ISSN: 2457-0400

Impact Factor: 7.675

WORLD JOURNAL OF ADVANCE HEALTHCARE RESEARCH

www.wjahr.com

Volume: 10, Issue: 3

Page N. 86-90

Year: 2026

Original Article

Coden USA: WJAMA3

CLINICO - EPIDEMIOLOGICAL STUDY ON HEARING IMPAIRMENT AMONG ATTENDANTS TO THE DEPARTMENTS OF AUDIOLOGY IN BAGHDAD AND AL-YARMOOK TEACHING HOSPITALS

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Article Received: 29 January 2026 **Article Revised:** 18 February 2026 **Article Published:** 01 March 2026

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DOI: https://doi.org/10.5281/zenodo.18815208

How to cite this Article: *[1]Naji Abed Radhi, [2]Ali Abed Radhi, [3]Suhad Abdul Wahed Younis, [4]Abbas Ejbaree Kawad. (2026) Clinico - epidemiological study on hearing impairment among attendants to the departments of audiology in baghdad and al-yarmook teaching hospitals. World Journal of Advance Healthcare Research, 10(3), 86–90.

ABSTRACT

Background: Hearing impairment is a common but often underestimated public health problem that affects communication, social interaction, and quality of life. Age-related degeneration and noise exposure remain major contributing factors worldwide. This study aimed to assess the clinico-epidemiological pattern of hearing impairment among attendants to audiology departments in Baghdad. **Methods:** A descriptive cross-sectional study was conducted in the audiology departments of Baghdad Teaching Hospital and Al-Yarmook Teaching Hospital between July and September 2004. Two hundred patients aged 18–55 years with abnormal pure tone audiometry were included. Data were collected using a structured questionnaire covering demographic characteristics, occupational history, associated diseases, family history, and exposure to accidents or explosions. Hearing thresholds were measured using standardized pure tone audiometry. Descriptive statistics and chi-square tests were applied. **Results:** The largest proportion of participants were aged ≥50 years (39.5%), and males constituted 70% of the sample. Severe hearing impairment was the most common grade (57.5%), while sensorineural hearing loss represented the predominant type (47.5%). Only 11.5% reported a positive family history. Cardiovascular disease (30.5%) and diabetes mellitus (22%) were the most frequent comorbidities. More than half of the participants reported exposure to explosions or accidents, and military and police personnel formed the largest occupational group. **Conclusion:** Hearing impairment in this population was mainly severe and sensorineural, with higher prevalence among older males and individuals exposed to occupational or environmental noise hazards. Early screening and preventive hearing conservation strategies are recommended.

KEYWORDS: Hearing impairment; Pure tone audiometry; Sensorineural hearing loss; Occupational noise exposure; Epidemiology.

INTRODUCTION

Hearing is one of the most essential human senses, playing a fundamental role in communication, social interaction, learning, and cognitive development. Together with vision, hearing allows individuals to interact effectively with their environment and serves as an important warning mechanism that remains active day and night. Impairment of hearing can significantly disrupt communication, reduce social participation, and negatively affect psychological well-being, often resulting in isolation, frustration, and a diminished quality of life. In modern societies, where communication increasingly depends on auditory-based technologies such as telephones, digital media, and virtual platforms, the importance of intact hearing has become even more pronounced.[1] Hearing loss is often described as a "silent disability" because it usually develops gradually and may remain unnoticed until it becomes clinically significant. Consequently, it is frequently underdiagnosed and undertreated, particularly in low- and middle-income countries. Despite its substantial impact, hearing impairment has historically

received limited attention in medical education and public health programs. Current evidence indicates that hearing loss is a major contributor to disability-adjusted life years (DALYs) and is associated with adverse outcomes including depression, social withdrawal, cognitive decline, and reduced work productivity.[2,3] Presbycusis, or age-related hearing loss, is the most common form of sensorineural hearing impairment and results from progressive degenerative changes in the auditory system. Its prevalence increases with advancing age, affecting a significant proportion of the elderly population worldwide.[4] Noise-induced hearing loss (NIHL) represents another major cause and arises from prolonged or repeated exposure to excessive sound levels. NIHL is considered one of the most prevalent occupational diseases globally and is largely preventable.[5] Hazardous noise exposure is not limited to industrial settings but also occurs in agriculture, aviation, military service, and various recreational activities such as music performance and firearm use. The extent of noise-related auditory damage is influenced by several factors, including sound intensity, frequency spectrum, duration of daily exposure, and cumulative exposure over time.[6] Although occupational safety regulations have been implemented in many countries, hearing impairment remains highly prevalent, reflecting gaps in awareness, enforcement, and preventive measures.[7] The World Health Organization has emphasized that the global burden of hearing loss has been underestimated for decades, highlighting the urgent need for accurate epidemiological data to guide prevention strategies and policy planning.[1,8] Understanding the prevalence and occupational distribution of hearing impairment is essential for identifying high-risk groups and developing effective public health interventions.

METHOD

Study design and setting

A descriptive cross-sectional study was conducted to evaluate hearing impairment among patients attending the audiology departments of Baghdad Teaching Hospital and Al-Yarmook Teaching Hospital. The study targeted individuals presenting to ENT consultation clinics with complaints suggestive of reduced hearing function. Data collection was carried out over a three-month period from 1 July 2004 to 30 September 2004, with an average working schedule of approximately four hours per day, five days per week.

Study population and sampling

A total of 200 participants were recruited through direct interview. Eligible cases were adults of working age (18–55 years) who reported hearing difficulties and demonstrated abnormal findings on pure tone audiometry (PTA). Patients with congenital hearing loss and those not currently employed were excluded from the study. Selection was limited to individuals attending the two participating audiology centers during the study period.

Data collection tools

Information was obtained using a structured, previously prepared questionnaire that included demographic characteristics, occupational details, history of ENT disorders, chronic diseases, medication use, family history of hearing impairment, and exposure to trauma, accidents, or explosions. The questionnaire also incorporated audiometric findings. Interviews were conducted directly by the investigator under the supervision of a senior audiologist and with the assistance of audiometric staff.

Audiometric assessment

Hearing evaluation was performed using a calibrated digital clinical audiometer (Model DA65-DANPLEX, GN Otometrics A/S, Denmark) in a standardized sound-proof room. Pure tone audiometry measured both air conduction (AC) and bone conduction (BC) thresholds using standardized masking techniques. Threshold determination followed ascending and descending procedures (5 dB ascending and 10 dB descending). Pure tone thresholds were recorded at frequencies of 250, 500, 1000, 2000, 4000, and 8000 Hz. Mean hearing levels were calculated for each ear, and the best binaural average was determined.

Classification of participants

Participants were categorized according to age into five groups: <20, 20–29, 30–39, 40–49, and ≥50 years. Severity of hearing loss was classified based on best binaural average as mild (26–40 dB), moderate (41–55 dB), and severe (56–70 dB).

Statistical analysis

Data were analyzed using descriptive statistics including frequencies, percentages, and ratios. Inferential analysis was conducted using the chi-square test to assess associations between hearing impairment and selected variables.

RESULTS

The age distribution showed that the largest proportion of participants were aged ≥50 years (39.5%), followed by those aged 40–49 years (22.5%). Participants aged below 20 years represented only 3% of the sample. Regarding gender, males constituted the majority of cases (70%), whereas females accounted for 30% of the study population. As in table 1.

Table 1: Demographic characteristics of the study population (Age and Gender).

Variable	Frequency	%
<20	6	3.0
20–29	39	19.5
30–39	31	15.5

40–49	45	22.5
≥50	79	39.5
Male	140	70.0
Female	60	30.0
Total	200	100

More than half of the study group had severe hearing impairment (57.5%), while moderate and mild impairment represented 24.5% and 18%, respectively. Sensorineural hearing loss was the most prevalent type (47.5%), followed by conductive (27.0%) and mixed hearing loss (25.5%). As in table 2.

Table 2: Distribution of hearing impairment by severity and type.

Variable	Frequency	%
Mild	36	18.0
Moderate	49	24.5
Severe	115	57.5
Sensorineural	95	47.5
Conductive	54	27.0
Mixed	51	25.5
Total	200	100

A positive family history of hearing impairment was reported in 11.5% of participants, while the majority (88.5%) had no family history. Regarding associated diseases, 40.5% had no reported comorbidity. Cardiovascular diseases were the most frequent associated condition (30.5%), followed by diabetes mellitus (22%). Other conditions were reported in small proportions of the sample. As in table 3.

Table 3: Family history and associated diseases among the study group.

Variable	Frequency	%
+ve family history	23	11.5
-ve family history	177	88.5
No disease	81	40.5
Cardiovascular disease	60	30.5
Diabetes mellitus	44	22.0
Asthma & sinusitis	5	2.5
Duodenal ulcer	4	2.0
Hemophilia	2	1.0
Psychiatric disorders	2	1.0
Thyroid diseases	2	1.0

Among participants with a history of explosion exposure, conductive hearing loss was slightly more frequent (40%), followed by sensorineural (32.3%) and mixed types (27.7%). A similar distribution pattern was observed among those exposed to accidents and those with no exposure. The proportions across exposure groups appeared relatively comparable. As in table 4.

Table 4: Exposure history by type of hearing impairment.

Exposure	Sensorineural	Conductive	Mixed	Total
Explosion	21 (32.3)	26 (40.0)	18 (27.7)	65
Accident	15 (33.3)	19 (42.2)	11 (24.5)	45
No exposure	31 (34.4)	38 (42.2)	21 (23.4)	90

Severe hearing impairment represented the largest proportion among individuals exposed to explosions (73.8%) and accidents (68.8%). Participants without exposure also showed a predominance of severe impairment (62.2%). Mild hearing loss constituted the smallest percentage across all exposure categories. As in table 5.

Table 5: Exposure history and severity of hearing impairment.

Exposure	Mild	Moderate	Severe	Total
Explosion	6 (9.3)	11 (16.9)	48 (73.8)	65
Accident	5 (11.2)	9 (20.0)	31 (68.8)	45
No exposure	9 (10.0)	25 (27.8)	56 (62.2)	90

Severe hearing impairment was the most common severity level across nearly all occupational categories. Military and police personnel represented the largest occupational group, with more than half showing severe impairment (51.5%). Teachers and retired participants also demonstrated high proportions of severe hearing loss (72.7% and 72.8%, respectively). Mild impairment represented the lowest proportion across most occupations. As in table 6.

Table 6: Occupational distribution and severity of hearing impairment.

Occupation	Mild	Moderate	Severe	Total
Housewife	3 (12)	5 (20)	17 (68)	25
Military & police	17 (25)	16 (23.5)	35 (51.5)	68
Teacher	2 (9.1)	4 (18.2)	16 (72.7)	22
Farmer	2 (22.2)	2 (22.2)	5 (55.6)	9
Driver	3 (25)	3 (25)	6 (50)	12
Sewing worker	3 (20)	5 (33.3)	7 (46.7)	15
Heavy machine worker	2 (20)	3 (30)	5 (50)	10
Office employee	4 (23.5)	5 (29.4)	8 (47.1)	17
Retired	0 (0)	6 (27.2)	16 (72.8)	22

DISCUSSION

The present study demonstrated that hearing impairment was more frequent among older age groups, with individuals aged ≥50 years representing the largest proportion of the sample. This finding is consistent with current epidemiological evidence indicating that age-related degenerative changes of the auditory system remain a major contributor to hearing loss worldwide.[1,2] Presbycusis leads to progressive sensorineural deterioration, which may explain the high prevalence of severe grades observed in the older participants.

Male predominance was evident in the study population, with a male-to-female ratio exceeding 2:1. Similar gender differences have been reported in occupational and community-based studies, where males are more frequently exposed to hazardous noise levels through military service, industrial work, and recreational firearm use.[3] Behavioral factors and healthcare-seeking patterns may also influence reporting rates and clinic attendance.

Regarding severity, more than half of the participants exhibited severe hearing impairment. This distribution likely reflects delayed presentation, as individuals with mild symptoms may not seek medical evaluation until communication difficulties become pronounced. Previous studies have shown that untreated noise exposure and aging contribute to progressive worsening of auditory thresholds, leading to advanced impairment at the time of diagnosis.[4]

Sensorineural hearing loss constituted the most common type identified. This pattern aligns with global reports emphasizing noise-induced hearing loss and presbycusis as dominant etiologies among adults.[5] In contrast, conductive hearing loss was less frequent and may be related to reversible middle ear pathology, which is more common in younger populations.

Only a small proportion of participants reported a positive family history of hearing impairment. While genetic predisposition plays a role in certain cases, environmental and occupational exposures appear to be more significant contributors in adult-onset hearing loss.[1] Associated diseases such as cardiovascular disorders and diabetes mellitus were relatively common in the present study. Emerging evidence suggests that vascular and metabolic factors may impair cochlear microcirculation, thereby increasing susceptibility to sensorineural damage.[6]

Exposure to explosions and accidents was reported by more than half of the participants, with a predominance of severe and sensorineural hearing impairment among exposed individuals. Although statistical significance was not demonstrated, previous literature indicates that blast injuries and acute acoustic trauma can produce irreversible cochlear damage.[7] Occupational analysis revealed that military and police personnel constituted the largest group affected, highlighting the importance of preventive hearing conservation programs in high-risk professions.[3]

CONCLUSION

Hearing impairment was more frequent among older adults (≥50 years) and predominantly affected males. Severe hearing loss and sensorineural type represented the largest proportions of cases. Most patients had no family history, while cardiovascular disease and diabetes were the main associated conditions. Exposure to accidents or explosions and military or police occupations were common among affected individuals.

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