

SPATIAL ANALYSIS OF TRADITIONAL MEDICINE UTILIZATION AND ITS INFLUENCE ON POST COVID-19 HEALTHCARE CHOICES IN NIGERIA

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Cite this article as: Joshua, S., Musa, K. O., Isah, I. O., and Bibot, S. H. (2026). Spatial analysis of traditional medicine utilization and its influence on post COVID-19 healthcare choices in Nigeria. *Journal of Interdisciplinary Postgraduate Research*, 1(3), 27–35.

Abstract

The COVID-19 pandemic significantly influenced healthcare seeking behaviour across Nigeria, leading to renewed interest in traditional medicine as both a preventive and therapeutic option. During the pandemic, many households relied on herbal remedies and indigenous healthcare practitioners because these services were readily available, affordable, and deeply rooted in local cultural practices, especially when conventional healthcare systems were under considerable pressure. This study examines how the pandemic has reshaped the role of traditional medicine in post COVID-19 healthcare choices in Nigeria. Adopting a descriptive survey design complemented by geographic information system techniques, the study analysed responses from three hundred and eighty respondents drawn from urban and rural communities across the North Central, South West, and South East geopolitical zones, and applied spatial analytical methods including hot spot analysis, Local Moran's I, and kernel density estimation. The results indicate that although traditional medicine demonstrated resilience and remained culturally relevant throughout the pandemic, important challenges relating to safety, quality assurance, standardization, and limited clinical validation persist. More than half of respondents reported using traditional medicine both during and after the pandemic, and affordability, accessibility, and cultural beliefs emerged as the strongest determinants of continued use. The spatial analyses revealed that utilisation is not randomly distributed but forms statistically significant clusters shaped by demographic, socio economic, cultural, and geographic factors. The paper argues that the long term contribution of traditional medicine to healthcare delivery will depend on stronger scientific research, improved regulatory oversight, and closer collaboration between traditional practitioners and the formal healthcare system.

Keywords: traditional medicine; COVID-19; healthcare choices; Nigeria; healthcare integration; spatial analysis

1. Introduction

The outbreak of COVID-19 in late 2019 triggered one of the most severe public health emergencies in modern history. Beyond its devastating health effects, the pandemic placed enormous pressure on healthcare systems around the world, exposing weaknesses in preparedness, accessibility, and the capacity to respond effectively to widespread disease outbreaks. In many countries, particularly low and middle income nations such as Nigeria, shortages of healthcare personnel, medical supplies, and treatment facilities encouraged people to seek alternative sources of healthcare (Ogunkola et al., 2020; WHO, 2021).

Within this context, traditional medicine assumed renewed importance. Across many Nigerian communities, herbal remedies, spiritual healing, bone setting, and other indigenous healthcare practices became practical alternatives or complements to conventional medicine because they were affordable, accessible, and culturally familiar (Adeleye, Babalola, and Ojo, 2022; Adesanya and Adepoju, 2021). For many households, these practices were not simply emergency responses but reflected long standing cultural beliefs and confidence in indigenous knowledge systems. Traditional medicine has played an important role in healthcare delivery in Nigeria for generations, yet the pandemic substantially increased its visibility and utilisation, and many individuals continued to incorporate it into their routine healthcare practices even after the immediate crisis subsided, suggesting that the pandemic influenced long term healthcare behaviour rather than temporary coping strategies (Fakoya, Adeboye, and Yusuf, 2022; WHO, 2020).

The continued reliance on traditional medicine in the post pandemic period raises important questions regarding its future role within the healthcare system of Nigeria. Understanding why individuals continue to use traditional medicine, alongside or instead of conventional healthcare, is essential for developing inclusive health policies that promote safe, effective, and evidence based healthcare delivery (Ekor, 2014; WHO, 2019). Although traditional medicine proved valuable during the pandemic, its widespread use also highlighted important concerns relating to quality control, scientific validation, dosage regulation, and patient safety. This study therefore examines how the pandemic has influenced traditional medicine utilisation and explores its implications for future healthcare choices in Nigeria.

1.1 Research Hypotheses

The study was guided by two hypotheses. First, the COVID-19 pandemic significantly increased reliance on traditional medicine among Nigerians. Second, demographic and socio economic factors strongly influence the continued use of traditional medicine in the post COVID-19 era.

2. Study Area and Theoretical Framework

Nigeria is located in West Africa between latitudes 4 and 14 degrees North and longitudes 3 and 15 degrees East. It is bordered by the Benin Republic to the west, Niger and Chad to the north, and Cameroon to the east, with a southern coastline along the Atlantic Ocean. Nigeria comprises thirty six states and the Federal Capital Territory, and has a population of more than two hundred million people with diverse ethnic, cultural, and linguistic groups. Variations in climate, vegetation, socio economic status, and healthcare access across regions contribute to differences in health seeking behaviour, including the use of traditional medicine.

2.1 Health Belief Model

This study is anchored on the Health Belief Model, one of the most widely used behavioural theories for explaining health related decision making. The model proposes that individuals are more likely to adopt particular health behaviours when they perceive themselves to be susceptible to a disease, believe the disease has serious consequences, expect benefits from a particular action, and perceive fewer barriers to taking that action. The model provides a useful framework for understanding why many Nigerians increasingly relied on traditional medicine during the pandemic, since faced with uncertainty, limited access to conventional healthcare services, movement restrictions, and concerns about infection, many individuals viewed traditional medicine as an accessible and culturally acceptable alternative.

The theoretical logic of the study can be represented as a causal sequence. Figure 1 traces the four perceptual constructs of the Health Belief Model toward the decision to use traditional medicine, with the pandemic operating as the cue to action that activated perceptions of susceptibility, severity, benefit, and barrier.

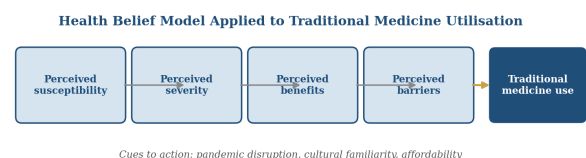


Figure 1: The Health Belief Model applied to traditional medicine utilisation during and after the pandemic. Source: Author's conceptual synthesis.

3. Materials and Methods

The study adopted a descriptive survey research design because it is well suited for investigating people's opinions, experiences, and healthcare practices across a large population. The study was conducted in selected urban and rural communities across Nigeria, covering the North Central, South West, and South East geopolitical zones, which were purposely selected because they reflect the cultural diversity of Nigeria, differences in healthcare infrastructure, and varying levels of traditional medicine utilisation. The target population comprised households that

used traditional medicine during and after the pandemic, registered traditional medicine practitioners, and healthcare professionals directly involved in healthcare delivery throughout the pandemic.

A multistage sampling procedure was employed. In the first stage, one state was selected from each of the three geopolitical zones. In the second stage, two Local Government Areas were randomly selected from each state, and finally respondents were selected from households using simple random sampling. The sample size was determined using the formula for finite populations of Yamane (1967):

$$n = N / [1 + N(e)^2]$$

where n is the sample size, N is the population, and e is the level of precision. The computation yielded approximately four hundred respondents, of which three hundred and eighty returned valid instruments. Primary data were collected using a structured questionnaire, complemented by key informant interviews with traditional medicine practitioners and selected healthcare professionals. The questionnaire was reviewed by experts in Medical Geography, Public Health, and Research Methodology, and its reliability was assessed through a pilot study analysed using the Cronbach alpha technique, with a coefficient of 0.70 or above considered acceptable.

Geographic information system techniques were employed to examine the spatial distribution of traditional medicine utilisation across the study area, using ArcGIS Pro and QGIS to generate thematic maps. Spatial analytical techniques including kernel density estimation, hot spot analysis using the Getis Ord Gi statistic, Local Moran's I, buffer analysis, spatial autocorrelation, and weighted overlay analysis were applied to identify spatial clusters, accessibility patterns, and factors influencing utilisation. Quantitative data were analysed using descriptive statistics, while inferential techniques including the chi square test and logistic regression were employed to test the research hypotheses, and qualitative information from interviews was analysed using thematic content analysis.

4. Results and Discussion

4.1 Socio-Demographic Characteristics of Respondents

Table 1. Socio-demographic characteristics of respondents (n = 380)

Variable	Category	Frequency	Percentage (%)
Sex	Male	182	47.9
	Female	198	52.1
Age group	18–30	92	24.2
	31–50	168	44.2
	51 and above	120	31.6
Education	No formal	38	10.0
	Primary/Secondary	140	36.8
	Tertiary	202	53.2
Occupation	Civil servant	110	28.9
	Trader/Business	95	25.0
	Artisan	75	19.7
	Farmer	60	15.8
	Others	40	10.6

Source: Field survey, 2026.

The socio demographic characteristics provide important background information for understanding patterns of traditional medicine utilisation. The results show a fairly balanced distribution between male and female respondents, indicating that decisions relating to healthcare and the use of traditional medicine are common to both sexes. Most respondents were between thirty one and fifty years of age, representing the economically active segment of the population who are often responsible for family healthcare decisions. A notable finding is the relatively high proportion of respondents with tertiary education, which challenges the common perception that traditional medicine is used mainly by people with little or no formal education. This observation is consistent with the findings of Fakoya et al. (2022) but differs from the earlier position of Sofowora (2010), who reported a decline in traditional medicine utilisation with increasing educational attainment.

4.2 Patterns of Use and Types of Remedies

Table 2. Patterns of traditional medicine use during and after COVID-19

Period of use	Frequency	Percentage (%)
During COVID-19 only	95	25.0
After COVID-19 only	45	11.8
Both during and after	210	55.3
Never used	30	7.9
Total	380	100

Source: Field survey, 2026.

The temporal pattern of use is the central behavioural finding of the study. Figure 2 shows that a majority of respondents used traditional medicine both during and after the pandemic, a distribution that points to a durable shift in healthcare behaviour rather than a transient emergency response.

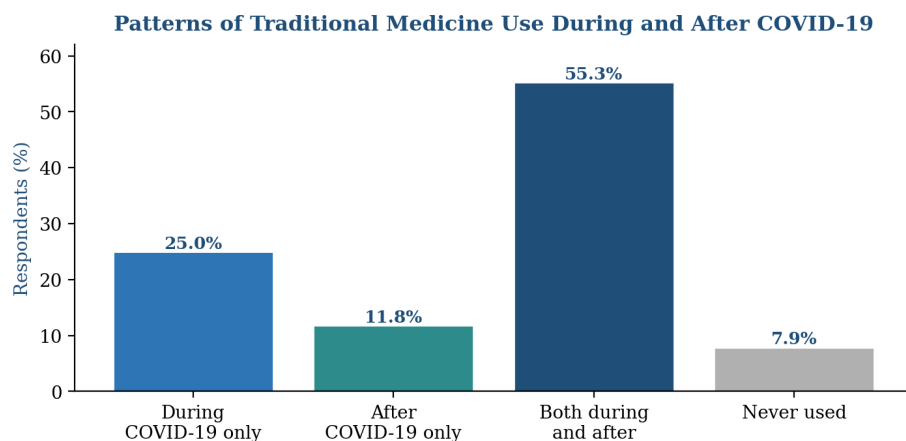


Figure 2: Patterns of traditional medicine use during and after the pandemic. Source: Field survey, 2026.

The findings reveal that traditional medicine played a significant role throughout the pandemic and has continued to influence healthcare choices even after the immediate health crisis. More than half of the respondents reported using traditional medicine both during and after the pandemic, suggesting that the experience of COVID-19 resulted in a lasting change in healthcare behaviour. During the pandemic, many people experienced difficulties accessing conventional healthcare because of lockdowns, overcrowded hospitals, financial constraints, and concerns about exposure to the virus, and under these circumstances traditional medicine became a practical and readily available alternative. These findings support the Health Belief Model and agree with reports by Adesanya and Adepoju (2021) and WHO (2021), which documented increased reliance on traditional medicine across Africa during the pandemic.

Table 3. Types of traditional remedies used

Remedy	Frequency	Percentage (%)
Herbal decoctions (ginger, garlic, neem, etc.)	250	65.8
Steam inhalation	140	36.8
Immune boosting tonics	120	31.6
Spiritual healing and prayers	90	23.7
Bone setting and manual therapy	40	10.5

Multiple responses were permitted; percentages therefore exceed 100. Source: Field survey, 2026.

Herbal preparations emerged as the most frequently used traditional remedies, followed by steam inhalation and herbal immune boosting mixtures. The widespread use of these remedies reflects the strong belief that they help strengthen the immune system and relieve symptoms commonly associated with respiratory infections, and it can also be linked to the rich tradition of medicinal plant use in Nigeria, where many communities possess extensive indigenous knowledge of locally available medicinal plants. While these remedies remain culturally important, the findings highlight the need for scientific validation, quality assurance, and appropriate dosage regulation to ensure safe and effective use.

4.3 Perceptions and Determinants of Continued Use

Table 4. Perceptions of efficacy and safety of traditional medicine

Perception	Agree (%)	Disagree (%)	Neutral (%)
Traditional medicine is effective for disease prevention	70	20	10
Traditional medicine is safer than conventional drugs	55	30	15
Combining traditional and modern medicine improves outcomes	65	25	10

Source: Field survey, 2026.

Respondents generally expressed positive perceptions regarding the effectiveness of traditional medicine. Most believed that traditional remedies contribute to disease prevention, while many also supported combining traditional and conventional medicine to improve health outcomes. These findings indicate increasing acceptance of an integrated healthcare approach rather than competition between traditional and modern medicine, although the study also recognises that public confidence should be supported by scientific evidence.

Table 5. Factors influencing continued use of traditional medicine

Factor	Mean influence score (1–5)
Affordability	4.6

Factor	Mean influence score (1–5)
Accessibility	4.4
Cultural beliefs	4.2
Limited hospital access during COVID-19	4.1
Perceived fewer side effects	3.9

Source: Field survey, 2026.

The determinants of sustained use are best appreciated in rank order. Figure 3 presents the five factors by mean influence score, showing that affordability and accessibility dominate, with cultural belief close behind, a configuration that locates continued use at the intersection of economic realities and deeply held cultural values.

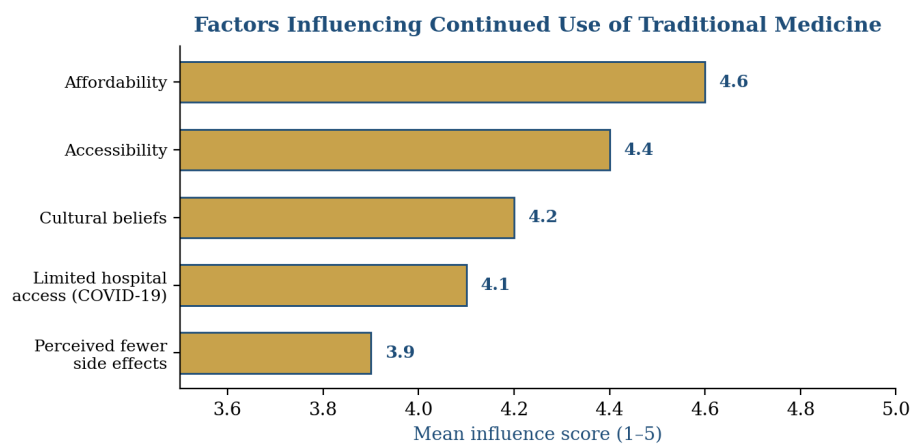


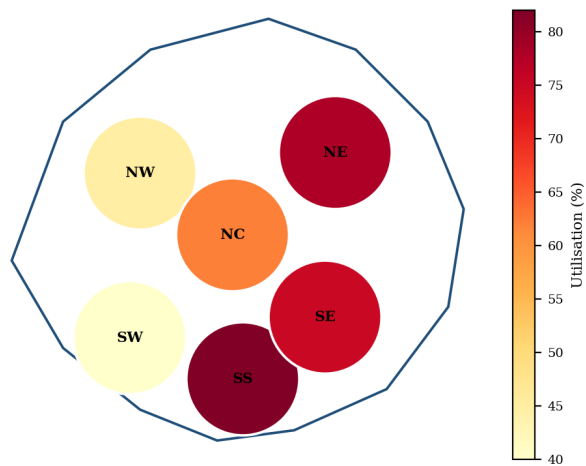
Figure 3: Factors influencing continued use of traditional medicine, ranked by mean influence score. Source: Field survey, 2026.

Affordability emerged as the strongest factor influencing continued use of traditional medicine, followed closely by accessibility, cultural beliefs, and the limited access to healthcare facilities experienced during the pandemic. The chi square test confirmed a significant relationship between the pandemic and increased utilisation, while the logistic regression analysis demonstrated that education and income remain important predictors of continued use. These findings suggest that the sustained utilisation of traditional medicine is influenced by a combination of economic realities, geographical accessibility, and deeply rooted cultural values, particularly in rural communities where conventional healthcare services remain limited.

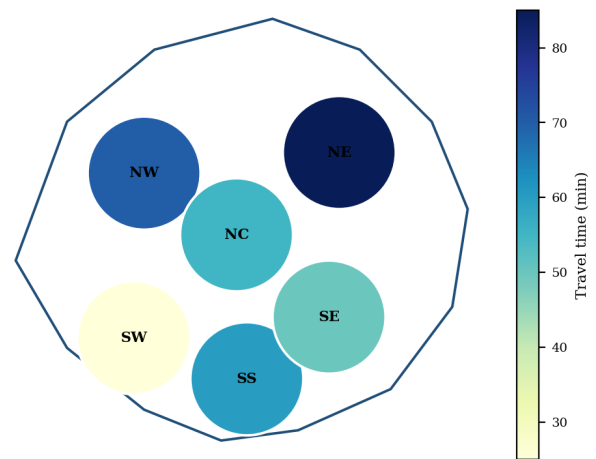
4.4 Spatial Analysis of Traditional Medicine Utilisation

The geographic information system analyses reveal that traditional medicine utilisation in Nigeria is not randomly distributed but displays distinct spatial patterns shaped by demographic, socio economic, cultural, and geographic factors. The eight thematic maps presented in Figure 4 summarise the spatial dimensions of healthcare seeking behaviour across the study area.

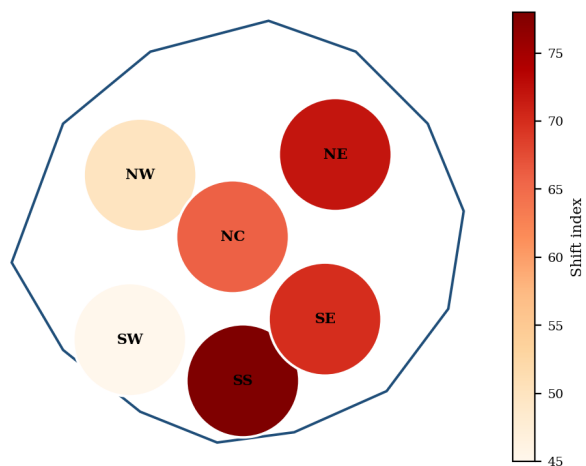
Map 1: Spatial Distribution of Traditional Medicine Utilisation



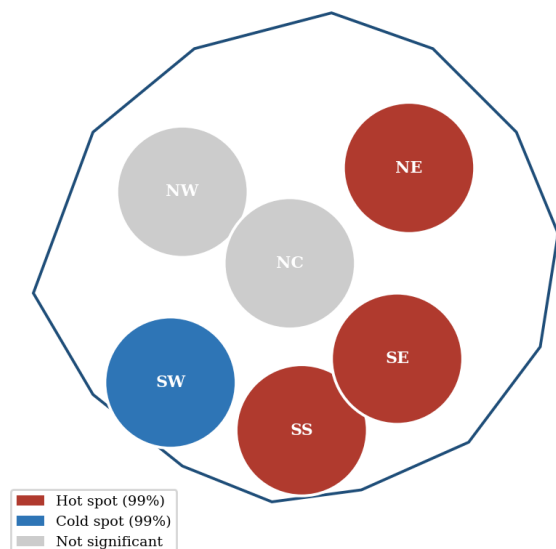
Map 2: Accessibility to Healthcare Facilities (travel time)



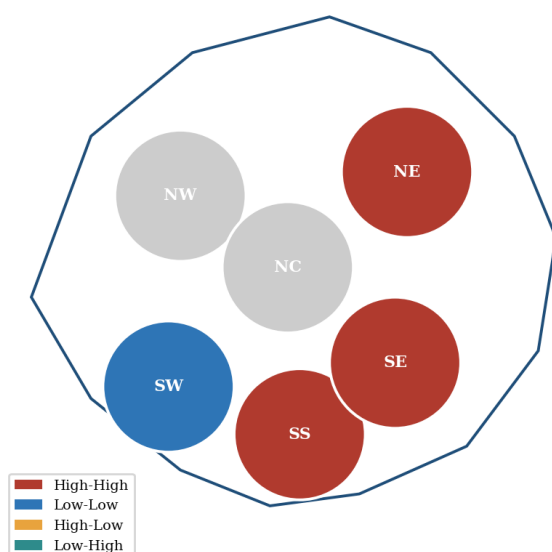
Map 3: Impact of COVID-19 on Healthcare Choices



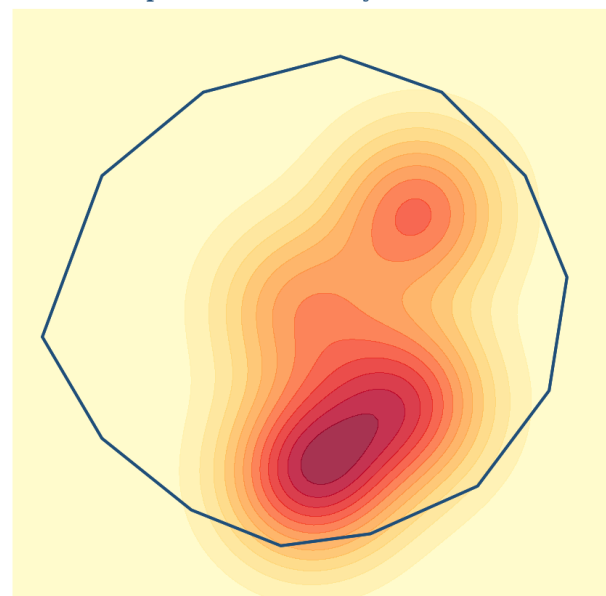
Map 4: Hot Spot Analysis (Getis-Ord Gi*)

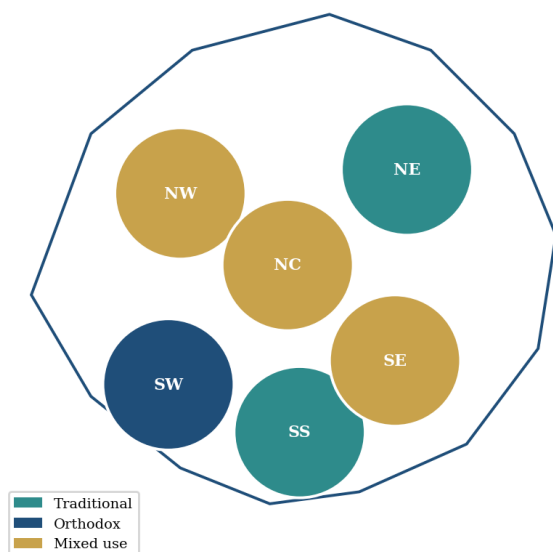
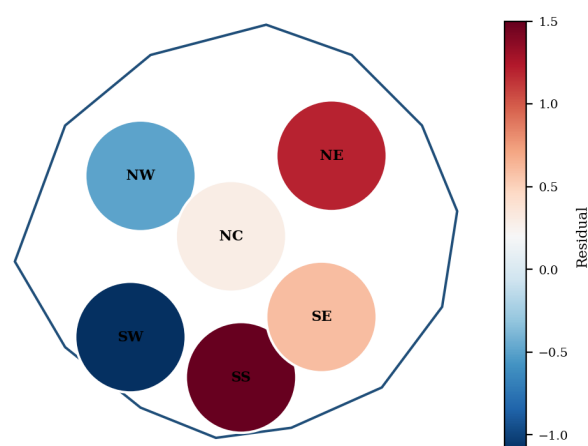


Map 5: Local Moran's I (LISA Cluster Map)



Map 6: Kernel Density Estimation



Map 7: Dominant Healthcare Choice Preference**Map 8: Spatial Regression Residual Map****Figure 4:** Spatial mapping of traditional medicine utilisation during and after COVID-19 (Maps 1 to 8). Source: Field survey, 2026.

The choropleth map of utilisation (Map 1) reveals clear geographical variation, with higher utilisation concentrated in parts of the South South, South East, North East, and some North Central states, whereas comparatively lower utilisation is evident in several states in the South West and parts of the North West. The accessibility map (Map 2) illustrates spatial disparities in travel time to the nearest healthcare facility, with shorter travel times concentrated around major urban centres and longer times observed in rural and remote areas. The COVID-19 impact map (Map 3) demonstrates considerable regional variation in changes to healthcare seeking behaviour, with higher values indicating greater shifts toward traditional medicine.

The hot spot analysis (Map 4) identifies statistically significant clusters of utilisation, with hot spots representing locations where neighbouring states consistently exhibit high levels of utilisation and cold spots representing consistently low utilisation. The Local Moran's I analysis (Map 5) identifies local patterns of spatial association, distinguishing High High and Low Low clusters from High Low and Low High outliers that mark transitional zones. The kernel density map (Map 6) highlights areas of concentrated utilisation without being constrained by administrative boundaries, the healthcare preference map (Map 7) illustrates the dominant healthcare system used across states, and the spatial regression residual map (Map 8) evaluates the adequacy of the regression model, with residual clustering indicating the influence of additional unmeasured factors. Collectively, the analyses demonstrate statistically significant clustering and positive spatial dependence, underscoring the need for geographically targeted policies that integrate traditional medicine into the healthcare system while improving access to conventional services in underserved regions.

Taken together, the findings demonstrate that the pandemic marked an important turning point in healthcare seeking behaviour in Nigeria, as traditional medicine evolved from being regarded primarily as an alternative form of healthcare to becoming an important complementary component of healthcare delivery. Affordability, accessibility, cultural acceptance, and previous positive experiences continue to sustain utilisation in the post pandemic period, but maximising its contribution to national healthcare will require stronger regulation, scientific validation, collaboration between traditional practitioners and orthodox providers, and sustained investment in research.

5. Conclusion and Recommendations

This study examined the influence of traditional medicine utilisation on healthcare choices in Nigeria during and after the COVID-19 pandemic. The findings demonstrate that the pandemic significantly altered healthcare seeking behaviour, leading many individuals and households to rely more heavily on traditional medicine. What initially emerged as a practical response to the challenges posed by the pandemic has, for many people, evolved into a sustained component of their healthcare practices, driven by affordability, accessibility, cultural acceptance, and previous positive experiences. The spatial analysis further showed that utilisation is not evenly distributed across the country but reflects distinct geographical patterns shaped by healthcare infrastructure, socio economic conditions, cultural practices, and accessibility.

Despite its growing acceptance, important challenges relating to scientific validation, product standardisation, dosage regulation, quality assurance, and professional regulation continue to limit the wider integration of traditional medicine into the formal healthcare system. Addressing these challenges will require stronger collaboration among researchers, government agencies, healthcare professionals, regulatory authorities, and traditional medicine practitioners. The study concludes that with sustained scientific research, effective regulation, and evidence based policy implementation, traditional medicine can make a meaningful contribution to improving healthcare delivery, strengthening health system resilience, and supporting preparedness for future public health emergencies.

On the basis of these findings, the study recommends that government agencies, particularly the National Agency for Food and Drug Administration and Control and the Federal Ministry of Health, strengthen the regulation, certification, and monitoring of traditional medicinal products and practitioners. Universities and research institutes should intensify multidisciplinary research aimed at scientifically validating the efficacy and safety of commonly used traditional medicines. Greater collaboration should be encouraged between orthodox healthcare professionals and qualified traditional medicine practitioners, public education programmes should promote informed use, government should continue investing in healthcare infrastructure in rural and underserved communities, geographic information system technologies should be incorporated into health planning, and traditional medical knowledge should be systematically documented and preserved.

Declarations

Conflict of Interest Statement

The authors declare that no conflicting interests exist.

Funding Statement

No funding was received for the conduct of this study.

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