

# Bridging the gap: addressing occupational noise-induced hearing loss in India

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## Introduction

Occupational noise-induced hearing loss (ONIH) remains a significant occupational health hazard in India, affecting workers across various industries. This article provides an overview of the prevalence of NIHL in India, highlights the existing gap between regulations and their implementation, and discusses strategies to bridge these gaps by modifying formulation of hearing conservation program and prevent NIHL. Noise-induced hearing loss (NIHL) is generally defined as hearing loss that develops slowly over a long period of time (several years) as the result of exposure to continuous or intermittent loud noise.<sup>1</sup> Continuous exposure to sounds greater than 85 dB for 8 hours has been shown to cause NIHL.<sup>2, 3</sup> Although the 8-hour exposure to 85 dB is a well-known loudness barometer, this does not mean that lower loudness levels will not cause damage in some individuals.

The most recent Global Burden of Disease report (2019) estimated that 1.57 billion people, or 20.3% of the world population are affected by any kind of hearing loss.<sup>4</sup> WHO estimates that in India there are approximately 63 million people suffering from Significant Auditory Impairment.<sup>5</sup> NIHL is the second most common cause of hearing loss after presbycusis (age-related hearing loss)<sup>6</sup>

The World Health Organization (WHO) estimates that billions of people worldwide are at risk of avoidable NIHL due to exposure to loud sound levels.<sup>7</sup> Global studies have found that workers engaged in construction, industrial (automotive industry, mines, quarry, metal, textile, etc.), shipyards, military, civil aviation, railways, agriculture, as well as firefighters, traffic policemen, teachers, etc., are at increased risk of NIHL.<sup>8-10</sup>

There exists no nationally representative data for NIHL in India; However, ONIHL is highly prevalent and is likely under-reported among Indian workers.<sup>11</sup> Studies from India have quoted the probable prevalence of NIHL from 6% to 90%.<sup>12, 13</sup>

Of note, ONIHL is correlated to the total exposure to sound; loudness over time, sudden impact explosive sound, the spectral components of the sound, as well as the length of exposure and the individual's susceptibility to hearing damage from noise.<sup>14</sup> Observational and experimental studies have shown that noise exposure leads to hearing loss, tinnitus, annoyance, sleep disturbance on-the-job performance, in hospitals, increases the occurrence of hypertension and cardiovascular disease etc. and more.<sup>15</sup> All these health problems have detrimental effects on quality of life and productivity.<sup>16</sup>

Despite the presence of regulatory frameworks such as the Factories Act, 1948, and the Noise Pollution (Regulation and Control) Rules, 2000,<sup>17</sup> there exists a notable gap between regulations and their effective implementation. Regulators are reluctant to impose stiff penalties on financially strapped plants that are major employers and as one might expect. In developing countries, state-owned plants may be treated more leniently than their private-sector counterparts.<sup>18</sup> Other challenges include limited awareness among employers

and workers,<sup>14</sup> lack of Personal Protective Equipment (PPE)<sup>12</sup> and insufficient resources including the expense involved for monitoring and engaging compliance for safety programs.<sup>19</sup>

To bridge this regulatory-implementation gap and to potentially prevent ONIHL, several strategies have been proposed. Among them is the understanding of the importance of implementing comprehensive health programs that address the physical repercussions of ONIHL and which recognize its impact on social and psychological well-being.

To address these issues, workplace health managers should integrate regular (annual) hearing tests and educational programs which reveal the multiple consequences of hearing loss including: decreased quality of life, less socialization, possible cognitive degradation, and which also focus on the significance of hearing protection, noise reduction and multiple interventions aimed at enhancing work place safety.

Additionally, there is a real need to raise awareness about ONIHL among workers and policymakers. These challenges and this initiative involves more than individual risk and individual risk reduction. Policy interventions, mandatory training sessions, workshops, and awareness campaigns, can significantly enhance workers' intention and ability to adopt preventive measures and influence the establishment of more stringent safety standards. Moreover, it is essential to proactively tackle the barriers hindering safety compliance in noisy and other work environments.

Initiative might include streamlining processes for obtaining protective gear, redesigning workspaces to mitigate noise levels, acquiring quiet machinery and implementing flexible schedules to facilitate adherence to safety protocols.

By addressing these challenges, workplaces may cultivate a culture of safety and significantly reduce workplace accidents and ONIHL, thereby enhancing overall worker safety and well-being.

It is important to appreciate that the responsibility is not simply a government or corporate responsibility, in the final analysis, individual responsibility plays a crucial role in maintaining occupational safety,

with workers encouraged to actively participate in safety training programs and adhere to regulations, including the consistent use of protective equipment, to mitigate the risk of NIHL effectively.<sup>20</sup> Providing and training workers with personal dosimeters (these are small devices which measure cumulative sound exposure over time) and providing workers with real-time self-control measurement of daily noise exposure and has shown to be very effective.<sup>21</sup>

## Conclusion

We suggest mandatory adoption of hearing conservation programs for high-risk industries to effectively mitigate risk of ONIHL. Workers union should consider getting involved in the formulation and implementation of hearing conservation programs to include mapping of high noise areas, noise control measures, administrative control, use of proper PPE, regular hearing screenings, and employee training on noise management and the outcomes associated with ONIHL.<sup>22,23</sup>

Among the most challenging factors for the success of a hearing protection program is the active engagement of workers. Burke et al. indicated that the most engaging methods of training were three times more effective than the least engaging methods in promoting knowledge and skill acquisition. As training methods became more engaging (i.e., requiring trainees' active participation), workers demonstrated greater knowledge acquisition, and the effect was reflected in reductions in accidents, illnesses, and injuries.<sup>24</sup>

In conclusion, addressing the burden of ONIHL in India requires a collaborative effort involving policymakers, regulatory agencies, employers, employees, workers, and healthcare professionals. Employers must find it practical and financially viable to put effort and resources into implementing measures to prevent ONIHL. All efforts must be made to increase the awareness and engagement of workers and employers to ensure the success of the hearing conservation program. By focusing on these strategies, India can bridge the gap between regulations and their implementation, thereby preventing NIHL and promoting a safer and healthier work environment for all.

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## Conflicts of interest

The authors declare that there are no Conflicts of interest.

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