ABSTRACT

Title of Abstract : Enhancing Noise-Induced Hearing Loss Detection through Air-Bone Gap Assessment in Oil and Gas Workers
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Background : Noise-Induced Hearing Loss (NIHL) remains a major occupational health problem in the oil and gas industry. Conventional surveillance methods, such as air conduction (AC) thresholds or Standard Threshold Shift, are limited in distinguishing NIHL from other types of hearing loss, leading to potential underestimation of prevalence. The Air-Bone Gap (ABG) parameter compares air and bone conduction thresholds, enabling the detection of sensorineural hearing loss that reflects inner ear damage specifically attributable to noise exposure. This makes ABG a more effective tool for early detection of NIHL and for supporting targeted hearing conservation programs

Objective : This study evaluated the role of ABG in improving NIHL identification accuracy.

Research Methods/ Implementation Methods : A cross-sectional design was applied using secondary data from audiometric examinations of 495 oil and gas workers purposively selected from Similar Exposure Groups (SEG) routinely exposed to occupational noise. NIHL was defined based on audiometric screening criteria, with AC thresholds classified as normal or impaired, and ABG categorized into conductive, sensorineural, and mixed. Chi-square tests assessed associations at $p < 0.05$.

Results : Results showed 14 cases (2.8%) of NIHL, all among workers with impaired AC thresholds, indicating a significant association between AC impairment and NIHL ($p < 0.05$). Moreover, all NIHL cases clustered exclusively in the sensorineural group of ABG classification, confirming a strong association between ABG and NIHL (< 0.05).

Conclusion/Lesson Learned : These findings highlight that ABG provides greater specificity in distinguishing NIHL from other disorders. Incorporating ABG into routine audiometric surveillance may enhance diagnostic accuracy and strengthen hearing conservation programs in high-noise industries.

Keyword : Noise-Induced Hearing Loss; Air-Bone Gap; Audiometry; Occupational Health; Oil and Gas