

Correlates of Acceptability of Covid-19 Vaccine Among Health Care Workers at Ndola Teaching Hospital, Ndola, Zambia

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Abstract

Introduction: The COVID-19 pandemic began in 2019, and as of September 2023, there were over 770 million confirmed cases and over 6 million deaths globally. Vaccines have long been a reliable method of illness prevention and saving millions of lives every year from life threatening diseases. However, vaccination hesitancy has been a major global problem, causing the World Health Organization to list it as one of the top ten global health threats in 2019. As a result, it is critical to examine HCWs' perceptions of vaccination acceptability and to develop particular strategic initiatives to improve HCWs' perceptions of the COVID-19 vaccine.

Objective: The objective of this study was to determine the factors associated with COVID-19 vaccine acceptability among health care workers at Ndola Teaching Hospital in Ndola, Zambia.

Study Methodology: This study was a cross-sectional analytical study that was assessing acceptability of COVID-19 vaccine among health care workers at Ndola Teaching Hospital, Ndola, Zambia. 320 HCWs (Medical Doctors, Pharmacists, Clinical Officers and Nurses) were sampled using a probability proportional to size method. Only 291 (90.9%) of the 320 HCWs were chosen to participate in the study after they disclosed their vaccination status.

Results: Out of 291 HCWs, n=205 (70.4%) were vaccinated against COVID-19. Clinical Officers, Medical Doctors, and Nurses are more likely to be vaccinated than Pharmacists. Those who have a chronic condition or have worked in a hospital for a longer period of time more likely to be vaccinated. HCWs who had Covid-19 disease ($p = <0.001$) were also significantly associated with vaccination acceptability. Having a moderate (aOR 0.007; 95% CI 0.000 - 0.181; $p=0.003$) and severe (aOR 0.030; 95% CI 0.002 - 0.511; $p=0.015$) Covid-19 disease in adults were significantly associated with vaccination acceptability.

Conclusion: The study indicates that, 205 out of 291 HCWs had been vaccinated, while 86 were still hesitant. Those that were not vaccinated explained their choice by not feeling at risk of complicated COVID-19, and because of fear of possible side effects associated with the vaccine. Investments in COVID-19 vaccine awareness is a critical to increasing vaccine acceptance especially among the unvaccinated.

Keywords: Covid-19, Vaccine, Healthcare Workers, Vaccine Hesitancy, Vaccine Uptake

List of Abbreviations

‰: Percentage

AEFI: Adverse Events Following Immunization

CDC: Centers of Disease Control and Prevention

CI: Confidence Interval

COVID-19: Coronavirus Disease 2019

EPI: Expanded Programme on Immunization

HCW: Healthcare worker

OR: Odds Ratio

P-Value: Probability value

SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus 2

UNICEF: United Nations Children's Fund

WHO: World Health Organisation

1. Introduction

1.1. Background

The COVID-19 pandemic began in 2019, and as of September 2023, there were over 770 million confirmed cases and over 6 million deaths globally [1]. The majority of those infected with the COVID-19 virus will have mild to moderate respiratory symptoms and recover without the need for medical attention [2]. Some, on the other hand, will become critically unwell and require medical assistance [3]. Serious sickness is more likely to strike the elderly and those with underlying medical disorders such as cardiovascular diseases, diabetes, chronic respiratory disease, or cancer [4]. COVID-19 can make anyone sick and cause them to get very ill or die at any age [5,6]. Although preventive methods have been found to reduce mortality and morbidity, any lapse in these measures, or the introduction of new mutations, has been shown to result in repeating waves of illnesses, which are often more damaging than the previous waves [7].

Occupational exposure to COVID-19 among healthcare workers (HCWs) can happen at any time in health-care institutions and the community, as well as during work-related travel to an area with local community transmission and on the way to and from work [8]. Aside from successful public health measures such as social distancing, wearing face masks, hand washing, avoiding crowded indoor locations, and informing the general public, effective vaccination is emerging as critical to minimizing disease and death from the pandemic [9,10].

Vaccines have long been a reliable method of illness prevention and saving millions of lives every year from life threatening diseases [8]. However, vaccination hesitancy and refusal, on the other hand, are major global problems, causing the World Health Organization to list vaccine hesitancy as one of the top ten global health threats in 2019 [11,12]. Vaccines have become the focus of attention in the fight against new emerging infections and illnesses due to their demonstrated success in reducing disease, disability, and death from vaccine-preventable illnesses [13]. Vaccines now provide protection against a variety of cancers [14]. Indeed, there is a plethora of evidence that supports immunization and vaccination [8,15]. However, people in many parts of the world, including Zambia, refuse to be vaccinated and continue to question the science behind vaccinations

[13,16,17]. Information related to the HCWs' acceptability and perception towards COVID-19 vaccine acceptability is limited, especially in tertiary hospitals in Zambia [19]. According to studies, a variety of factors influence the acceptability of a new vaccine [19]. These include vaccine efficacy and safety, negative health effects, misconceptions and disinformation about the necessity for vaccination, a lack of faith in the healthcare system, and a lack of community knowledge about vaccine-preventable diseases [20,21]. Misinformation leading to vaccine hesitancy could jeopardize public health and obstruct response to the current situation [22,23]. Despite the fact that health care workers can serve as ambassadors for COVID-19 vaccination adoption, surveys have revealed that HCWs have low acceptance rates [24].

In Zambia, from 3 January 2020 to 8 April 2022, WHO recorded 317,483 confirmed cases of COVID-19 in Zambia, with 3,967 deaths and a total of 3,383,947 vaccine doses administered [25]. However, vaccine acceptability remains a challenge, especially among healthcare workers, despite vaccines proving to be critical in reducing COVID-19 spread and the Zambian government making vaccines available for free [16]. Only 33.4% ($n = 226/677$) of healthcare workers across the country expressed interest in accepting the vaccine if made available to them [18]. Currently, little evidence on healthcare workers' perspectives of vaccine acceptability has been collected and analyzed [26]. As a result, it is critical to examine HCWs' perceptions of vaccination acceptability and to develop particular strategic initiatives to improve HCWs' perceptions of the COVID-19 vaccine [27,28]. The aim of this study was to address a research gap by determining the factors associated with COVID-19 vaccine acceptability among health care workers at Ndola Teaching Hospital in Zambia.

2. Literature Review

2.1. Introduction

COVID-19 infection is caused by a coronavirus, a seasonal infection that occurs in many countries around the world [6]. Despite the free availability of COVID-19 vaccine health facilities, many HCWs refuse to get vaccinated [29]. Vaccine hesitancy with COVID-19 vaccination is thus a safety issue and a public health concern [20,30]. This vaccine hesitancy on the part of HCWs sends the wrong signal to the public, and puts patients and their families at risk and puts at

risk the physicians as well as other members of a hospital community [31]. HCWs have the largest risk of transferring COVID-19 from patient to patient and to others at their workplace due to the nature of their profession [10]. To prepare for optimum efficacy and extensive coverage, the WHO has advised a preventive plan to overcome vaccination hesitancy and develop trust in a COVID-19 vaccine [10,29]. To achieve herd immunity, efficient and successful distribution and acceptance of COVID-19 vaccinations among the general people is very critical [32]. As evidenced by numerous research, previous negative attitudes against vaccines have had a negative impact on the public's willingness to be vaccinated against COVID-19 [16,33,34]. Authorities must understand the public's readiness to receive vaccines, as well as the reasons for any hesitancy, in order to develop an effective vaccination program [19]. The purpose of this study is to describe current vaccine acceptance, the reasons or factors that influence their readiness or unwillingness to be vaccinated, and the disparities in vaccine acceptance among respondents based on demographic data. This information will be critical in identifying program interventions that can be further strengthened to COVID-19 vaccine acceptability outcomes especially among healthcare workers in Zambia and other resource-limited settings.

2.2. Vaccination Hesitancy

Vaccination programs' introduction and success have resulted in improved health for both children and adults [35]. Vaccination programs have historically been very successful, and there has been a decrease in vaccine-preventable diseases, especially in more developed countries around the world [36]. On the other hand, the success of vaccination programs has led to the belief that vaccine-preventable disease morbidity and mortality are now a thing of the past, and that immunizations are no longer required [35]. Furthermore, in recent years, vaccination phobia has led to an increase in the number of parents refusing to vaccinate their children [37]. Vaccine-preventable diseases like measles and pertussis have resurfaced as a result of parents' increased unwillingness to vaccinate their children [36]. The fall in vaccine acceptability has also been connected to concerns over vaccine sterilizing techniques [38]. Due to the agony and pain their children faced when they received numerous needles at once, some parents concluded that vaccination of their children was unnecessary [36,37].

Vaccines aid in the prevention of the spread of contagious diseases and play a vital role in lowering deaths [35]. Vaccination hesitancy has also been identified as one of the most serious threats to global health by the WHO (WHO, 2019). Religious beliefs, a lack of faith in healthcare professionals, certain personality problems, and financial issues are only a few of the causes for social skepticism toward the vaccine [21]. Lack of knowledge has also been identified as a significant contributor to the high rate of vaccination hesitancy [39]. It is also vital to find credible sources of information and avoid being misled by information obtained from the internet and social media in order to reduce vaccination hesitance [40]. The number of

new cases, critically ill patients, and deaths due to COVID-19 had been dramatically reduced through mass vaccination campaigns, either globally or nationally [10]. Healthcare workers, the elderly, and those with medical problems are prioritized for COVID-19 vaccination, according to the WHO prioritization roadmap [41]. Due to the nature of their work, healthcare workers are at a great risk of contracting COVID-19 because they are required to promote and deliver the COVID-19 vaccine as well as counsel vaccine-hesitant patients [17,42]. It is consequently critical to comprehend vaccination hesitancy in this population [20].

2.3. Motivating Reasons for Vaccine uptake

Although much of the research has focused on why HCWs choose not to receive their COVID-19 vaccination, some studies have begun asking both vaccinated and unvaccinated HCWs about reasons that motivate or might encourage them to get vaccinated [43]. There has been a considerable deal of research on vaccine uptake and its behavioral determinants in recent years [41]. While the evidence is still emerging, these initiatives have resulted in a greater understanding of the vaccination barriers and facilitators - particularly for healthcare staff [44]. Research efforts have also yielded potentially beneficial techniques to boost vaccine acceptance and uptake that go beyond standard information campaigns aimed at changing behaviors through increased knowledge [32,45]. Although information alone has had a limited influence on promoting vaccination uptake, combining it with other measures such as removing barriers, utilizing reminders and planning prompts, and training and building confidence in health workers - has been found to be helpful [46].

While information on vaccination promotion in general is relevant in the context of the current epidemic, acceptance and uptake of COVID-19 vaccines pose an unprecedented difficulty [41]. To achieve high and equitable vaccination uptake, it is critical to employ existing scientific knowledge, as well as acquire new information and learn in real time about what works and what does not [46,47]. Engaging with target groups in local areas to listen to and respond to their thoughts, concerns, and vaccination expectations can help to promote learning [48]. These activities can help to enhance community trust in health-care systems, as well as guide the design and delivery of policies and services that are sensitive to and respectful of local needs [40].

Political decision-makers, vaccination program managers, community and religious leaders, health workers, civil society organizations, media outlets, and digital platforms all have an impact on vaccination uptake [41]. These players have the ability to encourage or discourage vaccination by establishing more or less hospitable conditions [49]. As a result, it is critical to evaluate how the behaviors of health system actors may influence the behavior of the general population [50]. Evidence suggests that removing barriers to vaccination and making it simple to get vaccinated can improve vaccine uptake, particularly among the huge number of people who are not avoiding vaccination on purpose [44].

Although an enabling environment is important and likely to boost vaccine acceptance and uptake, it is unlikely to be adequate on its own [51]. It should be complemented by focused, trustworthy, and unambiguous communication from trusted sources showing the importance and affordability of vaccination [41].

Unfavorable social influences and/or inadequately favorable ones can sometimes create hurdles to vaccine adoption and uptake [48]. People's perceptions of what the majority believe and do can also be skewed by dominating media narratives [52]. People's social networks, which include family members, friends, health professionals, and others with whom they engage, as well as the sources of information they access, affect vaccination decisions [53]. When a substantial proportion of persons in one's social network did not encourage vaccination, vaccine uptake was found to be lowered [40]. Encouragement and social pressure from respected and trusted people, on the other hand, has been shown to improve vaccine uptake [35]. Targeting persons in the network who are centrally placed, such as healthcare workers, who have more opportunity to influence vaccination behavior, can help behavior modification activities have a stronger impact and improve vaccine uptake [13,54].

2.4. Vaccination Acceptability: Cultural and Social Norms

Individuals in a group tend to operate in similar ways and react to situations in different ways than people in other groups [55]. These behavioral and emotional differences are due to cultural variations [56]. Individuals, groups, occupations, employers, and nations all have cultural differences and are influenced by culture in their daily activities and/or operations, while cultural persistence refers to the continual recurrence of behavior patterns across time [55]. Social norms represent cultural patterns and beliefs about others at home, in schools, and in health care settings, and these expectations apply to what people think and do, as well as what they anticipate from one another [51]. Some religions and civilizations oppose vaccinations, hence they advocate for other disease preventive measures [57]. Vaccination objections originate from ethical concerns about the belief that the human body is the Lord's temple and thus sacred while some faiths emphasize the use of God or other natural means to heal the body [57].

From 1967 to 2010, cultural and societal norms influenced how people reacted to the pertussis vaccine in the United Kingdom [58]. Even when the risk of a vaccine-preventable disease has passed, the behavior-incidence model explains how a vaccine fear can lead to very poor vaccine coverage [50,57]. During a vaccine fear, social and cultural norms may favor low vaccine coverage [59]. When it comes to vaccinations, the general public and HCWs views and perceptions are very similar [42]. The general public and HCWs has expressed tremendous worry over the reemergence of avoidable diseases (such as whooping cough and measles), yet vaccine compliance has not been encouraging [60]. Similarly, the norms of a society have been linked to hesitancy with COVID-19 vaccination [61].

COVID-19 vaccination compliance was also low due to ethnic diversity among HCWs [52]. A conspiracy idea concerning COVID-19 vaccinations, a lack of knowledge, and fears about the vaccine's potential side effects were among the causes for low compliance [28,44,45]. Understanding Cultural and Social Norms has been demonstrated in studies to be an effective technique for promoting COVID-19 vaccination among the general population and HCWs, resulting in increased vaccine acceptability. [57,60,61].

2.5. Summary

Several reviews and meta-analyses of the available data accurately and concisely reflect the current state of knowledge about seasonal COVID-19 vaccine reluctance among HCWs [34]. HCWs who have been vaccinated with the COVID-19 vaccine have been found to protect the patients they come into contact with [47]. COVID-19 vaccination reduces the number of secondary infections, prevents disease and death in elderly patients in long-term care, and prevents disease and death in patients with underlying illnesses, which has a significant impact on the cost-effectiveness COVID-19 disease management [4,43,60]. Despite this abundance of knowledge, little research has been conducted into why healthcare workers are hesitant to get COVID-19 vaccinations and what can be done to improve COVID-19 vaccine acceptability, particularly among healthcare workers in Zambia and other resource-constrained settings [18,16].

3. Research General Objectives

The General objective of this study was to determine the prevalence and factors associated with COVID-19 vaccine acceptability among healthcare workers at Ndola Teaching Hospital in Ndola, Zambia.

3.1. Specific Objectives

1. To establish the HCWs' socio-demographic characteristics that influence of COVID-19 vaccine acceptability.
2. To determine the perception of HCWs on COVID-19 vaccine acceptability
3. To determine the predictors of COVID-19 vaccines acceptability among HCWs

4. Research Questions

1. What are some of the HCWs' socio-demographic characteristics that influence of COVID-19 vaccine acceptability?
2. What is the perception of HCWs on COVID-19 vaccine acceptability?
3. What are some of the predictors of COVID-19 vaccines acceptability among HCWs?

5. Measurements

5.1 Dependent Variables

The dependent variable of the study was the COVID-19 vaccine acceptance among Health Care Workers at Ndola Teaching Hospital, Ndola, Zambia.

5.1 Independent Variable

The independent variables included demographic factors

(age, sex, work experience, department and HCW role), exposure type factors, knowledge about COVID-19 pandemic and vaccines and HCWs vaccine status.

6. Conceptual Framework

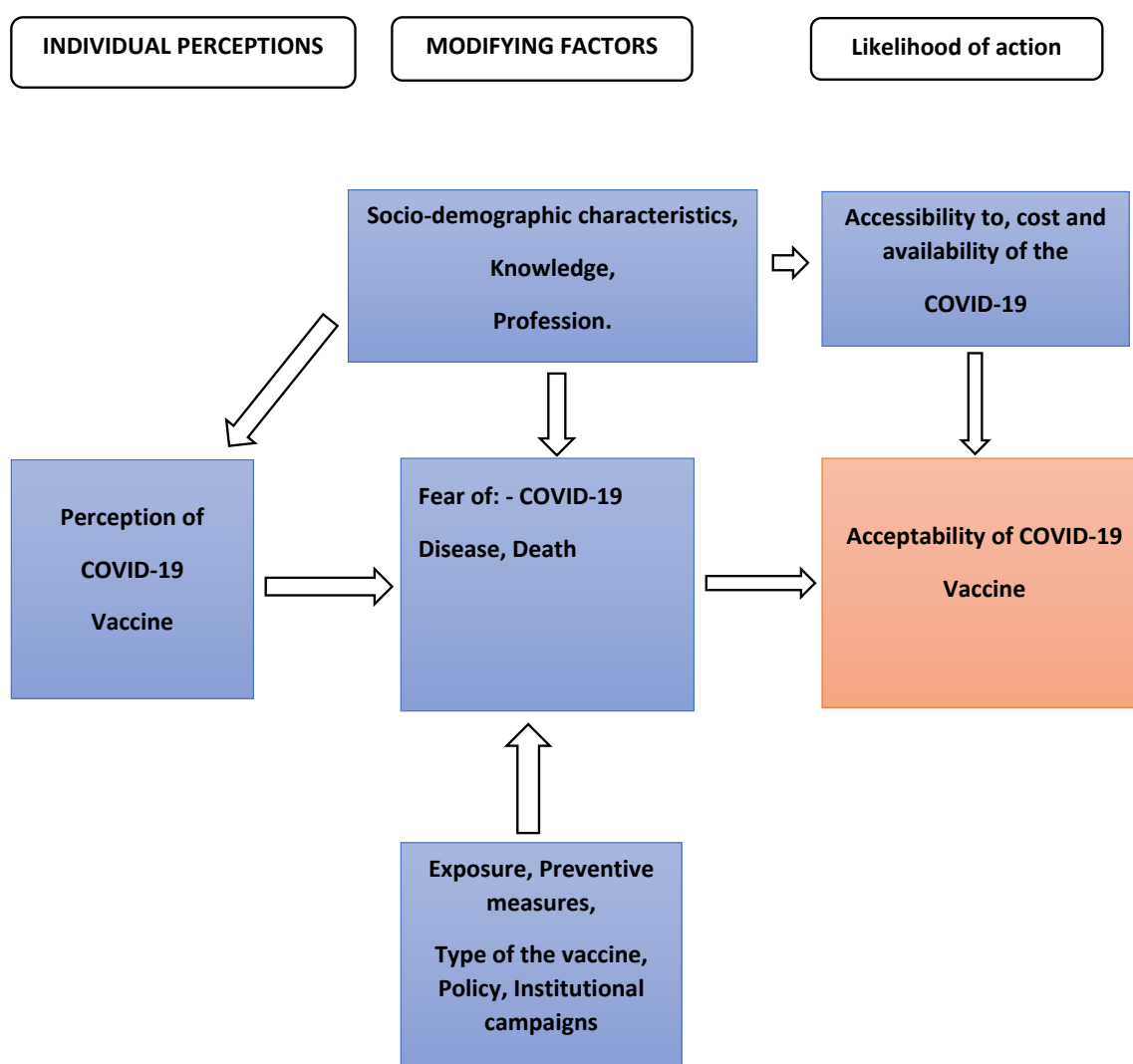


Figure 1: Conceptual Framework for the acceptability of the COVID-19 Vaccine.

7. Methodology

7.1. Study Site

This research was conducted at Ndola Teaching Hospital, which is one of Zambia's main referral hospitals, and is located in Ndola, the provincial capital of the Copperbelt province. There are 1066 HCWs at this tertiary hospital, including 390 Medical Doctors, 63 Pharmacists, 26 Clinical Officers, and 587 Nurses. It has a bed capacity of 851, and it predominantly serves referrals from Zambia's northern regions, including Copperbelt, Northwestern, Luapula, Muchinga, Northern, and parts of Central [83].

7.2. Target Population

This study involved HCWs at Ndola Teaching Hospital in Ndola district, Zambia.

7.3. Study Design

This study was a cross-sectional analytical study assessing acceptability of COVID-19 vaccine among health care

workers at Ndola Teaching Hospital, Ndola, Zambia.

7.4. Sample size

The study's target population included 1066 HCWs from Ndola Teaching Hospital; 390 Medical Doctors, 63 Pharmacists, 26 Clinical Officers, and 587 Nurses. The sample size was calculated using the Slovin's formula [62].

$$n = \frac{N}{1 + Ne^2}$$

Where n = Sample Required.
N = Population Size
e = Margin of error (0.05)

$$\text{Therefore, } n > \frac{1066}{[1 + 1066 (0.05)^2]} = 290.859 \approx 291$$

Sample size (n) = 291 adjusting for 10% nonresponse rate n= 320 HCWs. Using sampling of health care workers by probability proportional to size, 117 were Medical Doctors representing 36.6% of the total sample size, 19 Pharmacists

representing 5.9%, 8 Clinical Officers representing 2.4% and 176 Nurses representing 55.1%. However, after distributing the online questionnaire, 29 (9.1%) did not respond. The rest of the respondents were as shown in table 1.

s/no	Cadre of HCW	no. at NTH (N)	No. Allocated to NTH (n)	Actual No. of HCWs who responded
1	Medical Doctors	390	117	102 (31.9%)
2	Pharmacists	63	19	24 (7.5%)
3	Clinical Officers	26	8	10 (3.1%)
4	Nurses	587	176	155 (48.4%)
5	Non-Respondents			29 (9.1%)
6	Total	1066	320	320 (100%)

Table 1: Sampling of Health Care Workers by Probability Proportional to Size

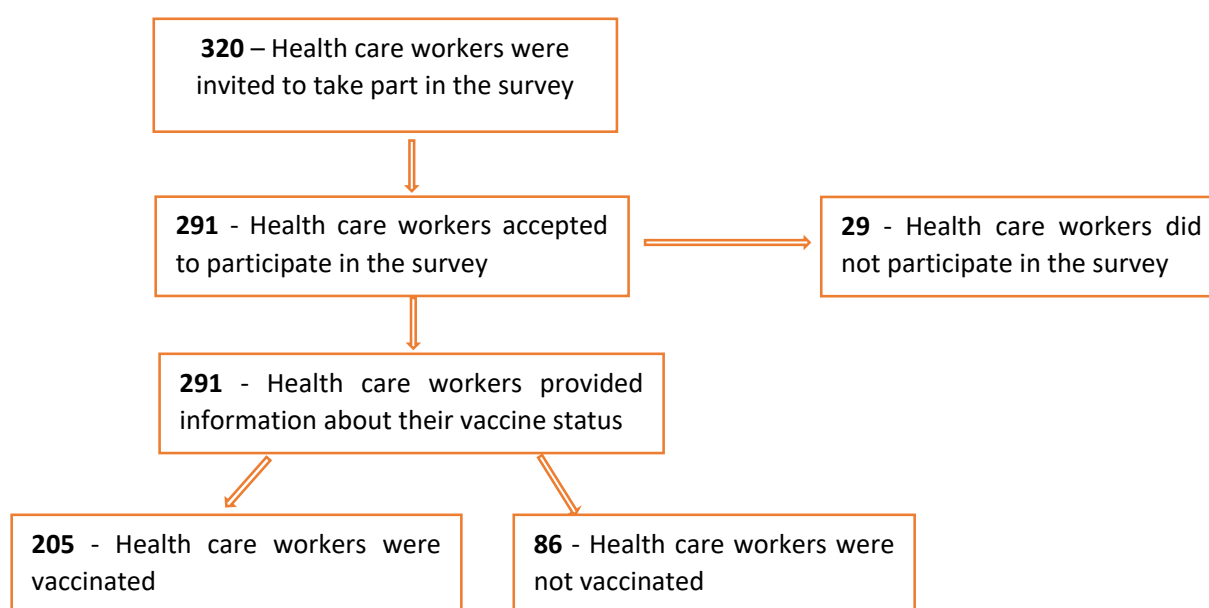


Figure 2: Flowchart of The Study Population That Participated in The Study Assessing the Covid-19 Vaccine Acceptability Among Healthcare Workers at Ndola Teaching Hospital

7.5. Sampling Procedures

Healthcare workers from Ndola Teaching Hospital who met the inclusion criteria were randomly sampled using the probability proportional to size method. Convenience sampling was used on HCWs who were given the electronic questionnaire via various electronic social media platforms and separated into equal groups based on the sample size.

7.6. Inclusion Criteria

1. HCW perceived to have the most potential risk of contracting COVID-19 infection through occupational exposure
2. Only Medical Doctors, Clinical Officers, Pharmacists and Nurses were included in the study at Ndola Teaching Hospital

7.7. Exclusion Criteria

1. HCWs who were not willing to give consent for the study.
2. HCWs who were not willing to discuss their vaccination status

7.8. Data Collection

Pre-testing of study tools were conducted among 20 healthcare workers which consisted of Biomedical Scientist, Radiographers, Physiotherapies and Pharmacy Technologists at Ndola Teaching Hospital. Revisions of contents and language based on feedback from the pre-test followed in order to perfect the questionnaire. HCWs who participated in the pre-test were not included in the main study. This was a cross-sectional study and the Google forms® platform was used to distribute the questionnaire to participants electronically using methods described before [63]. The data collection instrument was derived from the one used in Switzerland and tweaked for use in Zambia [7]. Experts from the University of Zambia (UNZA) and Copperbelt University (CBU) completed content and face validation of the questionnaire. The adapted questionnaire was used to collect data on the participants' socio-demographic characteristics, awareness, and acceptability of the COVID-19 vaccine. Section 1 consisted of demographic questions (question 1 -

5) while section 2 was intended to evaluate the perception regarding COVID-19 infection in general and in specific risk groups (question 6 – 13). Section 3 contained questions about COVID-19 vaccine perception (question 14 - 22). Section 4a (question 23) queried the vaccination status while section 4b queried vaccination collaborators about their motivation to be vaccinated was composed of 14 questions (question 23 - 37). Section 4b consisted of six questions for non-vaccination collaborators. The questionnaire was circulated and shared online electronically according to the sampling procedure.

7.9. Data analysis

Data was collated using excel® and numbers and percentages were used to represent categorical variables and analysed using IBM SPSS Statistics version 20 [64]. The Chi-square test was used to compare the responses of the two groups (vaccinated and unvaccinated hospital staff). A Bivariate logistic regression analysis was used to assess factors that determine the likelihood of accepting the vaccine or not and variables that demonstrated a possible association from bivariate analysis ($p < 0.20$) were entered into the multivariable model. Statistical significance was defined as a two-sided $P < 0.05$.

8. Ethical Consideration

Ethical approval was sought from the Tropical Disease Research Centre Ethics Committee (IRB number: 00002911).

Permission was also be obtained from the Ministry of Health (MoH) office of the Provincial Medical Officer, Copperbelt Province to carry out the study at the Ndola Teaching Hospital. The HCWs were contacted during their regular hospital work hours. In order to safeguard privacy, anonymity was used, and no personal identifiers were used. The data gathered from the HCWs was anonymously recorded and utilized only for academic purposes. The study's participants did not face any physical risks because there was no intervention used. Data were analysed anonymously, and the researcher was the only one with access to the participant's personal information.

9. Results

9.1. Demographic Characteristics

Out of the approximately 1066 HCWs at Ndola Teaching Hospital, 320 were chosen to take part in the study. Only 29 (9.1%) of the 320 individuals declined to participate in the survey that was conducted from June to August 2022. A total of 291 (90.9%) HCWs were included in the study after providing information on their vaccination status. As indicated in Figure 1, all the chosen HCWs were split into two groups: those who had received a COVID-19 vaccination ($n = 205$, 70.4%) and those who had not ($n = 86$, 29.6%). The majority of participants were females ($n = 159$, 54.6%), while participants who made up the bulk of the population between the ages of 20 and 30 ($n = 151$, 51.9%). The remaining characteristics were as listed in Table 2.

Variable		Frequency (n)	Percent (%)
Participant's Gender	Female	159	54.6
	Male	132	45.4
Age (years)	>40	21	7.2
	20-30	151	51.9
	31-40	119	40.9
Number of years working at the hospital	< 1 year	81	27.8
	> 10 years	15	5.2
	1-5 years	152	52.2
	6-10 years	43	14.8
Professional category at the hospital	Clinical Officer	10	3.4
	Medical Doctor	102	35.1
	Nurse	155	53.3
	Pharmacist	24	8.2
Chronic Disease conditions	No I don't have any	231	72.2
	Yes, I have	60	18.8

Table 2: Demographic Characteristics

9.2. Ndola Teaching Hospital Healthcare Workers' Vaccination Status

9.2.1. HCWs' Socio-Demographic Characteristics That Influence of Covid-19 Vaccine Acceptability

The impact of demographic characteristics on vaccination acceptability is as shown in table 3. Using Chi-Square test,

it showed that vaccination acceptability for HCWs was completely independent on the variables 'Gender' ($p = 0.437$) and 'Age' ($p = 0.903$) while 'work experience' ($p = 0.030$), 'work category' ($p = 0.053$) and 'having a chronic condition' ($p < 0.001$) was a significantly associated with vaccination acceptability as shown is Table 3.

Variables		UNVACCINATED (n=86)	VACCINATED (n =205)	TOTAL (n= 291)	P-VALUE (Chi ² -test)
Gender	Male	36 (27.3%)	96 (72.7%)	132	0.437 ^a
	Female	50 (31.4%)	109 (68.6%)	159	
Age	20-30 Years	45 (29.8%)	106 (70.2%)	151	0.903 ^a
	31-40 Years	34 (28.6%)	85 (71.4%)	139	
	>40 Years	7 (33.3%)	14 (66.7%)	21	
Work Experience	<1 Year	34 (42.0%)	47 (58.0%)	81	0.030 ^b
	1-5 Years	36 (23.7%)	116 (76.3%)	152	
	6-10 Years	13 (30.2%)	30 (69.8%)	43	
	>10 Years	3 (20.0%)	12 (80.0%)	15	
Work Category	Clinical Officer	0 (0.0%)	10 (100%)	10	0.053 ^b
	Medical Doctor	29 (28.4%)	73 (71.6%)	102	
	Nurse	46 (29.7%)	109 (70.3%)	155	
	Pharmacist	11 (45.8%)	13 (54.2%)	24	
Chronic Disease Conditions	No I Don't Have Any	71 (30.7%)	160 (69.3%)	231	<0.001 ^b
	Yes, I Have	15 (25.0%)	45 (75.0%)	60	

^a Pearson Chi-Square

^b Fisher's Exact Test

Table 3: HCWs' Socio-demographic Characteristics that Influence of COVID-19 Vaccine Acceptability

9.2.2. Perception of HCWs on COVID-19 Disease

The impact of the Perception of HCWs on COVID-19 disease on vaccination acceptability as shown in table 4 below. Using Chi-Square test, it showed that vaccination acceptability was independent of the variables 'perception of COVID-19 disease in adults' ($p=0.457$) and 'perception of Covid-19 Disease in Pregnant Women' ($p = 0.123$). The variables

'perception of Covid-19 Disease in Infants and Children' ($p = 0.004$) and 'perception of Covid-19 Disease in risk groups' ($p = 0.060$) on the other hand were significantly associated with vaccination acceptability. In addition, HCWs who had Covid-19 disease ($p < 0.001$) was also significantly associated with vaccination acceptability. The rest of the results were as shown in Table 4.

Variables		UNVACCINATED (n=86)	VACCINATED (n =205)	TOTAL (n= 291)	P-VALUE (Chi ² -test)
Perception Of Covid-19 Disease In Adults	Mild	9 (22.5%)	31 (77.5%)	40	0.457 ^b
	Moderate	32 (26.9%)	87 (73.1%)	119	
	Not Severe	5 (45.5%)	6 (54.5%)	11	
	Severe	29 (32.2%)	61 (67.8%)	90	
	Very Severe	11 (35.5%)	20 (64.5%)	31	
Perception Of Covid-19 Disease In Infants And Children	Mild	31 (27.0%)	84 (73.0%)	115	0.004 ^b
	Moderate	15 (26.3%)	42 (73.7%)	57	
	Not Severe	13 (19.7%)	53 (80.3%)	66	
	Severe	21 (52.5%)	19 (47.5%)	40	

	Very Severe	6 (46.2%)	7 (53.8%)	13	
Perception Of Covid-19 Disease In Pregnant Women	Mild	6 (19.4%)	25 (80.6%)	31	0.123 ^b
	Moderate	29 (24.4%)	90 (75.6%)	119	
	Not Severe	7 (46.7%)	8 (53.3%)	15	
	Severe	31 (36.5%)	54 (63.5%)	85	
	Very Severe	13 (31.7%)	28 (68.3%)	41	
Perception Of Covid-19 Disease In Risk Groups	Mild	3 (60.0%)	2 (40.0%)	5	0.060 ^b
	Moderate	1 (33.3%)	2 (66.7%)	3	
	Not Severe	0 (0%)	0 (%)	0	
	Severe	28 (22.8%)	95 (77.2%)	123	
	Very Severe	54 (33.8%)	106 (66.2%)	160	
HCWs are super-spreaders of COVID-19 disease	Yes	1 (50.0%)	1 (50.0%)	2	0.504 ^b
	No	85 (29.4%)	204 (70.6%)	289	
Infected HCWs become super-spreaders for COVID-19 disease to patients they attend to	Absolutely Agree	40 (27.6%)	105 (72.4%)	145	0.211 ^b
	Agree	41 (30.1%)	95 (69.9%)	136	
	Indifferent	0 (0.0%)	2 (100.0%)	2	
	Disagree	3 (75.0%)	1 (25.0%)	4	
	Absolutely Disagree	2 (50.0%)	2 (50.0%)	4	
Infected HCWs become super-spreaders for COVID-19 disease to household contacts	Absolutely Agree	38 (26.0%)	108 (74.0%)	146	0.119 ^b
	Agree	45 (32.1%)	95 (67.9%)	140	
	Indifferent	0 (0.0%)	1 (100.0%)	1	
	Disagree	1 (50.0%)	1 (50.0%)	2	
	Absolutely Disagree	2 (100.0%)	0 (0.0%)	2	
Ever Had Covid-19 Disease	Had Symptoms But Didn't Verify With COVID-19 specific Exams	13 (44.8%)	16 (55.2%)	29	<0.001 ^b
	No	44 (44.4%)	55 (55.6%)	99	
	Yes But Mild	22 (20.4%)	86 (79.6%)	108	
	Yes, No Symptoms	5 (25.0%)	15 (75.0%)	20	
	Yes, Severe	2 (6.1%)	31 (93.9%)	33	

^a Pearson Chi-Square^b Fisher's Exact Test**Table 4: Perception of HCWs on COVID-19 Disease****9.2.3. Perception of HCWs on COVID-19 Vaccine Acceptability**

The impact of the Perception of HCWs on COVID-19 vaccine acceptability on vaccination acceptability as shown in table 5 below. Using Chi-Square test, it showed that vaccination acceptability was independent of the variable 'we can stop taking Covid-19 precautions after being vaccinated' ($p = 0.343$). On the other hand, variables 'Covid-19 vaccines effective in preventing severe disease' ($p = <0.001$), 'Covid-19

vaccines cornerstone to ending the pandemic' ($p = <0.001$), 'are Covid-19 vaccines safe?' ($p = <0.001$), 'should you consider yourself vaccinated after having Covid-19 disease?' ($p = 0.039$), 'Covid-19 vaccines offer protection against all variants' ($p = 0.033$), 'would you agree to have children vaccinated against Covid-19?' ($p = <0.001$) and 'would you accept Covid-19 vaccines if they were made available?' ($p = <0.001$) were significantly associated with vaccination acceptability.

Variables		UNVACCINATED (n=86)	VACCINATED (n =205)	TOTAL (n =291)	P-VALUE (Chi ² - test)
Covid-19 Vaccines Effective In Preventing Severe Disease	Absolutely Agree	2 (3.8%)	51 (96.2%)	53	<0.001 ^b
	Agree	47 (26.0%)	134 (74.0%)	181	
	Indifferent	23 (69.7%)	10 (30.3%)	33	
	Disagree	13 (65.0%)	7 (35.0%)	20	
	Absolutely Disagree	1 (25.0%)	3 (75.0%)	4	
Covid-19 Vaccines Cornerstone To Ending The Pandemic	Absolutely Agree	10 (17.9%)	46 (82.1%)	56	<0.001 ^b
	Agree	41 (24.1%)	129 (75.9%)	170	
	Indifferent	18 (54.5%)	15 (45.5%)	33	
	Disagree	15 (53.6%)	13 (46.4%)	28	
	Absolutely Disagree	2 (50.0%)	2 (50.0%)	4	
Are Covid-19 Vaccines Safe?	Absolutely Agree	2 (4.8%)	40 (95.2%)	42	<0.001 ^b
	Agree	29 (17.2%)	137 (66.8%)	166	
	Indifferent	41 (60.3%)	27 (39.7%)	68	
	Disagree	13 (92.9%)	1 (7.1%)	14	
	Absolutely Disagree	1 (100.0%)	0 (0.0%)	1	
We Can Stop Taking Covid-19 Precautions After Being Vaccinated	Absolutely Agree	1 (33.3%)	2 (66.7%)	3	0.343 ^b
	Agree	8 (44.4%)	10 (55.6%)	18	
	Indifferent	3 (37.5%)	5 (62.5%)	8	
	Disagree	49 (31.0%)	109 (69.0%)	158	
	Absolutely Disagree	25 (24.0%)	79 (76.0%)	104	
Should You Consider Yourself Vaccinated After Having Covid-19 Disease?	Absolutely Agree	7 (20.6%)	27 (79.4%)	34	0.039 ^a
	Agree	37 (25.0%)	111 (70.6%)	148	
	Indifferent	13 (52.0%)	12 (48.0%)	25	
	Disagree	24 (35.8%)	43 (64.2%)	67	
	Absolutely Disagree	5 (29.4%)	12 (70.6%)	17	
Covid-19 Vaccines Offer Protection Against All Variants	Absolutely Agree	4 (16.0%)	21 (84.0%)	25	0.033 ^a
	Agree	23 (28.0%)	59 (72.0%)	82	
	Indifferent	23 (40.4%)	34 (59.6%)	57	
	Disagree	33 (33.0%)	67 (67.0%)	100	
	Absolutely Disagree	3 (11.1%)	24 (88.9%)	27	
Would You Agree To Have Children Vaccinated Against Covid-19?	Yes	17 (13.4%)	110 (86.6%)	127	<0.001 ^a
	No	41 (42.7%)	55 (57.3%)	96	
	Unsure	28 (41.2%)	40 (58.8%)	68	
Would You Accept Covid-19 Vaccines If They Were Made Available?	Yes	18 (8.7%)	189 (91.3%)	207	<0.001 ^a
	No	50 (89.3%)	6 (10.7%)	56	
	Maybe	18 (64.3%)	10 (35.7%)	28	

^a Pearson Chi-Square^b Fisher's Exact Test**Table 5: Perception of HCWs on COVID-19 Vaccine Acceptability**

9.2.4. Determinants of COVID-19 Vaccination Acceptability

Bivariate logistic regression analysis showed that several covariates including 'age', 'work experience', 'work category', 'perception of Covid-19 disease in adults', 'perception of Covid-19 disease in infants and children', 'perception of Covid-19 disease in pregnant women', 'ever had Covid-19 disease?', 'Covid-19 vaccines effective in preventing severe disease', 'Covid-19 vaccines cornerstone to ending the pandemic', 'we can stop taking Covid-19 precautions after being vaccinated', 'Covid-19 vaccines offer protection against all variants', and 'would you accept Covid-19 Vaccines if they were made available?' were significantly associated with vaccination acceptability.

In the multivariable logistic regression model work experience of less than one year (<1 year) was significantly associated with vaccination acceptability compared to work experience of 6-10 years (aOR 39.67; 95% CI 1.594 - 987.572; p=0.025). The perception of HCWs on the severity of Covid-19 disease in adults, the model yielded that classifying Covid-19 disease as moderate (aOR 0.007; 95% CI 0.000 - 0.181; p=0.003) and severe (aOR 0.030; 95% CI 0.002 - 0.511; p=0.015) were significantly related with vaccination acceptability compared to very severe. Having Covid-19 disease by HCWs yielded that those who had symptoms but did not verify with Covid-19 specific exams (aOR 102.264; 95% CI 1.564 - 6685.984; p=0.011) and those who did not have Covid-19 disease 'No' (aOR 217.185; 95% CI 3.491 -

13509.779; p=0.011) were also significantly related with vaccination acceptability compared to those who had severe cases of Covid-19 disease. For the HCWs perception on the effectiveness of Covid-19 vaccines in preventing severe disease, absolutely agree (aOR 0.001; 95% CI 7.408E-007 - 0.421; p=0.027) was significantly associated with vaccination acceptability compared to Absolutely Disagree.

For the perception of HCWs on COVID-19 vaccine acceptability, the variable Covid-19 vaccines cornerstone to ending the pandemic, HCWs who agreed (aOR 2130.514; 95% CI 9.351 - 485388.682; p=0.006) was significantly related with vaccination acceptability compared to those absolutely disagreed. For the safety of vaccines, HCWs who were indifferent (aOR 0.135; 95% CI 0.021 - 0.860; p=0.034) and those who disagreed (aOR 55.704; 95% CI 1.083 - 2865.323; p=0.046) were significantly related with vaccination acceptability compared to those absolutely disagreed. For the variable Covid-19 vaccines can offer protection against all variants, HCWs who disagreed (aOR 15.502; 95% CI 1.112 - 216.017; p=0.041) was significantly associated with vaccination acceptability compared to those absolutely disagreed. Lastly, the variable whether the HCWs would you accept Covid-19 vaccines if they were made available, those who said Yes (aOR 203.833; 95% CI 17.836 - 2329.447; p <0.001) and No (aOR 3065.730; 95% CI 113.551 - 82770.737; p <0.001) were significantly related with vaccination acceptability compared to those who chose 'Maybe'.

Variable		Bivariate logistic regression model			Multivariable* logistic regression model		
		Odds Ratio	95%CI	p value	Adjusted Odds Ratio	95%CI	p value
Gender	Female	0.853	0.492 - 1.479	0.572			
Age	31-40 Years	Baseline	Baseline				
	20-30 Years	2.134	0.992 - 4.592	0.052			
	>40 Years	0.252	0.048 - 1.312	0.101			
Work Experience	6-10 Years	Baseline			Baseline		
	<1 Year	0.242	0.078 - 0.745	0.013	39.671	1.594 - 987.572	0.025
	>10 Years	4.743	0.642 - 35.070	0.127	0.127	0.01 - 11.359	0.369
	1-5 Years	0.845	0.351 - 2.030	0.706	6.897	0.542 - 87.635	0.137
Work Category	Pharmacist	Baseline			Baseline		
	Clinical Officer	1037422700.542	0.000 - 0.000	0.999			
	Medical Doctor	2.349	0.898 - 6.148	0.082			
	Nurse	1.977	0.790 - 4.946	0.145			
Chronic Disease Conditions	No I Don't Have Any	0.761	0.382 - 1.513	0.436			

Perception Of Covid-19 Disease In Adults	Very Severe	Baseline			Baseline		
	Mild	0.369	0.089 - 1.532	0.170	0.078	0.002 – 2.515	0.150
	Moderate	0.702	0.227 - 2.176	0.540	0.007	0.000 - 0.181	0.003
	Not Severe	0.242	0.040 - 1.483	0.125	0.037	7.526E-606 – 178.334	0.443
	Severe	0.587	0.202 - 1.706	0.328	0.030	0.002 - 0.511	0.015
Perception Of Covid-19 Disease In Infants And Children	Very Severe	Baseline			Baseline		
	Mild	2.177	0.507 - 9.352	0.296			
	Moderate	2.636	0.611 - 11.377	0.194			
	Not Severe	5.101	1.032 - 25.219	0.046			
	Severe	1.059	0.244 - 4.599	0.939			
Perception Of Covid-19 Disease In Pregnant Women	Very Severe	Baseline			Baseline		
	Mild	2.607	0.563 - 12.077	0.220			
	Moderate	0.774	0.269 - 2.227	0.635			
	Not Severe	0.316	0.067 - 1.484	0.144			
	Severe	0.792	0.309 - 2.031	0.628			
Perception Of Covid-19 Disease In Risk Groups	Very Severe	Baseline			Baseline		
	Mild	0.214	0.015 - 3.073	0.257			
	Moderate	0.267	0.014 - 5.018	0.378			
	Severe	1.453	0.687 - 3.074	0.328			
Ever Had Covid-19 Disease?	Yes, Severe	Baseline			Baseline		
	Had Symptoms But Didn't Verify With COVID-19 specific Exams	0.065	0.012 - 0.351	0.001	102.264	1.564 - 6685.984	0.030
	No	0.090	0.019 - 0.430	0.003	217.185	3.491 - 13509.779	0.011
	Yes But Mild	0.277	0.059 - 1.306	0.105	11.207	0.246 – 511.366	0.213
	Yes, No Symptoms	0.201	0.030 - 1.347	0.098	6.105	0.085 – 44.184	0.407
Covid-19 Vaccines Effective In Preventing Severe Disease	Absolutely Disagree	Baseline			Baseline		
	Absolutely Agree	53.137	2.205 - 1280.312	0.014	0.001	7.408E-007 - 0.421	0.027
	Agree	0.369	0.015 - 8.897	0.539	0.005	3.904E-012 – 5761629.013	0.616
	Indifferent	2.152	0.387 - 11.981	0.381	0.234	0.016 – 3.413	0.288
	Disagree	4.536	0.410 - 50.132	0.217	0.056	0.002 – 1.530	0.088

Covid-19 Vaccines Cornerstone To Ending The Pandemic	Absolutely Disagree	Baseline			Baseline		
	Absolutely Agree	0.279	0.032 - 2.411	0.246	1.968	0.041 – 94.548	0.732
	Agree	0.029	0.002 - 0.510	0.015	2130.514	9.351 - 485388.682	0.006
	Indifferent	0.790	0.153 - 4.078	0.778	2.734	0.206 – 36.326	0.446
	Disagree	1.341	0.138 - 13.057	0.801	0.453	0.011 – 18.215	0.674
Are Covid-19 Vaccines Safe?	Absolutely Disagree	Baseline			Baseline		
	Absolutely Agree	6.009	0.412 - 87.716	0.190	0.008	5.394E-005 – 1.268	0.062
	Agree	0.000	0.000 - 0.000	1.000	1.02	0.01 -7.508	0.962
	Indifferent	1.825	0.581 - 5.735	0.303	0.135	0.021 - 0.860	0.034
	Disagree	0.035	0.002 - 0.563	0.018	55.704	1.083 - 2865.323	0.046
We Can Stop Taking Covid-19 Precautions After Being Vaccinated	Absolutely Disagree	Baseline			Baseline		
	Absolutely Agree	80.498	0.500 - 12961.352	0.091			
	Agree	6.838	0.299 - 156.408	0.229			
	Indifferent	8.727	0.278 - 274.150	0.218			
	Disagree	3.465	0.174 - 69.059	0.416			
Should You Consider Yourself Vaccinated After Having Covid-19 Disease?	Absolutely Disagree	Baseline			Baseline		
	Absolutely Agree	1.075	0.121 - 9.576	0.948			
	Agree	0.187	0.012 - 2.910	0.231			
	Indifferent	1.271	0.234 - 6.893	0.781			
	Disagree	0.922	0.145 - 5.843	0.931			
Covid-19 Vaccines Offer Protection Against All Variants	Absolutely Disagree	Baseline			Baseline		
	Absolutely Agree	0.123	0.010 - 1.462	0.097	52.191	0.890 – 3060.321	0.057
	Agree	0.381	0.036 - 4.036	0.423	38.306	0.543 – 2701.653	0.093
	Indifferent	0.441	0.097 - 2.014	0.291	0.356	0.030 – 4.194	0.412
	Disagree	0.293	0.064 - 1.335	0.113	15.502	1.112 - 216.017	0.041
Would You Agree To Have Children Vaccinated Against Covid-19?	Unsure	Baseline			Baseline		
	Yes	0.618	0.181 - 2.107	0.442			
	No	0.605	0.183 - 1.997	0.409			

Would You Accept Covid-19 Vaccines If They Were Made Available?	Maybe	Baseline			Baseline		
	Yes	0.033	0.009 - 0.125	<0.001	203.833	17.836 - 2329.447	<0.001
	No	0.005	0.001 - 0.026	<0.001	3065.730	113.551 - 82770.737	<0.001

*The multivariable model included variables with a p value of < 0.2 in the bivariate model [31].

Table 6: Determinant of COVID-19 Vaccination Acceptability

9.2.5. Vaccinated Collaborators

A total of 205 health care personnel received the COVID-19 vaccines, with many citing persuasive hospital information sessions (n=120, 58%). Others were convinced by scientific findings published in the media that COVID-19 infections can be severe and vaccinations are safe (n= 170, 82.9%) and wanting their life get back normal (n = 108, 52.7%). Furthermore, many HCWs stated that they were not motivated to be vaccinated because a colleague (n= 156, 76.1%) or superior (n= 170, 82.9%) advised it. Superiors or colleagues, on the other hand, did not force them to be vaccinated (187, 91.2%). However, as shown in Table 7, the majority of HCWs responded that they would recommend the COVID-19 vaccine to someone (n=199, 97.1%). Most HCWs (n = 113, 43.8%) did not hesitate to be vaccinated, but others

cited reasons such as wanting to do more research (n = 39, 15.1%), and being concerned about increased infections/deaths (n = 26, 10.1%). Furthermore, some HCWs were offered a vaccination with which they were more comfortable (n = 22, 8.5%), whilst others grew more comfortable as a result of multiple people being vaccinated (n = 21, 8.1%). The remaining reasons are listed in Table 8. Table 9, shows the available vaccines at the hospital that were administered to HCWs. The most commonly administered vaccine was Johnson & Johnson vaccine (n = 132, 64.4%) and Sinopharm BBIBP vaccine was the least preferred (n = 1, 0.5%). Most HCWs also claimed that they got their preferred vaccine (n = 115, 56.1%) as opposed to being administered what was available (n = 90, 43.9%) as shown in Table 10.

		N 205	Percent (%)
Have you chosen to be vaccinated because someone close to you and/or yourself are at high risk of COVID-19 complications (someone with chronic disease or have risk factors)?	No	118	57.6
	Yes	87	42.4
Have you chosen to be vaccinated because you have followed the scientific results discussed in the media that have convinced you that COVID-19 infections can be severe and vaccines are safe?	No	35	17.1
	Yes	170	82.9
Have you chosen to be vaccinated because you were convinced by an information session at the Hospital?	No	85	41.5
	Yes	120	58.5
Have you chosen to be vaccinated because you know someone who has suffered from complicated COVID-19 infections?	No	107	52.2
	Yes	98	47.8
Have you chosen to be vaccinated because a colleague recommended you to it?	No	156	76.1
	Yes	49	23.9
Have you chosen to be vaccinated because your superiors recommended you to it?	No	170	82.9
	Yes	35	17.1
Have you chosen to be vaccinated because your superiors or colleagues forced you?	No	187	91.2
	Yes	18	8.8
Have you chosen to be vaccinated because you want your life "get back normal" outside of work (i.e. travel, see friends...)?	No	97	47.3
	Yes	108	52.7
Would you recommend the COVID-19 vaccine to someone?	No	6	2.9
	Yes	199	97.1

Table 7: Attitude Towards covid-19 Vaccination.

	Responses	
	N	Percent
Not relevant I was never hesitant	113	43.8%
I was offered a vaccine I was more comfortable with	22	8.5%
I spoke to my healthcare worker	5	1.9%
I did more research	39	15.1%
I consulted family and friends	7	2.7%
My spiritual/religious leader advised me do it	4	1.6%
I was persuaded by government/public health authorities	6	2.3%
I noticed that a personality (public or otherwise) took it	5	1.9%
I was forced by my employer/family members or felt like I did not have a choice	4	1.6%
I felt more comfortable because several people took it before me	21	8.1%
I was frightened by the increased infections/deaths	26	10.1%
My circumstances changed (such as being pregnant or any other medical or personal factor)	6	2.3%
Total	258	100.0%

Table 8: Reasons Behind Vaccine Acceptance

	N	Percent (%)
BioNTech, Pfizer vaccine	26	12.7
Johnson & Johnson vaccine	132	64.4
Oxford, AstraZeneca vaccine	46	22.4
Sinopharm BBIBP vaccine	1	0.5
Total	205	100.0

Table 9: COVID-19 Vaccine Received

	N	Percent (%)
I chose my preferred vaccine	115	56.1
I took what was available	90	43.9
Total	205	100.0

Table 10: Choice of COVID-19 Vaccine Given**9.2.6. Non-Vaccinated Collaborators**

A total of 205 HCWs refused to accept the COVID-19 immunizations. Knowing someone who had suffered from complicated or severe COVID-19 disease (n = 77, 89.5%), having the misconception that one was protected after having already contracted the disease (n = 70, 81.4%), and not feeling the danger of having complicated or severe COVID-19 disease (n = 52, 60.5%) did not influence their hesitancy to COVID-19 vaccinations. Furthermore, they said that they did not intend to get vaccinated even if the vaccine was made available to them the following month (n = 73, 84.9%). Despite their reservations about the vaccinations, a bigger majority (n = 51, 59.3%) said they would recommend it to their colleagues. Table 12, shows the reasons for refusing COVID-19 vaccinations. The most common reasons were that the HCWs did not trust the vaccine because they

think that it is not safe was developed too quickly and they do not know what it contains (n = 40, 26.7%). They were also not sure about the long-term side effects of the vaccine (n = 34, 22.7%) and others did not like any of the vaccine options available to them (n = 16, 10.7%). Furthermore, others suggested that it was their choice, and that they chose not to be vaccinated (n = 26, 17.3%), while some did not take it due to religious reasons (n = 11, 7.3%). The rest of the reasons are as illustrated in Table 12. Surprisingly, some HCWs overwhelmingly stated that there was nothing that could change their mind and make them choose to be vaccinated against COVID-19 pandemic (n = 60, 69.8%) as shown in Table 13. For those who agreed to a mind change over COVID-19 vaccinations (n = 26, 30.2%), some of the reasons raised were as shown in Table 14.

		N 86	Percent (%)
Do you plan to get vaccinated in the next month?	No	73	84.9
	Yes	13	15.1
Have you chosen not to get vaccinated because you don't know anyone who has suffered from complicated or severe COVID-19 disease?	No	77	89.5
	Yes	9	10.5
Have you chosen not to get vaccinated, because you don't feel in danger of having a complicated or severe COVID-19 disease?	No	52	60.5
	Yes	34	39.5
Have you chosen not to get vaccinated, because you think you are protected after having already contracted the disease?	No	70	81.4
	Yes	16	18.6
Would you currently advise your colleagues to get vaccinated against COVID-19?	No	35	40.7
	Yes	51	59.3

Table 11: Attitude Towards covid-19 Vaccination

	Responses	
	N	Percent
I did not qualify to receive it before	2	1.3%
Can't find the time to go/lines are too long	5	3.3%
I don't like any of the vaccine options available to me	16	10.7%
I will not take it on religious grounds	11	7.3%
I do not trust the government/medical authorities here	6	4.0%
I do not trust the vaccine (not safe, developed too quickly, do not know what is in it)	40	26.7%
I believe it is a choice and I choose not to	26	17.3%
No reason really, I just won't take it	6	4.0%
I am not sure about long-term side effects of the vaccine	34	22.7%
It is not mandatory for my work	2	1.3%
experienced serious side effects following a vaccine in the past	2	1.3%
Total	150	100.0%

Table 12: Reasons for Refusing Vaccinations

	N	Percent (%)
No	60	69.8
Yes	26	30.2
Total	86	100.0

Table 13: Is There Anything That Could Change Your Mind and Make You Choose to Be Vaccinated.

	N	Percent (%)
N/A	56	65.1
After vaccines have been in use for long enough so as to rule out long term side effects	1	1.2
Because the people who are vaccinated are having slim chances of getting the virus	1	1.2
Evidence of safety	1	1.2
High death rate	1	1.2
High death rate due to COVID-19	1	1.2

I can only take if more scientific studies are conducted about the long term side effects it has on people living with H	1	1.2
I don't trust the COVID-19 vaccine	1	1.2
I feel it's not safe	1	1.2
I'm not satisfied with the available information provided on the vaccine	1	1.2
If evidence were to be presented to me on the importance and safety of these vaccines.	1	1.2
If further studies are done on long term effects, especially to people trying to convince	1	1.2
If I see the health of those vaccinated to be ok after a couple of years, I can consider it	1	1.2
If someone was to give clear information about the vaccines.	1	1.2
If someone was to provide evidence based information on the importance and effective of these vaccines.	1	1.2
If the government make clearly and evident results on the effectiveness of the vaccines.	1	1.2
If the safety of the vaccine is established via comprehensive studies and clinical trials	1	1.2
If the vaccine is made available in rural areas	1	1.2
In order to be on a safer side	1	1.2
More research and evidence based data	1	1.2
More research is done	1	1.2
Once those vaccinated stop presenting with severe disease and it stop being political disease.	1	1.2
Prevention of covid-19	1	1.2
Safety profile studies to confirm	1	1.2
If vaccines become more safe	1	1.2
To see if there are any covid-19 vaccines long term side effects	1	1.2
Travelling out of the country	1	1.2
Under strict reasons	1	1.2
When am fully convinced about the long term safety of the vaccines in terms of its side effects	1	1.2
When the long term side effects have been studied	1	1.2
Yes.... when it becomes very serious	1	1.2
Total	86	100.0

Table 14: If YES: Reasons That May Change Participants' Mind (Open Answers)

10. Discussion

10.1. Main Findings

The study found that the COVID-19 vaccinations was well-accepted by HCWs at Ndola Teaching Hospital (70.4% of survey respondents were vaccinated), with vaccine acceptability being highest among clinical officers (100%), then Medical Doctors (71.6%), Nurses (70.3%), and finally Pharmacists (54.2%). Previous research has also indicated that trust in the COVID-19 vaccination grows with education and a greater grasp of the vaccine's features [7,18,23]. Communication/video tutorials on vaccine characteristics and herd immunity, in particular, may minimize vaccine hesitation [13]. It is also believed that HCWs will be better able to distinguish between facts and misinformation as a result of their training, and hence vaccine acceptability will be higher [22,50,65].

The perceptions of Ndola Teaching Hospital toward COVID-19 disease for both vaccinated (n=84, 73.0%) and unvaccinated (n=31, 27.0%) HCWs acknowledged that

it is usually a mild disease in children and infants but can still have severe forms of the disease (unvaccinated n=21 52.5% and vaccinated n=19, 47.5%) which agrees with studies done in children who came to a similar conclusion [66,67]. They also acknowledged that it is very severe in risk groups (vaccinated n=106, 66.2% and unvaccinated n=54, 33.8%). Similar to what has been previously documented, people who fall into high-risk categories or who are in close proximity to high-risk individuals (such as elders, immunocompromised individuals, and those with chronic illnesses) are more likely to perceive COVID-19 disease as a severe [7,44]. However, both participants vaccinated (n=204, 70.6%) and unvaccinated (n=85, 29.4%) disagreed that HCWs are super-spreaders of COVID-19 disease. Studies comparing the super-spreaders of COVID-19 patients and HCWs have found that patients are more likely to contract the disease from other patients than from HCWs because HCWs are more aware of how to protect themselves and the patients they care for. Those who had COVID-19 disease, it was found that they were more likely to be vaccinated than

those who didn't ($p < 0.0001$).

The perceptions of Ndola Teaching Hospital HCWs toward vaccinations were fairly favourable compared to other healthcare professionals and to nations more affected by COVID-19, such as Israel (78.1% in March 2020), France and Canada (72.4% in October 2020), the United States (36% in October 2020), and Columbia (90.7% in January 2021) [31]. Furthermore, vaccination rates were higher in people who had a chronic illness and lived with someone who had a chronic illness. Similar to what has been previously documented, people who fall into high-risk categories or who are in close proximity to high-risk individuals (such as elders, immunocompromised individuals, and those with chronic illnesses) are more likely to consent to vaccination [7,44]. Hospital information sessions ($n = 120$, 58%), media reports about scientific findings regarding the safety of COVID-19 vaccinations ($n = 170$, 82.9%), and the desire to have their lives return to normal ($n = 108$, 52.7%) were other factors that encouraged HCWs to get vaccinated.

Furthermore, in this study, concerns about the safety and potential risks of COVID-19 vaccinations were cited as the primary justification for vaccine resistance. According to other studies, media controversy as well as a dearth of thorough and reliable data contributed to vaccine hesitancy [13,19]. All of these facts point to the urgent need for sufficient investment in vaccine education [23]. On the other hand, the majority of HCWs ($n=205$) received the COVID-19 vaccines, with many attributing their vaccination to persuading hospital information sessions ($n=120$, 58%). Other people ($n = 170$, 82.9%) were persuaded by scientific evidence reported in the media that COVID-19 infections can be serious and vaccinations are safe, and they wanted their lives to return to normal life ($n = 108$, 52.7%). Furthermore, the majority of HCWs ($n=115$, 56.1%) selected their favorite vaccination, with the Johnson & Johnson vaccine ($n=132$, 64.4) being the most popular. In addition, the majority of HCWs ($n=199$, 97.1%) said they would advise someone to get the COVID-19 vaccine.

A substantial proportion of unvaccinated individuals stated that they still had questions or concerns regarding the COVID-19 vaccines that they wanted addressed. They also stated that knowing someone who had suffered from complicated or severe COVID-19 disease ($n = 77$, 89.5%), believing one was protected after contracting the disease ($n = 70$, 81.4%), and not believing the danger of having complicated or severe COVID-19 disease ($n = 52$, 60.5%) did not influence their aversion to COVID-19 vaccinations. Additionally, they stated that they would not be vaccinated even if the vaccine became available the following month ($n = 73$, 84.9%).

Finally the study also indicated that people who were more aware of the possible risk associated with COVID-19 infection and believed themselves to be at risk of COVID-19 infection were more inclined to receive the vaccine. A similar

tendency was observed with the concern of spreading infection to patients or family members. The majority of both vaccinated and unvaccinated HCWs said they would suggest and encourage others to be vaccinated. This is consistent with results previously published by other researchers [7,50,68,69]. This emphasizes the important role that HCWs have been playing in this pandemic by sharing their understanding of COVID-19 vaccinations with both non-medical and medical colleagues as well as by advising their patients to get the vaccine [50].

10.2. Theoretical Implication

The study's findings are significant for both researchers and practitioners participating in vaccination initiatives. Several difficulties revealed by the current study deserve to be addressed. This study supports earlier research that found a strong correlation between faith in authoritative sources including the government, academia, and the media, as well as vaccination intention against the COVID-19 virus [16]. The underlying mechanism by which those variables influence intention undoubtedly needs research consideration in light of the findings above about the impact of those variables on vaccination intention. For example, it has been shown that trust in government influences vaccine trust, which suggests that it may indirectly affect vaccination intention [70]. Future research could therefore look into how these elements' indirect effects on intention.

As potential indicators of intention, it would be important to look at people's perceptions of how the COVID-19 vaccinations will allow them to resume their "normal" lives. Communication initiatives may want to emphasize how vaccinations would help things return to normal [44]. Although a valid proposal, empirical research is needed to determine the real effect of ideas about regaining normalcy through vaccination on one's intention to acquire the vaccinations. Additionally, social media's significance in relation to vaccination intention unquestionably merits further study given the current pandemic's growing reliance on it and the fact that many individuals are using it for information and guidance [26]. For instance, it would be intriguing to investigate the degree to which various social media sources influence one's vaccination intention, particularly in Zambia, as the results may offer insightful information for vaccine campaigns. Finally, because of the cross-sectional nature of this study, the findings may not be able to forecast future vaccine adoption. It is well known that vaccine acceptability varies throughout the course of a pandemic, depending on public perception of the disease's implications [31].

10.3. Practical Implication

The results of this study show a correlation between vaccine intention and vaccine manufacturer trust. In order to allay any worries that consumers may have about the accelerated distribution of vaccines, manufacturers must be transparent about the development and testing of vaccines, for example. The makers of particular vaccines must take the required

steps, like promptly releasing truthful explanations on these issues to the public, in light of the reported bad effects and occurrences of death supposedly attributed to these medications.

The emergence of novel viral variations that may be more contagious and immune to vaccines and the reports of illnesses following vaccination may lead some people to conclude that vaccines do not provide protection from the virus [71,72]. The advantages of COVID-19 vaccinations must be emphasized because lower perceived benefits would negatively affect vaccination intention [73]. Therefore, consistent campaigns emphasizing vaccine benefits are essential [51]. Examples include claims that vaccination against COVID-19 reduces the risk of developing symptoms compared to non-vaccination and that current vaccination campaigns for COVID-19 have a significant preventive impact on working-age adults [70,74].

People have seen how the COVID-19-related conspiracy theories have proliferated like wildfire in society in addition to this pandemic [65]. The results of this study show a link between lower vaccination intentions and greater levels of COVID-19 conspiracy theory believing. Giving accurate information about COVID-19 and COVID-19 vaccines must therefore continue to be a priority. Clear, timely, and evidence-based communications must be delivered through authorized channels in order to combat the growth of conspiracy theories [75]. This study demonstrates that lower vaccination intentions are associated with greater levels of concern about vaccine side effects [47]. As a result, the COVID-19 vaccination intervention and campaigns should give these challenges more attention [70].

Campaigns should accurately disclose potential responses and their frequency in order to reassure the public about the vaccinations' safety [76]. Therefore, it is crucial to let people know that they should expect mild, transient adverse effects from the vaccinations, such as headache and fatigue [77]. Although uncommon, major side effects allegedly brought on by the COVID-19 vaccinations were frequently associated to particular intrinsic characteristics of the vaccine recipients, such as those who were terminally sick [78]. This puts the possibility of adverse effects into perspective [79].

11. Study Limitation

There are several limitations to the study.

Firstly, this was a cross-sectional study and the findings may not be easily extended to other hospital settings. Secondly, the setting was in Ndola, at Ndola Teaching Hospital and a representation from an academic health system which limits the generalizability of the findings. Finally, the study had a high rate of COVID-19 vaccine acceptance because participants were healthcare workers with favourable vaccine attitudes and more likely to complete the questionnaire.

12. Recommendations

Many of the reasons for declination of COVID-19 vaccination

among this sample of health care workers coincided with the reasons espoused by HCWs. Factors that may encourage vaccination somewhat differed between these two populations, but those few differences offered insight into methods that Ministry of Health (MOH) in Zambia could adopt to increase their rates of COVID-19 vaccination. Specifically, MOH could focus their efforts on educating their employees about the vaccine and shift the paradigm away from vaccination as over-medication and more toward vaccination as a preventive measure to be used in tandem with universal precautions. Additionally, pursuing awareness campaigns that put a personal face to the risks of non-vaccination and/or personalizing the risks of non-vaccination and making them relevant to the employee's lived experience could be of particular benefit. Ministry of Health (MOH) in Zambia should also be aware that any interventions that appear coercive may unintentionally cause employees to reassert their anti-vaccination stance more firmly. Overall, the pursuit of any or all of these recommendations hopefully will yield cost-effective interventions that can be utilized by Ministry of Health (MOH) in Zambia to increase their organizational COVID-19 vaccination rate.

13. Conclusion

Vaccines must be used globally to create herd immunity and as a result, countries must promote COVID-19 vaccination in the community and research into vaccination acceptability will be crucial during the pandemic [70]. It is critical to understand the factors related with vaccine acceptability and ensure that vaccination methods are informed by those aspects in order to enhance vaccine uptake [7]. The COVID-19 vaccines were widely accepted among healthcare workers at Ndola Teaching Hospital, according to this study. Nonetheless, numerous interventions can be performed to promote HCW acceptance of the vaccination by increasing their understanding of the possible dangers of COVID-19 infection and the safety of COVID-19 vaccinations. Better-trained and knowledgeable health care workers could encourage the public to become vaccinated.

Definitions

Covid-19 Disease: An acute respiratory illness in humans caused by a coronavirus, capable of producing severe symptoms and in some cases death, especially in older people and those with underlying health conditions. It was originally identified in China in 2019 and became pandemic in 2020 [5].

Healthcare worker: – for the purpose of the study, HCWs included Medical Doctors, Clinical Officers, Pharmacists and Nurses only [80].

Perception of COVID-19 Vaccine: – refers to the deeper understanding and awareness of COVID-19 Vaccination [32].
Vaccination: – the process of inoculating persons with any antigenic material for the purpose of producing active artificial immunity [36].

Vaccine acceptance: the degree to which individuals accept, question, or refuse vaccination [7].

Vaccine hesitancy: refers to delay in acceptance or refusal

of vaccination despite availability of vaccination services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence [11].

Vaccine uptake: – the process of taking vaccine into one's body by injection [33].

Problem Statement

The efficiency of vaccinations and people's willingness to be vaccinated are both important factors in achieving adequate coverage [7]. This lack of trust, dubbed "vaccine hesitancy," has now been studied all over the world, and it is very well established that it affects both the general public and healthcare workers [49]. The vaccine's safety and efficacy, as well as its side effects, vaccination myths, and a lack of awareness, are all elements that contribute to vaccine hesitancy [22,45]. As vaccine use and popularity have grown, public worries regarding vaccine safety and efficacy have also grown [44].

Vaccine hesitancy and misinformation have created significant barriers to obtaining coverage and herd immunity, putting public health at risk, particularly if it continues during the current crisis [81]. In numerous cases, people's hesitancy to get vaccinated or having their children get vaccinated has resulted in isolated epidemics of vaccine-preventable diseases [29,42]. Despite the fact that vaccination has successfully decreased the global burden of disease and mortality, vaccine hesitancy is still one of the top ten global health threats, according to the WHO [12,22].

Given the voluntary nature of the COVID-19 vaccination program in Zambia, its effectiveness in creating herd immunity/protection would rely significantly on public consent and participation [16,82]. Since healthcare workers are the persons most exposed to COVID-19 disease, they have the highest risk of having a serious infection due to the nature of their work [27]. HCWs have direct contact with patients, patient's family members, physicians, other healthcare workers, and visitors [33]. HCWs likewise have the highest likelihood of transmitting the infection across all sections of the hospital community as well as to other people they meet [10]. Despite the fact that COVID-19 vaccination is provided free of charge to healthcare workers around the world, studies have shown that they are not compliant and unwilling to be vaccinated in order to create the herd immunity/protection that the world so desperately needs. [34,42]. The purpose of this study was to determine COVID-19 vaccine acceptability and associated factors among health care workers at Ndola Teaching Hospital in Zambia.

Rationale of the study

Healthcare workers have shown professional dedication since the beginning of the COVID-19 epidemic, despite the risk of becoming infected and infecting patients or family members [7]. They also serve as a reliable source of vaccination information for the general public, protecting them against false and confusing information [81]. Studies have also indicated that when a vaccine is suggested by a

healthcare worker, consumers are more likely to receive it (ECDPCS, 2020). Several health beliefs, such as perceived vaccine effectiveness and potential vaccine risks, have been linked to vaccine acceptability [42]. Several studies have also called for more personalized interventions and strategies to address vaccine hesitation beliefs in order to improve vaccine knowledge and attitudes and increase vaccination uptake [45].

In Zambia, only a few studies have looked into the prevalence of COVID-19 vaccine uptake and its healthcare workers acceptability [16]. Despite the fact that multiple surveys on COVID-19 vaccinations have been undertaken in these places, there was insufficient data on COVID-19 vaccine acceptability and perception among healthcare workers in Zambia [18]. The purpose of this study was to describe current vaccine acceptance, the reasons or factors that influence their readiness or unwillingness to be vaccinated, and the disparities in vaccine acceptance among respondents based on demographic data. This information will be critical in identifying program interventions that can be further strengthened to improve COVID-19 vaccine acceptability outcomes especially among healthcare workers in Zambia and other resource-limited settings [84-87].

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Research Workplan 2021/2023

Responsible Person	Activity	November 2021	May 2022	June 2022	October 2022	January 2023	July 2023
Hope Kalasa	Proposal development and submission						
Hope Kalasa	Ethics Clearance						
Hope Kalasa	Data collection						
Hope Kalasa	Sorting, tabulating, coding and analysis						
Hope Kalasa	Data analysis and report writing						
Hope Kalasa	Dissemination of Report findings						

Research Budget

CATEGORY OF ITEMS	UNIT	UNIT PRICE COST	QUANTITY	TOTAL
Plain papers	Rim	ZMW 80.00	10	ZMW 800.00
Pens	Box	ZMW 50.00	2	ZMW 100.00
Folder	Each	ZMW 100.00	5	ZMW 500.00
Printing	Page	ZMW 5.00	500	ZMW 2500.00
Photocopy	Page	ZMW 5.00	500	ZMW 2500.00
Binding	Booklet	ZMW 100.00	5	ZMW 500.00
Fuel	1L	ZMW 17.65	200	ZMW 3530.00
TOTAL ZMW 10,430.00				

Appendices

Appendix 1: Data Collection Tool (<https://forms.gle/EP7VUbdn8GqSREj66>)

Questionnaire about Sars-CoV2 and the COVID-19 Vaccine

Please Tick Each of The Boxes That Correspond to Your Answer(s):

Section 1. Demographic Questions

1. What is your gender?

- ☐ Male
☐ Female

2. Age (1 answer only)

- ☐ <20year
☐ 20 – 30 years
☐ 31 – 40 years
☐ > 40 years

3. How many years have you worked in a hospital? (1 answer only)

- ☐ < 1 year
- ☐ 1-5 years
- ☐ 6-10 years
- ☐ > 10 years

4. What is your working category in Hospital? (1 answer only)

- ☐ Nurse
- ☐ Doctor
- ☐ Pharmacist
- ☐ Clinical Officer

5. Do you have any of the following conditions? [Select all that apply]

- ☐ Cancer
- ☐ Immunocompromised state due to therapy or disease
- ☐ Obesity
- ☐ Diabetes (type 1 or 2)
- ☐ Cardiovascular disease
- ☐ Rheumatological condition
- ☐ HIV/AIDS

Section 2. Few Questions Concerning COVID-19 Infection: (1 answer only)

6. What is your perception of COVID-19 disease in adults?

- ☐ Not severe
- ☐ Mild
- ☐ Moderate
- ☐ Severe
- ☐ Very severe

7. What is your perception of COVID-19 disease in infants and children?

- ☐ Not severe
- ☐ Mild
- ☐ Moderate
- ☐ Severe
- ☐ Very severe

8. What is your perception of COVID-19 disease in pregnant women?

- ☐ Not severe
- ☐ Mild
- ☐ Moderate
- ☐ Severe
- ☐ Very severe

9. What is your perception of COVID-19 disease in risk groups (i.e. asthma, heart and pulmonary disease, diabetes)?

- ☐ Not severe
- ☐ Mild
- ☐ Moderate
- ☐ Severe
- ☐ Very severe

10. While working in the hospital, do you think that you have a high risk of being exposed to COVID-19 disease)? (1 answer only)

- ☐ No
- ☐ Yes

11. If a HCW is infected with COVID-19, do you think he/she becomes spreader to patients they attend to?

- ☐ Absolutely agree
- ☐ Agree
- ☐ Indifferent
- ☐ Disagree

☐ Absolutely disagree

12. If a HCW is infected with COVID-19, do you think he/she becomes spreader to household contacts?

- ☐ Absolutely agree
☐ Agree
☐ Indifferent
☐ Disagree
☐ Absolutely disagree

13. Have you ever had COVID-19 disease?

- ☐ No
☐ Yes with no symptoms
☐ Yes with mild symptoms
☐ Yes with severe symptoms
☐ I had suspected symptoms but I didn't verify them with COVID-19 specific exams

Section 3. Few Questions Concerning COVID-19 Vaccines: (1 answer only)

14. COVID-19 vaccines are effective in preventing severe forms of COVID-19 diseases?

- ☐ Absolutely agree
☐ Agree
☐ Indifferent
☐ Disagree
☐ Absolutely disagree

15. By reaching a sufficient coverage among the population, COVID-19 vaccines could be a cornerstone to end the COVID-19 pandemic?

- ☐ Absolutely agree
☐ Agree
☐ Indifferent
☐ Disagree
☐ Absolutely disagree

16. Are COVID-19 vaccines safe?

- ☐ Absolutely agree
☐ Agree
☐ Indifferent
☐ Disagree
☐ Absolutely disagree

17. We can stop taking precaution after being vaccinated (i.e. stop wearing a mask, social distancing...)?

- ☐ Absolutely agree
☐ Agree
☐ Indifferent
☐ Disagree
☐ Absolutely disagree

18. Should you still get vaccinated If You already had COVID-19?

- ☐ Absolutely agree
☐ Agree
☐ Indifferent
☐ Disagree
☐ Absolutely disagree

19. Do COVID-19 vaccines protect against the COVID-19 variants?

- ☐ Absolutely agree
☐ Agree
☐ Indifferent
☐ Disagree
☐ Absolutely disagree

20. Would you agree to have children (pre-primary to secondary school) vaccinated against COVID-19 disease?

- ☐ Yes
- ☐ No
- ☐ Unsur

21. IF you are hesitant to have children vaccinated which of these options best describes your reasons?

- ☐ Not relevant, not hesitant
- ☐ I think they are too young to be vaccinated
- ☐ It's against my religion to have children vaccinated
- ☐ I don't like the vaccine option available to children
- ☐ I do not trust the government/medical authorities with respect to my children's health
- ☐ My own research tells me that it is not a good idea to give them
- ☐ I believe it is a choice and I choose not to
- ☐ No reason really, I just won't let them take it

22. Would you accept the COVID-19 vaccine if they were generally made available to you?

- ☐ Yes
- ☐ No
- ☐ Maybe

Section 4. The Vaccination Status:

23. Have you been vaccinated against COVID-19?

No ☐ Yes ☐.

→ if YES, please continue till question 28

→ if NO, please go directly to question 24

Section 4a. Vaccinated Collaborators

24. Have you chosen to be vaccinated because someone close to you and/or yourself are at high risk of COVID-19 complications (someone with chronic disease or have risk factors)?

- ☐ No
- ☐ Yes

25. Have you chosen to be vaccinated because you have followed the scientific results discussed in the media that have convinced you that COVID-19 infections can be severe and vaccines are safe?

- ☐ No
- ☐ Yes

26. Have you chosen to be vaccinated because you were convinced by an information session at the hospital?

- ☐ No
- ☐ Yes

27. Have you chosen to be vaccinated because you know someone who has suffered from a complicated COVID-19 infections?

- ☐ No
- ☐ Yes

28. Have you chosen to be vaccinated because you were recommended to it by a colleague?

- ☐ No
- ☐ Yes

29. Have you chosen to be vaccinated because you were recommended to it by your hierarchical superiors?

- ☐ No
- ☐ Yes

30. Have you chosen to be vaccinated because you felt constrained by your superiors?

- ☐ No
- ☐ Yes

31. Have you chosen to be vaccinated because you want your life "get back normal" outside of work (i.e. travel, see friends...)?

- ☐ No
- ☐ Yes

32. Would you recommend the COVID-19 vaccine to someone?

- ☐ No
- ☐ Yes

33. Which of the vaccines did you receive?

- ☐ BioNTech, Pfizer vaccine
- ☐ Johnson & Johnson vaccine
- ☐ Oxford, AstraZeneca vaccine
- ☐ Moderna vaccine
- ☐ Sinopharm BBIBP vaccine

34. Did you choose your vaccination type, or did you just take what was available at the time?

- ☐ I chose my preferred vaccine
- ☐ I took what was available

35. Were you initially hesitant to take the vaccine? (Note here that a hesitant person was eligible but previously unwilling)

- ☐ Yes
- ☐ No
- ☐ Maybe

36. IF you were hesitant, please explain why you were initially hesitant. (Select all options that applies)

- ☐ Not relevant, I was never hesitant
- ☐ I did not qualify to receive it before
- ☐ I did not like any of the vaccine options available to me
- ☐ I had religious grounds for not taking it
- ☐ I had a medical condition that barred me from taking it
- ☐ I did not trust the government
- ☐ I did not trust the vaccines (not safe, developed too quickly, do not know what is in it)
- ☐ I was not sure about long-term side effects of the vaccine
- ☐ Other specify _____

37. IF you were hesitant, what changed your mind? (Select all options that applies)

- ☐ Not relevant I was never hesitant
- ☐ I was offered a vaccine I was more comfortable with
- ☐ I spoke to my healthcare worker
- ☐ I did more research
- ☐ I consulted family and friends
- ☐ My spiritual/religious leader advised me do it
- ☐ I was persuaded by government/public health authorities
- ☐ I noticed that a personality (public or otherwise) took it
- ☐ I was forced by my employer/family members or felt like I did not have a choice
- ☐ I felt more comfortable because several people took it before me
- ☐ I was frightened by the increased infections/deaths
- ☐ My circumstances changed (such as being pregnant or any other medical or personal factor)
- ☐ Other specify _____

Section 4b. Non-vaccinated Collaborators

38. Do you plan to get vaccinated in the next month?

- ☐ No
- ☐ Yes

39. Have you chosen not to get vaccinated because you don't know anyone who has suffered from complicated or severe COVID-19 disease?

- ☐ No
- ☐ Yes

40. Have you chosen not to get vaccinated, because you don't feel in danger of having a complicated or severe COVID-19 disease?

- ☐ No
- ☐ Yes

41. Have you chosen not to get vaccinated, because you think you are protected as having already contracted the disease?

- ☐ No
☐ Yes

42. Is there anything that could change your mind and let you get the COVID-19 vaccine?

- ☐ No
☐ Yes

→ if yes, reasons to change in intention to get vaccinated (Open answer)

43. Which of these reasons best explains why you are unvaccinated at this time? (Tick all that apply)

- ☐ I did not qualify to receive it before
☐ Can't find the time to go/lines are too long
☐ I don't like any of the vaccine options available to me
☐ I will not take it on religious grounds
☐ I believe that I have a medical condition that bars me from taking it
☐ I do not trust the government/medical authorities here
☐ I do not trust the vaccine (not safe, developed too quickly, do not know what is in it)
☐ I believe it is a choice and I choose not to
☐ No reason really, I just won't take it
☐ I am not sure about long-term side effects of the vaccine
☐ It is not mandatory for my work
☐ I experienced serious side effects following a vaccine in the past
☐ Other (Specify) _____

Appendix 2a: Consent Form and Participant Information Sheet:

Participant Information Sheet

Title of Study: Acceptability of COVID-19 Vaccine among Health Care Workers at Ndola Teaching Hospital, Ndola, Zambia.

Introduction

Hello, my name is Hope Kalasa from Ndola Teaching Hospital. I am carrying out a research on Acceptability of COVID-19 Vaccine among Health Care Workers at Ndola Teaching Hospital, Ndola, Zambia. This research is taking place in connection with the Master Public Health program at the Copperbelt University, School of Medicine. You are kindly invited to participate in this research study.

Purpose Study

As part of the study, the researcher will explore healthcare workers vaccine acceptability, the reasons or factors that influence their readiness or unwillingness to be vaccinated, and the disparities in vaccine acceptance among respondents based on demographic data. This information will be critical in identifying program interventions that can be further strengthened to COVID-19 vaccine acceptability outcomes especially among healthcare workers in Zambia and other resource-limited settings. You have been invited to participate in this study based on your status as an adolescent and because you currently reside in Ndola, Zambia- the town of interest

Study Procedures

In depth online questionnaire will be used to explore experiences, perception and acceptability of COVID-19 Vaccine among Health Care Workers at Ndola Teaching Hospital, Ndola, Zambia.

Confidentiality

Be assured that no private or personal information will be collected during the study and any information provided will be treated with confidentiality and will only be used for the purpose of the current study.

Study Benefits

Your participation in this study will go a long way to help policy makers in the Copperbelt and Zambia as a whole to refocus and improve already existing COVID-19 intervention programs and also develop new and effective ones with the hope of improving vaccine acceptability.

Study Risks

There is no risk associated with your participation in this study

Voluntaries

Please be informed that participation in this study is voluntary and you can withdraw at any time during the study without giving any reasons for your withdrawal. Taking part or withdrawal from the study will not put you in any disadvantage in terms of your rights and your entitlements.

The study will be reviewed and sanctioned by the Tropical Disease Research Centre Ethics Committee. Permission will also be obtained from the Ministry of Health (MoH) office of the Provincial Medical Officer, Copperbelt Province to carry out the study at Arthur Davison Children Hospital.

You are welcomed to ask any question concerning the study
Much thanks!

Appendix 2b: Icipepala Cha Cisuminisho Ne Bula Lye Lyashi Kubalesendamo Ulubali Mukufwailisha:**A. Ibula Lye Lyashi Kubalesendamo Ulubali Mukufwailisha**

Mulishani, ine ninebo Hope Kalasa elyo nsangwa ku Ndola Teaching Hospital. Mukwai muleitwa ukusendamo ulubali mu masambililo yakufwailisha ayeminine kusanga amafya ayakuma ku tushishi ukukana bwelela panshi mu baice abali COVID-19 pa Ndola Teaching Hospital mu Ndola, Zambia. Uku kufwailisha kulecitwa mukwikatana pamo ne milimo yamu Master Public Health pa Copperbelt University, School of Medicine.

Ubunkankala Bwa Masambililo Aya

Ngo lubali lya masambililo, bakafwailisha bakalolekesha pa mafya yamo-yamo ayalenga akashishi ukukana bwelela panshi elyo kabili ukusanga ubwishibilo elyo nemibele ya bantu pali COVID-19. Namwitwa ukusendamo ulubali muli aya amasambililo ukulola kufyo uli mu bumi nga abaice elyo kabili nico muleikala pali nomba mu Ndola, Zambia- icintungu cisalilwe.

Ifya Kukonka Pa Masambililo Aya

Ukwipusha ukushikile kuli nokubonfiwa ukulolekesha muficitika, ukumona nokufwa ifyaishibikwapo elyo ne mitontontanishishe ya baice pa akashishi ukukana bwelela panshi elyo nefyo COVID-19 yalenga ku mutende wa bumi bwa babombela muchipatala.

Ifya Nkama Pa Masambililo Aya

Cetekeleni ukuti takuli nkama nangu ilyashi pali imwe ili kasendwa panshita ya masambililo elyo nalimbi ilyashi ilipelwe lili nokusungwa ilya nkama elyo lili nokubofeshiwaye kubuyo bwa masambililo aya yaliko.

Ifisuma Ifikafuma Mumasambililo Aya

Ukusendamo ulubali kwenu muli aya masambililo ku katwala pantanshi mu kwafwailisha abapanga amafunde muno citungu ca migoti conse ica Zambia (Copperbelt- Zambia) mukulolekesha cipya-cipya elyo ukutwala imilimo pa mulu iyabapo kale iyisambilisha pa mibombe ya pali COVID-19 elyo kabili ukusanga inshila ishipya ishamaka.

Ifya Busansanso Ifi Ngafuma Mu Masambililo

Tamuli ifya busanso ifili fyonse ifingafuma mukubulamo ulubali lwenu muli uku kusambilila.

Ukuipelesha Mu Masambililo Aya

Twapapata ishibeni ukuti ukusendamo ulubali muli aya masambililo kwakuipelafye elyo kuti mwafumamo nshita ili yonse iyamasambililo ukwabula ukupela umulandu mwafuminamo. Ukusagwamo nangu ukufumamo mumasambililo takwakamubike mukupokwa ifili nga insambu shenu elyo nefyo mwaba nokupelwa. Amasambililo yakapitulukwamo elyo yakasuminishiwa naba Tropical Disease Research Centre Ethics Committee. Ulusa lukapokwa ukufuma kwi ofesi lya Ministry of Health (MOH) ilya ba Provincial Medical Officer, ncende ya migoti (Copperbelt Province) pa kucita amasambililo pa Ndola Teaching Hospital. Muli abakakulwa Ukwipusha amepusho ayali yonse ayakumine amasambililo. Ukutasha ukukalamba!

B. Icipepala Cha Cisuminisho Kubalesendamo Ulu Bali Mukufwailisha

Ukulanda kwa cisuminisho ca bafyashi pakusendamo ulubali mukufwailisha
Ndesuminisha ukusendamo ulubali kwa mwana wandi mukufwailisha panuma yakupoka ilyashi ilya pakufwailisha. Nishinikisha ukuti nipela ilyashi ilyalinga palwa kufwailisha ku ulesendamo ulubali.

Appendix 3: TDRC Ethics Approval Letter

