The Impact of Belief System, Anxiety, and Attitude of Healthcare Providers towards Post-COVID-19 Vaccines in Keffi, Nasarawa State, Nigeria

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ABSTRACT

Post-COVID-19 pandemic disposition of healthcare professionals regarding vaccination is influenced by fear and anxiety, beliefs concerning vaccine safety and side-effects, and confidence in governmental measures. This study examined the belief system, anxiety, and attitude towards post-COVID-19 vaccines among healthcare providers in Keffi Local Government Area of Nasarawa State, Nigeria. A total of one hundred and forty (140) randomly selected male and female healthcare workers, comprising twenty-four (24) medical doctors and one hundred and sixteen (116) nurses providing COVID-19 healthcare services in Federal Medical Center, Keffi, Nasarawa State, were used for the study. Three standardized instruments: (the Modified MERS-CoV Health Belief Model Scale-HBMS with Cronbach's alpha coefficients of 0.83, COVID-19 Anxiety Scale-CAS with Cronbach's alpha coefficients of .08, and Attitude towards COVID-19 Scale with Cronbach's Alpha reliability of 0.85) were used for data collection. Statistical analysis involved the use of Pearson Correlation and independent t-test to analyze the data collected at significant level of .05. Findings of first and second hypothesis show that independently belief system (r=0.205**, df=140, p<.0001) and anxiety (r=.308**, df=140, p<.0001) has a statistically significant relationship with the attitude of healthcare workers toward COVID-19 vaccine in Federal Medical Center, Keffi, Nasarawa State, Nigeria. This suggests that socio-cultural factors, including societal values, perceptions, and cultural beliefs, have a significant influence on the healthcare provider's attitude toward the COVID-19 vaccine. Also, worry and fear of COVID-19 side effects increase the level of anxiety and attitude of healthcare providers toward the COVID-19 vaccine. The finding of the third hypothesis reveals that there was a statistically significant difference in the attitude of male and female healthcare providers towards the COVID-19 vaccine in Federal Medical Center, Keffi, Nasarawa State, Nigeria (Cal.t=3.462, df=138, P<.025). Based on the findings, it was recommended that there is a need to reduce and redistribute individual workloads, recruit new staff, provide sufficient personal protective equipment, offer financial and psychological support, and shorten shift lengths among healthcare workers.

Keywords: attitude, anxiety, belief system, COVID-19 vaccine, healthcare provider

INTRODUCTION

Numerous research have examined healthcare workers' (HCWs) views about COVID-19 vaccinations and the potential influencing factors (Halevi et al., 2023). The belief system, anxiety levels, and attitudes of healthcare personnel towards ongoing post-COVID-19 vaccinations are influenced by cultural and socioeconomic factors.

In the context of the COVID-19 pandemic, numerous healthcare workers (HCWs) continue to struggle with adapting to standard working conditions due to experiences related to COVID-19 that elevate anxiety levels, thereby affecting their belief systems and attitudes towards ongoing advocacy for post-COVID-19 vaccination.

Healthcare workers (HCWs) are essential in providing counsel and guidance to patients and the broader community regarding vaccination, including precise information about the associated risks and benefits of the vaccine (Puertas et al., 2022). The World Health Organization (2020) emphasized that healthcare workers are prioritized for the initial administration of the COVID-19 vaccine. Moreover, it was observed that pro-vaccine sentiments diminished COVID-19 vaccination hesitancy in the UK (Woolf et al., 2021). In a research including primary healthcare workers, 50.4% of participants expressed a willingness to take the COVID-19 vaccination, 29.0% were uncertain, and 20.7% indicated they would not get it (İkiışık, Sezerol, Taşçı, & Maral, 2022). They are the most reliable sources of information regarding vaccines and vaccination for the general populace (Karafllakis et al., 2016). Healthcare professionals in Turkey often articulate skepticism regarding immunizations (Acar, Eke, & Ozen, 2021; Çevk, Guruz, Ceyhun, & Tekner, 2022). The most significant factor identified is the lack of trust in vaccinations (de Figueiredo, Simas, Karafllakis, Paterson, & Larson, 2020; Paudel, Palaian, Shankar, & Subedi, 2021).

COVID-19 vaccinations have been pivotal in the pandemic response, safeguarding individuals from serious sickness and facilitating the relaxation of public health measures, including lockdowns and compulsory face mask usage in public spaces. Fear and worry are common emotions experienced by frontline healthcare personnel, particularly those in emergency units managing pandemic cases. Mandatory vaccination against COVID-19 is a contentious topic among healthcare workers (Politis et al., 2023). The post-COVID-19 pandemic disposition of healthcare professionals regarding vaccination is influenced by fear and anxiety, beliefs concerning vaccine safety, apprehension about COVID-19, confidence in governmental measures, prior flu vaccination, presence of chronic comorbidities, history of recommendations, and recent depressive symptoms. They cultivate dread and anxiety that influence their belief system and attitude regarding ongoing post-COVID-19 vaccinations.

The study investigates the belief system, anxiety, and attitudes regarding Post-COVID-19 vaccines among healthcare providers in the Keffi Local Government Area of Nasarawa State, Nigeria, and aims to ascertain gender differences in attitudes toward the Post-COVID-19 vaccine among healthcare providers at the Federal Medical Center, Keffi, Nigeria.

METHODOLOGY

Design

A cross-sectional survey design was utilized for data collection. This method is particularly appropriate for this research as it enables the researcher to sample both male and female COVID-19 healthcare providers.

Participants

The study population consists of two hundred twenty-one (221) male and female healthcare workers delivering COVID-19 healthcare services at the Federal Medical Center in Keffi, Nasarawa State, Nigeria. Employing the Krejcie and Morgan (1970) sample size estimation formula, a sample of one hundred and forty (140) randomly selected male and female healthcare workers, consisting of twenty-four (24) medical doctors and one hundred and sixteen (116) nurses providing COVID-19 healthcare services at the Federal Medical Center, Keffi, Nasarawa State, was utilized for the study. Krejcie and Morgan's (1970) sample size estimation table demonstrates that for populations between 220 and 230, the requisite sample size is 140 (refer to Table 1).

Table 1. Krejcie and Morgan Sample Size Determination Table

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.
Source: Krejcie & Morgan, 1970

Instruments

The study adopted three standardized instruments including Modified MERS-CoV Health Belief Model scale, COVID-19 Anxiety Scale (CAS), and Attitude towards COVID-19 Scale.

The Modified MERS-CoV Health Belief Model Scale

The Modified MERS-CoV Health Belief Model scale is an altered version of the Health Belief Model (HBM) (Boulos & Hassan, 2023). This is a 26-item scale utilizing a 5-point Likert scale (ranging from strongly agree to strongly disagree), with scores assigned from 1 to 5. Elevated scores indicate an increased perception of threat, advantages, obstacles, prompts for action, and self-efficacy. The overall reliability of the instrument, as measured by Cronbach's alpha, was 0.83. Cronbach's alpha coefficients for each concept and practice are as follows: perceived susceptibility (0.70), perceived barriers (0.77), perceived advantages (0.81), signals to action (0.69), self-efficacy (0.73), and practice (0.85).

COVID-19 Anxiety Scale (CAS)

The COVID-19 Anxiety Scale (CAS) was created by Silva et al. (2022) to assess anxiety related to COVID-19. CAS is a seven-item scale employing a four-point system (0 = not applicable to me and 3 = highly appropriate to me). Anxiety levels were quantified by calculating the mean of participants' values (range from 0 to 3), indicating that a larger average signifies increased anxiety around COVID-19. The validation by content experts of the scale indicated that Content Validity Coefficient (CVC) values of .80 or higher serve as the standard for content validity. The findings indicated that all items exhibited values exceeding .80 in terms of pertinence, relevance, and clarity. The factor analysis of each item ranges from .53 to .88. The reliability coefficient for each item varied between .94 and 1.00.

Attitude towards COVID-19 Scale

Furthermore, Batholomew et al. (2022) created the Attitude towards COVID-19 Scale, a self-administered questionnaire with 11 items that utilize essential terminology about attitudes towards COVID-19 immunization. The 11-item measure was developed to categorize participants into three groups based on their attitudes and intentions regarding the COVID-19 vaccination. The replies were quantified on a Likert scale with categorical

options: Yes/No/Unsure/Not applicable to denote values 1, 2, 3, and 4. The cumulative attitude score was derived by aggregating the raw scores of the 11 items, which ranged from 1 to 4, with a higher mean score reflecting a more favorable attitude towards the COVID-19 vaccination. The instrument exhibited a Cronbach's Alpha reliability of 0.85, signifying its reliability.

Procedure

Prior to conducting data collection, the researcher physically approached the pertinent authorities at FMC and produced a letter of introduction acquired from the Department of Psychology at Nasarawa State University, Keffi. In each office visited, the researcher initially introduced himself to the Medical Director and personnel, provided an overview of the project, and requested their consent to collect data. Upon receiving authorization, the researcher individually visited the subjects, introduced himself, and requested their approval to partake in the study. Participants who consented were chosen to represent the study population and signed an informed consent form to demonstrate their desire to engage in the study. Furthermore, ethical regulations delineating professional ethics for the study's conduct were rigorously followed. Participants signed informed consent forms and were informed that the data collected for the study would be utilized for research purposes and the advancement of knowledge. Furthermore, all information obtained will be handled confidentially in accordance with the American Psychological Association (APA) Code of Conduct (2002).

Data analysis

The study employed Pearson Product Moment Correlation (PPMC) and Independent Sample t-test. The PPMC aims to investigate the presumed correlation between belief systems and attitudes about the post-COVID-19 vaccination, as well as the association between anxiety and attitudes toward post-COVID-19 in hypotheses one and two. The independent sample t-test was employed to determine the significant difference in hypothesis three of the investigation.

RESULTS

Hypothesis 1: This hypothesis stated that there will be a significant relationship between belief system and attitude toward post-COVID-19 vaccine among healthcare providers in Federal Medical Center, Keffi. The hypothesis was tested using Pearson-r correlation analysis and the result is presented in Table 2.

Table 2. Correlation between belief system and attitude toward Post-COVID-19 vaccine

		Belief System	Attitude towards COVID-19
Belief System	Pearson Correlation	1	.205**
	Sig. (2-tailed)		.0001
	N	140	140
Attitude towards COVID-19	Pearson Correlation	.205**	1
	Sig. (2-tailed)	.000	
	N	140	140
**. Correlation is significant at the 0.01 level (2-tailed).			

Pearson's correlation coefficient is 0.205**, indicating a positive correlation. The Pearson-r correlation study indicates a statistically significant association between belief systems and attitudes regarding the COVID-19 vaccine among healthcare providers at the Federal Medical Center, Keffi, Nasarawa State, Nigeria. The results demonstrated statistical significance at p<.0001. This indicates that the belief system significantly affects the healthcare provider's attitude towards the COVID-19 vaccine at the Federal Medical Center, Keffi, Nasarawa State, Nigeria.

Hypothesis 2: This hypothesis stated that there will be a significant relationship between anxiety and attitude toward post-COVID-19 vaccine among healthcare providers in Federal Medical Center, Keffi. The hypothesis was tested using Pearson-r correlation analysis and the result is presented in Table 3.

Table 3. Correlation between anxiety and attitude toward post-COVID-19 vaccine

		Anxiety	Attitude towards COVID-19
Anxiety	Pearson Correlation	1	.308**
	Sig. (2-tailed)		.0001
	N	140	140
Attitude towards COVID-19	Pearson Correlation	.308**	1
	Sig. (2-tailed)	.000	
	N	140	140
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 3 demonstrates that Pearson's correlation coefficient of 0.308** signifies a favorable association. The Pearson-r correlation study indicated a statistically significant link between anxiety and attitudes regarding the post-COVID-19 immunization among healthcare providers at the Federal Medical Center, Keffi, Nasarawa State, Nigeria. The findings demonstrated statistical significance at $p < .0001$. This indicates that fear, worry and anxiety significantly influences the healthcare provider's perspective on the post-COVID-19 immunization at the Federal Medical Center, Keffi, Nasarawa State, Nigeria.

Hypothesis 3: This hypothesis stated that there will be a significant gender difference in attitude toward post-COVID-19 vaccine among healthcare providers in Federal Medical Center, Keffi. The hypothesis was tested

using Pearson-r correlation analysis and the result is presented in Table 4.

Table 4. t-test showing gender differences in attitude toward post-COVID-19 vaccine

Variable	Gender	**Cal.t**	**df**	**t.Obs**	**P.value**
Attitude toward COVID-19 vaccine	Male	3.462	138	2.276	.025
	Female				

Table 4 indicates that the t-test analysis demonstrates a substantial gender disparity in the attitudes of healthcare personnel toward the post-COVID-19 immunization at the Federal Medical Center, Keffi, Nigeria. Consequently, the theory was affirmed. This indicates a statistically significant gender disparity among healthcare workers regarding the post-COVID-19 immunization at the Federal Medical Center, Keffi, Nasarawa State, Nigeria.

DISCUSSION

Hypothesis 1: This hypothesis posits a substantial correlation between belief systems and attitudes toward the post-COVID-19 immunization among healthcare providers at Federal Medical Center, Keffi. The hypothesis was evaluated by Pearson-r correlation analysis, which indicated a statistically significant association between belief systems and the attitudes of healthcare personnel regarding the post-COVID-19 immunization at the Federal Medical Center, Keffi, Nasarawa State, Nigeria. Socio-cultural factors, including societal values, perceptions, and cultural beliefs, influence healthcare providers' attitudes regarding the post-COVID-19 immunization at the Federal Medical Center in Keffi.

The results of this investigation are corroborated by the research of Tharwat et al. (2022). They evaluate the willingness to get the COVID-19 vaccine among healthcare workers (HCWs) in Egypt and identify the elements that may affect their decision. The study comprised 455 healthcare workers, with a mean age of 36.55 years (SD = 10.31), of which 80% were female. The acceptance rate for the COVID-19 vaccination was 70.5%, whereas reluctance and resistance were 17.6% and 11.9%, respectively. A majority of individuals experienced worry stemming from the perception of an elevated risk of getting COVID-19 (71.6%), while over 64% believed they

were susceptible to vaccine side effects. The fear of infection and the heightened danger of contracting it elevate anxiety levels and influence attitudes towards the post-COVID-19 era. The adoption of the COVID-19 immunization among healthcare workers is significantly elevated due to their belief systems. Deger and Yigitalp (2024) examined the attitudes towards the COVID-19 vaccine, the degree of vaccine hesitancy, and the factors affecting the Family Healthcare Center personnel responsible for providing primary healthcare services. Their findings indicated a weak negative correlation between the overall vaccination hesitation score and the overall attitude score towards the COVID-19 vaccine during the pandemic.

Aka et al. (2024) aimed to assess the acceptance rate and associated factors for COVID-19 immunization among healthcare workers in Yaoundé, Cameroon. The findings revealed that 45.5% of healthcare workers had adequate attitudes and 52.8% demonstrated appropriate beliefs regarding COVID-19 vaccinations. Approximately 68.4% of healthcare workers consented to vaccination, while 31.6% opposed it. Adverse attitudes (AOR: 4.411; 95% CI [2.324 - 8.372]) towards the COVID-19 vaccine were substantially correlated with vaccine uptake. Approximately 39.8% of healthcare workers indicated that the vaccinations could worsen pre-existing disorders. The inclination to receive vaccination was notably elevated among healthcare workers. Adverse perceptions of COVID-19 vaccinations were markedly correlated with the acceptability of vaccination. The study by Hajure et al. (2021) offers the most recent evaluation of healthcare personnel' perspectives regarding the COVID-19 immunization and its influencing factors globally. Approximately two-thirds of the 24 studies indicated that respondents had a favorable attitude (≥50%) towards COVID-19 immunization. In approximately 25% of the investigations, a negative attitude (less than 50%) towards vaccination was documented. While the majority of research indicate that healthcare workers possess a favorable disposition towards COVID-19 immunization, other surveys highlight negative sentiments regarding vaccine utilization, perhaps signifying missed opportunities or obstacles for global initiatives to alleviate the epidemic. Additional research.

Olaoye et al. (2023) evaluated public perceptions and the readiness to adopt COVID-19 vaccinations, along with associated factors, among people of Ondo State, Nigeria. Univariate and multivariate statistical analyses identified factors impacting beliefs and the readiness to accept COVID-19 vaccinations. Of the 223 responders, 72.9% reported having gotten at least one dose of COVID-19 vaccines, whereas 67.0% (n = 205) judged the vaccines to be effective. Among persons who had not had any COVID-19 vaccinations, 14.1% (n = 43) expressed unwillingness to accept the vaccines. The beliefs of respondents regarding the effectiveness of COVID-19 vaccines were affected by their gender, occupation, religion, and educational level ($p < 0.005$). Nevertheless, individuals who had not yet been vaccinated shown reluctance, necessitating more assertive risk communication to potentially change the trajectory of events.

Chew et al. (2021) assessed the readiness of healthcare personnel to receive the COVID-19 vaccination, revealing that over 95% expressed willingness to vaccinate. These participants were more inclined to view the pandemic as severe, regarded the vaccine as safe, experienced fewer financial concerns, exhibited reduced stigmatization towards the vaccine, demonstrated an enhanced pro-social mindset, and possessed greater trust in health authorities. The study suggests that perceived susceptibility, a potentially low risk of harm from the vaccine, and pro-social behavior are the primary determinants.

Furthermore, Alle and Oumer (2021) sought to evaluate and identify determinants influencing health professionals' attitudes towards the acceptability of the COVID-19 vaccination. In this study, 42.3% [95% CI (36.7–47.6)] of subjects had a favorable attitude towards COVID-19 vaccination uptake. The study determined that health professionals exhibited a deficient attitude towards COVID-19 vaccination acceptance.

Hypothesis 2: This hypothesis posits a substantial correlation between anxiety and attitudes regarding the post-COVID-19 immunization among healthcare providers at Federal Medical Center, Keffi. The hypothesis was evaluated by Pearson-r correlation analysis, which indicated a statistically significant association between anxiety and attitudes about the post-COVID-19 immunization among healthcare providers at the Federal Medical Center, Keffi, Nasarawa State, Nigeria. The results demonstrated statistical significance at $p < .0001$. This indicates that worry significantly influences the healthcare provider's perspective on the post-COVID-19 immunization at the Federal Medical Center in Keffi, Nasarawa State, Nigeria.

The results of this study align with the research performed by Lewandowska et al. (2024). The researchers evaluated the anxiety levels experienced by healthcare workers following the COVID-19 pandemic and

examined their perspectives on COVID-19 immunizations. The survey indicated that the participants exhibited a modest amount of worry, with 71% of respondents believing that immunizations are benign. The proportion of immunized nurses was markedly lower than that of their physician counterparts. Furthermore, Ayaz-Alkaya et al. (2023) examined the determinants of fear, anxiety, and nurses' attitudes towards the new coronavirus disease 2019 (COVID-19) vaccination. The findings indicated a positive correlation between anxiety and negative perceptions of the immunization and fear of COVID-19. Age and fear had a favorable correlation with anxiety according to COVID-19. Nurses who were vaccinated and those who experienced apprehension exhibited a favorable disposition towards the vaccine. The study advocated the introduction of psychosocial support programs to enhance favorable attitudes regarding immunization.

Similarly, Balaban et al. (2023) sought to assess the comparative levels of pandemic-related anxiety and fear before and after vaccination, as well as the attitudes of healthcare workers regarding COVID-19 vaccinations. The study revealed a significant degree of pre-vaccine anxiety and apprehension. The investigation indicated a reduction in worry and terror levels, and an enhancement in favorable attitudes towards the vaccine post-vaccination, suggesting that immunization may positively impact the mental health of healthcare workers. Di Prinzio et al. (2024) examined the impact of vaccination reluctance on the psychological burden faced by healthcare professionals. The findings revealed that hesitant healthcare workers were at an increased risk of psychological impairment compared to their counterparts, as healthcare workers are inclined to receive vaccinations to save patients and family members. Additional research has illustrated the correlation between anxiety and attitudes about the COVID-19 vaccine among healthcare professionals (Badami et al., 2022; Maraqa et al., 2024; Simsekoglu et al., 2024; Xu et al., 2023).

Hypothesis 3: This hypothesis posits that a considerable gender disparity exists in attitudes toward the COVID-19 immunization among healthcare providers at Federal Medical Center, Keffi. The hypothesis was evaluated by independent t-test analysis, which indicated a statistically significant gender difference among healthcare personnel at the Federal Medical Center, Keffi, Nasarawa State, Nigeria. Similarly, the study's results align with the research undertaken by Zaher, Basingab, Alrahimi, Basahel, and Aldahlawi (2023). They examined gender disparities in response to COVID-19 infection and immunization. The investigation examines the impact of COVID-19 infection and vaccination on sexual activity, hormonal levels in both males and females, and the menstrual cycle in females, as well as male sex hormones and sexual activity during and post-immunization.

Paudel et al. (2023) seeks to evaluate the knowledge and attitudes of healthcare workers regarding booster doses of COVID-19 vaccinations in Nepal. Among the study participants, 68.0% exhibited proficient understanding, while 78.6% demonstrated a positive attitude toward the COVID-19 booster dose. Female healthcare professionals and individuals who received a single dose of the COVID-19 vaccine had markedly reduced probabilities of possessing enough knowledge regarding the COVID-19 booster dosage. Jayawardana et al. (2024) examine gender disparities in attitudes regarding COVID-19 preventative measures and vaccination intentions in the United States, emphasizing the relationship between risk perception and attitudes towards public health standards. The results indicated that women possessed a heightened risk perception of COVID-19 and demonstrated increased adherence to preventative measures in comparison to males. Women exhibited greater concurrence with public policy initiatives aimed at limiting COVID-19. Comprehending the intricate relationships among risk perception, behavior, and gender can guide policymakers and health authorities in customizing interventions to meet the varied requirements of the population.

Zintel et al. (2021) performed a systematic study and meta-analysis regarding gender disparities in COVID-19 vaccination intentions. Sixty articles were incorporated into the study, with data from 46 research (n = 141,550) accessible for meta-analysis. A majority (58%) of studies indicated that men had greater intentions to receive the COVID-19 vaccine. Meta-analytic computations indicated that a substantially lower proportion of women expressed intent to receive vaccination compared to men, OR 1.41 (95% CI 1.28 to 1.55). This comprehensive review and meta-analysis revealed diminished vaccination intentions in women compared to men. Toshkov (2023) examines the gender disparity in COVID-19 vaccination attitudes by two nationally representative public opinion polls conducted in February and May 2021 across 27 European nations. The findings regarding gender demonstrated that diminished perceived risks of COVID-19 infection do not explain the gender disparity in vaccine reluctance. The gender disparity in COVID-19 vaccination reluctance largely stems from women assessing the hazards of the immunizations as outweighing their benefits.

Researchers discovered that whereas women and men reported comparable COVID-19 vaccination rates in 2022, unvaccinated men demonstrated a greater intention to receive the vaccine compared to unvaccinated women (Ndeji et al., 2024). Research by other scientists indicates that women are less inclined than men to accept COVID-19 vaccines, and in low- and middle-income countries, women may also exhibit lower vaccination rates against COVID-19, potentially attributable to factors such as reduced educational attainment, work commitments, and domestic caregiving responsibilities (Sullivan, Chen, & Ndeji, 2022). Health was tied with vaccination in men, but greater trust in the government was associated with vaccine uptake in women.

CONCLUSION

The research on the evaluation of belief systems, anxiety, and attitudes towards post-COVID-19 vaccines among male and female healthcare providers at Federal Medical Center Keffi, Nigeria, offers an in-depth insight into the intricate role of healthcare providers in enhancing acceptance of post-COVID-19 vaccines and advocating against COVID-19 conspiracy theories related to vaccination. This study's results indicate an independent association among belief systems, anxiety, and healthcare professionals' attitudes, with notable gender differences between male and female personnel at the Federal Medical Center, Keffi. The attitudes, belief systems, and anxiety levels significantly influence post-COVID-19 vaccine acceptance and vaccination rates among healthcare providers and patients in health facilities, particularly at the Federal Medical Center, Keffi, Nasarawa State, Nigeria. Healthcare professionals ought to be equipped with resources to mitigate this risk. This can be achieved by recognizing risk factors and implementing suitable measures, including emotional and mental support through personal or group counseling sessions, lectures, mental health counseling hotlines, and social networks, among others. This study offers stakeholders and policymakers valuable evidence regarding the mandatory or voluntary status of post-COVID-19 immunization policies for healthcare workers and the general populace. Furthermore, the current findings may help guide vaccination policy in forthcoming pandemics.

RECOMMENDATIONS

1. The health facilities and government must enact preventive measures and regulatory methods to manage the emotional well-being of healthcare personnel.
2. Furthermore, entities such as the World Health Organization and the Federal and State Ministries of Health, in conjunction with the Primary Health Care Centers in Keffi and Nasarawa State, should persist in disseminating updated information pertaining to post-COVID-19 to ensure enhanced management of COVID-19. Consistent with the WHO's recommendations, our findings indicate that policymakers should prioritize alternative measures, such as informational campaigns, rather than mandatory vaccination programs.
3. The health authorities, through healthcare providers recognized by the public as the most trustworthy source of information on post-COVID-19 vaccines, should develop interventions in the form of awareness campaigns utilizing various multimedia to disseminate clearer information regarding the safety and efficacy of the vaccines. The awareness efforts should elucidate the innovative technology employed in the manufacture of some vaccines to enhance acceptance of post-COVID-19 vaccinations.
4. It is necessary to diminish and redistribute individual workloads, hire additional personnel, supply adequate personal protective equipment, offer financial and psychological assistance, and reduce shift durations.

Suggestions for Further Research

Additional research is required to examine the combined impact of belief systems, anxiety, and attitudes of healthcare workers on the acceptability of post-COVID-19 vaccine obligations.

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