Hearing loss among prison inmates in India – a pilot study

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Abstract

Aims This study was done to assess the pattern of hearing loss and the types of ear diseases causing hearing loss among prisoners in an Indian prison.

Materials and methods A total of 102 inmates were studied by subjecting them to a complete ENT evaluation and pure tone audiometry.

Results Seventy inmates had normal bilateral peripheral hearing sensitivity while 32 had some degree of hearing impairment. Almost 50% of the hearing loss among the inmates was found to be sensorineural.

Conclusion This study supports earlier reports of high incidence of hearing loss among prison inmates. The majority with sensorineural hearing loss were in the younger age group but since this study was not designed to determine the cause or risk factors, this cannot be commented upon. Infective ear diseases were found to be a significant etiological factor for conductive hearing loss.

Keywords Prisoners · Sensorineural hearing loss · Otitis media · Hearing loss · Noise – induced

Introduction

Prisoners due to confinement are isolated from contact with the normal society and access to many of the facilities, including medical care. The presence of ear disease and hearing loss could hence remain undiagnosed and compromise their quality of life. Since they are vocationally rehabilitated during their stay in prison, hearing loss could affect their productivity and communication both before and after their release. According to the Task Force appointed by the American Speech and Hearing Association (ASHA) [1], prevalence of communicative disorders in incarcerated juveniles and adult inmates was estimated to be between 10 and 15% and the incidence of hearing loss among prison inmates was likely to be two to five times the general population. Clayton [2] in 1985 reported that among the 2000 juvenile offenders tested, nearly 35 to 45% suffered from impaired hearing, learning and language disorders. They attributed this finding to severe head injuries and prolonged drug abuse prior to incarceration.

A review of literature revealed that major studies on hearing loss among prison inmates were undertaken in developed countries and there is a paucity of data on hearing assessment among prisoners in the developing world. The objective of this study was to assess the pattern of hearing loss and the types of ear diseases causing the hearing loss among prisoners in an Indian prison.

Materials and methods

A weekly ENT clinic was set up from September 2005 to November 2005 in the prison hospital and all inmates were informed of our visit by the prison wardens. All prisoners who reported ENT problems were included in the study. A complete ENT evaluation was done and subsequently they were subjected to pure tone audiometry with a portable audiometer. Each inmate was interviewed to assess the history and following this, a clinical examination (including

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otoscopy and tuning fork tests) was performed. Hearing tests were conducted in a relatively quiet room (less than 40 dB) after checking the ambient noise levels with CRL 412 A sound level meter. Pure tone audiometry was performed with a calibrated audiometer using screening levels of 20 dB HL at 500, 1000, 2000, 4000 and 6000 Hz. Failure at any frequency required threshold determination. Medical management was given in coordination with the prison pharmacy. Patients were also educated about ear hygiene and preventive aspects of hearing loss. Patients needing further evaluation and management, such as surgical intervention were referred to the nearby prison medical referral centre.

Results

A total of 102 male inmates and 204 ears were assessed; 46% were in the age group 41 to 60 years, followed by 39.2% in the 20 to 40 year age group. The number of patients above the age of 60 years was 14.29%. The youngest subject was 18 and the oldest was 79 years of age.

Fig. 1 Types of hearing loss

Using otoscopic and audiometric evaluation, subjects were categorized into normal hearing (≤ 20 dB HL), conductive hearing loss, sensorineural hearing loss, mixed hearing loss and non-organic hearing loss. Seventy (68.63%) had normal bilateral peripheral hearing sensitivity; among 32 (31.37%) with hearing loss, 16 were sensorineural, 6 each were conductive and mixed, 4 in whom hearing loss could not be substantiated by tuning fork tests and pure tone audiogram, were considered to have non-organic hearing loss. This data is illustrated in Fig. 1.

The causes for hearing loss were many and they are mentioned in Table 1.

Sensory neural hearing loss needing further evaluation (34.38%) was the largest subgroup. Among the 16 subjects

with sensorineural hearing loss, 14 (87.5%) were under 60 years of age and only 2 (12.5%) were above 60 years.

Infective causes accounted for 31.25%; chronic suppurative otitis media tubo tympanic disease (18.75%), attico antral disease (9.38%), granular myringitis (3.12%). Other pathologies were noted to occur less frequently.

Discussion

Ear disease and hearing loss among prisoners is not widely researched in India, perhaps for several reasons; research among persons incarcerated may not readily get review board approval, health care is rudimentary in overcrowded prisons and hence low in the prison's priority, inherent suspicion among prisoners and hence lack of cooperation being some of them. This observational study was possible only because the prison authorities felt ENT services were needed and we started a routine clinical service. It hence became possible to observe the nature and patterns of ear

Table 1 Hearing loss and disease pattern

Chronic suppurative otitis media tubo tympanic disease	6 (18.75%)
Chronic suppurative otitis media attico antral disease	3 (9.38%)
Presbycusis	4 (12.5%)
Traumatic perforation	1 (3.12%)
Noise induced hearing loss	1 (3.12%)
Otosclerosis	1 (3.12%)
Granular myringitis	1 (3.12%)
Sensory neural hearing loss for evaluation	11 (34.38%)
Non-organic hearing loss	4 (12.5%)

disease and hearing loss among the prisoners in a large Indian prison.

It has been estimated that the incidence of hearing loss in prisoners interned in 1983 exceeds 30% (range 8.9% to 47%) [3], a finding similar to ours. Murray et al. [4], in a study conducted in 2004 among prisoners in New South Wales, Australia noted that prisoners in general have poorer hearing than a normative Australian population. A previous history of ear problems, history of exposure to noise and associated medications were some of the main factors noted to contribute significantly to hearing loss in their study. Holmes et al. [5] conducted hearing loss screenings for 226 incarcerated adolescents and found an overall failure rate of 35.5 percent.

Jacobson [6] in 1989 estimated that the incidence of hearing loss among prison inmates was nearly four times that in the general population. He suggested that the synergistic effects of drug abuse, noise exposure and head trauma were responsible for the high incidence of sensorineural hearing loss in the younger age group. Grossman et al. [7] in 1989 concluded that the common causes for hearing loss among the prisoners of war were starvation, head trauma, and trauma-related loss of consciousness. Gill et al. [8] in their study noted that sensorineural deafness was one of the manifestations of nutritional deficiency.

In our patients, we found a similar proportion (31.37%) with hearing loss among self referred prisoners and is hence likely to be an underestimate. Fifty per cent of hearing loss among prisoners in our study was sensorineural and the majority of these were below 60 years. The findings need to be interpreted with caution since the participants were self selected. Evaluation of risk factors and predisposing causes requires a prospective study as well as a baseline assessment at entry to the prison system.

Restricted access and limitation of time that could be spent in the prison were constraints we faced. Within the prison system were further subgroups such as the remand prisoners (short stay), long stay prisoners and those in solitary confinement and in the high security prison. In the absence of an opportunity to systematically screen everyone the extrapolation of our findings across prisons may not be representative.

The infective causes of hearing loss were the next major cause of hearing loss among prison inmates. These were referred for definitive management to the prison referral centre in consultation with the prison medical officers. The final decision on management at the tertiary care centre had to be left to the prison medical officers as they had to follow their own protocol and regulations. It is possible to speculate that some of these conditions may be linked to habits such as self cleaning of ears with unclean material, instillation of oil in the ears as a remedy for itching and recurrent upper respiratory infection among prisoners. These are all preventable causes to a certain extent. Otomycosis was noted among some of the prisoners and the prisoners

were educated on proper ear hygiene in order to prevent otomycosis

Four cases of non-organic hearing loss were noted in our study. This type of hearing loss is likely to occur among malingerers. Mixed hearing loss was noted in six patients and these patients were referred to the prison medical referral centre for further evaluation.

The study also noted that the health measures taken by the prison authorities were quite commendable. There were adequate facilities in the prison hospital for primary health care and facilities for referral for secondary care as and when needed. There were also regular visits by specialists to conduct outpatient clinics in the prison hospital, including visits by an otolaryngologist from the referral hospital.

A review of literature shows considerable decrease in the prevalence of hearing loss over the past 30 years in India. John Wilson [9] in 1985 refers to two surveys conducted in India – the first from 1972 to 1976 showed 17.55% had some hearing impairment, of which 10.4% had severe impairment and the second from 1975 to 1976 showed 19.36% suffered hearing impairment; including 8.58% who were severely impaired and 1.45% were profoundly deaf in both the ears. In the United States, in the general population approximately, 1.7 million male workers in the 50 to 59 years age group suffered from occupational hearing loss while the two studies done in developing nations do not mention noise induced hearing loss as a major problem [9].

Andrew Smith [10] refers to an Indian survey done among the poor rural communities, located nearby the prison where this current study has been done. He notes that 5.9% of the population had moderate or worse disabling hearing loss. This study published in 2001 reported that chronic middle ear infection which usually goes untreated in these regions, often led to life long hearing disability.

In our observations, the majority of the prisoners who volunteered for the ENT examination had ENT complaints. This was to be expected since it was a self-selected group. While this fact may account for the prevalence of hearing loss noted in this study (31.37%), the 28% with chronic suppurative otitis media stand out as an important cause of hearing loss. This finding fits in with earlier observations from Indian studies that chronic otitis media is a major factor for hearing loss in India [10]. Noised induced hearing loss however, was not found to be a major cause of hearing loss in our study.

Key messages

- Prisoners are known to have higher incidence of hearing loss in comparison with the normal population. This study has been done in one of the largest male prisons in India and the results have been compared with the studies done in the developed nations.

- A high percentage of sensorineural hearing loss was noted below the age of 60 years in our study. Reasons could not be explained adequately as this was a pilot study.
- Infective causes are a major factor for hearing loss among prisoners unlike studies done in developed nations. Noise induced hearing loss and nutritional deficiencies, which are noted to be major factors in Western studies, were not found to be significant in our study.

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