# COVID-19 PANDEMIC AND GLOBAL HEALTH WORKERS' MORTALITY: CHALLENGES, IMPLICATIONS AND PROGNOSIS OF ACTION FOR NIGERIA HEALTH CARE DELIVERY SYSTEM

BY

#### MIKE A. USHIE

Associate Professor, Department of Social Work, University of Calabar, P.M.B. 1115 Calabar, Nigeria Cross River State, Nigeria

#### ANTIGHA O. BASSEY

Associate Professor, Department of Sociology University of calabar, P.M.B. 1115 Calabar, Nigeria

#### **UMO A. BASSEY**

Lecturer, Department of Library and Information Science University of Calabar, P.M.B. 1115 Calabar, Nigeria Cross River State, Nigeria

#### CHRISTIANA A. USHIE

Lecturer, Department of Environmental Education
University of Calabar, P.M.B. 1115 Calabar, Nigeria Cross
River State, Nigeria

&

#### EBINGHA E. ENANG

Professor of Demography and Social Statistics and Dean Faculty of Social Sciences
University of Calabar, P.M.B. 1115 Calabar, Nigeria Cross
River State, Nigeria

#### **ABSTRACT**

COVID-19 is one of the pandemics in the world with the widest spread in terms of shortness of time and space coverage. Very few countries in the world are spared so far. Incidence of death is very high occasioned by COVID-19, especially among health care workers fighting the pandemic which constitutes 10% of global mortality due to COVID-19. Ex-post facto exploratory analysis was used

covering December 2019 to end of April, 2020 relying on secondary data professionally sourced in line with the independent variable COVID-19 pandemic and the dependent variable health workers' mortality. COVID-19 history, symptoms, transmission, containing strategies, were examined in view of attendant mortality, especially of health workers. Analysis was made following functional theory. It was concluded that COVID-19 caused high mortality which endangered health workers of all categories, especially skilled health workers like doctors and nurses. Increasing health workers mortality will cause lack of professionals to manage health facilities in developing countries like Nigeria and impede on the possibility of attaining skilled health workers density, which is a strategic component of achieving Sustainable Development Goals. It was recommended among others that personal protection and test kits should be provided by government, international agencies and humanitarian concerns, and health workers should be given adequate training on management of COVID-19.

**Keywords**: COVID-19, Pandemic, Health workers, Mortality, Healthcare delivery system, Sustainable development goals, Health workers density

#### INTRODUCTION

COVID-19 is a pandemic affecting the world, where only very few countries are yet to register incidence of coronavirus COVID-19 infection. In Africa, as at 2<sup>nd</sup> of May, 2020, only Lesotho is COVID-19 virus free (Shabam, 2020). Consequently, all other 53 countries in Africa have recorded 42,769 cases of COVID-19 at different magnitudes, with 1759 deaths and 14,129 recoveries (Shabam, 2020). The situation is not different in other continents like Europe, Asia, North and South America. Death occasioned by COVID-19 is gradually depleting world population, with great effect on occupational distribution of population, with particular reference to healthcare workers in diverse professional groups. This situation prompted the need to examine the impact of COVID-19 pandemic on mortality of healthcare

workers and its implication on healthcare delivery system, especially in a developing country like Nigeria.

Healthcare workers is an umbrella category, comprising all health professionals and providers, including medical doctors, pharmacists, medical laboratory scientists, radiographers, physiotherapists, dentists, optometrists, nurses, medical social workers, medical recorders and bio-statisticians, health administrators, health technicians, health educators and instructors, health assistants, paramedics, etc. European Centre for Disease Prevention and Control ECDC (2020) indicates that as at 3<sup>rd</sup> May, 2020 Africa has 42,778 cases, Asia 541,019 cases, America 1,434,136 cases, Europe 1,361,853 cases, Oceania 8,183 with corresponding deaths of 1,760 for Africa, 19,259 for Asia, 83,135 for

America, 139,031 for Europe and 120 for Oceania all of COVID-19 pandemic. The health

workers are front liners in battling COVID19 virus and they become victims of death from the virus, and the most largely affected professional group.

#### STATEMENT OF THE PROBLEM

Daily reports of new incidence are provided by disease control agencies in various countries, international disease control agencies at regional level and the World Health Organisation. Such reports indicate new infections, recoveries, deaths and accumulated update. Consequently, deaths of health workers are reported daily due to COVID-19 pandemic. This poses a serious threat to the 2006 World Health report which identified a minimum health worker density of 2.3 skilled health workers (physicians, midwives and nurses) per 1,000 population (World Health Organisation, 2016). The minimum health worker density is an integral component of achieving Sustainable Development Goals (SDGs), targeted at 2030. To what extent can the SDGs be realized in the face of increasing mortality of health workers poses a serious hindrance, which constitutes a global problem. What should be done to reverse the trend of increasing health workers' mortality provides a challenge to be investigated, in order to provide solutions or possible remedy to reduce the incidence of health workers' mortality.

#### **COVID-19 PANDEMIC**

COVID-19 is a highly transmittable and pathogenic viral infection which is caused by the severe acute respiratory syndrome Coronavirus 2, commonly identified or called SARS-COV-2 which was first identified in a China Town, Wuhan. According to Shereem, Kham,

Kazimi, Bashir and Rabeea (2020), COVID19 virus, SARS-COV-2 genomic analysis showed that it is phylogenetically related to severe acute respiratory syndrome (SARS) like bat virus, causing bats to be considered as one of the possible reservoir of SARSCOV-2.

Kahn and Mcintosh (2005) noted that human coronaviruses began in 1965 and at 2003, not less than five new human coronaviruses were identified which include severe acute respiratory syndrome coronavirus responsible for significant morbidity and mortality. Coronavirus constitutes a big family, comprising different viruses, in which some cause common cold in people, while others infect animals like bats, camels and cattle. After first detection of SARS-COV-2 which causes COVID-19 in Wuhan, China, in late 2019, from where it set off as a global pandemic spreading to the whole world. Experts assumed that SARS-COV-2 started from bats just like MERS and SARS before transmission to human beings (WebMD,

2020).

#### **Symptoms of COVID-19**

The symptoms of COVID-19 are wide ranging from mild to severe. These symptoms may appear in people between two to fourteen days after exposure to the virus, as presented by Centre for Disease Control and Prevention (2019).

#### **Specific symptoms**

- 1. Cough
- 2. Shortness of breath or difficulty breathing

#### **Broad symptoms**

- 1. Fever
- 2. Chills
- 3. Repeated shaking with chills
- 4. Muscle pain
- 5. Headache
- 6. Sore throat, and
- 7. New loss of taste or smell

The infection may occur when two or three of the combination of core and specific symptoms manifest in a person. Emergency sign which is likely to herald full blown infection includes:

- 1. Trouble breathing
- 2. Persistent pain or pressure in the chest
- 3. New confusion or inability to arouse
- 4. Bluish lips or face

The symptoms and emergency signs are similar in both children and adults, though children generally exhibit mild symptoms. Centre for Disease Control and Prevention (2019) observed that "older adults and people

who have severe underlying medical conditions like heart or lung disease seem to be at higher risk for developing more serious complication from COVID-19 disease. It is in view of this observation that special care is required for older people and those with underlying medical conditions to prevent them from infection from COVID19 virus, as their mortality rate is higher than others.

#### Mode of transmission of COVID-19

There are three major ways in which COVID-19 virus is transmitted. These are: Contact transmission, droplets and aerosol (Ghose, 2020). Contact transmission may be direct or indirect, such as person-to-person and touching surfaces. Respiratory droplets can occur through sneezing, coughing or talk. Aerosol transmission occurs when the virus is suspended in the air, which is why COVID-19 is considered as airborne infection. It is due to this fact that contact closeness should be restricted to 6 feet or 1.8 meters.

### **Containing COVID-19**

Since there is no generally accepted or universally approved vaccine or drug for treatment and prevention of COVID-19, World Health Organisation, Centre for Disease Control in various countries and regions of the world came up with strategies and methods of containing COVID-19, which in Nigeria alone as at 1<sup>st</sup> May, 2020 recorded a total of 2,170

confirmed cases, 351 discharged and 68 deaths (Nigeria Centre for Disease Control, 2020). Summary of containing strategies include:

- 1. Use of facemask
- 2. Ensuring social distance of 6 feet or 1.8 meters in social gatherings
- 3. Use of personal protective kits
- 4. Isolation of people with symptoms
- 5. Quarantine of confirmed patients
- 6. Application of lockdown (total or partial depending on intensity and spread)
- 7. Interstate and intercity lockdown
- 8. Closure of schools, offices, markets, churches and all places that promote group social gathering
- 9. Symptomatic treatment of patients
- 10. Regular hand washing and use of hand sanitizers

Clinical steps for handling COVID-19 outbreak are provided in World Health Organisation guide (WHO, 2020)

#### **Pandemic**

According to Hickok (2020), pandemic refers to a global outbreak of a disease. Pandemics are first categorized as epidemic, which means rapid spread of disease across a particular region or regions. Consequently, COVID-19 was an epidemic in China and Asia, before it spread to other continents of the world, which caused the World Health Organisation, being the sole body to determine which infection is a pandemic, to declare COVID-19 as a global pandemic on 12<sup>th</sup> of March, 2020. Between its

emergence in the late 2019 and March 2020, COVID-19 became a rampaging pandemic, killing people everywhere in the world, therefore altering global demographic mortality.

#### Mortality

simple language application, mortality refers to the incidence of death in a given population. It also refers to susceptibility to death. National Cancer Institute (2020) defined mortality as the number of deaths in a certain group of people in a certain period of time and the rate of mortality is determined per 1000 of the total population. Mortality could be reported for people who have a particular disease, like cancer or COVID-19. Mortality could also be reported of people living in a particular area of a country or region, people of certain gender, age, ethnic group, professional or occupational group. This invokes the concern for mortality of medical workers in the whole world during this period of COVID-19 pandemic, as they are affected by COVID-19 virus in their effort to save world population from rampage of COVID-19 virus.

#### **METHODOLOGY**

The effect of COVID-19 pandemic is examined on health workers' mortality, in which COVID-19 pandemic is independent variable and health workers' mortality is the dependent variable. It was an attempt to examine a cause-effect relationship using exploratory ex-post

facto analysis. Exploratory was carried out due to inadequacy of data and to provide opportunity for further empirical analysis. Secondary data was used, sourced by a professional academic librarian to ensure relevance with variables under examination.

Merton's (1936) functional theory was considered as appropriate theoretical framework, as COVID-19 is a health phenomenon occurring in the society and exert impact on the society, as social function is the objective consequence of a pattern of action on the system in which it takes place. Functional theory is an outgrowth of the general systems theory. The health sector where health workers work is a subsystem and anything happening in the subsector affects the entire system and vice versa. It is in this light that mortality of health workers is seen in line with Merton's (1936) postulate as a latent function, which refers to the unintended consequences. The intended consequences refers to manifest functions, which involve medical workers' effort to save lives by treating patients of COVID-19.

# Analysis of global health workers' mortality arising from COVID-19 pandemic

Since the onset of COVID-19, medical personnel of different categories are dying from infection. Their duty is to treat patients of COVID-19 and in the course of treatment, they contact the virus and many of them are dead due to infection from the virus. As reported by Coronavirus Resource Centre (2020), "As first-line healthcare workers care for patients with COVID-19, they commit

themselves to difficult draining work and also put themselves at risk of infection, where hundreds throughout the world have died". Their aim is to make sure they are not forgotten and promise to keep updating the list, which indicate name, age, professional and institutional affiliations, location, status in profession and country.

By so doing, providing an up-to-date record of health workers mortality from COVID-19 virus infection.

To ensure continuous update based on the importance of keeping record of health workers' mortality occasioned by COVID-19 pandemic, Coronavirus

Resource Centre (2020) provided an online form for people to supply incidence of health workers dead in the whole world, which is subject to confirmation by appropriate professional associations in country from where report is sent before documentation to ensure validity and reliability. The online list of medical workers that died due to COVID-19 infection in their process of treating and providing health services includes: doctors. nurses. clinical microbiologists, assistants, nurse hospital administrative staff, healthcare social workers, health hygiene specialists, pharmacists, radiologists, physician assistants, dentists. physical therapists, surgical technicians, paramedics, emergency medical technician instructors, student doctors and nurses, haematologists, mental health assistants and laboratory technicians.

Zhan, Quin, Xue and Zhu (2020) reported that as at 24th February, 2020, a total of 3387 of 77,262 patients with COVID-19 in China were healthcare workers and 23 out of 3387 health workers patients died as at 3<sup>rd</sup> April 2020. Chustecka (2020) reported that more than 60 doctors have died in Italy due to COVID-19 infection. The President of Federation of Medical Professionals in Italy Filippo Anelli stated that "our doctors have been sent to war unarmed, due to lack of personal protective kits, lack of proper information about COVID-19, facemasks, disposable gowns, inadequate skills in handling infectious disease like COVID-19". The situation is not better in other countries. As at 9<sup>th</sup> of April 2020, 100 Italian doctors and 30 nurses and nursing assistants had died of COVID-19 out of a total mortality of 17,667 in Italy (Anelli, 2020).

Africa is not spared in terms of Coronavirus infection general mortality and morbidity of healthcare workers specifically. Dalal (2020) lamented that Africa cannot afford to lose doctors and other health workers to COVID-19, as Africa is far from achieving Sustainable Development Goal of minimum health worker density of 2.3 skilled health workers per 1,000 population. Maintaining that one doctor's death in Africa is a loss to more than 10,000 people, shows that Africa's healthcare system is already overburdened. Hence, if African doctors and nurses are infected, they will transmit to everyone seeking healthcare. Like in Italy, Doctors lack

personal protective kits and are not adequately trained in handling pandemic emergencies.

British Broadcasting Corporation (BBC) (2020) announced that COVID-19 killed a brilliant doctor in Nigeria, Dr. Emeka Chugbo, who died on Wednesday the 15<sup>th</sup> day of April 2020 in Lagos University Teaching Hospital, at the age of 60 years. He contacted the virus while treating patients in his private clinic. Also reported was the death of Dr. Aliyu Yakubu, the first doctor in Nigeria to die of coronavirus.

Among the many causes of coronavirus deaths in Nigeria include: slow testing process, lack of adequate protective kits and lack of adequate protective gear and training. Other notable cause of medical workers' death occasioned by coronavirus COVID-19 as noted by Abu-Bashal (2020) include: doctors treating coronavirus patients in their private clinics without background training and consequently infecting themselves and their employees. As at Thursday 30<sup>th</sup> April, 2020, 113 health workers were infected in Nigeria of COVID-19, and out of 58 deaths from 2000 cases, 19 deaths were health workers (AbuBashal, 2020).

The situation in Nigeria is replicated in other African countries. Out of 53 African countries, only Lesotho is Coronavirus free (Shabam, 2020). It is due to this condition of increasing mortality of healthcare workers that Resident Doctors in Ogun State declared a strike action to demand for appropriate remuneration for doctors in Olabisi Onabanjo University Teaching Hospital battling COVID-19 pandemic, demand for hazard allowance,

working kits and good condition of isolation centres to promote good working environment and safety of workers (Ikeji,

2020). The increasing healthcare workers' mortality is established worldwide which challenges global human survival and the achievement of sustainable global development, requiring increase in number of health workers rather than depletion of number of health workers as occasioned by COVID-19 pandemic.

# Implication and challenges for Nigeria and other developing countries

The main implication of health workers' mortality occasioned by COVID19 pandemic in Nigeria, developing countries and the world is depletion in number of health workers available. As seen earlier, it is the goal of Sustainable Development Goals to achieve health workers' density of 2.3 skilled health workers per 1,000 population in 2030. From December 2019 to 30<sup>th</sup> April, 2020, a period of four months, so many health workers have lost their lives, as reported by Schlein (2020) that in most countries, 10% of infection and mortality are healthcare workers which caused World Health Organization to raise alarm and appeal for international support to provide health workers with supplies and other tools needed to stay safe and fight the global war of COVID-19 pandemic.

The only way to eradicate coronavirus which causes COVID-19 is by way of vaccine,

which none is available now as explained by virologists (Knowles, 2020). With this fact, death will continue to occur including death of health workers, which poses many challenges to healthcare delivery, particularly in developing countries and the world which is yet to achieve global health workers' density. In essence, if nothing is done fast, the 2030 Sustainable Development Goals Health Workers Density will not be achieved and healthcare will not be available for all by the year 2030, as projected.

In Cross River State, Nigeria, with only 33 medical doctors (NMA, 2020), if these doctors die, healthcare facilities will be abandoned and left to decay, as many General Hospitals in the state are not in use due to lack of medical doctors. This situation is the same in most states in Nigeria, especially in rural areas. Health facilities in terms of primary and model healthcare centres, cottage and General Hospitals fully built and equipped are left unused due to inadequate skilled health workers. The future of healthcare delivery system is bleak in Nigeria in particular and the rest of the world in general, except something is done fast to fast track containment of COVID-19 and enhance safety of healthcare workers in fighting COVID-19.

#### PROGNOSIS OF ACTION

It is imperative for practical action to be taken in order to prevent continuous loss of healthcare workers through death to COVID-19 in which they are forefront fighters. Many still consider COVID-19 as a political weapon, while some look at it as a myth rather than reality. Every fact presented shows that COVID-19 is a reality which must be attacked in order to curtail its further spread, to reduce mortality of infected persons, including health workers, if it cannot be eliminated.

First step is to invoke, abide by and practice the World Health Organisation (2020) guidelines for health workers, which are as follows:

- Infection prevention and control during health care when novel coronavirus (nCOV) infection is suspected.
- Health workers' exposure risk assessment and management in the context of COVID-19 virus.
- Rational use of personal protective equipment for coronavirus disease (COVID-19)
- 4. Advice on the use of masks
- Home care for patients with suspected novel coronavirus infection presenting with mild symptoms and management of contacts
- Question and answer on infection prevention and control for healthcare workers caring for patients with suspected or confirmed COVID-19
- 7. Water, sanitation, hygiene and waste management for COVID-19
- 8. Guide to local production of WHOrecommended handrub formulations
- 9. IPC guidance for long-term care facilities in the context of COVID-19

Attention should be on health workers as it is given to patients of COVID-

19, because health workers can automatically revert to patients' status if the virus is transmitted from patients to them. Health workers are constantly exposed to the pathogen, due to long working hours, which may give them psychological distress, fatigue, occupational burnout, stigma and in extreme situation physical and psychological violence. As observed in Nigeria, doctors should stop treating COVID-19 patients in private clinics which lack equipment, facilities and technical know-how required in managing COVID19. Appropriate remuneration should be given to health workers who are at the forefront of managing COVID-19 patients, commensurate with the hazard risk they are taking. All patients arriving hospital should be first tested for COVID-19 before any form of treatment is given in any hospital. Consequently, all hospitals should have COVID-19 test kits. Personal protective kits and other equipment should be provided for all categories of healthcare workers, who should also be given adequate training on containing or managing COVID-19, with establishment of test centres and laboratories, as a state like Cross River had none at the time of compiling this report.

In view of medical workers that loss their lives trying to contain the spread of COVID-19 pandemic, it is not enough to put their names in the hall of fame, it is appropriate to think and consider their dependents and institute a global insurance policy to provide

for their dependents through a post-humus social insurance policy, beyond the routine provision of employment death benefits, which may be grossly inadequate. Effort should be put in for leaders in developing countries like Nigeria to follow the example of Madagascar in which a local remedy is provided and adopted, which prevents further spread of COVID-19 and its attendant increased mortality. It is only when these actions are carried out that health workers shall be protected and preserved towards achieving SDGs goal of universal health coverage by 2030.

### CONCLUSION AND

#### RECOMMENDATION

Many people are dying all over the world due to COVID-19 pandemic. The only remedy is vaccine to stop the spread of the virus, which is not available yet. Awareness about COVID-19 virus is low which facilitates the fast nature and magnitude of its spread. Health workers who are at the forefront of fighting the pandemic are also ignorant of methods of management and face lack of personal protective kits and other equipment including test kits to facilitate their work. In essence, mortality keeps increasing, which includes mortality of health workers.

Government should exercise sincerity and willpower in funding research to provide local remedy to fight and contain further spread of COVID-19 while waiting for the discovery and approval of vaccine by World Health Organisation to forestall further deaths. Health

workers should adhere strictly to approved treatment guidelines, while government at all levels, international agencies and humanitarian organisations, as well as philanthropic groups and individuals should come together by providing necessary kits, equipments and facilities, as well as engage in social mobilization and awareness creation about COVID-19 and its effect on mortality to bring down high death incidence for patients and especially health workers in order to prepare grounds for achieving health workers' density which is a strategic component of Sustainable Development Goals.

#### REFERENCES

Abu-Bashal, A. 2020. "Nigeria:

113 healthcare workers
infected with

COVID-19" Anadolu Agency News
Broadcasting System, 1st May, 2020,
www.aa.com.tr. Retrieved 2nd May,
2020

Anelli, Filippo. 2020. "One hundred Italian doctors have died of coronavirus"

Aljazeera News 9<sup>th</sup> April, 2020,

www.aljazeera.com Retrieved 2<sup>nd</sup>

May, 2020

British Broadcasting Corporation. 2020.

"Coronavirus kills brilliant doctor in Nigeria". BBC News, 16<sup>th</sup> April, 2020, www.bbc.com Retrieved 2<sup>nd</sup> May, 2020

- Centre for Disease Control and Prevention.

  2019. Coronavirus disease 2019
  symptoms. <a href="www.cdc.gov">www.cdc.gov</a> Retrieved

  30<sup>th</sup> April, 2020
- Chustecka, Z. 2020. More than 60 doctors in

  Italy have died in COVID-19 pandemic,

  Medscape Medical News,

  March 30<sup>th</sup>, 2020, www.medscape.com

  Retrieved 2<sup>nd</sup>

  May, 2020
- Coronavirus Resource Centre. 2020. Update in memoriam: Healthcare workers who have died of COVID-19,

  \*Medscape Medical News\*, 1st April —

  1st May, 2020, <a href="www.medscape.com">www.medscape.com</a>,

  Retrieved 2nd May, 2020
- Dalal, N. 2020. Africa cannot afford to lose doctors to COVID-19. World Economic Forum, 9<sup>th</sup> April, 2020, Lusaka Hub: Global Shaper
- European Centre for Disease Prevention and Control (ECDC). 2020. Situation update worldwide, as of 3 May 2020, <a href="https://www.ecdc.europa.eu">www.ecdc.europa.eu</a> Retrieved 3<sup>rd</sup> May, 2020
- Ghose, T. 2020. How are people being infected with COVID-19, Livescience, <a href="https://www.livescience.com">www.livescience.com</a>, Retrieved 1<sup>st</sup> May, 2020
- Ikeji, L. 2020. "Doctors in Ogun to embark on three-day warning strike amidst

  COVID-19 pandemic,

  www.lindaikejiblog.com Retrieved 3<sup>rd</sup>

  May, 2020

- Kahn, J. and Mcintosh, K. 2005. "History and recent advanced in coronavirus discovery. *The Pedeatric Infectious Disease Journal*, 24(11), 223-227
- Knowles, D. 2020. How and when will this pandemic end? We asked a virologist,
  - World Economic Forum,

    www.weforum.org, Retrieved 2<sup>nd</sup>

    May, 2020
- Merton, R. 1936. The unanticipated consequences of purposes social action, *American Sociological Review*, 1(6), 894-904
- National Cancer Institute. 2020. NCI dictionary of cancer terms, United States of America. National Institute of Health

   American Cancer Society,

  www.cancer.gov Retrieved 3<sup>rd</sup> May,
  2020
- Nigeria Centre for Disease Control (NCDC). 2020. COVID-19 case update as at 1<sup>st</sup> May, 2020, <a href="www.ncdc.gov.ng">www.ncdc.gov.ng</a> Retrieved on 3<sup>rd</sup> May, 2020
- Nigeria Medical Association.

  2020. Statistics of doctors in Cross River
  State Government employment, Calabar,
  NMA Cross River State
  Branch
- Schlein, L. 2020. COVID-19 PandemicWHO:
  Alarming number of health workers at risk of COVID-19, Voice of America News, 11<sup>th</sup> April, 2020, <a href="https://www.voanews.com">www.voanews.com</a> Retrieved 33<sup>rd</sup> May, 2020

Shabam, A. R. 2020. Coronavirus in Africa:

Update, Africanews,
<a href="https://www.africanews.com">www.africanews.com</a> Retrieved 3<sup>rd</sup>
May, 2020

Shereem, M.; Khan, S.; Kazimi, A.; Bashir,N. & Rabeea, S. 2020. "COVID-19Infection: Origin, transmission and characteristics of human coronavirus".

*Journal of Advanced Research*, Vol. 24, July 2020, pp. 91-98

WebMD. 2020. Coronavirus history lung disease and respiratory health coronavirus reference, <a href="www.webmd.com">www.webmd.com</a> Retrieved 2<sup>nd</sup> May, 2020

World Health Organisation. 2016. Health workforce requirements for universal health coverage and the sustainable development goals: Human Resources for Health Observer – Issue No. 17, www.who.int. Retrieved 4<sup>th</sup> April, 2020

World Health Organisation (WHO). 2020.

Guidance for health workers –
Coronavirus disease (COVID-19)
outbreak: Rights, roles and responsibilities
of health workers, including key
considerations for occupational safety and
health, <a href="https://www.who.int">www.who.int</a>., Retrieved 2<sup>nd</sup> May,
2020

Zhan, M.; Qin, Y.; Xue, X. & Zhu, S. 2020.

Death from COVID-19 of 23

healthcare workers in China. *The New* 

England Journal of Medicine, Letter to the Editor,
DOI.1506/NEJMC2005696,
www.nejm.org Retrieved 2<sup>nd</sup> May,
2020