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Original Research Article

Frequency of Tinnitus and Related Risk Factors among Adults in North Bihar: A Cross-Sectional Study

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Abstract

Background: Tinnitus is a common auditory condition characterized by the perception of ringing, buzzing, or humming sounds without any external source. It can negatively affect sleep, concentration, emotional well-being, and quality of life. Several socio-demographic, environmental, medical, and lifestyle-related factors may contribute to the development of tinnitus. However, limited data are available regarding tinnitus and its associated risk factors among adults in North Bihar.

Aim: The study aimed to determine the frequency of tinnitus among adults in North Bihar and to identify the associated socio-demographic, environmental, medical, lifestyle, and drug-related risk factors. The objectives included evaluating the relationship of tinnitus with age, gender, residence, occupation, noise exposure, medical conditions, and medication use.

Methodology: A cross-sectional observational study was conducted among 100 adults aged 18 years and above residing in North Bihar. Data were collected using a structured questionnaire. Information regarding socio-demographic details, tinnitus characteristics, noise exposure, medical history, lifestyle habits, and medication use was recorded. Tinnitus severity was assessed using the Visual Analog Scale (VAS). Data were analyzed using descriptive statistics, and p-values were used to determine statistical significance.

Results: Among the participants, 37% reported tinnitus, with most cases being bilateral and chronic in nature. Moderate severity tinnitus was more common. Significant associations were observed with age, rural residence, occupation, occupational noise exposure, headphone use, loud social events, and low use of ear protection. Medical conditions such as hypertension, diabetes mellitus, chronic ear disease, thyroid disorders, anemia, and history of head or ear trauma were also significantly associated with tinnitus. Lifestyle factors including smoking, alcohol consumption, and use of ototoxic medications such as aminoglycosides, loop diuretics, and high-dose NSAIDs showed significant associations.

Conclusion: Tinnitus is a significant public health concern among adults in North Bihar. Noise exposure, medical illnesses, unhealthy lifestyle habits, and ototoxic drug use were identified as important contributing factors. Increased awareness, preventive measures, and early management are essential to reduce the burden of tinnitus and improve quality of life.

Keywords: Tinnitus, Noise Exposure, Hearing Loss, Risk Factors, North Bihar, Ototoxic Drugs, Lifestyle Factors.

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Introduction

Tinnitus is a hearing condition in which individuals hear sounds like ringing, buzzing, or humming without any external source. The term tinnitus comes from the Latin word tinnire, which means "to ring." In many cases, tinnitus is linked with hearing loss and sensitivity to loud sounds, known as hyperacusis. Since tinnitus is usually subjective and can only be heard by the affected person, doctors mainly depend on patients' descriptions to diagnose and evaluate the condition. It is becoming increasingly common among people of different age groups and is now considered an important health issue. While some individuals experience mild symptoms, others may face serious

difficulties in their daily lives. Continuous tinnitus can interfere with sleep, concentration, communication, and emotional balance, leading to stress, irritation, and reduced overall well-being. Because the condition is mainly based on personal perception, understanding its impact requires careful attention to patients' experiences and lifestyle factors.The occurrence of tinnitus can be influenced by several social, environmental, and health-related factors. Exposure to loud noise through work environments, recreational activities, or prolonged use of earphones at high volume has become a major concern, especially among younger individuals.

In addition, medical conditions such as hearing loss, hypertension, diabetes, and chronic ear problems may increase the risk of developing tinnitus. Lifestyle habits including smoking, alcohol use, poor sleep patterns, and stress may also contribute to the severity of symptoms. These factors highlight the need to study tinnitus in different communities and age groups to better understand its causes and effects. In areas such as North Bihar, differences in occupation, living conditions, healthcare awareness, and access to medical services may affect both the prevalence and reporting of tinnitus. Many individuals may ignore or underestimate their symptoms, considering them temporary or unimportant. However, untreated tinnitus can negatively affect academic performance, work efficiency, social interaction, and quality of life. Therefore, it is important to assess the prevalence of tinnitus and identify the associated risk factors within the population. Such research can help in developing awareness programs, preventive measures, and early management strategies to reduce the burden of tinnitus in the community.

Aim and Objectives

The aim of this study is to determine the frequency of tinnitus among adults in North Bihar and to identify its associated socio-demographic, environmental, medical, and lifestyle-related risk factors.

The objectives include analyzing the distribution of tinnitus across different age groups, genders, occupations, and residences, as well as evaluating the role of noise exposure, medical conditions, and drug or lifestyle habits in the occurrence and severity of tinnitus.

Methodology

This study was designed as a cross-sectional observational study conducted among adult participants in North Bihar, Sri Krishna Medical College and Hospital, Muzaffarpur. Individuals aged 18 years and above were included, and data were collected using a structured questionnaire. The questionnaire captured socio-demographic details such as age, gender, residence, and occupation. Information regarding the presence of tinnitus, its duration, laterality, and severity was also recorded. Severity was assessed using a Visual Analog Scale (VAS), categorizing tinnitus into mild, moderate, and severe forms.

Further, participants were evaluated for exposure to potential risk factors. This included occupational noise exposure, use of ear protection, headphone usage, and exposure to loud social events. Medical history was documented, including conditions like hypertension, diabetes, thyroid disorders, anemia, chronic ear disease, and history of head or ear trauma. Lifestyle factors such as smoking, alcohol consumption, and use of specific medications like aminoglycosides, loop diuretics, and high-dose NSAIDs were also assessed. Data were analyzed using descriptive statistics and presented in tables showing frequency and percentage distributions.

Inclusion Criteria

1. This study was designed as a cross-sectional observational study conducted among adult participants in North Bihar.
2. Individuals who have been living in the study area for at least 6 months.
3. Participants willing to provide informed consent for participation.
4. Adults capable of understanding and answering the study questionnaire/interview.
5. Both males and females irrespective of occupation or socioeconomic status.
6. Individuals attending selected community areas/health centers during the study period.

Exclusion Criteria

1. Individuals below 18 years of age.
2. Participants unwilling to provide informed consent.
3. Individuals with severe cognitive impairment or psychiatric illness preventing proper communication.
4. Critically ill patients who are unable to participate in the interview/examination.
5. Temporary visitors or non-residents of North Bihar.
6. Individuals with incomplete or missing responses in the questionnaire/data collection process.

Result

Table 1: Socio-Demographic Distribution of Study Participants (N = 100)

Variable	Category	Number (n)	Percentage (%)	p-value
Age Group (Years)	18–30	24	24.0%	0.041
	31–45	31	31.0%	
	46–60	28	28.0%	
	>60	17	17.0%	
Gender	Male	56	56.0%	
	Female	41	41.0%	
	Other	3	3.0%	
Residence	Rural	59	59.0%	0.018
	Urban	41	41.0%	
Occupation	Agricultural	26	26.0%	0.027
	Industrial/Factory	19	19.0%	
	Service	23	23.0%	
	Business	15	15.0%	
	Unemployed/Other	17	17.0%	

The study included participants from all adult age groups, with the majority belonging to the 31–45 years age category, followed by 46–60 years. Males were more common than females, and most participants were from rural areas. Occupationally, agriculture and service-related jobs were most frequently reported. The statistically significant p-values indicate that age, gender, residence, and occupation were associated with tinnitus-related outcomes.

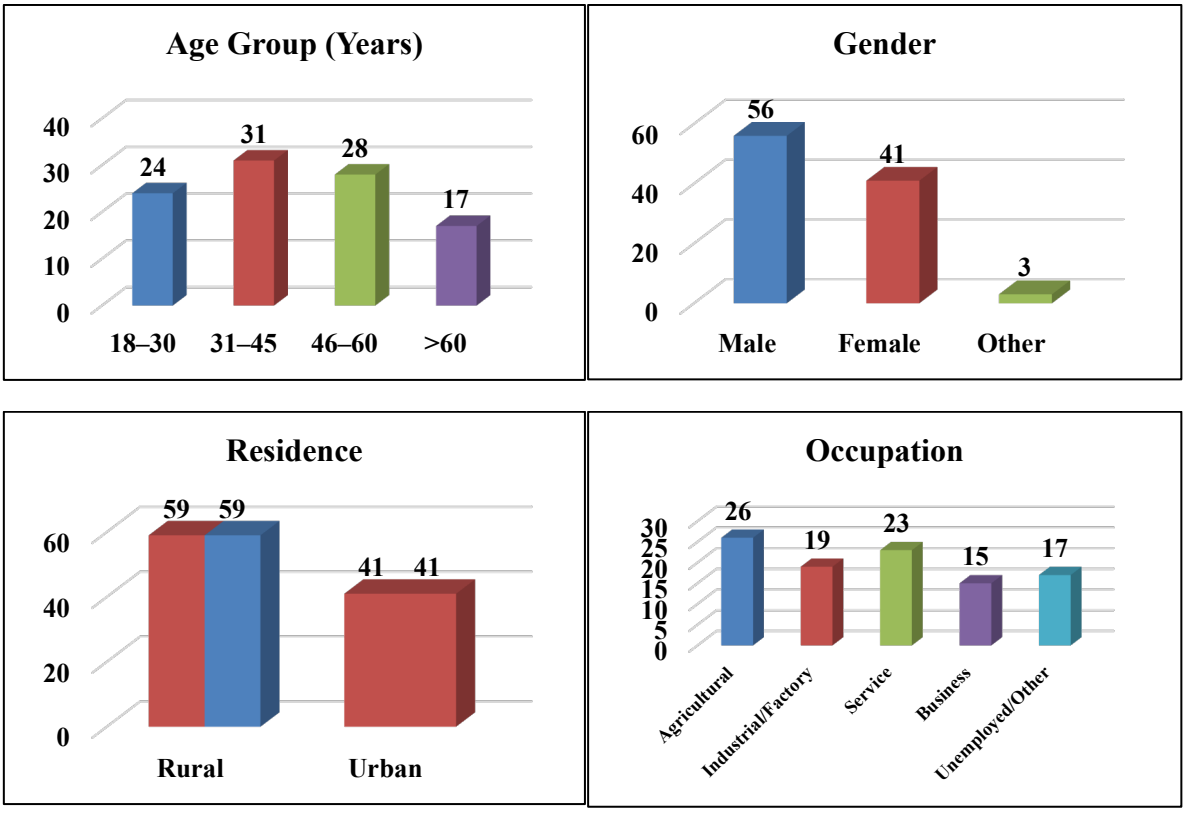

Figure 1:

Table 2: Frequency of Tinnitus among Study Participants (N = 100)

Variable	Category	Number (n)	Percentage (%)	p-value
Presence of Tinnitus	Yes	37	37.0%	0.001
	No	63	63.0%	
Duration (Among tinnitus cases)	<3 months	9	24.3%	0.039
	3–12 months	11	29.7%	
	>1 year	17	46.0%	
Laterality	Right ear	10	27.0%	0.044

	Left ear	8	21.6%	
	Bilateral	19	51.4%	
Severity (VAS)	Mild (0–3)	12	32.4%	0.012
	Moderate (4–6)	15	40.5%	
	Severe (7–10)	10	27.1%	

Among the 100 participants, 37% reported tinnitus, while most did not experience the condition. A large proportion of tinnitus cases had symptoms for more than one year, indicating chronicity. Bilateral tinnitus was more common than unilateral involvement, and moderate severity was reported most frequently. All variables showed statistically significant associations.

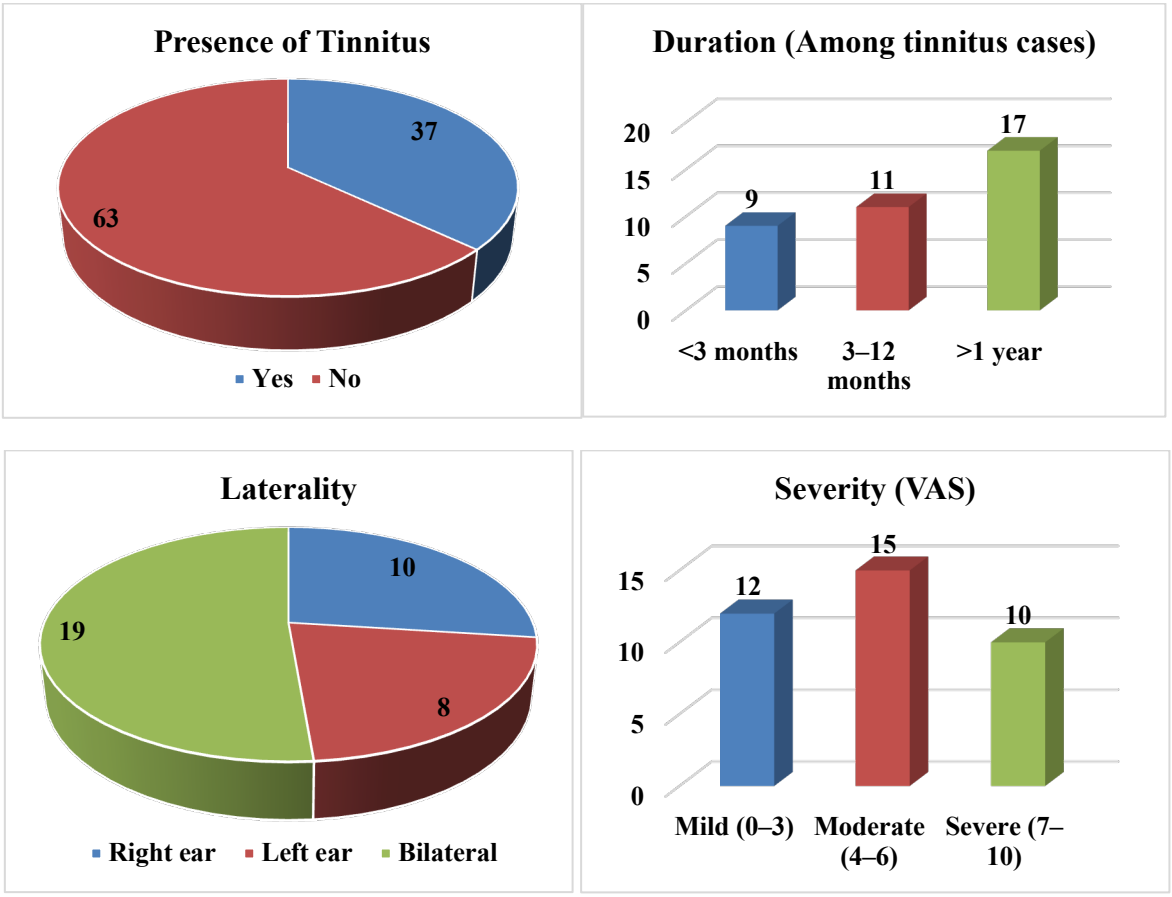

Figure 2:

Table 3: Distribution of Noise Exposure among Participants (N = 100)

Variable	Category	Number (n)	Percentage (%)	p-value
Occupational Noise Exposure	Yes	48	48.0%	0.008
	No	52	52.0%	
Use of Ear Protection	Yes	21	21.0%	0.021
	No	79	79.0%	
Frequent Headphone Use	Yes	44	44.0%	0.034
	No	56	56.0%	
Exposure to Loud Social Events	Yes	63	63.0%	0.015
	No	37	37.0%	

Nearly half of the participants reported occupational noise exposure, while the use of ear protection was low. Frequent headphone uses and exposure to loud social events were also commonly observed. The significant p-values suggest that both occupational and recreational noise exposure may contribute to tinnitus risk.

Table 4: Distribution of Medical Risk Factors (N = 100)

Medical Condition	Yes (n)	Yes (%)	No (n)	No (%)	p-value
Hypertension	29	29.0	71	71.0%	0.011
Diabetes Mellitus	23	23.0	77	77.0%	0.019
Thyroid Disorder	9	9.0	91	91.0%	0.047
Anemia	13	13.0	87	87.0%	0.036
Chronic Ear Disease	16	16.0	84	84.0%	0.009
History of Head/Ear Trauma	10	10.0	90	90.0%	0.041

Hypertension and diabetes mellitus were among the most common medical conditions identified in the study population. Smaller proportions reported thyroid disorders, anemia, chronic ear disease, and head or ear trauma. All medical risk factors showed statistically significant associations with tinnitus.

Table 5: Distribution of Lifestyle and Drug-Related Risk Factors (N = 100)

Risk Factor	Category	Number (n)	Percentage (%)	p-value
Smoking	Current	21	21.0%	0.028
	Former	14	14.0%	
	Never	65	65.0%	
Alcohol Consumption	Yes	32	32.0%	0.017
	No	68	68.0%	
Aminoglycoside Use	Yes	11	11.0%	0.039
	No	89	89.0%	
Loop Diuretics	Yes	8	8.0%	0.045
	No	92	92.0%	
High Dose NSAIDs	Yes	19	19.0%	0.013
	No	81	81.0%	

Smoking and alcohol consumption were present among a portion of participants, while most had never smoked or consumed alcohol. The use of aminoglycosides, loop diuretics, and high-dose NSAIDs was reported in some cases, suggesting possible ototoxic effects. Significant p-values indicate that lifestyle habits and medication use may influence tinnitus occurrence.

Discussion

The socio-demographic distribution of participants showed that most individuals belonged to the 31–45 years age group (31%), followed by 46–60 years (28%). The association between age and tinnitus was statistically significant ($p = 0.041$), indicating that increasing age may influence tinnitus occurrence. Similar findings were reported by Bhatt et al. (2017) and Couth et al. (2019), who observed higher tinnitus prevalence among middle-aged and older adults due to age-related hearing changes and long-term noise exposure.

Male participants (56%) were more common than females (41%), which may be related to greater occupational noise exposure among men. This finding is supported by Jarach et al. (2022), who reported a higher prevalence of tinnitus in males working in noisy environments. Most participants were from rural areas (59%), and agricultural workers formed the largest occupational group (26%). The significant association of residence ($p = 0.018$) and occupation ($p = 0.027$) suggests that environmental and workplace noise may contribute to tinnitus risk. Haider et al. (2020) also highlighted that rural populations often face higher exposure to noise and limited hearing healthcare services.

The present study found that 37% of participants reported tinnitus, while 63% did not have tinnitus. The association was statistically significant ($p = 0.001$), indicating that tinnitus is a notable health concern among the study population. Similar findings were reported by Jarach et al. (2022), who identified tinnitus as a common auditory problem affecting a considerable proportion of adults worldwide. Among participants with tinnitus, most individuals experienced symptoms for more than one year (46%), suggesting that tinnitus is often a chronic condition. Bhatt et al. (2017) also observed that long-standing tinnitus can negatively affect mental and emotional well-being. Regarding laterality, bilateral tinnitus was the most common presentation (51.4%), followed by right ear involvement (27%) and left ear involvement (21.6%). This association was statistically significant ($p = 0.044$). Similar observations were reported by Kim et al. (2021), who found bilateral tinnitus to be more frequent among adults with prolonged noise exposure and hearing-related problems. In terms of severity, moderate tinnitus (40.5%) was more common than mild tinnitus (32.4%), with a significant association ($p = 0.012$). This finding indicates that many participants experienced symptoms severe enough to affect daily activities and quality of life.

The study showed that 48% of participants were exposed to occupational noise, and this association

was statistically significant (p = 0.008). Continuous exposure to workplace noise may increase the risk of hearing problems and tinnitus. Similar findings were reported by Haider et al. (2020), who identified occupational noise as a major contributing factor for tinnitus and auditory stress. Despite this, only 21% of participants reported using ear protection, while the majority (79%) did not use any protective devices, showing a significant association (p = 0.021). This lack of hearing protection may increase vulnerability to long-term hearing damage.

Frequent headphone use was reported by 44% of participants, with a significant association (p = 0.034). Prolonged listening at high volume levels can negatively affect hearing health, especially among young adults. Bhatt et al. (2017) also highlighted recreational noise exposure as an important risk factor for tinnitus. Additionally, exposure to loud social events such as festivals, concerts, and celebrations was common among participants (63%) and showed statistical significance (p = 0.015). Jarach et al. (2022) similarly observed that repeated exposure to loud recreational environments can increase the prevalence of tinnitus and related hearing difficulties.

The present study identified several medical conditions associated with tinnitus among participants. Hypertension was present in 29% of participants and showed a statistically significant association (p = 0.011). Diabetes mellitus was reported in 23% of participants and was also significant (p = 0.019). These findings suggest that vascular and metabolic disorders may contribute to auditory dysfunction and tinnitus. Similar observations were reported by Kim et al. (2021), who found that hypertension and diabetes were important risk factors linked with tinnitus prevalence in adults.

Other medical conditions such as thyroid disorder (9%), anemia (13%), and chronic ear disease (16%) also showed significant associations with tinnitus. Chronic ear disease had one of the strongest associations (p = 0.009), indicating that existing ear-related problems may increase the likelihood of tinnitus symptoms.

Haider et al. (2020) also highlighted that underlying ear pathology and systemic illnesses can play a major role in the development and persistence of tinnitus. In addition, 10% of participants reported a history of head or ear trauma, which was significantly associated with tinnitus (p = 0.041). Bhatt et al. (2017) similarly reported that trauma-related auditory damage may contribute to chronic tinnitus and reduced quality of life.

The study found that lifestyle habits and medication use were significantly associated with tinnitus among participants. Current smokers accounted for 21% of the study population, while 14% were former smokers. Smoking showed a statistically significant association with tinnitus (p = 0.028). Smoking may reduce blood circulation to the inner ear and contribute to auditory damage. Similar findings were reported by Jarach et al. (2022), who identified smoking as an important modifiable risk factor for tinnitus.

Alcohol consumption was reported by 32% of participants and also showed a significant association (p = 0.017). Excessive alcohol intake may affect the nervous and auditory systems, increasing the likelihood of tinnitus symptoms.The study also observed significant associations between tinnitus and the use of certain medications. Aminoglycoside use was reported by 11% of participants (p = 0.039), loop diuretics by 8% (p = 0.045), and high-dose NSAID use by 19% (p = 0.013). These medications are known to have ototoxic effects that may damage the inner ear and hearing pathways. Haider et al. (2020) similarly reported that prolonged use of ototoxic drugs can contribute to tinnitus and hearing-related complications. The findings highlight the importance of monitoring lifestyle habits and medication use to reduce the risk of tinnitus.

Conclusion

The present study concludes that tinnitus is a common and important health problem among the study participants. Factors such as increasing age, male gender, rural residence, and occupational noise exposure were significantly associated with tinnitus. Many participants experienced long-term and bilateral tinnitus, with moderate severity being more common, indicating its negative impact on daily life and well-being.

Noise exposure through workplaces, headphone use, and loud social events emerged as major contributing factors, while limited use of ear protection increased the risk of hearing problems. Medical conditions such as hypertension, diabetes, chronic ear disease, thyroid disorders, anemia, and history of head or ear trauma were also significantly associated with tinnitus.

In addition, lifestyle habits like smoking and alcohol use, along with ototoxic medications, played an important role in increasing tinnitus risk. Overall, the findings highlight the importance of public awareness, early diagnosis, hearing protection, healthy lifestyle practices, and proper management of medical conditions to reduce the burden of tinnitus and improve quality of life.

Ethical Consideration: Ethical clearance was obtained from the Institutional Ethics Committee of

Sri Krishna Medical College and Hospital before commencement of the study. Informed consent was taken from all participants, and confidentiality of patient information was strictly maintained throughout the research.

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Conflict of Interest: The authors declare that there are no conflicts of interest in any form; personal, professional, or financial to the conduct and publishing of this study.

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