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Assessment of Readiness of Radiology Departments in Palestinian Hospitals in Light of the Corona Virus (COVID -19) Pandemic

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Assessment of Readiness of Radiology Departments in Palestinian Hospitals in Light of the Corona Virus (COVID -19) Pandemic

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1442/2021

Dedication

My God, the night is not good without your thanks….. , the day is not pleasant without your mention …. , the moments are not pleasant without your mention… , the hereafter is not perfected without your forgiveness… and heaven is not perfected except with your vision… God Almighty.

To whom God Has entrusted with prestige and dignity…To whom who has taught me to give without waiting… To whom I carry his name with pride…. I ask God to extend your life to see fruits whose harvest has come after long wait… My dearest father.

To my angel in life… to the meaning of love, compassion and dedication…to the smile of life and the abundance of existence … My dearest mother.

To the smile of life and the presence ….My children Baraa and Mohamed.
To impersonate brotherhood, loyalty and giving … My sisters and brothers.

Declaration

I certify that this thesis submitted for the degree of master, is the result of my own research, except where acknowledge, and that this thesis- or any part of the same material-has not been submitted for a higher degree to any other university or institution.

Signature .....

Anas Al-Khateeb

Date: 2 /8/2021

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First, praise and thanks be to God, Glory to Him, Who has supported us to achieve this study. Thanks and praised be to Him for His grace, bounty and generosity.

I would like to take this opportunity to express my deep regards to Dr. Hassein AlMasri for his advice, support, and time which he has spent reviewing my work that provided me valuable suggestions that have had a significant impact and helped in overcoming many obstacles in writing this thesis in the best way.

I would also like to take the opportunity to express my sincere respect and greetings to all who has supported me throughout my career, even if with a kind word.

Anas Khateeb

Abstract

The study aims to identify the measures to be taken by the Medical Imaging departments at hospitals in order to limit the spread of Coronavirus – COVID 19 by analyzing a group of studies related to this topic and where radiography is a critical matter in assessing the severity of the disease and its progression so working physicians in the Medical Imaging department must to be fully aware of the photographers' manifestations related to COVID19. This study sheds light on epidemiological matters and Medical Imaging to detect symptoms of Coronavirus syndromes in addition to identifying the changes that have occurred in the procedures and general safety precautions for the Medical Imaging department employees to be taken with infected people or suspected of having the disease.

The results of the study include populations of radiographers in Palestinian hospitals showed that the degree of readiness of medical imaging departments in Palestinian hospitals in light of the spread of the Coronavirus (COVID-19) were all moderate , The averages ranged between (3.24) and (3.36) which are for (Workers and patients) and (Workplace and equipment).

By reviewing the study literature , the researcher found out the important role of computed Medical Imaging in the early diagnosis of COVID 19. In particular, the typical results that make it possible to identify the disease and distinguish it from bacterial causes of infection and to determine which group of patients may benefit from computerized tomography in addition to the precautions that must be taken when performing the tests to prevent the spread of infection.

The results also showed that there are unprecedented challenges to COVID19 pandemic, the necessity of making changes, providing services and their maintenance and the need for these changes to achieve protection for employees and unaffected patients. The study concluded that the experiences of the countries affected by the pandemic can help guide those who suffer from the effects of the pandemic through guidance for radiographers to help meet the demands of their services.

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Conceptual Definitions

This section provides the main concepts that were used in the study and their operational definitions**.**

Corona virus: Corona viruses are large group viruses that cause disease, and it ranges from the primary virus to increasingly serious diseases such as Middle East Respiratory Syndrome (MERS-Cov).and Severs Acute Respiratory Syndrome (SARS-Cov). Coronavirus is another strain of infection that has not been yet characterized in humans (Rajrs, Abin. 2020).

WHO (2020) identified Corona virus as an infectious disease caused by recently discovered Corona virus and there was no knowledge of the existence of this vairus until the beginning of its appearance in the China city of Wuhan in December 2019 . This virus is considered as one of the latest strains of the Corona virus. It's symptoms include fever, fatigue and dry cough and some patients may suffer from pains, aches, nasal congestion, runny nose, sore throat or diarrhea. This disease is transmitted through secretions that come out from the person or through contact.

Radiography: in light of the corona pandemic, radiography includes making a frontal back image of the chest (Huang, C. et al., 2020).

Chapter One

1.1Introduction

The crises faced by the people of the world and its governments are considered among the difficult issues that affect the daily workflow and routine life of the people as the economy and development have become the everyone's concern , whether an individual or group level. It is seen that countries strive to avoid such crises, whether local , regional or global crises by various possible means available,**(WHO,2020).**so that some of them need others, and as a result of the change occurs in some aspects of life in order to adapt to the new reality of the crises or the problem faced by one state or all of them**(Khaira,2020).**

According to Kheerah & Teeb, the world is living today the consequences of the spread of the Corona virus epidemic that affected various life sectors, as it caused a great shock to the global economy in addition to affecting global growth rates towards sharply low and negative rates in 2020. Because the crisis is not the only one the world witnesses, Corona pandemic has proven that it is uncontrollable because it begins to spread in all parts of the world leaving its shocking effects on the health sector without a clear time for recovery, and no clear time vision in which this pandemic is likely to end **(Khaira,2020).**

The corona virus outbreak, also known as COVID-19, was first reported in December 2019 in the city of Wuhan, Hubei province, located in the central part of China **(WHO,2020),**Wuhan has a population of approximately 11.9 million people**.**

COVID-19 is a rare respiratory disease which can be deadly due to massive alveolar damage and progressive respiratory failure. It was thus declared a global pandemic by the World health organization (WHO). On April 30,

2020; more than 3,209,984 confirmed cases, 985,957 recovered cases and 222,057 deaths had been reported worldwide(Nigeria Centre for Disease Control (NCDC) **(WHO,2020).**

The novel corona virus was found to be caused by SARS-CoV-2 and has been shown to have phylogenetic similarities as well as pattern of manifestation like that of the severe acute respiratory syndrome (SARS) caused by SARS-CoV-1. In an earlier research conducted in China, in January 2020 by Bastola et al., reported that among 41 patients that were confirmed positive to the COVID- 19, half of them had underlying diseases such diabetes (20%), cardiovascular disease (15%), and hypertension (15%). Their symptoms were mainly fever (98%), cough (76%), and fatigue (44%). Other severe complications included respiratory distress syndrome (29%), RNAaemia (15%), acute cardiac injury (12%), and other secondary infections. Of the total infected patients, 32% were admitted to an Intensive Care Unit (ICU) and the death rate was 15%**(WHO, 2020).**

According to WHO (2020), the disease appears accompanied by respiratory symptoms of varying degree and severity. Also, it may require and advanced level of support for the respiratory system**.**

The diagnoses of COVID- 19 is currently confirmed by laboratory examination through the identification of viral RNA in the polymerase chain reaction test using the reverse transcription enzyme RT- PCR **(WHO,2020).**

Diagnostic examination of patients with suspected or potential virus in cases where the RT-PCR Test is not available, or its results are delayed and initially negative with symptoms indicating infection and imaging was also considered a complement to the clinical evaluation and laboratory

standards used in the management of patients already diagnosed with COVID- 19 **(Hung M,2020)**.

According to **(Covid.ncdc,2020)**, the epidemic has changed the dynamics of human life due to its spread and a lack of a treatment protocol in addition to the increasing number of cases of of the infection . This has necessitated changes in the degree of readiness of different sectors of the health care system and the radiography or medical imaging sciences is one of the professions that are at the forefront of dealing with this pendamic. So that the focus of this study is the first line radiographers who facilitate the use of diagnostic using chest X- Ray computerized tomography (CT) scans and ultrasound disease conditions **(United Nations,2020).**

Radiography in diagnosing COVID-19 includes obtaining a pleural chest radiograph where the extent of the virus spread is evaluated in three areas: the upper is above the carina, the middle (half of the carina space of the remaining lung) and the lower (the lower half of the carinal space of the remaining lung. Also, the classification of anomalies on the scale consisting 3 points: normal attenuation, ground attenuation and uniformity which indicate lung opacity within which the margins of the pulmonary blood vessels are not clear **(Covid.ncdc,2020).**

According to United Nation (2020) , the ability of the Palestinian health system to cope with an expected increase in number of patients remains severely deficient due to long- term challenges and critical shortage , particularly, in Gaza Strip. As in the case of other places, the most vulnerable groups are whose conditions may warrant intensive medical care which include elderly people suffering from high blood pressure, lung disease, kidney failure, cardiovascular disease and diabetes. People living in refugee camps and other poor and densely populated areas across the

occupied Palestinian territory face a great risk of infection due to overcrowding and poor sanitation systems **(United Nations,2020).**

As for equipments, the UN (2020), report added that the items most urgent and in shortage now that are indispensable to contain the spread of epidemic and reduce the risk of death among vulnerable groups which include: personal protective equipments and other basic supplies used to prevent and control of infection, consumables and medicines necessary to treat shortness of breath, ventilators, heart monitors, recovery vans, portable X-Ray machines and equipments for testing COVID-19. Hospitals across the occupied Palestinian territory are facing a shortage of specialized intensive care unit staff**(United Nations,2020).**

Because Medical Imaging Technologists are a major force working in producing diagnostic images, they are at great risk of acquiring and transmitting infection due to their face to face contact with cases and patients' contact with imaging equipments and supplies. So, it becomes necessary to assess the changes that have occurred as a measure of how radiographers are prepared to confront COVID- 19**(Covid.ncdc,2020).**

Accordingly, the current study examines the readiness of medical imaging departments in Palestinian hospitals in light of the spread of the Corona virus (COVID-19) and sheds light on this importance from point of view of medical imaging in Palestinian hospitals.

1.2 Statement of Problem

In Palestine, like the rest of the world, several similar measures have been taken to limit the spread of this pandemic which led to negative economic consequences that need a period of time to recover from , and because the phenomenon began as a new phenomenon, it put groups and individuals at a loose to deal with it considering the spread of the epidemic as a new era that requires individuals to be able to deal with each other in a new and different way for the sake of their safety, the safety of their lives , and limiting the spread of this epidemic . The health care staff mainly medical imaging team represents the first front line in addressing this epidemic and its consequences. So, the measures and changes that have been taken must be observed first in this vital sector of the country in order to reduce the spread of this disease since Medical Imaging Departments in this sector are in direct contact with the virus and with those infected with it.

Thus, the problem of the study is determined in answering its main question, which is:

What is the degree of readiness of Medical Imaging Departments in Palestinian hospitals in light of the spread of the COVID-19?

1.3 Significant of the Study

The importance of this study comes from the importance of the topic of the spread of Corona virus which is now the concern of the world and its effects have cast a shadow over all aspects of life which include work, economy, health, education, ..etc. Thus, the health sector is the main pillars hospitals, impact of COVID-19 on them can be important. The theoretical importance of the current study is that it is one of the first studies – according to the researcher- that was conducted on the readiness of medical imaging departments in Palestinian hospitals in light of the spread of the (COVID-19) in order to suggest some recommendations that may contribute to uncovering some aspects of this topic and lying the foundations for future studies which will examine this topics from other sides .

1.4 Questions of the Study

The study answers the following main question :

What is the degree of readiness of medical imaging departments in Palestinian hospitals in light of the spread of the COVID-19?

And the other sub- questions:

1. What is the degree of changes in the workplace and equipment in the Palestinian hospitals in light of the spread of the COVID-19?

2. What is the degree of changes in the workers and patients in the Palestinian hospitals in light of the spread of the COVID-19?

3. What is the degree of changes in policies and procedures in the Palestinian hospitals in light of the spread of the COVID-19?

4. Do the attitudes of MIT in medical imaging departments in the Palestinian hospitals differ regarding to readiness of medical imaging departments in Palestinian hospitals in light of the spread of COVID-19 according to the differences in the variables of (gender, qualification, experience, age, hospital type and hospital location)?

1.5 Objectives of the Study

The study tried to achieve the following objectives:

1. Identifying the readiness of medical imaging departments in Palestinian hospitals in light of the spread of the COVID-19.

2. Identifying the changes in the medical imaging departments and its equipment in the Palestinian hospitals in light of the spread of the COVID-19.

3. Identifying the changes in the medical imaging departments workers and patients in the Palestinian hospitals in light of the spread of the COVID-19.

4. Identifying the changes in policies and procedures in the Palestinian hospitals in light of the spread of the COVID-19.

5. Suggesting some appropriate recommendations related to the subject that medical imaging departments in Palestinian hospitals will benefit from in light of the spread of the COVID-19.

1.6 Hypotheses of the Study

The study tests the following hypotheses:

1. There are no statistical significant differences on (α=0.05) between study sample means about the readiness of medical imaging departments in

Palestinian hospitals in light of the spread of the COVID-19 attributed to the variable of gender.

2. There are no statistical significant differences on (α=0.05) between study sample means about the readiness of medical imaging departments in Palestinian hospitals in light of the spread of the COVID-19 attributed to the variable of qualification .

3. There are no statistical significant differences on (α=0.05) between study sample means about the readiness of medical imaging departments in Palestinian hospitals in light of the spread of the COVID-19 attributed to the variable of experience.

4. There are no statistical significant differences on (α=0.05) between study sample means about the readiness of medical imaging departments in Palestinian hospitals in light of the spread of the COVID-19 attributed to the variable of age.

5. There are no statistical significant differences on (α=0.05) between study sample means about the readiness of medical imaging departments in Palestinian hospitals in light of the spread of the COVID-19 attributed to the variable of hospital type.

6. There are no statistical significant differences on (α=0.05) between study sample means about the readiness of medical imaging departments in Palestinian hospitals in light of the spread of the COVID-19 attributed to the variable of hospital place.

Chapter Two

Literature view

2.1 Introduction

In light of the widespread and severe global health threat to the whole world what is supposed to be a decade of diligent work for sustainable development has turned into a decade of urgent action to save lives and repair live hoods. The Coronavirus has sparked a crisis that reminds us that a strong and effective on public sector is the first line defense against threats to entire systems. The epidemic is expanding and the world is already suffering under mounting conflicts and health pressures.**(AL-Talafha&AL-Manawer,2020).**

To contain the growing threats emanating from spread of the epidemic, everyone around the world should work together to reduce transmission and reduce the death toll, thinking about others, especially the most vulnerable and working to protect the**(WBG,2020)**. Coronavirus- COVID 19 now no boundaries **(WHO,2020).**

It severely affected the lives of all people in various social, economic and political relations reaching health and education**(AL-Talafha&AL-Manawer,2020).** This is a global emergency that calls for global emergency response. A response that does not aim to save the world's industries or financial markets, but rather thousands of lives. Any rescue initiative to eradicate this pandemic must be centered around the well-being of people and solidarity of the foundations of society. In addition, to enable governments to resume work to establish a safe and healthy world that does not neglect anyone **(AL-Talafha&AL-Manawer,2020).**

COVID-19 is just a family of widespread corona viruses known to cause diseases ranging from mild symptoms such as the common cold in humans to more severe symptoms such as Middle East Respiratory Syndrome (MERS), severe acute respiratory Syndrome (SARS). Covid -19 is the disease caused by the emerging corona virus called Corona-SARS-2 virus. The World Health Organization has discovered this emerging virus for the first time on December 31, 2019 after a group of viral pneumonia cases were reported in Wuhan, China **(Ncdc.org,2020).**

What Is The Emerging Corona- Virus (COVID- 19)?

Everyone talks about Coronavirus disease and wherever you look, you find information about the virus and how to protect yourself from it.**(Weizmann science,2021),** Knowing the facts that it is essential to being properly prepared to protect yourself and your loved ones. Unfortunately , there is a lot incorrect information. The spread of incorrect information during health crises makes people unprotected and vulnerable to disease and spread fear and stigmatization among them .What we must know is what this virus is**(Weizmann science,2021).**

Covid -19 is a new Coronavirus (COVID) originated from a new strain of corona virus called Corona virus disease 2019 (COVID-19) which first appeared in Wuhan, China and the English name is derived as follows: C and O are the first two letters of the word (virus) . D is the first letter of the word disease in English (Disease) **(Weizmann science,2021).**Previously, this diseases was called 2019 novel. In short, the COVID-19 virus is a new one that related to the same family of viruses to which the virus that causes Severe Acute Respiratory Syndrome (SARS) and some types of common cold**(Virus Taxonomy,2020).**COVID-19 circulates among the general

public of the human community several names, most notably: Coronavirus / Corona Virus**(De Groot RJ&others,2011).**

How Does COVID-19 Spread?

SARS-CoV-2 can spread from person to person through droplets produced during coughing or breathing during close contact with an infected person. The infection can also occur without direct contact that is when these droplets land on surfaces around the infected person and the other person touches theses objects or surfaces and then touches the eyes, nose or mouth. This the reason why it is important to stay one or two meters away from the sick person as stated by the World Health Organization in its protocols to confront the Pandemic**(www.unicef.org,2021).** Giving that some individuals do not develop symptoms during infection with the virus, a physical distance from one to two meters must be observed regardless of whether the other person appears sick or not **(UNRWA,2020).**

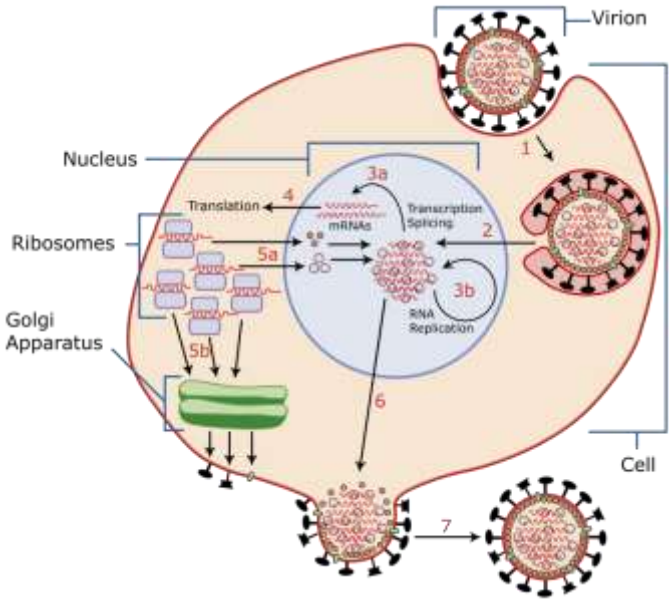

Fig 1: Virus Life Cycle**(Roberts RJ,2001).**

Figure 1 above shows how the virus reproduces, which is the formation of biological viruses during the infection process in the target host cells.

Viruses must first get into the cell before viral replication can occur. Through the generation of abundant copies of its genome and packaging these copies, the virus continues infecting new hosts. Replication between viruses is greatly varied and depends on the type of genes involved in them. Most DNA viruses assemble in the nucleus while most RNA viruses develop solely in cytoplasm**(Roberts RJ,2001).**

Viruses multiply only in living cells. The host cell must provide the energy and synthetic machinery and the low molecular-weight precursors for the synthesis of viral proteins and nucleic acids **(Brooks, M.D, et al,2013).**

The virus replication occurs in seven stages, namely; Attachment, Entry, Uncoating, Transcription / mRNA production**,(Cobb,2015).**Synthesis of virus components, Virion assembly and Release (Liberation Stage).**(Roberts RJ,2001)**.

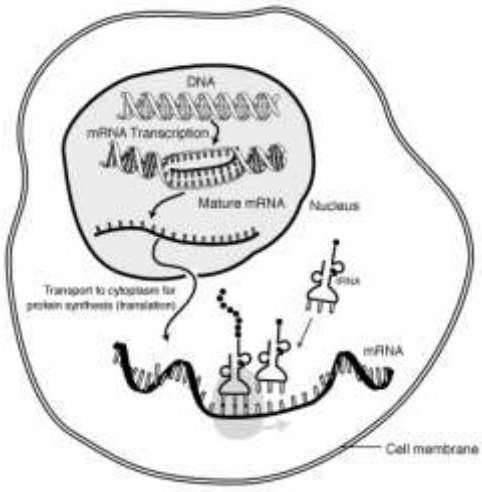

Fig 2: Life Cycle" of an mRNA in a eukaryotic cell**(Cobb,2015).**

Measures to prevent infection include frequent hand washing, social distancing (maintaining adequate distance between people) and avoiding touching the face (**ElsevierBV,2020**). It is recommended to wear medical masks for those suspected of carrying the virus and for people who care for them while the general public is not advised to wear them. Regarding the

current time, both of Center for Disease Control (CDC) and World Health Organization **(CDC,2020)**,**(WHO,2020).**now recommend that masks should be worn to the general public in public places although both organizations reported exactly the opposite at the start of the outbreak. The change may have confused the general public about the usefulness of masks. But health experts say the evidence is becoming clear that masks can help prevent the spread of the pandemic and that more people who wear masks, **(Nine Bai,2020).**

2.2 Symptoms of the Covid-19 Virus

Until a person realizes that he/ she has Covid-19 disease, some symptoms may appear on him/ her which are as follows**(www.gov,2020).**

The most common symptoms are:

1. Fever.

2. Dry cough .

3. Stress.

The most common symptoms that may affect some patients include: **(www.annahar.com,2020).**

1. Loss of taste and smell.

2. Nasal congestion , conjunctivitis,(also known as red eyes).

3. Sore throat.

4. Headache.

5. Muscle or joint pain.

6. Various types of rashes.

7. Nausea or Vomiting.

8. Diarrhea, and,

9. Tremors or dizziness.

Symptoms are usually mild, and some people become infected but only have very mild symptoms or no symptoms at all**(www.gov,2020).**

The symptoms that indicate that a person is suffering from severe COVID-19 are the following:**(www.mayoclinic.org,2020).**

1. Shortness of breath.

2. Lack of appetite.

3. Confusion or disorientation.

4. Persistent pain of a feeling of pressure in the chest.

5. High temperature (More than 38 C.).

6. Irritability.

7. Decreased level of consciousness (sometimes associated with seizures).

8. Anxiety.

9. Depression, and,

10. Sleep disorders.

There are complications that are more severe, serious and rare : strokes, encephalitis, delirium, or delirium or nerve damage without prior warning which warns that the patient is in the stage of death**(www.who.int,2020).**

Accordingly, COVID-19 virus must be taken seriously and vigilance is required. While disease caused by COVID-19 infection is generally mild in

most infected people, it can cause serious illness with about 1 in 5 people who need hospital care. Therefore, it is very natural for people to worry about how the Covid-19 outbreak is affecting them and those around them**(www.who.int,2020).**

2.3 The Course of the Disease and Complications

Disease can follow three primary paths. First: it can pass as a mild illness similar to common upper respiratory disease**,** The second possibility is pneumonia which is an infection in the lower part of the respiratory system. The third and most dangerous pathway is the rapid progression of the disease into acute respiratory distress syndrome.**(WHO,2020).**

Basically, advanced age is associated with an elevation of the Dimer-D Value (an indicator indicating the activation of the thrombotic reaction to circulatory system) above 1 mg /ml upon admission to patient and an elevation of the SOVA (clinical measure that estimates the function of a number of metabolic systems and organs such as the lungs, heart, liver and kidneys with the increased risk of disease progression **(www.owlapps.net,2020).**

In addition, high levels of Interleukin -6, the highly sensitive cardiac enzyme Troponin I, lactic Dehydrogenase and Lymphocyte deficiency in blood counts are associated with more severe forms of the disease resulting from the virus **(AL-Fatafta,2020).**

COVID-19 complications include sepsis and heart complications (heart failure or heart rhythm disturbances) which are more likely to occur in those with pre-existing heart diseases **(AL-Fatafta,2020).** In addition, 90% of patients with pneumonia caused by the virus were hyper-coagulable **(AL-Fatafta,2020).**

2.4 Diagnosis

The World Health Organization (WHO) recently published several protocols for novel coronavirus tests that use the Reverse Transcriptase Polymerase Chain Reaction (RRT-PCR) test **(WHO, 2020).**The test may be performed on samples from the respiratory system or blood. Results generally appear within few hours to days **(www.gov.il, 2020).**

The Chinese scientists were able to isolate a strain of Corona virus and publish the genetic sequence so that laboratories around the world can independently develop tests for Polymerase Chain Reaction (PCR) to detect infection with the virus**(www.iaea.org, 2021).**

The diagnostic recommendations issued by Zhongan Hospital of Wuhan University suggested methods of diagnosing the infection based on clinical signs and epidemiological severity **(Zhong Nan Shan, 2020).**

These criteria included identifying people with at least two of the following symptoms in addition to a history of travel or contact with an infected person: fever, radiological signs of pneumonia, stable or lack of leucytes or low lymphocyte count **(www.iaea.org, 2021).**

A study published**(Medical Society, 2020)**.by a team from Tongji Hospital in Wuhan on February 26, 2020 showed that CT scan has higher sensitivity (98%) than PCR (71%) False negative results can occur as a result of a failed laboratory kit or due to problems of sample extraction or testing. False positive results are relatively rare **(Clinical Pathology, 2020).**

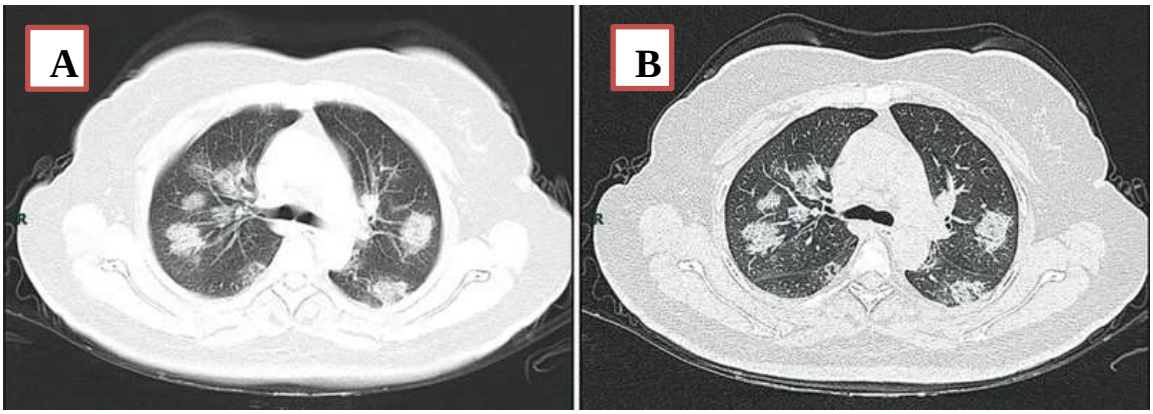

Fig3: Image A is computed tomography of a person with COVID-19. Image B is HRCT.

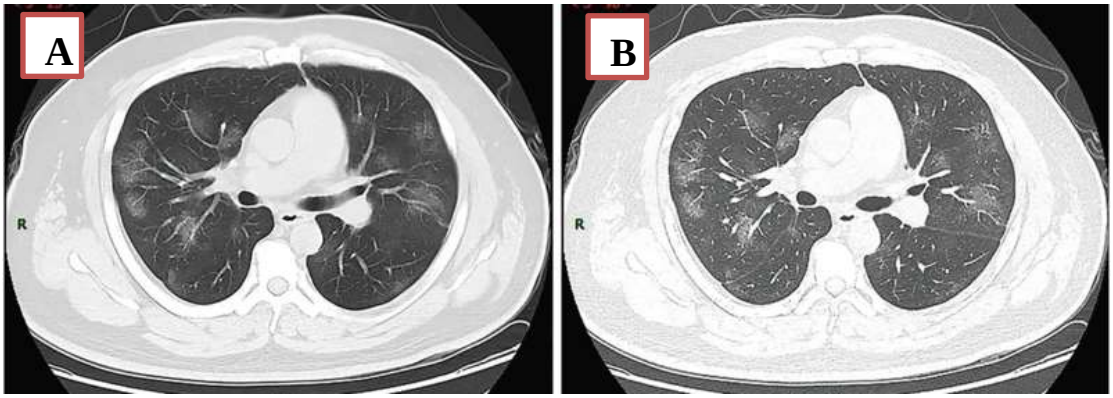

Fig 4: Image A is a computed tomography of a rapid stage of COVID-19 disease. Image B is a HRCT.

2.5 The Global and Local Health Sector in Light of the Spread of COVID-19.

The new Corona virus has left cracks in the most advanced health systems around the world. The emergence of the Corona virus has led to the collapse of the current health system which is based on confronting endemic disease and epidemic that are easy to predict and their course**(WBG,2020).** The ideal quality of health service provided in hospitals is no longer the decisive indicator. In improving health care and preserving the lives of patients , all countries of the world, including countries that have advanced health systems and superior health care, have

found themselves in danger of new type for which there is no specific treatment or vaccine and the course of its spread with an determined end date **(WBG,2020).**

It is found that the current health system role was limited to trying to reduce risks caused by the virus through providing health care that deals with the repercussions of the virus such as heat retarders, ventilators, immune- modulators and face masks **(WHO,2020).**

2.5.1 The Impact of Corona on Health Systems Internationally (China and the United States).

China and the Unites States faced great repercussions due to the spread of the Corona virus in these two countries and the mutual accusations war between the two parties contributed to maximizing theses effects **(Sansa, N.A, 2020).**

2.5.1.1 China Classification as a Source of the Pandemic.

The impact of the emergence of the new Corona virus in an animal market in Wuhan, China on China reputation, especially, since it is not the first time for the emergence of Corona in Chin, the SARS virus appeared in China also in, 2002, and it become possible for new viruses to appear in the future in the same way and this also indicates the weakness of the states' ability to monitor markets which makes it vulnerable to emerging virus outbreak **(Fakhri, 2020) .**

The city of Wuhan suffered from great pressure on the hospitals which didn't exceed seven hospitals and therefore, its capacity was not able to deal with the continuous increase in the rate of injuries .

The hospitals also suffered from shortage of medical teams which promoted the Chinese authorities to inaugurate a large field hospital.

Wuhan has a capacity of 1000 beds and it has also sent 450 physicians with extensive experience in dealing with viruses such as (SARS-Ebola) **(Business Insider,2020).**

In light of this suffering, the impact of this on the spread of infections among health workers, among the78,800 infected people in China during the outbreak of the epidemic. More than 3,300 workers in the Chinese health sector were exposed to infection with the Coronavirus which means that the infection rate among medical teams exceeded 4% of the number of infections and 13 medical personnel have died including Dr. Li Wenliang , an ophthalmologist who was monitored by Chinese authorities after warning his colleagues about the outbreak of the Coronavirus **(Business Insider,2020).**

In a study of 138 COVID -19 patients inside Wuhan hospitals, it is found that there is 29% of the total number of cases within 40 cases from health sector workers **(Jama Network, 2020) .**

2.5.1.2 The United States

It is considered one of the highest infection rate location in the world in terms of population , as the United States topped the map of Corona statistics in both in terms of the number of cases which reached 2 million and nearly 300 thousands after the expiration of 20 days of June which is the highest of rate of infection with the virus in the world and number of deaths reached 220 thousands deaths which is the highest rate in the world and represents 9.5% of the the total number of infection **(Hillary Hoffer,2020).**

These repercussions are indication of weakness of the American health system and its inability to reduce the number of cases as well as the high

death rate is an indication of the poor level of medical services and the delay in dealing with the affected cases **(Hillary Hoffer, 2020).**

In light of this large number of cases of COVID-19 virus, these numbers affected the spread of infections among health workers . As by the end of last May, the number of infections among health sector workers reached more than 60,000 cases while the number of deaths among the workers in the health sector has nearly 300 deaths **(Mario Tama, 2020)**.

2.5.2 The Local Level, Palestine

It is found that the reality of the Palestinian health system is not isolated from the pandemic that has affected the world. Whereas, the spread of Covid–19 virus in Palestine was confirmed on March 5, 2020 **(www.aa.com).**When the Palestinian Ministry of Heath stated that the cases were first discovered in a hotel in Bethlehem and a group of Greek tourists visited the hotel in late February and later on two of them were diagnosed with the virus **(Ed- Batsh, 2020).**

In order to confront the pandemic, the government set several principles on which its strategy is based first on preventing the epidemic from reaching Palestine, this was not ,of course, then limiting the spread **(Ghanem,2021).**

The government sought to make this strategy flexible in making decisions focused on preventing the spread of the epidemic**(Ghanem,2021).**In order to achieve the principle of transparency, the Ministry of Health Worked in cooperation with the Palestinian government to provide the public with accurate and continuous information about the epidemic in order to reassure citizens and prevent rumors **(Abdel-Ghani,2020).**Accordingly, WHO praized the performance of the Palestinian government that has taken advanced measures to combat the spread of COVID-19 virus. Research

confirmed that the government has taken procedures exceed what is internationally recommended **(Ghanem,2021).**

When the Government has formulated its strategy in combating the pandemic, it sought to be linked to implementation mechanisms in line with the standards crisis management so that the Palestinian Ministry of Health planned and updated epidemiological maps on a daily basis and examined samples at the national level on a daily basis and worked to prepare quarantine areas to treat and follow –up cases **(www.ochaopt.org).** It worked to prepare health protocols to deal with cases and their surroundings and take the necessary measures to equip the medical staff including public safety measures **(www.site.moh.ps).**

The Palestinian government , as other world governments, was surprised at the second confrontation which began more fiercely and with faster spread**(www.ochaopt.org).** The Palestinian Ministry of Health did not think that it would face such a challenge, especially in light of difficult conditions that that the Palestinian Authority suffers from. Such a challenge requires huge capabilities , greater resources and large medical staff in addition to well- developed infrastructure**(Ghanem,2021) .**

However, the Palestinian Ministry of Health faced the challenge with efficiency that the world witnessed **(www.ochaopt.org).** and the crisis was managed with great wisdom and tremendous efforts made by health staffs on a basis of a coherent plan aimed to increase test capacity to reach 20,000 samples, increasing hospital capacity by 200 additional beds in addition to disseminating guidance and awareness massages showing preventative measures and how effectively protect against virus infection **(www.site.moh.ps).**

2.6 Medical Imaging Departments in Hospitals in Light of the Spread of COVID - 19 Virus.

In times of disasters , epidemics and pandemics , schools and universities are distrusted , countries announce curfews, air traffic and travel stop, markets stagnate and warning shouts rise :" Stay at home .. and protect yourself." Cries that may work with some , but not for health sector workers doctors , nurses radiographers and administrators find themselves in the front lines " On the line of fire" **(Nicole Jauert,2020).**

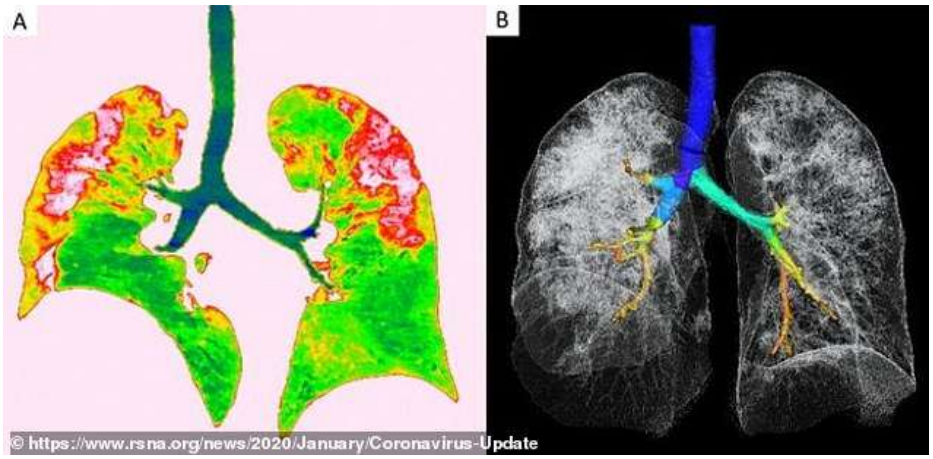

Fig 5: infected lung with the emerging corona virus **(pubs.rsana.org).**

The infection that doctors and workers may be exposed to is one of the important health issues that outweigh other sectors.

The reasons are endless including that they move between patients and thus they may cause the disease to be transmitted to others who are not infected with it, they might return to their families and may cause in transmitting the disease to them. In addition to the fact that the causes of hospital infection may sometimes be characterized by virulence and resistance to antibiotics and to the fact that they may fall victim to a disease trying to search for a cure which makes protecting health care workers from infection an utmost necessity **(Nicole Jauert,2020).**

The world celebrates the efforts of health care workers ors in combating Corona (COVID-19) whose role can't be denied. There are unknown solders who work in silence in the middle of the battle and the straggle in Corona war is not straightforward without them ,rather they are the basis of the defense forces that stand for diagnosis , protection and infection control **(Rafael Grossi, 2020).**An important division in the health sector is the medical and radiological imaging department – one of the most vital departments in hospitals- and in light of COVID- 19 pandemic, the world is now relying on the COVID-19 diagnosis protocol on chest CT scans as x-rays help health professionals understand what is happening inside the human body. On assessing and understanding the Covid -19 disease caused by the newly discovered Corona virus , Oliver Pele , a radiologist at IAEA tells :" Diagnostic imaging is a window into the body "**(Gawart N,2020).**

It has allowed us to detect complications such as skin lesions, pneumonia, or blood clots in the lungs. Every day , we learn new things about the virus and its effect on human body , while we discover new signs and symptoms associated with COVID- 19 that have not been seen before even when a person otherwise appears without symptoms **(Gawart N,2020).**

Medical imaging has been used all over the world for more than a hundred years to diagnose, monitor and help treat many health conditions and although there are range of imaging techniques available , the three most commonly used methods to assess the condition of COVID-19 patients are chest X-ray and computed tomography, computerized chest and lung ultrasound **(www.health.gov.il).**

Chest X ray

Xrays are type of radiation. Many people know that there are used in the diagnosis of bone fractures or dental examination and to assess the status of COVID-19**(Nicole Jauert,2020).**X – rays for a chest are taken to look at the lung tissue. This test is used for patients suffering from respiratory symptoms caused by COVID-19**(Nicole Jauert,2020).**It is also used to monitor disease progression and make decisions about treatment and follow up such as hospitalizing a patient or sending a patient with severe symptoms for a CT scan **(Zenoni/Division).**

Fig 6: X- ray of a patient with pneumonia due to a COVID-19 infection signs **(AL-Bara Radiology, 2021).**

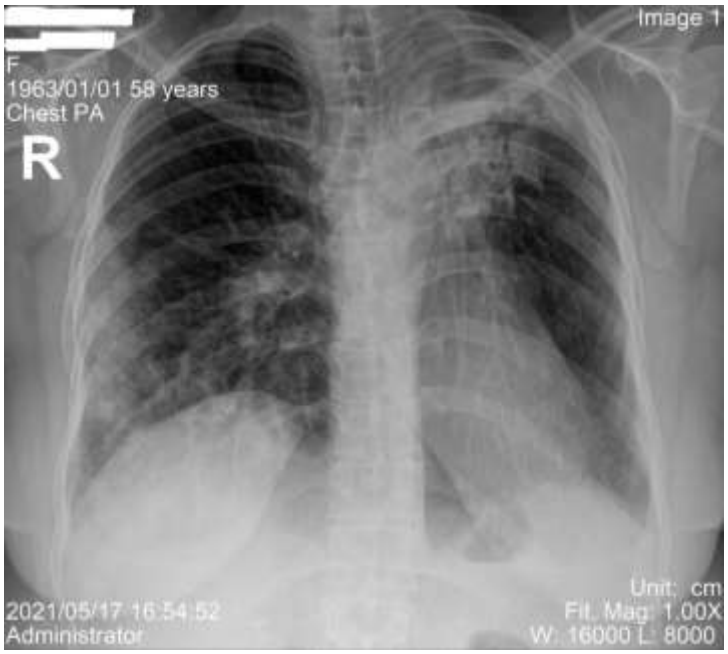

Fig 7: An X- ray of a patient with pneumonia due to a COVID - 19 infection signs, especially the right lung**(AL- Bara Radiology,2021).**

Examination of the Chest by Computed Tomography

Computerized Tomography (CT) scan is a collection of multiple X-ray images. The CT scan machine rotates around the patient and quickly sends X-rays across the body from multiple angles **(www.mayoclinic.org).** A ring of hundreds of specialized detectors around the body tracks the patterns of the X-rays.

This is then subjected to processing by a powerful computer attached to the device to create images constructed from ultra-thin body sections up to 0.3mm wide often in 3D . For a chest CT scan which is the area of the body that is usually examined when evaluating a case of COVID- 19 .Hundred of images are created to cover the entire chest area **(www.mayoclinic.org).**

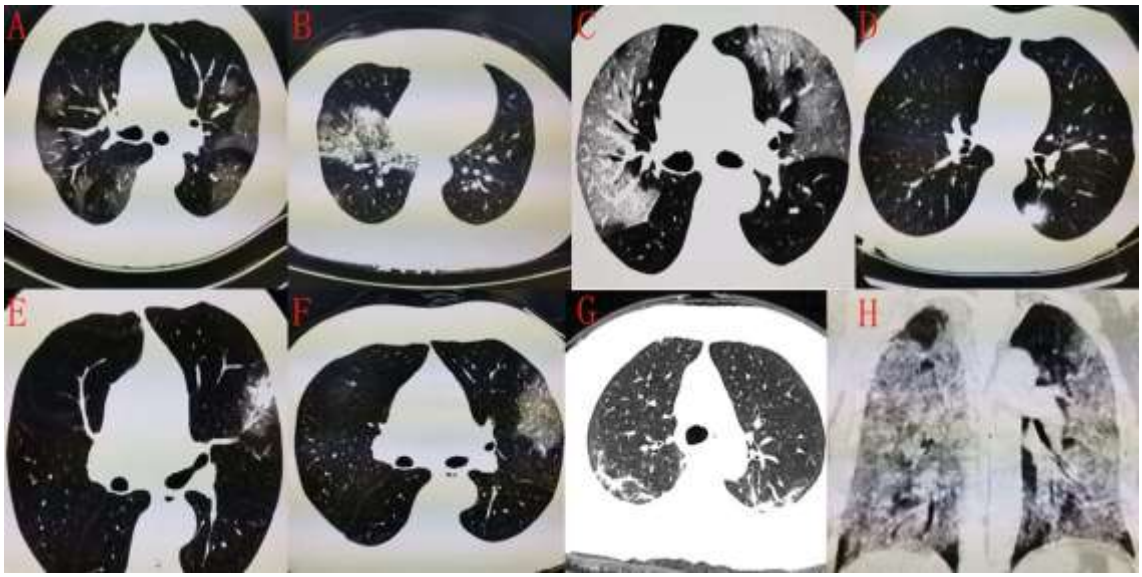

Fig 8:CT scan of patient with pneumonia due to COVID -19 infection , both lungs are effected **(https://www.ncbi.nlm.nih.gov/ /PMC7063273).**

Ultrasound

Ultrasound machines use high – frequency sounds waves instead of radiation to create the image (**American University, 2018).** A probe connected to an ultrasound machines sends and receives millions of sound waves through the target body which in the case of COVID-19 patients is usually the lungs. When the waves hit a boundary, such as the boundary between soft tissue and fluid or soft tissue and bone, they bounce off the probe. Probe tracks the distance and intensity of the echo and translate this into images **(www.siemens-healthineers.com).**

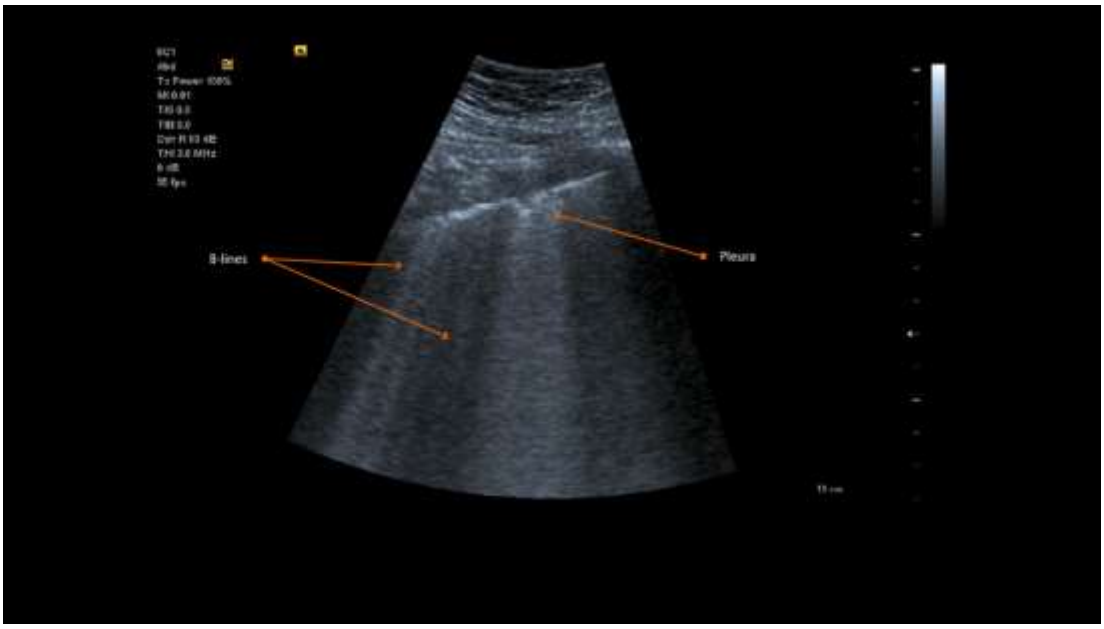

Fig 9: Lung Ultrasound in Patients with Coronavirus COVID-19 Disease **(www.siemens-healthineers.com).**

2.7 Preparation of the Health Care Workers in MI Departments of Doctors and Technicians at the Level of Palestinian Hospitals.

A specialized MIT is responsible for imaging, setting the correct patient position and changing the X-ray image receptor. He/ she deals directly with suspects or those already diagnosed to follow up the lung **(Abdel-Ghani,2020).**

There are advices published by World Health Organization for health sector workers in order to take care of their health including getting enough rest between shifts and after working hours paying attention to healthy nutrition, exercising and communicating with family and friends if not direct contact due to work conditions letting it be via the phone and social media platforms **(Abdel-Ghani,2020).**

On the national level, Palestinian hospitals have not been able to rehabilitate radiology and medical imaging departments or increase the equipment and tools required to confront the Corona pandemic**(Abdel-Ghani,2020).**

However, it tied to work as much as possible to impose policies and procedures while in hospitals, especially since the locations of the radiology and medical imaging departments in most hospitals, whether on the Palestinian or international levels are located in the basements lacking the elements of ventilation or the ingress of sunlight which stimulates the Covid-19 virus to being and living in fertile environment helps it to spread and reproduce **(Abdel-Ghani,2020).**

Fig 10:A Photo of a MIT at Governmental Hospital

Among the policies and procedure that the Ministry of Health has deliberately and insisted upon in applying those to employees with their presence in hospitals are: **(www.site.moh.ps).**

1. The Ministry held several sessions explaining how to deal with suspected or infected Covid-19 patients.

2. The Ministry worked to provide the supplies needed by the medical staff including the radiologist whether from a protective suit or face masks and medical gloves.

3. It also increased medical sterilizers and disinfectants in order to work on the continuous sterilization of hospitals and the treating medical staff themselves.

4. Working to set up indicative panels to reduce friction with the medical staff by the auditors. These instructions were adopted on how to assemble and move between departments, the importance of spacing between all references and adherence to the prevention tools of face masks and hand gloves.

In terms of medical imaging departments in particular, the following measures have been taken:**(www.moh.gov.ps).**

1. Commitment to a protective suit for any procedure, either for X-ray or CT scan procedure.

2. Not to dispense with face mask throughout the period of stay inside the Medical Imaging department with wearing the gloves of the hand and replacing it from time to time.

3. Focusing on disposing of the waste of the medical imaging departments whether from consumer tools or staff protection tools with all safety and knowing how to get rid of this waste according to the protocol of the Palestinian Ministry of Health.

4. Working to sterilize the radiography room after every patient's use whether infected or suspected.

5. Forcing all to wear a face mask and not to remove it after leaving the hospital.

6. Mechanisms have been imposed to receive, centered on removing some seats from the waiting hall in order to achieve accountability for the spacing between auditors.

7. Washing hands frequently after every procedure and using sterilization inside the room while the patient is in and out of the imaging room.

The ability of the Palestinian health system to cope with an expected increase in the number of patients remains severely deficient due to long term challenges and critical shortages especially in the Gaza. As is the case in the other places, the most vulnerable groups whose condition may warrant intensive medical care include elderly people, people suffering hypertension, lung disease, kidney failure, cardiovascular disease and diabetes. People living in refugee camps and other poor and densely populated areas across the occupied Palestinian territories face a greater risk of infection due to overcrowding and poor sanitation system.

The items most urgent in shortage now that are indispensable to contain the spread of epidemic and reduce the risk of death among vulnerable groups include: personal protective equipment and other essential supplies to prevent and control infection, equipment, consumables and drugs necessary to treat shortness of breath, ventilators, heart monitors, resuscitation carts, portable X-ray machines and equipment needed to conduct tests for COVID-19 infection. Hospitals across the occupied Palestinian territories are facing a shortage of specialized intensive care unit staff **(www.moh.gov.ps).**

2.8 Previous Studies

Huang et al (2020) study about the battle against Coronavirus disease 2019 (COVID-19): emergency management and infection control in a Medical Imaging department sets up emergency management and sensing control teams. The finding showed that none of the staff of the Medical Imaging department were infected with COVID-19. Strategic planning and

adequate protections can help protect patients and staff against a highly infectious disease while maintaining function at a high-volume capacity.

Kooraki,(**2020**) conducted a study about Coronavirus (COVID-19) Outbreak: What the Department of Radiology Should Know. The study stated that in December 2019, novel coronavirus (COVID-19) pneumonia emerged in Wuhan, China. Since then, this highly contagious. Findings of coronavirus syndromes, with a focus on the reported imaging findings of NCIP. Moreover, the authors review precautions and safety measures for Medical Imaging department personnel to manage patients with known or suspected NCIP. Implementation of a robust plan in the Medical Imaging department is required to prevent further transmission of the virus to patients and department staff members**.**

Politi and Balzarini (2020), conducted a study about the Medical Imaging department during the COVID-19 pandemic: a challenging, radical change the fundamental changes which aimed to provide a brief description of the modifications and safety measures that have been taken in the Medical Imaging department in Italian hospitals aimed to prevent the spreading of the disease within the hospital, separate ED, wards, and intensive care units (ICUs) were created for COVID-19 positive (or suspected positive) and non-COVID-19 patients, with medical and paramedical staff.

All the personal protective equipment (PPE) was available when facing a suspicious or confirmed COVID-19 patient. In case of interventional radiological or neuro radiological procedures, the following PPEs are always available: double sterile gloves, Ffp2/3 masks, no sterile

waterproof gown, and sterile surgical gown, adhering mask for eye protection.

For radiological intervention, two pathways were organized. First, an operating room equipped with C-arm, with a negative pressure environment, was set up in an isolated COVID-19 area to perform surgical, interventional radiology and hemodynamics procedures in COVID-19 patients. Second, non-COVID patients underwent interventional radiological procedures, in the “clean” angiographic suite in the medical imaging departments. For urgent endovascular thrombectomy in either COVID-19 patients or suspected COVID-19 patients presenting acute stroke, the dedicated biplane neuro-angiographic suite was employed and decontaminated immediately after each procedure. The study concluded that the great cooperation between radiologists, radiographers, nurses and other service providers is critical in achieving the required safety measures within hospital Medical Imaging department. Radiography also plays an active role in the outbreak of the Corona pandemic which is a health and economic emergency that represents a challenge to the entire health care system**.**

Ravel (2020) carried out a study about COVID-19 patients and the Medical Imaging department – advice from the European Society of Radiology (ESR) and the European Society of Thoracic Imaging (ESTI) aims to present the main imaging features, and the role of CT scan in the early diagnosis of COVID-19, describing, in particular, the typical findings which make it possible to identify the disease and distinguish it from bacterial causes of infection, and to define which category of patients may benefit from CT imaging. The precautions that must be taken when performing scans to protect radiologists and technologists from infection will be described. The organizational measures that can be taken within Medical Imaging department in order to cope with the influx of patients,

while continuing to manage other emergency and time-sensitive activity (e.g. oncology, other infectious diseases etc**.**

Bien Peng Tan, Kheng Choon Lim, (2020) study about Radiology Preparedness in the Ongoing Battle against COVID-19: Experiences from Large to Small Public Hospitals in Singapore aimed to identify the readiness of radiography in the ongoing battle with Covid 19 in small and large public hospitals in Singapore by examining the level of health care provision and the capacity of beds of six hospitals in Singapore as well as through monitoring distributed among workers concluded that the Corona pandemic is an unprecedented challenge, but fortunately Singapore was able to benefit from the experiences of SARS and swine flu , thus put in place a strong system supported by trained and experienced staff in managing medical care efforts, protecting and isolating infected cases and the sustainability of those efforts **.**

Chapter Three

Methodology

3.1 Sampling Population , Instrumentation and Procedure

The sample consisted of 207 radiographers working in medical imaging departments in Palestine. The study population consisted of all radiographers and the researcher has sent the study tool on-line , only 207 responded to the questionnaire using stratified random sampling method. The study sample is varied in terms of gender, qualification, years of experiences, age, hospitaltype and location of hospital.

3.2 Instrumentation

To achieve the objectives of the study, the researcher used a 25-item questionnaire for MIT sample by using previous literature and the researcher's own experience in the field of health professions. The questionnaire consisted of two sections; the first focused on demographic data of the respondents such as gender, qualification, years of experiencs, age, hospital type and location. The second consisted of three domains of the radiographers' attitudes towards readiness of medical imaging departments in Palestinian hospitals in light of the spread of Covid- 19 changes in work place and facilities, changes in workers and patients and changes in procedures and policies.

The scores of responses to each item were calculated according to a five-point Likert scale for the first three domains responses in which strongly agree =5 points, agree =4 points, neutral = 3,disagree = 2 points and strongly disagree = 1 point .

3.3 Validity of the Questionnaire

To ensure the validity of the questionnaire, it was rated by a jury of experts in the field of health professionsat Al- Quds University. The respondents' comments and the jury's suggestions were taken into consideration to modify and improve the questionnaire's content and wordings by omitting, adding or rephrasing items bringing the number of items remained 25 items.

3.4 Reliability of the Questionnaire

The reliability of the questionnaire was calculated through Cornbach Alpha formula and the following table1, illustrates the results:

Table (1): Cornbach Alpha test for the study tools

Study Tool	Items	Cornbach Alpha
Changes in Work Place and Facilities	10	89.0
Changes in Workers and Patients	6	89.8
Changes in Procedures and Policies	9	91.0
Total	25	96.7

Results in table (1) illustrate that Cronbach Alpha coefficient ranged from (88.2) to (91.0) for the domains of (**Changes in Work Place and Facilities**) and (**Changes in Procedures and Policies**) . Cronbach Alpha coefficient for the total degree was (96.7) . These values are excellent and acceptable for the purpose of the study. In order to evaluate the results of Cronbach Alpha, the following scale is used as demonstrated in the table 3:

Table (2): Cronbach alpha Internal Consistency (Tavakol.M,2011).

Cronbach alpha	Internal Consistency
$\alpha \geq 0.9$	Excellent
$0.7 \leq \alpha < 0.9$	Good
$0.6 \leq \alpha < 0.7$	Acceptable

3.5 Procedure

The final draft of the questionnaire was distributed to study sample online It took about five weeks for the instrument to be distributed, collected, and returned to the researcher. The total number of the returned questionnaires was 207 .

3.6 Study Variables

This study included the following variables:

Demographic Variables:

1. **Gender**: it includes two categories (males and females)

2. **Qualifications**: it includes four categories, 1) Diploma, 2) BSc, 3) MCs and 4) Ph.D.

3. **Years of experience**: it includes three categories (1- 5 years, 6 – 10 years and More than 10 years).

4. **Age**: it includes three categories 20-35, 36-45and more than 46).

5. **Hospital type:** it includes three categories (Governmental, private and NGO).

6. **Hospital location**: it includes two categories (West Bank and Gaza).

Dependent Variables: which are the study sample responses on the readiness of medical imaging departments in Palestinian hospitals in light of the spread of COVID- 19 with the domains of (changes in work place and facilities, changes in workers and patients and changes in procedures and policies).

3.7 Statistical Procedures

The data collected were analyzed using (SPSS) to provide answers to the hypotheses and questions of the study, the researcher used the following:

1. Means, frequencies, standard deviations, and percentages in order to estimate the relative percentage of every item.

2. T-tests for Independent Samples to test the assumptions related to the variables of gender and hospital location.

3. One-Way Analysis of Variance (ANOVA) to test years of qualification, experience, age and kind of hospital.

4. Cronbach Alpha is used to test the consistency of the items in the questionnaire.

3.8 Data Analysis

The data collected were analyzed using (SPSS, 17) to provide answers to the questions and hypothesis of the study.

Accordingly, the researcher used the following scale to represent the estimation level of sample responses. In order to limit the length of the cells of the five-point Liker scale (minimum and maximum limits , range has been calculated (5-1=4), divided on the correct length of the (4/5=0.80) and added to the lowest value of the scale (1) in order to reach the highest limit of this cell . Cell limits became as in Table (3):

Table (3): Scale for representing the estimation level of sample responses.

Mean	Percentage %	Estimation Level
4.20 and more	84.0 % and more	Very High
3.40-4.19	68.0 – 83.8 %	High
2.60-3.39	52.0 – 67.8 %	Moderate
1-80- 2.59	36.0 – 51.8 %	Low
Less than 1.8	35.9% and less	Very Low

Table 3 shows scale for representing the estimation level of sample responses.

Chapter Four

4.1 Results

This study aimed at identifying radiographers attitudes towards readiness of medical imaging departments in Palestinian hospitals in light of the spread of Coronavirus (Covid- 19). It also aimed at identifying the effect of several variables on the responses of the study sample . To accomplish the aims of the study, the researchers analyzed the data of the questionnaire in the accordance with the study questions and the results were as follows:

Table (4) : Distribution of Sample According to Study Independent Variables

Variable	Class	Frequency	Percentage %
Gender	Female	159	76.8
	Male	48	23.2
Qualification	Diploma	18	8.7
	BSc	160	77.3
	MSc	26	12.6
	Ph.D	3	1.4
Years of Experience	<5 years	56	27.1
	6 – 10 years	72	34.8
	>10 years	79	38.2
Age	20-35	89	43.0
	36-45	88	42.5
	≥ 46	30	14.5
Hospital type	Governmental	124	59.9
	Private	69	33.3
	NGO	14	6.8
Hospital Location	West Bank	141	68.1
	Gaza	66	31.9
Total		207	100.0

4.2 Results related to Study Questions.

Q1-What is the degree of readiness of MI departments in Palestinian hospitals in light of the spread of the Corona virus COVID -19?

To answer this question, the researcher used means, standard deviations and estimation level of the study tool domains as shown in table5.

Table (5):Means, Standard Deviations and estimated level of readiness of medical imaging departments in Palestinian hospitals in light of the spread of the Corona virus (Covid-19) in descending order.

Rank	No. in the Questionnaire	Domains	Means	Standard deviations	Percentage %	Estimated level
1	1	**Changes in Work Place and Facilities**	**3.36**	**0.74**	67.2	Moderate
2	3	**Changes in Procedures and Policies**	**3.26**	**0.76**	65.2	Moderate
3	2	**Changes in Workers and Patients**	**3.24**	**0.83**	64.8	Moderate
Total			3.26	0.76	65.2	Moderate

Table (5) shows that the total degree for the radiographers' attitudes towards readiness of medical imaging departments in Palestinian hospitals in light of the spread of Coronavirus (Covid- 19) was (3.26) which suggest moderate level of response . The highest mean was given to the domain Changes in Work Place and Facilities. The lowest was for the domain (Changes in Workers and Patients).

Results related to the first study Question.

Q2- What is the degree of changes in the workplace and its equipment in Palestinian hospitals in light of the spread of the Corona virus Covid-19?

To answer this question, the researcher used means, standard deviations and estimation level of the study tool domains as shown in following table 6.

Table (6): Means, Standard Deviations and estimated level of the first domain (workplace and its equipment) in descending order according to the mean.

Rank	No. in the Questionnaire	Item	Means	Standard deviations	Percentage %	Estimated level
1.	5	Special containers have been designated for the disposal of masks, uniforms and gloves	3.88	0.91	77.6	High
2.	8	Running water was placed over a hand wash basin in exposure rooms and increased hand washing procedures	3.74	1.01	74.8	High
3.	1	A change has occurred to the department's working mechanisms	3.63	0.99	72.6	High

4.	9	The correct sequence of taking off and putting on Person Protection Equipments has been trained	3.48	1.15	69.6	High
5.	4	There is now a separate entrance to enter and exit the department from the rest of the other departments	3.39	1.11	67.8	Moderate
6.	2	Equipments and materials required for sterilization and protection have been adequately provided	3.36	1.17	67.2	Moderate
7.	3	There is sterilization of the area and equipments for each patient after imaging	3.28	1.11	65.6	Moderate
8.	6	The department provided additional disinfectants and protective equipments	3.22	1.13	64.4	Moderate

9.	7	The equipments are being whipped off after use by each patient or covered with disposable wrappers during the tests.	2.87	1.16	57.4	Moderate
10.	10	There are now special uniforms to work within the departments	2.75	1.25	55.0	Moderate
Total			**3.36**	**0.74**	67.2	Moderate

Table (6) shows that the total degree for the first domain (workplace and its equipments) was (3.36) which suggest moderate level of response . The highest mean was given to the item (Special containers have been designated for the disposal of masks, uniforms and gloves).The lowest was for the item (There are now special uniforms to work within the departments).

Results related to the second study Question.

Q3- What is the degree of changes in workers and patients in the Palestinian hospitals in light of the spread of Covid-19?

To answer this question, the researcher used means, standard deviations and estimation level of the study tool domains as shown in table7.

Table (7):Means , Standard Deviations and estimated level of the second domain (Changes in Workers and Patients) in descending order according to the mean.

Rank	No. in the Questionnaire	Item	Means	standard deviations	Percentage %	Estimated level
1	2	There was a change in patients reception and waiting to reduce crowded in the Ward	3.72	1.08	74.4	Moderate
2	1	Courses were held and leaflets were distributed explaining how to deal with patients with Covid-19	3.32	1.10	33.4	Moderate
3	4	All patients were required to wear masks and other protective equipments	3.27	1.06	65.4	Moderate
4	5	There has been training on prevention and dispont of masks, uniforms and gloves	3.19	1.28	63.8	Moderate
5	3	Infected and non-infected cases are reported before being brought to the department	3.16	1.17	63.2	Moderate
6	6	periods for new patients to stay in imaging room is now defined	2.97	1.14	59.4	Moderate
		Total	**3.24**	**0.83**	64.8	Moderate

Table (7) shows that the total degree for the second domain (**Changes in workers and patients**) was (3.24) which suggest moderate level of response. The highest mean was given to the item (There was a change in patients reception and waiting to reduce crowded in the Ward).The lowest was for the item (periods for new patients to stay in imaging room is now defined).

Q4- What is the degree of changes in Procedures and Policies in the Palestinian hospitals in light of the spread of COVID-19?

To answer this question, the researcher used means, standard deviations and estimation level of the study tool domains as shown in Table 8.

Table (8):Means , Standard Deviations and estimated level of the third domain (Changes in Procedures and Policies) in descending order according to the mean.

Rank	No. in the Questionnaire	Item	Means	standard deviations	Percentage %	Estimated level
1	9	Signboards for COVID -19 safety protocols have been increased	3.53	1.06	70.6	High
2	2	Coordination has been made with the workers regarding the policies that must be followed in light of COVID -19 and to take your observations	3.35	1.07	67.0	Moderate
3	1	The system of work and shifts have been changed in order to reduce friction between workers	3.32	1.10	66.4	Moderate
4	6	It is forbidden to approach the department for those who have no official job	3.30	1.22	66.0	Moderate
5	4	There is now a follow- up to implement the	3.29	1.05	65.8	Moderate

		instructions				
6	3	There is a policy to reduce patient contact	3.29	1.14	65.8	Moderate
7	5	There has become a clear mechanism for radiography that differs from before the pandemic	3.09	1.13	61.8	Moderate
8	7	The mechanism of sending pictures and samples to doctors and radiographers has changed	3.05	1.21	61.0	Moderate
9	8	Ventilation and cleaning procedures increased in the department	2.98	1.24	59.6	Moderate
Total			**3.26**	**0.76**	65.2	Moderate

Table (8) shows that the total degree for the third domain (**Changes in procedures and policies**) was (3.26) which suggest moderate level response of mean was given to the item (Signboards for COVID -19 safety protocols have been increased).The lowest was for the item (Ventilation estimation .

Q5- Do the attitudes of radiographers in medical imaging departments in the Palestinian hospitals differ regarding to readiness of medical imaging departments in Palestinian hospitals in light of the spread of (COVID-19) according to the differences in the variables of (gender, qualification, experience, age , hospital type and location)?

To answer this question, the following hypotheses have been tested as the following:

4.3 Results related to Study Hypotheses

4.3.1.H1 There are no statistical significant differences on (α=0.05) between study sample means about the readiness of medical imaging departments in Palestinian hospitals in light of the spread of COVID -19 attributed to the variable of gender.

To analyze the first hypotheses, Independent sample t-tests was used and results are shown in Table (9).

Table (9): Independent sample t test result of readiness of medical imaging departments in Palestinian hospitals in light of the spread of COVID-19 due to gender:

Domain	Gender	N	Mean	S. D	t	Sig.*
Workplace and its equipments	Female	159	3.36	0.73	0.161	0.872
	Male	48	3.35	0.79		
Changes in Workers and Patients	Female	159	3.22	0.88	1.118	0.265
	Male	48	3.06	0.90		
Changes in Procedures and Policies	Female	159	3.24	0.82	-0.053	0.958
	Male	48	3.25	0.87		
Total degree	Female	159	3.28	0.75	0.463	0.644
	Male	48	3.22	0.80		

***. The mean difference is significant at the 0.05 level.**

Table(9) shows that there are no statistical significant differences in three domains and the total degree between males and females.

4.3.2.H2 There are no statistical significant differences on (α=0.05) between study sample means about the readiness of medical imaging departments in Palestinian hospitals in light of the spread of Covid-19 attributed to the variable of qualification.

To analyze the second hypotheses, One Way ANOVA test was used and the Tables (10) and (11) show the results:

Table(10): Frequencies, means and standards deviations of the readiness of medical imaging departments in Palestinian hospitals in light of the spread of Covid-19 attributed to the variable of qualification for the total degree.

Qualification (Total Degree)		N	Mean	S.D
The readiness of radiography departments in Palestinian hospitals	Diploma	18	3.40	0.75
	BSc	160	3.27	0.76
	MSc	26	3.18	0.85
	Ph.D.	3	2.99	0.09
	Total	207	3.26	0.76

Table (10) shows that there are differences in means of the levels of the qualification. In order to show these differences, One Way ANOVA test was used and Table (11) shows the results.

Table (11): Results of One Way ANOVA of the readiness of medical imaging departments in Palestinian hospitals in light of the spread of Covid-19 attributed to the variable of qualification

Readiness of medical imaging departments in Palestinian hospitals	Experience	Sum of Squares	df	Mean Square	F	Sig.
Workplace and its equipments	Between Groups	1.001	3	0.334	0.597	0.617
	Within Groups	113.349	203	0.558		
	Total	114.350	206			
Changes in Workers and Patients	Between Groups	1.383	3	0.461	0.580	0.629
	Within Groups	161.294	203	0.795		
	Total	162.677	206			
Changes in Procedures and Policies	Between Groups	1.082	3	0.361	0.513	0.674
	Within Groups	142.597	203	0.702		
	Total	143.678	206			
Total	Between Groups	0.734	3	0.245	0.411	0.745
	Within Groups	120.710	203	0.595		
	Total	121.444	206			

*** The mean difference is significant at the 0.05 level.**

Table (11) shows that the significant value was (0.745) which is more than (0.05). Therefore, no statistical significant differences were found in the three domains according to qualification.

4.3.3.H3 There are no statistical significant differences on (α=0.05) between study sample means about the readiness of medical imaging departments in Palestinian hospitals in light of the spread of the Corona virus (Covid-19) attributed to the variable of experience.

To analyze the third hypotheses, One Way ANOVA test was used and the Tables (12) and (13) show the results:

Table(12): Frequencies, means and standards deviations of the readiness of medical imaging departments in Palestinian hospitals in light of the spread of (COVID-19) attributed to the variable of experience for the total degree.

Experience (Total Degree)		N	Mean	S.D
The readiness of radiography departments in Palestinian hospitals	<5 years	56	3.15	0.84
	6 – 10 years	72	3.36	0.57
	>10 years	79	3.26	0.86
	Total	207	3.26	0.76

Table (12) shows that there are differences in means of the levels of the **experience**. In order to show these differences, One Way ANOVA test was used and Table (13) shows the results

Table (13): Results of One Way ANOVA of the readiness of medical imaging departments in Palestinian hospitals in light of the spread of the Corona virus (Covid-19) attributed to the variable of experience

Readiness of medical imaging departments in Palestinian hospitals	Experience	Sum of Squares	df	Mean Square	F	Sig.
Workplace and its equipments	Between Groups	0.783	2	0.391	0.703	0.496
	Within Groups	113.567	204	0.557		
	Total	114.350	206			
Changes in Workers and Patients	Between Groups	0.736	2	0.368	0.464	0.630
	Within Groups	161.940	204	0.794		
	Total	162.677	206			
Changes in Procedures and Policies	Between Groups	3.757	2	1.878	2.739	0.067
	Within Groups	139.921	204	0.686		
	Total	143.678	206			
Total	Between Groups	1.454	2	0.727	1.236	0.293
	Within Groups	119.991	204	0.588		
	Total	121.444	206			

*** The mean difference is significant at the 0.05 level.**

Table(13) shows that the significant value was (0.745) which is more than (0.05). Therefore, no statistical significant differences were found in the three domains according to qualification according to experience.

4.3.4.H4 There are no statistical significant differences on (α=0.05) between study sample means about the readiness of medical imaging departments in Palestinian hospitals in light of the spread of the Corona virus (Covid-19) attributed to Participant age.

To analyze the fourth hypotheses, One Way ANOVA test was used and the Tables (14) and (15) show the results:

Table(14): Frequencies, Means and Standards Deviations of the readiness of medical imaging departments in Palestinian hospitals in light of the spread of Covid-19 attributed to the variable of age for the total degree.

Age (Total Degree)		N	Mean	S.D
The readiness of radiography departments in Palestinian hospitals	25-35	89	3.30	0.76
	36-45	88	3.25	0.70
	≥ 46	30	3.20	0.95
	Total	207	3.26	0.76

Table (14) shows that there are differences in means of the levels of the **age**. In order to show these differences, One Way ANOVA test was used and Table (15) shows the results

Table (15)Results of One Way ANOVA of the readiness of medical imaging departments in Palestinian hospitals in light of the spread of Covid-19 attributed to the variable of age

Readiness of medical imaging departments in Palestinian hospitals	Exp	Sum of Squares	df	Mean Square	F	Sig.
Workplace and its equipments	Between Groups	0.113	2	0.057	0.101	0.904
	Within Groups	114.236	204	0.560		
	Total	114.350	206			
Changes in Workers and Patients	Between Groups	0.345	2	0.172	0.217	0.805
	Within Groups	162.332	204	0.796		
	Total	162.677	206			
Changes in Procedures and Policies	Between Groups	0.867	2	0.433	0.619	0.539
	Within Groups	142.811	204	0.700		
	Total	143.678	206			
Total	Between Groups	0.233	2	0.116	0.196	0.822
	Within Groups	121.212	204	0.594		
	Total	121.444	206			

*** The mean difference is significant at the 0.05 level.**

Table(15) shows that the significant value was (0.822) which is more than (0.05). Therefore, no statistical significant differences were found in the three domains according to qualification according to age.

4.3.5.H5 There are no statistical significant differences on (α=0.05) between study sample means about the medical imaging departments in Palestinian hospitals in light of the spread of COVID-19 attributed to the type of hospitals.

To analyze the fifth hypotheses, One Way ANOVA test was used and the Tables (16) and (17) show the results:

Table(16):Frequencies ,Means and Standards Deviations of the readiness of medical imaging departments in Palestinian hospitals in light of the spread of COVID-19 attributed to the variable of type of hospitals for the total degree

Kind of hospital (Total Degree)		N	Mean	S.D
The readiness of radiography departments in Palestinian hospitals	Governmental	124	3.31	0.80
	Private	69	3.25	0.67
	Charitable hospital	14	2.94	0.85
	Total	207	3.26	0.76

Table (16) shows that there are differences in means of the levels of the type of hospital. In order to show these differences, One Way ANOVA test was used and Table (17) shows the results

Table (17):Results of One Way ANOVA of the readiness of medical imaging departments in Palestinian hospitals in light of the spread of Covid-19 attributed to the variable of type of hospital

Readiness of radiography departments in Palestinian hospitals	Exp	Sum of Squares	df	Mean Square	F	Sig.
Workplace and its equipments	Between Groups	1.000	2	0.500	0.900	0.408
	Within Groups	113.349	204	0.556		
	Total	114.350	206			
Changes in Workers and Patients	Between Groups	3.838	2	1.919	2.465	0.088
	Within Groups	158.838	204	0.779		
	Total	162.677	206			
Changes in Procedures and Policies	Between Groups	1.414	2	0.707	1.014	0.365
	Within Groups	142.264	204	0.697		
	Total	143.678	206			
Total	Between Groups	1.760	2	0.880	1.500	0.226
	Within Groups	119.685	204	0.587		
	Total	121.444	206			

*** The mean difference is significant at the 0.05 level.**

Table(17) shows that the significant value was (0.226) which is more than (0.05). Therefore, no statistical significant differences were found in the three domains according to qualification according to type of hospital.

4.3.6.H6 There are no statistical significant differences on (α=0.05) between study sample means about the readiness of medical imaging departments in Palestinian hospitals in light of the spread of COVID-19 attributed to the variable of hospital location.

To analyze the sixth hypotheses, Independent sample t tests was used and the Table (18) shows the results:

Table (18): Independent two sample t test result of readiness of medical imaging departments in Palestinian hospitals in light of the spread of COVID-19 due to hospital location:

Domain	Location	N	Mean	S. D	t	Sig.*
Workplace and its equipments	West Bank	141	3.36	0.73	0.061	0.952
	Gaza	66	3.3606	0.77		
Changes in Workers and Patients	West Bank	141	3.17	0.84	-0.394	0.694
	Gaza	66	3.22	0.98		
Changes in Procedures and Policies	West Bank	141	3.24	0.84	-0.199	0.842
	Gaza	66	3.26	0.81		
Total degree	West Bank	141	3.26	0.75	-0.205	0.838
	Gaza	66	3.28	0.80		

*** The mean difference is significant at the 0.05 level.**

Table (18) shows that there are no statistical significant differences in three domains and the total degree between males and females.

Chapter Five

5.1 Discussion

It is noticed that degree of readiness of medical imaging departments in Palestinian hospitals in light of the spread of (**COVID**-19) was "moderate". The highest mean was given to the domain (Changes in Work Place and Facilities The lowest was for the domain (Changes in Workers and Patients) is a new phenomenon that affect the world and the health sector in Palestine as in other countries is not ready to face this pandemic. Procedures for confronting this disease have been taken in fast and they need time to reach a good level

The results show that the total degree for the first domain (workplace and its equipments) was (3.36) which suggest moderate level of estimation . The highest mean was given to the item (Special containers have been designated for the disposal of masks, uniforms and gloves).The lowest was for the item (There are now special uniforms to work within the departments).

This could be due to the fact that preparing workplace and its equipments to confront the disease needs time, equipment's, efforts and especial preparing in addition to the limited potentialities that the Palestinian health sector has.

The results show that the total degree for the second domain (**Changes in Workers and Patients**) was (3.24) which suggest moderate level of estimation. The highest mean was given to the item (There was a change in patients reception and waiting to reduce crowded in the ward).The lowest was for the item (periods for new patients to stay in imaging room is now defined).

This could be due to the fact that preparing health stuff was in hurry and it needs time to reach the accepted level due to the sudden spread of COVID-**19**.

The results also show that the total degree for the third domain (**Changes in Procedures and Policies**) was (3.26) which suggest moderate level of mean was given to the item (Signboards for Covid -19 safety protocols have been increased).The lowest was for the item (Ventilation and cleaning procedures increased in the department).

This could be due to the fact that preparing procedures for confronting Covid-19 was in hurry and it needs time to reach the accepted level due to the sudden spread of **COVID-19**.

Statistically significant differences do not exist in the study sample gender. The significance level is (0.644). This is due to the fact that males and female workers have the same skills in dealing with the procedures that have been taken to confront Corona virus (COVID-19) .

Also, statistically significant differences do not exist in the study sample qualification. The significance level is (0.745.). This is due to the fact that workers who are from different levels of education have similar skills in dealing with the procedures that have been taken to confront COVID-19. .

Statistically significant differences do not exist in the study sample experience . The significance level is (0.293.). This is due to the fact that workers who are from different levels of experience have the close skills in dealing with the procedures that have been taken to confront COVID-19

Statistically significant differences do not exist in the study sample age variable. The significance level is (0.822.). This is due to the fact that workers who are from different ages have the similar skills in dealing

with the procedures that have been taken to confront Corona virus (Covid-19) .

Statistically significant differences do not exist in the study sample hospitaltype. The significance level is (0.226). This is due to the fact that workers who are from different kinds of hospital have the similar skills in dealing with the procedures that have been taken to confront Corona virus (Covid-19) and the same policies that hospitals follow in confronting the disease as the Ministry of Health enforces the application of similar procedures in dealing with the pandemic.

Statistically significant differences do not exist in the study sample kind of hospital. The significance level is (0.838). This is due to the fact that workers who are from different hospitals location have the same skills in dealing with the procedures that have been taken to confront Corona virus (Covid-19) and the same policies that hospitals follow in confronting the disease, whether it is in the West Bank or Gaza.

5.2Recommendations

In light of the previously mentioned results, the researcher recommends the following:

1. Equipment of the medical imaging departments in hospitals must be developed in terms of ventilation and mechanism for entering patients and time of watining .
2. The hospital administration is recommended to create a communication mechanism between departments the aim of which is to show the patient's morbid condition in order to take the necessary measures by the medical stuff receiving the patient.
3. Basic protocol showing procedures for dealing with patients in general with infectious diseases, particularly, with COVID-19 must be issued by PMH .
4. The official authorities in the Palestinian Ministry of Health must implement the protocols of the World Health Organization in hospitals at the highest level.
5. Continuously working on sterilizing devices for COVID-19 patients as well as bringing in a staff whose mission is to follow up the workflow in hospital departments and the extent of compliance with instructions which gives a true image of the quality of work with hospital departments in facing the pandemic and other health crises that me be encountered.
6. It is recommended that the hospital administration permanently allocate special rooms for COVID- 19 patients and work as much as possible to separate them while they are inside the hospital or health center.
7. Preparing appropriate hospital infrastructure in order to be ready for confronting Covid -19.

5.3 Conclusion

The recent study investigated the readiness of medical imaging departments in Palestinian hospitals in light of the corona virus (COVID -19) pandemic by testing 207individuals. The study indicated that the readiness of medical imaging departments in Palestinian hospitals in light of the corona virus (COVID -19) pandemic was moderate in addition to no differences according to the gender, qualification, years of experiences, age, kind of hospital and location of hospital.

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استعداد أقسام التصوير الشعاعي في المستشفيات الفلسطينية في الضفة الغربية وقطاع غزة في ضوء انتشار فيروس كورونا (كوفيد-19).

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الملخص

تهدف دراستنا هذه للتعرف على الإجراءات الواجب اتخاذها من قبل قسم التصوير الطبي في المستشفى للحد من انتشار فيروس كورونا – كوفيد 19 من خلال تحليل مجموعة من الدراسات التي تتعلق بهذا الموضوع، وحيث يعد التصوير الشعاعي الطبي أمراً بالغ الأهمية في تقييم شدة المرض وتطوره لذلك يجب على الأطباء العاملين في قسم التصوير الطبي أن يكونوا على دراية كاملة بالمظاهر التصويرية المتعلقة بكوفيد 19 فإن هذه الدراسة تلقي الضوء على الأمور الوبائية والتصوير الشعاعي للكشف عن أعراض متلازمات الفيروس التاجي، بالإضافة إلى التعرف إلى التغيرات التي حصلت في اجراءات واحتياطات السلامة العامة لموظفي قسم التصوير الطبي الواجب اتخاذها مع الأشخاص المصابين او المشتبه بإصابتهم بالمرض.

تمثل نتائج مجتمع الدراسة اختصاصيي الاشعة والتصوير الطبي في المستشفيات الفلسطينية سواء في الضفة الغربية او قطاع غزة، وبعد تحليل تلك النتائج على برنامج ال **spss** فقد أظهرت الدراسة أن درجة مجالات استعداد أقسام التصوير الطبي في المستشفيات الفلسطينية في ضوء انتشار فيروس كورونا(كوفيد-19) كانت جميعها متوسطة، فقد تراوحت المتوسطات الحسابية عليها ما بين(3.24) و (3.36) وهما المجالات(**العاملين والمرضى**) و(**مكان العمل وتجهيزاته**).

وأظهرت النتائج ايضاً إلى وجود تحديات غير مسبوقة لجائحة كوفيد 19 والى ضرورة إحداث تغييرات وتوفير خدمات أشعة وصيانتها وضرورة أن تحقق هذه التغيرات حماية للموظفين والمرضى

غير المصابين، وقد استخلصت الدراسة أن تجارب البلدان الأخرى التي تأثرت في الجائحة يمكن لها أن تساعد في توجيه أولئك الذين يعانون من آثار الجائحة من خلال إرشادات لأخصائي الأشعة للمساعدة في تلبية مطالب خدماتها.

ومن خلال مراجعة ادبيات الدراسة تبين للباحث أهمية ودور التصوير المقطعي في التشخيص المبكر ل كوفيد 19، ووصفه وبشكل خاص النتائج النموذجية التي تجعل من الممكن التعرف على المرض وتمييزه عن الأسباب البكتيرية للعدوى وتحديد أي فئة من المرضى والتي ممكن أن تستفيد من التصوير المقطعي المحوسب، بالإضافة إلى الاجراءات التي يجب اتخاذها عند إجراء الفحص للحماية من انتشار العدوى.

ومن خلال تلك النتيجة يظهر لنا الأمر ان الكوادر الادارية في مستويات وزارة الصحة الفلسطينية، قد ادركت مبكراً مدى خطورة هذا الفايروس على المجتمع الفلسطيني في ظل الامكانيات الشبه معدومة في بعض المستشفيات الا ان دافعية النجاح في التحدي أظهر مهارة طواقم العمل الطبي لمواجهة هذه الجائحة والتي مازالت مستمرة.

Annexes

Annex 1: Study survey (English version)

Questionnaire

Dear Respondent :

The questionnaire is designed to investigate ***The Readiness of medical imaging departments in Palestinian Hospitals in the West Bank and Gaza Strip in Light of the Corona (Covid -19) Pandemic*** **"**

Please ,read all the questions carefully and then tick the your option which you consider . Your answer will be confidential and will only be used for research purposes

Thank you for your cooperation .

Researcher :…… .

Section (1) : Personal Information

1) Gender : ☐ Male ☐ Female

2) Qualification : ☐ Dipploma ☐ B.A ☐ M.A ☐ Ph.D

3) Experience : 1-5 ☐ 6-10 ☐ More than 10 years ☐

4) Age : 20-35 ☐ 36-45 ☐ More than 45 years. ☐

4) Hospital : Governmental ☐ Private ☐ NGO ☐

5) Place : ***West Bank*** ☐ ***Gaza Strip*** ☐

Section (2) : Read the following statements carefully and check under the column that best represent your level of agreement with each statement

No.	Item	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Changes in Work Place and Facilities						
1.	A change has occurred to the department's working mechanisms					
2.	Equipments and materials required for sterilization and protection have been adequately provided.					
3.	There is sterilization of the area and equipments for each patient after imaging					
4.	There is now a separate entrance to enter and exit the department from the rest of the other departments					
5.	Special containers have been designated for the disposal of masks, uniforms and gloves					
6.	The department provided additional disinfectants and protective equipments					
7.	The equipments are being wiped off after use by each patient or covered with disposable wrappers during the tests.					
8.	Running water was placed over a hand wash basin in exposure rooms and increased hand washing procedures					
9.	The correct sequence of taking off and putting on Person Protection Equipments has been trained					
10.	There are now special uniforms to work within the departments					
Changes in Workers and Patients						
11.	Courses were held and leaflets were distributed explaining how to deal with patients WITH Covid-19					
12.	There was a change in patients reception and waiting to reduce crowded in the Ward					

13.	Infected and non- infected cases are reported before being brought to the department					
14.	All patients were required to wear masks and other protective equipments					
15.	There has been training on prevention and dispos of masks, uniforms and gloves.					
16.	periods for new patients to stay in imaging room is now defined					
Changes in Procedures and Policies						
17.	The system of work and shifts have been changed in order to reduce friction between workers					
18.	Coordination has been made with the workers regarding the policies that must be followed in light of Corona and to take your observations.					
19.	There is a policy to reduce patient contact					
20.	There is now a follow- up to implement the instructions					
21.	There has become a clear mechanism for radiography that differs from before the pandemic					
22.	It is forbidden to approach the department for those who have no official job.					
23.	The mechanism of sending pictures and samples to doctors and radiographers has changed					
24.	Ventilation and cleaning procedures increased in the department					
25.	Signboards for Covid -19 safety protocols have been increased					

Annex 2: Study survey (Arabic version)

استبانة

تحية طيبة وبعد:

تم تصميم هذا الاستبيان للتعرف على (**استعداد أقسام التصوير الشعاعي في المستشفيات الفلسطينية في الضفة الغربية وقطاع غزة في ضوء انتشار فيروس كورونا (كوفيد-19)**، لذلك أتمنى من حضرتكم الإجابة على جميع فقرات هذه الاستبانة وبدقة وموضوعية واختيار الإجابات التي تعكس وجهة نظركم، علما بأن جميع اجاباتكم لن تستخدم الا لغرض البحث العلمي فقط ، وسيتم التعامل بها بسرية تامة.

الباحث: انس عبد الرؤوف خطيب

القسم الأول :بيانات أولية:

الرجاء وضع علامة (×) في الفراغ الذي يناسبكم:

الجنس: ذكر( ) أنثى ( )

المؤهل العلمي : دبلوم ( ) بكالوريوس ( ) ماجستير ( )دكتوراه ( )

سنوات الخبرة: 1-5 سنوات ( ) من 6الى 10 سنوات ( ) أكثر من 10 سنوات ( )

العمر : من 25- 35 ( ) من 36-45 ( ) أكثر من 35 سنة ( )

نوع المستشفى : حكومي ( ) خاص ( ) جمعية خيرية ( )

الموقع: الضفة الغربية ( ) قطاع غزة ( )

القسم الثاني :مجالات الدراسة:

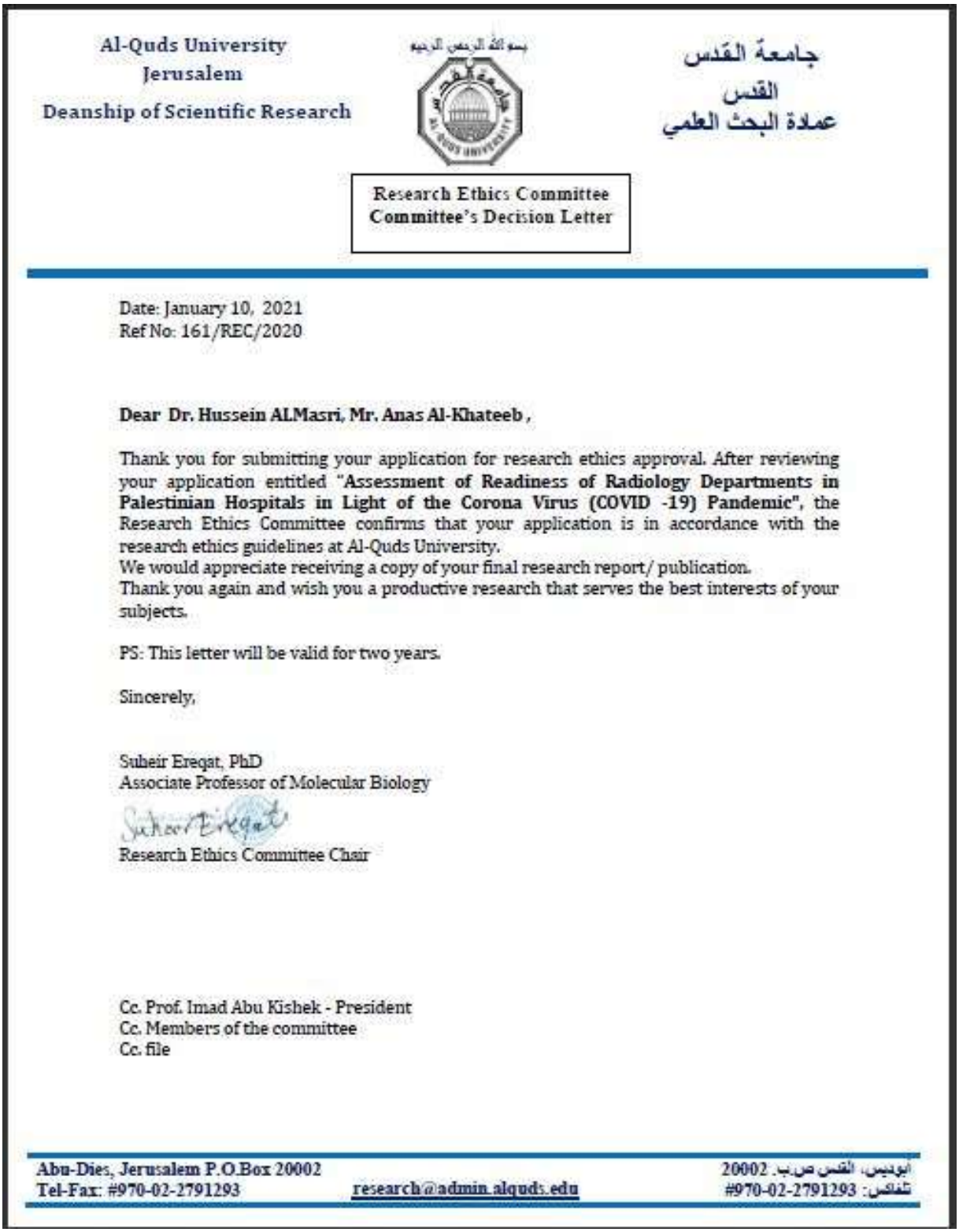
يرجى وضع إشارة(×) في المربع المناسب:

رقم	الفقرة	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
مكان العمل وتجهيزاته						
1	حدثت تغيرات في أقسام العمل وتجهيزاته					
2	تم توفير المعدات والمواد المطلوبة لعملية التعقيم بشكل كاف					
3	يحدث هناك تعقيم للمكان والمعدات بعد تصوير كل مريض					
4	هناك الآن مدخل منفصل للدخول إلى القسم والخروج منه منفصل عن بقية الأقسام					
5	تم تخصيص حاويات خاصة للتخلص من الأقنعة والزي الرسمي والقفازات					
6	تم تزويد القسم بمعدات مطهرات ومعدات حماية إضافية					
7	يتم نزع المعدات بعد استخدامها من قبل كل مريض أو تغطيتها بأغلفة يمكن التخلص منها أثناء إجراء عملية التصوير					
8	تم وضع ماء جاري فوق حوض الغسيل في غرف التعرض وزيادة إجراءات غسل اليدين					
9	تم التدريب على عملية تسلسل خلع الملابس وارتداء معدات حماية الأشخاص					
10	يوجد الآن زي موحد خاص للعمل داخل الأقسام					
العاملين والمرضى						
11	تم عقد دورات وتوزيع منشورات توضح كيفية التعامل مع مرضى كوفيد 19					
12	حصل هناك تغيير في استقبال المرضى وانتظارهم وذلك لتخفيف الاكتظاظ بعد الجائحة					
13	يتم تسجيل الحالات المصابة بكوفيد 19 وغير المصابة قيل إحضارها للقسم					
14	يتم الطلب من جميع المرضى ارتداء الكمامات ووسائل الحماية الأخرى					
15	أصبح هناك تدريب على الوقاية وإلقاء الكمامات والألبسة					

	والقفازات					
16	تم تحديد فترة بقاء المرضى في غرفة التصوير					
السياسات والإجراءات						
17	تم تغيير نظام العمل والورديات وذلك من أجل تقليل الاحتكاك بين العاملين					
18	تم التنسيق مع العاملين في ما يتعلق بالسياسات التي يجب اتباعها في ضوء كورونا وأخذ ملاحظاتهم					
19	هناك سياسة لتقليل التواصل بين المرضى					
20	أصبح هناك متابعة لتطبيق التعليمات الخاصة بالحد من انتشار الفيروس					
21	أصبح هناك آلية واضحة للتصوير الشعاعي تختلف عن ما كانت عليه قبل الجائحة					
22	يمنع دخول قسم التصوير الشعاعي لمن ليس له عمل رسمي					
23	تم تغيير آلية إرسال الصور والعينات إلى الأطباء والمختصين					
24	تم زيادة إجراءات التهوية والتنظيف في القسم					
25	تم زيادة وضع لوحات إعلانات السلامة من فيروس كوفيد 19					

Annex 3

Research Ethics Committee / Committee's Decision Letter



Al-Quds University
Jerusalem
Deanship of Scientific Research

بسم الله الرحمن الرحيم

جامعة القدس
القدس
عمادة البحث العلمي

Research Ethics Committee
Committee's Decision Letter

Date: January 10, 2021
Ref No: 161/REC/2020

Dear Dr. Hussein ALMasri, Mr. Anas Al-Khateeb ,

Thank you for submitting your application for research ethics approval. After reviewing your application entitled "**Assessment of Readiness of Radiology Departments in Palestinian Hospitals in Light of the Corona Virus (COVID -19) Pandemic**", the Research Ethics Committee confirms that your application is in accordance with the research ethics guidelines at Al-Quds University.
We would appreciate receiving a copy of your final research report/ publication.
Thank you again and wish you a productive research that serves the best interests of your subjects.

PS: This letter will be valid for two years.

Sincerely,

Suheir Ereqat, PhD
Associate Professor of Molecular Biology

Research Ethics Committee Chair

Cc. Prof. Imad Abu Kishek - President
Cc. Members of the committee
Cc. file

Abu-Dies, Jerusalem P.O.Box 20002
Tel-Fax: #970-02-2791293
research@admin.alquds.edu
ابوديس، القدس ص.ب. 20002
تلفاكس: #970-02-2791293

Annex 4

Guidance Boards in Hospital Departments

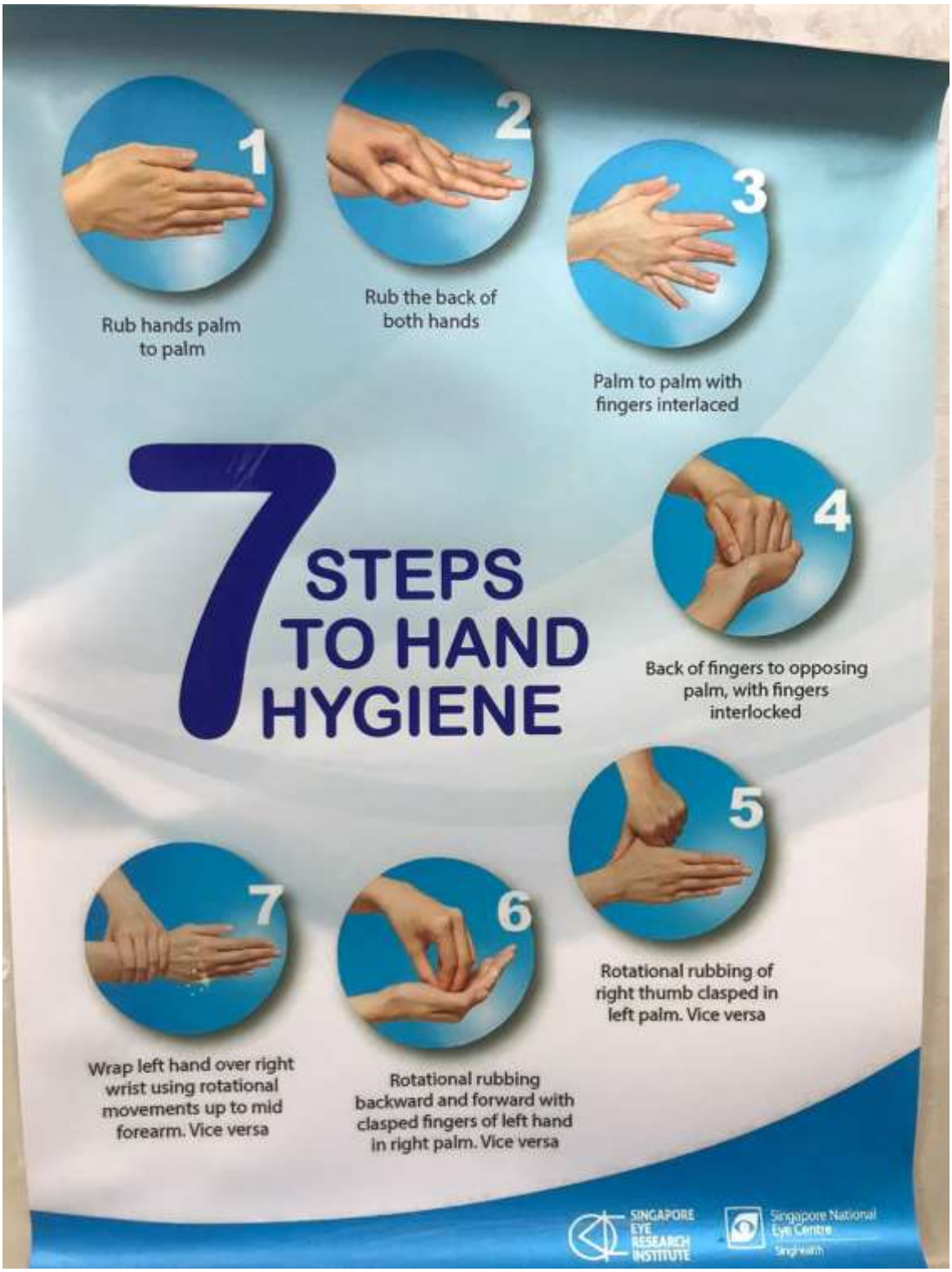
مستشفى نابلس التخصصي
NABLUS SPECIALITY HOSPITAL

ارشادات منظمة الصحة العالمية للتعامل مع فايروس كورونا

- الاهتمام بنظافة وغسل اليدين بشكل اولي ومن ثم الالتزام بتعقيم اليدين عن طريق استخدام مطهر اليدين (Hygine) وتطبيقه لمدة 20 ثانية الى حين جفافه.
- تجنب ملامسة العين والانف والفم في حال تلوث اليد.
- ممارسة القواعد السليمة والصحية اذا تعرض الشخص للعطاس والقحة وذلك من كتم العطسة في كوع اليد لمنع انتشار الرذاذ او من خلال استخدام المناديل الورقية والتخلص منها فورا.
- الالتزام بإرتداء القناع الطبي في حالة وجود اي من اعراض مشاكل الجهاز التنفسي وتبديله بشكل منتظم وتعقيم اليد بعد كل استبدال له.
- الحفاظ على وجود مسافة لا تقل عن 1 متر من اي مريض يعاني من مشاكل تنفسية.
- استعمال الادوات الواقية بطريقة منطقية ومناسبة للوضع الصحي الحالي بدون مبالغة للحفاظ على ضمان استمرارية وجود الموارد بسبب شح عالمي لها.
- في حال دخول حالة مرضية الى الاقسام يجب التعامل معها بحذر و عزلها بعدة طرق منها وضع حواجز بلاستيكية او زجاجية وذلك لمنع انتشار الفايروس للطاقم الطبي.
- الحد من زيارات الطاقم الطبي للمرضى ممن ليس لهم تعامل مباشر مع المريض او عمل جميع الخدمات في جلسة واحدة (على قدر المستطاع) وذلك منعا لتفشي العدوى.
- يمنع منعا باتا زيارة المرضى المصابين بالفايروس ، وفي حالة وجود استثناءات للزيارة فيجب الحد من عدد الزوار وتقليل مدة الزيارة واعطاء الارشادات الكاملة للزوار في كيفية استخدام الادوات الواقية وكيفية التخلص منها والتعقيم بعد ذلك لتجنب نقل العدوى للمرافقين.

الادوات التي يجب ان تستخدم للوقاية:

- القناع الطبي
- مريول العزل
- الكفوف الطبية
- أغطية العزل للأحذية
- نظارات العين الواقية في حال التعرض لرذاذ من مواد عضوية او كيميائية.


1
Rub hands palm to palm
2
Rub the back of both hands
3
Palm to palm with fingers interlaced
7 STEPS TO HAND HYGIENE
4
Back of fingers to opposing palm, with fingers interlocked
5
Rotational rubbing of right thumb clasped in left palm. Vice versa
6
Rotational rubbing backward and forward with clasped fingers of left hand in right palm. Vice versa
7
Wrap left hand over right wrist using rotational movements up to mid forearm. Vice versa
SINGAPORE EYE RESEARCH INSTITUTE
Singapore National Eye Centre