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PSYCHOLOGICAL IMPACT OF COVID-19 OUTBREAK ON HEALTHCARE SERVICE PROVIDERS IN LUSAKA

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ABSTRACT

The coronavirus disease 2019 is a respiratory disease caused by the SARS-CoV-2 virus. The pandemic is extremely contagious with high risk of death from infection. Thus, it has been causing unbearable psychological pressure to everyone including healthcare service providers. An analytical cross-sectional study was conducted to examine the psychological impact of the coronavirus disease 2019 outbreak on the healthcare service providers in Lusaka district. The target population were front-line health care workers who were considered most vulnerable to COVID-19 pandemic. The results show that 79 % of healthcare workers working in the first line, with higher clinical responsibilities in Lusaka district were deeply concerned about being infected with COVID-19. Shortage of personal protective equipment has been associated with fear of infection among health workers, and just like in other developing countries. The 91% who reported being worried to infect family with COVID-19 also said they had to report for work every day. During the COVID-19 pandemic, some workers have been infected and recuperated while others lost their lives. All these experiences have left them psychologically stressed. The study highlights that healthcare workers are at utmost risk for psychological distress during the COVID-19 outbreak. Thus, timely psychological interventions targeting this vulnerable group may be beneficial. There is need to provide sociological and psychological support to frontline healthcare workers. Training may be of essence to bridge the gaps in knowledge that is required for health care workers to handle the pandemic and to cope with the psychological pressure.

Keywords: *coronavirus, psychological pressure, healthcare workers.*

1. INTRODUCTION

At first, the COVID-19 pandemic was just a fairy tale, a rumour that sounded to be far from our reach; an infection widespread far beyond Zambia's borders, massacring masses of people and sending developed and developing countries into panic. Then March 18, 2020 came, Zambia

recorded its first two cases of COVID-19. Since the first two COVID-19 cases, the escalating figures of confirmed infections and suspected cases show that the aggressive pandemic may become severe in Zambia.

Zambia, like many other developing countries grapple with shortage of human resources for health, and amidst COVID-19 pandemic, the inadequacy for human resource is even worse as the same labour force must be allocated to work in COVID-19 demarcated centres. From a severe shortage of healthcare workers to the lack of economic and monetary capacity, low supplies of respirators, absence of testing kits, scant personal protection equipment, and other crucial health kits for treating cases of COVID-19, with all these challenges the devastating outbreak of COVID-19 pandemic is simply taking a vast toll. It has being observed that the response to prevent the new infections is ineffective, as such, Zambia is poised to follow the paths of other nations with rising infection rates and mounting deaths.

During an outbreak of an infectious diseases, implementation of infection prevention and control (IPC) is of great importance in healthcare settings, especially regarding personal protection of HCWs[1]. To that effect, multiple agencies, including WHO have issued regulations and best practices for workplaces so as to contain COVID-19. For HCWs performing aerosol generating procedures, WHO recommends airborne and contact precautions. The use of medical masks, eye protection, gloves and gown are required for direct patient care[2]. Research further shows that suspected and diagnosed patients with 2019-nCoV pneumonia as well as health professionals working in hospitals caring for infected patients should receive regular clinical screening for depression, anxiety, and suicidality by mental health workers. Timely psychiatric treatments should be provided for those presenting with more severe mental health problems.[3]

SARS-CoV-2 virus infects people of all ages and status. However, studies suggest two groups of people that are at a higher risk of getting severe COVID-19, the old and those with underlying metabolic conditions[4]. This couple with reports from studies indicate that human-to-human transmission occurs mainly between family members, including relatives and friends who intimately interact with patients or incubation carriers, the transmission and risk among HCW is much more than imagined[5]. This risk posed by an infectious disease outbreaks instigates psychological pressure or hostile mental health distresses among HCWs working with individuals affected by or at risk for COVID-19.

According to WHO, HCW who are at the frontline of COVID-19 outbreak response are unquestionably exposed to hazards that put them at high risk of infection. Hazards include; exposure to infections, long working hours, psychological distress, fatigue, occupational burnout, stigma, and physical and psychological violence[6]. In addition, HCW are more exposed to COVID-19 patients than an average citizen[7]. They spend longer periods of time as they carryout aerosol-generating procedures, swabbing the throat or nose of a patient and as such, and this put them at a higher risk of getting infected more than average citizens.

From the time when COVID-19 was confirmed in Zambia, many people if not all have been experiencing unbearable psychological pressure; manifesting in form of depression, anxiety, panic, insomnia, and distress. There have been reports which indicate that the frontline HCWs who are directly and indirectly involved in the diagnosis, treatment, and care of people with COVID-19 are psychologically stressed.

Studies have revealed profound and broad spectrums of psychological impact that COVID-19 outbreak inflicts on HCWs. HCWs have experienced fear of infection and spreading the virus to their families, and other members of in their communities. This is expected as the anxiety and fear

of getting infected is much higher with the risk of exposure. The balance between professional duty, self-sacrifice and personal fear for oneself and others often cause conflict and resistance in many HCWs[8]. In one study, authors asserted that the extended working hours also inevitably mean less time for usual activities outside of work such as family, friends, and taking care of oneself[9]. Although HCWs keep themselves busy during normal shifts, the prolonged duration of isolation increases stress levels, restlessness, and physical inactivity due to confinement.

Sudden outbreaks of public health events always pose huge challenges to the mental health service system. Several studies have long-established the psychological effects of outbreaks, examples include the HIV/AIDS that captivated world attention in the 1980s and 1990s, the severe acute respiratory syndrome (SARS) in 2002 and 2003, the H1N1 influenza pandemic of 2009, the Ebola virus outbreak in 2013, and the Zika virus outbreak in 2016[10]. In times of an outbreak significant psychiatric indispositions have been found to present in form of depression, anxiety, panic attacks, somatic symptoms, and posttraumatic stress disorder symptoms, to delirium, psychosis and even sociality. Although occasional psychological pressure may not impair our health, psychological stress can eventually weaken the body's immune system[11].

There are reports in China, Asia Pacific, Spain and other countries that health workers are constantly infected and dying from COVID-19. While studies have been conducted in other countries, albeit few, Zambia is yet to know how this pandemic is affecting the psychological wellbeing of healthcare workers. Knowing this is important as it can help how HCWs are taken care of to ensure service delivery goes uninterrupted. This study set out to investigate the psychological impact of COVID-19 outbreak on the healthcare service providers in Lusaka district.

2. METHODOLOGY

This was an analytical cross-sectional study. The target population for this study involved front-line HCWs who were considered most vulnerable to COVID-19 pandemic. HCWs encompassed doctors; clinical officers; nurses; midwives, pharmacists, laboratory staff, and biomedical scientists. Owing to the fact that the study was conducted during COVID-19 pandemic, the existing social distancing policies dictated reduced face-to-face contact, communication and avoidance of large gatherings and activities. As a result, an anonymous online questionnaire was designed and shared to study participants via emails, WhatsApp and other online platforms through various mother bodies vis-a-vi Zambia Medical Association, General Nursing Council, Biomedical Society of Zambia and Pharmaceutical Society of Zambia. A total of 245 HCWs were enrolled. The study participants were selected conveniently. In this study, there were two groups of participants; HCWs who were directly involved in attending to COVID-19 cases and those who were indirectly supporting the containment of COVID-19. Data was cleaned to guarantee accuracy and was analysed using SPSS version 25.0. Data was presented using tables and charts. Logistic regression and multivariate analysis were used to determine the associations between the response (dependent) and exploratory (independent) variables. P – Values of less than and equal to 0.05 were considered to be statistically significant.

3. RESULTS

3.1. Gender and Age

Table 1 shows descriptive Information for gender and age of participants, the table presents frequencies only without percentages. Of the 245 HCWs that participated in the study, 48.6% (119/245) were males and consist of 19% (23/119) who were above the ages of 45 years; 48% (57/119) were between 31 and 45 years and lastly 33% (39/119) of the participants were between the ages of 18 and 30 years. The median age for the male HCWs was 40 years, with the interquartile range (IQR) of 31- 45 Years.

There were 51.4% (126/245) female HWCs that participated in the study, comprising 39% (49/126) who were between the ages 18-30 years; 40% (51/126) between the ages of 31 – 45 years and 21% (26/126) above 45 years, with the median age of 42 years and an IQR of 31-45 years. The female HCWs had a higher proportion of participants 51.4% (126/245) than that of the male HCWs 48.6% (119/245).

Generally the majority of HCWs that enrolled in the survey 44.1% (108/2450) were between the ages of 31-45 years, followed by 35.9% (88/245) between the ages 18-30 years, and lastly 20% (49/245) HCWs above 45 years. The main stream of respondents were HCWS between 31 and 45.

Table 1: Descriptive Information for Gender and Age Group

		Age Group			Total
		18-30 Yrs.	31-45 Yrs.	>45 Yrs.	
Gender	Male	39	57	23	**119**
	Female	49	51	26	**126**
Total		**88**	**108**	**49**	**245**

Table 2 shows a one-way analysis of variance between-groups. Multivariate analysis of variance which was performed to investigate the difference between gender in knowledge, fears, concerns and attitudes of HCWs regarding COVID-19 using seven dependent variables: thoughts about COVID -19 pandemic, experience of its psychological effects, facing pandemics anxieties, rating of COVID-19 services, attitude toward PPEs, rating of COVID-19's virulence and availability of testing for COVID -19. The independent was variable gender. There was a statistically significant difference between males and females on the combined variables, $F(7, 237) = 3.010$, $p = 0.005$, Wilks' $\Lambda = 0.918$, partial $\eta^2 = 0.082$.

The one-way MANOVA shows that there is a difference but does not show where a statistically significant adjusted mean difference between the groups of the independent variable in terms of each dependent variable lies. Upon comparing results of the dependent variables separately, the

only difference that was statistically significant, using Bonferroni adjusted alpha level of 0.017, was in their rating of COVID-19's virulence, F (1, 243) = 13.606, $p < 0.017$, $\eta^2 = 0.053$. Males rated viewed covid-19 as more deadly, (M = 1.61, SD = 0.55) than females (M =1. 37, SD = 0.50).

Table 2: The Difference between Gender in Knowledge, Fears, Concerns and Attitudes

Multivariate Tests[a]							
Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.965	943.100[b]	7.000	237.000	.000	.965
	Wilks' Lambda	.035	943.100[b]	7.000	237.000	.000	.965
	Hotelling's Trace	27.855	943.100[b]	7.000	237.000	.000	.965
	Roy's Largest Root	27.855	943.100[b]	7.000	237.000	.000	.965
Sex	Pillai's Trace	.082	3.010[b]	7.000	237.000	.005	.082
	Wilks' Lambda	.918	3.010[b]	7.000	237.000	.005	.082
	Hotelling's Trace	.089	3.010[b]	7.000	237.000	.005	.082
	Roy's Largest Root	.089	3.010[b]	7.000	237.000	.005	.082

In Figure 1. Out of 245 HCWs that completed the survey questionnaire, 32.7% (80/245) were nurses, 31.4% (77/245) were doctors, 11.8% (29/245) accounted for Pharmacists and Laboratory technicians respectively, 7.8% (19/245) were Public health personnel, 1.2% (3/25) were dentists and physiotherapist respectively, 0.8% (2/245) were clinical officer and biomedical scientist and psychosocial counsellor had 0.4% (1/245).

3.2 Specialty

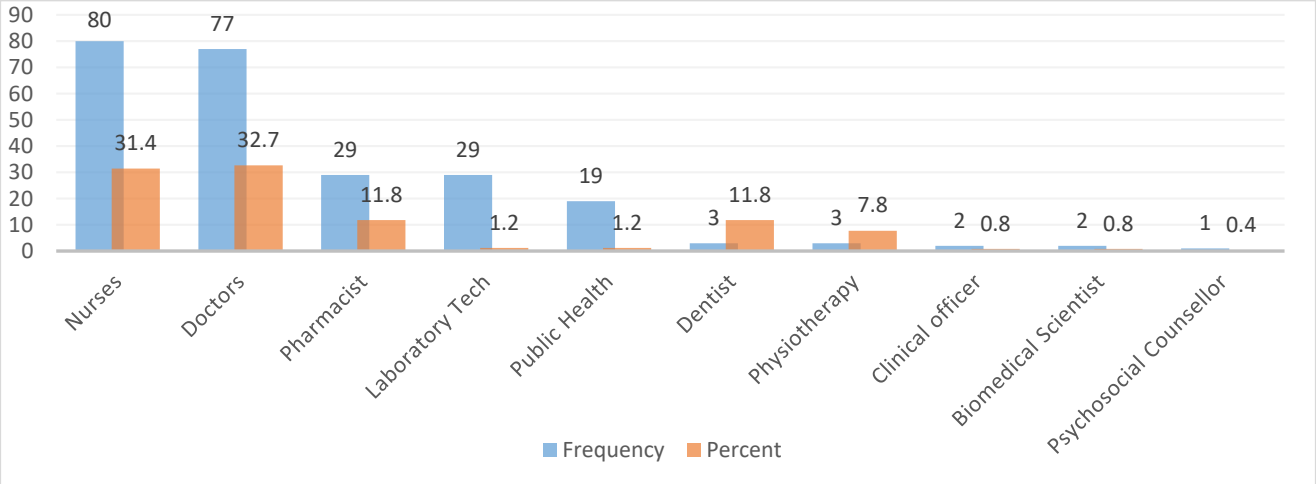

Figure 1: Participants Profession Distribution

3.3 Years in Practice

Figure 2 shows that HCWs who have been in service for less than 5 years accounted for 36% (88/245), followed by those who served for 6-10 years and 11-20 years which had 23%(57/245) respectively, with 21-30 years of service recording 13% (32/245) and 30 years and above recording 5%(12/245).

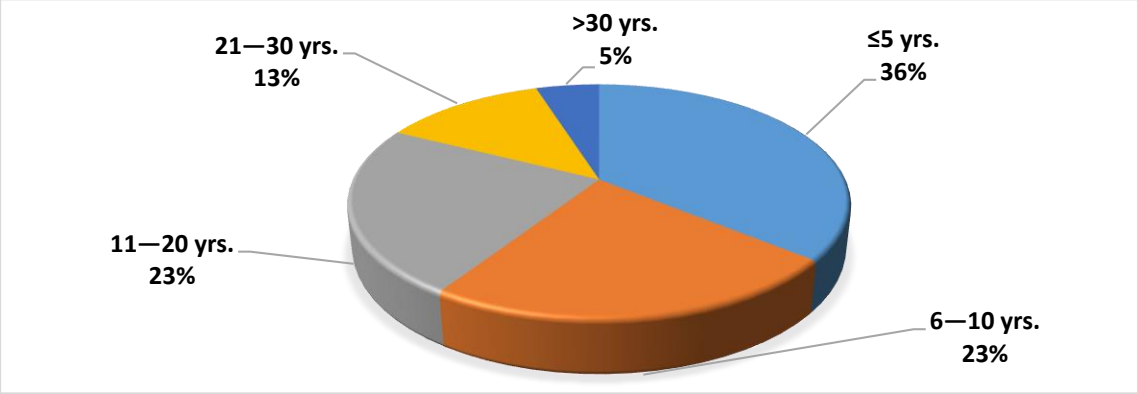

Figure 2: Exhibits Number of Years in Service

Figure 3 shows the fears and concerns concerning COVID-19 among HCWs. Many HCWs reported experiencing significant change in sleep and eating pattern, 26.9% (66/245), difficulty concentration 22% (54/245), and worsening of chronic health problems 7.3% (18/245). However, it was interesting to note that the majority 59.2% (145/245) reported never to have experienced any of these psychological changes even if they were attending directly or indirectly to COVID-19 infected or suspected patients.

Furthermore, frontline HCWs reported being concerned about being infected with COVID-19, the report shows a significant heights of 93% (230/245) compare to only 7% (15/245) who reported not being concerned. 71.4% (175/245) reported that they sometime feel that they are perhaps infected with Corona-virus and 87.3% (214/245) indicated that they have been badly thinking about COVID-19 on a daily basis, as they attend to patients even when they are off duty.

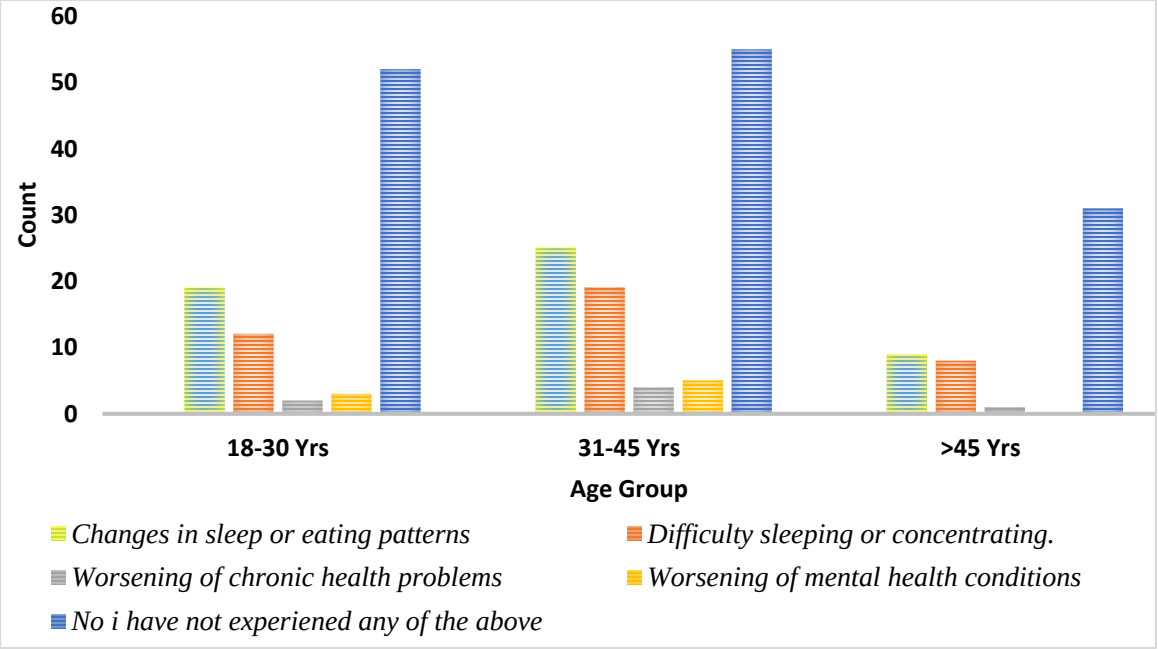

Figure 3: Fears and Concerns Concerning COVID-19

Table 3 shows particular anxieties Faced by HCWs by Professional Categories. Participants reported facing some particular anxieties, for instance, 92% (225/245) reported being uncertain and fear of being infected and infecting their loved ones '; 72% (176/245) indicated being overwhelmed by the workload; 90% (224/245) reported not having sufficient protective gears; 85% (208/245) witnessing patients' experiences and the marginal reported not experiencing any of these anxieties.

Table 3: Particular Anxieties Currently Faced by HCWs by Professional Categories

			Doctors/dentists/ nurses/clinical officers/physiotherapists	Lab technologists /scientists	Pharmacists	Public health/non-clinical/admin/ social workers	Total
Concerns regarding being infected and infecting others	Yes	Fr	154	26	27	18	225
		%	62%	11%	12%	7%	92.%
	No	Fr	11	5	2	2	20
		%	4%	2%	1%	1%	8%
Feeling not protected enough from Corona-virus?	Yes	Fr	155	25	26	18	224
		%	62%	10%	11%	7%	90%
	No	Fr	10	6	3	2	21
		%	4%	3%	2%	1%	10%
Overwhelmed by workload	Yes	Fr	122	19	23	12	176
		%	50%	8%	9%	5%	72%
	No	Fr	43	12	6	8	69

		%	18%	5%	2%	3%	28%
witnessing patients' experiences	Yes	Fr	150	22	21	15	208
		%	60%	10%	9%	6%	85%
	No	Fr	15	9	8	5	37
		%	6%	4%	3%	2%	15%

3.4 Healthcare Workers Protection against COVID-19

Most of the HCWs 89.4% (218/245) reported adequate washing hands or hand hygiene, they disinfect their hands before and after contact with patients; 82.2% (202/245) reported having guidelines to help triage patients with symptoms congruent with COVID-19. There is strict adherence to the guidelines which is highly significant for the protection of HCWs, however, it is unclear whether health facilities are implementing the stringent measures with regard to wok restrictions recommended for HCWs who are at higher risk for COVID-19 pandemic, 49.4% (121/245) said there are wok restrictions recommended while 50.6% (124/245) reported not having wok restrictions commended for HCWs who are at higher risk for COVID-19. Furthermore, 71.8% (176/245) reported not having adequate PPEs compare to 28.2% (69/245) who reported having adequate PPEs. Many HCWs 80.8% (198/245) reported extreme shortage of PPEs supplies in health facilities compared to 19.2% (47/245) who reported to have consistent supplies (Figure 4)

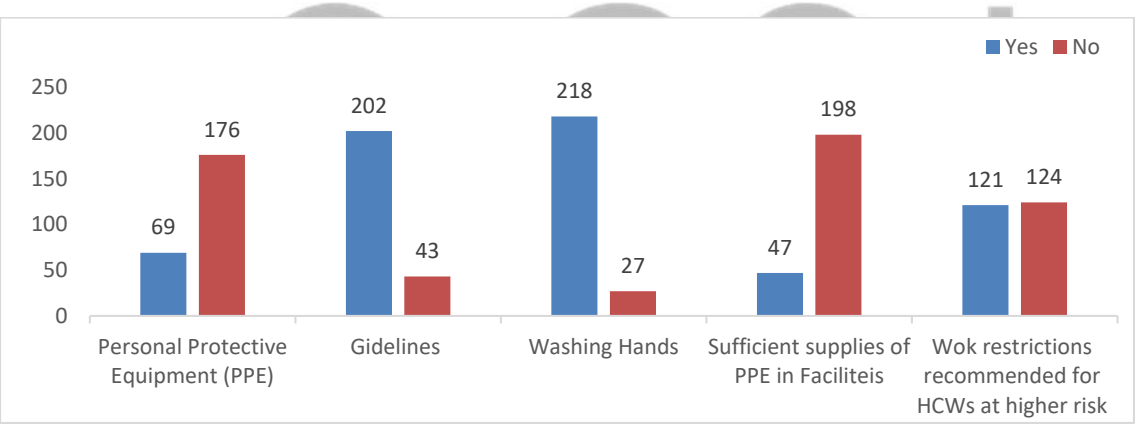

Figure 4: Protection Measure at Individual and Facility Level

3.5 Knowledge attitude and practice of HCWs

Table 4 shows that there is a greater demand for provision of mental health support, 78.8% (193/245) of HCWs affirmed desiring to receive any type of professional mental support, militate against 10.6% (26/245) who refused and 11% (27/245) who said they have no worries. 94.7% (232) of participants requested for support and assistance from psychological professionals, to help in dealing with the current COVID-19 pandemic situation, and only 5.3% (13) had no interest having access to acute mental health services. 93% expressed displeasure for the results which are taking too long to come out, and 76.6% confirmed that testing availability remains insufficient.

The results in Table 4 show that the majority 82.9% (203/245) understand that COVID-19 is caused by SARS-Cov 2, compare to 17.1% (42/245) who showed unawareness of the cause of covid-19. Impressively, 98% (240/245) were aware of the fact the HCWs are at a higher risk of infection as well as the majority 53% (132/245) indicated that COVID-19 is extremely deadly compared to 44.5% (109/245) who said it is moderate and 2% (5/245) it not deadly at all. Largely 94.7% (232/245 of HCWs agreed that COVID-19 exist, except for a hand few 1.6% (4/245) who did not accept that it exists and 4.5% (11/245) who were still question its existence (Table 4).

Table 4: Knowledge Attitude and Practice of HCWS

		Frequency	Percent
COVID-19 is caused by SARS-Cov 2	Yes	203	82.9
	No	42	17.1
Healthcare workers are at a higher risk of infection?	True	240	98.0
	False	5	2.0
Would be nice to talk to someone about your worries?	Yes	193	78.8
	No	26	10.6
	I have no worries	26	10.6
How deadly is COVID-19?	Extremely	131	53.5
	Moderately	109	44.5
	Not at all	5	2.0
Do you really believe COVID-19 exists?	Yes	232	94.7
	No	4	1.6
	Maybe	8	3.3
Missing	System	1	0.4

In Figure 5 shows 74.7% (183/245) of HCWs expressed no confidence in the Zambian health system to handle COVID-19 virus compared to 25.3% (62/245) who had confidence that the Zambian health system can handle the coronavirus pandemic. Out of all the respondents 80.8% (198/245) rated prevention to be inadequate, 47.8% (117/245) said isolation facilities are inadequate, 58.8% stated that political leaders are not leading by examples and the minority 1.6% prevention services are perfect while 2.4% said we have the best political leadership in the COVID-19 fight

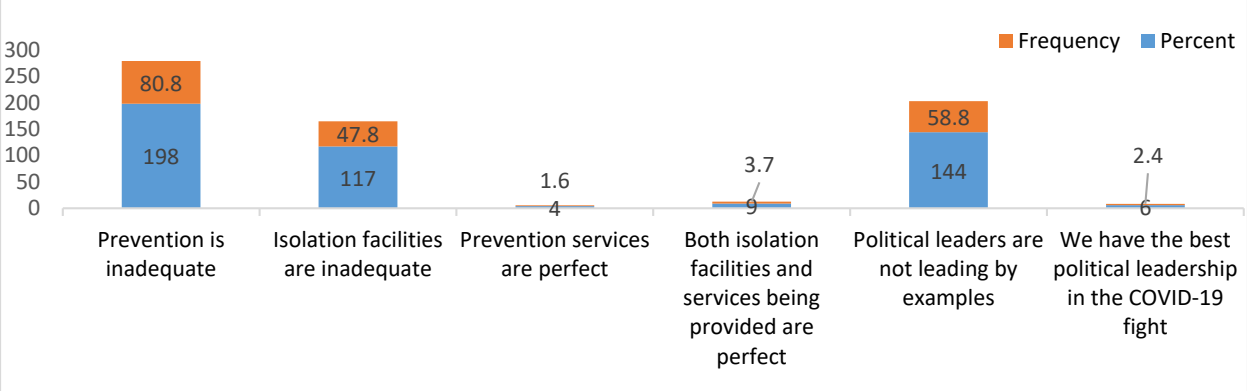

Figure 5: COVID-19 services Rates

In table 5, the chi-square tests for independence showed that the type of profession was significantly associated with feeling as though the HCW were infected with corona virus, $x^2(3) = 12.486$, $p = 0.006$, $\varphi_c = 0.006$, with doctors, dentists, nurses, clinical officers and physiotherapists being impacted the most. Professional group was also found to be significantly associated with the worry that the HCW might infect the family members, $x^2(3) = 14.395$, $p = 0.002$, $\varphi_c = 0.002$. The perception of all HCWs having proper PPEs in facilities was also influenced significantly by profession, $x^2(3) = 15.669$, $p = 0.001$, $\varphi_c = 0.001$, albeit the association between profession and perception of having sufficient supplies of PPEs was not statistically significant, $x^2(3) = 6.746$, $p = 0.080$, $\varphi_c = 0.080$. Table 5.

A one-way between-groups multivariate analysis of variance was performed to investigate age group differences in knowledge, fears, concerns and attitudes of healthcare workers regarding COVID-19 using seven dependent variables: thoughts about covid-19 pandemic, experience of its psychological effects, facing pandemics anxieties, rating of covid-19 services, attitude toward PPEs, rating of COVID-19's virulence and availability of testing for COVID-19. The independent variable was age group. There was no statistically significant difference between age groups (18-30 Yrs., 31-45 Yrs. and >45 Yrs.) on the combined variables, $F(14, 472) = 0.936$, $p = 0.519$, Wilks' $\Lambda = 0.947$, partial $\eta^2 = 0.027$. Table 5.

Table 5: Age Group Differences in Knowledge, Fears, Concerns and Attitudes

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.961	821.453[b]	7.000	236.000	.000	.961
	Wilks' Lambda	.039	821.453[b]	7.000	236.000	.000	.961
	Hotelling's Trace	24.365	821.453[b]	7.000	236.000	.000	.961
	Roy's Largest Root	24.365	821.453[b]	7.000	236.000	.000	.961
AgeGroup	Pillai's Trace	.054	.938	14.000	474.000	.518	.027
	Wilks' Lambda	.947	.936[b]	14.000	472.000	.519	.027
	Hotelling's Trace	.056	.935	14.000	470.000	.520	.027
	Roy's Largest Root	.041	1.384[c]	7.000	237.000	.213	.039

4.0 DISCUSSION

Results of this study indicate that female HCWs experienced constant worry compared to men; despite the fact they were confronted with the same range of stressors. Among other stressors are uncertainties around COVID-19 exposure, anxieties related to shortages of PPE or other essential equipment and working irregular hours and higher workloads, coupled with edginess, as they enter new or unfamiliar clinical roles. This is consistent with the study which stated that; although women and men have no significant difference in receiving stress from the surrounding environment; women are more likely to deal with psychological distress, while men are more dealing with physical stress[12 13]. Most studies point to an increased risk for women of having worse physical and mental health during the pandemic[14]. The extreme reporting of the COVID-19 pandemic through various media platforms has overblown and to a greater extent has distorted the perceptions of COVID-19. This rapid spreading information has also extensively instilled fear, panic, and stress among HCWS. From the results in chapter four it evident that COVID-19 has different effects on sexes.

The study findings show that HCWs who had less experience were more anxious about the infection compared to those who were more experienced. More experienced HCWs were just concerned about the risk associated with the infection, especially HCWs aged >60 years, as they are at higher risk. However, middle-aged HCWs gave the impression of being resilient against distress. The majority were concerned about being infected with COVID-19. Such immense fears and concerns have negative adverse effect on the daily performance of HCWs and eventually they may lead to avoidance to give proper care to patients, as HCWs avoid the risk of exposure to this highly infectious pathogen or patient environment or biological samples. This is line with other findings which reported that HCWs who were exposed to severe acute respiratory syndrome (SARS) outbreak in 2002–2003 experienced high levels of psychological stress and eventually ending in a refusal to care for patients[15].

The results herein indicate that there are not enough health human resources to cope with the current excessive demands. Which has led to HCWs working more hours than usual. This takes away their time needed for resting to guarantee personal wellness and, hence, a proper job performance. COVID-19 pandemic has put HCWs under immense pressure and has stretched them beyond their capacity. As such, responding to this public health emergency and effectively minimizing its impact requires building health professional capacity. A 2016 study commissioned by the World Health Organization found that the "lack of trained health professionals was obviously a major constraint on our ability to achieve health delivery."[16] There has been a focus on physical infrastructure generation, building hospitals, and buying new equipment but not exactly an equivalent effort on building health professional capacity.

A high percentage of HCWs reported lack of adequate PPE in addition to not using it properly. Due to lack of PPE many HCWs have to re-use their PPE more than once even those which are recommended for one-time use. Mainly HCWS are getting infected for not having adequate PPE above and beyond not using it properly; other than the lack of PPEs, is the lack of test gears to identify possible cases among HCWs. Besides HCWs testified that they were not encouraged to test for COVID-19 for fear that when they test positive they will be isolate to avoid virus propagation, and return that would cause shortage of labour force. All of these engendered fear, uncertainty and anxiety in HCWS.

The lack of experience in dealing with the COVID-19 pandemic and lack of training exerted significant psychological impacts on the HCWs. Training interventions should target medical healthcare workers to warrant understanding of clinical information, use of contagion control measures and guidance about COVID-19. Gerada (2019) affirms in support that the COVID-19 has confronted all HCWs with unexpected life-threatening experiences for which they had not been trained[17].

The results show that HCWs working with individuals affected by or at risk for COVID-19 are also at risk for hostile mental health distresses. These finding are in line to the mental health risks posed by infectious disease outbreaks which were reported after the SARS-CoV-1, H1N1 influenza and Ebola virus. The results show that HCWs, either in direct contact with or are just part of the healthcare system providing care for persons with COVID-19 experienced significant levels of psychological distress. The findings herein further show that there is a greater demand for provision of psychological health support.

The majority of the HCWs expressed no confidence, this is as a result of the prevention techniques that remain inadequate and porous, isolation facilities are equally poor, and political leaders are said not to be leading by examples. It is well distinguished that the HCWs works understand that COVID-19 exists and they are more susceptible to the infection because of their daily contacts with individuals affected by or at risk for COVID-19. In pandemic situations, this is essential, failure to accept this fact leaves many to take no responsibility of themselves and others.

5.0 CONCLUSION

The study highlights that HCWs are at utmost risk for psychological distress during the COVID-19 outbreak. HCWs are more susceptible to COVID-19 due to their role in providing care to patients with COVID-19. HCWs have been infected and quarantined or even hospitalized while others lost their lives. All these experiences, have rendered HCWs to develop psychological and physical health problems. Even though there are few intervention to mitigate this impact, early psychological interventions targeting this vulnerable group may be beneficial. Thus, implementation of strict measures or strategies such as shorter shift lengths, adequate provision and training on the use of PPE and provision of mental health and support services would health to reduce the psychological stress amongst HCWs.

Limitations of the Study

There were a number of inherent limitations in this study. Firstly, the sample size used in this study was smaller than projected and because of the small sample size, findings in this study cannot be generalized to the whole country. However, the sample size used was suitable and apt to detect relevant differences, determine the relationship among the groups that were evaluated and was sufficient for the statistical analysis that were employed to draw conclusions. Secondly, this was an electronic survey, and while this method was useful for rapid collection of data, we cannot guarantee that every respondent was Lusaka based HCW. However, the results do indicate the plausible need to urgently address the psychological wellbeing of HCWs, who are in constant fear of the pandemic.

References

[1]Chang D, Xu H, Rebaza A, Sharma L, Dela Cruz CS. Protecting health-care workers from subclinical coronavirus infection. Lancet Respir Med 2020 Feb 13.

[2] Novel Coronavirus (2019-nCoV) Situation Report-7 - World Health Organization (WHO), January 27, 2020

[3] Xiang YT, Yang Y, Li W, et al. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Lancet Psychiatry*. 2020;7(3):228-229. doi:10.1016/S2215-0366(20)30046-8

[4] Novel Coronavirus (2019-nCoV) Situation Report-7 - World Health Organization (WHO), January 27, 2020

[5] Guo, YR., Cao, QD., Hong, ZS. *et al.* The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak – an update on the status. *Military Med Res* **7,** 11 (2020). https://doi.org/10.1186/s40779-020-00240-0

[6] Novel Coronavirus (2019-nCoV) Situation Report-7 - World Health Organization (WHO), January 27, 2020

[7] Kannampallil TG, Goss CW, Evanoff BA, Strickland JR, McAlister RP, Duncan J. Exposure to COVID-19 patients increases physician trainee stress and burnout. *PLoS One*. 2020;15(8):e0237301. Published 2020 Aug 6. doi:10.1371/journal.pone.0237301

[8] Guy Kahane, Jim A. C. Everett, Brian D. Earp, Lucius Caviola, Nadira S. Faber, Molly J. Crockett, Julian Savulescu. Beyond Sacrificial Harm: A Two-Dimensional Model of Utilitarian Psychology. Psychol Rev. 2018 Mar; 125(2): 131–164. Published online 2017 Dec 21. doi: 10.1037/rev0000093

[9] Chua RL, Lukassen S, Trump S, et al. COVID-19 severity correlates with airway epithelium-immune cell interactions identified by single-cell analysis. *Nat Biotechnol*. 2020;38(8):970-979. doi:10.1038/s41587-020-0602-4

[10] Jun Zhang, Weili Wu, Xin Zhao, Wei Zhang, Recommended psychological crisis intervention response to the 2019 novel coronavirus pneumonia outbreak in China: a model of West China Hospital, *Precision Clinical Medicine*, Volume 3, Issue 1, March 2020, Pages 3–8, https://doi.org/10.1093/pcmedi/pbaa006

[11] Segerstrom SC, Miller GE. Psychological stress and the human immune system: a meta-analytic study of 30 years of inquiry. *Psychol Bull*. 2004;130(4):601-630. doi:10.1037/0033-2909.130.4.601

[12] Mayor E. Gender roles and traits in stress and health. *Front Psychol*. 2015;6:779. Published 2015 Jun 9. doi:10.3389/fpsyg.2015.00779

[13] American Psychological Association Gender and Stress. 2012 https://www.apa.org/news/press/releases/stress/2010/gender-stress

[14] Braquehais MD, Vargas-Cáceres S, Gómez-Durán E, et al. The impact of the COVID-19 pandemic on the mental health of healthcare professionals [published online ahead of print, 2020 Jun 22]. *QJM*. 2020;hcaa207. doi:10.1093/qjmed/hcaa207

[15] Wu P, Fang Y, Guan Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry*. 2009;54(5):302-311. doi:10.1177/070674370905400504

[16] Sudhir Anand and Victoria Fan. The health workforce in India human resources for health observer series no. 16.

[17] Braquehais MD, Vargas-Cáceres S, Gómez-Durán E, et al. The impact of the COVID-19 pandemic on the mental health of healthcare professionals [published online ahead of print, 2020 Jun 22]. *QJM*. 2020;hcaa207. doi:10.1093/qjmed/hcaa207