



St PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE

**IMPACT OF COVID 19 PANDEMIC ON TEACHING
ACTIVITIES AND QUALITY OF LIFE AMONG
RESIDENTS AT SAINT PAUL'S HOSPITAL
MILLENNIUM MEDICAL COLLEGE, 2021**

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ACRONYMS

SPHMMC.....	Saint Paul’s hospital millennium medical college
WHO.....	World health organization
HCW.....	Health care workers
PPE.....	Personal protective equipment
COVID 19.....	Corona virus disease 2019
ARDS.....	Acute respiratory disease syndrome
ICU.....	Intensive care unit
ED.....	Emergency department
PPH.....	Patient per hour
NGOs.....	nongovernmental organizations
ETB.....	Ethiopian birr
GYNI / OBS.....	Gynecology and Obstetrics
QOL.....	Quality of life

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ABSTRACT

Background: Corona virus disease 2019 (COVID-19), the public health emergency that emerged from the city of Wuhan of China in December 2019, has been declared a pandemic in March 2020 by the World Health Organization. Health care workers (HCW) are on the frontline to fight the disease and are particularly at high risk of being infected. The rapid dissemination of the disease and influx of patients not only increased the workload, but also disrupted the residency training programs. The fear within the professional and personal lives can lead to physical, mental, and emotional exhaustion of the HCW and is associated with multiple psychiatric problems.

Objective: this study assessed the impact of COVID 19 pandemic on teaching activities and quality of life among residents in SPHMMC from February 1, 2021 to May 31, 2021.

Method and Material: institution based descriptive cross-sectional study was conducted on residents of SPHMMC by using a structured and standardized questionnaire. Data will be analyzed using Statistical Package for Social Sciences (SPSS) for windows version 25.0. Descriptive statistics will be used to describe the independent variables and association between variables will be checked using P- value. P-value less than 0.05 will be statistically significant

Results: 117 (53.4%), 101 (46.1%), 153 (69.9%), 141 (64.4%), 134 (61.2%), 88 (40.2%), 84 (38.4%), 100 (45.7%), 124 (56.6%) responded that number of admitted patients, ward time round, teaching activities, Diagnostic procedures, Minor procedures, Working hours, Major surgeries, detachments and progressive assessment are reduced after COVID-19 pandemic respectively. 182 (83.1%) responded that they had virtual teaching. 115 residents (52.5%) had history of COVID infection and 37 (42%) responded that their family got the infection because of them. Those who are not vaccinated had 1.7 times increased odds of acquiring the infection. On QOL, 112 (51%) had poor quality of life while those who had COVID infection had 3.17 times increased chance of having poor QOL ($p = < 0.0001$). 18 (8.22%) residents are depressed of which 6 are from GYNI / OBS department.

Conclusion: This study revealed that COVID-19 resulted in a significant reduction of teaching activities among residents, a negative impact in quality of life and significant portion of the residents were depressed as a result of COVID-19.

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INTRODUCTION

1.1 BACKGROUND

Corona virus disease 2019 (COVID-19), the public health emergency that emerged from the city of Wuhan of China in December 2019, has been declared a pandemic in March 2020 by the World Health Organization (WHO) (1). It is a respiratory tract infection caused by a newly emergent Corona virus, SARS-CoV-2, which is an RNA virus that causes 30% of common colds. While most people with COVID-19 develop mild or uncomplicated illness, approximately 14% develop severe disease requiring hospitalization and oxygen support and 5% require admission to an intensive care unit. Mode of transmission is primarily respiratory droplets and droplet contacts that remain for less than an hour in the space but can last from a few hours to over a day depending on the nature of the surface. In severe cases, COVID-19 can be complicated by acute respiratory disease syndrome (ARDS), sepsis and septic shock, multi-organ failure, including acute kidney injury and cardiac injury. Older age and co-morbid diseases have been reported as risk factors for death. (2)

Health care workers (HCW) are on the frontline to fight the disease that can easily be transmitted through aerosols. They are particularly at high risk of being infected due to direct and indirect exposure with COVID-19 positive individuals and also due to limited availability of personal protective equipment (PPE). The rapid dissemination of the disease and influx of patients not only increased the workload, but also disrupted the residency training programs. The fear within the professional and personal lives can lead to physical, mental, and emotional exhaustion of the HCW and is associated with multiple psychiatric problems. (1)

Over the past 10 months, COVID 19 pandemic has caused huge stress on the health care system of all countries in the world. Hospitals were overcrowded and many lives were lost. The damage it has caused on the economy is estimated to take years to recover, especially to low and middle income countries of Africa. (3) As of November 18, 2021, total number of Corona virus Cases in the world is **256 million** of which **5.13 million** died and in Ethiopia, total Corona virus Cases are **369,000** and **6,647** died. (4) As the number of COVID cases is increasing from day to day, the impact on the health care system, the frontline health care workers, patient care, residency programs and the country's economy will be more and so the preventive mechanisms should be strengthened before it is getting out of control. (3)

1.2 STATEMENT OF THE PROBLEM

The novel Covid-19 pandemic affected negatively the educational training for all residents worldwide due to modification within hospitals, such as limiting the presence of residents who are on duty, cancelling elective procedures, and cancelling lectures and educational conferences to adhere to social distancing recommendations. Regarding teaching, in-person academic activities, including face-to-face teaching and simulation laboratories have been interrupted, along with an interruption of the clinical rotation within the different areas of the same institution. (5)

The COVID-19 pandemic not only affects physical health, it also lead to elevated levels of mental health problems such as posttraumatic stress symptoms, anxiety, depression, and insomnia. Psychological implications can be attributed to direct or indirect effects of the illness on livelihood and living conditions. Asymptomatic transmission of the disease causes fear and anxiety. In addition, lack of personal protective equipment (PPE) and social discrimination increase the stress and anxiety levels among health care professionals. A recent study in China that was conducted to assess psychiatric symptoms among physicians and nurses revealed an alarming prevalence of moderate to severe distress, depression, anxiety and insomnia (ranging from 8 to 35%). (1)

SIGNIFICANCE OF THE STUDY

The findings of this study will come up with untold truth of COVID 19 as most policy makers, higher officials and NGOs focus on prevention, community and other vulnerable group engagement. The impact of COVID assumed to be more significant on exercising resident than thought, in addition to the stressful residency program. As the COVID pandemic is recent, there is limited data on the subject especially in developing countries like Ethiopia and the findings of this study can serve as baseline data. The data can also be used to anticipate future concerns regarding the residency programs so that the patient care and teaching activities will not be affected.

LITERATURE REVIEW

Impact of COVID pandemic on teaching activity

According to nationwide cross-sectional study on the impact of COVID-19 pandemic on residency and fellowship training programs in Saudi Arabia; Approximately 43% of them had direct contact with patients with COVID-19 and 43.8% had enough training regarding the proper use of PPE. 2.9% were infected by the disease. Among them 2.5% of the members of the family had also been infected.

84.6% of residents and fellows reported a reduction in training activities during the pandemic.

(6)

Impact of the COVID-19 pandemic on emergency medicine residency training: an observational study in Taiwan; The mean number of patients per hour (PPH) seen by EM residents in the adult ED decreased in all three hospitals during the pandemic. The average PPH of critical area of medical ED was 1.68 in the pre-epidemic period and decreased to 1.33 in the epidemic period (p value < 0.001). The average number of patients managed by residents decreased from 1.24 to 0.82 in the trauma ED (emergency department) (p value = 0.01) and 1.56 to 0.51 in the pediatric ED (p value = 0.003) during the pandemic, respectively. The severity of patient illness did not change significantly between the periods. (7)

Based on the impact of COVID-19 pandemic on ophthalmology residency training in Saudi Arabia. there was a significant decline in exposure to emergency eye consultation ($P < 0.001$). The COVID 19 pandemic effect on mental health was reported by 70.5% of participants. 55.4% of respondents were satisfied with virtual method of education. (8)

Impact of COVID pandemic on quality of life

A study on the effect of COVID-19 pandemic on pediatric residents of USA children hospitals showed, 50% of the respondents had depression due to the pandemic. Other factors negatively impacted their wellbeing were social isolation from colleagues (78%), inability to engage in outdoor activities (82%), and social gatherings (86%). (9)

A cross-sectional study on the psychological impact of COVID-19 pandemic on residents of Pakistan universities showed the prevalence of depressive symptoms, generalized anxiety disorder and acute stress disorder as (26.4%), (22.6%) and (4.4%), respectively. Female residents reported experiencing more depression with P value <0.001). (10)

According to a study on the professional and psychological impacts of COVID-19 pandemic on oncology residents of France, training and research activities decreased for 89% and 41% of respondents respectively. 70% of the respondents declared that they have faced ethical issues, 35% felt worried about their health, 32% were anxious and 17% depressed. Consumption of tobacco, psychostimulants, and alcohol increased in 31%, 24% and 29% of respondents respectively. (11)

On a study of psychological impact of the COVID-19 outbreak among medical residents in Tunisia; 30.5% of the participants had sever levels of depression according to DASS score. 41.4% of the residents had symptoms of insomnia. Having other personal and/ or financial concerns related to COVID-19 appeared to be the independent risk factor for depression (OR, 2.64, $P = .012$). (12)

On medicine and surgery residents' perspectives on the impact of COVID-19 on graduate medical education; the primary outcomes, anxiety about PPE ($P < 0.001$), female gender ($P = 0.03$), and the interaction between female gender and anxiety about PPE ($P = 0.04$) were significantly related to increased stress during the COVID-19 pandemic. Secondary analyses suggested that medicine residents were more comfortable than surgical residents using telemedicine ($P > 0.001$). Additionally, compared to juniors, seniors believed that the pandemic was more disruptive, modified schedules were effective, and virtual meetings were less effective while virtual lectures were more effective (all $P \leq 0.05$). Furthermore, the pandemic experience has allowed seniors in particular to feel more confident to lead in future health crises ($P \leq 0.05$). The researchers recommended transparent communication, telemedicine, online lectures/meetings, procedure simulations, advocacy groups, and wellness resources may help to mitigate some of the challenges posed by the pandemic. (13)

OBJECTIVE

General objective

To assess the impact of COVID 19 pandemic among residents at SPHMMC from FEBRUARY 1, 2021 to MAY 31, 2021.

Specific objective

- To assess the impact of COVID 19 pandemic on
 - teaching activities and
 - quality of life among residents at SPHMMC

METHODOLOGY

1.1 Study area

The study will be conducted on residents in St. Paul's hospital millennium medical college, one of the two tertiary hospitals found in Addis Ababa Ethiopia. It was built in 1969 by Emperor Haile Selassie in collaboration with German Evangelical Church, as a provider of medical care for underserved populations. The service given to the population as a whole was dramatically increased since the opening of medical school and currently serving as one of the referral centers from the whole regions of Ethiopia. Currently SPHMMC has 19 departments with 14 general specialty training and 16 subspecialty training and giving clinical service for more than 400,000 patients per year both inpatient and outpatient clinics. Currently, there are **322** seniors, **321** GPs, **1059** nurses, **151** laboratory technicians and **88** pharmacists. There are a total of **452** residents (excluding first year residents) attaching at 19 departments of which 226 are attaching at internal medicine, surgery, gynecology & obstetrics and pediatrics. Department of pediatrics and child health is one of the major departments, having EOPD, ROPD, follow up clinics, Neonatal ICU and also Ward having around 35 beds and Pediatric ICU having 4 beds equipped with mechanical ventilator.

SPHMMC is also one of COVID treatment centers in Addis Ababa and currently, it has a ward with a total of 10 beds, high dependence unit with 42 beds and ICU having 13 beds equipped with mechanical ventilator. There are assigned physicians and nurses working with 6hrs shift.

1.2 Study design and period

Descriptive cross-sectional study will be conducted and study period is from February 1-2021 to May31-2021.

1.3 Study population

All residents, 2nd year to final year, working at St. Paul's hospital millennium medical collage during the study period

1.4 Inclusion criteria

- ✓ All residents working at St. Paul's hospital millennium medical collage during the study period

1.5 Exclusion criteria

- ✓ Residents who transferred or withdraw before the study period
- ✓ New 1st year residents (as they didn't start residency during the pandemic)
- ✓ Graduating residents that left before the study period

1.6 Sample size determination and sampling technique

$$n = Z^2 p (1-p) / w^2$$

n= sample size

Z= 1.96 for 95% confidence interval

P= proportion (50% if we don't have previous value)

W= margin of error (5% for 95% CI)

$$n = 1.96^2 * 0.5 * (1-0.5) / 0.05^2$$

$$= 384.2 = 385$$

$$S = n / 1 + n/N$$

S= corrected sample size for small number of study population, n= initial sample size, N= study population (452 residents)

$$S = 385 / 1 + 385/452$$

$$= 207.8 = 208 + 5\% \text{ for non responders (10.4)}$$

$$= 208 + 11 = 219$$

1.7 Sampling technique

- ✓ Will be stratified sampling to take residents from 19 departments according to the total number of residents available at each department and sample from each departments will be taken by systematic random sampling.

Departments	Frequency (n=219) (% from 219 residents)
PEDIATRICS	20 (9.1)
INT.MEDICINE	25 (11.4)
GYN/OBS	40 (18.3)
GENERAL SURGERY	20 (9.1)
ORTHOPEDICS	21 (9.6)
RADIOLOGY	9 (4.1)
EMER. MEDICINE	18 (8.2)
ANESTHESIA	8 (3.7)
OPHTALMOLOGY	6 (2.7)
NEURO.SURGERY	8 (3.7)
FORENSIC MEDICINE	7 (3.2)
MAXILO-FACIAL	4 (1.8)
PSYCHATRY	5 (2.3)
PATHOLOGY	5 (2.3)
PLASTIC SURGERY	5 (2.3)
ENT	3 (1.4)
PEDIATRIC SURGERY	3 (1.4)
DERMATOLOGY	2 (0.9)
UROSURGERY	10 (4.6)

1.8 Data collection

Data collection will be undertaken by questionnaire which is going to be filled by residents after taking verbal consent. The residents will fill the questionnaire after taking all precautions (sanitizer and face mask) and the filled questionnaires will be handled properly by the investigator.

The questionnaire will include questions on demography and parts related to impact of COVID pandemic on teaching activities and quality of life on self and family wellbeing, life style and financial aspect and depression. It will be prepared in English. The main investigator will recheck the data collection forms to ensure their completeness and accuracy.

1.9 Dependent and Independent Variables

1.9.1 Dependent variable

- ✓ Residency program

1.9.2 Independent variables

- ✓ Department
- ✓ Treating suspected or confirmed COVID cases
- ✓ History of COVID infection
- ✓ Teaching sessions after COVID
- ✓ Virtual teaching after COVID
- ✓ Hospital activities after COVID
- ✓ Availability of PPE
- ✓ Vaccination for COVID
- ✓ Depression

1.10 Data processing & analysis

After data collection, each data set will be checked for completeness based on the code given during data collection. The data will be entered into SPSS version 25 statistical package. Coding of individual questionnaires will be checked before data entry into the software. Further data cleaning will be performed to check for outliers, missed values and any inconsistencies before the data were analyzed using the software. Descriptive statistics will be used to describe the independent variable and association between variables will be checked using P- value.

Characteristics of the study variables will be analyzed using descriptive statistics such as frequency, tables, graphs, percentages and cross tabulations. P value <0.05 will be considered statistically significant.

Quality of life of the study participants was assessed based on the WHO QOL assessing tool having four sections which are (physical health, psychological and body image appearance, social/personal relationships, environment/financial impacts). Accordingly, each questions under each parameters taking in to consideration negatively coded responses as if having a lower value (code) and those positives as high value. The QOL variable was computed and dichotomized as poor and good quality of life based on the mean score and thus, those who scored below the mean were considered as if they have poor QOL and vice versa.

Depression among residents will be analyzed manually based on the fulfillment of DSM V criteria of major depressive disorders.

1.11 Data Quality Assurance

The questionnaire is pretested and the pretest results are not included in the study. The main investigator supervised the data collection. Each day, the collected data was checked for accuracy and completeness.

Ethical Consideration

Permission and ethical clearance was obtained from SPHMMC IRB (Institutional Review Board) and department of pediatrics and child health before data collection was started.

Operational definition

- Impact of COVID19 pandemic
 - The study assessed what COVID 19 pandemic imposed on residents but it didn't compare with preexisting data prior to the pandemic
- Pandemic
 - Is a disease outbreak that spreads across countries or continents. It affects more people and takes more lives than an epidemic. The World Health Organization

(WHO) declared COVID-19 to be a pandemic when it became clear that the illness was severe and that it was spreading quickly over a wide area.(14)

➤ Teaching activities

- Includes academic activities like lectures, seminars, and grand rounds etc, patient contacts, hospital activities, duties and rotations.

➤ Quality of life

- WHO defines Quality of Life as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns
- WHOQOL- BREF is a shorter version of WHOQOL- 100 and it has 4 domains which are physical health, psychological health, social relations and environment with a total of 23 questions. (15)

➤ The definition of depression is according to DSM 5 criteria(Diagnostic and Statistical Manual of Mental Disorders) of major depressive disorder which is 5 criteria out of 9 have been present during the same 2 weeks period (at least one of the symptoms must be either diminished interest or depressed mood) (16).

RESULT

1. Socio-demographic characteristics

From a total of 452 residents, 219 were involved in the study to assess the impact of COVID 19 pandemic on teaching activities and quality of life with 100% response rate. 118 (53%) of the respondents were between the age group of 30-34 years. The mean age of study subjects was 30.2 with (Mean $\pm$ SD=30.2 $\pm$ 6). 146 (66.7%) of the residents were male and 73 (33.3%) were female. 133 (60.7%) were single and most residents (157/ 71.7%) didn't have children. 88 (40.2%) were second year residents. (See Table 1)

Table1. Socio-demographic characteristics of Residents at SPHMMC, 2021

Variables	Frequency (n=219)/ Percentage (%)
Age group	
24-29	98/ 44.7
30-34	118/ 53.9
35-39	1/ 0.5
>=40	2/ 0.9
Sex	
Male	146/ 66.7
Female	73/ 33.3
Marital Status	
Married	86/ 39.3
Single	133/ 60.7
Do you have children	
Yes	62/ 28.3

No	157/ 71.7
Residency	
2nd yr	88/ 40.2
3rd yr	92/ 42.0
4th yr	35/ 16.0
5th yr	4/ 1.8
Department	
GYNI / OBS	40 (18.3)
Dermatology	2 (0.9)

2. Impact of COVID19 Pandemic on hospital activities

In this study, 172 (78.5%) residents were involved in the treatment of COVID-19 cases. 125 (57.1%) were psychological ready to study and read and 106/ 48.1% (P-value= 0.806) got support from their department to improve teaching activities after COVID pandemic. 117 (53.4%) didn't have awareness of new management protocol, (See Table 2 below). Moreover, 81 (37%), 61 (27.9%), 101 (46.1%), 118 (53.9%) and 113 (51.6%) responded that activities are reduced as a result of COVID-19 at, ICU, Ward, ROPD, and Follow up clinics respectively (see figure given below).

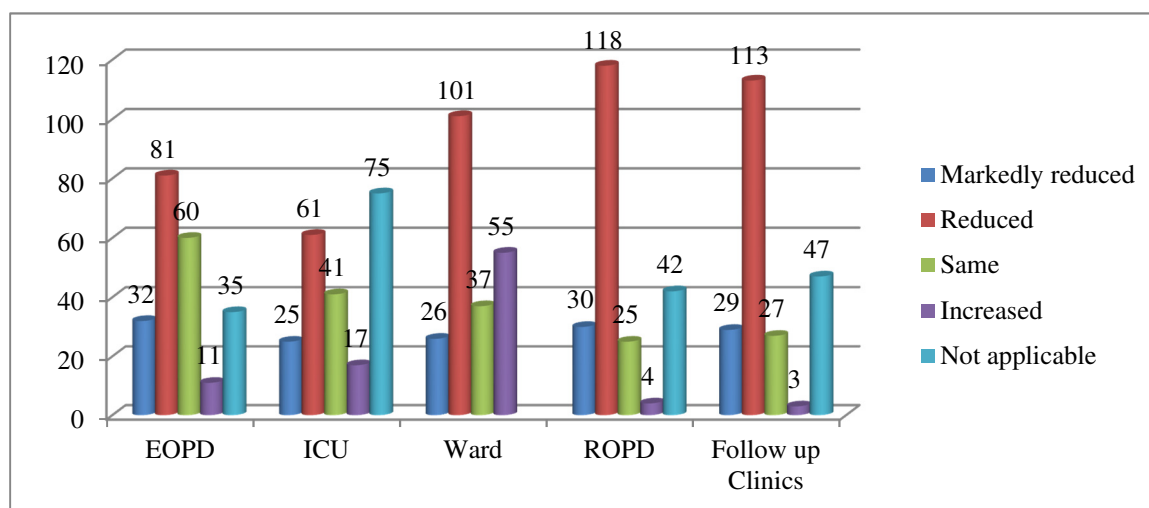


Figure 1. Impact of COVID-19 on hospital activities at SPHMMC, 2021

Likewise, the residents responded that the following activities were reduced: 117 residents (53.4%) in number of admitted patients, 101 (46.1%) time for round, 153 (69.9%) in teaching activities, 141 (64.4%) in Diagnostic procedures, 134 (61.2%) for Minor procedures, 88 (40.2%) for Major surgeries and 100 (45.7%) in reduction of attachments at other hospitals (detachment).

Moreover, 84 (38.4%) of the residents responded that Working hour was reduced and 124 (56.6%) residents progressive assessment was reduced after COVID-19 pandemic. (See figure 2 given below).

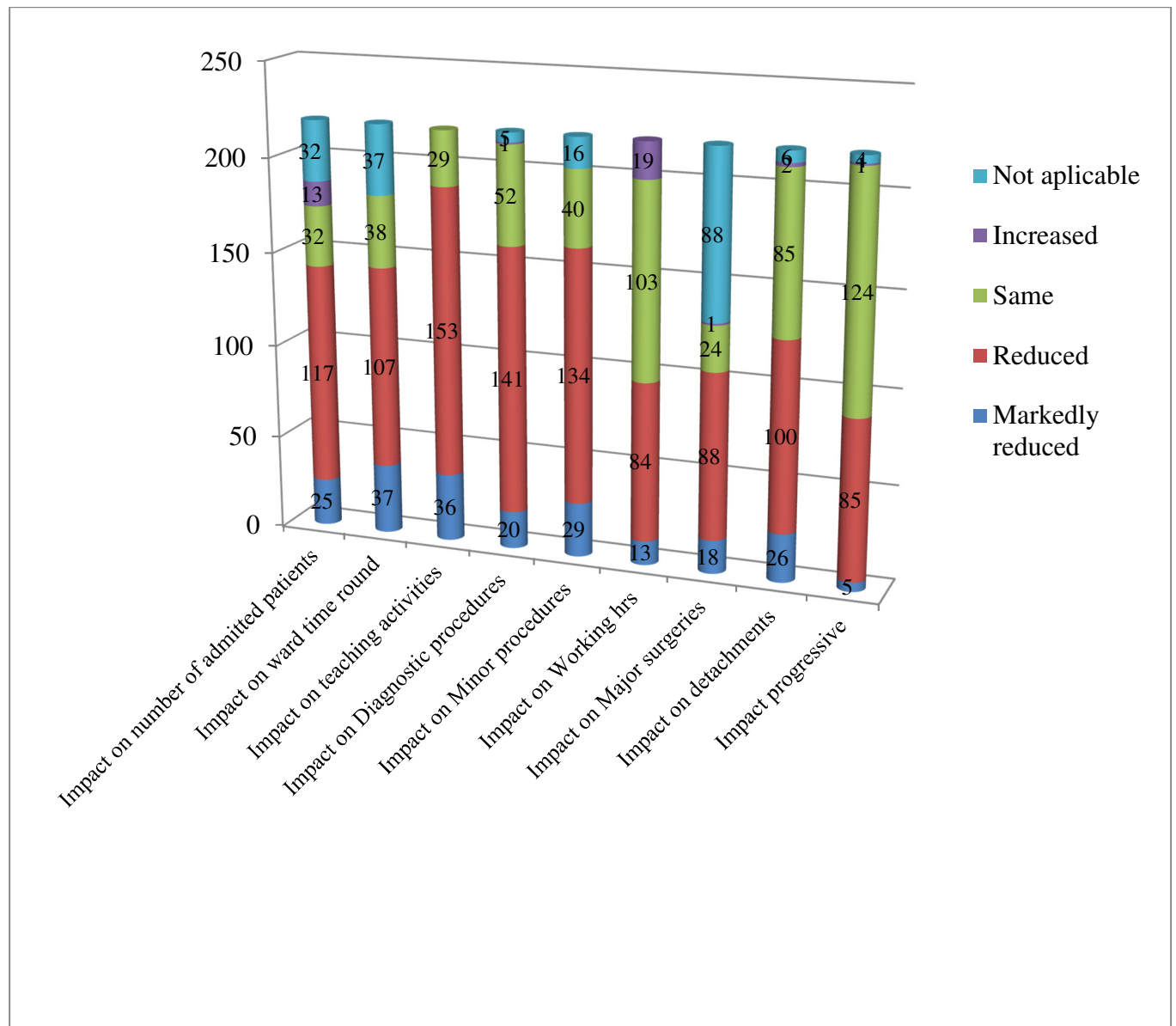


Figure2. Impact of COVID-19 pandemic on teaching and clinical activities among residents at SPHMMC, 2021

182 (83.1%) had virtual teaching and 134 (61.2%) responded that virtual teaching is worse than teaching prior to the pandemic. 118 (53.9%) had enough time to study during the pandemic. 30 residents (13.7%) thought of withdrawing as result of COVID-19 pandemic. (See **table 2** below).

Table2. Impact of COVID 19 on teaching activities among resident at SPHMMC, 2021

Variables	Frequency (n=219) (%)	P-value
Do you get any form of virtual teaching?		0.564
Yes	182 (83.1)	
How often do you get virtual teaching after COVID pandemic?		
Weekly	73 (33.3)	
2-3times/wk	96 (43.8)	
4-5times/wk	7 (4.1)	
Virtual teaching with teaching activities prior to the pandemic		
Better	35 (16.0)	
Worse	134 (61.2)	
very much worse	5 (2.3)	
Same	11 (5.0)	
The reason		
not interactive	15 (6.8)	

Internet interruption	49 (22.4)	
easily destructed	4 (1.8)	
more time for teaching/discussion	2 (0.9)	
Enough time to read and study during COVID 19 Pandemic		0.020
Yes	101 (46.1)	
If Yes, Properly Using		
NO	70 (69.3)	
Residency prolonged		
YES	169 (77.2)	
By how much?		
1-2MONTH	96 (56.8)	
3-4MONTH	73(43.2)	
Withdrawal thought		0.484
YES	30 (13.7)	

3. Impact of Covid Pandemic on Quality of life

3.1 Self and family well being

110 (50.7%) were in anxious state due to the pandemic (P-value= 0.893). 115 residents (52.5%) had history of COVID infection and 88 (40.2%) had infected family members Of which 37 (42%) responded that their family got the infection because of them. 141 (64.4%) live away from their families to avoid contact while 133 (60.7%) residents' families and friends avoided contact with them due to COVID-19 pandemic (P-value= 0.365) .

41 (18.7%) are not vaccinated for COVID-19 and from this, 18 (43.9%) were not vaccinated as they were not convinced by its efficacy. From those who are vaccinated, 124 (69.6%) responded as if their worries somewhat decreased after they took the vaccine.

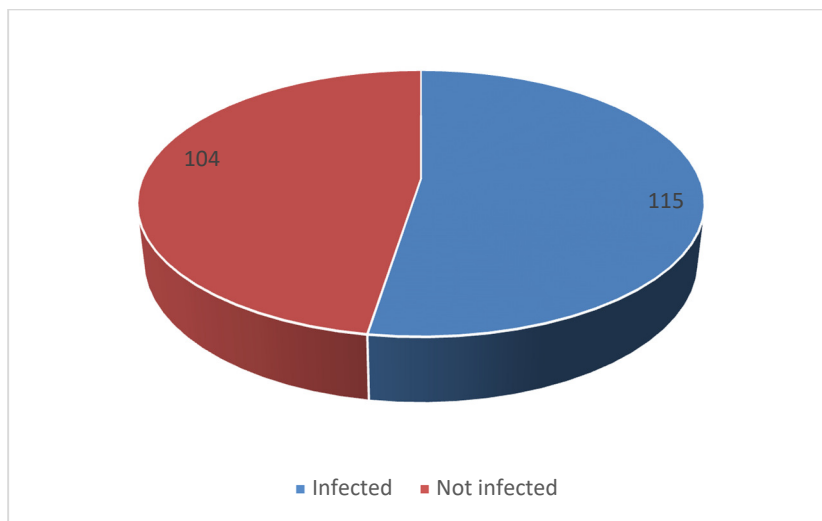


Figure 3 COVID 19 infection among residents at SPHMMC, 2021

Cross tabulation between Department Versus COVID Infection

The majority of the infected residents were from GYNI / OBS department i.e. 13 (10.4%) (See table given below)

Department * INFECTED Cross tabulation				
Count				
		INFECTED		Total
		YES (% from total residents at each department)	NO	
Department	PEDIATRICS	11 (55)	9	20
	INT.MEDICINE	13 (52)	12	25
	GYN/OBS	21 (52.5)	19	40
	GENERAL SURGERY	9 (45)	11	20
	ORTHOPEDICS	15 (71.43)	6	21
	RADIOLOGY	3 (33.3)	6	9
	EMER. MEDICINE	16 (88.9)	2	18
	ANESTHESIA	6 (75)	2	8
	OPHTALMOLOGY	1 (16.7)	5	6
	NEURO.SURGERY	4 (50)	4	8
	FORENSIC MEDICINE	1 (14.3)	6	7
	MAXILO-FACIAL	1 (25)	3	4
	PSYCHATRY	3 (60)	2	5
	PATHOLOGY	1 (20)	4	5
	PLASTIC SURGERY	3 (60)	2	5
	ENT	2 (66.7)	1	3
	PEDIATRIC SURGERY	1 (33.3)	2	3

	DERMATOLOGY	0 (0)	2	2
	Urosurgery	4 (40)	6	10
Total		115	104	219

Cross tabulation between Vaccination for COVID-19 and infection

The study revealed that 30 (73.2%) of the residents who didn't took the vaccine got infected (See table below).

TAKE COVID VACCINE * INFECTED Cross tabulation				
Count				
		INFECTED		Total
		YES	NO	
TAKE COVID VACCINE	YES	85	93	178
	NO	30	11	41
Total		115	104	219

Association between COVID infection and vaccination

Those who didn't took the vaccine were at a 1.7 increased odds of contracting the infection (OR= 1.738, P-value= 0.021).

Cross tabulation between PPE availability and infection

134 (61.2%) responded that PPE is rarely available and 94 (42.9%) didn't get proper training on PPE.

2 residents were infected among those who responded that PPE is always available in contrary, 69 residents contracted the virus among those who responded that PPE is rarely available (See table below).

PPE availability * INFECTED Cross tabulation				
Count				
		INFECTED		Total
		YES	NO	
PPE availability	always	2	4	6
	most of the time	14	25	39
	rarely	69	65	134
	never	30	10	40
Total		115	104	219

Association between availability of PPE with Infection

In this study, those residents who said that PPE is rarely available and never available were at a 3 and 3.8 increased odds of being infected than who said that PPE is always available (OR=3.03, P-value=0.027) versus (OR=3.88, P-value=0.002).

3.2 Life style and financial aspect

107(48.9%) are stressed about acquiring COVID infection in their families or themselves. Whereas, 88 (40.2%) responded that the stress was affecting their day to day activities and 53 (24.2%) couldn't control their worries. 22 (10.2%) had sleep problems, of which 5 (2.27%) responded that the sleep problem affected their activity (P-value= 0.847). 11(5%) started substance abuse as a result of the COVID-19 pandemic, of which 5(45%) abused alcohol and chat each (P-value= 0.299). Moreover, 127 (58%) couldn't have a good life after the pandemic and 163/74.4% (P-value= 0.58) their financial level was affected. Of those responding as if the pandemic imposed negative impact on their finance, 20 (12.2%) responded the impact was visible in increased price of materials.

Quality of Life (QOL) analysis

Based on WHO QOL tool components, the mean score was computed and it is 13.36 (Mean $\pm$ SD=13.3 $\pm$ 2) and those who scored below the mean were considered as if they have poor QOL and vice versa (See Figure 4).

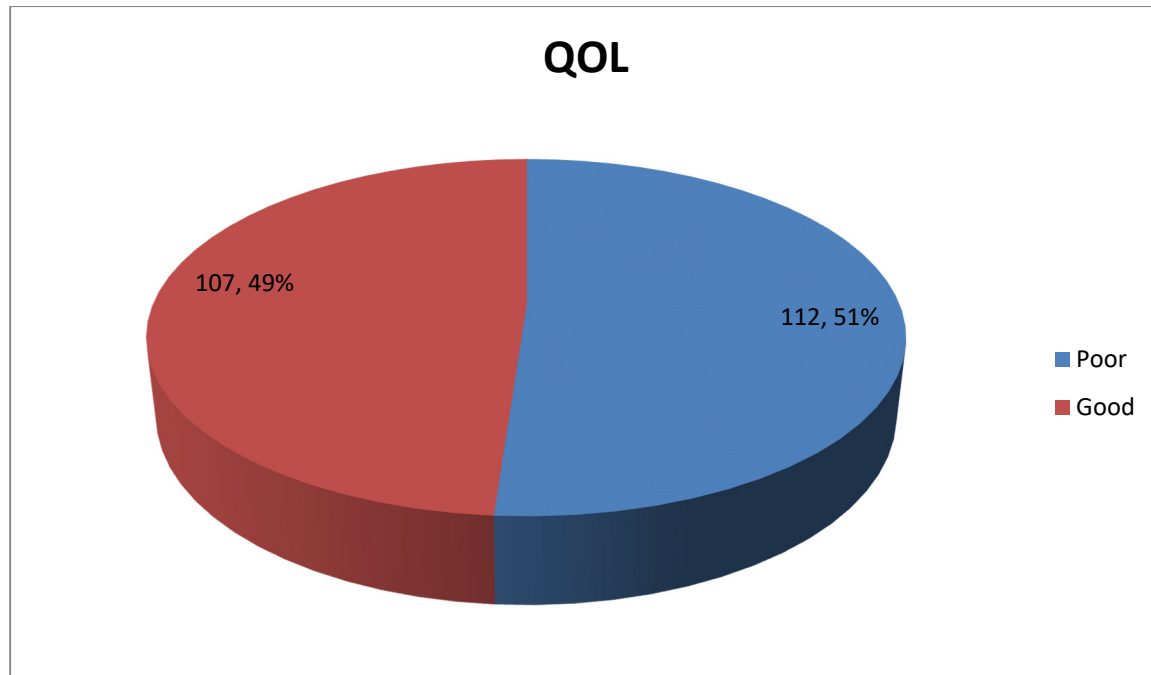


Figure 4 - Quality of life among residents at SPHMMC, 2021

Association between QOL and infection status

This study revealed the presence of strong statistical correlation between QOL and COVID infection. Accordingly, the study revealed, those study participants who were infected had a 3.17 times increased chance of having poor QOL (OR=3.175, $P<0.0001$).

INFECTED * QOL category Cross tabulation

	QOL category		OR	P-value
	Poor Quality of life	Good quality of life		0.0001
YES	74	41	3.175	
INFECTED?				
NO	38	66		
Total	112	107		

QOL categories across departments

Poor quality of life was reported from GYNI/OBS department. Whereas, Good quality of life from internal medicine (See table given below).

Department * QOL Cross tabulation				
Departments		QOL		Total
		Poor Quality of life	Good quality of life	
	PEDIATRICS	13	7	20
	INT.MEDICINE	9	16	25

	GYN/OBS	26	14	40
	GENERAL SURGERY	12	8	20
	ORTHOPEDICS	12	9	21
	RADIOLOGY	3	6	9
	EMER. MEDICINE	9	9	18
	ANESTHESIA	5	3	8
	OPHTALMOLOGY	2	4	6
	NEURO.SURGERY	5	3	8
	FORENSIC MEDICINE	2	5	7
	MAXILO-FACIAL	2	2	4
	PSYCHATRY	1	4	5
	PATHOLOGY	2	3	5
	PLASTIC SURGERY	2	3	5
	ENT	1	2	3
	PEDIATRIC SURGERY	0	3	3
	DERMATOLOGY	0	2	2
	UROSURGERY	6	4	10
Total		112	107	219

4. Depression due to COVID-19 Pandemic

The depression level of the residents was assessed based on a nine item tool having a likert scale type of options and 15 were feeling down more than half of a day per week and 36 had fatigue or loss of energy more than half of the days per week.

With this, the residents were assessed for depression based on DSM V criteria and from a total of 219 residents, 18 (8.22%) fulfilled the criteria for depression. Of which 6 (33.3%) were from GYNI/OBS and 4 (22.2%) were from emergency medicine. 14 (77.8%) are male and 4 (22.2%) are female while 8 are R2 (2nd year resident), 8 are R3 (3rd year resident) and 2 are R4 (4th year resident). From 18 depressed residents, 15 (83.3%) residents had history of COVID infection.

Table 3- Number of residents with depression in respective departments according to DSM-V criteria

DEPARTMENT	Residents with depression (% of the depressed residents)	sex		Marital status		Year of residency	COVID infection history	
		Male	Female	Married	single		yes	No
PEDIATRICS	2 (11.1)	x		x		R3	x	
			x	x		R2		X
INTERNAL MEDICINE	1 (5.56)		x	x		R3	x	
ENT	1 (5.56)	x			x	R2	x	
GENERAL SURGERY	1 (5.56)	x		x		R2		X
ANESTHESIA	1 (5.56)		x		x	R3	x	
PLASTIC SURGERY	1 (5.56)	x		x		R4	x	

GYNECOLOGY AND OBSTETRICS	6 (33.3)		x		x	R3		X
		x			x	R4	x	
		x		x		R3	x	
		x			x	R3	x	
		x		x		R2	x	
		x			x	R2	x	
EMERGENCY MEDICINE	4 (22.2)	x		x		R2	x	
		x		x		R2	x	
		x		x		R3	x	
		x		x		R3	x	
PSYCHATRY	1 (5.56)	x			x	R2	x	
TOTAL (%)	18	14 (77.8)	4 (22.2)	11 (61.1)	7 (38.9)	8R3, 8R2 and 2R4 *	15 (83.3)	3 (16.7)

* R2= 44.4%, R3= 44.4%, R4= 11.2%

Discussion

This study revealed a deleterious impact of COVID-19 on: residency program, quality of life (in terms of self and family well-being, financial and life style) and depression among residents.

In this study, teaching activities, diagnostic procedures, major and minor surgeries, were reduced by, 69.9%, 64.4%, 40.2%, 61.2%, secondary to COVID-19 respectively. The finding from this study on the impact of COVID-19 on teaching activities is comparable with studies conducted in Saudi Arabia and where 84.6% responded that teaching activities were reduced and 97% (only for surgical residents) reduction in major surgeries. The study in Saudi Arabia also showed that 71.1% use virtual teaching while 83.1% in this study and psychological preparedness to study is 32.9% in contrast to 57.1% in this study (6).

Likewise, COVID-19 imposed its impact on quality of life of residents particularly on the self and family well-being. Accordingly, 52.5 % got infected by the virus, of those infected by the virus, 40.2% had an infected family member. Out of the 219 residents, only 41% were vaccinated and from 115 infected residents 30 (26.1) were not vaccinated. This finding was much higher than the finding from a study conducted in Saudi Arabia (6), where only 2.9% of the residents got infected and 16.7% of their families got the infection because of them. The possible justification for this discrepancy might be due to differences in working area and PPE availability (14.2% responded that PPE is rarely available in contrast to 61.2% in this study) and vaccination status (18.7% are not vaccinated in this study but vaccination isn't included in Saudi Arabia's study). Moreover, the findings of this study are also comparable on being anxious about the situation (50.7% versus 45%) while thought of withdrawal from the residency program is 13.7% in this study while 46.7% in Saudi Arabia's study. (6)

Quality of life was assessed with WHO / QOL tool and 107 (49%) had values above the mean score and hence good quality of life and 112 (51%) had values below the mean score and have poor quality of life. This study revealed presence of strong statistical correlation between QOL and COVID infection which is residents who were infected had a 3.17 times increased chance of encountering poor QOL (OR=3.175, P<0.0001).

Similarly, 11 (5%) abused substances, alcohol and chat being the commonest, as a result of the pandemic. This finding is lower than a finding reported from France (11), where, 29% of the participants became substance abusers. The possible reason for the disparity might emanate from differences in behavioral and preexisting substance abuse habit and sample size differences.

The study also revealed that 18 (8.22%) residents fulfilled the DSM-V criteria for depression. Of which 6 (33.3%) were from GYNI/OBS and 4 (22.2%) were from emergency medicine. It is difficult to compare the finding of this study from prior ones because the depression level in the current study was measured

using a nine item tool based on DSM-V criteria. Whereas, the prior researches which were conducted in Pakistan (1), Tunisia (12) and France (11) used sample mean score which yielded 26.4%, 30.5% and 17% of depression level respectively.

CONCLUSION

- This study revealed that COVID-19 pandemic resulted in
 - significant reduction of teaching activities among residents
 - a negative impact on quality of life of residents
 - significant number of residents were depressed
- It also showed that
 - Many residents were not vaccinated
 - PPE was not adequately available and many residents weren't trained on PPE use
 - many departments did not have management protocols

RECOMMENDATION

- Try to avail proper PPE and give training on PPE use
- Encourage those who didn't took COVID vaccine to get vaccinated
- Try to prepare management protocols for departments which do not have protocols
- Improve internet connection for virtual teaching
- Further study on teaching activities and QOL prior to the pandemic to assess the effect of COVID 19 pandemic on residents
- Further study on depression among residents to assess the outcome of the depressed residents

LIMITATION OF THE STUDY

- It was only done at a single tertiary hospital and may not be used to generalize for other hospitals

RESULT DISSEMINATION PLAN

The results of this study presented to SPHMMC's department of pediatrics and child health. The findings will be published in a relevant scientific journal and disseminated online so that they can be of use for other academic researchers and clinical practitioners. It can also serve as a base line for future studies.

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ANNEX

Questioner

Impact of COVID19 pandemic on teaching activities and quality of life among Residents at SPHMMC, 2021

I. Socio-demographic information

1. Age-----

2. Gender

a) Male

b) Female

3. Marital status

a) Married

b) Single

c) Divorced

d) Other-----

4. Do you have children?

a) Yes

b) No

5. Which department are you working? -----

6. Year of Residency -----

II. Impact of Covid 19 Pandemic on teaching activities

1. Are you directly involved in the treatment of Suspected or confirmed COVID 19 case?

a) Yes

b) No

2. Do you feel that you are Psychological prepared to study and read?

a) Not at all

b) Somewhat

c) Much

d) Very much

3. Do you get support from your department to improve teaching activities after COVID pandemic?

a) Always

b) Most of the time

c) Rarely

d) Never

4. Are you aware of new management Protocol that is related to your specialty which has been generated in Covid 19 pandemic?

a) Yes

b) No

5. How do you rate the impact of COVID 19 pandemic on the following activities? (Please mark under the rate that best describes your feeling)

Activities	Markedly reduced	Reduced	Same	Increased	Not applicable
routine activities in the:-					
✓ EOPD					
✓ ICU					
✓ Ward					
✓ ROPD					
✓ Follow up clinics					
No. of admitted patients					
Time spent on ward rounds					
Teaching activities (lecture, seminar, case presentations...)					
Simple diagnostic procedures					
Minor procedures (specific to each department)					
Major surgeries					
Working hours					
Detachments					
Your progressive assessment					

6. Do you get any form of virtual teaching?

- a) Yes b) No

7. If your answer to question no. 6 is yes, how often do you get virtual teaching after COVID pandemic?

- a) Weekly b) 2-3times/week c) 4-5times/week d) daily

9. When you compare virtual teaching with teaching activities prior to the pandemic, it is

- a) Better b) Worse c) Very much worse

Please explain your reason? -----

10. Did you miss an exam during the pandemic?

- a) Yes b) No

13. Do you have enough time to read and study during COVID 19 Pandemic?

- a) Yes b) No

14. If question no. 13 is yes, are you using it properly?

- a) Yes b) No

15. Is your residency period prolonged because of COVID?

- a) Yes b) No

If yes, by how much is it prolonged? -----

16. Have you thought of withdrawing because of Covid 19 outbreak?

- a) Yes b) No

III. Impact of Covid Pandemic on Quality of life

A. Self and family well being

1. Are you anxious about the situation?

- a) Not at all b) somewhat c) Much d) Very much e) Extremely

2. Did you get infected because of working exposure?

- a) Yes b) No

3. Have you worried about life threatening situation once infected?

- a) Yes b) No

4. Did any member of your family get infected?

- a) Yes b) No

5. If question no 4 is yes, is it because of you?

- a) Yes b) No

6. Are you away from your family to protect them?

- a) Yes b) No

7. Do you feel that families and friends have avoided contact with you because of your work?

- a) Yes b) No

8. Do you have enough and proper PPE (Personal protective Equipment)?

- a) Always b) Most of the time c) Rarely d) Never

9. Did you get training on site for PPE?

- a) Yes b) No

10. Did you take COVID vaccine?

- a) Yes b) No

If your answer is No, what is your reason? -----

If your answer is yes, are your worries improved after taking the vaccine?

- a) Not at all b) Somewhat c) reduced d) significantly reduced

B. Life style and financial aspect

1 .Do you have excessive stress or worry about you self and your family members being infected with COVID-19

- a) Always b) Most of the time c) Rarely d) Never

2. Is your stress interfering with your daily activity?

- a) Yes b) No

3. Are you not being able to stop/control your worry?

- a) Yes b) No

4. Do you have any sleep problem?

- a) Yes b) No

5. Is your sleep problem interfering with your activity?

- a) Yes b) No

6 .Is there use of or increased use of Substance abuse (alcohol, Cigarette or chat) after the pandemic

- a) Yes b) No

If yes, specify the substance abused-----

7. Are you maintaining good life style after Covid pandemic on feeding or exercise?

- a) Yes b) No

8. Does Covid-19 Pandemic affected your financial level

- a) Yes b) No

9 .If question No. 8 is yes, in what way it affects your financial level (you can select more than one answer)

- a) Increase price of Material
- b) Problems of transportation
- c) Decreased income from other activities
- d) Others-----

C. Depression

Please mark under the column that best describes your answer (based on symptoms that have been present during the same 2weeks period.)

<u>no</u>		Not at all	Several days	More than half of days per week	Nearly every day
1	Feeling down or hopeless				
2	Diminished interest or pleasure in most activities				
3	Has difficulty of falling asleep or sleeping to much				
4	Poor appetite or over eating				
5	Difficulty of concentration in different activities				
6	Feeling bad about one self or feeling of excessive guilt				
7	Fatigue or loss of energy				
8	Slowing down of thought and a reduction of physical activity				
9	Thought that you would better be dead or history of hurting yourself or recurrent suicidal ideation				

Thank you...