

**NURSES' VULNERABILITY TO COVID-19 AND WORKPLACE
SAFETY DURING THE PANDEMIC AT PUBLIC AND PRIVATE
HOSPITALS OF ISLAMABAD**



By

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Abstract

The novel coronavirus disease 2019, commonly known as COVID-19, since its emergence in 2019, has brought various challenges to healthcare professionals including nurses. It has posed serious threats to their life and health ultimately making them vulnerable to the deadly infections. The current research investigates the nurses' vulnerability to COVID-19 in both public and private hospitals of Islamabad, and the level of safety measures employed by the hospital management to protect them. The research method used in the study was quantitative with the sample size of 200 respondents, including male and female from public and private hospitals of Islamabad. The study found that 56% nurses of both public and private hospitals were provided adequate Personal Protective Equipment (PPE). While only 36% of the respondents were competent in terms of having knowledge about COVID-19, among them, 75% nurses attained that knowledge from hospital trainings. Surprisingly, 56% of them did not have adequate testing capacity at their respective hospitals. Therefore, the research concludes that the workplace safety of nurses is highly compromised, making them vulnerable to this infectious disease. This is high time for the hospital management to strengthen the testing and diagnostic capacity for the nurses and make surveillance and contact tracing mandatory at all entry points of the hospitals in order to reduce their vulnerability.

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Chapter No 1
INTRODUCTION

The world has been struggling to combat the viral disease known as coronavirus disease 2019 (COVID-19) which has turned out to be the biggest turmoil of the year 2020. It has far reaching implications for those working on the frontline in critical care settings to treat the patients with COVID-19 particularly, for nurses who are the most vulnerable population during this pandemic. It has affected their physical, social, and psychological health and well-being. In this context, Pakistan has identified 85,264 confirmed cases and 1,770 deaths as of July 2020 reported by National Command and Operation Center (NCOC). The death rate is 2.0% as compared to Europe (14.6%) and the United States (5.7%) per 100,000 population. The number of frontline staff including nurses, doctors, and other health workers who have been infected with COVID-19 is around 440 and 8 confirmed deaths are reported in different provinces of Pakistan. There is a sharp continuous increase in these numbers that pose a serious threat to the health and well-being of the healthcare professionals, especially nurses working in the critical wards of the hospitals. They are facing common challenges such as lack of staff, lack of personal protective equipment (PPE), limited knowledge regarding standard infection control practices, isolation protocols, lack of administrative support, transportation, accommodation, childcare facility, and so forth. In turn, most of the nurses are showing symptoms of fear, anxiety, depression, post-traumatic symptoms, spiritual, and moral distress. In addition, the lack of programming and training of healthcare workers on communicable, non-communicable, and pandemic diseases, is seen at provincial and federal levels (Meghani and Lalani 2020). The present research on the 'Nurses' Vulnerability to Covid-19 and Workplace Safety in Public and Private Hospitals of Islamabad' is an attempt to study the significant relationship. It aims to highlight the reasons behind the nurses' risk of contracting the Covid-19, the organizational safety measures and the

level of awareness among the nurses to reduce their contact with the deadly virus at both private and public hospitals in Islamabad Capital Territory (ICT), Pakistan.

Workplace safety, in such conditions, plays a vital role to minimize the vulnerability of nurses. Safety measures like adequate availability of material and nonmaterial resources including, Personal Protective Equipment (PPE), support services, risk management and guidance provided by the hospital authorities are essential to protect the nurses from this viral disease. In a report (UNICEF 2020), WHO witnessed an alarming failure in the provision of global supply of personal protective equipment and coronavirus testing kits which indicates the mounting vulnerable condition of nurses in the hospitals. Furthermore, Giorgio Cometto, Coordinator Human Resource for Health Policies and Standards at WHO's Health Workforce Department highlighted the global market failure in the provision of PPE and extra hours' duty by nurses in Intensive Care Units (ICU) due to the global shortfall of nurses. Howard Catton, head of the International Council of Nurses (ICN) reported the death of more than 100 health professionals from the new coronavirus since it first emerged in China in late December 2019. This indicates the importance of the fact that COVID-19 tests are essential for healthcare workers in order to bring them back to work (Narain 2020).

In his article, Mann (2020) shed light on the warning signs emerged in early February 2020, weeks before COVID-19. He warned of a severe disruption in the PPE supply chain while quoting Tedros Adhanom Ghebreyesus, director-general of the World Health Organization. The research showed that the demand of PPE was up to 100 times higher than normal and global stocks of masks and respirators were insufficient to meet the needs. However, it was seen that the little was done to expand the overall supply of masks, gowns and other PPE. According to Cohen and Rodger (2020), without proper PPE

healthcare workers are more likely to become sick which may cause shortage in the supply of healthcare workers. This intensifies the demand for care and causes unstable healthcare infrastructure, thus reducing the quality and quantity of care available. Sick nurses may also lead to viral transmission. Hence, provision of PPE to healthcare workers is of immense importance for infection prevention and control. It is revealed that almost 1842 nurses, doctors, physicians, assistants, medical technicians, and other healthcare workers globally, and 342 in the US, died due to the virus as of July 28, 2020, and many more became sick. The research also noted that nearly one-third of hospitals did not have adequate face masks and 13% ran out of plastic face shields.

1.1 Research Questions

1. What are the challenges faced by the nurses at their workplaces that increase their vulnerability at the public and private hospitals during the time of COVID-19 pandemic in Islamabad, Pakistan?
2. What are the significant preparatory measures taken by the hospital management to reduce the nurses' vulnerability during the time of global pandemic in Islamabad?
3. What is nurses' level of awareness regarding COVID-19 to prevent their vulnerable conditions at public and private hospitals of Islamabad during COVID-19 pandemic?

1.2 Objectives of the Study

The study was aimed:

- To find out the relationship between nurses' vulnerability to COVID-19 and workplace safety at public and private hospitals of Islamabad during the pandemic.
- To investigate the availability of adequate resources and support services at public and private hospitals of Islamabad leading to minimum level of nurses' vulnerable conditions during COVID-19 pandemic.
- To identify the level of compliance with the safety measures at public and private hospitals of Islamabad during the pandemic.

1.3 Statement of the Problem

The health sector of Pakistan has been largely affected by the widely spread disease known as COVID-19 during the global pandemic. Nurses, along with other frontline workers, are likely to face various kinds of problems such as, inadequate provision of Personal Protective Equipment (PPE), low testing capacity of COVID-19 and non-compliance with Standard Operating Procedures (SOPs) which are mandatory to maintain workplace safety in the hospitals. Consequently, they become vulnerable to COVID-19. Hence, it is need of the hour to investigate what specific measures hospital management is taking to alleviate the vulnerability of the nurses. In addition, the responsibility of nurses to comply with the preparatory measures suggested by the management is equally important for their own safety in the workplace. Moreover, it is also essential to know their level of knowledge regarding COVID-19 as well as the sources used to attain that particular knowledge. This would be helpful for making preventive strategies for nurses

and adapting to the suggested preventive measures in order to control the pandemic.

1.4 Significance of the Study

In Pakistan, there is negligible systematic study conducted on nurses and their health conditions not only during the emergent pandemic of COVID-19 but in the past as well. The current study is an endeavor to investigate the vulnerability of this highly neglected segment of healthcare professionals and workplace safety in different public and private hospitals of Islamabad. The result findings of this study would benefit nurses in particular and other frontline workers in general, who are striving to fight with the deadly virus not only in Islamabad but also in other cities of Pakistan. Moreover, the study will also provide insights to government officials as well as to public and private hospital authorities to find out the loopholes and take stringent measures in order to make hospital environment safer and more resilient for patients, nurses and others serving as the frontline workers in critical healthcare settings.

Chapter No 2

REVIEW OF THE RELEVANT LITERATURE

Literature review is a crucial part of the research. Its main objective is to explore the already existing data available on the research topic. Its prime motive is to investigate the perceptions of various scholars and authors about a particular research topic. It helps the researcher to analyze and comprehend the study area in a more clear and precise manner.

2.1. World Scenario of Nurses' Vulnerability to COVID-19 and Workplace Safety

A World Health Organization (WHO) report reveals that nurses are on the frontline attempting to combat COVID-19, and helping patients to deal with this difficult time. According to research reports of the Philippines' Department of Health (DOH 2020), the number of frontline workers being infected is increasing at large scale indicating that the number of health workers who tested positive for COVID-19 was 252 in April 2020. Likewise, Russians reported at least 450 medical workers, whereas in China around 40 infected health workers from 138 hospitalized patients in Wuhan, during January, 2020. Additionally, Spain reported the highest number of infected cases in April 2020, of which 14% were confirmed, from the health care workers' groups (Pasay-An 2020). Nurses in China have been playing an important role to contain the pandemic. In Hubei province alone, a total of 28.6 thousand nurses accounting for 68% of all medical workforce is fighting on the frontline to control epidemic. On the other hand, the world seems to face difficulties in the global supply of protective clothing and new coronavirus tests, along with workload which lead to global staff shortages. It shows the level of vulnerability the nurses are facing during the global pandemic (Zhang 2021). The United Nations chief, António Guterres, while addressing the nurses, midwives, technicians, paramedics, pharmacists, doctors, drivers, cleaners, administrators and few others who are contributing their parts day and night to keep the masses safe said, *"Today, we are more*

deeply grateful than ever to all of you, as you work, round the clock, putting yourselves at risk, to fight the ravages of this pandemic” (UNICEF 2020). The United Nations Health Agency in its first report raised questions on the violation and intimidation faced by nurses and midwifery across 191 countries, and emphasized on the need for special protective measures. Furthermore, Giorgio Cometto, coordinator Human Resource for Health Policies and Standards, at WHO’s Health Workforce department stated that they were witnessing an unprecedented global market failure in the provision of Personal Protective Equipment (PPE) (UNICEF 2020). The above data analysis shows the significance of research topic to examine the marginal position of nurses at the time of COVID-19 pandemic in Islamabad, Pakistan.

2.2 Global Staffing Shortfall and Shift Patterns

For a smooth functioning of hospitals, it is essential to have an adequate number of frontline workers including nurses to contain the pandemic. In a joint publication of World’s Nursing Report and World Health Organization (WHO 2020), a worldwide shortage of nurses and midwives has been reported. The report represents statistics wherein the global nursing workforce is 27.9 million out of which 19.3 million are professional nurses. It also raised concerns for the lack of available workers throughout Africa and parts of the Americas as well as it found great staffing gaps in South East Asia and the Eastern Mediterranean region (UNICEF 2020). In another studies, severe shortage of staff due to self-isolation and unavailability of testing opportunities is seen. A male general nurse shared his experience, *“There is severe shortage of staff due to absence of staff who might choose to self-isolate once they have a cough not knowing whether it is COVID – 19 or not honestly, sometimes shifts are so heavy to do.”* Additionally, a female domiciliary worker stated, *“The morale at work is sometimes low when you think of the situation. More so, many staff members are not taking up as many*

hours as they used to do due to self-isolation if any of their family members or themselves catch a cough.” (Nyashanu, Pfende, and Ekpenyong 2020:658). The first priority of China during the COVID-19 outbreak was to select and reallocate capable nurses to support outbreak areas: Wuhan, Hubei Province. As per the instructions of National Health Commission, hospitals in Wuhan were requested to assign three teams with 102 nurses. The nursing department, in order to build a COVID-19 Rapid Response Team (C-RRT), conducted a review of available staff capacity in each department of hospitals. The recruitment of nurses into the C-RRT was based on: (1) more than three-year work experience; (2) work capabilities in emergency, critical care, respiratory and infection departments; (3) a voluntary principle (Zhang 2021). In their research studies, Huang et al. (2020) stated that it was very important to establish a scientific and reasonable nursing shift schedule owing to the rapid increase in patients which will lead to severe nursing shortages. The studies proposed 3 shift patterns: (1) 4 hours of work in the morning and 4 hours’ work in the afternoon with an interval of 8 hours; (2) 6 hours’ continuous work; and (3) 6 hours of continuous work with, the next nursing shift overlapping by 1 hour at the end of shift. A survey was conducted where 74% of nurses preferred the third schedule. Gao et al. (2020), asserts that the provision of care for COVID-19 patients is challenging, the workload has increased in isolation wards, and the workflow and shift patterns are quite different from normal routine. Because there is shortage of nurses it is important and urgent to arrange nurses’ shift patterns scientifically and allocate workforce based on the principle of rationality in order to reduce nurses’ workload, improve nursing quality and promote physical and mental health among them during the COVID-19 pandemic. To make this happen, nursing managers need to evaluate nurses’ competencies and capabilities in advance to arrange the shifts reasonably and they should

put emphasis on the experiences of nurses caring for COVID-19 patients. The discussion shows the importance of workload and staff management for the nurses in order to reduce their vulnerability during the time of global pandemic in government and private hospitals of the capital city of Pakistan.

2.3 Mental Health and Psychological Impacts from Overwork

COVID-19 has repercussions not only for general public but also for healthcare providers including nurses in particular as they feel emotionally exhausted, which causes anxiety and stress like mental problems among them. The study indicates that the lack of resources, such as protective gear, and the nature of their work have made the frontline workers vulnerable to COVID-19 which lead them to stress and uncertainty. Pasay-An (2020) suggested that the healthcare workers who were exposed and are suspected COVID-19 positive are at a high risk of not only the viral infection but also of developing mental health-related problems. Liu et al (2003) in their research study found that healthcare workers who rendered their services in the Severe Acute Respiratory Syndrome (SARS) units of hospitals suffered from depression, apprehension, fear, and frustration. The risk of contracting the disease is likely to affect the workers emotionally, mentally, and physically, which may lead to Post-traumatic Stress Disorder (PTSD). Thus, Pasay-An (2020) emphasized on implementation of measures to counter the adverse psychological impact of COVID-19 on frontline healthcare professionals. To avoid stress, their need for precautionary measures and positive health behavior should be prioritized and there should be clear communication of directives and precautionary measures by colleagues and supervisors to support the healthcare workers. Gao et al. (2020) raised concerns about the physical and psychological well-being of nurses while stating that they were uncomfortable in wearing the protective suits and goggles and were always conscious about the fear of infection and physical

discomfort. They were also anxious because they could not leave the room. Therefore, nursing managers were required to pay attention to nurses' physical and psychological well-being during the pandemic. Another Pakistan based research, Khattak et al (2020) revealed that the COVID-19 pandemic has significantly affected the mental, emotional and psychological health of frontline nurses. According to the research, this fear has led them to turnover intention, secondary trauma, and psychological distress. It found a positive relationship between fear of COVID-19 and nurses mental health. It revealed that there was no major difference in the level of fear between the nurses who were directly in contact with COVID-19 patients and those working in other units of the hospital. Moreover, it focused on factors like easy transmission, an increase in the number of cases per day and workload, death ratios, quarantine, social distancing, work-related COVID-19 precautions and non-availability of personal protective equipment which deepen the fear among nurses and strongly affect their emotional and psychological health and job performance. The key indicator, according to the research, that increases fear among nurses is the risk of being infected as well as getting their family members infected unknowingly. Thus, it suggests hospital administrations to support, encourage and motivate frontline nurses to reduce their negative emotional and mental health issues.

2.4 Changes in Practice/ Changes to Employment Role

In a previous study, Diez-Sampedro et al. (2020) suggested that the COVID-19 pandemic has altered the practices of hospitals, clinics, and patients. Due to these changes, the common practices, like direct patient care, of nurses have also changed. In addition, it is evident that the nurses and other frontline healthcare workers are going through significant emotional distress as a result of providing direct patient care during this pandemic. Hence, nurses are facing challenges in the prevention of infection and in educating people

during this rapidly changing environment. They must be prepared to alter their normal practice accordingly to take into account the reluctance of patients to seek care for fear of exposure, the additional need for personal protective equipment (PPE) and any resulting changes to patient assessment, novel policies, testing guidelines, and more. Moreover, nurses must educate themselves on current best practices during this era of evolving practices, participate in effective patient teaching about viral symptoms and transmission, and help overcome the psychological and mental impact that the pandemic may have on themselves, patients, and colleagues. Furthermore, the shortage of physicians have increased the need for nurses to fulfil vital patient care roles at hospitals. In this context, several states have enacted emergency legislation to enhance the licensing of nurses as well as have expanded the scope of practice for both nurses and physician assistants. To make this happen, the American Association of Nurse Practitioners has established a webpage with links to individual state legislatures for the purpose of highlighting what changes have been made to scope of practice. Along with that, the emergency action has been taken by the Centers for Medicare and Medicaid Services (CMS) as it authorized an emergency declaration to increase practice flexibility for nurses. This also contains relaxation of physician supervision requirements for nurses in the provision of patient care, order of specific tests, and prescription of certain medications. The intent of this all is to allow nurses to practice at their best of their licenses (Diez-Sampedro et al. 2020). According to revealed statistics of a study, almost half of the respondents (43.7%) reported either decreased hours of employment, threatened termination, or actual termination of employment since the emergence of the disease. Another 22% of the respondents considered resignation owing to personal physical safety (52.9%) and psychological safety (43.6%), lack of job security or reduced hours (50.7%)

and family safety (42.9%). Some respondents comprising 39.2% reported a reduction in nursing roles since there are fewer face-to-face consultations during the pandemic and there is increase in telehealth consultations by general practitioners (GPs) which indicates the lesser need for nurses at practice. In contrast, more than half of the respondents (52.9%) reported additional tasks being incorporated within the roles performed by nurses. Others described an initial increase in employment hours to prepare workplaces for an influx of COVID-19 patients by “writing policy, developing triage tool, educating staff, sourcing increased stock and more”. However, most of the respondents (81.0%) were still involved in face-to-face consultations. Most importantly, 34.0% of the respondents opined that the quality of care provided was significantly or slightly worse than before COVID-19 (Halcomb et al. 2020).

2.5 Personal Protective Equipment (PPE): Shortage and Evolving Guidance

Many healthcare workers are facing major challenges in establishing and maintaining safe clinical care. At present, media reports the shortages of critical Personal Protective Equipment (PPE) without which nurses risk the health and safety of their patients as well as themselves (Diez-Sampedro et al. 2020). A study showed that there was severe shortage of PPE making nurses vulnerable enough to discharge from their duties. In addition, they thought that, at some point, the PPE was not fit for purpose. As a female care assistant states *“Most of the PPE we had ran out within two days and we had to wait for days to get some only to last for two days. Honestly, this was the most difficult time to work in health and social care. The few PPE available was not fit for purpose as everyone had little knowledge about COVID-19”*. Another male Learning Disabilities nurse reports *“This was the most difficult time to do caring in a nursing home. We had to improvise to make sure that*

everyone was safe from COVID19. We waited for so many days with little or no PPE. Honestly, in future there is need to get it right” (Nyashanu, Pfende, and Ekpenyong 2020:657). Some healthcare workers also reported about ever evolving PPE guidelines from public health authorities and central government. Consequently, it created panic among nurses as they feared contracting COVID-19. It is evidenced by a female support worker’s statement, *“There are so many changes that are coming every day, today is one thing tomorrow is another one what are the guidance really? It really confuses and panics me”*. Another male learning disability nurse states: *“The hygiene guidelines have changed several times since the outbreak of COVID-19. It is really confusing; you begin to think I have been doing it wrong so I might have contracted it already.”* (Nyashanu, Pfende, and Ekpenyong 2020:658). Nearly half of the workers (42.5%) responded that there was general guidelines for PPE use at workplace or COVID-19-specific guidelines (47.3%). Some of the workers (26.7%) reported having sufficient gowns and P2/N95 masks (23.3%), with 40.1% of them never having sufficient gowns (40.1%) and P2/N95 masks (45.4%) available. This largely indicates the lack of stock availability owing to the worldwide shortage. Some healthcare workers reported that the practice manager who allocated supplies kept the masks aside and they were unable to get surgical masks or P2. Various workers commented that hospitals were prioritized with PPE supply. Some of the nurses reported that their organizations informed them that they did not need PPE because of minimal face-to-face interactions. Others who had some stock of PPE were directed to reuse masks for a few shifts. Rather, they purchased the stock on their own (Halcomb et al. 2020). In another research study, it was seen that the nurses were being put into high-risk conditions, and some of them had even died due to the shortage of appropriate and high-quality Personal Protective Equipment (PPE). The

International Council of Nurses (ICN) has urged governments to make the availability of such equipment their number one priority for the purpose of stopping further loss of life among the nurses who are rendering their services to the world's most vulnerable patients (Catton 2020).

2.6 Testing for COVID-19

According to Diez-Sampedro et al. (2020), merely 29.4% of respondents admitted that they were undertaking COVID-19 testing in their workplace. Most of the testing was being undertaken in dedicated rooms (46.2%), car parks (45.6%), standard consulting rooms (14.6%), and patients' homes (6.4%). The study shows many of the healthcare workers had sufficient testing equipment (73.1%) (Halcomb et al. 2020). A study reports 3 priority groups for testing of COVID-19 which include hospitalized patients, healthcare workers with symptoms, first responders, long-term care facility workers, and symptomatic residents of long-term care facilities. In this process, the clinicians are directed to first test for other causes of respiratory diseases. The center for disease control and prevention (CDC) instructs clinicians to work in association with their state and local health departments for the coordination of testing as well as to use laboratories with Emergency Use Authorizations for viral testing of COVID-19. The nurses are suggested to continue using appropriate PPE on patients until and unless they are sure about the recovery and discharge of patients with COVID-19. Moreover, they are also suggested to beware of the limitation of several tests and their appropriate use as their sensitivity vary to a great extent such as the tests having relatively poor positive or negative predictive values may result in an incorrect diagnosis or a false sense of security (Diez-Sampedro et al. 2020). Furthermore, delays in COVID-19 testing of healthcare workers was reported which was leading them towards difficulties in knowing whether staff had COVID-19 or not. In addition, it was resulting in staff shortage as they were

compelled to self-isolate at few points because they reported that they were in state of confusion and mishap whenever they had symptoms like cough and high temperatures. One of the female mental health support workers among them argued that she was unable to find a place to get tested in case of having symptoms related to COVID-19. Resultantly, she had to isolate herself. Another female general nurse stated that she was surviving in an uncertain situation that whether she was affected by COVID-19 or not (Nyashanu, Pfende, and Ekpenyong 2020).

2.7 Hospital Staff Preparedness

In a study, Nyashanu, Pfende, and Ekpenyong (2020) stated that nearly all of the healthcare workers gave an impression that preparations for the COVID-19 pandemic were not as per requirements. They complained of unclear strategic policy dealings with the pandemic in health and social care. A female mental health nurse stated that the pandemic affected almost everyone and they did not have adequate preparations and systematic strategies to cope up with that as they were not mentally prepared to welcome the COVID-19 pandemic. Another male general nurse said that she did not know where to start from and what to do with this new pandemic as she never experienced it in health and social care set up. While Meo et al. (2020) previously described that the Government of Pakistan was taking all possible measures to counter COVID-19 for the protection and security of its citizens and healthcare professionals. The research study represented the total number of hospitals which were involved in the treatment of patients with COVID-19 region-wise. It showed that less than 3 % of Pakistan's GDP was spent on the health sector in Pakistan which indicated the presence of a fragile health infrastructure. According to the study, federal area owned 128.13 beds per 0.1 million people, Punjab held 54.72 beds per 0.1 million people, Sindh held 82.62 beds per 0.1 million people, KPK owned 62.362 beds, Baluchistan

62.76 beds, Azad Jammu and Kashmir 92.75 beds, and Gilgit Baltistan held 28.2 beds per 0.1 million people, respectively. By this date, there are 0.249 million confirmed cases, 0.157 million infected patients have recovered, and the death toll has reached to 5,197. In terms of isolation facilities at hospitals, the study showed that Punjab, KPK, and Balochistan had the highest number of isolation wards, respectively. However, when talked about quarantine facilities, region-wise, Punjab, Balochistan, and KPK were highly ranked, respectively. Moreover, Khan et al. (2020) revealed that the basic infection control protocols were insufficiently considered which included hand washing and personal protective equipment use in the educational and health care institutes of the country.

2.8 Knowledge, Attitude and Support

A research put emphasis on the basic knowledge, attitude, and behavior towards COVID-19 and directed about a prompt response against it in order to confront the COVID-19 pandemic. However, it was found that the masses of Pakistan were not aware of the severity of the pandemic. It was also observed that the front-line workers were not prepared to deal with the challenge. Moreover, it also encountered the profession-based awareness which revealed that the basic knowledge of frontline workers regarding, name, origin, common signs and symptoms, sources of COVID-19 infection and awareness regarding any other pandemic viral infection in the past varied to great extent. Thus, it is a dire need to spread awareness at all levels (Khan et al. 2020). In addition, Khattak et al. (2020) emphasized on the effective management of the pandemic, well-organized work-related procedures and protocols. It directed the workers to take set of actions regarding the disease outbreak like, guidelines about caring affected patients, relevant training, safety practices, response plans and mutual coordination with other units. Because the nurses are involved in direct contact with COVID-19 patients,

they should be aware of safety and workplace protocols so that they can perform better in their workplace. The study showed that the government of Pakistan originated a media campaign about awareness related to workplace safety so that the hospital administration as well as the general public be better prepared for the COVID-19 pandemic. In doing so, the hospital administration, including doctors, nurses, paramedic and emergency staff would be able to manage the situation in more effective way (Khattak et al. 2020). The statistics of a research (Halcomb et al. 2020) represent that 93.5% of frontline workers understood the risks of COVID-19 for patients as well as for health professionals and 91.5% of them knew how to protect themselves and patients (89.5%). Others, comprising 79.1%, had adequate knowledge regarding COVID-19 pandemic. Most importantly, 80.9% of them were concerned about the spread of COVID-19 to their family members and 70.8% were afraid of putting their health at risk due to their clinical role. In terms of responsibilities, 51.6% of the workers had care responsibilities, 32.7% had responsibilities for children, and 7.4% for elderly parents, 1.7% for spouses, 1.6% for grandchildren, and 2.7% had multiple care responsibilities. Merely 56% of them were ready to care for patients with COVID-19 when provided with the opportunity. Moreover, the data showed that they were less positive about feeling supported, with only 54.8% of them were strongly agreed that they felt well supported in their clinical role by their employer. 40.3% of the workers strongly agreed that they felt supported by the Primary Health Network and only 29.6% felt supported by the government. The discussion highlights the importance of ethical responsibility and available support system for nurses during COVID-19, while working at the government hospitals in Islamabad, Pakistan.

2.9 Ethical Challenges

One of the biggest challenges faced by nurses was to address the number of questions about COVID-19 inundated by the patients and residents who were living in an atmosphere of anxiety and fear during this pandemic. The nurses were unable to answer those questions as the situation of pandemic was quite new for everyone including nurses. A female domiciliary support worker admitted that the state of being unable to answer the queries of patients was a challenge of its own kind. Another major challenge faced by them was to ensure social distancing among individuals who were unable to understand the severity of the problem and respond in accordance with the social distancing guidelines provided to them. Fulfilling the social shielding responsibility, that is the duty to protect the individuals they looked after, was also a challenge for them. To perform such duties, nurses had to live in the workplace for days to prevent the risk of going out and bringing in COVID-19 to the individuals they were looking after. A male general nurse shared his experience while saying that he spent five weeks living at workplace to avoid contacting with people outside and bring coronavirus at workplace as he had responsibility to make sure that all those people who he looked after were prevented from any kind of disease or condition. Another female health care worker serving as home manager stated that it was the most difficult time ever in her career as a nurse as she was responsible to fulfil her obligation of protecting the residents for which she had to work excessively at workplace in order to keep the residents safe from coronavirus disease. At the end, she said that it was a stressful situation for her because of this uncertainty that what would be happen the very next day (Nyashanu, Pfende, and Ekpenyong 2020). Another ethical challenge, according to a research, is the concern of health care workers regarding occupational hazard. They are not prone to rapidly respond, just like other human beings, to the pandemic like stressful

situations. Some of the studies have tried to investigate their willingness to work in such kind of situations. They came across the fact that 80% of the physicians were willing to work with patients with contagious conditions and merely 55% of the physicians were of the opinion that they had an obligation to work during an epidemic even if it puts their health at stake. On the other hand, it is observed that there were less or no such well-organized ethics teams at smaller hospitals which include community hospitals and rural institutions. Creating such ethics teams is a challenge particularly in geographically diverse health care systems, where the needs of large urban hospitals and small rural hospitals varies. In this scenario, the study emphasizes on the requirement of diverse leadership for the provision of better care throughout the health care system. In this regard, the healthcare workers and clinician of large and small hospitals need to stand together for the betterment of all the patients and communities. They should also work hand in hand with ethics specialists and hospital administration to ensure their strong leadership. Thus, it is essential to transform the mindset of frontline workers and the general public from a focus on the individual patient to a focus on overall well-being of the larger community in order to make this process reality (Patel et al. 2021).

2.10 Assumptions

1. There is a shortage of nursing staff at hospitals during the COVID-19 pandemic caused by inadequate resources and lack of support services.
2. The nurses are compelled to perform extra hours of their duties due to the shortage of staff at hospitals.
3. The hospital management is providing required number of Personal Protective Equipment (PPE) to the nurses during the pandemic.

4. The surroundings of hospitals including high touch surfaces and common spaces are frequently disinfected.

Chapter No 3

THEORETICAL FRAMEWORK

3.1 Institutional Theory

Institutional theory is a behavioral and an organizational theory which is based on the social constructionism of Peter Berger and Thomas Luckmann (1967). The roots of this theory are also richly found in the formative years of Social Sciences in 1950s and 1960s which involve the contributions of various scholars ranging from Marx and Weber, Cooley and Mead, to Veblen and Commons (David, Tolbert, and Boghossian 2019). In this approach, organizational and management practices are considered as the product of social rather than economic pressures. The key idea or assumption of this theory is that the adoption and retention of several organizational practices are often more dependent on social pressures for conformity and legitimacy rather than on technical pressures for economic performance. The theory emphasizes on the processes by which structures, including schemas, rules, norms, and routines, are considered as authoritative guidelines for social behavior. The backbone of this theory is social legitimacy and survival. It is almost similar to the legitimacy theory but the point of divergence between these theories is that the Legitimacy Theory is focused on feelings and perceptions of society towards organizations whereas, Institutional Theory is mainly interested in how the organizations interact within their internal environment rather than external, at larger societal level. Therefore, 'institution' is the core of this theory (Scott 2004).

3.2 Explanation of Theory

According to the theory, institutions are the basic building blocks of social, political and organizational life which are helpful in shaping behavior, perception and choices of individuals. These include governance structure, social arrangements, norms, rules and ways of thinking and organizing. Institutions are not organizations but they are something which arise to reduce the cost and meet social needs. W. Richard Scott (2004) termed

‘institution’ as comprised of regulative, normative and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to the social life. Meyer and Rowan (1977) described this theory as social pressures, obligations or actualities that come to take on a rule-like status in social thought or action.

The Elements/Characteristics of an Institution:

There are three major elements or characteristics- also called institutional controls; rationalizing agents- of an institution which are as follows:

1. Regulative: (Formal)

These are the formal rules, laws, sanctions and policies devised by institutions. It pushes compliance by expedience and operates by coercive isomorphism. The society expects that institutions will live by these rules.

2. Normative: (Informal)

These are the norms and values that permeate through the institution and give it its ethics, individuality and personality. It involves the expectations of the proper ways to behave which are initially given to the individuals by the experts through the system of education, accreditation and professional development. It works through normative isomorphism. It pushes compliance by social obligations.

3. Cultural-Cognitive: (Public)

These are the taken for granted ways of getting things done. An institution sits easily in a society when it has absorbed the society’s culture and ways of doing things. In short, the organization learns to live by society’s rules and expectations. It talks the language of society. It provides its services in a way

that society has become familiar with. In addition, it works through mimetic isomorphism and pushes compliance based on what is taken for granted.

The Dimensions of Institutional Theory:

There are two dimensions that indicate the dynamics of institutional change relative to social interaction.

1. Isomorphism:

This is a constraining and homogenization process whereby an institution changes to resemble itself with other institutions facing the same environmental conditions. The way they shape themselves, present themselves, the services they provide and the governance structure becomes similar. According to DiMaggio and Powell (1983), the organizations compete not just for resources and customers, but for political power and institutional legitimacy, for social as well as economic fitness. This is the process through which an institution can change to meet social expectations in a number of ways. There are following three mechanisms through which institutional isomorphism change occurs.

Coercive Isomorphism: (Political)

The institution changes its practices due to the formal or informal pressure exerted on the organization by the government or other organizations or the environment. These pressures are often associated with legal requirements, health and safety regulations and so on.

Mimetic Isomorphism: (Imitate)

Institutions adapt the practices of successful institutions and therefore come to resemble them if it leads to greater access to resources and even some strategic advantages. Mimetic forces are pressures to copy or emulate other

organizations' activities, systems or structures. Innovations are deemed to enhance legitimacy are seen as desirable especially, under conditions of uncertainty.

Normative Isomorphism: (Professional Pool)

Norm groups (pressure groups) pressurize institutions to adapt what they see as normal behavior. It describes the effect of professional standards on the influence of professional communities on organizational characteristics. They capture the ways in which institutions are expected to conform to standards of professionalism and to adapt systems and techniques considered to be legitimate by relevant professional groupings.

2. Decoupling/Loose Coupling:

Decoupling is referred to as the separation or gap from the formal institutional (the one that reflects society's expectations) and the actual practices of the organization. It states that sometimes an institution seeks all the benefits of appearing to comply with social expectations, while in reality they are engaged in predatory and the most unethical behavior imaginable. According to Meyer (1970), various formal organizational structures arise as a result of mirroring of rational institutional rules. Institutional products, services, techniques, policies and programs function as powerful myths and several organizations adapt them as a means of creating legitimacy, resources, stability and hence increasing their survival prospects. Organizations tend to buffer their formal structures in order to maintain conformity with rationalized institutional myths. In other words, they build gaps between formal structures and the actual work activities.

3.3 Application of Theory

From the above discussed theory, it can be inferred that the interaction and balance between three major pillars (i.e. regulative, normative and cognitive) plays its key role to hold up the safe workplace environment for nurses in public and private hospitals of Islamabad. The hospital administration must emphasize on formulating all-inclusive laws, rules, and policies and impose sanctions in the hospital settings for the survival and betterment of the frontline nurses who are at high risk of being infected by the Coronavirus disease 2019. Moreover, nurses also need to comply with the policies put forward by the administration for the sake of their own health. To ensure this, the hospitals should organize awareness programs like events for their capacity building. They should also provide certifications and accreditations to the nurses who regularly follow the instructions given to them and adapt significant preparatory measures during their presence in the sensitive wards of the hospitals. Furthermore, institutional isomorphism, along with its three mechanisms, may greatly help in providing a safe workplace environment to the nurses through establishing and promoting the desired expectations, practices, norms and beliefs in this difficult time of the global pandemic. The hospitals of Islamabad need to adapt the safety mechanisms followed by those who successfully dealt with the COVID-19 pandemic for their institutional legitimacy and social fitness. The public and private hospital administrations need to change their conventional and traditional practices in accordance with the new normal brought in by the COVID-19 pandemic. In case of public hospitals, the government is supposed to play its part to assist the hospitals in order to reduce the nurses' vulnerability through supplying them adequate PPE and testing capacity. In addition, professional community such as, nursing staff may also come forward to demand the required facilities they need to prevent themselves from contracting the disease. Pertinently, the

hospitals must not bring the gap between the formal institutional practices and actual practices in order to avoid the decoupling. They should rather prioritize the health of their nurses by providing them as much safe workplace as possible. In a nutshell, both the nurses and hospital administration need to realize their respective roles and responsibilities and perform them wholeheartedly for their mutual benefit and ultimately for the better cause of the society as a whole.

3.4 Propositions

- Inadequate availability of Personal Protective Equipment (PPE) to the nurses may threaten their health and life as it makes them more vulnerable to COVID-19.
- The noncompliance of nurses towards Significant Operating Procedures (SOPs) against COVID-19 may endanger their life.
- The gap between formal organizational and the actual practices of hospitals will contribute to increase the vulnerability of nurses towards COVID-19.
- The administration of public and private hospitals of Islamabad emphasizes on devising comprehensive formal laws and policies to ensure safety in the hospital settings.
- The hospital administration considerably stresses on training sessions regarding COVID-19 for the development of the nurses.

3.5. Hypotheses

Alternative Hypotheses (H₁)

1. The availability of adequate Personal Protective Equipment (PPE) results in healthy workplace environment for the nurses in public and private hospitals of Islamabad.

2. An increased level of compliance with significant preparatory measures ensures safe environment for nurses in public and private hospitals of Islamabad.
3. Hospital trainings increase the level of awareness among the nursing staff at both public and private hospital in Islamabad.

Null Hypotheses (H₀)

1. The availability of adequate Personal Protective Equipment (PPE) does not result in healthy workplace environment for the nurses in public and private hospitals of Islamabad.
2. An increased level of compliance with significant preparatory measures does not ensure safe environment for nurses in public and private hospitals of Islamabad.
3. Hospital trainings do not increase the level of awareness among the nursing staff in public and private hospital of Islamabad.

Chapter No 4

CONCEPTUALIZATION AND OPERATIONALIZATION

4.1 Conceptualization

Conceptualization is a process which includes the conceptual or theoretical definition of the key concepts used in the research. It helps in developing the basic ideas of the research by clarifying the concepts which ultimately leads to a comprehensive understanding of the research topic. In this part of the chapter the researcher has given various conceptual definitions of the key variables revealed in the research.

4.1.1 Vulnerability

According to World Bank (2001), “Vulnerability measures the resilience against a shock or stresses – the likelihood that a shock will result in a decline in well-being. Vulnerability is primarily a function of a household’s asset endowments and insurance mechanisms – and of the characteristics (severity, frequency) of the shock.” (Ludi and Bird 2007). Further, the International Strategy for Disaster Reduction (UN/ISDR 2004) defines vulnerability as, “The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards.” (Makoka and Kaplan 2005). Also, the United Nations Development Program (UNDP 2004) describes it as, “A human condition or process resulting from physical, social, economic and environmental factors, which determine the likelihood and scale of damage from the impact of a given hazard.” (Makoka and Kaplan 2005).

4.1.2 Workplace Safety

“Organization shared attitudes, values, norms and beliefs about safety, including attitudes about danger, risks, and the proper conduct of hazardous operation.” (Shuen and Wahab 2014). “Employees' imaging of safety conditions in the workplace; which images then affect organizational safety activities.” (Shuen and Wahab 2014). “The values, attitudes, beliefs, risk-

perceptions and behaviors as they relate to employee safety.” (Shuen and Wahab 2014).

4.2 Operationalization

Operationalization, on the other hand, is a process consisting of a more precise and specific definitions of the concepts based on the empirical observation and utilization of the researcher. This section explains how the researcher has employed the key terms which are conceptualized earlier.

4.2.1 Vulnerability

It has been understood that the vulnerability is referred to as a state of being at risk due to various factors or processes. This research study has identified the nurses’ vulnerability as they are at higher risk of contracting the viral disease of COVID-19 at their workplaces where they are working on the frontline, in hospital settings, to treat the suspected or confirmed COVID-19 patients.

4.2.2 Workplace Safety

Here, workplace safety refers to as the risk-free environment in public and private hospitals of Islamabad during the global pandemic. The factors influencing safety at hospitals include proper implementation of significant preparatory measures, knowledge and attitude of vulnerable population, i.e. nurses, towards COVID-19.

Chapter No 5
RESEARCH METHODOLOGY

5.1 Research Design

The researchers adopt various research methods in order to conduct a systematic research and collect the accurate data. The present research is quantitative in nature, which was focused on nurses' vulnerability to COVID-19 and workplace safety in public and private hospitals of Islamabad. It aims to identify the challenges faced by the nurses, significant preparatory measures taken by the hospital management and the level of awareness possessed by nurses about COVID-19 which will help them to prevent themselves from contracting the viral disease. The rationale for adopting quantitative research method in the current study was that through this approach the researcher could collect and analyze the data easily and within a short period of time. Moreover, the researcher could get significant results by using this method. In this approach, the survey had been conducted to figure out the nurses' vulnerability to COVID-19 and acquire knowledge about the workplace safety in public and private hospitals of Islamabad. A sample of numerous respondents was taken to collect the data where all the respondents were asked the same questions.

5.2 Universe of the Study

In total, the research was conducted from 5 major hospitals of Islamabad out of which 2 were public hospitals and 3 private. The public hospitals were Polyclinic Hospital and Capital Hospital (CDA) and the private hospitals were Riphah International Hospital (RIH), Shifa International Hospital (SIH) and Quaid e Azam International Hospital (QIH), respectively. The data was collected from different wards of the hospitals mainly from emergency, ICU and isolation wards where patients with COVID-19 were being treated. This is a workplace of study participants which focuses on the nurses' vulnerability and their workplace safety while working at both public and private hospitals in Islamabad.

5.3 Unit of Analysis

The unit of analysis in this research were nurses, both male and female, who were exposed to Coronavirus Disease 2019 (COVID-19) and likely to be vulnerable in catching the deadly disease as working frontline health workers in hospital settings.

5.4 Sampling Technique

The study focus was on the nurses' vulnerability, and the workplace safety, primarily at the hospitals. The Purposive or Judgemental, non-probability sampling technique, was the most suitable for data collection. According to Tongco (2007), purposive sampling is an informant selection tool to seek out appropriate or potential informants who possess specific qualities. It is used when investigating about any specific skill, knowledge or practice as a research problem. The researcher also adapts this technique when time and resources are too limited and information is held by only certain members of the community. Similarly, the nurses, who had likely to have interaction with COVID-19 patients at hospital wards, were selected.

5.5 Sample Size

To accomplish the research objectives, a sample size of 200 participants has been achieved. Due to the prevailing situation of the COVID-19, most of the hospital management was reluctant in sharing the statistical information of the workforce and giving access to the nursing staff in Islamabad city. Despite these challenging circumstances, the researcher managed to gain access to the desired respondents, 100 from each sector i.e. public and private hospitals of Islamabad.

5.6 Tools for Data Collection

A closed ended structured questionnaire was used as a tool to collect the data from targeted population which was then distributed among the respondents.

It was divided into three sections based on the research objectives. The language used in the questionnaire was comprehensible to the respondents. The researcher used questionnaire because it was difficult to collect the data from a huge population in a limited time period.

5.7 Pre-Testing

The questionnaire was pretested by distributing 10 questionnaires to the respondents 5 each from public and private hospitals of Islamabad. The researcher, further, made certain minor changes in the questionnaire as suggested by pretesting.

5.8 Tools for Data Analysis

The data was systematically analyzed through IBM Statistics, commonly known as Statistical Package for Social Sciences (SPSS). The researcher used this software to compute frequency, percentage and chi square test for data analysis. Furthermore, the tables generated through SPSS were elaborated and explained in Microsoft Word software.

5.9 Limitations of the Study

The study is limited to the Islamabad city in Pakistan owing to the travelling cost and shortage of time. The scope of this research is restricted to 5 main hospitals due to the strict adherence of social distancing and other preventive measures adapted by the hospitals in Islamabad. However, the study has highlighted the situation of nurses' vulnerability to COVID-19 at the health care facilities. It will be helpful for health care providers to understand the prevalence of risk factors which are involved in the nurses' safety. It has also outlined few key challenges faced by the researcher while approaching the hospital administration and seeking their permission for data collection from the key respondents. They were somehow reluctant to share the data of their

employees. Moreover, their major concern was security as well as the reputation of the hospital and respondents.

5.10 Ethical Concerns

Research ethics is one of the most crucial parts of research. Therefore, it is very essential for researchers to follow the code of ethics throughout the research process. In this regard, the researcher had considered the ethical standards while conducting the research. The rapport was built among the respondents before collecting data. The anonymity of the respondents and the confidentiality of their shared data was ensured by the researcher. They were ensured that the data collected from them would solely be used for academic purpose.

Chapter No 6
RESULTS AND FINDINGS

The following chapter shows the results of the research in the form of tables and the hypothesis testing. The chapter is divided into the descriptive analysis and inferential analysis. In addition, it also provides a comparative analysis section. Statistically, descriptive analysis provides the description of the data with the help of frequencies and percentages whereas, inferential analysis tries to find out the relationship between the frequency and percentages of the respondents illustrated in the form of table for an immediate and comprehensive grasp of the results. In addition, the results are further divided into three parts where the first part addresses the vulnerability of nurses towards COVID-19. The second part involves significant preparatory measures, while the last part comprises nurses' level of knowledge about COVID-19.

6.1 Descriptive Statistics

Descriptive statistics is used to describe the statistical data which is collected through survey. The researcher used descriptive analysis in order to describe the data in statistical form which was collected from the respondents.

Table 6. 1 Sampling Distribution

Public/Private		
Category	Frequency	Percent
Public	100	50.0
Private	100	50.0
Total	200	100.0
Hospital Name		
Capital H(CDA)	50	25.0
Polyclinic	50	25.0
Shifa International	50	25.0
Riphah International	20	10.0

Quaid e Azam International Total	30 200	15.0 100.0
Hospital Ward		
Emergency Ward	90	45.0
High Dependency Unit	15	7.5
ICU Ward	40	20.0
Isolation Ward	25	12.5
Obstetric Ward	10	5.0
Surgical Ward	20	10.0
Total	200	100.0

Table 6.1 highlights the sample distribution of data collected from the nurses of public and private hospitals in Islamabad. The total sample of 200 was equally distributed between public and private hospitals i.e. 100 respondents from each sector. The data was collected from 5 major hospitals of Islamabad out of which 2 were public hospitals and 3 private. The number of respondents from both public hospitals, Polyclinic and Capital Hospital (CDA), was 50 (25%) each. However, the respondents from private hospitals were distributed as: 50 (25%), 20 (10%) and 30 (15%) from Shifa International Hospital (SIH), Riphah International Hospital (RIH) and Quaid e Azam International Hospital (QIH), respectively. Furthermore, the data was collected from different wards of the hospitals where patients with COVID-19 were being treated. Out of 200, the data of 90 (45%) respondents was collected from Emergency ward, 40 (20%) from Intensive Care Unit (ICU) ward, 25 (12.5%) from Isolation ward, 20 (10%) from Surgical ward, 15 (7.5%) from High Dependency Unit and 10 (5%) from Obstetric ward in both public and private hospitals of Islamabad.

Demographics of the Respondents

Table 6. 2 Gender

Gender		
Category	Frequency	Percent
Male	70	35.0
Female	130	65.0
Total	200	100.0

The table 6.2 shows the gender of the respondents. Out of the total participants, 70 (35%) respondents of overall distribution were male. However, 130 (65%) respondents were female. Majority of the respondents in the research were female owing to the nature of nursing job.

Table 6. 3 Age

Age		
Category	Frequency	Percent
20-29	145	72.5
30-39	39	19.5
40-49	9	4.5
50-Above	7	3.5
Total	200	100.0

Table 6.3 represents the age of the respondents. The results show that the number of respondents from the age group 20-29 was 145 (72.5%). The respondents from age group 30-39 were 39 (19.5%), respondents from the age group 40-49 were 9 (4.5%). While the respondents from age group 50-Above were 7 (3.5%). As can be seen from the table above, majority of the respondents who were exposed to COVID-19 were aged between 20-29 years.

Table 6. 4 Marital Status

Marital status		
Category	Frequency	Percent
Single	118	59.0
Married	82	41.0
Total	200	100.0

The nurses, whether they are single or married, are not only themselves vulnerable to COVID-19 they may also infect the people associated with them. Such as, the married nurses may have responsibilities of spouse and child care which is likely to be affected. Table 6.4 shows the marital status of the respondents. It can be seen from the table that 118 (59%) nurses out of 200 were single. Whereas, 82 (41%) of them were married. The results reveal that the majority of the nurses, 118 (59%), were single.

Table 6. 5 No of Children of the Nurses and Their Ages

No of Children			
Category	Frequency	Percent	Cumulative Percent
1-2	48	67.6	67.6
3-4	18	25.4	93.0
5-6	5	7.0	100.0
Total	71	100.0	
Ages of Children			
Child 1			
1-7	29	41.4	41.4
8-14	23	32.9	74.3
15-21	10	14.3	88.6
22-Above	8	11.4	100.0
Total	70	100.0	
Child 2			
1-7	17	37.0	37.0

8-14	18	39.1	76.1
15-21	6	13.0	89.1
22-Above	5	10.9	100.0
Total	46	100.0	
Child 3			
1-7	7	31.8	31.8
8-14	8	36.4	68.2
15-21	6	27.3	95.5
22-Above	1	4.5	100.0
Total	22	100.0	

The more children nurses have the more people are vulnerable to the disease. In fact, children with higher dependency parents are likely to be affected. Table 6.5 provides the statistical summary for the number of children of the married nurses. Out of married respondents, 71 were those who had children. About 48 (67.6%) nurses were having children between the class intervals 1-2, 18 (25.4%) respondents were having children between 3-4, and 5 (7%) respondents were having children between 5-6. Majority of the nurses had children in the first interval i.e. 1-2. The point of concern in this table is that the majority of the children were falling in the age categories of 1-7 and 8-14 at which children are more dependent on their parents. For the first child, 74.3% belonged to the age categories of 1-7 and 8-14. Similarly, 76.1% of the children were falling in the same age categories when it comes to the second child of the respondents. As far as the age of third child is concerned, the cumulative percentage of first two age categories i.e. 1-7 and 8-14 was 68.2%. From this, it can be concluded that not only nurses but the health and life of children were also at stake owing to the prevailing situation in the hospitals.

Table 6. 6 Family Structure

Family Structure		
Category	Frequency	Percent
Joint Family	98	49.0
Nuclear Family	101	50.5
Extended Family	1	.5
Total	200	100.0

It is commonly seen that people in nuclear family are less in number than that of joint and extended family. In nuclear family less people are likely to be infected, while relatively more individuals are at risk in joint and extended families. Table 6.6 highlights the family structure of the respondents which illustrates that 50.5% of the nurses belonged to nuclear family, 49% belonged to joint family and merely 0.5% constituted extended family. Majority of the participants, with a slight difference from joint family, were from nuclear family.

Table 6. 7 No of Persons Living in the Same House

No of persons in the same house		
Category	Frequency	Percent
1-5	65	32.5
6-10	99	49.5
11-15	29	14.5
16-20	5	2.5
21-Above	2	1.0
Total	200	100.0

Since COVID-19 is a widely spreading disease among individuals the people living in the same house from where nurses belong to are at risk of catching the viral disease. Table 6.7 indicates the number of persons living in the same house. From this data, it can be seen that 49.5% nurses lived in the same house where 6-10 people were living, 32.5% belonged to the house where 1-

5 people lived, 14.5% lived in house with 11-15 people, 2.5% lived in house with 16-20 people and 1% nurses were those who lived in the house of 21 people and above. Hence, majority of the total nurses (49.5%) lived in the house of 6-10 people. It shows the vulnerability of not only nurses but also the people associated with them outside the workplace environment.

Table 6. 8 Education

Education		
Category	Frequency	Percent
Matriculation	26	13.0
Intermediate	57	28.5
Bachelors	112	56.0
Masters	5	2.5
Total	200	100.0

The more educated nurses are the more aware they are likely to be in dealing with the deadly virus. The table 6.8 describes the educational background of the nurses. It reveals that 13% of the respondents had education of matriculation, 28.5% intermediate, 56% bachelors and 2.5% masters. Majority of the nurses had educational qualification of bachelors.

Table 6. 9 Professional Status

Professional Status		
Category	Frequency	Percent
Registered Nurse	164	82.0
Nurse Practitioner	21	10.5
Nurse In charge	6	3.0
Head Nurse	9	4.5
Total	200	100.0

Table 6.9 is about the professional status of the nurses in public and private hospitals of Islamabad. The data shows that 82%, a significantly high percentage, of nurses were registered nurses followed by 10.5% nurse practitioners, 3% nurse in charge and 4.5 percent head nurses.

Table 6. 10 Work Experience (in years)

Work Experience (in years)		
Category	Frequency	Percent
0-3	62	31.0
4-7	82	41.0
8-11	15	7.5
12-15	25	12.5
16-Above	16	8.0
Total	200	100.0

The vulnerability of nurses to COVID-19 becomes lesser with their growing experience in dealing with the patients at hospitals. Table 6.10 depicts the work experience - in years - of the respondents in their respective hospital settings. It is evidenced by the data that 31% nurses had 0-3 years of work experience, 41% (majority) had work experience of 4-7 years, and 7.5% had 8-11 years' experience. In addition, 12.5% and 8% respondents were shown to have work experience of 12-15 years and 16 years and above, respectively.

Part I: Assessing Nurses’ Exposure/Vulnerability to COVID-19

This part shows the result findings while addressing the first research question on the assessment of challenges faced by the nurses at their workplaces of government and private hospitals during the pandemic in Islamabad, which can be a source of nurses’ exposure and vulnerability towards COVID-19 in Pakistan.

Table 6. 11 History of Staying with Confirmed COVID-19 Patient in the Ward

Staying with confirmed COVID-19 patient		
Category	Frequency	Percent
Yes	184	92.0
No	11	5.5
Neutral	5	2.5
Total	200	100.0

The life and health of individuals become risky and unsafe when they are involved in a sensitive workplace environment. Table 6.11 illustrates whether the nurses had a history of staying with confirmed COVID-19 patients in the wards of hospital setting. The table shows that of the total sample size, a considerable proportion of the nurses (92%) had stayed with confirmed COVID-19 patients in various wards which has increased the potential risk of attracting the disease for the nurses, and their families as well. Whereas, 5.5 % of the respondents did not have a history of staying with confirmed COVID-19 patients. While 2.5 % nurses stood neutral in response to this question.

Table 6. 12 Traveling together with Confirmed COVID-19 Patient

Traveling together with confirmed COVID-19 patient		
Category	Frequency	Percent
Yes	108	54.0
No	78	39.0
Neutral	14	7.0
Total	200	100.0

The vulnerability of nurses is likely to be increased when they travel with confirmed COVID-19 patients. Table 6.12 provides the responses of nurses regarding their travelling history with confirmed COVID-19 patients. The data suggests that 54% out of 200 nurses had travelled together with confirmed COVID-19 patient. On the contrary, 39 % nurses did not travel with confirmed COVID-19 patients. While 7% of the nurses were seem to be neutral. Majority of them had a history of traveling together with the patients making themselves exposed and vulnerable to coronavirus disease 2019 (COVID-19).

Table 6. 13 Direct Care to Confirmed COVID-19 Patients

Direct care to confirmed COVID-19 patient		
Category	Frequency	Percent
Yes	163	81.5
No	24	12.0
Neutral	13	6.5
Total	200	100.0

During the COVID-19 pandemic, nurses are seen to provide direct care to confirmed COVID-19 patients which makes them vulnerable. Table 6.13 describes whether the nurses provided direct care to the patients with COVID-19. In response to that, a significant proportion of the participants

(81.5%) answered positively. Whereas, 12% of them did not provide direct care to the patients in various wards of the hospitals. Out of 200 participants, 6.5% remained neutral.

Table 6. 14 Face to Face Contact with Confirmed COVID-19 Patients

Face to face contact with confirmed COVID-19 patient		
Category	Frequency	Percent
Yes	178	89.0
No	14	7.0
Neutral	8	4.0
Total	200	100.0

In providing direct care to the patients nurses may come into face to face contact with them which is risky for their own health conditions. Table 6.14 shows that 89% of the nurses came across COVID-19 patients through face to face contact. However, 7% nurses were those who did not have face to face contact with them, while 4% were said to be neutral in this regard.

Table 6. 15 Presence Ratio during Aerosol Generating Procedure

Presence ratio during aerosol generating procedure		
Category	Frequency	Percent
Yes	176	88.0
No	22	11.0
Neutral	2	1.0
Total	200	100.0
Types of Procedure		
Tracheal Intubation	65	100.0
Nebulizer Treatment	161	100.0
Open Airway	62	100.0
Suctioning		
Collection of Sputum	29	100.0

Along with doctors and other healthcare professionals, nurses are also supposed to be present in the critical wards where the patients are treated. This table contains the responses of nurses about their presence ratio in the wards during aerosol generating procedure of COVID-19. The data shows that 176 (88%) nurses were present in wards during aerosol generating procedure, while 22 (11%) respondents were not present. Furthermore, 2 (1%) nurses were neutral. It can be seen from the findings that 65, 161, 62 and 29 nurses were present in procedures like, tracheal intubation, nebulizer treatment, open airway suctioning and collection of sputum, respectively. A significant proportion of the nurses was present in Nebulizer Treatment type of aerosol generating procedure.

Table 6. 16 Direct Contact with Environment

Direct contact with the environment where confirmed COVID-19 patient is cared for		
Category	Frequency	Percent
Yes	150	75.0
No	42	21.0
Neutral	8	4.0
Total	200	100.0

The likelihood of vulnerability is increased when frontline workers especially, nurses come in direct contact with the environment- beds, linen, medical equipment, bathroom and other high touch surfaces- where confirmed COVID-19 patients are cared for. Table 6.16 depicts that a huge proportion of 150 (75%) nurses had direct contact with the environment where the patients with COVID-19 were present, of the rest 42 (21%) nurses did not have direct contact, while 8 (4%) respondents were neutral. Hence, a considerable proportion of the participants were at risk of being infected.

Table 6. 17 Obligation to Perform Duty when Sick

Obligation to perform duty when sick		
Category	Frequency	Percent
Yes	110	55.0
No	89	44.5
Neutral	1	.5
Total	200	100.0

Table 6.17 presents the obligation of nurses to perform their duties in hospital when they are sick. The closer inspection of the table shows that a significant number of 110 (55%) nurses were obligated to perform their duties even when they were not feeling well which made them vulnerable to COVID-19. On the other hand, a welcoming result represents that 89 (44.5%) respondents were not forced to perform their jobs. In addition, 1 (0.5%) of the nurse was neutral in this context.

Table 6. 18 Interaction in another Healthcare Facility

Interaction in another health care facility		
Category	Frequency	Percent
Yes	54	27.0
No	141	70.5
Neutral	5	2.5
Total	200	100.0
Ambulance	33	100.0
Home Care	29	100.0

It is found that nurses, sometimes, perform their duties out of their respective wards in the hospitals such as in ambulance or provide home care to the patients which also results in nurses' vulnerable conditions. Table 6.18 illustrates the interaction of the nurses with COVID-19 patients in health care facilities other than their respective wards. It infers that 141 (70.5%) of the

respondents had interaction with the patients in another facility, while 54 (27%) did not have. Moreover, 5 (2.5%) of the respondents were neutral. A number of 33 and 29 nurses had interaction with the patients in ambulance and home care, respectively.

Table 6. 19 Over Performance of Duty in Workplace

Over performance of duty		
Category	Frequency	Percent
Yes	130	65.0
No	67	33.5
Neutral	3	1.5
Total	200	100.0
No of Extra Hours per Day		
1-4	92	73.0
5-8	29	23.0
9-12	5	4.0
Total	126	100.0

Table 6.19 indicates the over performance of the nurses' duties due to the mounting workload in the hospitals as a result of the COVID-19 pandemic. The data reveals that 130 (65%) out of 200 respondents overly performed their duties in the wards whereas, 67 (33.5%) were doing their jobs as usual. The remaining 3 (1.5%) of the nurses were neutral. Furthermore, 92 (73%), 29 (23%) and 5 (4%) respondents were spending 1-4, 5-8 and 9-12 extra hours per day, respectively.

Table 6. 20 Performance of Additional Roles due to Increased Workload

Performance of additional roles due to increased workload		
Category	Frequency	Percent
Yes	18	9.0
No	179	89.5
Neutral	3	1.5
Total	200	100.0

Table 6.20 explains the performance of nurses' additional roles in response to the increased workload during the time of COVID-19 pandemic. As shown in the table, majority of the respondents i.e. 179 (89%) did not perform additional roles, while 18 (9%) of them were assigned few other roles. The rest of 3 (1.5%) nurses remained neutral.

Part II: Significant Preparatory Measure

This section presents the result findings while addressing the second research question on the significant preparatory measures taken by the hospital management to reduce the nurses’ vulnerability during the time of global pandemic in Islamabad, which can be a source of preventing potential risk of the nurses towards COVID-19 in Pakistan.

Table 6. 21 Wearing PPE during Interaction with Confirmed COVID-19 Patients

Wearing PPE during interaction with confirmed COVID-19 patient		
Category	Frequency	Percent
Always, as recommended	138	69.0
Not Always	62	31.0
Total	200	100.0
Use of Medical Mask		
Always, as recommended	142	71.0
Not Always	58	29.0
Total	200	100.0
Use of Face Shield or Goggles/Protective Glasses		
Always, as recommended	74	37.0
Not Always	126	63.0
Total	200	100.0
Use of Disposable Gown		
Always, as recommended	103	51.5
Not Always	97	48.5
Total	200	100.0

In order to avoid contracting the disease, it is imperative for the nurses to comply with the precautionary measures in this high time of the worldwide pandemic. Table 6.21 takes into account the practice of nurses to wear Personal Protective Equipment (PPE) during interaction with confirmed COVID-19 patients. It is observed that 138 (69%) nurses wore PPE always in the workplace as per recommendation. In contrast, 62 (31%) of the respondents did not wear PPE which makes them vulnerable by posing threat to their health. Moreover, the results show that 142 (71%) and 103 (51.5%) participants always used medical mask and disposable gown, respectively. On the other hand, a significant ratio of the nurses 126 (63%) did not use protective glasses during interaction.

Table 6. 22 Provision of Enough or Extra PPE to Avoid Contracting COVID-19

Provision of enough or extra PPE to avoid contracting COVID-19		
Category	Frequency	Percent
Always, as recommended	112	56.0
Not Always	88	44.0
Total	200	100.0

It is obligatory for the authorities concerned to provide enough or extra PPE to the nurses for reducing their vulnerability to the disease. Table 6.22 shows a good sign that the majority of the respondents, i.e. 56%, were given enough or extra PPE but still there were 88 (44%) nurses who looked for adequate availability of PPE.

Table 6. 23 Removal or Replacement of PPE According to Protocol during Interaction with COVID-19 Patients

Removal or replacement of PPE according to protocol during interaction		
Category	Frequency	Percent
Always, as recommended	119	59.5
Not Always	81	40.5
Total	200	100.0

Table 6.23 is about nurses' removal or replacement of PPE according to protocol while interacting with COVID-19 patients. The results reveal that 119 (59.5%) respondents removed or replaced PPE, while 81 (40.5%) did not. The majority of participants followed this precautionary measure.

Table 6. 24 Hand Hygiene Before and After Touching the COVID-19 Patient during Interaction

Hand hygiene before and after touching the COVID-19 patient during interaction		
Category	Frequency	Percent
Always, as recommended	154	77.0
Not Always	46	23.0
Total	200	100.0

Table 6.24 represents nurses' practice of hand hygiene before and after touching the COVID-19 patients during interaction. Out of 200 nurses, 154 (77%) did this practice always as recommended, while rest of the 46 (23%) did not perform hand hygiene always which makes them, and also others, vulnerable to COVID-19. Hence, majority of the participants complied with this measure.

Table 6. 25 Hand Hygiene Before and After Clean or Aseptic Procedure

Hand hygiene before and after clean or aseptic procedure		
Category	Frequency	Percent
Always, as recommended	139	69.5
Not Always	61	30.5
Total	200	100.0

Table 6.25 explains the hand hygiene practice of the nurses before and after clean or aseptic procedure in the wards. The data indicates that the majority of the participants 139 (69.5%) practiced hand hygiene always for this purpose. Likewise, 61 (30%) nurses followed this practice but not always.

Table 6. 26 Hand Hygiene after Exposure to Body Fluid during Interaction with COVID-19 Patient

Hand hygiene after exposure to body fluid during interaction with COVID-19 patient		
Category	Frequency	Percent
Always, as recommended	140	70.0
Not Always	60	30.0
Total	200	100.0

Table 6.1.26 provides the responses of nurses regarding hand hygiene after exposure to body fluid while interacting with COVID-19 patients. The data exhibits that 140 (70%) out of 200 nurses always performed hand hygiene in this regard. On the contrary, 60 (30%) participants adopted this practice but not always. Majority of them always complied with this Standard Operating Procedure (SOP).

Table 6. 27 Hand Hygiene after Touching the Patient's Surroundings

Hand hygiene after touching the patient's surroundings		
Category	Frequency	Percent
Always, as recommended	117	58.5
Not Always	83	41.5
Total	200	100.0

Table 6.27 is about nurses' hand hygiene practice after touching the patients' surroundings. The table illustrates that 117 (58.5%) respondents performed hand hygiene always as per recommendations. In contrast, 83 (41.5%) followed this practice but not always. The majority of participants followed this precautionary measure always.

Table 6. 28 Disinfection of High Touch Surfaces in Patient Wards and Common Spaces

Disinfection of high touch surfaces in patient wards and common spaces		
Category	Frequency	Percent
Always, as recommended	75	37.5
Not Always	125	62.5
Total	200	100.0

It is pertinent to disinfect the high touch surfaces both in patient wards and other common spaces in order to facilitate nurses and other healthcare workers with safe workplace environment during the pandemic. Table 6.28 shows an appalling result where the majority of nurses i.e. 125 (62.5%) responded that the high touch surfaces were not always disinfected in patient wards as well as in common spaces. Consequently, it increased the vulnerability of nurses towards COVID-19. However, 75 (37.5%) participants responded that this precautionary measure was adapted always as recommended.

Table 6. 29 Required No of Isolation Wards and Quarantine Facilities

Required no of isolation wards and quarantine facilities		
Category	Frequency	Percent
Always, as recommended	99	49.5
Not Always	101	50.5
Total	200	100.0

Table 6.29 highlights the availability of required number of isolation wards and quarantine facilities, for patients as well as for nurses, in the hospitals. Apparently, majority of the nurses 101 (50.5%) were of the view that there was not always required number of isolation wards and quarantine facilities. On the contrary, 99 (49.5%) respondents believed that the hospital always had required number of isolation wards and quarantine facilities.

Table 6. 30 Adequate Testing Capacity of COVID-19 for Patients As Well As for Nurses

Adequate testing capacity of COVID-19 for patients as well as for nurses		
Category	Frequency	Percent
Always, as recommended	88	44.0
Not Always	112	56.0
Total	200	100.0

Table 6.30 represents the data on availability of adequate testing capacity of COVID-19 not only for patients but also nurses. Evidently, majority of the nurses 112 (56%) did not always have the required testing facility of COVID-19. On the other hand, 88 (44%) respondents had required testing capacity but not always.

Part III: Level of Awareness

The third part presents the result findings to answer the third research question on the level of awareness available to nurses in order to prevent their vulnerable conditions at public and private hospitals of Islamabad during COVID-19 pandemic that can potentially decrease the risk of the nurses towards COVID-19 in Pakistan.

Table 6. 31 Level of Knowledge

Level of knowledge		
Category	Frequency	Percent
Beginner	23	11.5
Advanced beginner	57	28.5
Competent	72	36.0
Proficient	38	19.0
Expert	10	5.0
Total	200	100.0

Adequate knowledge about the symptoms, hazards and risks of COVID-19 may help its potential victims to avoid being infected from this life-threatening disease. Table 6.31 portrays the nurses' overall level of knowledge regarding Coronavirus disease 2019 (COVID-19). The data shows that 23 (11.5%) nurses were beginner in terms of knowledge about COVID-19, while 57 (28.5%) were advanced beginner. On the other side, 72 (36%), 38 (19%) and 10 (5%) were shown to be competent, proficient and expert, respectively. Majority of the respondents regarded themselves as competent in terms of COVID-19 related knowledge.

Table 6. 32 Sources of Knowledge

Sources of Knowledge		
News media as a source of knowledge		
Category	Frequency	Percent
Least Used	41	20.5
Sometimes	90	45.0
Most Used	69	34.5
Total	200	100.0
Social media as a source of knowledge		
Least Used	43	21.5
Sometimes	69	34.5
Most Used	88	44.0
Total	200	100.0
Medical journals as a source of knowledge		
Least Used	46	23.0
Sometimes	65	32.5
Most Used	89	44.5
Total	200	100.0
Hospital trainings as a source of knowledge		
Least Used	24	12.0
Sometimes	26	13.0
Most Used	150	75.0
Total	200	100.0
Family and Friends as a source of knowledge		
Least Used	63	31.5
Sometimes	59	29.5

Most Used	78	39.0
Total	200	100.0
Official Govt. Websites as a source of knowledge		
Least Used	47	23.5
Sometimes	94	47.0
Most Used	59	29.5
Total	200	100.0

It is essential for nurses to get knowledge about COVID-19 from authentic and reliable sources. Table 6.32 provides explanation of the sources used by nurses to gain knowledge about COVID-19. These sources include news media, social media, medical journals, hospital trainings, family and friends and official government websites. The table above shows that 41 (20.5%) nurses were least likely to use news media as a source of knowledge, 90 (45%) used it sometimes, while 69 (34.5%) were most likely to use this source of knowledge. Secondly, 43 (21.5%) nurses were least likely to use social media as a source of knowledge, 69 (34.5%) used it sometimes and 88 (44%) were most likely to use this source. For medical journals, 46 (23%) respondents used it the least, 65(32.5%) used sometimes, while 89 (44.5%) used this source the most. Out of 200, 24 (12%) nurses were less likely to gain knowledge from hospital trainings, 26 (13%) used it sometimes, while a significant ratio of 150 (75%) respondents used this source the most for knowledge accumulation. Moreover, 63 (31.5%), 59 (29.5%) and 78 (39%) nurses regarded family and friends as the least, sometimes and the most used source, respectively. Finally, 47 (23.5%) participants least consulted official government websites. On the contrary, 59 (29.5%) used it the most, while 94 (47%) participants used sometimes.

6.2 Inferential Statistics

Inferential statistics highlights the important association of the key variables in order to address the key research questions and the hypothesis.

Table 6. 33 Presence in Ward and Availability of PPE

H₁: The availability of adequate Personal Protective Equipment (PPE) results in healthy workplace environment for the nurses in public and private hospitals of Islamabad.

H₀: The availability of adequate Personal Protective Equipment (PPE) do not result in healthy workplace environment for the nurses in public and private hospitals of Islamabad.

Cross Tabulation			Does hospital provide you enough or extra PPE to prevent yourself from contracting COVID-19 disease?		Total
			Always, as recommended	Not Always	
Were you present in the ward when any aerosol generating procedure	Yes	Count	102	74	176
		% within Presence during aerosol generating procedure	58.0%	42.0%	100.0%
		Count	9	13	22

g procedur e was performe d on the COVID- 19 patient?	No	% within Presenc e during aerosol generati ng procedu re	40.9%	59.1%	100.0 %
	Neutral	Count	1	1	2
		% within Presenc e during aerosol generati ng procedu re	50.0%	50.0%	100.0 %
	Total	Count	112	88	200
		% within Presenc e during aerosol generati ng procedu re	56.0%	44.0%	100.0 %

The above cross tabulation shows the analogy of nurses' presence in the critical wards when any aerosol generating procedure was performed on the COVID-19 patients and the provision of enough or extra Personal Protective Equipment (PPE) to prevent themselves from contracting the viral disease during interaction with COVID-19 patients. The results show that the

majority of 102 (58%) nurses, out of those involved in aerosol generating procedure, were always given adequate PPE while interacting with the patients in the wards but still a good number of 74 (42%) respondents did not always have enough or extra PPE to secure themselves from the virus.

Hypothesis Test I:

Table 6. 34 Hypothesis Test I

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	13.439 ^a	6	.008
Likelihood Ratio	15.401	6	.044
N of Valid Cases	200		
a. 7 cells (58.3%) have expected count less than 5. The minimum expected count is .04.			

The value of Pearson Chi-Square in the above table is 13.439^a, Degree of Freedom (df) is 6 and the Asymptotic Significance value is .008. Since, the p-value (0.008) is less than the level of significance 0.05 it shows that the relationship between the variables is statistically significant. Hence, the alternate hypothesis is accepted, while the null hypothesis is rejected. The acceptance of alternative hypothesis shows that the provision of adequate Personal Protective Equipment (PPE) results in healthy workplace environment for the nurses in critical wards of the hospitals which makes them less vulnerable to COVID-19.

Table 6. 35 Presence in Ward and Wearing PPE

H₁: An increased level of compliance with significant preparatory measures ensures safe environment for nurses in public and private hospitals of Islamabad.

H₀: An increased level of compliance with significant preparatory measures do not ensure safe environment for nurses in public and private hospitals of Islamabad.

Cross Tabulation			During interaction with COVID-19 patients, do you wear Personal Protective Equipment (PPE)?		Total
			Always, as recommended	Not Always	
Were you present in the ward when any aerosol generating procedure was performed on the COVID-	Yes	Count	126	50	176
		% within Presence during aerosol generating procedure	71.6%	28.4%	100.0%
	No	Count	11	11	22
		% within Presence during aerosol generating procedure	50.0%	50.0%	100.0%
		Count	1	1	2

19 patient?	Neutral	% within Presence during aerosol generating procedure	50.0%	50.0%	100.0%
	Total	Count	138	62	200
		% within Presence during aerosol generating procedure	69.0%	31.0%	100.0%

The above cross tabulation puts emphasis on the analogy of nurses' presence in the wards when any aerosol generating procedure was performed on the COVID-19 patients and practice of wearing Personal Protective Equipment (PPE) adopted by them during interaction with COVID-19 patients. The results show that the major proportion of 126 (71.6%) nurses, out of those involved in aerosol generating procedure, always wore PPE while interacting with the patients in the wards but still a good number of 50 (28.4%) respondents did not always follow this practice which is alarming.

Hypothesis Test II:

Table 6. 36 Hypothesis Test II

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18.291 ^a	6	.006
Likelihood Ratio	12.798	6	.046
N of Valid Cases	200		
a. 7 cells (58.3%) have expected count less than 5. The minimum expected count is .02.			

The value of Pearson Chi-Square in the above table is 18.291^a, Degree of Freedom (df) is 6 and the Asymptotic Significance value (p-value) is .008. Since, the p-value is less than the level of significance 0.05 it shows that the relationship between the variables is statistically significant. Hence, the alternate hypothesis is accepted, while the null hypothesis is rejected. The acceptance of alternative hypothesis indicates that the increased level of compliance with significant preparatory measures ensures safe environment for nurses in the hospitals which ultimately makes them less vulnerable to COVID-19.

Table 6. 37 Level of Awareness and Hospital Trainings

H₁: Hospital trainings increase the level of awareness among the nursing staff at both public and private hospital in Islamabad.

H₀: Hospital trainings do not increase the level of awareness among the nursing staff at both public and private hospital in Islamabad.

Cross Tabulation			Hospital trainings as a source of knowledge				Total
			Least Used	Sometimes	More Often	Most Used	
Level of Awareness	Beginner	Count	4	5	7	7	23
		% within Overall level of knowledge	17.4%	21.7%	30.4%	30.4%	100.0%
	Advanced beginner	Count	10	11	19	17	57
		% within Overall level of knowledge	17.5%	19.3%	33.3%	29.8%	100.0%
	Competent	Count	1	9	26	36	72
		% within Overall level of knowledge	1.4%	12.5%	36.1%	50.0%	100.0%
		Count	9	1	8	20	38

	Proficient	% within Overall level of knowledge	23.7%	2.6%	21.1%	52.6%	100.0%
	Expert	Count	0	0	3	7	10
		% within Overall level of knowledge	0.0%	0.0%	30.0%	70.0%	100.0%
	Total	Count	24	26	63	87	200
		% within Overall level of knowledge	12.0%	13.0%	31.5%	43.5%	100.0%

The above cross tabulation 6.37 shows the analogy between nurses' level of awareness and hospital trainings as a source of knowledge they possess about COVID-19. The key results reveal that among those who were competent a majority of 50% nurses mostly used hospital trainings as a source of knowledge. While an overwhelming proportion of 52.6% and 70% nurses who used hospital trainings the most were proficient and expert, respectively.

Hypothesis Test III:

Table 6. 38 Hypothesis Test III

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	30.117 ^a	12	.003
Likelihood Ratio	36.930	12	.000
N of Valid Cases	200		
a. 8 cells (40.0%) have expected count less than 5. The minimum expected count is 1.20.			

The value of Pearson Chi-Square in the above table is 30.117^a, Degree of Freedom (df) is 12 and the Asymptotic Significance value (p-value) is .003. Since, the p-value is less than the level of significance 0.05 it shows that the relationship between the variables is statistically significant. Hence, the alternate hypothesis is accepted, while the null hypothesis is rejected. The acceptance of alternative hypothesis shows that the hospital trainings increase the level of awareness among the nursing staff at both public and private hospital in Islamabad.

Table 6. 39 Direct Contact with Environment and Disinfection

Cross Tabulation			Are high touch surfaces in both patient wards and common spaces disinfected frequently (at least thrice a day) during interaction with confirmed COVID-19 patients?		Total
			Always, as recommended	Not Always	
Do you come in direct contact with the environment where confirmed COVID-19	Yes	Count	56	94	150
		% within Direct contact with the environment	37.3%	62.7%	100.0%
	No	Count	15	27	42
		% within Direct contact with the environment	35.7%	64.3%	100.0%

patient is cared for? (E.g. bed, linen, medical equipment, bathroom, etc.)	Neutral	Count	4	4	8
		% within Direct contact with the environment	50.0%	50.0%	100.0%
	Total	Count	75	125	200
		% within Direct contact with the environment	37.5%	62.5%	100.0%

The above cross tabulation 6.39 shows the analogy between nurses' direct contact with the environment- bed, linen, medical equipment, bathroom, etc. - where confirmed COVID-19 patients are cared for and process of disinfecting high touch surfaces in the wards and common spaces at least thrice a day. Surprisingly, the majority of 94 (62.7%) nurses responded that the disinfection process was not always followed. However, 56 (37.3%) respondents believed that the wards and common spaces were always disinfected at least thrice a day which indeed is a positive sign.

Table 6. 40 Obligation to Perform Duty and Testing Capacity

Cross Tabulation			Does hospital provide adequate testing capacity of COVID-19 for patients as well as for nurses in the hospitals?		Total
			Always, as recommended	Not Always	
Are you obliged to perform your duty even when you are sick?	Yes	Count	48	62	110
		% within Obligation to perform duty when sick	43.6%	56.4%	100.0%
	No	Count	40	49	89
		% within Obligation to perform duty when sick	44.9%	55.1%	100.0%
	Neutral	Count	0	1	1
		% within Obligation to perform duty when sick	0.0%	100.0%	100.0%
	Total	Count	88	112	200
		% within Obligation to perform duty when sick	44.0%	56.0%	100.0%

The above cross tabulation 6.40 illustrates the analogy of nurses' obligation to perform duties regardless of their health conditions and provision of adequate testing capacity of the deadly virus for patients as well as for nurses. The table asserts that 48 (43.6%) nurses were provided with adequate testing capacity. The irony is that the majority of 62 (56.4%) nurses did not always have this facility which led them towards higher vulnerability of COVID-19.

Cross Tabulation for Comparative Analysis

Table 6. 41 Work Experience: Comparative Analysis

Cross Tabulation		Work Experience (in years)					Total
		0-3	4-7	8-11	12-15	16-Above	
Public	Count	14	49	7	18	12	100
	% within Public/Private	14.0%	49.0%	7.0%	18.0%	12.0%	100.0%
Private	Count	48	33	8	7	4	100
	% within Public/Private	48.0%	33.0%	8.0%	7.0%	4.0%	100.0%
Total	Count	62	82	15	25	16	200
	% within Public/Private	31.0%	41.0%	7.5%	12.5%	8.0%	100.0%

The above cross tabulation 6.41 helps to distinguish the work experience (in years) of nurses between public and private hospitals of Islamabad. Their experiences were categorized into five class intervals which included 0-3 years, 4-7 years, 8-11 years, 12-15 years and 16 years and above. In the first class interval (0-3 years), the private hospitals seemed to have more percentage (48%) than the public hospitals (14%). In the second class interval (4-7 years), the public and private hospitals had 49% and 33% of their nurses, respectively. Similarly, third class interval (8-11 years) tells that 7% of the public hospital nurses had work experience of 8-11 years, while 8% of the private hospitals had experience in the same category. For the fourth and the fifth class intervals ranging from 12-15 years and 16 and above years, the ratio for public hospital nurses was 18% and 12%, respectively. While the percentage of private hospital nurses in the same categories were 7% and 4%, respectively. The data indicates the fact that the nurses of private hospitals

had more percentage of experience in 0-3 years and majority of the public hospital nurses had 4-7 years of work experience.

Table 6. 42 Obligation to Perform Duty: Comparative Analysis

Cross Tabulation		Obligation to perform duty when sick			Total
		Yes	No	Unknown	
Public	Count	58	41	1	100
	% within Public/Private	58.0%	41.0%	1.0%	100.0%
Private	Count	52	48	0	100
	% within Public/Private	52.0%	48.0%	0.0%	100.0%
Total	Count	110	89	1	200
	% within Public/Private	55.0%	44.5%	0.5%	100.0%

The above cross tabulation 6.42 distinguishes between the public and the private hospitals for nurses' obligation to perform their duties during sickness. The data shows that 58% of the respondents from public hospitals said that they performed duties even when they were sick whereas, 52% of the private hospital nurses asserted that they performed duties when they were not feeling well. In the same way, 41% nurses of the public hospitals expressed that they did not perform duties when they were sick and similar views were expressed by 48% nurses of the private hospitals. In addition, 1% of the public hospital respondents were unknown about their status of sickness.

Table 6. 43 Over Performance of Duty: Comparative Analysis

Cross Tabulation		Over performance of duty			Total
		Yes	No	Unknown	
Public	Count	56	41	3	100
	% within Public/Private	56.0%	41.0%	3.0%	100.0%
Private	Count	74	26	0	100
	% within Public/Private	74.0%	26.0%	0.0%	100.0%
Total	Count	130	67	3	200
	% within Public/Private	65.0%	33.5%	1.5%	100.0%

The above cross tabulation 6.43 differentiates between the responses of public and the private hospitals for nurses' over performance of duty. The data shows that 56% of the respondents from public hospitals said that they performed duties beyond their stated hours of the job and 74% of the private hospital nurses also expressed the same. Likewise, 41% nurses of the public hospitals expressed that they did not perform extra hours of duties and 26% of the nurses from private hospitals also fulfilled their suggested hours of job. In addition, 3% of the public hospital respondents were unaware about their extra hours of job.

Table 6. 44 No of Extra Hours per Day: Comparative Analysis

Cross Tabulation		No of extra hours per day			Total
		1-4	5-8	9-12	
Public	Count	37	17	3	57
	% within Public/Private	64.9%	29.8%	5.3%	100.0%
Private	Count	55	12	2	69
	% within Public/Private	79.7%	17.4%	2.9%	100.0%
Total	Count	92	29	5	126
	% within Public/Private	73.0%	23.0%	4.0%	100.0%

The above cross tabulation 6.44 shows the difference between the responses of public and the private hospitals for nurses' number of extra performed hours in the job per day. As shown in the table, there are three different categories in the data which includes the category of 1-4 extra hours, 5-8 extra hours and 9-12 extra hours per day. The data asserts that 64.9% of the respondents from public hospitals worked 1-4 extra hours daily and 79.7% of the public hospital nurses were of the same views. Similarly, 29.8% participants were observed to have 5-8 extra working hours which were slightly greater than 17.4% in private hospitals for the same category. Finally, 5.3% of the nurses in public hospitals informed that they worked 9-12 extra hours on daily basis, while 2.9% of the private hospital nurses performed 9-12 extra hours. The closer inspection of the table shows that majority of the nurses in both public and private hospitals were performing 1-4 additional hours per day.

Table 6. 45 Wearing PPE: Comparative Analysis

Cross Tabulation		Wearing PPE during interaction with confirmed COVID-19 patient		Total
		Always, as recommended	Not Always	
Public	Count	59	41	100
	% within Public/Private	59.0%	41.0%	100.0%
Private	Count	79	21	100
	% within Public/Private	79.0%	21.0%	100.0%
Total	Count	138	62	200
	% within Public/Private	69.0%	31.0%	100.0%

The above given cross tabulation 6.45 highlights different responses of public and the private hospital nurses about the practice of wearing PPE during interaction with confirmed COVID-19 patients which shows the level of compliance with significant preparatory measures. It can be seen from the table that 59% nurses of the public hospitals always wore PPE while interacting with the patients, rest of the 41% wore PPE but not always. Whereas, 79% nurses of the private hospitals always followed this practice and rest of the 21% participants did not always comply with this Standard Operating Procedures (SOPs). The results illustrate that majority of the nurses in both public and private hospitals always followed this precautionary measure during their interaction with the patients.

Table 6. 46 Provision of PPE: Comparative Analysis

Cross Tabulation		Provision of Enough or Extra PPE to Prevent Nurses from Contracting COVID-19		Total
		Always, as recommended	Not Always	
Public	Count	39	61	100
	% within Public/Private	39.0%	61.0%	100.0%
Private	Count	73	27	100
	% within Public/Private	73.0%	27.0%	100.0%
Total	Count	112	88	200
	% within Public/Private	56.0%	44.0%	100.0%

The cross tabulation 6.46 shows various responses of public and the private hospital nurses about the provision of enough or extra PPE to prevent them from contracting COVID-19. The data reveals that that 39% nurses of the public hospitals were always provided with enough or extra PPE while, rest of the 61% were not always given adequate or additional PPE. Whereas, 73% nurses of the private hospitals were always given required or additional PPE and rest of the 27% participants were not always provided with this facility. It can be concluded from this data that majority of the nurses in public hospitals were not always given enough or extra PPE. On the contrary, majority of the private hospital nurses were always given PPE to protect themselves from the virus.

Table 6. 47 Disinfection: Comparative Analysis

Cross Tabulation		Disinfection of high touch surfaces in both patient wards and common spaces at least thrice a day		Total
		Always, as recommended	Not Always	
Public	Count	28	72	100
	% within Public/Private	28.0%	72.0%	100.0%
Private	Count	47	53	100
	% within Public/Private	47.0%	53.0%	100.0%
Total	Count	75	125	200
	% within Public/Private	37.5%	62.5%	100.0%

The table 6.47 exhibits disinfection of high touch surfaces in both patient wards and common spaces at least thrice a day for both the public and the private hospitals. In public hospitals, 28% of the nurses expressed that they felt disinfection of high touch surfaces in both patient wards and common spaces at least thrice a day whereas, the 72% of them were of the view that it was not the case always. Whereas, from the private hospitals 47% always admitted disinfection of high touch surfaces in both patient wards and common spaces at least thrice a day and 53% told that it was not the case always.

Table 6.48 Provision of Adequate Testing Capacity: Comparative Analysis

Cross Tabulation		Provision of Adequate Testing Capacity of COVID-19 for Patients as well as for Nurses		Total
		Always, as recommended	Not Always	
Public	Count	34	66	100
	% within Public/Private	34.0%	66.0%	100.0%
Private	Count	54	46	100
	% within Public/Private	54.0%	46.0%	100.0%
Total	Count	88	112	200
	% within Public/Private	44.0%	56.0%	100.0%

The table 6.48 shows provision of adequate testing capacity of COVID-19 for patients as well as for nurses for both the public and the private hospitals. In public hospitals, 34% of the nurses expressed that there was the provision of adequate testing capacity of COVID-19 for patients as well as for nurses whereas, the 66% of them were of the view that it was not the case always. Whereas, from the private hospitals 54% nurses said there was the provision of adequate testing capacity of COVID-19 for patients as well as for nurses and 46% told that it was not the case always. This indicates that private hospitals were doing much better in terms of COVID-19 testing facilities.

Table 6. 49 Level of Knowledge: Comparative Analysis

Cross Tabulation		Level of knowledge					Total
		Beginner	Advanced beginner	Competent	Proficient	Expert	
Public	Count	17	28	32	20	3	100
	% within Public/Private	17.0%	28.0%	32.0%	20.0%	3.0%	100.0%
Private	Count	6	29	40	18	7	100
	% within Public/Private	6.0%	29.0%	40.0%	18.0%	7.0%	100.0%
Total	Count	23	57	72	38	10	200
	% within Public/Private	11.5%	28.5%	36.0%	19.0%	5.0%	100.0%

The table 6.49 exhibits the overall level of knowledge between the public and the private hospitals nurses regarding COVID-19. The responses are divided into five sections which includes beginner, advanced beginner, competent, proficient and expert. For the public hospital, 17% of the nurses were found in the beginner category, 28% in the advanced beginner, 32% in the competent, 20% in the proficient and 3% in the expert category. Whereas, the nurses in the private hospitals had 6%, 29%, 40%, 18%, and 7% level of knowledge in beginner, advanced beginner, competent, proficient and expert category, respectively. Most of the public hospital nurses were found in the competent category whereas, the significant number of private hospital nurses tended to have competent level of knowledge regarding COVID-19.

Table 6. 50 Medical Journal as a Source of Knowledge: Comparative Analysis

Cross Tabulation		Medical Journal as a Source of Knowledge			Total
		Least Used	Sometimes	Most Used	
Public	Count	14	31	55	100
	% within Public/Private	14.0%	31.0%	55.0%	100.0%
Private	Count	32	34	34	100
	% within Public/Private	32.0%	34.0%	34.0%	100.0%
Total	Count	46	65	89	200
	% within Public/Private	23.0%	32.5%	44.5%	100.0%

The table 6.50 shows the respective contribution of the medical journal as a source of knowledge in the public and the private hospitals nurses. It is divided into three part which ranges from least used to most used having sometimes as in between these both extremes. The retrospect of public hospitals showed that 14% of the nurses were least likely to use the medical journal as source of knowledge, 31% used it sometimes and rest of 55% were more likely to use the medical journal for the consultations. Whereas, the private hospital nurses were scored as 32%, 34% and 34% for using medical journal as consultation least likely, sometimes and most of the times, respectively.

Table 6. 51 Hospital Trainings as a Source of Knowledge: Comparative Analysis

Cross Tabulation		Hospital Trainings as a Source of Knowledge			Total
		Least Used	Sometimes	Most Used	
Public	Count	12	21	67	100
	% within Public/Private	12.0%	21.0%	67.0%	100.0%
Private	Count	12	5	83	100
	% within Public/Private	12.0%	5.0%	83.0%	100.0%
Total	Count	24	26	150	200
	% within Public/Private	12.0%	13.0%	75.0%	100.0%

The table 6.51 shows the respective contribution of the hospital training as a source of knowledge in the public and the private hospitals nurses. It is divided into three part which ranges from least used to most used having sometimes as in between these both extremes. The retrospect of public hospitals showed that 12% of the nurses were least likely to use the hospital training as a source of knowledge, 21% used it sometimes and the rest of 67% were more likely to use the medical journal for the consultations. Whereas, the private hospital nurses were scored as 12%, 5% and 83% for using hospital training as consultation least likely, sometimes and most of the time respectively.

Chapter No 7

DISCUSSION AND CONCLUSION

7.1 Discussion

The literature shows that the world has been facing countless challenges in almost all spheres of life since the outbreak of the COVID-19 pandemic. It has been observed that the health sector, among various others, is the one which has suffered from this deadly virus the most. Many healthcare professionals have become the victim of the disease and nurses are no exception. According to (Mann 2020), around 1842 nurses, doctors, physicians, assistants, medical technicians, and other healthcare workers globally, and 342 in the US, died due to the virus as of July 28, 2020, and many more became sick. The pandemic has resulted in the shortage of global supply of Personal Protective Equipment (PPE) and the coronavirus testing capacity which ultimately makes nurses vulnerable to COVID-19 (Diez-Sampedro et al. 2020). In this regard, the World Health Organizations' (WHO 2020) Health Workforce Department has witnessed the global market failure in the provision of PPE (Narain 2020). The present research is an attempt to study the nurses' vulnerability to COVID-19 and workplace safety in public and private hospitals of Islamabad. It focuses mainly on the challenges nurses have been facing since the outbreak of the global pandemic and the corrective measures taken by the hospital management of public and private hospitals of Islamabad so far. Another major aspect covered in the research is the level of knowledge possessed by the nurses who are exposed to various critical care units of hospitals. Among the respondents, 65% were female, while 35% were male nurses. In addition, it also comparatively analyzes the results of both public and private hospitals of Islamabad.

The result findings, in order to address the first research question on the challenges, show that a significant number of 110 (55%) nurses were obligated to perform their duties even when they were not feeling well ultimately making them vulnerable to COVID-19. On the other hand, a

welcoming result represents that 89 (44.5%) respondents were not forced to perform their jobs after being sick. The data shows that 58% of the respondents from public hospitals performed duties even when they were sick whereas, 52% of the private hospital nurses did the same despite the fact that most of them did not have enough testing capacity. The primary research also reveals that 130 (65%) out of 200 respondents over performed their duties in different wards of public and private hospitals (56% and 74%, respectively) whereas, 67 (33.5%) were doing their jobs as usual. For those who over performed their jobs, the majority of 64.9% respondents from public hospitals worked 1-4 extra hours daily and 79.7% of the private hospitals nurses did the same. It is concluded from these findings that the proportion of private hospital nurses, who were performing 1-4 extra hours of their required job, was comparatively higher than that of public hospital nurses. The current study also enlists another key hurdle which describes that 18 (9%) of the nurses, though a little proportion, were assigned few additional roles whereas, majority of them comprising 179 (89%) were not. In addition, majority of them (62%) did not always have adequate COVID-19 testing capacity which made them more vulnerable to COVID-19. Similarly, in a previous study, Diez-Sampedro et al. (2020), revealed that merely 29.4% nurses were undertaking COVID-19 testing in hospital settings.

The second question of the research is based on the significant preparatory measures taken by the hospital management to contain the spread of COVID-19 among the nurses making them less vulnerable to the disease. The result findings show that the majority of nurses (56%) were provided enough or extra PPE to avoid contracting the disease in the hospitals, though when comparing the performance of both public and private hospitals, the latter (with 73%) was doing better in providing required or extra PPE to the nurses as compared to the public hospitals in Islamabad. Whereas, the majority of

public hospital nurses (61%) did not always have adequate or extra PPE. From these results, it is evident that public hospitals are lacking in providing enough or extra PPE to the nurses which adds into their vulnerability to COVID-19 and they still have a room for improvement in this regard. In compliance with the Standard Operating Procedures (SOPs), most of the nurses from both public and private hospitals (59% and 79%, respectively) always wore PPE during their interaction with confirmed COVID-19 patients. Yet, a considerable proportion of them 126 (63%) did not use protective glasses during interaction with confirmed COVID-19 patient. One unanticipated research finding, even neglected by the earlier studies, exposes that the high touch surfaces in patient wards and common spaces of both public and private hospitals (72% and 53%, respectively) were not always disinfected frequently or at least thrice a day. Consequently, it increased the vulnerability of nurses towards COVID-19. However, 75 (37.5%) participants responded that this precautionary measure was adapted always as recommended. Furthermore, majority of the nurses 112 (56%) did not always have the required testing facility of COVID-19 at their workplaces. On the other hand, 88 (44%) respondents were having required testing capacity but not always. This is also supported by the literature review which shows that merely 29.4% nurses were undertaking COVID-19 testing due to which the hospitals were facing severe shortage of nursing staff (Halcomb et al. 2020). However, the present research reveals that the private hospitals (54%) were doing comparatively better than the public hospitals (34%) in providing enough testing capacity to the nurses in Islamabad, Pakistan. Moreover, previous study emphasized that the delay in testing was causing difficulties for the nurses to know whether they had COVID-19 or not. As a result, they isolated themselves when they were in a state of confusion which,

in turn, produced staff shortage in the hospitals (Nyashanu, Pfende, and Ekpenyong 2020:657).

The third research question is about the level of awareness regarding COVID-19 possessed by the nurses of public and private hospitals of Islamabad. The results indicate that the majority of nurses i.e. 72 (36%) were competent in terms of COVID-19 related knowledge. However, 23 (11.5%) nurses were beginner, while 57 (28.5%) were advanced beginner. On the other hand, 38 (19%) and 10 (5%) were shown to be proficient and expert, respectively which emphasizes that most of the nurses still need to expand their knowledge base to reach that level. For the public hospital, 28% nurses were in the advanced beginner category, while majority of 32% nurses were competent and only 3% experts. Whereas, in the private hospitals, 29%, nurses were advanced beginner, while majority of them (40%) were competent and 7% experts. To sum up, majority of the nurses in both public and private hospitals were found to be competent in terms of having knowledge about COVID-19. Out of the sources they used, a significant proportion of 150 (75%) nurses used hospital trainings as a source of knowledge, while 24 (12%) nurses were less likely to use it. Meghani and Lalani (2020) have noted that the government of Pakistan is spending less than 3% of its Gross Domestic Product (GDP) on health sector which indicates a fragile healthcare infrastructure in the country. Despite that, the government is taking all possible measures to counter COVID-19 for the protection and security of its citizens and healthcare professionals that is evidenced by the fact that the hospitals in Islamabad have the facility of 128.13 beds per 0.1 million people. Moreover, the government has originated a media campaign for spreading awareness related to the workplace safety so that the hospital administrations as well as the general public be better prepared for the COVID-19 pandemic. In this way, the hospital

administration including doctors and nurses will be able to manage the situation effectively and efficiently. This study shows that due to this initiative taken by the government of Pakistan 93.5% frontline workers understood the risk of COVID-19 pandemic, 91.5% got to know how to protect themselves and the patients and 79.1% acquired adequate knowledge regarding COVID-19 pandemic.

From the above discussion, it is essential to note that the nurses, during the prevailing situation of pandemic, are facing multifold challenges in the hospitals which mainly include performing extra hours of duty regardless of their health conditions and doing certain additional roles due to shortage of the staff. Although the hospital management is providing PPE to most of the nurses still there are few who do not always get PPE to prevent themselves from the risk of contracting the disease. Surprisingly, high touch surfaces in both patient wards and common spaces are not disinfected frequently which increases the vulnerability of the nurses as revealed by the current study. However, the private hospitals are doing comparatively better. Moreover, a majority of the nurses are unable to have testing facilities in their workplace environments in public and private hospitals. Importantly, the management of both public and private hospitals is providing trainings to the nurses at considerably great extent in order to increase their level of awareness.

7.2 Conclusion

The aim of present research was to identify the availability of resources including personal protective equipment to the nurses, working on frontline to treat the patients with COVID-19, in critical care units of different public and private hospitals of Islamabad during prevalent COVID-19 global pandemic situation. The study was also designed to examine nurses' compliance with the continuous and proper usage of PPE including masks, face shields and gowns. It also focused on the pandemic-induced challenges

faced by the nurses at their respective wards in different hospitals of Islamabad. Furthermore, it was devised to determine the level of awareness possessed by nurses which is a critical aspect for reducing their vulnerability to COVID-19.

The study identified that the challenges faced by the nurses included obligation to perform duties when they were sick, spending extra hours of their job in critical wards and provision of certain additional roles to them due to the shortage of staff indicating the vulnerability of nurses towards COVID-19. The nurses from both public and private hospitals were facing the same challenges but the latter were doing relatively better. In conquest of investigating the significant preparatory measures, the study found that a majority of nurses (56%) were given adequate PPE in the hospitals during their interaction with COVID-19 patients. However, a considerable proportion of nurses (56%) from both public and private hospitals did not have enough testing capacity at their workplaces. More surprisingly, the study revealed that the high touch surfaces of patient wards and common spaces of hospitals were not frequently, or at least thrice a day, disinfected which exacerbates the vulnerable condition of the nurses. Furthermore, present study provided an interesting finding showing that the majority of nurses (36%) were competent in terms of having awareness about COVID-19, majority of them attained that level of knowledge through hospital trainings. Yet, 11.5% nurses were still at beginner level who needed improvement in order to make themselves less vulnerable to COVID-19. As a matter of fact, the hospital management was taking steps to aware nurses about COVID-19 as much as possible through organizing training sessions in the hospitals.

The pandemic is showing no signs of easing therefore, the study suggests that the hospital management should formulate effective mechanism to make

hospital environments of Islamabad more resilient and safer for the nurses so that they may become less vulnerable to the deadly virus that the world is going through at present. Since, the world has been facing the third wave of COVID-19 there is a lot more to explore and improve the services for nurses in private and public hospitals of Islamabad during the pandemic. Although the process of vaccination has been started the nurses need prior attention in this regard.

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ANNEXURE

QUESTIONNAIRE

TOPIC: Nurses' Vulnerability to COVID-19 and Workplace Safety during the Pandemic at Public and Private Hospitals of Islamabad

Introduction
I am Junaid Bashir, student of M.sc Sociology at Quaid-I-Azam University, Islamabad. This questionnaire is designed to accomplish an essential data for academic research on the topic "Nurses' Vulnerability to COVID-19 and Workplace Safety during the Pandemic at Public and Private Hospitals of Islamabad". The focus of this research is to evaluate the vulnerability of nurses and workplace safety at public hospitals of Islamabad. The personal information will not be exposed and it will be kept confidential.

Hospital Name _____ Hospital Ward _____

Socio-demographic Information of the Respondents
Gender
1. Male 2. Female
Age _____
Marital Status
1. Single 2. Married 3. Divorced 4. Widowed 5. Separated
If married, specify no of children _____

Child 1, age _____ Child 2, age _____ Child 3, age _____
Family Structure
1. Joint Family 2. Nuclear Family 3. Extended Family
Total no of persons living in the same house _____
Education
1. Matriculation 2. Intermediate 3. Bachelors 4. Masters
Professional Status
1. Registered Nurse 2. Nurse Practitioner 3. Nurse in Charge 4. Head Nurse
Work Experience (in years) _____

Part I: Assessing Nurses' Exposure/Vulnerability to COVID-19

Read the following questions carefully and check under the appropriate option.

S/No	Questions	Yes	No	Neutral
1	Do you have a history of staying in the same ward with a confirmed COVID-19 patient?			
2	Do you have the history of traveling together in close proximity (within 1 meter) with a confirmed COVID-19 patient?			

3	Do you provide direct care to a confirmed patient of COVID-19?			
4	Do you have face to face contact (within 1 meter) with a confirmed COVID-19 patient?			
5	Were you present when any aerosol generating procedure was performed on the patient?			
	If yes, what type of procedure? <ul style="list-style-type: none"> ○ Tracheal Intubation ○ Nebulizer Treatment ○ Open airway suctioning ○ Collection of Sputum 			
6	Do you come in direct contact with the environment where the confirmed COVID-19 patient is cared for? (E.g. bed, linen, medical equipment, bathroom, etc.)			
7	Are you obliged to perform your duty even when you are sick or not feeling well?			
8	Were you involved in health care interaction(s) (paid or unpaid) in another health care facility during the pandemic?			
	If yes, specify <ul style="list-style-type: none"> ○ Ambulance ○ Home care 			
9	Do you overly perform your duty in the hospital during COVID-19 pandemic?			

	If yes, specify the average no of extra hours per day _____			
10	Do you perform additional roles in hospital due to increased workload during the time of pandemic?			

Part II: Significant Preparatory Measures

For the following questions, please quantify the frequency with which you wore PPE, as recommended:

S/No	Questions	Always, as recommended	Not Always
1	During interaction with COVID-19 patient, do you wear personal protective equipment (PPE)?		
	If yes, for each item of PPE below indicate how often you use it?		
	Medical mask		
	Face shield or goggles/protective glasses		
	Disposable gown		
2	Does hospital provide you enough or extra personal protective equipment (PPE) to prevent yourself from contracting COVID-19 disease?		
3	During interaction with a COVID-19 patient, do you remove and replace your PPE according to protocol? (E.g.		

	Disposing the medical mask in waste bin and performing hand hygiene when it becomes wet)		
4	Do you perform hand hygiene before and after touching the COVID-19 patient during interaction? (whether or not you are wearing gloves)		
5	Do you perform hand hygiene before and after any clean or aseptic procedure is performed?		
6	During interaction with COVID-19 patient, do you perform hand hygiene after exposure to body fluid?		
7	Do you perform hand hygiene after touching the patient's surroundings (E.g. bed, door, handle, etc.) regardless of whether you were wearing gloves?		
8	Are high touch surfaces in both patient wards and common spaces disinfected frequently (at least three times daily) during interaction with confirmed COVID-19 patients?		
9	Does hospital have required number of isolation wards and quarantine facilities to contain the spread of the disease?		

10	Does hospital provide adequate testing capacity of COVID-19 for patients as well as for nurses in the hospital?		
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Part III: Level of Awareness

1. According to your overall level of knowledge regarding COVID-19, you are?

1. Beginner 2. Advanced Beginner 3. Competent 4. Proficient
5. Expert

2. To what extent did you use the following source(s) of knowledge?

S/No	Source	Least Used	Sometimes	Most Used
1	News Media			
2	Social Media			
3	Medical Journals			
4	Hospital Trainings			
5	Family and Friends			
6	Official govt. website			