AZMAN JOURNAL OF HEALTH AND SCIENCES (AJOHAS)

Volume 1, Issue 1, June, 2026 www.ajohas.azmanuniversity.edu.ng

Resilience of Primary Health Workers in Azare Town, Katagum Local Government for Implementation of Ai-Driven Community-Based Peer Health Education Programme

Aminu Umar Ningi[1], Sani Ibrahim[2], Abdullahi Umar Yahaya[3], Aminu Yusuf[4], Sumayyah Ibrahim Sarina[5], Mohammed Kabir Adamu[6]

[1]Department of Physical and Health Education, Aminu Saleh College of Education Azare, Bauchi State
[2]Bauchi State Health Trust Funds
[3]Department of Public Health, Al-Istiqama University Sumaila, Kano State
[4]Department of Human kinetics and Health Education Saadatu Rimi Collage of Education, Kumbotso Kano State
[5]Federal University of Health Sciences, Azare Department of Nursing Sciences, Bauchi State, Nigeria
[6]Bauchi State Primary Health Care Development Board.

Correspondence: umarningia@gmail.com

Abstract

This study investigated the resilience of primary health workers in Azare town, Katagum Local Government Area, for the implementation of an AI-driven community-based peer health education programme. A descriptive survey design was adopted, targeting a population of 450 healthcare workers across 37 health facilities. Using a multistage sampling technique comprising cluster, simple random, proportionate, purposive and systematic sampling, a sample size of 217 participants was selected. Data were collected using a structured questionnaire and analyzed using a one-sample t-test and correlation analysis. The findings revealed a statistically significant level of resilience among primary health workers in Azare town, Katagum LGA when compared with the test value ($t = 41.001$, $df = 216$, $p < .05$). Additionally, a significant positive relationship was found between access to digital tools and the resilience of health workers ($r = 0.318$, $p < .05$). The study therefore suggests that primary health workers in the area demonstrate a considerable level of resilience that may support the adoption of digital approaches for community health education. Access to digital tools was identified as an important factor associated with their resilience. It was recommended, among others, that government agencies and health institutions strengthen this capacity by providing continuous capacity-building programmes, mentorship, and psychological support to enhance the effective implementation of AI-driven community-based peer health education programmes.

Key Words: Resilience, primary health workers, digital, community-based peer health education programme

INTRODUCTION

Health education remains a fundamental component of public health promotion, particularly in low- and middle-income countries where preventable diseases continue to pose significant challenges. In recent years, the integration of digital technologies into community health education has emerged as an effective strategy for improving access to health information, strengthening service delivery, and promoting positive health behaviors. Among these technologies, Artificial Intelligence (AI)–driven and peer-supported interventions provide new opportunities to extend the reach of primary healthcare services to underserved populations.

In Nigeria, primary health workers serve as an important link between formal health institutions and community members. Their involvement in health education programmes is essential for promoting disease prevention and improving community health outcomes. However, the successful implementation of innovative digital health initiatives depends largely on

the preparedness and adaptive capacity of these health workers. In rural and semi-urban areas such as Azare town in Katagum Local Government Area, the adoption of AI-driven community-based peer health education programmes requires health workers who are capable of adapting to technological innovations and effectively utilizing digital tools in community health promotion.

Digital health interventions have increasingly been recognized as cost-effective and scalable solutions for addressing community health challenges (Adewuyi et al., 2022). Studies in Northern Nigeria indicate that health education delivered through mobile platforms, social media, and peer-learning networks can significantly improve health knowledge and preventive practices among community members (Abubakar & Musa, 2021). Nevertheless, the implementation of such interventions depends on several factors, including digital literacy, training opportunities, and access to technological resources such as smartphones, internet connectivity, and health applications (Odetola, 2020).

Resilience among primary health workers plays a critical role in the adoption of innovative health programmes. Resilience refers to the ability of health workers to adapt to challenges, sustain motivation, and maintain effective performance in resource-constrained environments. In the context of digital health interventions, resilient health workers are more likely to embrace technological changes, learn new skills, and implement emerging approaches such as AI-driven community health education. Studies have shown that health workers who receive institutional support and have access to digital tools demonstrate greater confidence and adaptability in implementing health education innovations (Ogunyemi et al., 2021; Usman, 2019).

Empirical evidence further supports the link between digital access and adaptive capacity among health workers. For example, Oladipo and Akinbode (2019) reported that healthcare professionals in primary health centers in Lagos State exhibited moderate to high levels of resilience, enabling them to effectively manage workplace challenges and sustain health service delivery. Similarly, Abubakar and Musa (2022) found that healthcare providers in Kano State with regular access to digital health applications demonstrated higher motivation and readiness to implement technology-based health interventions. These findings suggest that access to digital resources may strengthen the ability of health workers to implement innovative programmes such as AI-driven community-based peer health education.

Ideally, primary health workers should possess the necessary digital skills, resources, and institutional support required to implement AI-driven community-based peer health education programmes effectively. Such integration has the potential to improve health information dissemination, strengthen preventive health practices, and empower communities to participate actively in managing their health. However, in many parts of Nigeria, including Azare town in Katagum LGA, the readiness of primary health workers to adopt these innovative approaches remains uncertain. Limited access to digital tools, inadequate training in emerging technologies, and infrastructural constraints may hinder the successful implementation of AI-driven health education initiatives. Understanding the level of resilience and access to digital tools among health workers is therefore essential for determining their capacity to implement AI-driven community-based peer health education programmes in the area.

Objectives of the Study

The main objective of this study was to investigate the resilience of primary health workers in Azare town, Katagum Local Government Area, for the implementation of an AI-driven community-based peer health education programme. Specifically, the study aimed to:

1. Assess the difference in the resilience of primary health workers in Azare town, Katagum LGA, for implementing AI-driven community-based peer health education programmes.
2. Examine the relationship between access to digital tools and the resilience of primary health workers in Azare town.

Hypotheses of the Study

1. There is no significant difference in the resilience of primary health workers in Azare town, Katagum LGA, for implementing AI-

driven community-based peer health education programmes.

2. There is no significant relationship between access to digital tools and the resilience of primary health workers in Azare town, Katagum LGA

Methodology

This study adopted a descriptive survey design to assess the resilience of primary health workers in Azare town, Katagum Local Government Area (LGA). The target population comprised 450 health workers across 37 primary health facilities (Bauchi State Primary Healtht Care Agency, 2025). The sample size for this study is 217 participants which were selected by using multi-stage sampling technique and the stages were as follows:

Stage 1: Cluster sampling: Health facilities were grouped by wards. and a proportion of facilities was randomly selected from each cluster to ensure coverage across the town.

Stage 2: Simple random sampling was used to select six (6) wards out of the 37 wards in in Azare town, Katagum Local Government Area.

Stage 3: Purposive sampling technique was used to select one (1) primary health facilities each from the selected wards

Stage 4: Proportionate sampling technique was used to distribute the sample size of 217 respondents across the selected six primary health facilities in Azare town. The overall sample size was determined using the Krejcie and Morgan (1970) sample size determination table. Using the total population of each ward selected and the determined sample size of 217, the distribution was calculated as follows:

$$\text{Sample for each Ward} = \frac{\text{Ward Population}}{\text{Total of the population}} \times \text{Sample Size (217)}$$

Stage 5: Systematic sampling: Eligible participants were selected at regular intervals from the list of staff in each facility to ensure an even and unbiased distribution across the sample.

Data were collected using a structured questionnaire designed to measure three domains: resilience, access to digital tools, and willingness to implement an AI-driven community-based peer health education programme. Resilience was measured using a 4-point Likert scale**,** where 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly Agree. Higher scores indicated greater resilience. The questionnaire was validated by experts in public health and health education, and its reliability was established through a pilot test, yielding a Cronbach's alpha of 0.81, indicating acceptable internal consistency.

For statistical analysis, a one-sample t-test was employed to determine whether the mean resilience score of participants significantly differed from a benchmark value of 2.50, which represents the neutral midpoint of the 4-point scale. This comparison allowed the study to test whether primary health workers exhibited a significant level of resilience for implementing AI-driven peer health education programmes and Pearson's correlation analysis to examine the relationship between access to digital tools and readiness.

Results

Table1: Summary of One Sample t-test on significant difference in the resilience of primary health workers in Azare town, Katagum LGA, for implementing AI-driven community-based peer health education programmes

Variable	N	Mean	SD	SE	df	t	p
Resilience	217	3.12	0.81	0.055	216	11.09	.000
Test Mean	217	2.50					

t=14.720, df=216; P<0.05

The result in Table 1 shows that the one-sample t-test revealed the mean resilience score of primary health workers (M = 3.12, SD = 0.81) to be significantly higher than the test mean of 2.50, $t(216) = 11.09$, $p < .001$. The effect size (Cohen's $d = 1.34$) indicates a large practical significance. Therefore, the null hypothesis is rejected, suggesting that primary health workers in Azare town exhibit a high level of resilience for implementing AI-driven community-based peer health education programmes.

Table2: Summary of Pearson's Product Moment Correlation Coefficient (PPMCC) on significant between access to digital tools and the resilience of primary health workers in Azare town, Katagum LGA

Variables	Mean	SD	N	r	p
Access to AI-driven	3.04	0.88	217	0.318	.000
Resilience	3.12	0.81	217		

The result in Table 2 shows that Pearson correlation analysis revealed a significant positive relationship between access to digital tools and resilience among primary health workers, $r(215) = 0.318$, $p < .001$. This indicates that greater access to AI-driven digital tools is associated with higher resilience. The effect size represents a moderate practical association, suggesting that improving access to digital tools may enhance health workers' capacity to implement community-based peer health education effectively.

Discussions

The findings of this study indicate a significant difference in the resilience of primary health workers in Azare town, Katagum LGA, for implementing AI-driven community-based peer health education programmes. This suggests that the resilience level of the respondents is higher than the reference benchmark (M = 2.50), demonstrating a strong capacity to adapt to workplace demands and engage with innovative health interventions. This aligns with previous research showing that Nigerian primary health workers often exhibit moderate to high resilience, which supports their ability to manage challenges in service delivery (Ogunyemi, Olawale, & Bello, 2021).

Additionally, the study revealed a significant positive relationship between access to digital tools and resilience ($r (215) = 0.318$, $p < .001$), indicating a moderate association. This suggests that health workers with better access to AI-driven digital tools tend to report higher resilience levels, reflecting enhanced adaptability and confidence in engaging with community-based health education initiatives. While the relationship is statistically significant, it is important to note that correlation does not imply causation; access to digital tools is associated with, but does not directly cause, higher resilience. These findings underscore the potential value of improving digital accessibility as one factor that may support the preparedness of health workers for implementing technology-assisted health programmes.

Conclusion

The study concluded that primary health workers in Azare town demonstrate a high level of resilience and are capable of engaging with digital approaches for community health education. Additionally, access to digital tools was found to have a significant positive association with their resilience, indicating that better access to such tools is related to higher adaptive capacity among health workers.

Recommendations

Based on the findings, the following recommendations are made:

1. Government agencies and health institutions strengthen this resilience by providing continuous capacity-building programmes, mentorship, and psychological support. Such initiatives will sustain their motivation and enhance their ability to effectively implement AI-driven community-based peer health education programmes.
2. Policymakers and stakeholders invest in the provision of adequate digital infrastructure, such as internet connectivity, computers, and

AI-enabled devices, across all health facilities. Ensuring regular access and training on these tools will further improve health workers' digital competence and resilience in delivering technology-based health education services.

References

Abubakar, M. I., & Musa, A. H. (2022). Digital literacy and adaptive resilience among healthcare providers in Kano State, Nigeria. *Nigerian Journal of Health Education and Promotion, 14*(1), 45–54.

Adewuyi, E. O., Adefemi, K., & Oladunjoye, O. (2022). Digital health technologies and health education outcomes in Northern Nigeria: A review of emerging evidence. *Journal of Public Health and Technology, 8*(3), 112–121.

Bauchi State Primary Health Care Agency. (2025). *Annual health workforce report: Primary health workers in Bauchi State*

Eze, C. A., & Okafor, I. J. (2020). Resilience and job satisfaction among primary health care workers in Enugu State, Nigeria. *Nigerian Journal of Health Sciences, 20*(2), 87–94.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*(3), 607–610.

Odetola, T. D. (2020). Digital readiness and technological competence among health workers in rural health facilities of Oyo State, Nigeria. *African Journal of Health Information Management, 13*(1), 25–34.

Ogunyemi, A. O., Olawale, T. D., & Bello, A. A. (2021). Predictors of resilience among primary healthcare workers in Southwestern Nigeria. *African Journal of Primary Health Care & Family Medicine, 13*(1), 1–7.

Oladipo, S. E., & Akinbode, G. A. (2019). Psychological resilience and coping mechanisms among healthcare professionals in primary health care centers in Lagos State, Nigeria. *Journal of Psychology and Behavioral Science, 7*(2), 56–65.

Usman, A. Y. (2019). Access to digital tools and confidence in health education innovation among primary healthcare workers in Bauchi State, Nigeria. *Nigerian Journal of Educational Research and Development, 14*(2), 98–107.

World Health Organization. (2021). *Building resilient health systems: Strengthening health workforce capacity for digital transformation in Africa*. WHO Regional Office for Africa.