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ORIGINAL RESEARCH ARTICLE

Healthcare Worker Perspectives on Emerging and Re-emerging Infectious Diseases: A Cross-Sectional Study in Chiroma Ward, Nigeria

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ABSTRACT
Background: Emerging and re-emerging infectious diseases continue to pose significant public health threats globally, particularly in low- and middle-income countries. Healthcare workers, as frontline responders, play a critical role in disease detection, containment, and response. Understanding their knowledge, perception, preparedness, and the institutional barriers they face is crucial for informing strategic public health interventions. Objective: This study assessed the knowledge, perception, preparedness, and systemic challenges related to emerging and re-emerging infectious diseases among healthcare workers in Chiroma Ward, Nigeria. Methods: A cross-sectional survey was conducted among 111 healthcare workers selected from various professional cadres using a structured, pretested questionnaire. Descriptive statistics were used to summarise data, while Chi-square tests determined associations between sociodemographic variables and awareness/knowledge levels. Results: The findings showed that 51.4% of respondents were aware of emerging and re-emerging infectious diseases, with Lassa fever being the most frequently recognised (38.7%). A majority (59.5%) reported receiving formal training; however, only 35.1% felt adequately equipped to respond to outbreaks. Facility preparedness was rated as well prepared (32.4%) or moderately prepared (28.8%) by most respondents. Institutional barriers such as inadequate funding (39.6%) and lack of PPE (25.2%) were frequently reported. Statistically significant associations were found between knowledge levels and factors such as age, marital status, cadre, and educational qualification ($p < 0.05$). Conclusion: Although moderate levels of knowledge and preparedness were observed, there are still gaps in personal readiness, institutional support, and inter-agency collaboration. Addressing these barriers through targeted training, improved funding, and systemic policy reforms is essential for strengthening epidemic preparedness in Chiroma Ward and similar settings.

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Emerging infectious diseases, healthcare workers, perception, preparedness, institutional barriers

INTRODUCTION
Emerging and re-emerging infectious diseases continue to pose substantial threats to global health, especially in low- and middle-income countries (Kobayashi *et al.* 2018; Mostafavi *et al.*, 2021; Ramon-Torrell, 2023). Emerging infectious diseases (EIDs) are infections that have newly appeared in a population or have existed but are rapidly increasing in incidence or geographic range (Chen, 2022). Re-emerging infectious diseases, on the other hand, are those that were previously controlled, but have again risen to be a significant health threat (Petersen *et al.*, 2018; Mostafavi *et al.*, 2021; Kobayashi *et al.*, 2018). The emergence of high-threat pathogenic diseases has increased globally in recent years (Mostafavi *et al.*, 2021). Almost 75% of recently emerged diseases afflicting humans have a zoonotic origin (Petersen *et al.*, 2018; Munyua *et al.*, 2019). Factors associated with the emergence or re-emergence of high-threat pathogenic diseases include the pathogen's adaptation or resistance, host behaviour such as migration, international travel, human-animal interaction, poverty, climate change, and industrial and economic development (Morens *et al.*, 2004). EIDs cause a huge economic crisis and public health problems in the world (Morens *et al.*, 2004; McArthur, 2019; Chen, 2022).

The past two decades have witnessed the rise of several EIDs, including SARS, MERS, Ebola virus disease, Zika virus, and, most recently, the COVID-19 pandemic, which has challenged even the most robust healthcare systems globally (WHO, 2020; Omilabu, 2016). In the African context, diseases such as Lassa fever, cholera, yellow fever, and monkey pox have resurfaced, complicating already

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strained healthcare systems (NCDC, 2023). Nigeria, with its vast population and varying ecological and socioeconomic settings, has experienced recurrent outbreaks of both new and re-emerging infectious diseases (Omitola *et al.*, 2020; Ademulegun *et al.*, 2024). Despite institutional advances such as the establishment of the Nigeria Centre for Disease Control (NCDC), systemic challenges, particularly at the primaary healthcare level still persist. A 2022 WHO Joint External Evaluation report identified gaps in workforce development, real-time surveillance, and risk communication at sub-national levels (WHO JEE, 2022).

The frontline role of healthcare workers (HCWs) in infectious disease detection, containment, and management is widely acknowledged. Their awareness, attitudes, and preparedness are pivotal to the success of public health responses (Sultan *et al.*, 2020; Tang *et al.*, 2022). However, studies have shown that many HCWs in developing countries lack adequate training, resources, and institutional support to effectively respond to emerging infections (Abalkhail and Alslamah, 2022; Iheanacho *et al.*, 2021). Understanding their perspectives, particularly in rural or semi-urban wards like Chiroma, is essential for informing policy and improving response mechanisms at the local level.

Chiroma Ward, located in a semi-urban area with limited health infrastructure, represents one such underserved locality. The locality is characterised by limited access to diagnostic infrastructure, irregular training, and overstretched health personnel. The ward remains vulnerable to infectious disease threats. Yet, to date, no published study has systematically examined the perceptions, awareness levels, or institutional preparedness of HCWs within this locality. This research, therefore, seeks to fill a critical gap by examining healthcare worker perspectives on emerging and re-emerging infectious diseases in Chiroma Ward. The study aims to provide evidence that will inform locally responsive policies, capacity-building interventions, and community-level preparedness strategies that align with Nigeria's broader public health security goals.

MATERIALS AND METHODS

Research Design

The study adopted a cross-sectional descriptive design aimed at assessing the perspectives of healthcare workers on emerging and re-emerging infectious diseases. The cross-sectional approach was appropriate for capturing data at a specific point in time, allowing for an analysis of knowledge, attitudes, and perceived preparedness among health personnel (Levin, 2006; Maier *et al.*, 2023).

Study Area

The study was conducted in Chiroma Ward, located within Lafia LGA, in Nasarawa State, Nigeria. The ward is part of Nigeria's decentralised healthcare delivery system, where primary health care (PHC) facilities form the foundational tier. The ward is representative of many semi-urban communities across northern and middle-belt Nigeria, characterised by moderate population density, limited health infrastructure, and high vulnerability to infectious disease outbreaks due to environmental, socioeconomic, and systemic health factors. Health services in the ward are delivered through a combination of Primary Health Centres (PHCs), Health Posts, and dispensaries, staffed predominantly by Community Health Extension Workers (CHEWs), nurses, midwives, and occasionally medical officers. The ward's vulnerability is heightened by its ecological profile, which may include stagnant water bodies, poor waste management systems, and seasonal climate variability. Chiroma is also situated within a region classified by the Nigeria Centre for Disease Control (NCDC) as moderately endemic for Lassa fever and prone to annual outbreaks of cholera and measles (NCDC, 2022).

Study Population

The target population comprised healthcare workers (HCWs) currently practising in Chiroma Ward. These included community health extension workers (CHEWs), nurses and midwives, medical Officers, laboratory scientists/technicians, and environmental health officers.

Inclusion criteria required that respondents be actively engaged in healthcare delivery and present in the ward during the period of data collection. Volunteers, corps members, student trainees, interns, HCWs on leave and administrative staff were excluded.

Sample Size Determination

The sample size for this study was determined using the Taro Yamane formula (Yamane, 1967), which is commonly applied in social science and public health research to determine sample size from a finite population. The formula is given as:

$$\frac{N}{1 + N\,(e)^2}$$

Where:

- n = sample size
- N = total population of healthcare workers in Chiroma Ward (135)
- e = margin of error (commonly set at 0.05 for 95% confidence level)

Substituting the values into the formula:
$n = 135 / (1 + 135 * 0.05^2) = 135 / (1 + 135 * 0.0025) = 135 / (1 + 0.3375) = 135 / 1.3375 = 100.9$

Rounded up, the minimum required sample size is 101 healthcare workers.

To account for non-response or incomplete questionnaires, a 10% buffer was added:

101 + 10% of 101 = 101 + 10.1 = 111

Sampling Technique

A stratified random sampling method was employed to ensure proportional representation across different cadres of healthcare workers. The strata included CHEWs,

nurses/midwives, medical officers, and laboratory personnel. From each stratum, participants were randomly selected using facility rosters and random number generation.

Instrument of Data Collection

A structured self-administered questionnaire was used to collect data. The researcher designed the instrument after conducting a literature review. The questionnaire consisted of five sections. Section A elicited sociodemographic characteristics of participants, section B was concerned with knowledge of emerging and re-emerging infectious diseases, section C was concerned with perception of risk and preparedness while section D was concerned with attitudes and beliefs about response efforts while section E was concerned with systematic and institutional challenges in the management of emerging and re-emerging infectious diseases.

Validity and Reliability of the Instrument

Content validity was ensured through expert review by two epidemiologists and one public health researcher. Face validity was established via a pilot test involving 20 healthcare workers in a neighbouring ward, not part of the study area.

For reliability, Cronbach's alpha was computed for internal consistency. A coefficient of 0.84 was obtained, indicating an acceptable level of reliability (Kılıç, 2016).

Method of Data Collection

Data were collected over a three-week period by trained research assistants under the supervision of the principal investigator. Respondents were briefed on the purpose of the study and assured of confidentiality. Informed consent was obtained prior to questionnaire administration.

Method of Data Analysis

Collected data were coded and entered into Statistical Package for the Social Sciences (SPSS) version 25 for analysis. Descriptive statistics such as frequencies, means, and standard deviations were used to summarise the data. Inferential statistics including the chi-square test was employed to examine associations between sociodemographic characteristics and perspectives on infectious disease threats. Significance was set at $p < 0.05$.

Ethical Considerations

Ethical approval for the study was obtained from the Nasarawa State Ministry of Health (NIREC Protocol No: 18/06/2017). Permission to conduct the study was obtained from the management of the facilities to be used as study centres. Informed consent was obtained from each participant. Confidentiality, anonymity, and voluntary participation were ensured throughout the data collection process, in accordance with the Declaration of Helsinki.

RESULTS

Table 1 shows the demographic information of the respondents. Findings of the study reveal that the majority of the participants were males (51.4%), who were within the age range of 26–35 years (22.5%). Most respondents were single (27.0%), and the predominant professional group was laboratory scientists/technicians (32.4%). The highest level of education among participants was a Bachelor of Science degree (31.5%), and most of them worked in public health facilities (51.4%). In terms of years of professional experience, the majority had between 1–5 years (34.2%).

Table 1: Sociodemographic Information of Respondents

Variables	Frequency	Percentages
Gender		
Male	57	51.4
Female	46	41.4
Prefer not to say	8	7.2
Age (Years)		
18-25	22	19.8
26-35	25	22.5
36-45	20	18.0
46-55	20	18.0
56 and above	24	21.6
Marital status		
Single	30	27.0
Married	27	24.3
Divorced	24	21.6
Separated	22	19.8
Widowed	8	7.2
Cadre/Designation		
Medical Director	23	20.7
Nurse/Midwife	27	24.3
Lab Scientist/Technician	36	32.4
Community Health Officer	25	22.5
Educational level		
Diploma	27	24.3
B. Sc.	35	31.5
M. Sc.	28	25.2
Fellowship/Doctorate	21	18.9
Total	**111**	**100**

Source: Field Survey, 2025

Table 2 shows the respondents' knowledge of emerging and re-emerging infectious diseases. The majority of the respondents (51.4%) were aware of such diseases, with Lassa fever (38.7%) being the most frequently identified emerging infection. In the category of re-emerging diseases, measles was most commonly cited (32.4%). The majority of participants (34.2%) acknowledged all listed factors (climate change, urbanisation, antimicrobial resistance, and global travel) as contributing to the emergence and re-emergence of infectious diseases. Additionally, 59.5% of respondents indicated they had received formal training on the topic. In terms of self-assessed knowledge levels, the most frequently reported category was "fair" (32.4%), suggesting moderate awareness among healthcare professionals in the study area.

Table 2: Knowledge of Emerging and Re-Emerging Infectious Diseases

Variables	Frequency	Percentages (%)
Awareness of emerging and re-emerging infections		
Yes	57	51.4
No	36	32.4
Not sure	18	16.2
Emerging Infectious Disease		
Covid-19	27	24.3
Lassa fever	43	38.7
Ebola Virus Disease	30	27.0
Zika virus	11	9.9
Re-emerging Infectious Disease		
Measles	36	32.4
Tuberculosis	33	29.7
HIV/AIDS	6	5.4
Smallpox	13	11.7
Cholera	23	20.7
Factors contributing to EID/RID		
Climate change	24	21.6
Urbanisation	20	18.0
Antimicrobial Resistance	7	6.3
Global travel	22	19.8
All of the above	38	34.2
Formal Training on emerging and re-emerging infectious diseases		
Yes	66	59.5
No	45	40.5
Level of Knowledge		
Poor	20	18.0
Fair	36	32.4
Good	21	18.9
Very Good	7	6.3
Excellent	27	24.3

Source: Field Survey, 2025

Table 3: Perception and Preparedness of Healthcare Workers

Variables	Frequency	Percentages (%)
Emerging/re-emerging infectious diseases are a serious threat to public health?		
Strongly disagree	21	18.9
Disagree	21	18.9
Neutral	27	24.3
Agree	24	21.6
Strongly agree	18	16,2
Facility Preparedness		
Not prepare	9	8.1
Slightly prepared	13	11.7
Moderately prepare	32	28.8
Well prepared	36	32.4
Fully prepared	21	18.9
Adequately equipped WITH the skills to manage such diseases		
Yes	39	35.1
No	46	41.4
Not sure	26	23.4
Facility have an infection prevention and control (IPC) protocol for outbreaks		
Yes	45	40.5
No	38	34.2
Not sure	28	25.2
Outbreak drills or simulation exercises		
Never	60	54.1
Occasionally	21	18.9
Often	13	11.7
Very frequently	17	15.3

Source: Field Survey, 2025

Presented in Table 3 is the perception and preparedness of healthcare workers toward emerging and re-emerging infectious diseases. Findings show that respondents were fairly divided in their perception of threat, with 24.3% maintaining a neutral stance, while 21.6% agreed and 18.9% strongly disagreed that such diseases pose a serious public health threat. In terms of facility preparedness, most respondents indicated their facilities were either well prepared (32.4%) or moderately prepared (28.8%). However, only 35.1% believed they were adequately equipped with the skills to manage such diseases, while 41.4% disagreed, indicating a notable skills gap among healthcare workers. Furthermore, only 40.5% confirmed that their facilities had an infection prevention and control (IPC) protocol in place, and a majority (54.1%) reported that their facilities never conducted outbreak drills or simulations.

Presented in Table 4 are the attitudes and perceptions of healthcare workers towards emerging and re-emerging infectious diseases. Results obtained from the table indicate that the perception that emerging infectious diseases are inevitable in the 21st century, willingness to volunteer during an outbreak, the belief that PPE should be mandatory during suspected outbreaks, the notion that healthcare workers should receive periodic training on infectious disease preparedness, and confidence in their ability to respond effectively during an infectious disease outbreak had mean scores of 3.9, 3.1, 3.1, 3.0, and 3.0 respectively. With all items having mean values equal to or greater than the decision benchmark of 3.0, it can be inferred that the attitudes and perceptions of healthcare workers towards emerging and re-emerging infectious diseases are generally positive.

Table 4: Attitudes and Perceptions of Healthcare Workers towards these Diseases

Items	Attitudes and Perceptions	$\bar{x}$	Sd	Decision
1	Emerging infectious diseases are inevitable in the 21st century	3.9	0.7	Accepted
2	I am willing to volunteer during an outbreak in my facility	3.1	1.4	Accepted
3	PPE should be mandatory during suspected outbreaks	3.1	1.3	Accepted
4	HW should receive periodic training on infectious disease preparedness	3.0	1.5	Accepted
5	I feel confident in my ability to respond effectively during an infectious disease	3.0	1.3	Accepted
	Cluster Mean	**3.2**	**1.7**	**Accepted**

PPE: Personal protective equipment; **HW:** Healthcare workers; **Source: Field Survey, 2025**

Table 5: Systemic and Institutional Challenges in the Management of Emerging and Re-emerging Infectious Diseases

Variables	Frequency	Percentages (%)
Institutional Challenges		
Inadequate funding	44	39.6
Lack of PPE	28	25.2
Poor communication	16	14.4
Insufficient Staff	11	9.9
Poor surveillance infrastructure	12	10.8
Partners with Authorities		
Yes	34	30.6
No	40	36.0
Not sure	37	33.3
Feedback Mechanism		
Yes	31	27.9
No	52	46.8
Don't know	28	25.2

Source: Field Survey, 2025

Presented in Table 5 are the systemic and institutional challenges encountered by healthcare workers in responding to emerging and re-emerging infectious diseases in Chiroma Ward. The results indicate that the most frequently reported institutional challenge was inadequate funding, cited by 39.6% of respondents. This is followed by a lack of personal protective equipment (PPE) (25.2%), poor communication systems (14.4%), poor surveillance infrastructure (10.8%), and insufficient staffing (9.9%). In terms of institutional collaboration, only 30.6% of respondents affirmed that their facilities partnered with local or state public health authorities during outbreaks. A slightly higher proportion (36.0%) indicated the absence of such partnerships, while 33.3% were uncertain. With regard to internal review systems, only 27.9% of healthcare workers reported the presence of a feedback mechanism in their facility following outbreak responses. In contrast, 46.8% stated that no such mechanism existed, and 25.2% were unaware.

Table 6 presents the association between selected sociodemographic variables and healthcare workers' awareness of emerging and re-emerging infectious diseases. Findings of the study showed that awareness was highest among those who preferred not to state their gender (100%), followed by females (50.0%) and males (45.5%). Respondents aged 36–45 years (100%) and 18–25 years (90.9%) were more aware compared to those aged 46–55 years, of whom only 5.0% were aware. By professional designation, awareness was most prevalent among nurses/midwives (92.6%) and medical directors

(87.0%), whereas laboratory scientists/technicians (8.3%) exhibited the least awareness. Educationally, those with Diplomas (85.2%) and Master's degrees (67.9%) reported higher awareness than respondents with Bachelor's degrees (20.0%) and Doctorates/Fellowships (38.1%).

Chi-square analysis revealed that marital status did not show a significant association ($p = 0.256$). However, there was a statistically significant associations between awareness and gender ($\chi^2 = 10.9$, $p = 0.027$), age ($\chi^2 = 58.3$, $p < 0.001$), cadre/designation ($\chi^2 = 60.7$, $p < 0.001$), and educational qualification ($\chi^2 = 37.23$, $p < 0.001$).

Table 7 presents the association between selected sociodemographic variables and healthcare workers' level of knowledge of emerging and re-emerging infectious diseases. Findings of the study showed that knowledge was highest among respondents aged 46–55 years, where 65.0% demonstrated excellent knowledge, followed by the 18–25 years group, of whom 50.0% had excellent knowledge and none reported poor knowledge. In contrast, a majority of respondents aged 36–45 years (70.0%) reported poor knowledge. Regarding gender, respondents who preferred not to disclose their gender had the highest proportion of poor knowledge (50.0%), followed by females (17.4%) and males (14.0%), though gender was not statistically significant. Among marital groups, excellent knowledge was most observed among single respondents (40.0%) and married respondents (33.3%), while divorced respondents had the highest poor knowledge at 33.3%.

In terms of professional designation, medical directors recorded the highest excellent knowledge level (47.8%) and none reported poor knowledge. In contrast, nurses/midwives showed the highest percentage of poor knowledge (55.6%), while laboratory scientists/technicians showed relatively balanced responses with 22.2% scoring excellent and 33.3% good knowledge. Community health officers had a mixed distribution, with the highest percentage (28.0%) in the very good knowledge category. Educationally, respondents with Diplomas had the highest proportion of excellent knowledge (40.7%), followed by Fellowship/Doctorate holders (38.1%), while Master's degree holders recorded the highest poor knowledge (42.9%).

Chi-square analysis revealed no significant association between knowledge and gender ($p = 0.170$). However, there were statistically significant associations between knowledge and age ($\chi^2 = 126.0$, $p < 0.001$), marital status ($\chi^2 = 42.8$, $p < 0.001$), cadre/designation ($\chi^2 = 70.1$, $p < 0.001$), and educational qualification ($\chi^2 = 59.9$, $p < 0.001$).

Table 6: Sociodemographic Characteristics and Awareness of Emerging and Re-emerging Infectious Diseases

Variables	Awareness			χ^2	P-Value
	Yes (%)	No (%)	Not sure (%)		
Gender					
Male	26 (45.5)	18 (31.6)	13(22.8)	10.9	0.027
Female	23 (50.0)	18 (39.1)	5 (10.9)		
Prefer not to say	8 (100.0)	0 (0.0)	0 (0.0)		
Age (Years)					
18-25	20 (90.9)	2 (9.1)	0 (0.0)	58.3	0.000
26-35	7 (28.0)	11 (44.0)	7 (28.0)		
36-45	20 (100.0)	0 (0.0)	0 (0.0)		
46-55	1 (5.0)	12 (60.0)	7 (35.0)		
56 and above	9 (37.5)	11 (45.8)	4 (16.7)		
Marital status					
Single	13 (43.3)	8 (26.7)	9 (30.0)	10.12	0.256
Married	11 (40.7)	13 (48.1)	3 (11.1)		
Divorced	15 (62.5)	6 (25.0)	3 (12.5)		
Separated	14 (63.6)	6 (27.3)	2 (9.1)		
Widowed	4 (50.0)	3 (37.5)	1 (12.5)		
Cadre/Designation					
Medical Director	20 (87.0)	3 (13.0)	0 (0.0)	60.7	0.000
Nurse/Midwife	25 (92.6)	2 (7.4)	0 (0.0)		
Lab Scientist/Technician	3 (8.3)	20 (55.6)	13 (36.1)		
Community Health Officer	9 (36.0)	11 (44.0)	5 (20.0)		
Educational level					
Diploma	23 (85.2)	4 (14.8)	0 (0.0)	37.23	0.000
B. Sc.	7 (20.0)	15 (42.9)	13 (37.1)		
M. Sc.	19 (67.9)	6 (21.4)	3 (10.7)		
Fellowship/Doctorate	8 (38.1)	11 (52.4)	2 (9.5)		

Source: Field Survey, 2025

DISCUSSION

This study was conducted to assess the knowledge, perception, preparedness, and institutional challenges related to emerging and re-emerging infectious diseases among healthcare workers in Chiroma Ward, Nigeria. The findings revealed that 51.4% of the respondents were aware of emerging and re-emerging infectious diseases.

This finding aligns with the study by Rugarabamu *et al.* (2020) in Tanzania, which reported that 84% of healthcare workers were aware of infectious disease outbreaks. It is also similar to the report of Zhong *et al.* (2020) in China, where awareness among healthcare workers during the COVID-19 outbreak was over 90%. These findings corroborate the report of Patel *et al.* (2017), who reported a high level of awareness and knowledge among medical students. It is also in line with findings from an Ethiopian study (Abebe *et al.,* 2016) where around 80% HCWs were aware of EVD. Alsahafi and Cheng (2019) also reported a higher level of awareness among healthcare workers in Hajj 2015. The finding of this study however, differs from the report of Alsahafi and Cheng (2016) in Mecca, Medina and Jeddah, where the knowledge about MERS-CoV, Ebola and other emerging infectious diseases was low. The disparity may be attributed to differences in outbreak exposure, availability of surveillance infrastructure, and training across regions.

Lassa fever was the most frequently recognised emerging disease, which is consistent with the findings by Olowookere *et al.* (2015), who reported that Lassa fever was one of the most commonly identified infectious threats among Nigerian health personnel. Awareness of contributing factors such as climate change, urbanisation, antimicrobial resistance, and global travel was reported by 34.2% of participants, similar to findings by Jones *et al.* (2008), Allen *et al.* (2017) and Liao *et al.* (2024), who identified these factors as key drivers of global disease emergence. Formal training on infectious diseases was reported by 59.5% of participants. This is comparable to a study by Temsah *et al.* (2020), where 61.7% of healthcare workers in Saudi Arabia received formal outbreak training. Regarding the level of knowledge, the majority of respondents rated themselves as having fair knowledge. This corroborates the report by Ndu *et al.* (2019), who reported fair knowledge levels among healthcare workers in Enugu. It also echoes the findings of Bhagavathula *et al.* (2020), who reported moderate knowledge levels among health workers in the UAE during the early pandemic stages. This finding also corroborates the report of Sampa (2025), who reported low knowledge in Chililabombwe and Lusaka Districts of Zambia, and Ndu *et al.* (2019), who reported fair knowledge among HCWs in Enugu

Table 7: Sociodemographic Characteristics and Level of Knowledge on Emerging and Re-emerging Infectious Diseases

Variables	Level of Knowledge					χ^2	P-Value
	Poor (%)	Fair (%)	Good (%)	Very Good (%)	Excellent (%)		
Gender							
Male	8 (14.0)	21 (36.8)	9 (15.8)	5 (8.8)	14 (24.6)	11.6	0.170
Female	8 (17.4)	15 (32.6)	9 (19.6)	2 (4.3)	12 (26.1)		
Prefer not to say	4 (50.0)	0 (0.0)	3 (37.5)	0 (0.0)	1 (12.5)		
Age (Years)							
18-25	0 (0.0)	8 (36.4)	3 (13.6)	0 (0.0)	11 (50.0)	126.0	0.000
26-35	0 (0.0)	12 (48.0)	13 (52.0)	0 (0.0)	0 (0.0)		
36-45	14 (70.0)	3 (15.0)	0 (0.0)	0 (0.0)	3 (15.0)		
46-55	4 (20.0)	3 (15.0)	0 (0.0)	0 (0.0)	13 (65.0)		
56 and above	2 (8.3)	10 (41.7)	5 (20.8)	7 (29.2)	0 (0.0)		
Marital status							
Single	3 (10.0)	7 (23.3)	6 (20.0)	2 (6.7)	12 (40.0)	42.8	0.000
Married	6 (22.2)	11 (40.7)	1 (3.7)	0 (0.0)	9 (33.3)		
Divorced	8 (33.3)	3 (12.5)	8 (33.3)	5 (20.8)	0 (0.0)		
Separated	3 (13.6)	11 (50.0)	3 (13.6)	0 (0.0)	5 (22.7)		
Widowed	0 (0.0)	4 (50.0)	3 (37.5)	0 (0.0)	1 (12.5)		
Cadre/Designation							
Medical Director	0 (0.0)	8 (34.8)	4 (17.4)	0 (0.0)	11 (47.8)	70.1	0.000
Nurse/Midwife	15 (55.6)	8 (29.6)	0 (0.0)	0 (0.0)	4 (14.8)		
LST	2 (5.6)	14 (38.9)	12 (33.3)	0 (0.0)	8 (22.2)		
CHO	3 (12.0)	6 (24.0)	5 (20.0)	7 (28.0)	4 (16.0)		
Educational level							
Diploma	0 (0.0)	8 (29.6)	8 (29.6)	0 (0.0)	11 (40.7)	59.9	0.000
B. Sc.	3 (8.6)	15 (42.9)	11 (31.4)	0 (0.0)	6 (17.1)		
M. Sc.	12 (42.9)	5 (17.9)	2 (7.1)	7 (25.0)	2 (7.1)		
Fellowship/Doctorate	5 (23.8)	8 (38.1)	0 (0.0)	0 (0.0)	8 (38.1)		

LST: Lab Scientist/Technician; **CHO:** Community Health Officer; **Source: Field Survey, 2025**

On perception, 24.3% of respondents were neutral about the threat of emerging diseases, while 21.6% agreed and 18.9% strongly disagreed. These divergent views reflect a possible gap between knowledge and perceived risk. This observation is consistent with findings by Olapegba *et al.* (2020), who reported similar inconsistencies in knowledge and perception among Nigerian respondents during the early phase of the COVID-19 pandemic. This finding is also similar to the report of Isah *et al.* (2020), who reported misconceptions in the general population of Katsina State, Nigeria. A possible reason for the mixed perceptions could be attributed to variations to exposure

to accurate health information. Primary healthcare workers in many parts of Nigeria often rely on fragmented or outdated training modules and may lack regular access to continuing medical education or standardised outbreak communication materials.

In terms of preparedness, most respondents reported their facilities as well prepared or moderately prepared, which is similar to findings by Ilesanmi and Afolabi (2021), who noted a comparable trend among healthcare facilities in Ibadan. Ndu *et al.* (2019) also reported a poor level of preparedness for Lassa fever in Engu, Nigeria. The findings, however, disagree with the report of Ughasoro *et al.* (2019) in Nigeria, where 98.4% of HCWs reported that their HCFs were insufficiently equipped to respond to disease outbreaks. A poor level of preparedness was also observed in the study conducted by Ndu *et al.* (2019) and Olowookere *et al.* (2015). However, only 35.1% felt personally equipped to manage emerging infections, indicating a notable skills gap. This aligns with the study by Al Meslamani *et al.* (2025), which showed insufficient readiness among healthcare providers to manage Mpox. A study conducted by Sadek *et al.* (2024) in Egypt also found that nurses' readiness for Mpox was inadequate. Attitudinally, a majority agreed that emerging infectious diseases are inevitable and that periodic training is necessary, suggesting proactive orientation. This supports findings from studies by Al Meslamani *et al.* (2025), Sadek *et al.* (2024), Hasan *et al.* (2023), AlBalas *et al.* (2024) and Malaeb *et al.* (2023), which reported positive attitudes among health workers towards outbreak preparedness. The difference in attitudes may be attributed to variations in organisational support, training opportunities, and exposure to infectious disease management in healthcare settings.

Systemic barriers such as inadequate funding (39.6%), lack of PPE (25.2%), and poor communication infrastructure (14.4%) were most reported. These findings are consistent with those of Olumade *et al.* (2020) and Dairo *et al.* (2010), who identified funding and logistic limitations as major constraints that continue to limit the ability of the Nigerian public healthcare system to effectively prepare and respond to infectious disease outbreaks. This finding is also in line with the findings of Ughasoro *et al.* (2019), who reported that lack of funds, amongst many other barriers, mitigate against having an optimal level of preparedness. Chi-square analysis revealed significant associations between awareness and demographic variables such as gender, age, cadre, and education. This aligns with the findings of Ilesanmi and Alele (2016), who also found significant demographic predictors of outbreak awareness. Similarly, knowledge levels were significantly associated with age, marital status, cadre, and education. This is consistent with reports by Olowookere *et al.* (2015), who highlighted occupation as a determinants of good/appropriate knowledge of EVD.

CONCLUSION

Emerging and re-emerging infectious diseases remain a major public health concern, particularly in resource-constrained settings such as Chiroma Ward, Nigeria. This study has shown that while healthcare workers demonstrate moderate levels of awareness and fair knowledge, their individual preparedness to respond to disease outbreaks is limited. Although many facilities were perceived as moderately or well prepared, a significant proportion of healthcare workers did not feel personally equipped to manage emerging health threats, pointing to critical gaps in skills and practical training. This disjunction between perceived preparedness and actual institutional capacity is not merely academic; it carries life-and-death consequences in a region vulnerable to epidemics such as Lassa fever and COVID-19. The study's nuanced insights into how sociodemographic variables influence knowledge and preparedness further provide a roadmap for designing targeted interventions that are equitable and evidence-based. From a public health perspective, this study highlights the urgent need to integrate epidemic preparedness into routine health service delivery. It highlights the necessity of embedding simulation drills, continuous professional training, and inter-agency partnerships into health facility protocols, not as reactive measures, but as institutional standards. Policymakers must prioritise sustained investment in workforce development, the establishment of real-time surveillance mechanisms, and equitable access to personal protective resources across all levels of care. The study calls for a paradigm shift from episodic response to permanent preparedness. If translated into actionable policy, its findings can help catalyse a more resilient, responsive, and risk-informed healthcare system, not only in Chiroma Ward but across similar resource-constrained settings in Nigeria and sub-Saharan Africa.

RECOMMENDATIONS

Based on the findings, it is recommended that:

1. The government and health authorities at local and state levels should ensure continuous, evidence-based training for healthcare workers. Training should be inclusive of all healthcare cadres and should address the specific knowledge gaps revealed in this study.
2. Inadequate funding was identified as the most significant institutional barrier. Local governments and health ministries should increase budgetary allocation to primary health facilities, with specific provisions for personal protective equipment, emergency stockpiles, and capacity-building initiatives.
3. Awareness efforts should be demographically tailored, addressing sociodemographic groups identified in the study as having low awareness or knowledge. Community-based strategies, including outreach by trained health educators, should complement facility-based programs.

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