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Research Article

Assessment of Knowledge and Attitude of Primary Healthcare Workers toward COVID-19 Vaccine Compliance in Gusau Metropolis, Zamfara State, Nigeria

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ABSTRACT
The global impact of the COVID-19 pandemic has severely affected healthcare systems worldwide. COVID-19 has led to significant morbidity and mortality globally, including substantial cases and deaths in Nigeria. The roles of the healthcare worker in the uptake of the Covid-19 vaccine are enormous in education, information dissemination, building trust, motivation and support, accessibility and logistics, monitoring and follow-up, the importance of their knowledge and attitude is of paramount importance in helping the members of the community to make informed decision, demonstrate positive attitudes, serve as community role models and addressing misinformation. The study aimed to: Asses knowledge and to determine the attitudes of primary healthcare workers towards COVID-19 vaccination compliance in Gusau Metropolis. Descriptive cross-sectional design was employed. 128 primary healthcare workers were sampled. Multistage random sampling was used to select the population. Using a structured questionnaire conducted data collection, the responses were analysed using descriptive statistics for knowledge and attitude and inferential statistics of the Chi-square test to explore the relationship between knowledge and attitudes toward vaccine compliance. Findings showed that 65.6% of respondents possessed good knowledge about the COVID-19 vaccines. The attitudes towards the vaccines were positive, evidenced by an average attitude score of 3.0, indicating favourable vaccine compliance. There was a relationship between the knowledge of covid-19 vaccine and attitudes toward covid-19 vaccine compliance. The study concluded that primary healthcare workers in Gusau are well-informed about COVID-19 and possess positive attitudes towards COVID-19 vaccination.

Keywords: Assessment; Knowledge; Attitude; COVID-19 vaccine; Compliance; Primary Healthcare Workers; Gusau

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INTRODUCTION

The Coronavirus Disease 2019 (COVID-19) pandemic caused severe disruptions and unprecedented challenges for healthcare systems worldwide. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), causative of severe viral pneumonia that started in Wuhan, China, infected 768,982,331 people and caused 6,953,730 deaths as of December 06, 2023 worldwide (WHO, 2019).

COVID-19 primarily affects the respiratory system with a range of symptoms from mild rhinorrhea to severe respiratory distress syndrome (Guan *et al*., 2012). This virus is generally more fatal for the elderly and those with a history of comorbidities, such as hypertension, obesity, diabetes, and kidney disease African healthcare systems are not well-equipped to tackle this pandemic (Elhadi, *et al* 2020).

Globally, the severe acute respiratory syndrome coronavirus -2 (SARS-CoV-2) caused coronavirus disease 2019 (COVID-19) pandemic poses a serious threat, instigating a pandemic affecting more than 185 countries (Acter *et al*., 2020). The pandemic has crippled

global economic activity, overloaded hospital systems, and induced panic among the general population (MacDonald *et al*., 2015).

Vaccination is one of the most important public health measures to stop the spread of certain infectious diseases and to lower their mortality rate (Mahmoud *et al*., 2021). According to the World Health Organization (WHO), vaccines prevented at least 10 million deaths between 2010 and 2015 (Haque & Pant, 2020). Since the emergence of this new coronavirus, numerous organizations around the globe have conducted substantial research to create a vaccine that will protect people from this deadly new virus safely and efficiently (Gollust *et al*., 2020).

Globally, worries about vaccine hesitancy are rising, particularly in populous nations with poor literacy rates. The definition of vaccine hesitancy is "delay in accepting or refusing vaccinations notwithstanding the availability of vaccination services" (Abu-Hammour *et al*., 2022).

While African countries are at a higher risk of disease spread due to limited health infrastructure and training, their inability to promptly obtain the vaccine further increases the risk of disease spread, but vaccine-related costs and transfer issues may also further delay vaccination procedures for African people as far as late 2021 or early 2022 (Elhadi, *et al* 2020).

The first case of COVID-19 in Libya was reported on March 24, 2020. Since then, the pandemic has spread rapidly there, resulting in more than 146,000 cases and 2402 deaths as of March 16, 2021. However, Libya's healthcare system was not prepared for this pandemic and continues to suffer from several issues such as shortage of personal protective equipment, lack of healthcare training, unavailability of testing centres in many cities, and shortage of healthcare centre funding due to the ongoing civil war conflict and financial crisis; these factors have resulted in several unprecedented financial, psychological, and social challenges for healthcare workers (Elhadi, *et al* 2020).

Vaccines happen to be known as an important tool for stopping the spread of the pandemic such as COVID-19, influenza, etc. In excess of 100 competitors were in the race to deliver the COVID-19 vaccine (Mahmoud, *et al*., 2021). A safe and effective vaccine for the Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), has been on the wish list of healthcare agencies across the globe (Chakraborty & Maity, 2020).

The process of vaccine development is slow and time-consuming and has to go through multiple checks for potency, efficacy and safety, particularly in high-risk individuals; elderly, pregnant women, and people with co-morbidities, and immunodeficiencies (Verger *et al*., 2021). In addition, the acceptability of the newly launched vaccine is yet another parameter to be considered, since vaccine coverage rate among the population is essential for a successful immunization program. The launch of the COVID-19 vaccine has been an accelerated program, with the vaccine going to market merely nine months after the discovery of the virus. While there is some early data to suggest the safety and efficacy of the approved vaccines, long-term efficacy and any long-term side effects are largely unknown (Bohme & Michie, 2010).

The COVID-19 pandemic has caused disruptions in almost all areas of life all over the world. Education, especially medical education, is one of the areas negatively affected by the pandemic. Medical schools were also suspended during the Covid-19 pandemic, and as such, many students were at home. This has disrupted the medical education process. There have been problems in bedside and practical training with online medical education. Although time is needed to accurately predict the effects of the pandemic on education, it is predicted that it may pose important problems for the learning experience and professional development of medical students (Pogue *et al*., 2020).

It is known that the most beneficial method for the whole world to get rid of the negative effects of the pandemic is vaccination against COVID-19. It is possible with vaccination on the return of medical education and medical faculty students to normal life (Bish & Michie, 2010). Although vaccination seems to be the way out of the pandemic, the willingness of individuals to be vaccinated is also important in combating the pandemic. During the 2009 influenza A (H1N1) pandemic, it was reported that the acceptability of influenza vaccination among adults in the USA was between 50-64%. Nevertheless, there is not enough literature about the COVID-19 vaccine acceptance and the factors influencing it in Nigeria and Africa. Such information which acceptance rate and affecting factors are may be useful for improving COVID-19 vaccine acceptability (Gidengil *et al*., 2012).

The researcher was motivated by some attitudes and discussions of some vaccinators who happen to be the staff of PHC for not taking the vaccine themselves and also filling in the immunization card to many people without necessarily taking the vaccine.

Objectives of the study

Specifically, the objectives were to:

- Assess the level of knowledge of the COVID-19 vaccine among primary healthcare workers in Gusau metropolis.
- Identify the Attitude of primary healthcare workers toward COVID-19 vaccination in Gusau metropolis.

Hypothesis

There is no relationship between knowledge and attitude regarding COVID-19 vaccine compliance among primary healthcare workers in the Gusau metropolis

MATERIALS AND METHODS

Research Design

Descriptive cross-sectional survey design was used for this study. This design was suitable because it can allow assess all the necessary information regarding the study objectives and covers a good number of the target population to allow generalization of the information (Gay, 2012).

Sample Size

The sample size was determined using Isaac and Michael Sample Selection Chart (1995), at precision level of 5% which reveals that for a population of 163 a sample size of 122 is sufficient for generalization. Alteration limit of 10% was considered which 12 additional questionnaires are and given a total of 134 respondents and finally 128 were duly filled and returned and were used for the analysis.

Sampling Techniques

Multistage sampling technique was used. These include 4 stages in which **Stage 1** Gusau metropolis was stratified into 5 political wards. **Stage 2** All the primary health centers were purposefully selected for the study. **Stage 3** Proportionate sampling was used to draw the number of respondents required from each primary health center. **Stage 4** Simple random sampling technique was employed using a paper basket method for the respondents to pick and those that pick yes were administered with the Questionnaire and those that pick no were not administered with the Questionnaire.

Tools/Instrument

Adapted Questionnaire was used from Mastewal, Mohammed, Abdulaziz & Giaoby, it was pretested at PHC Birnin Malam Less Privileged PHC Bungudu, the reliability index was established using Cronbach's Alpha and the result is 0.763. The data was collected following collection of an introduction from the Department of Nursing ABU Zaria which was presented to Zamfara State Ministry of Health Research and Ethical Committee for ethical approval. The duration for the data collection was for 2day from each facility which covers a period of two weeks.

Section A: facilitators driving the acceptance containing 10 items

Section B: barriers of covid-19 vaccine compliance containing 10 items

Data Analysis

The data collected for this study was coded and subjected to Statistical Package for Social Sciences (SPSS) version 26, for appropriate analysis. To analyze the data collected, frequency & percentage was used for demographic data and knowledge, mean and standard deviations were employed to answer the research questions on attitude of the healthcare workers on Covid-19 vaccine compliance, note that for each mean score of response to be accepted, it must be 2.5 or above, and any mean score of response which is less than 2.5 is not accepted. 128 questionnaires were dully filled and returned and were used for the analysis.

Scoring and rating of the instrument For the Knowledge

- 0 – 50% - Poor Knowledge
- 51 – 100 - Good Knowledge

For the Attitude Mean score

- 0 – 2.4 Poor Attitude
- 2.5 > Good Attitude

Ethical Consideration

An official permission to conduct the study was obtained from ethical and research committee of the Zamfara State Ministry of Health with a reference No: (**ZSHREC08092023/221).** All necessary information's about the study were explained to the participants to make them understand the aim of the research which is academic, also, it was explained that the participation was voluntary and that they can withdraw at any time they so wish, with no consequences, and they were informed that there won't be physical, social or psychological risks involve while participating in the study. Names were not required; no any other person apart from the researcher will have access to any of the information. There was no prejudicial treatment for the participants who refused to participate or withdraw from the study.

RESULTS

Table 1 showed that, 27 (21.2%) of the respondents are within the age range of 16-20 years. The findings of this result showed that, majority of the respondents 106 (82.8%) were Hausa by tribe. Moreover, in relation to Marital status of the respondents 74 (57.8%)) are married. Also, 70 (54.7) were female among the respondents. About 44 (33.4%) of the respondents were Senior Health Extension Workers (SCHEW) by profession. Furthermore, it showed that, 95 (74.2%) of the respondents possess Diploma by educational status.

A careful observation of the Table 2 showed that 65.6% of the respondents have good knowledge of COVID-19 vaccine. While 34.3.8% of the respondents has poor knowledge regarding the COVID-19 vaccine.

Table 3 showed an aggregate mean of 3.0, this implies that the majority of respondents has positive attitude toward COVID-19 vaccine compliance. Table 4 shows that chi-square test of independence was conducted to examine the relationship between knowledge level and attitude. The results showed a significant association between knowledge level and attitude, $\chi 2$ (2, N=128)

=78.46, p<.001. This suggests that respondents' knowledge level is strongly related to their attitudes, with observed attitudes differing significantly from expected frequencies

Table 1 Socio-demographic Characteristics of the Study Population n=128

S/N	Characteristic	Frequency	Percentage (%)
1.	**Age in Years**		
	16-20	27	21.2
	21-25	17	13.2
	26-30	21	16.4
	31-35	21	16.4
	36-40	21	16.4
	41 and above	21	16.4
	Mean age = 28 Years		
2.	**Tribe**		
	Hausa	106	82.8
	Fulani	20	15.6
	Igbo	2	1.6
3.	**Marital status**		
	Married	74	57.8
	Single	54	42.2
4.	**Gender**		
	Male	58	45.3
	Female	70	54.7
5.	**Professional Cadres**		
	Senior Community Health Extension Worker	44	34.4
	Junior Community Health Extension Worker	8	6.3
	Health Information Management worker	21	16.4
	Pharmacy	4	3.1
	Lab scientist	11	8.6
	Nursing	1	.8
	Midwifery	12	9.4
	Community Health Officer	2	1.6
	Dental Technician	8	6.3
	Public Health officer	4	3.1
	Environmental Health Technician	4	3.1
	Public Health Technician	7	5.5
	Community Midwifery	2	1.6
6.	**Educational Status**		
	SSCE Certificate	22	17.2
	Diploma	95	74.2
	HND	4	3.1
	Degree	7	5.5

Table 2 Level of Knowledge of COVID-19 vaccine among the primary healthcare workers n=128

Statement	Correct answer		Wrong answer	
	Freq	(%)	Freq	(%)
All the below are examples of Covid-19 vaccine except	70	54.6	58	45.3
Which of these is the source of information of Covid-19 vaccine to you	123	96	05	3.9
Covid-19 vaccine is	75	58.5	53	41.4
Covid-19 vaccine causes all except	44	34.3	84	65.6
The following group of people can take Covid-19 vaccine except	36	28.1	92	71.8
The most effect way of preventing Covid-19 infection is through	75	58.5	53	41.4

Covid-19 vaccine work in the body by	80	62.5	48	37.5
Aggregate Percentage	**84**	**65.6%**	**44**	**34.3%**

Table 3 Attitude of Primary Healthcare Workers toward COVID-19 Vaccine Compliance n=128

Statement	SA	A	D	SD	(x̄)±SD
Young adult (less than 30) and children do not need any vaccination against COVID-19	45	47	14	22	2.8±1.0
Vaccines should be produced, marketed and distributed entirely by the government of Nigeria	58	55	12	3	3.3±0.7
Do you think that you are at risk of COVID-19 vaccine adverse effect	29	58	23	18	2.7±0.9
Vaccination of COVID-19 should always be compulsory for healthcare workers once its available	69	42	9	8	3.3±0.8
Family/friends/relatives should be encouraged to get vaccinated	76	44	7	1	3.5±0.6
It's important for one to be vaccinated against Covid-19 vaccine	55	56	12	6	3.2±0.8
Do you have concerns for the acquisition of COVID-19 from the vaccine	57	45	12	14	3.1±0.9
Do you think that COVID-19 vaccine is the best protective method against COVID-19	63	42	17	6	3.2±0.8
Vaccination of COVID-19 should always be compulsory for health care workers once it is available	52	60	13	3	3.2±0.7
There is no need to be vaccinated because natural immunity exists	38	29	23	38	2.5±1.2
Aggregate mean					**3.0**

Table 4 Relationship between Knowledge and Attitude of COVID-19 Vaccine Compliance among primary Healthcare Workers

Knowledge Level	Positive Attitude (O)	Neutral Attitude (O)	Negative Attitude (O)	Total
High Knowledge	Observed: 55	Observed: 5	Observed: 4	64
	Expected: 30	Expected: 17.5	Expected: 16.5	
Low Knowledge	Observed: 5	Observed: 30	Observed: 29	64
	Expected: 30	Expected: 17.5	Expected: 16.5	
Total	60	35	33	128

$\chi 2$ (2, N=128) =78.46, p<.001

DISCUSSION

About the age of the respondents, 27 (21.2%) are within the age range of 16-20 years. The findings of this result showed that the majority of the respondents 106 (82.8%)) are Hausa by tribe this might be attributed to the fact that Gusau is a predominantly Hausa-speaking community. Moreover, in relation to the Marital status of the respondents 74 (57.8%)) are married. About 44 (33.4%)) of the respondents are Senior Health Extension Workers (SCHEW) by profession.

Concerning the educational status of the respondents, more than two over three 95 (74.2%) of the respondents possess Diploma by educational status, while 7 (5.5%) are the only graduates among all the respondents.

The study reveals that 65.6% of the respondents within the Gusau metropolis have a good knowledge of the COVID-19 vaccine, with a score exceeding 50%. This suggests a reasonably high level of knowledge among primary healthcare workers in the area. This finding aligns with study conducted in Ethiopia, by Adane *et al*. (2022) that reported a significantly higher rate of good knowledge among healthcare workers (HCWs), with 95% demonstrating a substantial understanding of the COVID-19 vaccine. This disparity might be attributed to different educational outreach programs or public health strategies implemented in these regions. The high knowledge rate in Ethiopia could reflect more effective training or communication efforts targeted at HCWs.

Contrary results were observed in studies from Malaysia and Bangladesh. In Malaysia, 62.0% of respondents had poor knowledge about the COVID-19 vaccine [20]. Similarly, in Bangladesh, a significant portion of the population demonstrated low knowledge regarding COVID-19 vaccinations (Chakraborty & Maity, 2020). These differences may be attributed to variations in public health infrastructure, educational outreach, and socio-economic factors influencing access to accurate information.

The study also indicates that the respondents has positive attitude towards COVID-19 vaccine compliance, with an aggregate mean score of 3.0. This is consistent with findings from Jordan, where 66.5% of participants

agreed on the importance of getting vaccinated and this demonstrate a positive attitude (MacDonal *et al*., 2015), and in New York, 87.1% of healthcare workers had favorable attitudes towards the vaccination (Tatar *et al*., 2021).

In Saudi Arabia, about 51.1% of participants viewed the COVID-19 vaccine as safe and had positive attitudes towards it (Mahmoud *et al*., 2021).

Contrary findings were observed in Cyprus, where significant vaccine hesitancy was noted on negative attitudes due to concerns about vaccine development, safety, and side effects (Fakonti *et al.,* 2021).

The result on the relationship between knowledge & attitude shows that the P value is less than 0.005 the null hypothesis which says that, there is no significant relationship between knowledge and attitude is hereby rejected therefore, the alternate hypothesis that there is a significant relationship between knowledge and attitude is accepted. In a related study conducted in the United States focusing on factors influencing COVID-19 vaccination intentions by Zhang and Li (2020), similar patterns emerged. The study found that higher levels of vaccine knowledge positively impact individuals' intentions to get vaccinated, reinforcing the notion that informed decision-making is closely tied to attitudes toward vaccination. However, the study also highlights nuances in the relationship, noting insignificant indirect effects in certain pathways. This suggests that the influence of vaccine knowledge on attitudes may vary based on specific factors such as individual beliefs or contextual factors.

CONCLUSION

The current study on the knowledge and attitudes of healthcare workers (HCWs) in the Gusau metropolis regarding the COVID-19 vaccine reveals several key insights. The findings demonstrate that 65.6% of respondents possess good knowledge of the COVID-19 vaccine, indicating a generally satisfactory level of awareness among primary healthcare workers. The study also shows a positive attitude towards COVID-19 vaccine compliance among respondents, with an aggregate mean score of 3.0.

Differences in vaccine knowledge and attitudes were evident; levels of knowledge may likely influence the likely influence the attitude of the health workers. Additionally, professional roles may influence knowledge levels.

In conclusion, while healthcare workers in the Gusau metropolis generally exhibit good knowledge and positive attitudes towards the COVID-19 vaccine compliance, ongoing efforts are required to address gaps and sustain more positive attitudes among the remaining healthcare workers.

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