A STUDY ON THE ROLE OF HOSPITAL PHARMACIST DURING THE COVID-19 PANDEMIC IN NIGERIA

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JULY, 2021

CERTIFICATION

This is to certify that this work was successful carried out by Evans Itepu, department of clinical pharmacy, faculty of pharmacy, University of Benin, Benin City in partial fulfillment of the requirement for the Doctor of Pharmacy (Pharm. D) degree of the University of Benin, Benin City, Edo state, Nigeria.

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DEDICATION

This work is wholly dedicated to the Lord God Almighty for His grace and guidance before, during and after the course of this project and as well my lovely mum, Mrs Cordillia Itepu and my elder Endurance Itepu.

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My profound gratitude goes to for Almighty my creator, Benefactor and source of inspiration in this academic pursuit for His divine protection over me and my family and for making it possible for me to successfully complete my project research. I also want to appreciate the entire staff of the faculty of pharmacy, University of Benin for giving me the opportunity to have a first-hand experience in pharmacy practice. My appreciation goes to Prof. Ehijie F.O Enato my project supervisor, for his guidance, advice before and after the course of this project. Special thanks to my lovely mum Mrs Cordillia Itepu and my elder Endurance Itepu, for their love and support. Thank you for teaching me that I can be anything I want to be in life, once I set my heart on it.

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ABSTRACT

Background: In hospital practice, the roles of pharmacists as assets are very significant in achieving the overall goals of the hospital which is provision of humanistic, economical and clinical outcomes.

Objective: The purpose of this study is to determine the role of hospital pharmacist during the Covid-19 pandemic in Nigeria.

Method: The study was conducted on pharmacists practicing in either government or private owned hospitals within Benin-City, Edo state. Descriptive survey design was used for the study and 3 research questions was developed for the study. Random sampling method was used. The instrument used for collection of data was a structured questionnaire.

Key findings: Total 180 hospital pharmacist were involved in the study. This study highlights the various roles and pharmaceutical care services provided and implemented by pharmacists during the COVID-19 pandemic in Nigeria. Pharmaceutical care services like patient education and counselling, social distancing, wearing of mask, providing information, addressing medication shortages, teleconsultation, medication review, optimizing medication regimen, adverse drug reaction monitoringand addressing the medication-related problems are being delivered by the pharmacists in this ongoing pandemic.

Conclusion: All the studies described the roles and responsibilities of the pharmacists duringCOVID-19 in Nigeria. This pandemic adversity has opened up new avenues for the hospital pharmacists which have broadened their scope as the member of multidisciplinary healthcare team. Pharmacists have to overcome the unforeseen barriers and challenges and continue providing need-based pharmaceutical care services.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Since the start of the new Coronavirus (Covid-19) outbreak in the December 2019, pharmacist worldwide is playing a key role adopting innovative strategies to minimize the adverse impact of the pandemic. They are strategically positioned to help manage the Covid-19 pandemic and also strengthen a countries response and readiness to pandemic.

1.2 RESEARCH QUESTIONS

1: Services provided by the pharmacist during the Covid-19 pandemic

2: Measures put in place by the hospital for the pharmacist protection'

3: Measures put in place by the pharmacist to prevent the spread of Covid-19

1.3 SCOPE OF THE STUDY

This study is carried out in various hospitals in Benin City. The population size and population sample consist of license pharmacist working in different department either federal or private hospital. Therefore, the population for this study compose of200 pharmacists working in different department in both private and general hospitals within Benin City.

1.4 SIGNIFICANCE OF THE STUDY

It is believed that at the completion of the study, the application of this study will help the government, stakeholders and regulatory bodies like Pharmacists Council of Nigeria (PCN) develop good policies that will enhance commitment of pharmacists in order to achieve good practices by pharmacists in the health sector. The study will help to enumerate various measures

put in place by hospital to protect the pharmacist and measures put in place the pharmacist to prevent the spread of Covid-19 pandemic and also provide the approaches to ameliorating the incidence of transmission of coronavirus from one person to another, and transmission of other respiratory disease. The study will also be of great benefit to the researchers who intends to embark on research on similar topics as it will serve as a guide.

Finally, the significance of this study is to understand the role of pharmacist during the covid-19 pandemic in Nigeria, which will form critical inputs for policy makers, hospital administrators as well as health organizations both in the private and public sectors.

1.5 LITERATURE REVIEW

Most of the studies concerning Covid-19 were conducted in the United States of America and China. These countries are the second and first in the scientific publication ranking worldwide, respectively. Moreover, China was the first region affected by the COVID-19 infection and therefore first experiences were felt in this location. Regarding the type of publication, most studies were letters and other rapid scientific communications reporting experiences. However, considering the current pandemic, when there is a need for rapid information for activity guidelines by the pharmacists need to have quick information to guide their activities. The hospital was the main workplace of the pharmacist, which was an expected result because the role of pharmacist in hospital pharmacy practice is one of the most consolidated. Pharmacists have a very comprehensive role within the hospital, performing from administrative activities to clinical services. Therefore, they must be involved with all aspects of medicines use and be accessible as a point of contact for patients and health care providers. As a consequence, it is more than expected that they would be on the frontline against COVID-19 pandemic and reporting on their successful experiences. This review showed that pharmacists play a vital role

during the COVID-19 pandemic. According to the key domains of pharmacist interventions, most studies were carried out for healthcare professionals and patients. Pharmacist-provided interventions with the recipients have been shown to improve patient therapeutic outcomes and contribute to substantial healthcare savings. It is important to note that pharmacists can play a role in health education and disease prevention in various ways for the general population. Moreover, the level of pharmacist-recipient interaction varied between studies. Most of them described the use of telephone, written interaction including web-based, and video conference. Studies involving the use of these methods of communication have been successful and these valuable tools may be applied in a social distancing context. In addition, one study reported that pharmacists used a hospital's radio station as a communication strategy in patients who had difficulty in dealing with available technologies, highlighting the creative character. Regarding the setting of intervention, most studies were performed in hospital bedside, ambulatory, and recipient's home. Pharmacist interventions were described in several settings as to improving the quality of care. This study discussed the role of community pharmacists during the COVID-19 pandemic, collecting and summarizing the experience of Pharmacists in Nigeria. Meanwhile, it is well known that community pharmacies are an important setting of care in the COVID-19 pandemic period. Drug information for healthcare professionals and patient counseling were the main actions provided by the pharmacists identified in this review. These actions focus on enhancing the problem-solving skills of the patient for the purpose of improving or maintaining the quality of life. In addition, other actions (drug supply management and safety measures for infection control).

1.6 OVERVIEW

The Coronavirus Disease 2019 (COVID-19) is an infection caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) first emerged in Wuhan (China) in December 2019, spreading rapidly across the world. On the 11th of March 2020, the World Health Organization (WHO) declared COVID-19 a pandemic. At the time of writing there have been 10 million cases of COVID-19 reported globally, with more than 500 000 deaths reported across 216 countries. Currently, the COVID-19 pandemic is a major public health problem worldwide. The most common symptoms for patients infected with COVID-19 are fever, cough, difficulty breathing, fatigue, and headache. Most symptomatic patients will develop mild symptoms. However, some patients may progress to serious illness, such pneumonia, acute respiratory distress syndrome, multi organ dysfunction and even death. So far, there are no proven effective treatments against COVID-19 and widespread effort is being devoted towards the development of a safe vaccine. Thus, the population must follow recommendations to decrease the transmission of SARS-CoV-2, including social distancing, wearing masks and strict hand hygiene. While millions of people are in their homes in order to decrease the risk of transmission of the infection, health workers are on the frontline against COVID-19. These professionals are committed to ensuring that the population have access to health services and to minimize the adverse impact of the pandemic. Given the seriousness of the coronavirus outbreaks, health professionals with expertise in public health are essential. As healthcare professionals, pharmacists can play key role during the pandemic, acting directly with the community, continuing to care for patients with chronic diseases, working in hospital pharmacies and providing pharmaceutical care to COVID-19 patients. Moreover, they may provide reliable information for preventing, detecting, treating and managing coronavirus infections. As a result,

several challenges have emerged and innovative strategies are being adopted by pharmacists to overcome them. Since the beginning of the outbreak, many guidelines have been published with recommendations for pharmacists as well as their responsibilities during the pandemic. However, few describe pharmacists' experiences in this novel context. Therefore, this scoping review is aimed to identify and describe core services provided by the pharmacist during the COVID-19 pandemic.

1.6.1 History of Severe Acute Respiratory Syndrome (SARS)

1.6.2 Outbreak in south China

The epidemic of SARS appears to have started in Guangdong Province, China in November 2002. The first reported case of SARS originated in Shunde, Foshan, Guangdong in November 2002, and the patient, a farmer, was treated in the First People's Hospital of Foshan (Mckay Dennis). The patient died soon after, and no definite diagnosis was made on his cause of death. Despite taking some action to control it, Chinese government officials did not inform the World Health Organization of the outbreak until February 2003. This lack of openness caused delays in efforts to control the epidemic, resulting in criticism of the People's Republic of China from the international community. China has since officially apologized for early slowness in dealing with the SARS epidemic. The first clue of the outbreak appears to be 27 November 2002 when Canada's Global Public Health Intelligence Network (GPHIN), an electronic warning system that is part of the World Health Organization's Global Outbreak and Alert Response Network (GOARN), picked up reports of a 'flu outbreak' in China through Internet media monitoring and analysis and sent them to the WHO. Importantly, while GPHIN's capability had recently been upgraded to enable Arabic, Chinese, English, French, Russian, and Spanish translation, the system was limited to English or French in presenting this information. Thus, while the first

reports of an unusual outbreak were in Chinese, an English report was not generated until 21 January 2003. Subsequent to this, the WHO requested information from Chinese authorities on 5 and 11 December. Despite the successes of the network in previous outbreak of diseases, it was proven rather defective after receiving intelligence on the media reports from China several months after the outbreak of SARS. Along with the second alert, WHO released the name, definition, as well as an activation of a coordinated global outbreak response network that brought sensitive attention and containment procedures (Heymann, 2003).However, by then although the new definitions do give nations a guideline to contain SARS, over 500 deaths and an additional 2,000 cases had already occurred worldwide. In early April, after Jiang Yanyong pushed to report the danger to China, there appeared to be a change in official policy when SARS began to receive a much greater prominence in the official media. Some have directly attributed this to the death of American James Earl Salisbury. However, also in early April, accusations by Jiang Yanyong emerged regarding the undercounting of cases in Beijing military hospitals. After intense pressure, Chinese officials allowed international officials to investigate the situation there. This revealed problem plaguing the aging mainland Chinese healthcare system, including increasing decentralization, red tape, and inadequate communication. Many doctors and other medical staff in many nations heroically risked their lives treating patients and containing the infection before ways to prevent infection were known. Not all survived.

1.6.3 Spread to other countries and regions

The epidemic reached the public spotlight in February 2003, when an American businessman traveling from China became afflicted with pneumonia-like symptoms while on a flight to Singapore. The plane stopped at Hanoi, Vietnam, where the victim died in The French Hospital of Hanoi. Several of the medical staff who treated him soon developed the same disease despite

basic hospital procedures. Italian doctor Carlo Urbani identified the threat and communicated it to WHO and the Vietnamese government; he later succumbed to the disease. The severity of the symptoms and the infection of hospital staff alarmed global health authorities fearful of another emergent pneumonia epidemic. On 12 March 2003, the WHO issued a global alert, followed by a health alert by the United States Centers for Disease Control and Prevention (CDC). Local transmission of SARS took place in Toronto, Ottawa, San Francisco, Ulan Bator, Manila, Singapore, Taiwan, Hanoi and Hong Kong whereas within China it spread to Guangdong, Jilin, Hebei, Hubei, Shaanxi, Jiangsu, Shanxi, Tianjin, and Inner Mongolia. In Hong Kong, the first cohort of affected people was discharged from the hospital on 29 March 2003. The disease spread in Hong Kong from a mainland doctor who arrived in February and stayed at the ninth floor of the AMetropole Hotel in Kowloon, infecting 16 of the hotel visitors. Those visitors traveled to Canada, Singapore, Taiwan, and Vietnam, spreading SARS to those locations. Another larger cluster of cases in Hong Kong centred on the Amoy Gardens housing estate. Its spread is suspected to have been facilitated by defects in its drainage system. Concerned citizens in Hong Kong worried that information was not reaching people quickly enough and created a website called sosick.org, which eventually forced the Hong Kong government to provide information related to SARS in a timely manner.

1.6.4 First case of coronavirus disease in Nigeria

The Federal Ministry of Health has confirmed a coronavirus disease (COVID-19) case in Lagos State, Nigeria. The case, which was confirmed on the 27th of February 2020, is the first case to be reported in Nigeria since the beginning of the outbreak in China in January 2020. The case is an Italian citizen who works in Nigeria and returned from Milan, Italy to Lagos, Nigeria on the 25th of February 2020. He was confirmed by the Virology Laboratory of the Lagos University

Teaching Hospital, part of the Laboratory Network of the Nigeria Centre for Disease Control. The patient is clinically stable, with no serious symptoms, and is being managed at the Infectious Disease Hospital in Yaba, Lagos. The Government of Nigeria, through the Federal Ministry of Health has been strengthening measures to ensure an outbreak in Nigeria is controlled and contained quickly. The multi-sectoral Coronavirus Preparedness Group led by the Nigeria Centre for Disease Control (NCDC) has immediately activated its national Emergency Operations Centre and will work closely with Lagos State Health authorities to respond to this case and implement firm control measures.

Table 4: Number of confirmed COVID-19 cases confirmed by states as of 10th July 2020.

State	Confirmed cases	Cases on admission	Discharged cases	No. of death
Lagos	58,317	888	56,990	439
FCT	19,765	510	19,090	165
Oyo	6,850	5	6,721	124
Edo	4,899	4	4,710	185
Delta	2,620	805	1,744	71
Rivers	7,100	40	6,959	101
Kano	3,954	20	3,824	110
Ogun	4,651	30	4,572	49
Kaduna	9,042	6	8,971	65
Katsina	2,097	14	2,049	34
Ondo	3,242	1,099	2,080	63
Borno	1,337	99	1,200	38
Gombe	2,034	4	1,986	44
Bauchi	1,548	13	1,518	17
Ebonyi	2,030	33	1,965	32
Plateau	9,049	10	8,982	57
Enugu	2,345	303	2,013	29
Abia	1,689	9	1,658	22
Imo	1,657	28	1,592	37
Jigawa	321	2	308	11
Kwara	311	131	168	12
Bayelsa	299	128	153	18
Nassarawa	238	117	113	8
Osun	212	121	84	7
Sokoto	153	2	135	16
Niger	135	20	108	7
Akwa-Ibom	134	60	71	3
Benue	121	80	35	6
Adamawa	100	22	71	7
Anambra	93	19	65	9
Kebbi	86	16	63	7
Zamfara	76	1	71	5
Yobe	62	3	51	8
Taraba	27	16	11	0
Cross Rivers	5	1	3	1
Kogi	5	0	3	2
Ekiti	46	4		
Total	**31,323**	**17,819**	**12,795**	**709**

1.6.5 Identification of virus

The CDC and a Canadian laboratory identified the SARS genome in April, 2003. Scientists at Erasmus University in Rotterdam, the Netherlands demonstrated that the SARS coronavirus fulfilled Koch's postulates thereby confirming it as the causative agent. In the experiments, macaques infected with the virus developed the same symptoms as human SARS victims. In late May 2003, studies from samples of wild animals sold as food in the local market in Guangdong, China, found the SARS coronavirus could be isolated from masked palm civets (Paguma sp.), but the animals did not always show clinical signs. The preliminary conclusion was the SARS virus crossed the xenographic barrier from palm civet to humans, and more than 10,000 masked palm civets were killed in Guangdong Province. Virus was also later found in raccoon dogs (Nyctereuteus sp.), ferret badgers (Melogale spp.), and domestic cats. In 2005, two studies identified a number of SARS-like coronaviruses in Chinese bats. Phylogenetic analysis of these viruses indicated a high probability that SARS coronavirus originated in bats and spread to humans either directly or through animals held in Chinese markets. The bats did not show any visible signs of disease, but are the likely natural reservoirs of SARS-like coronaviruses. In late 2006, scientists from the Chinese Centre for Disease Control and Prevention of Hong Kong University and the Guangzhou Centre for Disease Control and Prevention established a genetic link between the SARS coronavirus appearing in civets and humans, bearing out claims that the disease had jumped across species.

1.6.6 Mode of transmission of COVID-19

Human-to-human transmission of SARS-CoV-2 is mainly through respiratory droplets from infected individuals, contact with contaminated objects and surfaces and social activities like hand-shaking and hugging (Enitan et al., 2020). The virus is spread in droplets or droplet nuclei

released from the nose and mouth of an infected person when they sneeze or cough. Once the virus becomes airborne, it may remain suspended in the air for up to 8 hours depending on the prevailing environmental conditions such as temperature and relative humidity (Ibeh et al., 2020). Anyone within two (2) meters of the cough or sneeze of an infected person may take in the respiratory droplets into his or her airway and become infected. Otherwise, the viral particle drops about 10 feet after been discharged from an infected person and may fall on other's people clothing and surfaces around them. The virus remains on these surfaces for the stipulated periods waiting to be picked up by people's hands when they touched such surfaces and then touch their eyes, ears, nose or mouth, from there the virus can find its way into the respiratory tract of the victim, where it then initiates an infection (Berkeley, 2020; Imai et al., 2020; Majumdar and Mandi, 2020).

1.6.7 Classification and origin

SARS-CoV-2 is a member of the family Coronaviridae and order Nidovirales. The family consists of two subfamilies, Coronavirinae and Torovirinae and members of the subfamily Coronavirinae are subdivided into four genera:

a. Alphacoronavirus contains the human coronavirus (HCoV)-229E and HCoV-NL63;
b. Betacoronavirus includes HCoV-OC43, Severe Acute Respiratory Syndrome human coronavirus (SARS-HCoV), HCoV-HKU1, and Middle Eastern respiratory syndrome coronavirus (MERS-CoV);
c. Gammacoronavirus includes viruses of whales and birds and;
d. Deltacoronavirus includes viruses isolated from pigs and birds.

SARS-CoV-2 belongs to Betacoronavirus together with two highly pathogenic viruses, SARS-CoV and MERS-CoV. SARS-CoV-2 is an envelope and positive-sense single-stranded RNA (+ssRNA) virus SARS-CoV-2 is considered a novel human-infecting Betacoronavirus. Phylogenetic analysis of the SARS-CoV-2 genome indicates that the virus is closely related (with 88% identity) to two bat-derived SARS-like coronaviruses collected in 2018 in eastern China (bat-SL-CoVZC45 and bat-SL-CoVZXC21) and genetically distinct from SARS-CoV (with about 79% similarity) and MERS-CoV. Using the genome sequences of SARS-CoV-2, RaTG13, and SARS-CoV, a further study found that the virus is more related to BatCoV RaTG13, a bat coronavirus that was previously detected in Rhinolophus affinis from Yunnan Province, with 96.2% overall genome sequence identity. A study found that no evidence of recombination events detected in the genome of SARS-CoV-2 from other viruses originating from bats such as BatCoV RaTG13, SARSCoV and SARSr-CoVs. Altogether, these findings suggest that bats might be the original host of this virus. However, a study is needed to elucidate whether any intermediate hosts have facilitated the transmission of the virus to humans. Bats are unlikely to be the animal that is directly responsible for transmission of the virus to humans for several reasons:

1. There were various non-aquatic animals (including mammals) available for purchase in Huanan Seafood Wholesale Market but no bats were sold or found;
2. SARS-CoV-2 and its close relatives, bat- SL-CoVZC45 and bat-SL-CoVZXC21, have a relatively long branch (sequence identity of less than 90%), suggesting those viruses are not direct ancestors of SARS-CoV-2; and (3) in other coronaviruses where bat is the natural reservoir such as SARS-CoV and MERS-CoV, other animals have acted as the intermediate host (civets and possibly camels, respectively). Nevertheless, bats do not

always need an intermediary host to transmit viruses to humans. For example, Nipah virus in Bangladesh is transmitted through bats shedding into raw date palm sap.

1.6.8 Clinical manifestations of Covid-19

Clinical manifestations of 2019-nCoV infection have similarities with SARS-CoV; the common symptoms of COVID-19 include cough, shortness of breath, and fever; disease ranges in severity from asymptomatic infection, mild disease (in 81% of patients), to pneumonia, respiratory failure, and death. Less common symptoms include headache, dizziness, abdominal pain, diarrhea, nausea, and vomiting. Based on the report of the first 425 confirmed cases in Wuhan, the common symptoms include fever, dry cough, myalgia and fatigue with less common are sputum production, headache, haemoptysis, abdominal pain, and diarrhea. Approximately 75% patients had bilateral pneumonia. Different from SARS-CoV and MERS-CoV infections, however, is that very few COVID-19 patients show prominent upper respiratory tract signs and symptoms such as rhinorrhoea, sneezing, or sore throat, suggesting that the virus might have greater preference for infecting the lower respiratory tract. Pregnant and non-pregnant women have similar characteristics. Severe complications such as hypoxaemia, acute ARDS, arrythmia, shock, acute cardiac injury, and acute kidney injury have been reported among COVID-19 patients. A study among 99 patients found that approximately 17% patients developed ARDS and, among them, 11% died of multiple organ failure. The median duration from first symptoms to ARDS was 8 days.

1.6.9 Risk factors

The incidence of SARS-CoV-2 infection is seen most often in adult male patients with the median age of the patients was between 34 and 59 years. SARS-CoV-2 is also more likely to infect people with chronic comorbidities such as cardiovascular and cerebrovascular diseases and

diabetes. The highest proportion of severe cases occurs in adults ≥60 years of age, and in those with certain underlying conditions, such as cardiovascular and cerebrovascular diseases and diabetes. Severe manifestations maybe also associated with coinfections of bacteria and fungi. Fewer COVID-19 cases have been reported in children less than 15 years. In a study of 425 COVID-19 patients in Wuhan, published on January 29, there were no cases in children under 15 years of age. Nevertheless, 28 paediatric patients have been reported by January 2020. The clinical features of infected paediatric patients vary, but most have had mild symptoms with no fever or pneumonia, and have a good prognosis. Another study found that although a child had radiological ground-glass lung opacities, the patient was asymptomatic. In summary, children might be less likely to be infected or, if infected, present milder manifestations than adults; therefore, it is possible that their parents will not seek out treatment leading to underestimates of COVID-19 incidence in this age group.

1.6.10 Diagnosis

Efforts to control spread of COVID-19, institute quarantine and isolation measures, and appropriately clinically manage patients all require useful screening and diagnostic tools. While SARS-CoV-2 is spreading, other respiratory infections may be more common in a local community. The WHO has released a guideline on case surveillance of COVID-19 on January 31, 2020. For a person who meets certain criteria, WHO recommends to first screen for more common causes of respiratory illness given the season and location. If a negative result is found, the sample should be sent to referral laboratory for SARS-CoV-2 detection. Case definitions can vary by country and will evolve over time as the epidemiological circumstances change in a given location. In China, a confirmed case from January 15, 2020 required an epidemiological linkage to Wuhan within 2 weeks and clinical features such as fever, pneumonia, and low white

blood cell count. On January 18, 2020 the epidemiological criterion was expanded to include contact with anyone who had been in Wuhan in the past 2 weeks. Later, the case definitions removed the epidemiological linkage. The WHO has put forward case definitions. Suspected cases of COVID-19 are persons (a) with severe acute respiratory infections (history of fever and cough requiring admission to hospital) and with no other aetiology that fully explains the clinical presentation and a history of travel to or residence in China during the 14 days prior to symptom onset; or (b) a patient with any acute respiratory illness and at least one of the following during the 14 days prior to symptom onset: contact with a confirmed or probable case of SARS-CoV-2 infection or worked in or attended a health care facility where patients with confirmed or probable SARS-CoV-2 acute respiratory disease patients were being treated. Probable cases are those for who testing for SARS-CoV-2 is inconclusive or who test positive using a pan-coronavirus assay and without laboratory evidence of other respiratory pathogens. A confirmed case is one with a laboratory confirmation of SARS-CoV-2 infection, irrespective of clinical signs and symptoms. For patients who meet diagnostic criteria for SARS-CoV-2 testing, the CDC recommends collection of specimens from the upper respiratory tract (nasopharyngeal and oropharyngeal swab) and, if possible, the lower respiratory tract (sputum, tracheal aspirate, or bronchoalveolar lavage). In each country, the tests are performed by laboratories designated by the government.

1.6.11 Laboratory Findings

Among COVID-19 patients, common laboratory abnormalities include lymphopenia, prolonged prothrombin time, and elevated lactate dehydrogenase. ICU-admitted patients had more laboratory abnormalities compared with non-ICU patients. Some patients had elevated aspartate aminotransferase, creatine kinase, creatinine, and C-reactive protein. Most patients have shown

normal serum procalcitonin levels. COVID-19 patients have high level of IL1, IFN-, IP10, and MCP1. ICU-admitted patients tend to have higher concentration of granulocyte-colony stimulating factor (GCSF), IP10, MCP1A, MIP1A, and TNF-.

Table 1: Number of confirmed COVID-19 cases as of 10th July 2020, according to region.

Region	Confirmed cases	Total death
Globally	12,322,395	12,322,395
Africa	594,955	13,246
Americas	6,397,230	279,857
Eastern Mediterranean	1, 255, 977	30,145
Europe	2,888,850	202,837
South-East Asia	1,097,074	27,990
Western Pacific	239,111	7,563

Table 2: Countries with highest number of confirmed COVID-19 cases as of 10th July 2020.

Country	Confirmed cases	Total death
United States of America	3,329,821	137,174
Brazil	1,810,691	70,623
India	850,358	22,687
Russia	720,547	11,205
Peru	319,646	11,500
Chile	312,0219	6,881
Spain	300,988	28,403
Mexico	289,174	34,191
The United Kingdom	288,953	44,798
Iran	255,117	12,635

1.6.12 Radiology findings

Radiology finding may vary with patient's age, disease progression, immunity status, comorbidity, and initial medical intervention. In a study describing 41 of the initial cases of 2019-nCoV infection, all 41 patients had pneumonia with abnormal findings on chest computed tomography (CT-scan). Abnormalities on chest CT-scan were also seen in another study of 6 cases, in which all of them showed multifocal patchy ground-glass opacities notably nearby the peripheral sections of the lungs. Data from studies indicate that the typical of chest CT-scan findings are bilateral pulmonary parenchymal ground-glass and consolidative pulmonary opacities. The consolidated lung lesions among patients five or more days from disease onset and those 50 years old or older compared to 4 or fewer days and those 50 years or younger, respectively. As the disease course continue, mild to moderate progression of disease were noted in some cases which manifested by extension and increasing density of lung opacities. Bilateral multiple lobular and subsegmental areas of consolidation are typical findings on chest CT-scan of ICU-admitted patients. A study among 99 patients, one patient had pneumothorax in an imaging examination.

1.6.13 Control and prevention strategies

COVID-19 is clearly a serious disease of international concern. By some estimates it has a higher reproductive number than SARS, and more people have been reported to have been infected or died from it than SARS. Similar to SARS-CoV and MERS-CoV, disrupting the chain of transmission is considered key to stopping the spread of disease. Different strategies should be implemented in health care settings and at the local and global levels. Health care settings can unfortunately be an important source of viral transmission. As shown in the model for SARS, applying triage, following correct infection control measures, isolating the cases and contact

tracing are key to limit the further spreading of the virus in clinics and hospitals. Suspected cases presenting at healthcare facilities with symptoms of respiratory infections (e.g. runny nose, fever and cough) must wear a face mask to contain the virus and strictly adhere triage procedure. They should not be permitted to wait with other patients seeking medical care at the facilities. They should be placed in a separated, fully ventilated room and approximately 2 m away from other patients with convenient access to respiratory hygiene supplies. In addition, if a confirmed COVID-19 case requires hospitalization, they must be placed in a single patient room with negative air pressure – a minimum of six air changes per hour. Exhausted air has to be filtered through high efficiency particulate air (HEPA) and medical personnel entering the room should wear Personal Protective Equipment (PPE) such as gloves, gown, disposable N95, and eye protection. Once the cases are recovered and discharged, the room should be decontaminated or disinfected and personnel entering the room need to wear PPE particularly facemask, gown, eye protection. In a community setting, isolating infected people are the primary measure to interrupt the transmission. For example, immediate actions taken by Chinese health authorities included isolating the infected people and quarantining of suspected people and their close contacts. Also, as there are still conflicting assumptions regarding the animal origins of the virus (i.e. some studies linked the virus to bat while others associated the virus with snake), contacts with these animal fluids or tissues or consumption of wild caught animal meet should be avoided. Moreover, educating the public to recognize unusual symptoms such as chronic cough or shortness of breath is essential therefore that they could seek medical care for early detection of the virus. If large-scale community transmission occurs, mitigating social gatherings, temporary school closure, home isolation, close monitoring of symptomatic individual, provision of life supports (e.g. oxygen supply, mechanical ventilator), personal hand hygiene, and wearing personal protective

equipment such as facemask should also be enforced. In global setting, locking down Wuhan city was one of the immediate measures taken by Chinese authorities and hence had slowed the global spread of COVID-19. Air travel should be limited for the cases unless severe medical attentions are required. Setting up temperature check or scanning is mandatory at airport and border to identify the suspected cases. Continued research into the virus is critical to trace the source of the outbreak and provide evidence for future outbreak.

Drug treatment available against novel coronavirus-induced pneumonia

Drug	Dosage	Mode of administration	Duration of treatment
IFN-α	5 million U or equivalent dose each time, 2 times/day	Vapour inhalation	No more than 10 days
Lopinavir/ritonavir	200 mg/50 mg/capsule, Two capsules every time, twice a day	Oral	No more than 10 days
Ribavirin	500 mg each time, 2 to 3 times/day in combination with IFN-α or lopinavir/ritonavir	Intravenous infusion	No more than 10 days
Chloroquine phosphate	Each day, 2 times a day, chloroquine phosphate 500 mg (300 mg chloroquine)	Oral	No more than 10 days
Arbidol	200 mg each time, 3 times/day	Oral	No more than 10 days
hydroxychloroquine sulfate	200 mg, three times per day during ten days	Oral	No more than 10 days
Umifenovir	200 mg TDS	Oral	for a duration of 10 days
Teicoplanin	daily dose of 400 mg	Oral	No more than 10 days
Melatonin	3 mg, 6 mg and 10 mg (dose of 1 g/d for a month, there was no adverse reports of the treatment)	Oral	-
Tocilzumab	4-8 mg/kg or 400 mg standard dose IV once, with the option to repeat a dose in 12 hours (not to exceed a total dose of 800 mg)	Intravenous infusion	-
Lactoferrin	doses ranging from 100 mg to 4.5 g a day	doses ranging from 100 mg to 4.5 g a day	-

1.7 MEASURES PUT IN PLACE BY THE HOSPITAL FOR THE PHARMACIST PROTECTION

Pharmacies have to act fast during public health emergencies such as the coronavirus disease 2019 (COVID-19) pandemic. As an essential business, it is of the highest importance to put policies into place to protect pharmacy staff so that the business can continue to function and serve the needs of its patients during this public health crisis. Frontline health-care workers have higher rates for seropositivity than non-clinical staff during a pandemic. Using guidance from governmental and professional organizations can aid in the rapid development of safety protocols for pharmacy personnel. Resources from institutions such as the Centers for Disease Control and Prevention (CDC), pharmacy consultant organizations, wholesaler and buying groups, and state and national pharmacy associations are the first step to developing and implementing new emergency policies.

Using such guidance, some key best practices for protecting pharmacist during the COVID-19 pandemic include:

- Closing the pharmacy retail front-end and diverting patients to drive-through and/or curbside service.
- Expanding home delivery services.
- Enrolling patients in appointment-based medication synchronization to reduce patient trips to pharmacy.
- Using shift teams to prevent crossover infection.
- Increasing hand washing and pharmacy cleaning.

- Including pharmacy personnel in decision-making whenever possible and ensuring explicit and constant communication on policies, procedures, and best practices for implementation into busy pharmacy workflow

In an effort to keep pharmacist healthy, hospital pharmacy closed the front-end of all retail locations and are operating via the drive-through, curbside pickup, and delivery services. Their delivery services have been greatly expanded and pharmacy staff are making increased efforts to enroll all patients in appointment-based medication synchronization to decrease the number of trips that patients are making to the pharmacy. A shift team-based approach has been implemented to increase the degree of separation inside the pharmacies. This team-based approach divides pharmacy staff into different shifts and does not allow for any crossover of staff members. Implementing this approach also prepares the pharmacy for a scenario where if any of the team members becomes infected, the whole team of the individual infected would quarantine and the pharmacy would still be able to operate with the opposite team. With the implementation of this policy, increased hand washing has been integrated into pharmacy workflow. It is also mandatory that staff thoroughly clean the pharmacy at the open and close of business. Determining policies and procedures to select for the pharmacy also followed a team-based approach to ensure buy-in and to ensure that each team member was on the same page. Once the decisions were made, explicit direction was given to personnel on how to best implement hand washing into workflow and two different cleaning solutions (with different contact times) have been provided to pharmacies with instructions on how to use each and when. It is also important to make address the individual staff member's desire for additional precautions, such as permission to wear masks. In some cases, a pharmacy may not be able to close their front end. In these cases, additional precautions such as the installation of plexiglass

partitions at checkout lanes as well as providing signage and marking on floors indicating where to line up to maintain 6 feet of distance from other patients to promote social distancing. As essential businesses in a public health crisis, such as the COVID-19 pandemic, pharmacies have an obligation to ensure access to patient care and medication access. However, in doing so, pharmacists and support personnel who on the frontlines are potentially at risk of infection. To protect pharmacy staff, it is critical to stay up-to-date on the latest guidance from governmental and professional organizations, adapt guidance to the unique characteristics of the pharmacy, and ensure consistent communication with explicit instructions for pharmacy personnel.

1.8 MEASURES PUT IN PLACE BY THE PHARMACIST TO PREVENT THE SPREAD OF COVID-19

1.8.1 Providing event-driven pharmaceutical care

Pharmacists ensure medication safety, assist health care team to have best therapeutic outcome. The clinical pharmacy team is valued for directly making the difference for best possible outcome. Since 27th February 2020, when the first COVID-19 case was reported in Nigeria, health and health care systems have been disrupted extensively and most of the countries are still facing and fighting against the immediate consequences of higher mortality and morbidity rate due to severe acute respiratory syndrome coronavirus (SARS-CoV-2). Improving patient safety and work quality involve coordinated efforts of multidisciplinary health care team, including clinical pharmacist as the vital team member. In this evolving situation where the COVID-19 patients needed new therapies and experimental drugs been used for them, the need for a clinical pharmacist was more than ever before. To combat this challenging situation clinical pharmacy lead redesigned the front-line clinical pharmacist activities and job responsibilities. In normal routine our clinical pharmacists are involved in all the critical care wards of adult and pediatric units, where they participate in daily patient bedside rounds with the health care team. After the

outbreak of COVID-19 and influx of infected patients, national guidelines were developed, and to stop the human-to-human transmission of infections minimum staff were allowed to be involved, isolation wards and rooms were created and allocated for COVID-19 patients. With these fears and limitations, clinical pharmacy lead planned to provide event-driven pharmaceutical care in our hospital both for adult and pediatric COVID-19 patients. These practices go beyond the routine activities of the clinical pharmacist, including patient medications profile review, prescribing supports to physicians, and counseling the patients. The most important aspect of the event-driven pharmaceutical care is to ensure the usage of off-label drugs appropriately, as several drugs are prescribed off-label for treating this life-threatening infection. The role of clinical pharmacist demands to evaluate the recent literature and published guidelines of these off-label used medications as the associated adverse drug reactions (ADRs) of few of the off-label used drugs include flu-like symptoms, fever, and fatigue, which are actual symptoms of the COVID-19 disease. Liver damage is reported in COVID-19 patients, which might be related to SARS-CoV-2 or drug-induced. Newly developed kidney damage has been reported in renal histopathological analysis of COVID-19 patients' postmortem findings. Here the role of the clinical pharmacist is very crucial to save the lives through monitoring the patients on drugs which may cause hepatoxicity, renal toxicity, or any other ADR and finally adjust the doses based on organ functionality.

1.8.2 Tele-clinical pharmacist activities for making individualized treatment strategies with multidisciplinary team

Activities redesigned and now clinical pharmacists are doing round virtually specifically in COVID-19 unit. Distinctive challenges may be experienced while physically distant from the patient's bedside round. Pharmacists must be more productive and more efficacious in

transmitting input and knowledge to the team independently. Established relationships with the team had positive effect. Teamwork as multidisciplinary and collaboration is amazing. Physician, pharmacist, nurses, and respiratory therapists, infectious diseases and other specialties like cardiology, nephrology, etc., put the input of their expertise. With persistence compassion for medication safety, patient medication profiles have been reviewed by clinical pharmacists through computerized pharmacy system and health information management system. Room discussion planned where whole team sits together and discusses patient management without exposure to the bedside. All medical staff engaged in this activity wearing all personal protective equipment (PPE). Bedside staff and doctors get connected to this discussion group through video conference calls and discuss the matters related to the patients. When needed telephonic communication was arranged and created a WhatsApp group of all health care professionals. It is always made sure that pharmacist can be approached for any information required and all the medication adjustments are done with pharmacist recommendations. This initiative significantly helped in COVID-19 recovery in terms of providing them safe and effective pharmaceutical care. The number of clinical pharmacist interventions also support this initiative. Another important aspect of event-driven pharmaceutical care is to provide online real-time clinical supports to health care providers working in the battle zone, including front-line physicians, nurses, and pharmacists. Despite resource limitations and restrictions due to pandemic situations, clinical pharmacy lead created several communication ways, available 24 hour. A WhatsApp group was created including all the clinical pharmacists and front-line physicians for immediate communication with all at a time and for timely decision-making. Infectious disease (ID) faculty directly involved ID-clinical pharmacist in real-time for pharmacotherapy consultation and quick decision-making after the approval of off-label drugs.

1.8.3 Keeping the front-line health care providers updated through drug evaluation and evidence-based guidelines

Presently, there is no defined treatment option for treating COVID-19 and none of the used medicine has been specifically tested for its safety and efficacy for COVID-19. In the ongoing evolving situation of the COVID-19 pandemic, the need for drugs increased and is very uncertain, especially for those drugs used off-label. In Nigeria where pharmacists are already mitigating drugs shortage by various strategies, it requires more dedicated pharmacy support to conduct evidence-based drug evaluations and establishing the guidelines for our population. For example, judicious use of chloroquine phosphate and antivirals for preventing and treating COVID-19, evaluating efficacy and safety of antivirals, and glucocorticoids with monitoring throughout. Further assisting front-line physicians for optimal dosing schedules, appropriate routes of administration. Establishing local rational drug use guidelines is always a practical approach to mitigate the drugs-related issues in the local population. In our hospital, clinical lead pharmacists play a vital role with the hospital leads to establish these guidelines. For updating all the health care providers about the use of medications in COVID-19 patients regularly updated through the generalized mail for all. Addressing the drug indications, available dosage form, dosing schedule, suitable solvents, possible routes of administration, associated ADRs, precautions, and conditions requiring dose adjustment, such as pregnancy, lactation, pediatric and elderly patients, renal and hepatic dose adjustments, etc. In addition, to keep all the front-line pharmacists updated is highly crucial and challenging. Team members share their learnings and aim for the distinctive goal to overcome this challenge. Recent literature and treatment updates are regularly shared to provide the best possible care to the patients. All this activity is done through emails, WhatsApp groups, and online meetings.

1.8.4 Guidance for pharmacy staff for continuity of services; redesigned shift hours

Health care staff exposure to the hospital during the pandemic of COVID-19 includes the risk of being infected. To continue the services and to keep the front-line pharmacy staff safe and fit to work, we decided to decrease the exposure of staff to hospital and to minimize the cluster. As in the case, if any staff gets COVID-19 infected quarantine is required, thus this initiative of duty hours redesign helped to have enough backup staff to keep the functionality of the department. In addition, due to reduced hospital admissions and clinic visits this redesigned duty hours also reduced the institutional financial burden. In this situation of persistent anxiety, pharmacy lead maintaining the staff morale high through appreciation and showing empathy for hospital staff directly dealing with the patients and appreciating their selflessness. Staff is specifically trained and reinforced to adhere to personal protective equipment use guidelines.

1.8.5 Mitigation of drug shortages issues

Drug shortage during the COVID-19 pandemic has affected almost all the countries. Shortage of both prescribed and over-the-counter drugs may develop. Disruption in the local production process and international transport are the main reasons for the short supply in our country. In our pharmacy, we established an early warning system by following the American Society of Health-System Pharmacists (ASHP) guidelines, through ongoing active surveillance conducted by pharmacists and addressing the shortage issues promptly.

1.8.6 Reduced medication wastage by implementation of unit dosage system

The pharmacy department has always been an integral section of the hospital for managing and treating the patient. When faced with major public health emergencies from infectious diseases, 2019-nCoV, the concern is to protect staff so that they do not become infected and protect them from becoming vector or carriers. Prevention and control are done in inpatient pharmacy

medication distribution within the hospital. Physicians enter medication orders for inpatient through physician order entry system (CPOE) and pharmacist verifies the orders while sitting in the satellite pharmacy. In our hospital normally medications are supplied for 24 h to the nursing station by practicing modified-unit-dosage-drug-delivery system. Medication carts are prepared by technicians and pharmacist check for accurate dispensing before sending to the wards. Practicing modified 24-h medications supply, in return, increases the number of medications return to pharmacy because of extra dose dispensing of more than one time and new order entry for the admitted patients. Various medications are returned to pharmacy from the ward where they were not used. Before the COVID-19 pandemic, a number of unused medications are return to pharmacy in the form of regular credit that was about 15% of the total medications dispensed. In critical areas after positive cases being treated in hospital, the drugs exposed directly to the environment of the wards of COVID-19 were decided not to be returned for credit to protect the staff. We decided to make changes in the process flow to stop this wastage of expensive medications and ultimately save the cost. Modified unit dosage form (24 h supply) was switched to unit dosage form (one dose of a drug dispensed at a time). As a result, not only the wastage is prevented, but the number of medicine return to pharmacy also decreased and saved the pharmacy staff time previously wasted in rework. Along with the implementation of the actual unit dosage system, we also modified the process and placed drugs cassette in the area entry, only the drugs need to be administered were taken to the isolation ward and all others kept outside so that they can be returned. Dedicated medication staff were assigned to handover the medicine to the assigned staff. Implementing actual unit dose dispensing system is a big challenge in resource-limiting settings, but we accepted and met the goals of reduced wastage and improved safety.

1.9 SERVICES PROVIDED BY THE PHARMACIST DURING THE COVID-19 PANDEMIC

- ❖ Disease prevention and infection control service
- ❖ Adequate storage and drug supply service
- ❖ Patient care and support for healthcare professional service

1.9.1 Disease prevention and infection control service

a) Decrease the visits to the pharmacy area by colleagues from other units, encouraging them to use phones or in-basket messages from the computerized physician order entry system to communicate; change of staff plan; implementation of system changes in perioperative areas; utilization of automation to reduce traffic of pharmacy staff in the hospital; discard of all unused medications dispensed for COVID-19 patients; floor markings on the ground to section areas of the pharmacy that patients can stand in while waiting or being helped.

b) Change in mode of drug delivery.

c) Repacking of bulk packages of masks into unit packets containing the rationed amount and distributed them for residents in their communities; education and consultation on proper hygiene strategies; disseminating of accurate information to counter myths and misinformation; and providing of emotional support to alleviate public concerns arising from the COVID-19 crisis.

d) Help consumers differentiate surgical masks from other types of face masks not made for protection against virus transmission; price control of surgical masks within reasonable price range; and implementing “The Guaranteed Mask Supply for Macao Residents Scheme” in response to the new government policy.

e) Designing safety transfer devices to avoid contacting patients in drugs dispensing; adjusting the route and time of drug transportation in the hospital and using designated elevators and vehicles for drug delivery; publicized the prevention and control of COVID-19 to the public free of charge online.

f) Staff redeployment and staffing modifications; sourcing and using of PPE; installation of hand-sanitizing stations and plexiglass dividers in pharmacies.

g) Staff redeployment and staffing modifications; sourcing and using of PPE; installation of hand-sanitizing stations and plexiglass dividers in pharmacies.

1.9.2 Adequate storage and drug supply service

a) Switch of intravenous to oral medications and intravenous infusion to intravenous push to prevent drug shortages; management of drug stocks using therapeutic interchange; communication with the supply team about adequate supplies of medications.

b) Contribution with medication access by making telephone calls to outside pharmacies, insurance companies, and patients or families.

c) Drug formulary and purchase, storage, and distribution of drugs; critical care trolleys loaded with all kinds of critical care drugs.

d) Establishing pharmacies from grounds up, including locating the ideal pharmacy location and procuring necessary equipment; compiling drug formulary; cataloging and stocking formulary drugs; resolving drug shortages.

e) Establishing a list of COVID-19 therapeutic drugs to control drug supply schemes; implementing online drug procurement; managing donated medicine.

f) Developing a list of medications required for treatment of COVID-19 patients to guide the drug supply and calculating medication quantities to purchase; developing new

medication and supply storage and delivery mechanisms; creation of a virtual dashboard to clearly communicate current strategic supply inventory.

1.9.3 Patient care and support for healthcare professional service

a) Participation in the development of a COVID-19 protocol; conduction of clinical interventions; monitoring and prevention of drug-drug interactions and ADR; updating pharmacy professionals about new scientific research.

b) Participation in interdisciplinary inpatient rounds using Microsoft Teams; conduction patient profile reviews to assess the safety and efficacy of medication therapy using secure remote access to patient information in the EMR; providing patient education and counseling via telephone and Microsoft Teams; continuation of quality improvement projects, formulary and inventory management, and research by conference calls, email, and telephone communication as well as Microsoft Teams and other video conferencing platforms; providing ambulatory care services remotely.

c) Providing medication recommendations during virtual rounds with HCP; providing remote education for the patients to assist their learning of medications and lifestyle choices in discharge or admission.

d) Online review of electronic orders; providing online medication consultation for 484 patients using WeChat; providing medication and health education in the WeChat group; use a module radio station to inform the patients about the medication, rational nutrition and diet suggestions for COVID-19, and self-protection and medication guidance after discharge.

e) Development of a medicinal dictionary for formulary drugs to be docked into the CDS to provide prescribing support; education for patients on medications taken at the hospital

and upon discharge; providing drug information to physicians especially concerning drugs that general practitioners are not familiar with a focus on off-label drug use, and interactions between TCMs and western medicines; medication reconciliation to ensure the safe transition of care.

f) Managing and providing recommendations on warfarin dose adjustment to over 500 patients via a mobile phone app.

g) Monitoring ADR and providing ADR information; participating in the multidisciplinary diagnosis and treatment of COVID-19 patients; participating in multidisciplinary consultations; monitoring drug interactions, implementing remote pharmaceutical services; caring out medication review.

h) Participating in virtual meetings and inpatient rounds; patient counseling via smartphones or telehealth visits; participating of the COVID-19 pharmacotherapy working group that provided initial treatment recommendations published weekly on institutions intranet; developing of a guidance for patients receiving biologics who were at risk for COVID-19 acquisition due to immunosuppression so that providers could advise them to suspend therapy if necessary; coordinated many patients' transition from infusions to self-administered medications.

1.10 IMPACTS OF COVID-19 ON HEALTHCARE WORKERS

Healthcare workers consists of all paid and unpaid persons serving in healthcare settings who have the potential for direct or indirect exposure to patients or their infectious secretions and materials (e.g., doctors, nurses, medical laboratory scientists, maintenance staff, clinical trainees, volunteers etc.) (CDC, 2020a). These are the armies in the frontline of the fight against the Coronavirus Disease – 2019 (COVID-19) and their safety should be an urgent focus in the global

response to pandemic (Nigeria Health Watch, 2020). The Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) has infected about more than 4.6 million people, leaving more than 310,000 people dead in about 188 countries across the globe (JHU-CSSE, 2020). Globally, healthcare workers have been in the spotlight since the fight against the COVID-19 pandemic started and every country experiencing the onslaught of the virus now consider their healthcare workers as national heroes for the gallant role they are playing in combating the pandemic. One of the cardinal principles of hospital and healthcare is that it should cause no harm to the patient or to the healthcare giver. However, for many healthcare workers in the frontline of the COVID-19 outbreak response, the outcome is different (Joob and Wiwanitkit, 2020). They stand the risk of acquiring infection directly, while attending to patients or indirectly, while handling and testing patient's specimens (Schwikowski, 2020; Minder and Peltier, 2020; Nadarajanet al., 2020; Imai et al., 2020; Majumdar and Mandl, 2020). At the moment, COVID-19 is not only zoonotic in nature, it has become both community and hospital-acquired infection. The potential for exposure to COVID-19 is generally higher for healthcare workers than other members of the society because of the nature of their work (They work in hospital environment where sick people are being tested, treated and monitored). If they escape exposure to COVID-19 back at home, their work in the hospital environment put them in the harms-way (Ağalarand Engin, 2020; All Africa, 2020; Nadarajan et al., 2020). Considering the infectiousness of SARCoV-2, it has become very expedient for health workers to be fully informed, equipped, and strictly adopt the required biosafety measures so as to stay safe from the disease (Wang et al., 2019; CDC, 2020b; WHO 2020a). Preventing exposure to COVID-19 in the healthcare settings depends on healthcare workers understanding of the followings: The infectious nature of SARCoV-2, the

routes by which SARCoV-2 is acquired, the techniques that are the most hazardous and safe working practices.

The increased hospitalization associated with the COVID-19 pandemic is far over stretching the resilience of the health system of most countries. Hospital and healthcare workers (Doctors, Nurses, Medical Laboratory Scientists, etc) are already overwhelmed by the numbers of people requesting testing and treatment at the same time (Nigeria Health Watch, 2020). Besides the COVID-19 patients, they also have other category of patients to care for, including those with diabetes, cancer, liver failure, kidney failure, hypertensive etc (CDC, 2020b). This results in long and distressing work shifts to meet health services requirements. High prevalence rates of severe insomnia, anxiety, depression, somatization, and obsessive-compulsive symptoms have been reported among healthcare workers since the fight against COVID-19 started. Thus, the presence of these symptoms in addition to the life status of daily fighting against COVID-19 suggests that they must cope with psychological distress and are at risk of allostatic overload (Fava et al., 2019).

Stigmatization towards working with COVID-19 patients, stress from using strict biosecurity measures (such as physical strain of protective equipment, need for constant awareness and vigilance, strict procedures to follow, preventing autonomy, physical isolation, higher demands in the work setting (10 hours of shifts per day), reduced capacity to use social support due to physical distancing and stigma, insufficient capacity to give self-care and insufficient knowledge about the long-term exposure to individuals infected with COVID-19 place additional stress on frontline healthcare workers (International Council of Nurses, 2020). Furthermore; healthcare workers are afraid they might infect their family members and live-in relatives. Thus, hospitals are under pressure to provide additional accommodation at workplaces (Schwikowski, 2020).

According to the WHO Director General (Dr. Tedros Ghebreyesus), nothing less than 3,000 health workers has been infected globally, with many paying the supreme price with their lives in a bid to provide health care to COVID-19 patients(All Africa, 2020). Doctors and health workers, more especially in Africa, are protesting the poor working conditions, scarcity of personal protective equipment (PPE), poor hazards allowances, lack of life insurances and the fear of infection from the coronavirus (MacLeod, 2020). Some are staying away from work, yet they are urgently needed. As of May, 01 2020, the total number of health workers infected with novel coronavirus outbreak in Nigeria has reached 113, according to the country's health minister (Dr. Osagie Ehanirein). Around 6% of the COVID-19 cases in the country composed of healthcare workers, with some of them working in private clinics without necessary training and necessary precautions. They have not only infected themselves, but have also become a source of infection to their families. Many exposed health workers are currently either in quarantine or isolation; while others have lost their lives since the fight against COVID-19 started. Consequent upon these, workflow is being disrupted with possible discontinuity of healthcare services in some cases (Anadolu Agency, 2020). If COVID-19 cases continue to escalate, it will no doubt, put many healthcare personnel out of work, and more hospitals will be stretched thin – especially in communities that were already facing a shortage of healthcare workers and resources. For example, Idaho, New Mexico and Vermont all had fewer than 10 physicians and surgeons per 100,000 people in 2018, compared with about 5,883 per 100,000 people in New York and more than 1,200 each in Virginia and Massachusetts, according to an analysis by USA Facts (Galvin, 2020).

As healthcare workers become increasingly infected, the burdens increase on healthcare systems already groaning under the strain of an expanding pandemic. Now, infected healthcare workers

are increasingly being recognized as vectors for the spread of the virus. The risk of exposure to COVID-19, the accompanying health impacts and the need for biosafety measures among health workers remain critical as it affects the quality of testing, treatment and health care rendered, not only to COVID-19 patients, but also to other category of patients receiving healthcare services in the hospital for reasons other than COVID-19.

1.11 COVID-19 AND BIOSAFETY MEASURES

1.11.1 Personal Protective Equipment

Healthcare workers working in COVID-19 laboratories, clinics, isolation and treatment centres must be fully equipped with the necessary Personal Protective Equipment (PPE) designed to protect wearer's skin, eyes, mucous membranes, airways and clothing contact with infectious agents (CDC, 2020c, WHO, 2020d). These include: 1) Gloves (Protect hands), 2), Gowns/aprons (Protect skin and/or clothing), 3) Masks (Protect mouth/nose), 4) Respirators (Protect respiratory tract from airborne infectious agents, 5) Goggles (Protect eyes), and 6) Face shields (Protect face, mouth, nose, and eyes). Risk consider include: nature of contact (direct or indirect) and duration of contact with patient or patient's specimens. Factors Influencing PPE Selection include: Type of exposure anticipated, potential splash/spray versus touch, category of isolation precautions, durability and appropriateness for the task and lastly, fitness. The use of PPE is very critical in protecting healthcare professional against COVID-19; however, they are not substitute for proper infection prevention and control practice (WHO, 2002). Meanwhile, healthcare Workers must be familiar and proficient in wearing (donning) and removing (doffing) the PPE. This requires specific training (ECDC, 2020; WHO, 2020e). As a general rule, it is mandatory for health professional to perform hand hygiene (Wash hands with soap and water or use an alcohol-based

hand sanitizer) between steps if hands get contaminated during and immediately after removal of PPE (CDC, 2020a; 2020c).

1.12 SAFETY PRECAUTION IN THE USE OF PPE

1.12.1 Gloves

Protective gloves should be worn before touching COVID-19 patients, when taking samples from patients and when handling patient's specimens for laboratory analyses.

- The hands should be clean before putting on gloves for a sterile procedure.
- Opportunities for "touch" contamination must be limited as much as possible.
- Touching the face or adjusting PPE with contaminated gloves must be avoided.
- Touching environmental surfaces during patient care should be avoided, except as necessary.
- Gloves should be changed during use if torn, and when heavily soiled (even during use on the same patient) and after use on each patient.
- Used gloves should be discarded in appropriate receptacle.
- Disposable gloves should never be washed or reused.
- Re-usable gloves must be properly decontaminated and washed, while on the hands and after removal (Nigeria Centre for Disease Control, 2020b).

1.12.2 Mask

Masks are made to guarantee one-way protection for healthcare workers (To capture their droplets).

- Mask must be checked to ensure it has no defects, such as a tear or torn strap or ear loop.
- The top ties should be brought to the crown of head and secure with a bow; while the bottom ties should be secured in a bow at the nape of neck.

- The mask should be removed when no longer in clinical space and the patient intervention is completed.
- For ear loop mask, the mask should be removed from the side with the head tilted forward.
- Mask should not be worn if wet or soiled; a new mask instead should be obtained.
- Mask should not be left hanging off one's ear or hanging around neck.
- Used mask should be discarded after wearing once.
- Touching the front of the mask should be avoided, as it is contaminated after use (WHO, 2020f).

1.12.3 N95 Respirator

Respirators are tight masks that must seal off the wearer's face and work in a bidirectional sense, in particular for the protection of the wearer (e.g. protect from dust or small particles present in the air).

- The N95 respirator should be checked to ensure it has no defects such as holes or torn straps.
- It should be worn for protection against very small particles that float in the air (e.g., Tuberculosis, measles, or chickenpox).
- The manufacturer's instructions must be followed during donning and doffing of the N95 respirator.
- The N95 respirator must be properly fitted -making sure the nose and mouth are completely covered. It must have a complete seal all around. Complete face seal check must be ensured, after donning the respirator.
- Wet or soiled N95 respirator should not be worn; a new one should be obtained instead.
- N95 respirator that hasn't been properly fit tested should not be worn. Proper fit is essential.
- N95 respirator with air leaks around the edges should not be worn.

- It should never be shared with others; pathogens can spread that way.
- The front of the N95 respirator should not be touched as it is contaminated after use. The straps should not be snapped, as that may spread pathogens (Nigeria Centre for Disease Control, 2020b).

1.12.4 Gown

- Gown should be secured at the base of the neck and at the waist or as indicated by manufacturer.
- Wearer must sure that the gown completely
- covers clothing-front to back-if design of gown allows or as indicated by manufacturer.
- Gown should be removed by slowly rolling it inside out and away from the body. Contaminated front and sleeves should be kept inside the bundle.
- Gown must not be re-use for the same or different patient. Disposable and reusable gowns are single time use items.
- Contaminated gowns must not be allowed to hang out of the garbage.
- Lastly, contaminated gown must not be worn outside of the patient care area or laboratory or taken home for the purpose of washing (Nigeria Centre for Disease Control, 2020b).

1.13 MAXIMUM CONTAINMENT LABORATORY

Avoiding biohazards of all forms is very critical for health workers in the fight against any pandemic (Chang et al., 2020a). Work with pathogens in the various Risk Groups (1, 2, 3 and 4) requires different conditions for containment and different equipment and procedures to conduct work safely (WHO, 2004). To this end, there are four Biosafety Levels of laboratory: Basic, Biosafety Level 1, Basic, Biosafety Level 2, Containment, Biosafety Level 3 and Maximum Containment, Biosafety Level 4 (Cheesbrough, 2009). Assignment of an agent to a biosafety

level for laboratory work is based on a risk assessment. The COVID-19 virus (SARCoV-2) falls into the Risk Group 4 category, just like its counterparts: SARS-CoV-1 and MERS (Guamer, 2020). The pathogens in this group are deadly and offer a high risk to the laboratory worker and to the community. They can cause serious disease and are readily transmitted from one individual to another. Effective treatment and preventive measures are not usually available. The Maximum Containment laboratory, Level 4 is intended for work with viruses in Risk Group 4, for which the most-strict safety precautions are necessary (CDC, 2007). These laboratories are usually separate buildings with strictly controlled access through air locks and exit through decontaminant showers. They have pressure gradients between their various rooms and all air from rooms and safety cabinets is filtered twice before discharge to the atmosphere. All effluents from sinks, lavatories, etc. are decontaminated before discharge into the public sewer. The staff of these laboratories are specifically trained for the work they do (CDC, 2020d). However, in resource limited countries, where the Maximum Containment laboratory, Level 4 is lacking, it is required that any work done on COVID-19 virus must be carried out in Biosafety Level 3 (BSL-3) facility or at least a BSL-2 as required by International Standard Organization (International Standards Organization, 2014).

1.14 BIOSAFETY CABINETS

Biosafety cabinets are intended to protect laboratory workers from aerosols and airborne particles (CDC, 2007; Tran et al., 2012). There are three kinds of safety cabinet, Classes I, II, and III. Class I and Class II cabinets are used in diagnostic and containment laboratories for work with Risk Group 3 organisms. Class III safety cabinets are used almost exclusively for Risk Group 4 organisms such as SARS-CoV-2 (CDC, 2020d). This type of cabinet is totally enclosed and is tested under pressure to ensure that no particles can leak from it into the room. The

operator works with gloves which form part of the cabinet. Air enters through a filter and is exhausted to atmosphere through one or two more filters. Work should be done in the middle to rear of the cabinet, not near the front. The operator should avoid bringing the hands and arms out of the cabinet while working. After each set of manipulations and before withdrawing the hands, the operator should wait for 2–3 minutes to allow any aerosols to be swept into the filters. After finishing work in a safety cabinet, the hands and arms may be decontaminated and should be washed immediately. Safety cabinets should be swabbed out with a suitable disinfectant after use and regularly decontaminated with formaldehyde. Decontamination is essential before the filters are changed (Cheesbrough, 2009; WHO, 2004; 2020c).

1.15 SAFE TRANSPORT OF SPECIMENS FOR COVID-19 TESTING

Safety measures are needed to ensure specimens from suspected, probable or confirmed cases of COVID-19 are transported safely and with care. Transport of specimens within national borders should comply with applicable national regulations. While international transport of potentially COVID-19 virus containing samples should follow the United Nations (UN) Model Regulations, and any other applicable regulations depending on the mode of transport being used (Cheesbrough, 2009; WHO, 2019).

1.16 MANAGEMENT OF MEDICAL WASTES

Medical wastes should be segregated into non-infectious waste (e.g food reminants), infectious waste (e.g gloves), highly infectious waste (e.g test tube containing patient's specimen) and sharp waste (e.g needle and syringe), before being disposed. Wastes from COVID-19 patients are considered highly infectious and must be handled with utmost caution. Solid and liquid medical wastes must be handled separately and according to existing safety rules for handling of medical wastes (Cheesbrough, 2009; Waste360, 2020).

1.17 DISPOSAL OF MEDICAL WASTES

1.17.1 Incineration

An effective disposal method is incineration (i.e., destruction by burning). This is a practical and effective method of disposing of laboratory waste including contaminated disposables and specimens in non-reusable containers, e.g. faeces from COVID-19 patient. Purpose-built incinerators are rarely available in resource-limited countries. Open burning is more common. The materials to be incinerated must be carried to the incineration site in closed leakproof puncture resistant containers (Cheesbrough, 2009; Waste360, 2020).

1.17.2 Burial in a deep pit or landfill

Burying medical wastes prevents it becoming a hazard provided the pit is: located in a safe fenced off area, is sufficiently deep (4–5 metres) and wide (1–2 metres), has a strengthened rim, and is kept covered. The disposal pit should not be used for items that do not decompose, e.g. plastic laboratory wares. These are best incinerated. Ideally all infectious medical wastes should be decontaminated or incinerated before it is discarded in a pit or landfill. Once a week the waste should be covered by a layer of quicklime, or if unavailable by soil or leaves. If a local landfill site is available, local health authority guidelines should be followed regarding its use (medical waste must never be disposed of with household waste).

1.18 DEFINITION OF TERMS

The coronavirus pandemic has introduced us to new words and phrases. Understanding what they mean can help you protect yourself from infection and decrease anxiety.

Asymptomatic

Not showing any symptoms (signs of disease or illness). Some people without any symptoms

still have and can spread the coronavirus. They’re asymptomatic, but contagious. Fever, cough, and shortness of breath are the main symptoms of COVID-19. Call your healthcare provider or a UVA clinic if you have any of the symptoms.

The Centers for Disease Control (CDC)

The United States' federal health protection organization.

Communicable

Similar in meaning as "contagious." Used to describe diseases that can be spread or transmitted from one person to another.

Community spread

The spread of an illness within a particular location, like a neighborhood or town. During community spread, there's no clear source of contact or infection.

Confirmed case

Someone tested and confirmed to have COVID-19.

Congregate settings

Public places that can get crowded and where contact with infected people can happen. This includes places like malls, theaters, and grocery stores.

Coronavirus

A family of related viruses. Many of them cause respiratory illnesses. Coronaviruses cause COVID-19, SARS, MERS, and some strains of influenza, or flu. The coronavirus that causes COVID-19 is officially called SARS-CoV-2, which stands for severe acute respiratory syndrome coronavirus 2.

COVID-19

The name of the illness caused by the coronavirus SARS-CoV-2. COVID-19 stands for "coronavirus disease 2019."

Epidemic

A situation where more cases of disease than expected happen in a given area or to a group of people.

Epidemiology

The branch of medicine that studies how diseases happen and spread in communities of people. A person who studies epidemiology is called an epidemiologist.

Flattening the curve

Controlling the rate of new cases of COVID-19.The "curve" refers to a graph showing the number of cases of COVID-19 that happen over a period of time. Many cases happening in a short period of time create a graph that looks like a tall spike. By using protective measures, we can slow down how many new cases happen. This is the "flattening" of the curve – on the graph, the flattened curve winds up looking more like a gentle hill. Too many new cases happening in a short time can create a serious problem. Hospital systems only have so many supplies, like beds and PPE. There are also only so many doctors, nurses and other healthcare workers. Too many patients at one time can overwhelm these resources. This means sick and injured people may not get needed treatment.

Flattening the curve reduces the numbers of people needing healthcare at one time. This allows hospitals to treat patients throughout the pandemic.

Immunity

Your body's ability to resist or fight off an infection. Your immune system is a network of cells

throughout your body that help you avoid getting infected and help you get better when you are infected.

Immunocompromised

Also called immune-compromised or immunodeficient. This describes someone who has an immune system that can't resist or fight off infections as well as most people. This can be caused by several illnesses. Some treatments for illnesses can also cause someone to be immunocompromised.

Incubation period

The time it takes for someone with an infection to start showing symptoms. For COVID-19, symptoms appear 2-14 days after infection.

Outbreak

A sudden increase of a specific illness in a small area.

Pandemic

When a new disease spreads to many countries around the world.

PPE

PPE Stands for personal protective equipment. This includes masks, face shields, gloves, gowns and other coverings that healthcare workers use to prevent the spread of infection to themselves and other patients.

Person under investigation (PUI)

When a health provider suspects a person has the coronavirus. But no test has confirmed the infection.

Presumptive positive case

When a person tests positive for the coronavirus, but the CDC hasn't confirmed the case.

Quarantine

Sometimes called "isolation." Quarantines keep people away from each other to prevent the spread of disease. Stay-at-home orders are a type of quarantine. Governments sometimes order quarantines to keep healthy people from exposure to infected people. They give rules to behavior and boundaries to movement.

Screening

This is not the same as a coronavirus test. This step helps healthcare workers to decide if you actually need a coronavirus test. It's a series of basic questions about your health condition and recent history. Screening may also include other common healthcare procedures, like taking your temperature.

Self-isolation

Also called self-quarantine. Separating yourself when you're sick from healthy individuals to prevent spreading illness.

Shelter in place

An order for people to stay where they are and not leave for their own protection. A stay-at-home order is a kind of shelter-in-place order.

Social distancing

Also called physical distancing. It means putting space between yourself and other people at all times. The goal is to slow down how fast an infection spread. Stay-at-home orders are a way that the government can enforce social distancing. The CDC recommends keeping at least six feet between you and others around you in public. Social distancing also includes avoiding crowds and groups in public.

Symptomatic

When a person shows signs of illness. For COVID-19, that includes cough, fever or shortness of breath.

Ventilator

A machine that supplies oxygen to a patient with severe lung issues. People with severe cases of COVID-19 can't provide enough oxygen to their body. Their lungs are too limited. A ventilator machine requires a specialist or respiratory therapist. It is more invasive than an oxygen mask. Many hospitals don't have a supply of ventilators big enough for the COVID-19 outbreak.

World Health Organization (WHO)

This United Nations organization monitors and protects public health around the world.

Zoonotic

This means that a disease was originally was detected in animal, but is now infecting people also.

1.19 OBJECTIVES OF THE STUDY

1.19.1General objective

The general objective of this research work was to determine the roles of the hospital pharmacist during the COVID-19 pandemic in Nigeria.

1.19.2 Specific objectives

- To identify and describe core services provide by the pharmacist during the Covid-19 pandemic.
- To determine how pharmacist were to carry out pharmaceutical care in the hospital despite the social distance.
- To determine if pharmacist counsel patient on thee important of multivitamins such as Vitamin C on diet.

- To determine if proper measures were put in place to ensure pharmacists protection during the Covid-19 pandemic in rendering pharmaceutical care such as hand sanitizer, face mask and other safety measures
- To assess the economic impact of Covid-19 on the community pharmacy practice
- To assess if pharmacist counsel patients on their medication.

CHAPTER TWO

METHODOLOGY

2.1 INTRODUCTION

This segment of the study deals with a description of the method employed in undertaking the study, which includes the research design, population and sampling technique, the research instruments, operationalization of variables, and the method of data analysis. All these sub-points are considered as follows:

2.2 THE RESEARCH DESIGN

The research design employed in this study is the descriptive research. These design forms the full basis upon which the data shall be analyzed and then generalized in attempt to make inferences. The study is designed to find out the role of clinical pharmacists in hospital settings during the Covid-19 Pandemic in Nigeria, Benin-City in Edo state.

2.3 POPULATION AND SAMPLING

Because this study is conducted to examine the role of hospital pharmacist during the covid-19 pandemic, pharmacists in hospital practice in Edo state; the population consists of all levels of pharmacists working in hospital pharmacies in Benin-City. Unarguably, pharmacists are active healthcare professionals working in a health organization and hospital pharmacies are firms that have a clear organizational structure. Accordingly, the population of this study is composed of registered pharmacists working in either private or government hospital pharmacies in Benin-City, Edo state. At the time of the study over 200 pharmacists were working in both of the organizations (private and government hospital pharmacies) taking part in the study. Simple Random Sampling Method is chosen in the course of this study, this is due to the fact that simple random technique is a sample selection method whereby every member or element of the

population has an equal and known chance of being selected. However, the ultimate purpose of simple random sampling, then, is to ensure that a set of elements is drawn from the study population in such a way that the statistics computed from the sample data will accurately portray the population from which the elements were selected. Besides, it ensures the sample chosen is free from bias and partiality.

2.4 SAMPLE SIZE

Two hundred (200) respondents were considered appropriate as sample size. This sample cut across the target population. A total of two hundred (200) questionnaires were administered to pharmacists working in hospital practice in either of private and government hospital in Benin-City, Edo state. One hundred and eighty (180) completed and retrieved, indicating 90% response rate. It is recommended that a feasible sample size should be between 100 and 200, in order to be adequate for the data analysis (Obeidat et al. 2013). Hence, our sample size is considered adequate for the data analysis. This questionnaire is composed of 22 questions that represent all the variables of this research. The respondents answered all items on four-point Likert-scales.

2.5 INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria: Registered pharmacists working in pharmacies in a registered private or government hospital in Benin-City, Edo state.

Exclusion Criteria: Respondents that refused to complete the questionnaire.

2.6 SOURCES OF DATA

The sources of data employed for this study is the primary data.

2.7 RESEARCH INSTRUMENT

The research instrument for this study consists of a structured questionnaire consisting of two sections. Section A includes the demographic-data of respondents, Section B contain services

provided by the pharmacist during the covid-19 pandemic, Section C contain measures put in place by the hospital for the pharmacist protection, Section D contain measures put in place by the pharmacist to prevent the spread of covid-19,options which the targeted respondents have a choice to choose from. This is in order to obtain first-hand information and adequate answers from the respondents.

2.8 VALIDITY OF THE INSTRUMENT

To ensure content validity, the researcher adopted scales and items that were previously developed and used by other researchers with similar interest. Also a draft of the questionnaire was formulated, and then it was reviewed by my research supervisor in the department of clinical pharmacy, University of Benin, Benin-city who has sufficient knowledge and experience in this scope, to insure that each item is measuring what is intended to be measured, and to avoid ambiguity and complexity in the phrasing of questions.

2.9 DATA COLLECTION METHOD

In order to ensure a high response rate, a cover letter accompanied each questionnaire to respondents explaining the research objectives with the assurance of the confidentiality of the information were provided. Each cover letter was sent directly to the pharmacists in the hospitals where they were working, and they were asked to fill in the survey. To enhance the response rate, questionnaires were delivered and collected in person. The cover letter offered a brief introduction to the research and its objectives, and requested written consent from those pharmacists who were willing to take part in the study. Pharmacists were given one week to fill the questionnaires before of collection.

2.10 DATA ANALYSIS

The questionnaires will be analyzed descriptively based on the percentage frequency distribution of the respondents' demographics. All data were analyzed using the statistical package for the social science version 24 (IBM: SSPS Inc.)

CHAPTER THREE

RESULTS AND DATA PRESENTATION

The demographic statistics of our respondents are presented in the tales below

Table 3.1: Demographic data

Variables	Frequency	Percent (%)	Valid percent	Cumulative percent
Age				
>50	4	2.2	2.2	2.2
18-30	75	41.7	41.7	43.9
31-40	58	32.2	32.2	76.1
41-50	42	23.3	23.3	100.0
Sex				
Female	76	42.2	42.2	42.2
Male	104	57.8	57.8	100.0
Marital status				
Married	98	54.4	54.4	54.4
Single	82	45.6	45.6	100.0
Occupation				
Pharmacist	180	100	100	100
Year(s) of service				
< 1 year	59	32.8	32.8	32.8
>20 years	13	7.2	7.2	40.0
1-10 years	79	43.9	43.9	83.9
11-20 years	29	16.1	16.1	100.0
Religion				
Christian	169	93.9	93.9	93.9
Muslim	10	5.6	5.6	99.4
Others	1	0.6	.6	100.0

Section B:

Table 3.3: Services provided by the hospital pharmacist during the covid-19 pandemic

Variables	Frequency	Percent	Valid percent	Cumulative Percent
Did the pharmacist counsel patients on the need for social distancing				
Yes	179	99.4	99.4	99.4
No	0	0	0	0
Maybe	1	0.6	0.6	100.0
Did the pharmacist counsel patients on the need to always use alcohol-based hand sanitizers				
Yes	174	96.7	96.7	96.7
No	1	0.6	0.6	97.2
May	5	2.8	2.8	100.0
Did the pharmacist counsel patients on the importance of adherence to their medication				
Yes	178	98.9	98.9	98.9
No	0	0	0	0
Maybe	2	1.1	1.1	100.0
Did the pharmacist counsel patients on the proper use of a face mask				
Yes	171	95.0	95.0	95.0
No	2	1.1	1.1	96.1
Maybe	7	3.9	3.9	100.0
Did the pharmacist counsel on the need to include vitamin c rich fruits to their diet				
Yes	155	86.1	86.1	86.1
No	6	3.3	3.3	89.4

Maybe	19	10.6	10.6	100.0
How would you assess pharmaceutical care provided by pharmacist during the covid-19 pandemic				
20%	7	3.9	3.9	3.9
40%	30	16.7	16.7	20.6
80%	108	60.0	60.0	80.6
100%	35	19.4	19.4	100.0

Table 3.4: Measures put in place by the hospital for the pharmacist protection

Variables	Frequency	Percent	Valid percent	Cumulative percent
Did the hospital provide free face mask for pharmacist				
Yes	162	90.0	90.0	90.0
No	18	10.0	10.0	100.0
Did the hospital provide free alcohol-based hand sanitizers for pharmacist				
Yes	161	89.4	89.4	89.4
No	19	10.6	10.6	100.0
Did the hospital provide free alcohol-based hand sanitizers for pharmacist				
Yes	129	71.7	71.7	71.7
No	51	28.3	28.3	100.0
Were pharmacist paid hazard allowances during the covid-19 pandemic				
Yes	116	64.4	64.4	64.4
No	64	35.6	35.6	100.0
How would you assess the measures in the pharmaceutical sector during the covid-19 pandemic				
5%	6	3.3	3.3	3.3
20%	16	8.9	8.9	12.2
80%	128	71.1	71.1	83.3
100%	30	16.7	16.7	100.0

Table 3.5:measures put in place by the pharmacist to prevent the spread of covid-19

Variables	Frequency	Percent	Valid percent	Cumulative Percent
Did the pharmacist practice social distancing when counselling the patient				
Yes	176	97.8	97.8	97.8
No	1	0.6	0.6	98.3
Maybe	3	1.7	1.7	100.0
What was the distance between the pharmacist and the patients				
1 meter	6	3.3	3.3	3.3
2 meters	61	33.9	33.9	37.2
3 meters	89	49.4	49.4	86.7
Others	24	13.3	13.3	100.0
Was free hand sanitizers / soap and water present in the pharmacy				
Yes	174	96.7	96.7	96.7
No	2	1.1	1.1	97.8
Maybe	4	2.2	2.2	100.0
Was it mandatory for all patients to wear a face mask before entering the pharmacy				
Yes	178	98.9	98.9	98.9
No	2	1.1	1.1	100.0
How would you assess the measures put in place by the pharmacist to prevent the spread of covid-19				
5%	1	0.6	.6	.6
20%	19	10.6	10.6	11.1
80%	106	58.9	58.9	70.0
100%	54	30.0	30.0	100.0

CHAPTER FOUR

4.1 DISCUSSION

This study aims to determinethe role of hospital pharmacist during the Covid-19 pandemic in Nigeria. Of the 180 completed questionnaires, all the respondents work in the hospital (n=180, 100%).Table 3.2 depicts the age categories into which the respondents fall. In responding to the question of age, the respondents' answers displayed point to a fair spread of ages amongst the hospital pharmacists. There were (n=4, 2.2%) participants aged greater 50 years, (n=75, 41.7%) aged 18-30 years,(n=58, 32.2%) aged 31-40 years, (n=42, 23.3%) aged 41-50 years. The majority the pharmacists (n=75, 41.7%) have spent between 5-10years in hospital practice. This scenario reflects a component of varying age groups within hospital, with senior and most senior pharmacist having the advantage of sharing their views and roles pharmacists played during Covid-19 pandemic in Nigeria.

Table 3.2demonstrates the distribution of the gender of the respondents. The table shows that (n=76, 42.2%) female respondents completed the questionnaire and(n=104, 57.8%) male respondents. This result indicates that more of male's participants were working in the various hospital during the Covid-19 pandemic than female participants.

Table 3.2 illustrates the status the respondents. n=98, 54.4% were married and n=82, 45.6% of the respondents are single.

Table 3.2 all the respondents are licensed pharmacists working in different hospital in Benin-City.

Table 3.2 tabulates year(s) of service of respondents in their hospital. A substantial proportion of respondents, (n=59, 32.8%)fall within less than one year of service, they are mostly intern pharmacists. (n=13, 7.2%) of the respondents fall within greater 20 years of service. Majority (n=79, 43.9%) of the respondent's hospital pharmacists fall within 1-10 years of service, (n=29,

16.1%) of the respondents fall within 11-20 years of service. Table 3.2depicts the distribution of the philosophical orientation of respondents. The majority of respondents (n=169, 93.9%) had a Christian philosophical orientation. Minority of respondents (n=10, 5.6%) had a Muslim philosophical orientation. Whereas (n=1, 0.6%) had other philosophical orientation.

The results in table 3.3 revealed that (n=179, 99.4%) of the respondents agreed pharmacist counsel patients on the need for social distancing, while only (n=1, 0.6%) said maybe. This clearly indicated that pharmacist played a role in educating patients on the need for social distancing, during Covid-19 pandemic in Nigeria. Social distancing, also called physical distancing. It means putting space between yourself and other people at all times. The goal is to slow down how fast an infection spread. Stay-at-home orders are a way that the government can enforce social distancing. The CDC recommends keeping at least six feet between you and others around you in public. Social distancing also includes avoiding crowds and groups in public. Designing safety transfer devices to avoid contacting patients in drugs dispensing; adjusting the route and time of drug transportation in the hospital and using designated elevators and vehicles for drug delivery; publicized the prevention and control of COVID-19 to the public free of charge online.

The results in table 3.3 revealed that (n=174, 96.4%) of the respondents agreed pharmacist counsel patients on the need to always use alcohol-based hand sanitizers, only (n=1, 0.6%) responded No, whereas (n=5, 2.8%) of the respondents said maybe. Alcohol-based hand sanitizer will help prevent transmission of coronavirus into the nose or mouth, in a scenario where there is contamination with the hand.

The results in table 3.3: revealed that (n=178, 98.9%) of the respondents agreed pharmacist counsel patients on the importance of adherence to their medication. No None of the pharmacist said no, while (n=2, 1.1%0 said maybe. Medication adherence is the voluntary cooperation of the patient in taking drugs or medicine as prescribed, including timing, dosage, and frequency. The term concordance, which has developed over the past decade, is based on the patient-centered philosophy that the patient and the health care provider (HCP) play equal roles in medication decision-making.1 These terms have replaced the term "compliance," which places no emphasis on the patient's contribution to the patient–physician relationship. Good adherence is especially important in the management of chronic diseases. Pharmacists have a major role in improving medication adherence in patients. They can confirm that patients are on the correct medications and are not taking any other treatments/drugs that may undermine the effectiveness of important therapies. Monitoring ADR and providing ADR information; participating in the multidisciplinary diagnosis and treatment of COVID-19 patients; participating in multidisciplinary consultations; monitoring drug interactions, implementing remote pharmaceutical services; caring out medication review.

The results in table 3.3: revealed that (n=171, 95.0%) of the respondents agreed pharmacist counsel patients on the proper use of a face mask; (n=2, 1.1%) said otherwise and (n=7, 3.9%) responded maybe. Masks are made to guarantee one-way protection for healthcare workers (To capture their droplets). Mask must be checked to ensure it has no defects, such as a tear or torn strap or ear loop. Touching the front of the mask should be avoided, as it is contaminated after use (WHO, 2020f).

Table 3.3 disclosed that (n=155, 86.1%) of the respondents ticked Yes, the pharmacist counsel patients on the need to include Vitamin C rich fruits to their diet; (n=6, 3.3%) of respondents ticked No, while (n=19, 10.6%) of the respondents ticked Maybe. Vitamin C keeps your bones and connective tissues healthy, allows you to absorb iron and helps prevent infections. Vitamin C is important for: your skin, bones and connective tissue healthy, helping wounds heal, helping prevent infections, helping you absorb iron from your food.

The results in table 3.3: revealed that (n=7, 3.9%) represent the lowest percentage the respondents that assessed pharmaceutical care during the Covid-19 pandemic; while (n=108, 60.0%) represent the highest percentage the respondents that assessed pharmaceutical care provided by the pharmacist. Pharmacists have proven to be an indispensable member of the frontline healthcare team during this COVID-19 pandemic in Nigeria. Pharmaceutical care services, including patient education and counselling, providing information, addressing medication shortages, teleconsultation, medication review, optimizing medication regimen, adverse drug reaction monitoring and addressing the medication-related problems are being delivered by the pharmacists in this ongoing pandemic. COVID-19 pandemic has forced pharmacists to adapt to new situations and challenges, which has further enhanced their roles and responsibilities.

The results in table 3.4 revealed that (n=162, 90%) of the respondents agreed pharmacist the hospital provide free face mask for pharmacist, (n=18, 10%) responded No. Masks are made to guarantee one-way protection for healthcare workers (To capture their droplets).

The results in table 3.4 revealed that (n=161, 89.4%) of the respondents agreed that the hospital provide free alcohol-based hand sanitizers for the pharmacists, while (n=19, 10.6%) respondents disagreed. The best way to prevent the spread of infections and decrease the risk of getting sick is by washing your hands with plain soap and water, advises the Centers for Disease Control and Prevention (CDC). Washing hands often with soap and water for at least 20 seconds is essential, especially after going to the bathroom; before eating; and after coughing, sneezing, or blowing one's nose. If soap and water are not available, CDC recommends consumers use an alcohol-based hand sanitizer that contains at least 60% alcohol.

The results in table 3.4 revealed that (n=129, 71.7%) of the respondents agreed that the hospital provide free covid-19 test for pharmacist, while (n=51, 28.3%) of the respondents disagreed by saying No.

The results in table 3.4 revealed that (n=116, 64.4%) of the respondents agreed pharmacist paid hazard allowances during the covid-19 pandemic, while (n=64, 35.6%) of the respondents disagreed. There is varied opinion from various hospital pharmacist

The results in table 3.4 revealed that (n=6, 3.3%) represent the lowest percentage the respondents that assessed pharmaceutical sector during the Covid-19 pandemic; while (n=128, 71.1%) represent the highest percentage the respondents that assessed pharmaceutical sector. The emergence of this pandemic brought with it, unprecedented challenges, and changes to all the nations of the world, Nigeria inclusive. As a result of this, a country such as Nigeria which is heavily dependent on importation to meet its demands, will suffer a huge blow to several sectors including the pharmaceutical industry. Nigeria is only able to meet 25% of its local demand. Nigeria's pharmaceutical market predominantly runs on imports of active pharmaceutical ingredients machinery and quality control analytical equipment from abroad. In Nigeria, over

70% of the prescribed medications are produced from active ingredients primarily sourced from firms in China and India. Taking these into consideration alongside the travel restrictions in most countries, and the recently imposed travel ban on Nigerians, the current and future drug security in Nigeria is threatened.

The results in table 3.5 revealed that (n=176, 97.8%) of the respondents agreed that the pharmacist practice social distancing when counselling the patient, while (n=0.6%) of the respondents said No, and (n=3, 1.7%) responded Maybe. Social distancing, also called "physical distancing," means keeping a safe space between yourself and other people who are not from your household.

In table 3.5the responses to the question were varied, (n=6, 3.3%) responded 1 meter, (n=61, 33.9%) responded 2 meters, (n=89, 49.4%) responded 3 meters, (n=24, 13.3%) responded others. According to CDC, to practice social or physical distancing, stay at least 6 feet (about 2 arm lengths) from other people who are not from your household in both indoor and outdoor spaces. Social distancing should be practiced in combination with other everyday preventive actions to reduce the spread of COVID-19, including wearing masks, avoiding touching your face with unwashed hands, and frequently washing your hands with soap and water for at least 20 seconds.

The results in table 3.5 revealed that (n=174, 96.7%) of the respondents agreed that there was free hand sanitizers / soap and water present in the pharmacy, (n=2, 1.1%) disagreed, while (n=4, 2.2%) responded maybe.

The results in table 3.5 revealed that (n=178, 98.9%) of the respondents agreed that there was mandatory for all patients to wear a face mask before entering the pharmacy, (n=2, 1.1%) disagreed. This will serve as one of the precautionary measures to contain the spread of Covid-19.

The results in table 3.5 revealed that (n=1, 0.6%) represent the lowest percentage the respondents that assessed the measures put in place by the pharmacist to prevent the spread of covid-19; while (n=106, 58.9%) represent the highest percentage the respondents. Measures put in place my hospital pharmacists include: disease prevention and infection control measure, adequate storage and drug supply service, patient care and support for healthcare professional service

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 CONCLUSION

This study highlights the various roles and pharmaceutical care services provided and implemented by pharmacists during the COVID-19 pandemic in Nigeria. Pharmaceutical care services like patient education and counselling, social distancing, wearing of mask, providing information, addressing medication shortages, teleconsultation, medication review, optimizing medication regimen, adverse drug reaction monitoring and addressing the medication-related problems are being delivered by the pharmacists in this ongoing pandemic. However, COVID-19 pandemic has forced hospital pharmacists in Nigeria to adapt to new situations and challenges, which has further enhanced their roles and responsibilities beyond their usual scope. This adversity has opened up new avenues for pharmacists, which they can capitalize on post-COVID-19. As a multidisciplinary healthcare team member, pharmacists should always find ways to overcome the barriers or challenges and look for opportunities to provide need-based pharmaceutical care services in a coordinated effort involving public–private partnerships.

5.2 RECOMMENDATION

- The exposed hospital pharmacist should be excluded from work and self-isolate immediately.
- Specimen for COVID-19 testing should be collected as soon as possible.
- Temperature and respiratory symptoms should be monitored daily for 14 days after the last day of exposure to a COVID-19 patient, while awaiting test result.
- The state COVID-19 response team should be contacted immediately if symptoms suggestive of COVID-19 begin to appear.

- ❖ Treatment of confirmed cases should be initiated promptly following the recommended treatment protocol of the state (Self-medication should be avoided).
- ❖ Clinically recovered healthcare worker should only be discharged after confirmation of negative viral status usually by at least two consecutive polymerase chain reaction (PCR) tests.
- ❖ Following laboratory confirmation of negative viral status, recovered healthcare worker may report back to his/her duty post and continue with his/her day-to-day activities.
- ❖ Hospitals should engage in training and development programs for pharmacist in helping them updated on the new development in the practice of the profession as well as help them improve their competence in the practice of the profession as it helps them to stay committed to the organization with the belief that their growth is of priority to the hospital where they practice.
- ❖ Periodic performance appraisal should also be adopted by hospital management to serve as a means of helping pharmacists see how their effort is helping the hospital to achieve her goals. This will always serve as a means of feedback to pharmacists in the hospital as regards the areas, they need improvement.

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APPENDIX

A STUDY ON THE ROLE OF HOSPITAL PHARMACIST DURING THE COVID-19 PANDEMIC IN NIGERIA
Kindly tick the appropriate option.
(Your participation is highly is anonymous and highly appreciated)
SECTION A (DEMOGRAPHIC DATA)

1. Age (years) : (a) 18-30 [ ] (b) 31-40 [ ] (c) 41-50 [ ] (d) > 50 [ ]
2. Sex : (a) Male [ ] (b) Female [ ]
3. Marital Status : (a) Single [ ] (b) Married [ ] (c) Divorced [ ] (d) Widow [ ]
4. Occupation : (a) Pharmacist [ ] (b) Pharmacy Intern [ ]
5. Religion : (a) Christian [ ] (b) Muslim [ ] (c) Others [ ]

SECTION B (PHARMACEUTICAL CARE)

1. Were patients counselled on the need for social distancing? (a) Yes [ ] (b) No [ ] (c) Maybe [ ]
2. Were patients counselled on the need to always use hand sanitizers? (a) Yes [ ] (b) No [ ] (c) Maybe [ ]
3. Despite social distancing, do you feel pharmacists were able to provide adequate pharmaceutical care? (a) Yes [ ] (b) No [ ] (c) Maybe [ ]
4. Were patients counselled on the need to always use a face mask? (a) Yes [ ] (b) No [ ] (c) Maybe [ ]
5. Were patients counselled on the need to avoid self medications for treating covid-19 symptoms?(a) Yes [ ] (b) No [ ] (c) Maybe [ ]
6. How would you assess pharmaceutical care provided by pharmacist during the covid-19 pandemic? (a) 20% [ ] (b)
   50%[ ] (c) 80% [ ] (d) 100% [ ]

SECTION C (FINANCING)

1. Did the hospital provide free face mask for pharmacist? (a) Yes [ ] (b) No [ ]
2. Did the hospital provide free hand sanitizers for pharmacist? (a) Yes [ ] (b) No [ ]
3. Did the hospital provide free covid-19 test for pharmacist? (a) Yes [ ] (b) No [ ]
4. Were pharmacist paid hazard allowances during the covid-19 pandemic? (a) Yes [ ] (b) No [ ]
5. How would you rate the financing in the pharmaceutical sector during the covid-19 pandemic? (a) 5% [ ] (b) 20%[ ] (c) 80% [ ] (d) 100% [ ]

SECTION D (MEASURES PUT IN PLACE BY THE PHARMACIST TO PREVENT THE SPREAD OF COVID-19)

1. Was social distancing practiced by the pharmacist when counselling patients? (a) Yes [ ] (b) No [ ] (c) Maybe [ ]
2. What was the distance between the pharmacist and the patients ? (a) 1 metre [ ] (b) 2 metre [ ] (c) 3 metre [ ] (d) Others [ ]
3. Was hand sanitizers / soap and water present in the pharmacy (a) Yes [ ] (b) No [ ] (c) Maybe [ ]
4. Was it mandatory for all patients to wear a face mask before entering the pharmacy? (a) Yes [ ] (b) No [ ] (c) Maybe [ ]
5. How would you assess the measures put in place by the pharmacist to prevent the spread of covid-19? (a) 5% [ ] (b) 20%[ ] (c) 80% [ ] (d) 100% [ ]