

Assessment Of Risk Factors For Corona Virus Disease 2019 (COVID-19) In Health Workers

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Abstract: Background: COVID-19 is a pandemic caused by novel Corona virus; it has infected millions of people and caused mortality of more than half million people around globe.

Objective: The study aimed to assess risk factors of infection with COVID-19 among health care workers (HCW) from different aspects.

Methods: A cross sectional study was applied based upon a WHO assessment protocol to explore the real facts and situation leading to Health Care Workers infections.

Results: The current study has shown that health care workers were often affected by the disease exploring that males and young age employees had predominantly higher percentage of infection.

Regarding the occupation, it was clear that doctors were the most often symptomatic (45%) of the total studied samples; 46% contracted the infection through contact with patients at work. Finally the study illustrated that only 46% tried their best to protect themselves from infection and 4 out of 44 cases denied the existence of the pandemic.

Conclusion: It was concluded that males were predominantly infected, patients with longer exposure had higher rate of infection and those properly using PPE had less chance to acquire the disease.

Key words: COVID-19, health care workers, pandemic, Kirkuk

1. INTRODUCTION

According to World Health Organization (WHO), the pandemic of SARS-CoV19 at the time of writing this report affected more than 17 million people and caused more than half million deaths worldwide [1], about 10% of all cases globally were among health workers [2]. In Kirkuk province–Iraq 384 health workers infected till 20th of June, 2020 (this figure represents 13.2% of all COVID-19 cases reported by Kirkuk Directorate of health) [3].

One of the critical issues to protect HCW is to tell the specific IPC (infection prevention and control) measures needed to prevent infection. Really a limited number of publications studied the risk factor of infection with COVID-19 among HCWs. Although the infection was acquired in both work place and in the community, yet other factors may

be associated with such infection including; late detection of cases, working in high risk department, sub-optimal adherence to IPC measures, lack or improper use of PPE, long hours of duty and insufficient IPC training for respiratory pathogens; for these reasons WHO have recommended the use of contact and droplet precaution by HCWs managing patients with COVID-19; as well as application of airborne precautions in setting where aerosol generating procedures are performed as well as adequate staffing level and clinical rotation to assist workers to decent working condition [4].

The fact that health workers are at risk of infection in the epidemic chain is a critical issue because health workers help in controlling the pandemic. Therefore, all possible actions must be taken to control the spread of the infection to health workers, first by identifying the risk factors for infection and then by taking appropriate measures to reduce these risks.

It is well established that transmission of the disease among health workers is associated with overcrowding, absence of isolation room facilities, and environmental contamination. However, this is likely compounded by the fact that some health workers have inadequate awareness of infection prevention practices and these affects their attitudes and practices, as incorrect attitudes and practices directly increase the risk of infection [5].

One of the main routes of COVID-19 transmission is direct contact from patient to HCW's hands after touching the patient or fomites, so it is proved that hand hygiene is considered the most important prevention measure to reduce the risk of infection [6].

Understanding health workers attitudes, practices and possible risk factors helps to predict the outcomes of planned behavior. Thus, this study aimed assessing the potential risk factors for SARS-CoV-2 infection among health workers, and assign recommendations accordingly to prevent future infections among health workers and preventing the health-care-associated infections, and updating infection prevention and control (IPC) measures at health care facility at local and national levels. Protection of HCWs and providing adequate PPE is crucial for each country's strategy to respond to COVID-19, as rising infection and death among HCW will paralyze the country response to COVID-19 and it will have impact on future health care delivery, due to lacking trained personnel in addition to other factors [7].

2. OBJECTIVES

The aims of this study were:

- 1-To characterize and assess the risk factors for SARS-CoV-2 infection in health workers exposed to COVID-19 patients.
- 2-To check the effectiveness of IPC measure among health workers in concern to COVID-19.
- 3-To assess knowledge, belief, denial myth and ignorance of health care workers about proper way to utilize PPE measures.

3. PATIENTS AND METHODS

3.1-Questionnaire: -

We designed the questionnaire after the Protocol for assessment of potential risk factors for corona virus disease 2019 (COVID-19) among health workers in a health care setting issued by world health organization in 23 rd March 2020 [8] and assessment of risk factors for corona virus disease 2019 (COVID-19) in health workers: protocol for a case-control study issued by world health organization in 26th March 2020 [9]. A modified questionnaire arranged for the purpose of the study [Annex 1].

3.2-Population: -

Health workers defined for the study as any member of staff in the health care facility involved in the provision of care for a COVID-19 patient, including those who have been present in the same area as the patient as well as those who may not have provided direct care to the patient but who have had contact with the patient's body fluids, potentially contaminated items or environmental surfaces. We included health workers with confirmed COVID-19 in the study.

3.3-Recruitment: -

Reported health workers infected with Covid19 for the period from 25th June till 25th July 2020

3.4-Respondents interview: -

The authors completed interview by utilizing the modified questionnaire during the period of the study.

3.5-Statistical analysis:

The data collected and represented as percentage form to show the differences between groups, MS office, Excel 2016 was used.

4. RESULTS: -

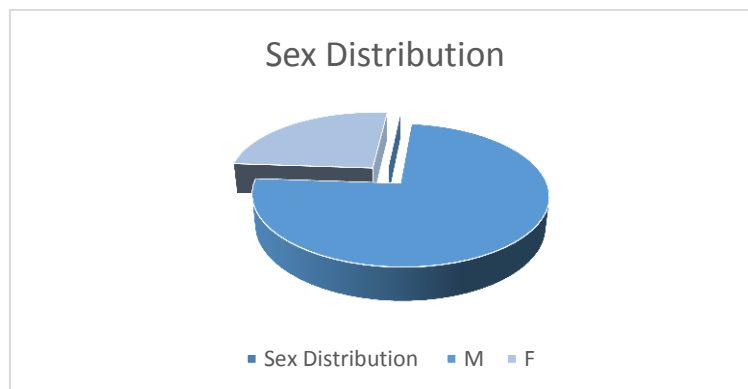


Fig (1): shows distribution of cases according to gender.

The total number of the medical staff infected in Kirkuk city enrolled was 44 HCWs for the period from 25th June till 25th July 2020 in a retrospective observational study. Percentage of males was 32(73%), females 12(27%), the ratio of male to female was 3:1. Their ages were ranging from 23 to 60 years with the mean age of 36 years, least 23 and greatest 60 years (greatest age was 60 because the retirement age is sixty years by current Iraqi laws).

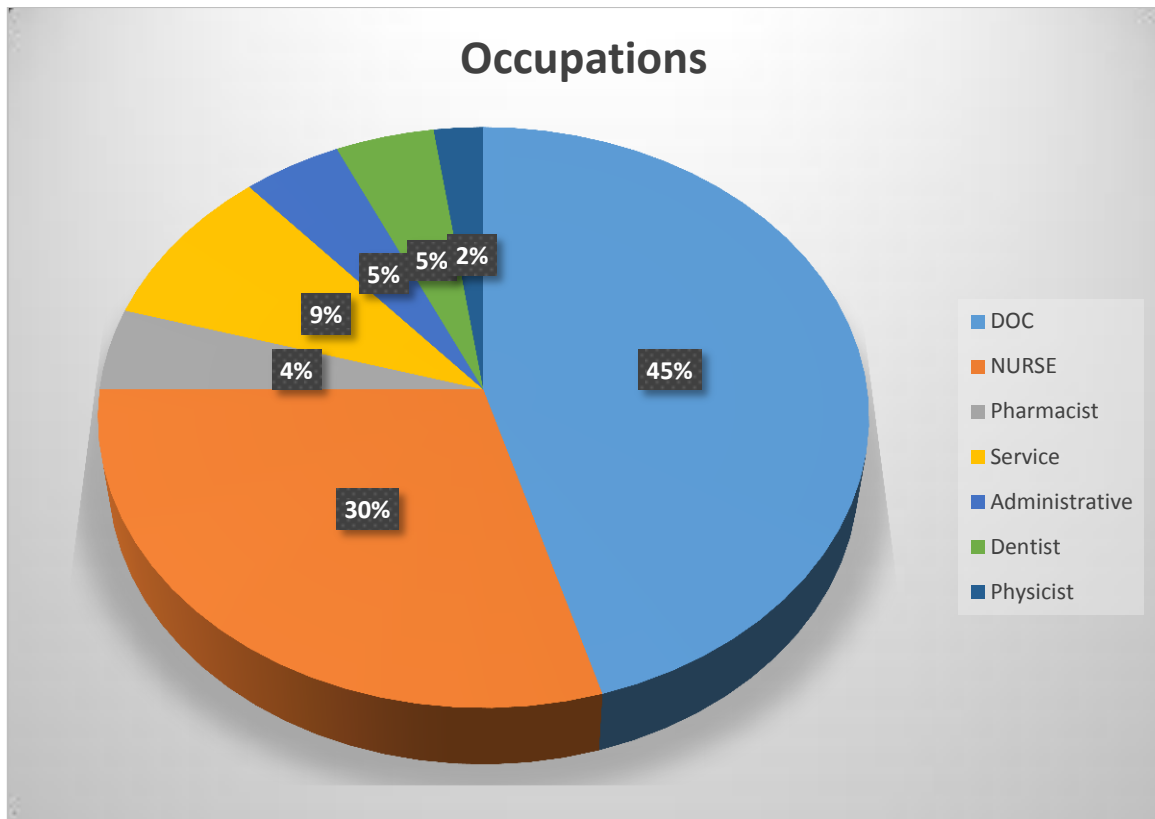


Fig.2.shows the distribution of the disease among HCWs according to their occupation; the highest percentage was among doctors 20(45%), followed by nurses 13(29%), service workers 4(9%), and 2(4%) for each pharmacists, administrative officers and dentists while the radiographers were the lowest observed 1(2%).

In exploring the most probable source of infection among the enrolled group of HCWs, it was clear that 46% got the infection by direct contact with patients, 15% from their collages while 11% of the s HCW got the infection from private clinic (pharmacy, clinic and nursing clinics) as indicated in figure (3).

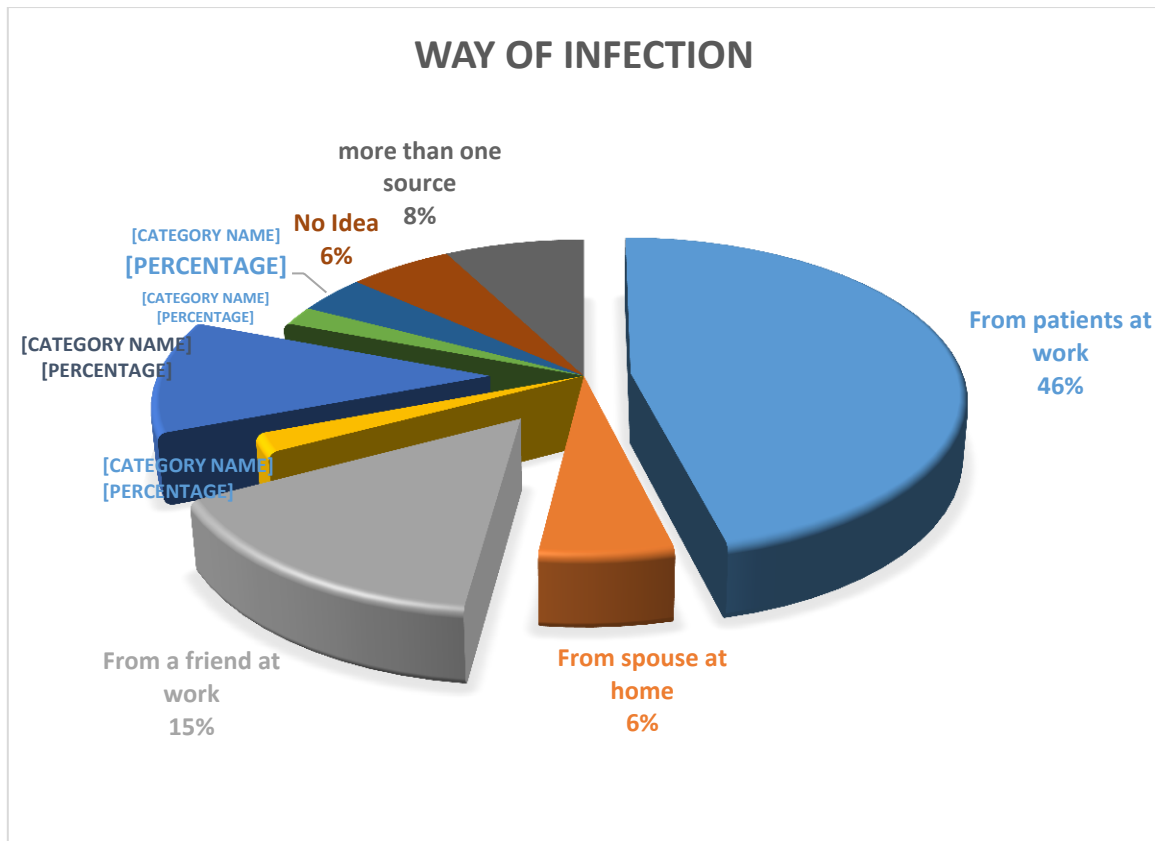


Fig (3) the most probable source of infection according to patient's perception.

The medical staff estimates an approximate time of exposure to patients differently but the largest group as it is expected were frequent and prolonged exposure, long exposure was set as more than 15 minutes for each patient and frequent more than three patients per day. Large number of the staff can't remember exactly the time of exposure; simply they could not recall events as illustrated in fig. (4).

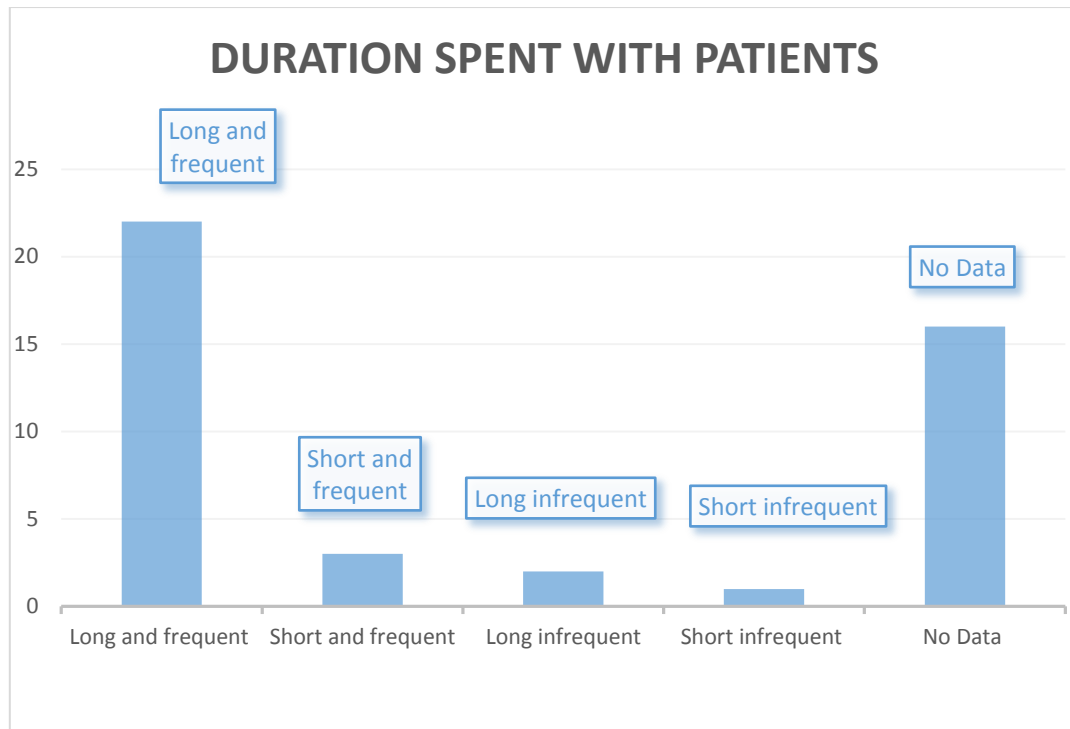


Fig (4) Duration and frequency of exposure of the medical staff to probable sources of infection based on their expectations.

(HCW estimation of the time spent with the patients subjected to great variations depending on the person and the state of anxiety, anger and what he remembered at time of the questioner, which is usually weeks later but it is still the only way we can gain information by).

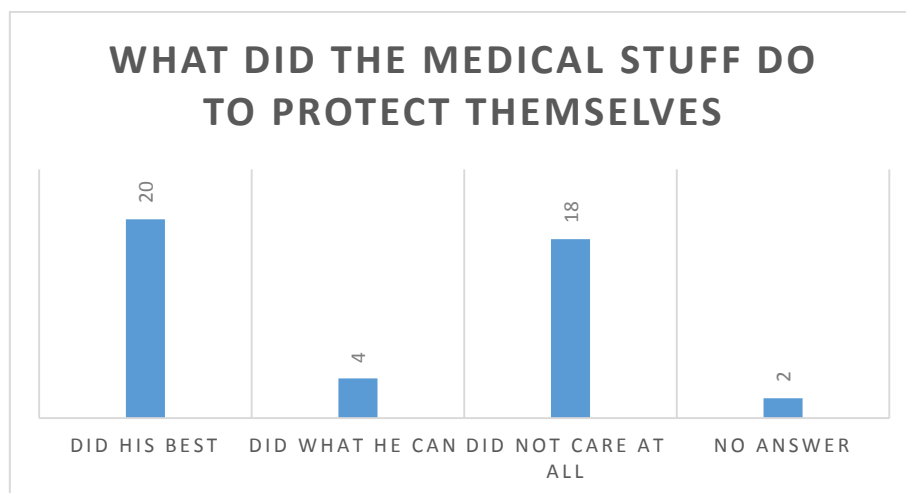


Fig. 5 shows the action taken by HCWs to protect themselves according to their satisfaction; surprisingly 4 out of 44 denied the fact of existence of pandemic and one of them in spite of being a junior doctor totally refused the presence of the disease.

In figure (5) a substantial number 41% did not take any effort to protect themselves against the infection despite we were in the eye of the storm of the pandemic.

5. DISCUSSION

The pandemic of SARS COV 2 imposes great impact on the communities all over the world. Globally there have been 17.354.751 confirmed cases including 674.291 deaths till the date of writing this study (10). Countries with big economies suffered greatly from different aspects. The frontline against this pandemic for sure is medical staff, losing the efforts of those people means losing the battle all together. We are here trying to figure out what were the defects and how can we fix them if possible.

The period of the study is short one month reflected the urgency and importance of the dilemma. Our response needs a robust and active actions. The mean age was 36 years and this may point to the affection of

Higher age groups than lower age group among employees. The younger age groups usually involved more in contact with the patients in hospitals in general. This point needs further larger study to verify the causes by larger study as our sample size is relatively small and selection of cases may be biased. The gender distribution goes with other studies worldwide as 25% for females 75% for males. This may be due to females usually avoiding duties at night shift and males took heavy exhausting duties. This is in agreement with (11) who showed the number of males was 2.4 times higher than that of females among infected patients.

Concerning type of occupation, as expected doctors and nurses were the groups mostly affected. This may be due to closer contact with patients and are more often involved. In a study done by Jiang et al. (12) showed that the rate of infection is related to HCWs types and frequency of occupational exposure. There is something more to clarify the picture; the cases collected by us for this study, collected based on relations and personal knowledge of cases, which subjects the distribution of occupations to biases.

The sources of infection verified based on the affected HCWs assumption, although some of them knew by solid evidence who was the positive case transmitted the infection to them like a spouse, a patient at home and in certain occasions which was well-known to the hospital staff for an example, a missed case admitted to the general ward and after prolonged care giving, proved to be a positive case of COVID 19, but still there are patients based their assumption on speculations. Despite that we didn't have a better way to investigate more than that. In general, the three major sections were from: 1- patients at hospital work 2-a friend or colleague at hospital work 3-from his or her work at private site like clinic, pharmacy and nursing practice outside hospital. Regarding hospital acquired infection in the current study was 61% of the total cases. This stresses the need for better hospital acquired infection control procedures. We should deal with any case what so ever the disease is as a possible case of COVID 19 and all procedures and precautions need to be taken to break transmission. There was a case of cerebrovascular accident admitted to the general ward, transmitted COVID 19 to medical staff, simply because they did not assume this possibility in their mind. On the contrary, a study performed in Alberta, the data analysis results showed that the occupational risk is similar to community risk, reflecting the effectiveness of PPE and other IPC measure (13).

The staff acquired COVID 19 from medical staffs themselves as in a case who transmitted the disease to six other members at work, raises many questions as ignorance and delay announcement; practicing social distancing and other precautions among colleague or getting leave from the duty. There was a relaxing attitude among doctors with other colleague at work, assuming they are not infectious. Those false beliefs need change by arguments and

repetition of facts. Julia et al (14) reported that usually HCWs are likely to be in contact with colleague who are asymptomatic still being highly contagious, as well as having a family member with COVID-19 may raise the risk of HCWs infection.

Acquiring the infection from private clinics and pharmacies comes next as those places are overcrowded, poorly ventilated, inadequately supplied PPE and the relaxed mood compared to hospital work, doctors are more friendly at their clinics for different reasons among them less stress and feeling of ownership of the practice. To slow the transmission of COVID-19 and minimize the rate of infection, community mobilization and engagement by participating every member in infection control may reduce the impact of the pandemic (15). One more case which was notable is dealing with a device without precautions. He did not have contact with patients at least that what he thought.

Concerning the exposure time and frequency of exposure among the medical staff, what is expected appeared her, those who spent more time and more often exposed were more prone to infection among others. Putting in mind the bias which the infected staff does when recalls the duration and frequency on questionnaire. Sick medical staff expected to overestimate the duration spent with patients if he can recall memories clearly at all (12).

Centers for primary health care workers were more ignorant about PPE than hospital health worker, Our explanations, that they expected to faced less positive cases and they refer possible cases to hospitals and they didn't feedback the results for better awareness. Asking the staff about the methods and practices they made to protect themselves, less than half of them took the matter seriously only 45 % tried their best to do what they knew about that subject, a nearly equal number 41% did not care at all. They practice their work without masks, gloves or gowns etc. Most shocking fact is that four cases included a junior doctor, denied the presence of the pandemic all together. The reason behind that idea may be the effect of fake news by social media propagating among people. This observation critically needs reevaluation of the training of junior doctor, as this may have a negative impact on the effort of the medical authorities. These observations are in disagreement with the study done in Qatar which showed that PHCC (Primary Health Care Center) has played an important role in screening for COVID-19 as they detected about 13.4% of total positive cases with a proactive cooperation response to COVID-19 (16).

6. CONCLUSIONS

From the results of current study, it was concluded that the disease was more obvious in males than females staff, those with longer and more frequent exposure had higher percentage of the disease, HCWs using PPE had less chance to acquired the disease and workers in PHCC were more ignorant about PPE application.

Recommendations:

1-More concentration needed for IPC training and stress put on the seriousness of the current situation.

2-Establishing supervision on the rules of biosafety level needed and proper wearing of PPE, social distancing practices from community medicine specialists. Better to take roll in training and transmitting sound information about IPC, explaining common mistakes and breaches in the practices of hospital acquired infection control.

3-Stressing on social distancing in the doctor's residency by preparing single room for each staff followed by sterilization of the place by trained personal.

4-Encouraging staff to declare symptoms as early as possible to quarantine themselves to decrease transmission as less as possible.

- 5 - Performing PCR test on asymptomatic working staff to discover possible sources of infections.
- 6 - Establishing a ventilation system in the wards based on best evidence facts, especially after emergence of the possibility of airborne transmission of the disease by WHO and other scientific committees.
- 7- Reducing the time spends in the wards by every mean possible, even by video communication with less severe patients.
- 8-Implementing necessary education programmes to combat the denial among health worker about the seriousness of the illness.
- 9-Special measure implemented in primary health care centres since these are important and serious source of virus spread among people attending these centres for other reasons like immunization.

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Annex 1

The Questioner utilized for the study

Name:

Age:

Gender male/ female

Jobs title:

Doctor / resident / permanent/ specialist

Nurse

Nurse technician / paramedic

X-ray technician

Laboratory person

Educational level: high school / diploma / Bachelor/ PHD

Work location :-

Duration of work by hours in each shift:

Periodicity of the shifts every other day / each 3 days/ each 4 days

.....

- **Are you a health worker dedicated to caring suspected/probable /confirmed corona virus patient(s).**

Yes

No

Not sure

- **Do you follow recommended hand hygiene practices?**

Always, as recommended

Most of the time

Occasionally

Rarely

- **Do you use soap and water or alcohol-based hand wash before touching a patient?**

All time

Most of the time

Some times

Rarely

- **Do you use soap and water or alcohol-based hand rub after touching a patient?**

All time

Most of the time

Occasionally

Rarely

- **Do you follow IPC standard precautions when in contact with any patient?**

All time,

Most of the time

Occasionally

Rarely

I don't know what are IPC standard precautions

- **Have you exposed to corona virus infected patient(s)**

Yes

No

I don't remember

If yes what was the Date of admission of corona virus confirmed patient

___/___/___

(If you were exposed to more than one corona virus patient, please

Provide the earliest admission date among them) ___/___/___

- **Have you had close contact (within 1 meter) with the patient(s) since their admission?**

Yes

No

I don't remember

- **If you were wearing gloves, did you remove them after contact with the Patient?**

Yes

No

Unknown

If yes, did you perform hand hygiene before contact with the patient?

All time

Most of the time

Occasionally

Rarely

If yes: what you use

Alcohol-based

Soap and water

Water alone

If yes, did you perform hand hygiene after contact with the patient?

All of time

Most of the time

Occasionally

Rarely

Never

If yes: what was?

Alcohol-based hand wash

Water and Soap

Water alone

- **Have you had direct contact with patients body fluid or materials or the surfaces around him ?**

Yes

No

Don't remember

If yes, which type?

Body fluids of patient's
patients OF materials
Surfaces around patient

If yes, were you wearing PPE?

Yes

No

Don't remember

If yes, what type? :

Medical/ mask

Face shield

Gloves

Glasses

Gown

Coverall

Head cover

Respirator (e.g. N95, FFP2 or equivalent)

Shoe covers

- **In the previous 14 days, outside of your occupational duties have you been in contact with a person or persons known to have been diagnosed with corona virus ?**

- Yes

No

I don't remember

If yes, was this:

Household

Professional colleagues ()

Everyday social interactions (e.g. public transport, market)

- **In the past 14 days, how often have you had social interaction with individuals outside of work, home or transport (e.g. in markets, shops etc.)**

Most days (≥ 8 days)

Some days (4–7 days)

Few days (≤ 3 days)

Not had any other social interaction

- **in the past 14 days, outside of your occupational duties ,do you had spent time with your colleagues in rest house or had breakfast ,lunch , dinner or spent free time together**

Yes

No

I don't remember

- **If yes did wear a mask**

Yes

No
I don't remember

Did you comply to hand washing or using alcohol-based hand rub

Yes
No

Don't remember

Did you comply with physical distancing

Yes
No

I don't remember