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Original Research Article

Bengal's Dhakis: awareness and impact of long-term noise exposure

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ABSTRACT

Background: The hazards of occupational noise exposure among musicians are extensively studied globally, yet remain rare in the Indian setting, particularly for indigenous rural musicians like Bengal's Dhakis.
Methods: This observational, cross-sectional study aimed to assess the knowledge, attitudes, practices, and objective impact of noise exposure in this community. Conducted in Hadal Narayanpur, Bankura in October 2023, the study included 168 male musicians working for more than five years. Data was collected via a one-to-one interview utilizing a pre-tested questionnaire. Screening audiometry was performed using a manually calibrated Android application.
Results: The mean age of participants was 33.5 years. While 80.4% (n=135) believed prolonged loud noise exposure causes irreversible hearing loss, only 7.1% (n=12) had ever used hearing protection. Following intervention, 76.8% (n=129) expressed willingness to use protection. Subjectively, hearing difficulty was prevalent in 42.9% (n=72) and 78.6% (n=132) experienced tinnitus post-event. Objective screening audiometry revealed that 37.5% (n=63) had mild or greater hearing loss.
Conclusions: There is an alarming lack of awareness and severe underutilization of hearing protection among Dhakis. The high incidence of hearing impairment necessitates urgent public health interventions to provide inexpensive hearing protectors and preserve this culturally vital community's auditory health.

Keywords: Noise-induced hearing loss, Occupational health, Rural musicians, Tinnitus, Audiometry

INTRODUCTION

The hazards of occupational noise exposure among musicians have been extensively studied across the world.[1,2] However, such studies are rare in the Indian setting, much less for indigenous and rural musicians.[3] Noise-induced hearing loss (NIHL) typically presents as symmetrical, mild to moderate sensorineural hearing loss.[4] The extent of the damage is a function of both the sound pressure level and the duration of exposure.[5]

The physiological impact of this exposure can manifest in various forms, including temporary threshold shift, permanent threshold shift, and hidden hearing loss.[6] Furthermore, genetic susceptibility plays a role in the development of NIHL, with recognized variations occurring in the HSP70-1, HSP70-2, and HSP70-hom genes.[7] This study aims to assess the knowledge, attitudes, and practices, and to measure the objective impact of occupational noise exposure among Bengal's rural musician community, specifically the Dhakis.

METHODS

An observational, cross-sectional study was designed and conducted in Hadal Narayanpur, Sonamukhi, Bankura, in October 2023. Ethical approval for this study was obtained from the Institutional Ethics Committee prior to the commencement of data collection, and informed consent was obtained from all participants.

The target population comprised villagers actively working as musicians. A convenience sampling technique

was utilized to recruit participants, and a sample size of 168 was achieved based on the availability of eligible musicians during the study period who provided informed consent.

Participant selection was based on specific inclusion and exclusion criteria. Individuals working as musicians for more than 5 years were included in the study. Exclusion criteria encompassed any history of ear discharge within the last 5 years, any history of ear surgery, and otoscopic findings indicating tympanic membrane perforation, retraction (grade 2/stage 2 or higher), otitis media with effusion, or external auditory canal wax impaction.

Data collection involved a two-pronged approach. First, a modified questionnaire, adopted from previous studies on occupational noise exposure, was pre-tested on a subset of the target population. This questionnaire was then administered by a doctor in a one-to-one interview format. Second, screening audiometry was performed utilizing an Android application.

For this, first, manual calibration was conducted for a single pair of in-ear headphones and the Android mobile device, which was corroborated with a standard pure-tone audiometer, then the application was used on each study participant, with this pair of Android device and in-ear headphones. Air conduction graphs were obtained for each ear of each eligible participant, and the pure tone average (PTA) was calculated at frequencies of 500, 1000, 2000, and 4000 Hz.

Quantitative data analysis was performed using Microsoft Excel software. Descriptive statistics, including frequencies, percentages, and means, were calculated to summarize demographic variables, awareness levels, occupational practices, and audiological findings.

RESULTS

All 168 participants included in the study were male. The age of the participants ranged from 16 to 65 years, with a mean age of 33.5 years. Regarding the duration of occupational exposure playing music at events (such as Weddings and Pujas), 53.6% (n=90) had been playing for 5 to 10 years, while 46.4% (n=78) had been playing for over 10 years.

When queried about their awareness of noise hazards, 80.4% (n=135) believed that prolonged exposure to loud noises causes irreversible hearing loss, whereas 19.6% (n=33) did not. Despite this awareness, protective practices were critically low; only 7.1% (n=12) reported ever using hearing protection during music events, while 92.9% (n=156) had never used any form of protection. However, assessing their attitudes post-interview revealed that 76.8% (n=129) expressed a willingness to use hearing protection after learning of the dangers of prolonged noise exposure, leaving 23.2% (n=39) still resistant.

Subjective self-reporting indicated that 42.9% (n=72) of the participants experienced general hearing difficulty, which strongly correlated with increasing age. General tinnitus was self-reported by 28.6% (n=48) of the cohort. The acute impact of noise exposure was more pronounced, with 42.9% (n=72) reporting hearing difficulty immediately after an event, and a substantial 78.6% (n=132) experiencing tinnitus following an event.

Objective screening audiometry corroborated the subjective findings. It was found that 37.5% (n=63) of the participants exhibited mild hearing loss or greater in one or both ears, while 62.5% (n=105) had a pure tone average within normal limits. The incidence of mild or greater hearing loss demonstrated a clear upward trend with increasing age groups.

Table 1: Summary of key findings.

Parameters/categories	Finding	Statistic (n=168)
Study details	Observational, cross-sectional, Hadal Narayanpur, Bankura	
Demographics	Total participants (male)	n=168
	Mean age	33.5 years
	Age range	16-65
Occupational experience	Playing duration: 5-10 years	53.6% (n=90)
	Playing duration: >10 years	46.4% (n=78)
Knowledge and practice	Belief in long-term noise risk	80.4% (n=135)
	Ever used hearing protection	7.1% (n=12)
	Willingness to use protection (post-intervention)	76.8% (n=129)
Subjective symptoms (self-reported)	General hearing difficulty	42.9% (n=72)
	General tinnitus	28.6% (n=48)
Acute post-event symptoms (self-reported)	Hearing difficulty after event	42.9% (n=72)
	Tinnitus after event	78.6% (n=132)
Objective audiometry (screening)	Mild or greater hearing loss	37.5% (n=63)
	PTA within normal limits (WNL)	62.5% (n=105)

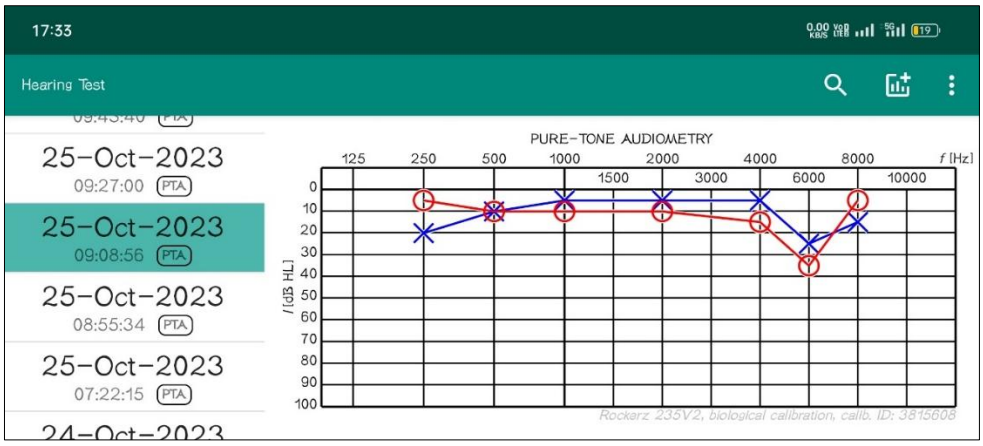

Figure 1: Screenshot of one PTA from the Android app used for screening hearing loss.

DISCUSSION

The observations from this focused study highlight an alarming lack of awareness regarding the hazards of prolonged noise exposure among rural musicians in our state, compounded by a severe lack of hearing protection utilization.[8] Hearing disorders were observed to increase with occupational exposure.[9] In this study, age was utilized as a reliable proxy for 'total years performing' to avoid recall bias.[10] Although partially self-reported, the high incidence of hearing difficulty among middle-aged and older participants is a significant cause for concern, pointing towards an extremely high rate of noise-induced hearing loss in this specific demographic.[11]

The prevention of NIHL in this community is highly feasible.[12] Hearing protectors, such as ear muffs or even basic cotton plugs, are inexpensive, readily accessible, and may greatly decrease the irreversible damage caused by occupational noise exposure.[13]

This study has several limitations that must be acknowledged. The screening audiometry was calibrated but inherently possesses limited accuracy compared to clinical-grade audiological assessments in a soundproof environment.[14,15] Finally, the unavailability of speech audiometry restricted the study's ability to screen for hidden hearing loss, potentially underestimating the true burden of noise damage in this population.

CONCLUSION

Rural musicians in Bengal face a significant occupational hazard from long-term noise exposure, leading to high rates of subjective and objective hearing impairment. There is a critical disconnect between the theoretical knowledge of noise hazards and the practical application of preventative measures. This study advances knowledge and understanding in the field by documenting the severe auditory risks faced by a uniquely vulnerable, indigenous musician community in India that has previously been entirely unstudied. It highlights the urgent need for targeted public health interventions, culturally appropriate hearing conservation programs, and the provision of affordable hearing protection to preserve the auditory health of these vital cultural artists.

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