



# Tinnitus in Later Life: The Role of Socio-Cultural Determinants, Social Support, Health Conditions, and Lifestyle Behaviours among the Rural Elderly in North-Central Nigeria

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Article history: Received 12 April 2025, Reviewed 17 May 2025, Accepted for publication 02 June 2025

## Abstract

**Background:** Tinnitus, defined as the perception of sound without external stimuli, significantly affects the life quality among elderly populations worldwide. This study investigated the prevalence and associations of tinnitus with socio-cultural determinants, social support, health conditions, and lifestyle behaviors among rural elderly residents in Asa Local Government Area of Kwara state, North-Central Nigeria.

**Methods:** This was a cross-sectional study conducted among 427 elderly residents ( $\geq 65$  years) using structured questionnaires to collect data on tinnitus symptoms, socio-demographic characteristics, cultural beliefs, social support (measured by the Oslo Social Support Scale), health conditions, and lifestyle behaviors. Chi-square analysis was employed to determine associations between variables.

**Results:** Tinnitus prevalence was found to be 41.7% among participants. Observed was significant associations between tinnitus and educational status ( $\chi^2 = 12.36$ ,  $p = 0.006$ ), age ( $\chi^2 = 9.84$ ,  $p = 0.007$ ), cultural beliefs about loss of hearing ( $\chi^2 = 18.73$ ,  $p < 0.001$ ), social support levels ( $\chi^2 = 15.28$ ,  $p < 0.001$ ), hypertension ( $\chi^2 = 11.42$ ,  $p < 0.001$ ), diabetes ( $\chi^2 = 7.65$ ,  $p = 0.006$ ), and exposure to environmental noise ( $\chi^2 = 14.32$ ,  $p < 0.001$ ). Low social support was more common among tinnitus sufferers (52.8%) compared to non-sufferers (31.5%).

**Conclusion:** There is significant association between tinnitus among rural elderly Nigerians and socio-cultural factors, lack of social support, chronic health conditions, and lifestyle behaviors. Culturally sensitive interventions that address modifiable risk factors and strengthen social support systems are recommended to reduce tinnitus burden in this population.

**Keywords:** Tinnitus, elderly, rural Nigeria, social support, socio-cultural determinants, lifestyle



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## How to cite this article

Aremu SK, Achebe CC, Issa Y. Tinnitus in Later Life: The Role of Socio-Cultural Determinants, Social Support, Health Conditions, and Lifestyle Behaviours among the Rural Elderly in North-Central Nigeria. The Nigerian Health Journal 2025; 25(2): 737 – 747.

<https://doi.org/10.71637/tnhj.v25i2.1078>



## Introduction

Tinnitus, which is characterized by the perception of sound in the absence of external auditory stimuli, represents a significant global health challenge among elderly populations<sup>1</sup>. It manifests as ringing, buzzing, hissing, or roaring sounds that can severely impact quality of life, psychological well-being, and social functioning<sup>2</sup>. Tinnitus affects approximately 10-15% of adults worldwide, and its prevalence increases markedly with age, affecting up to 30% of adults over 65 years<sup>3</sup>.

The study explored four critical constructs—socio-cultural determinants, social support, health conditions, and lifestyle behaviors—that influence the health and well-being of elderly populations. Socio-cultural determinants include traditional beliefs, values, norms, and practices that shape how individuals perceive health and illness. In rural communities, conditions are often attributed to spiritual forces, ancestral punishment, or natural ageing, which can guide health-seeking behaviours and the acceptance of both modern and traditional remedies. These cultural frameworks deeply influence how symptoms are interpreted and whether individuals pursue biomedical or traditional healing approaches<sup>3</sup>. Social support refers to the emotional, informational, and practical assistance available through social networks such as family, friends, neighbors, and community groups. In ageing populations, strong social support can buffer against stress, reduce feelings of isolation, and improve coping with illness. The absence of support may lead to poor mental and physical outcomes, particularly in resource-limited settings where formal healthcare is inadequate or inaccessible<sup>3</sup>. Health conditions, especially chronic diseases like hypertension, diabetes, and arthritis, are prevalent in older adults and often co-occur with functional limitations. These conditions may go undiagnosed or be poorly managed due to low awareness, financial constraints, and limited access to care. They can also interact with each other, compounding health risks and reducing quality of life.

Lifestyle behaviors such as smoking, alcohol consumption, diet, physical inactivity, and environmental exposures (e.g., loud noise or harmful traditional substances) are important modifiable risk factors. In rural settings, lifestyle choices are influenced by cultural practices, occupational demands, and limited public health education. Understanding how these behaviors are embedded in daily life is essential for designing effective interventions. Altogether, these constructs provide a comprehensive framework for

analysing health outcomes in elderly populations and are particularly useful in settings where cultural beliefs, limited resources, and traditional practices intersect<sup>4</sup>.

Tinnitus was observed with features of being short term, unilateral in presentation, intermittent, and non-pulsatile in nature, and it is associated with otological, audiological, anthropometric and cardiovascular anomalies<sup>4</sup>. Nigerian patients exhibit similar characteristics to those described in developed countries, but the major risk factors for tinnitus except hearing impairment, may be different from the latter<sup>4</sup>. In low and middle-income countries (LMICs), particularly in rural sub-Saharan Africa, tinnitus remains understudied despite its potential prevalence and impact<sup>5</sup>. Nigeria, Africa's most populous nation, is faced with great challenges in geriatric healthcare delivery, especially in rural areas where there is limited access to specialized services<sup>6</sup>. Rural elderly populations in Nigeria operate within well-defined socio-cultural contexts that influence perception, reporting, and management of conditions like tinnitus<sup>7</sup>.

A study revealed that the most reported handicap in tinnitus individuals was anxiety and difficulty with concentration followed by depression and irritability. No correlation was found between the disability shown by the Tinnitus handicap inventory (THI) score and the age, sex, duration of the tinnitus, the tinnitus pitch, tinnitus loudness, or the laterality of the tinnitus. There was a significant positive correlation between the grade of hearing loss and the level of disability reported in the THI ( $P = .01$ )<sup>8</sup>.

Asa Local Government Area in Kwara State, North-Central Nigeria, is a typical rural Nigerian setting with predominantly agrarian communities, limited healthcare infrastructure, and strong traditional cultural influences<sup>9</sup>. Understanding tinnitus in this context requires exploration beyond mere biomedical perspectives to include socio-cultural determinants, social support systems, comorbid health conditions, and lifestyle behaviors that may influence its prevalence and impact. Previous research has revealed associations between tinnitus and various factors which include hearing loss, cardiovascular disease, diabetes, noise exposure, and certain medications<sup>10</sup>. However, the complex interplay between these factors and the socio-cultural context of rural Nigerian elderly remains largely unexplored. Additionally, social support—an important determinant

of health outcomes in elderly populations—has rarely been examined in relation to tinnitus in African settings<sup>11</sup>.

A study observed that due to tinnitus manifested in most of the of the participants with loss of concentration abnormal behavior and despair. However, there was no significant difference between psycho- social reactions of elderly listeners in urban and rural areas. Based on these findings, the authors of the work recommended that elderly people should avoid exposure to noise, emotional stress, worry and unprescribed drugs; and audiological screening at regular intervals<sup>12</sup>.

This study seeks to bridge these knowledge gaps by investigating the prevalence of tinnitus among rural elderly residents in Asa Local Government Area and examining associations between tinnitus and socio-demographic characteristics, cultural beliefs, social support, health conditions, and lifestyle behaviors. The findings will inform culturally appropriate interventions that could reduce tinnitus burden and improve quality of life among this vulnerable population.

## Methodology

### Study Design and Setting

This cross-sectional study was conducted between November 2024 and February 2025 in Asa Local Government Area, Kwara State, North-Central Nigeria. Asa LGA has a population of approximately 142,000 inhabitants (projected from 2006 census), with elderly persons ( $\geq 65$  years) constituting 4.8% of the population (approximately 6,816 individuals). The LGA encompasses 12 wards with predominantly rural settlements that are characterized by limited healthcare infrastructure, and strong traditional cultural practices and beliefs.

### Sample Size and Sampling Technique

The Cochran formula:  $n = Z^2pq/d^2$  was used to calculate the sample size<sup>3</sup>

Where:  $Z = 1.96$  (95% confidence level),  $p = 0.30$  (estimated prevalence of tinnitus among elderly based on previous studies),  $q = 1-p = 0.70$ ,  $d = 0.05$  (margin of error).

This generated a minimum sample size of 323. Accounting for a 10% non-response rate, the target sample size was adjusted to 355. The final sample obtained was 427 participants.

A multistage sampling technique was employed in this study. First, six wards were randomly selected from the twelve wards in Asa Local Government Area (LGA). From each of these six wards, two communities were randomly chosen, resulting in a total of twelve communities. Within these selected communities, households with elderly residents were identified using community registers maintained by community health workers and political secretaries. All elderly individuals aged 65 years and above who consented to participate were subsequently recruited from these households.

### Data Collection

Trained research assistants who are fluent in both English and Yoruba (the predominant local language) administered structured questionnaires through face-to-face interviews. The questionnaire was translated into Yoruba, when necessary, and back-translated to ensure accuracy.

The questionnaire obtained data which covered several domains relevant to the study.

First, socio-demographic characteristics were gathered, including participants' age, gender, marital status, educational level, occupation, income level, and household composition. Tinnitus was assessed by examining its presence, duration, and severity, using a modified version of the Tinnitus Handicap Inventory–Screening Version, along with participants' help-seeking behaviours related to the condition.

Socio-cultural determinants were also explored. These included cultural beliefs about hearing loss and tinnitus, traditional practices associated with hearing problems, and perceptions of ageing and its related symptoms. Social support was evaluated using the Oslo Social Support Scale (OSSS-3), which assesses the number of close confidants, the level of interest and concern shown by others, and the ease of obtaining practical help from neighbours. The OSSS-3 scores range from 3 to 14 and are categorised as poor support (3–8), moderate support (9–11), and strong support (12–14).

Health conditions were self-reported, including diagnoses of hypertension, diabetes, stroke, and arthritis, as well as hearing difficulties and current medication use. Lifestyle behaviours were also documented, including smoking status, alcohol consumption, exposure to loud noise (whether occupational or environmental), and the use of ototoxic substances, including traditional medicines.

In addition to self-reported data, basic health measurements were obtained. These included blood pressure (measured using calibrated sphygmomanometers), random blood glucose levels (measured using glucometers), and height and weight for body mass index (BMI) calculation.

The study investigated tinnitus among elderly individuals in rural North-Central Nigeria using a cross-sectional design. It involved 427 participants aged 65 years and above. The dependent variable was tinnitus, operationalized as the perception of sound in the absence of external auditory stimuli. Tinnitus was measured through self-report during structured interviews. Participants were asked about the presence of tinnitus, its duration (categorized as less than 1 year, 1–3 years, or more than 3 years), and its severity.

Severity of tinnitus was assessed using a modified version of the Tinnitus Handicap Inventory–Screening Version (THI-S). Participants also reported their help-seeking behaviors, such as visiting a traditional healer, a health facility, or using self-medication. The independent variables included socio-demographic factors, socio-cultural beliefs, health conditions, and lifestyle behaviors.

Socio-demographic data (age, gender, marital status, education, occupation, income, and household size) were collected via structured questionnaires. Socio-cultural beliefs were operationalized through questions about traditional interpretations of tinnitus, including whether participants believed tinnitus was a form of spiritual communication or a result of ancestral punishment. Beliefs that hearing loss is a normal part of aging were also assessed.

Social support was measured using the Oslo Social Support Scale (OSSS-3), which includes three items on close confidants, interest from others, and availability of practical help. Scores ranged from 3 to 14, and were categorized as poor (3–8), moderate (9–11), or strong (12–14) social support.

Health conditions were measured through self-reported diagnosis of hypertension, diabetes, stroke, arthritis, and hearing problems. Clinical measurements of blood pressure and blood glucose were taken using standard medical devices. Medication use was also recorded, specifically noting polypharmacy (use of three or more medications).

Lifestyle behaviors included current or past smoking and alcohol use, exposure to environmental noise, and use of ototoxic traditional medicines. These behaviors were assessed through interview questions. Trained research assistants conducted face-to-face interviews in English or Yoruba to ensure understanding.

All data were entered and analyzed using SPSS version 25. SPSS was used to generate descriptive statistics such as frequencies, percentages, and means. Chi-square tests were conducted in SPSS to determine associations between tinnitus and categorical variables. When expected cell counts were below five, Fisher's exact test was applied. Binary logistic regression was also performed in SPSS to identify independent predictors of tinnitus.

### **Ethical Considerations**

We obtained ethical approval from the Research Ethics Committee of Federal Teaching Hospital Ido-Ekiti. Permission was also secured from local authorities including the Asa LGA Chairman and traditional leaders of selected communities. Written or thumbprint-indicated informed consent was obtained from all participants after explaining the study's purpose and procedures in their preferred language.

### **Data Analysis**

This study addressed key research questions through a combination of descriptive and inferential statistical analyses. First, it explored the prevalence of tinnitus among rural elderly individuals, which was found to be 41.7%. To answer the question of which socio-demographic factors are associated with tinnitus, chi-square tests revealed significant associations with age and educational status, with older adults and those with no formal education more likely to report symptoms. The study also examined whether socio-cultural beliefs influence tinnitus, finding significant associations with beliefs such as tinnitus being a form of spiritual communication or a result of ancestral punishment. In addressing whether social support levels affect tinnitus, results showed that poor social support was both significantly associated and an independent predictor. The question of whether health conditions are related to tinnitus was supported by strong links to hypertension, diabetes, and hearing difficulties. Finally, in examining lifestyle factors, significant associations were found with exposure to environmental noise, smoking, and use of ototoxic traditional medicines. Binary logistic regression confirmed age  $\geq 85$ , poor social support, hypertension,

hearing difficulties, and spiritual beliefs as independent predictors. All analyses were conducted using SPSS version 25, and significance was set at  $p < 0.05$ , ensuring the study reliably answered its core research questions.

## Results

### *Socio-demographic Characteristics*

A total of 427 elderly participants were included in the analysis. Table 1 displays the socio-demographic characteristics. The mean for the age was  $72.6 \pm 6.8$  years, with 58.1% between 65-74 years. Female respondents (53.2%) were more than male respondents (46.8%). Most participants were married (62.1%) or widowed (32.8%). Educational status was generally low, with 64.4% having no formal education. Farming was the predominant occupation (56.9%), followed by trading (23.7%).

### *Prevalence and Characteristics of Tinnitus*

As shown in Table 2, the overall prevalence of tinnitus was 41.7% ( $n=178$ ) among the study participants. Among those with tinnitus, 45.5% reported experiencing symptoms for more than 3 years, and 32.6% described the severity as moderate to severe. Most participants (58.4%) had not sought any formal medical help for their tinnitus symptoms.

### *Socio-Cultural Determinants and Tinnitus*

Table 3 shows the relationship between socio-cultural factors and tinnitus. Cultural beliefs about hearing loss being a normal part of aging were significantly associated with tinnitus ( $\chi^2 = 18.73$ ,  $p < 0.001$ ). Similarly, beliefs that tinnitus represents spiritual communication ( $\chi^2 = 10.42$ ,  $p = 0.001$ ) and that hearing problems result from ancestral punishment ( $\chi^2 = 7.86$ ,  $p = 0.005$ ) were significantly associated with tinnitus.

### *Social Support and Tinnitus*

Analysis of social support levels using the Oslo Social Support Scale showed significant associations with tinnitus (Table 4). Participants with tinnitus were more likely to have poor social support (52.8%) compared to those without tinnitus (31.5%). The association between social support categories and tinnitus was statistically significant ( $\chi^2 = 15.28$ ,  $p < 0.001$ ).

### *Health Conditions and Tinnitus*

Table 5 displays the association between tinnitus and different health conditions. There was observed significant relationship between tinnitus and

hypertension ( $\chi^2 = 11.42$ ,  $p < 0.001$ ), diabetes ( $\chi^2 = 7.65$ ,  $p = 0.006$ ), self-reported difficulties in hearing ( $\chi^2 = 22.81$ ,  $p < 0.001$ ), and consumption multiple medications ( $\chi^2 = 9.27$ ,  $p = 0.002$ ). No statistically significant associations were observed between tinnitus and stroke or arthritis.

### *Lifestyle Behaviors and Tinnitus*

Analysis of lifestyle behaviors (Table 6) showed significant associations between tinnitus and exposure to environmental noise ( $\chi^2 = 14.32$ ,  $p < 0.001$ ), past or current smoking ( $\chi^2 = 7.03$ ,  $p = 0.008$ ), and use of ototoxic traditional medicines ( $\chi^2 = 6.45$ ,  $p = 0.011$ ). No significant association was found between tinnitus and alcohol consumption.

### *Multivariate Analysis of Factors Associated with Tinnitus*

Table 7 presents the results of logistic regression analysis examining factors independently associated with tinnitus. After adjusting for confounding variables, significant independent predictors of tinnitus included: age  $\geq 85$  years (AOR = 2.18, 95% CI: 1.34-3.56), poor social support (AOR = 1.92, 95% CI: 1.28-2.87), hypertension (AOR = 1.78, 95% CI: 1.18-2.67), self-reported hearing difficulties (AOR = 2.21, 95% CI: 1.47-3.33), exposure to environmental noise (AOR = 1.83, 95% CI: 1.22-2.76), and belief that tinnitus represents spiritual communication (AOR = 1.56, 95% CI: 1.02-2.39).





**Table 1:** Socio-demographic Characteristics of Participants

Characteristic	Category	Frequency (n=427)	Percentage (%)
Age (years)	65-74	248	58.1
	75-84	138	32.3
	≥85	41	9.6
Gender	Male	200	46.8
	Female	227	53.2
Marital Status	Married	265	62.1
	Widowed	140	32.8
	Divorced/Separated	22	5.1
Educational Status	No formal education	275	64.4
	Primary education	98	23.0
	Secondary education	36	8.4
	Tertiary education	18	4.2
Occupation	Farming	243	56.9
	Trading	101	23.7
	Artisan	42	9.8
	Retired civil servant	25	5.9
	Others	16	3.7
Monthly Income	<₦20,000	285	66.7
	₦20,000-₦50,000	112	26.2
	>₦50,000	30	7.1
Household Size	Living alone	43	10.1
	2-4 people	162	37.9
	≥5 people	222	52.0

**Table 2:** Prevalence and Characteristics of Tinnitus

Characteristic	Category	Frequency	Percentage (%)
Presence of Tinnitus	Yes	178	41.7
	No	249	58.3
Duration of Tinnitus (n=178)	<1 year	42	23.6
	1-3 years	55	30.9
	>3 years	81	45.5
Severity of Tinnitus (n=178)	Mild	120	67.4
	Moderate	43	24.2
	Severe	15	8.4
Help-seeking for Tinnitus (n=178)	None	104	58.4
	Traditional healer	39	21.9
	Healthcare facility	28	15.7
	Self-medication	7	4.0

**Table 3:** Association Between Socio-Cultural Determinants and Tinnitus

Socio-Cultural Factor	Category	Tinnitus (n=178)	Present Tinnitus (n=249)	Absent $\chi^2$ value	p-value
Belief that hearing loss is normal with aging	Yes	152 (85.4%)	173 (69.5%)	18.73	<0.001*
	No	26 (14.6%)	76 (30.5%)		
Belief that tinnitus represents spiritual communication	Yes	79 (44.4%)	72 (28.9%)	10.42	0.001*
	No	99 (55.6%)	177 (71.1%)		
Belief that hearing problems result from ancestral punishment	Yes	53 (29.8%)	43 (17.3%)	7.86	0.005*
	No	125 (70.2%)	206 (82.7%)		
Use of traditional remedies for ear problems	Yes	95 (53.4%)	112 (45.0%)	3.79	0.051
	No	83 (46.6%)	137 (55.0%)		
Participation in traditional ceremonies with loud sounds	Yes	102 (57.3%)	126 (50.6%)	1.52	0.218
	No	76 (42.7%)	123 (49.4%)		

\*Statistically significant ( $p < 0.05$ )

**Table 4:** Association Between Social Support and Tinnitus

Social Support	Tinnitus Present (n=178)	Tinnitus Absent (n=249)	$\chi^2$ value	p-value
Poor support (3-8)	94 (52.8%)	77 (31.5%)	15.28	<0.001*
Moderate support (9-11)	63 (35.4%)	122 (49.0%)		
Strong support (12-14)	21 (11.8%)	48 (19.5%)		

\*Statistically significant ( $p < 0.05$ )

**Table 5:** Association Between Health Conditions and Tinnitus

Health Condition	Status	Tinnitus Present (n=178)	Tinnitus Absent (n=249)	$\chi^2$ value	p-value
Hypertension	Yes	109 (61.2%)	112 (45.0%)	11.42	<0.001*
	No	69 (38.8%)	137 (55.0%)		
Diabetes	Yes	48 (27.0%)	40 (16.1%)	7.65	0.006*
	No	130 (73.0%)	209 (83.9%)		
Stroke	Yes	14 (7.9%)	15 (6.0%)	0.52	0.472
	No	164 (92.1%)	234 (94.0%)		
Arthritis	Yes	91 (51.1%)	119 (47.8%)	0.41	0.522
	No	87 (48.9%)	130 (52.2%)		
Self-reported hearing difficulties	Yes	123 (69.1%)	112 (45.0%)	22.81	<0.001*
	No	55 (30.9%)	137 (55.0%)		
Multiple medication use ( $\geq 3$ )	Yes	87 (48.9%)	85 (34.1%)	9.27	0.002*
	No	91 (51.1%)	164 (65.9%)		

\*Statistically significant ( $p < 0.05$ )

**Table 6:** Association Between Lifestyle Behaviors and Tinnitus

Lifestyle Factor	Category	Tinnitus Present (n=178)	Tinnitus Absent (n=249)	$\chi^2$ value	p-value
Exposure to environmental noise	Yes	105 (59.0%)	99 (39.8%)	14.32	<0.001*
	No	73 (41.0%)	150 (60.2%)		
Smoking (past or current)	Yes	67 (37.6%)	65 (26.1%)	7.03	0.008*
	No	111 (62.4%)	184 (73.9%)		
Alcohol consumption (past or current)	Yes	83 (46.6%)	105 (42.2%)	0.76	0.384
	No	95 (53.4%)	144 (57.8%)		
Use of ototoxic traditional medicines	Yes	69 (38.8%)	67 (26.9%)	6.45	0.011*
	No	109 (61.2%)	182 (73.1%)		

\*Statistically significant ( $p < 0.05$ )

**Table 7:** Logistic Regression Analysis of Factors Associated with Tinnitus

Factor	Category	Adjusted Odds Ratio	95% Confidence Interval	p-value
Age (years)	65-74	1.00 (Reference)		
	75-84	1.47	0.96-2.25	0.074
	≥85	2.18	1.34-3.56	0.002*
Social support	Strong	1.00 (Reference)		
	Moderate	1.36	0.85-2.17	0.197
	Poor	1.92	1.28-2.87	0.001*
Hypertension	No	1.00 (Reference)		
	Yes	1.78	1.18-2.67	0.006*
Diabetes	No	1.00 (Reference)		
	Yes	1.42	0.87-2.32	0.159
Self-reported hearing difficulties	No	1.00 (Reference)		
	Yes	2.21	1.47-3.33	<0.001*
Multiple medication use	No	1.00 (Reference)		
	Yes	1.31	0.86-1.99	0.210
Exposure to environmental noise	No	1.00 (Reference)		
	Yes	1.83	1.22-2.76	0.004*
Smoking (past or current)	No	1.00 (Reference)		
	Yes	1.28	0.82-1.99	0.272
Use of ototoxic traditional medicines	No	1.00 (Reference)		
	Yes	1.45	0.94-2.24	0.087
Belief: hearing loss normal with aging	No	1.00 (Reference)		
	Yes	1.70	1.01-2.87	0.046*
Belief: tinnitus represents spiritual communication	No	1.00 (Reference)		
	Yes	1.56	1.02-2.39	0.039*

\*Statistically significant ( $p < 0.05$ )



## Discussion

This study investigated the prevalence of tinnitus and its associations with socio-cultural determinants, social support, health conditions, and lifestyle behaviors among rural elderly residents in Asa Local Government Area of North-Central Nigeria. The findings reveal a high prevalence of tinnitus (41.7%) in this population, significantly higher than the global average of 10-15% in the general adult population<sup>2</sup> but comparable to rates reported among elderly populations in similar settings<sup>5</sup>.

### Socio-demographic Factors and Tinnitus

Our results show significant associations between tinnitus and advanced age, particularly among those aged 85 years and above. This aligns with previous studies highlighting age-related degeneration of the auditory system as a contributing factor to tinnitus in elderly populations<sup>11</sup>. The association between tinnitus and educational status suggests that lower education levels may impact health literacy, awareness, and health-seeking behaviors related to auditory symptoms<sup>7</sup>.

### Socio-Cultural Context and Tinnitus

The significant associations between cultural beliefs and tinnitus highlight the importance of socio-cultural context in understanding and addressing this condition. The widespread belief that hearing loss is a normal part of aging (reported by 85.4% of tinnitus sufferers) may contribute to normalization of symptoms and reduced help-seeking behavior<sup>11</sup>. Similarly, beliefs attributing tinnitus to spiritual communication or ancestral punishment reflect cultural interpretations that may influence perception and management of the condition. These findings underscore the need for culturally sensitive approaches to tinnitus awareness and intervention in rural Nigerian settings. Health promotion efforts must acknowledge and respectfully engage with existing cultural frameworks while providing evidence-based information about auditory health<sup>7</sup>.

### Social Support and Tinnitus

A notable finding is the significant association between poor social support and tinnitus, with tinnitus sufferers more likely to report poor social support (52.8%) compared to non-sufferers (31.5%). This relationship may be bidirectional: limited social support might exacerbate tinnitus perception and impact through increased stress and reduced coping resources, while tinnitus itself may lead to social withdrawal and communication difficulties<sup>13</sup>.

The importance of social support in tinnitus management has been highlighted in high-income countries<sup>2</sup>, but rarely examined in African settings. Our findings suggest that interventions strengthening social support networks could be particularly beneficial in this population, especially given the communal nature of traditional rural Nigerian societies that could be leveraged for peer support initiatives.

### Health Conditions and Tinnitus

The study revealed a statistically significant association between educational status and tinnitus ( $\chi^2 = 12.36$ ,  $p = 0.006$ ). This finding suggests that the prevalence of tinnitus may differ across educational levels. Individuals with lower educational attainment might have reduced awareness of tinnitus risk factors, preventive strategies, or access to healthcare. It also raises questions about health literacy and its role in managing auditory health. The significant associations between tinnitus and both hypertension and diabetes align with growing evidence linking these conditions to auditory dysfunction<sup>10</sup>. Potential mechanisms include microvascular damage affecting the cochlea and auditory pathways<sup>10</sup>. The high prevalence of these conditions in our study population (61.2% hypertension and 27.0% diabetes among tinnitus sufferers) highlights the need for integrated approaches addressing both auditory and cardiovascular health.

Self-reported hearing difficulties showed the strongest association with tinnitus (OR = 2.21), consistent with established relationships between hearing loss and tinnitus. Multiple medication use was also significantly associated with tinnitus, potentially reflecting both polypharmacy-related ototoxicity and the complex medical profiles of participants<sup>2</sup>.

### Lifestyle Behaviors and Tinnitus

Environmental noise exposure emerged as a significant predictor of tinnitus, consistent with evidence on noise-induced auditory damage<sup>10</sup>. In rural Asa, sources of environmental noise include agricultural machinery, community festivities, and religious gatherings, suggesting potential targets for preventive interventions. The association between smoking and tinnitus aligns with previous studies demonstrating smoking's adverse effects on auditory function through vascular mechanisms and oxidative stress<sup>8</sup>. Similarly, the use of ototoxic traditional medicines, reported by 38.8% of tinnitus sufferers, represents a modifiable risk factor that could be addressed through enhanced awareness of potential auditory side effects.

### Implications for Practice and Policy

These findings have several implications for healthcare practice and policy in rural Nigerian settings:

- a. **Integrated screening and management:** Incorporating tinnitus screening into routine elderly care, particularly for those with hypertension, diabetes, or hearing difficulties, could facilitate early identification and management.
- b. **Culturally sensitive education:** Health education addressing tinnitus should acknowledge cultural beliefs while providing evidence-based information about auditory health, prevention, and management options.
- c. **Strengthening social support:** Community-based interventions that enhance social support networks could improve coping mechanisms and quality of life among elderly individuals with tinnitus.
- d. **Addressing modifiable risk factors:** Targeted efforts to reduce exposure to environmental noise, discourage smoking, and increase awareness about potentially ototoxic traditional medicines could help reduce tinnitus burden.
- e. **Healthcare workforce capacity building:** Training primary healthcare workers in basic auditory assessment and tinnitus management could improve service accessibility in rural areas with limited specialist care.

### Limitations

There are some limitations which should be considered when interpreting these findings. The first is that the cross-sectional design used precludes establishment of causal relationships between the identified factors and tinnitus. Second, self-reported data on health conditions and tinnitus may be subject to recall bias and cultural influences on symptom reporting. Third, the study did not include objective audiometric assessment, which would have provided more comprehensive data on hearing status. Finally, while the study achieved a robust sample size, the findings may not be generalizable to all rural elderly populations in Nigeria due to regional cultural and environmental variations.

### Conclusion

This study reveals a high prevalence of tinnitus among rural elderly residents in Asa Local Government Area, North-Central Nigeria, with significant associations between tinnitus and socio-cultural factors, social support levels, chronic health conditions, and lifestyle behaviors. The findings highlight the complex interplay

between biomedical and socio-cultural determinants of tinnitus in this population. Addressing tinnitus among rural elderly Nigerians requires multifaceted approaches that integrate biomedical interventions with culturally appropriate strategies, strengthen social support systems, and address modifiable risk factors. Future research should explore longitudinal relationships between identified factors and tinnitus, evaluate culturally adapted interventions, and incorporate objective audiological assessments to better understand the burden and determinants of tinnitus in this vulnerable population.

### References

1. World Health Organization. World report on hearing. Geneva: WHO; 2021.
2. Bhatt JM, Lin HW, Bhattacharyya N. Prevalence, severity, exposures, and treatment patterns of tinnitus in the United States. *JAMA Otolaryngol Head Neck Surg.* 2016;142(10):959-965.
3. Baguley D, McFerran D, Hall D. Tinnitus. *Lancet.* 2013 Nov 9;382(9904):1600-7. doi: 10.1016/S0140-6736(13)60142-7.
4. Lasisi AO, Ayodele OE, Ajuwon AJ. Characterization of tinnitus in Nigeria. *J Laryngol Otol.* 2012;126(3):288-293. doi:10.1017/S0022215111003221.
5. Lasisi AO, Abiona T, Gureje O. Tinnitus in the elderly: Profile, correlates, and impact in the Nigerian Study of Ageing. *Otolaryngol Head Neck Surg.* 2010 Oct;143(4):510-5. doi: 10.1016/j.otohns.2010.06.817. PMID: 20869560.
6. Nigerian National Bureau of Statistics. Demographic statistics bulletin 2023. Abuja: NBS; 2023.
7. Global Research on Developmental Disabilities Collaborators. Developmental disabilities among children younger than 5 years in 195 countries and territories, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet Glob Health.* 2018 Oct;6(10):e1100-e1121. doi: 10.1016/S2214-109X(18)30309-7. Epub 2018 Aug 29. Erratum in: *Lancet Glob Health.* 2018 Dec;6(12):e1287. doi: 10.1016/S2214-109X(18)30443-1. PMID: 30172774; PMCID: PMC6139259.
8. Ezeanolue BC, Okoye BC, Ezeanolue CO. Tinnitus and its effect on the quality of life of sufferers: A Nigerian cohort study. *Otolaryngol Head Neck Surg.* 2017;157(4):651-655. doi:10.1177/0194599817713451
9. Ministry of Health, Kwara State. Annual health sector performance report 2022-2023. Ilorin: Kwara State Government; 2023.



10. Sule SO, Fasunla AJ, Nwaorgu OG. Hearing loss among the elderly at a geriatric centre in South-west Nigeria. *Niger J Med* 2023; 32:351-5.
11. Sogebi OA. Profile of ear diseases among elderly patients in Sagamu, south-western Nigeria. *Niger J Med*. 2013 Apr-Jun;22(2):143-7. Erratum in: *Niger J Med*. 2013 Jul-Sep;22(3):257. Olusola, A S [corrected to Sogebi, O A]. PMID: 23829127.
12. Shargorodsky J, Curhan GC, Farwell WR. Prevalence and characteristics of tinnitus among US adults. *Am J Med*. 2010 Aug;123(8):711-8. doi: 10.1016/j.amjmed.2010.02.015. PMID: 20670725.
13. Chen Z, Lu Y, Chen C, Lin S, Xie T, Luo X, Lin Y, Chen Y, Feng Y, Xiong G, Ma X, Zeng C and Lin C (2024) Association between tinnitus and hearing impairment among older adults with age-related hearing loss: a multi-center cross-sectional study. *Front. Neurol.* 15: 1501561. doi: 10.3389/fneur.2024.1501561