من الاسئلة المطروحة.

**الحق في الانسحاب من البحث:** لديك الحق في الانسحاب من الدراسة في اي وقت دون عواقب.

**الموافقة:** اوضح لي ان طبيعة البحث قد تم شرحها بالكامل لي, انني افهم تماما تفاصيل مشاركتي وان هذه الموافقة تمت بحرية تامة وطوعية, وذلك بعد شرح عادل ومفهوم عن طبيعة البحث.

التاريخ: .....

مشاركة: .....

4. STUDY MAP AREA

