

Table Of Content

Journal Cover	2
Author[s] Statement	3
Editorial Team	4
Article information	5
Check this article update (crossmark)	5
Check this article impact	5
Cite this article	5
Title page	6
Article Title	6
Author information	6
Abstract	6
Article content	7

Academia Open



By Universitas Muhammadiyah Sidoarjo

Originality Statement

The author[s] declare that this article is their own work and to the best of their knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the published of any other published materials, except where due acknowledgement is made in the article. Any contribution made to the research by others, with whom author[s] have work, is explicitly acknowledged in the article.

Conflict of Interest Statement

The author[s] declare that this article was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright Statement

Copyright © Author(s). This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

EDITORIAL TEAM

Editor in Chief

Mochammad Tanzil Multazam, Universitas Muhammadiyah Sidoarjo, Indonesia

Managing Editor

Bobur Sobirov, Samarkand Institute of Economics and Service, Uzbekistan

Editors

Fika Megawati, Universitas Muhammadiyah Sidoarjo, Indonesia

Mahardika Darmawan Kusuma Wardana, Universitas Muhammadiyah Sidoarjo, Indonesia

Wiwit Wahyu Wijayanti, Universitas Muhammadiyah Sidoarjo, Indonesia

Farkhod Abdurakhmonov, Silk Road International Tourism University, Uzbekistan

Dr. Hindarto, Universitas Muhammadiyah Sidoarjo, Indonesia

Evi Rinata, Universitas Muhammadiyah Sidoarjo, Indonesia

M Faisal Amir, Universitas Muhammadiyah Sidoarjo, Indonesia

Dr. Hana Catur Wahyuni, Universitas Muhammadiyah Sidoarjo, Indonesia

Complete list of editorial team ([link](#))

Complete list of indexing services for this journal ([link](#))

How to submit to this journal ([link](#))

Article information

Check this article update (crossmark)



Check this article impact (*)



Save this article to Mendeley



(*) Time for indexing process is various, depends on indexing database platform

Hearing Loss in Iraq Deteriorates Social and Environmental Quality of Life

Gangguan Pendengaran di Irak Memperburuk Kualitas Hidup Sosial dan Lingkungan

Sarah Abed Alsada, sara.abd2206m@conursing.uobaghdad.edu.iq, (1)

Academic Nurse, Ministry of Health, Al-Diwaniya Health Directorate, Iraq

Nuha Adel Ibrahim, nuhaa@conursing.uobaghdad.edu.iq, (0)

Department Maternal and Neonate Nursing, College of Nursing, University of Baghdad, Baghdad, Iraq

⁽¹⁾ Corresponding author

Abstract

This study investigates the impact of hearing loss on social interactions and environmental behaviors in individuals, utilizing a descriptive method at the Otolaryngology Department of Al-Diwaniyah Teaching Hospital, Iraq, with 200 participants from December 25, 2023, to March 1, 2024. Participants underwent pure tone audiometry and completed the WHO Quality of Life-BREF (WHOQOL-BREF) Version in Arabic. Results indicate a moderate decline in social and environmental quality of life among those with hearing loss, highlighting the necessity for targeted interventions to improve outcomes. This study underscores the need for regular auditory screenings and enhanced support services to better the quality of life for individuals suffering from hearing loss.

Highlights:

- **Quality of Life:** Hearing loss significantly impacts social and environmental interactions.
- **Intervention Need:** Highlights the necessity for targeted interventions to improve life quality.
- **Screening Importance:** Emphasizes regular auditory screenings to detect and manage hearing loss early.

Keywords: Hearing Loss, Social Interaction, Environmental Behavior, Quality of Life, Auditory Health

Published date: 2024-06-11 00:00:00

Introduction

Hearing impairment is often utilized as a substitute for hearing loss. Hearing impairment is a reduction in the ability to hear caused by failure in either the neurological or auditory system. Loss might lead to a decline in language interpretation skills and sensitivity to various frequencies [1]

Hearing impairment is the most severe and dangerous limitation that a human could have[2]

Hearing enables communication through the use of sound[3]

Quality of life refers to an individual's ability to recognize their place in society within the cultural and value frameworks they are part of, aligning with their personal goals, expectations, and standards[4] (QOL) is a holistic term[5]

It observes life satisfaction, encompassing aspects such as physical health, family, education, career, wealth, religious beliefs, finance, and the environment[6]

Health-related (QoL) is increasingly accepted as an outcome measure[7]

A high standard of life is evident when community members have the essential conditions for optimal health[8]

HL is a significant public health issue[9]. Hearing loss can result in secondary issues such as learning impairments, social isolation, reduced independence, depression, and the potential early onset of dementia, all of which impact quality of life[10].

People with hearing impairments experience challenges in communication, limited access to health information, and inadequate support and education from healthcare professionals, resulting in disparities in health outcomes and higher healthcare costs[11]

HL is one of the most prevalent work-related illnesses globally[12]

The implication of chemical-induced hearing loss on workers should not be underestimated [13]

Noise is a significant risk in occupational and environmental settings, leading to hearing impairment, The World Health Organization stated that 16% of adult debilitating hearing loss is caused by exposure to industrial noise[14] In Iraq Hearing loss has been more prevalent among Iraqi people since 2006, perhaps due to the effects of civilization and urbanization[15]

Objectives of Study

1. To evaluate the effectiveness of hearing loss on the Social and Environmental behaviors of patients with hearing loss

Method

A. Study Design and Setting

A descriptive study was carried out at the Otolaryngology department on 200 patients was used, which was non-randomized at Al-Diwaniya Teaching Hospital, located in Al-Diwaniyah From December 25th, 2023, to February 26th, 2024.

Study population and sampling technique

The study included a sample of 200 patients who visit Al-Diwaniyah Teaching Hospital . A nonprobability-purposive sampling technique was used to select the participants.

Patients who are eligible for study with age over 18 years with Diagnosed with hearing loss. While the exclusive criteria was Hearing-impaired individual, Incapacity to comprehend, collaborate, and respond. And Suffering from a terminal illness

B. Sample Size

The number of people who had examined in pure tone audiometry at Otolaryngology department in Al-Diwaniya teaching hospital, in Al-Diwaniyah city four months was 500.

After following the table prepared by Krejcie & Morgan for the sample size for a known population[16] , it was found that the sample size was 217, 17 questionnaires were ruled out because of the inaccuracy and clarity of the answers.

Data collection and Study instruments

Data were collected via a self-report questionnaire

utilizing the WHO Quality of Life-BREF (WHOQOL-BREF) Version in Arabic.

The WHOQOL-BREF is a 26-item questionnaire with four domains:

1. Physical health (7 items)
2. Psychological health (6 items)
3. Social relationships (3 items)
4. Environmental health (8 items).[17]

It also includes questions about quality of life and general health. Each item of the WHOQOL-BREF is rated on a five-point ordinal scale from 1 to 5.

Hearing loss measured by PTA

Pilot study

- a. A pilot study was conducted for one week before beginning data collection from 2023 /12/ 20 to 2023 /12 /23 .
- b. A pilot study was carried out using a sample size of 20 participants

The study results showed that the questions were simple to understand. The questionnaire can be completed in an appropriate period of 5-10 minutes. The pilot study sample has been excluded from the original study sample.

C. Ethical Consideration and Agreement

Approval from the ethics committee of Baghdad Nursing College.

Participation in the study was voluntary. The researcher clarified the study's objectives to the patients and their relatives. All patients who choose to participate in the trial provided verbal consent. All individuals were freely given the decision to participate in the study. They were permitted to withdraw whenever they felt uncomfortable. Full confidentiality was guaranteed, and all gathered data will be utilized solely for research reasons. Personal details were obtained with serial identifying numbers, ensuring anonymity.

D. Data Collection

Data were collected by a self-administered questionnaire comprising three components.

Part one was designed by the researcher and authorized by the supervisor.

The Socio-demographic data of patients includes gender, age, education level, marital status, occupation, income, and property ownership.

Part two: Medical information

Part three: Quality of life was assessed by a self-reported structured questionnaire utilizing the WHO Quality of Life-BREF (WHOQOL-BREF) Version in Arabic

The WHOQOL-BREF is a 26-item questionnaire with four domains

item of the WHOQOL-BREF is rated on a five-point ordinal scale from 1 to 5.

E. Statistical Analysis

The data were analyzed using IBM's Statistical Package for Social Science (SPSS) for Windows, version 27. The descriptive statistical measures of frequency and percent were employed. The measures of central tendency,

specifically the arithmetic mean, and scattering, specifically the standard deviation, were also employed [18]. Spearman's rank correlation coefficient was employed to determine the relationship between the variables under study. Point Biserial Correlation was employed to quantify the disparity in the dependent variable when the independent variable comprises two distinct categories [19].

Results and Discussion

A. Results

The mean age 64.7 ± 11.699 . as gender distribution 60.5% of adults with hearing loss are females and 39.5% of them are males. The residency refers that the majority of adults with hearing loss are resident in urban (92.5%). according to causes of hearing loss 57.5% of them reported that diseases were the cause, 38.5% reported that trauma was the cause [20],

Social QoL	F	%	M	SD	Ass.
Low	29	14.5	10.56	2.902	Moderate
Moderate	88	44			
High	83	41.5			
Total	200	100			

Table 1. Evaluation of Quality of Life related to "Social Domain" among Adults with Hearing Loss

f: Frequency, %: Percentage

M: Mean for total score, SD: Standard Deviation for total score, Ass: Assessment

Low= 3 - 7, Moderate= 7.1 - 11, High= 11.1 - 15

This table indicates that adults with hearing loss perceive moderate to high social quality of life in which 44% seen with a moderate level and 41.5

% of them seen with the high level.

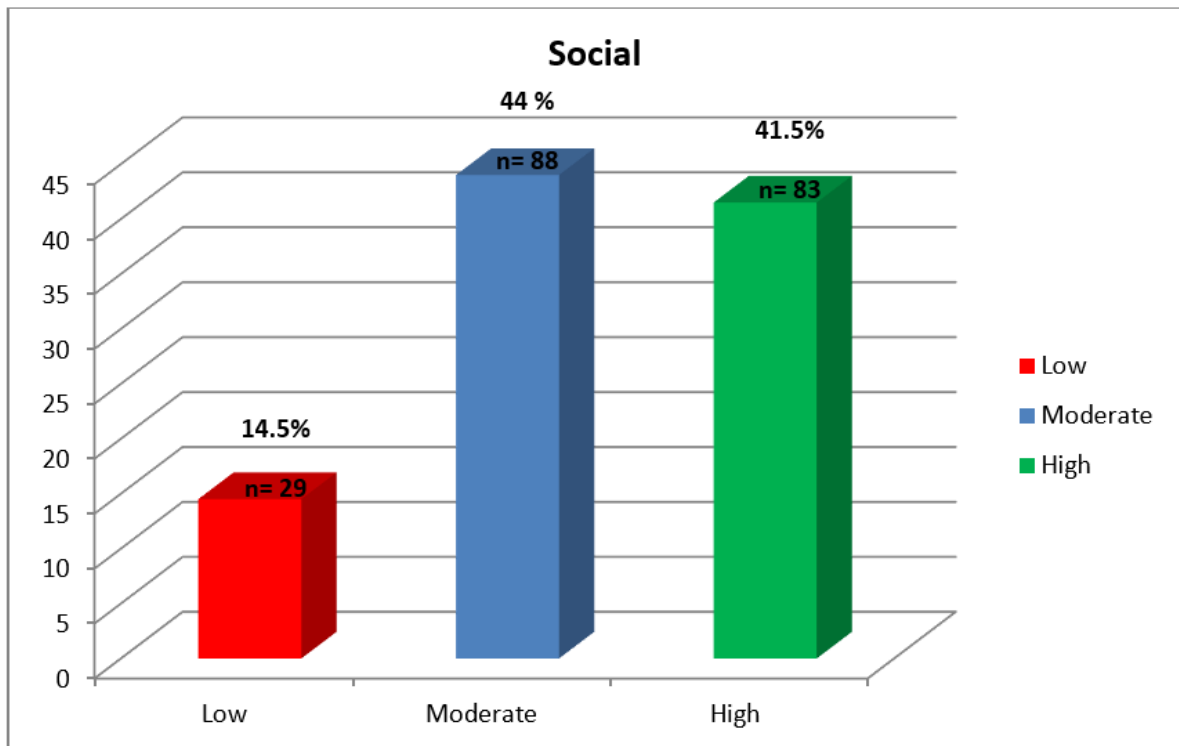


Figure 1. Levels of Social Quality of life among Adults with Hearing Loss (N=200)

This figure reveals that 44% of adults with hearing loss associated with moderate social quality of life while 41.5% associated with a high social quality of life.

List	Social	M	SD	Evaluation
1	How satisfied are you with your personal relationships?	3.81	1.176	High
2	How satisfied are you with your sex life?	3.44	1.197	Moderate
3	How satisfied are you with the support you get from your friends?	3.32	1.347	Moderate

Table 2. Evaluation of Social Domain among Adults with Hearing Loss (N=200)

M: Mean, SD: Standard Deviation

Low= 1 - 2.33, Moderate= 2.34 - 3.66, High= 3.67 - 5

This table presents the items of the quality of life related to social domain among adults with hearing loss; [21] the mean scores indicate that adults with hearing loss have moderate to high quality of life related to social aspect in which they are highly satisfied with their personal relationship and moderately satisfied with their sexual life perceiving support from family and friends [22].

Environmental QoL	f	%	M	SD	Ass.
Low	36	18	23.98	5.996	Moderate
Moderate	130	65			
High	34	17			
Total	200	100			

Table 3. Evaluation of Quality of Life related to "Environmental Domain" among Adults with Hearing Loss

f: Frequency, %: Percentage

M: Mean for total score, SD: Standard Deviation for total score, Ass: Assessment

Low= 8 - 18.66, Moderate= 18.67 - 29.33, High= 29.34 - 40

This table shows that adults with hearing loss have a moderate level of environmental quality of life as reported among 65% of them.

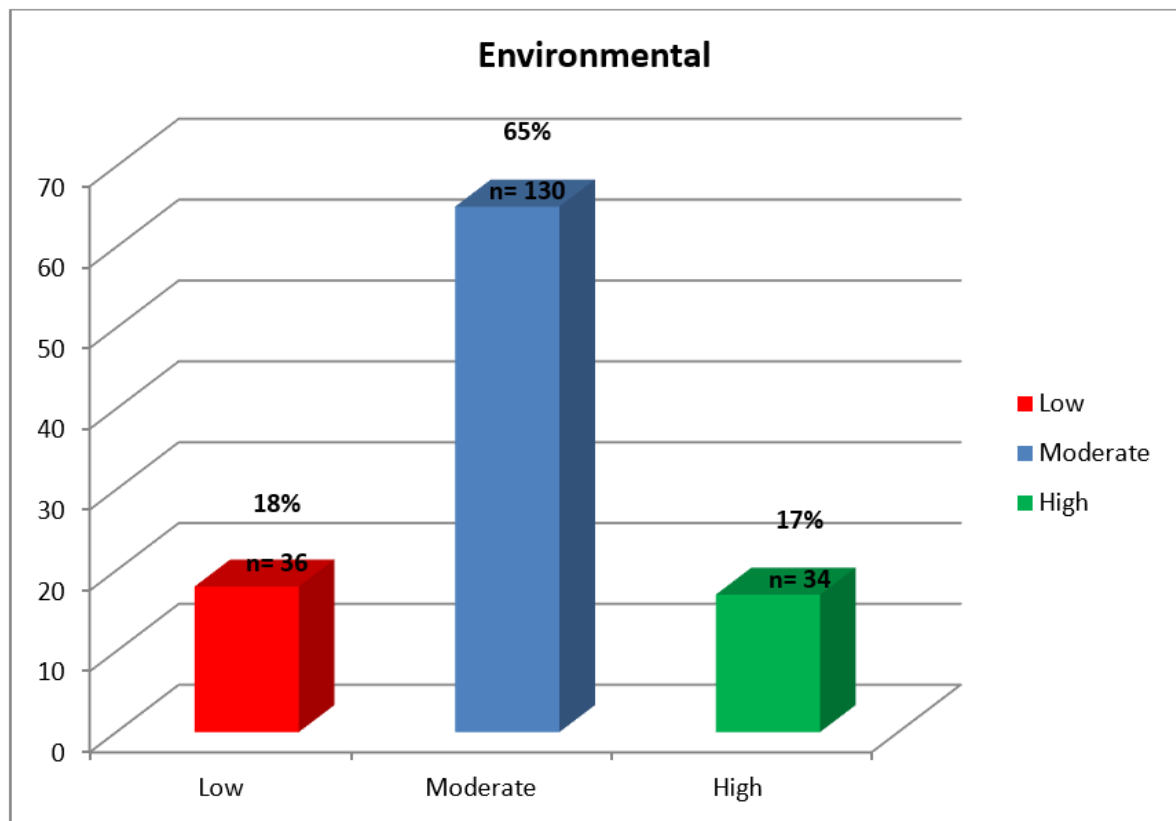


Figure 2. Levels of Environmental Quality of life among Adults with Hearing Loss (N=200)

This figure reveals that 65% of adults with hearing loss have a moderate environmental quality of life.

List	Environmental	M	SD	Evaluation
1	How safe do you feel in your daily life?	3.28	1.195	Moderate
2	How healthy is your physical environment?	2.90	1.268	Moderate
3	Have you enough money to meet your needs?	2.73	1.260	Moderate
4	How available to you is the information that you need in your day-to-day life?	3.04	1.138	Moderate
5	To what extent do you have the opportunity for leisure activities?	2.43	1.278	Moderate
6	How satisfied are you with the conditions of your living place?	3.40	1.240	Moderate
7	How satisfied are you with your access to health services?	2.94	1.232	Moderate
8	How satisfied are you with your transport?	3.27	1.083	Moderate

Table 4. Evaluation of Environmental Domain among Adults with Hearing Loss (N=200)

M: Mean, SD: Standard Deviation

Low= 1 - 2.33, Moderate= 2.34 - 3.66, High= 3.67 - 5

This table presents the items of quality of life related to environmental domain among adults with hearing loss; the mean scores indicate that adults with hearing loss have moderate quality of life related to environmental aspect among all items [23].

Overall QoL	f	%	M	SD	Ass.
Low	30	15	79.11	17.065	Moderate
Moderate	130	69			
High	32	16			
Total	200	100			

Table 5. Overall Evaluation of Quality of Life related among Adults with Hearing Loss

f: Frequency, %: Percentage

M: Mean for total score, SD: Standard Deviation for total score, Ass: Assessment

Low= 26 - 60.66, Moderate= 60.67 - 95.33, High= 95.34 - 130

This table manifests that adults with hearing loss have a moderate quality of life as reported among 69% of them (M±SD= 79.11±17.065).

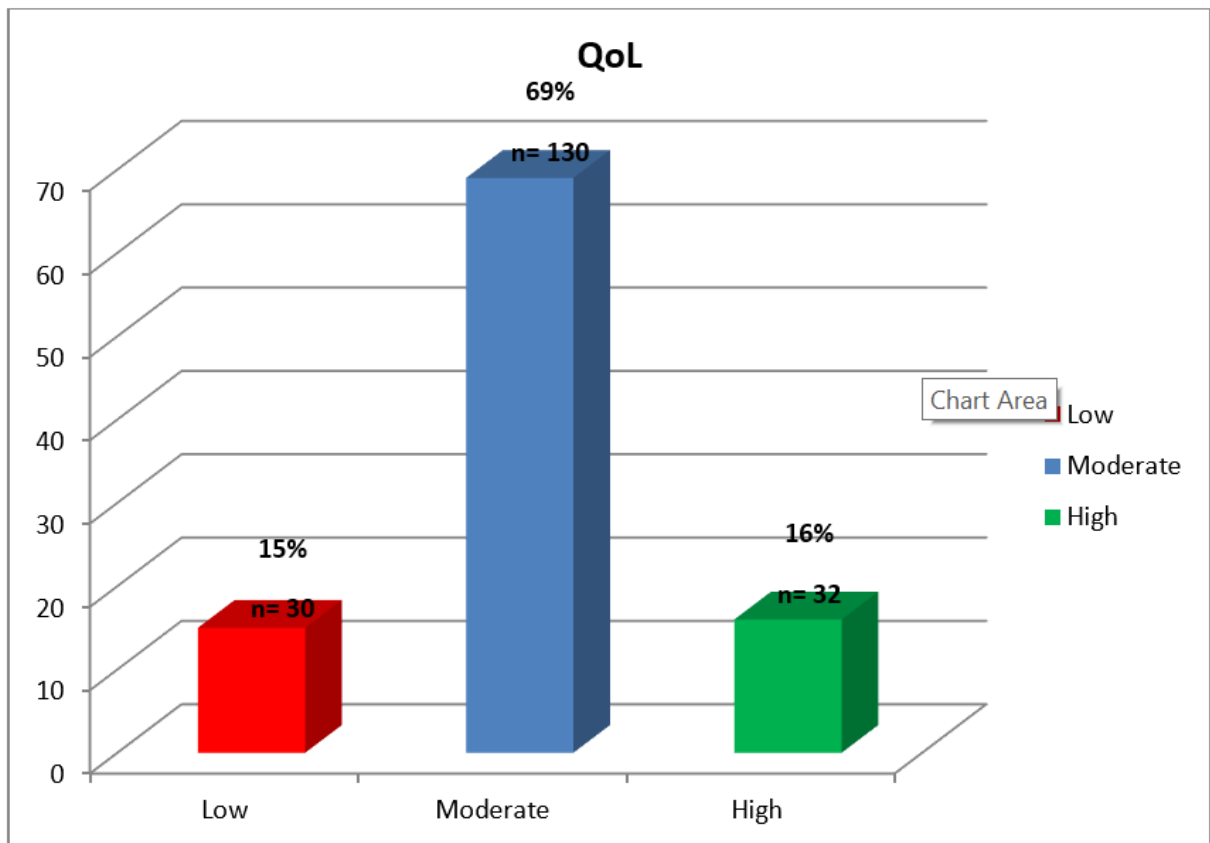


Figure 3. Overall Quality of life among Adults with Hearing Loss (N=200)

This figure reveals that 69% of adults with hearing loss associated with moderate quality of life.

B. Discussion

In This tables reveals that adults with hearing loss have moderate”

Studies show that people with hearing loss are less likely to engage in social activities, experience more difficulty in

relationships with family and friends, and encounter emotional challenges in the workplace [24]

Difficulties in maintaining connections and social interactions, along with the shame and difficulties associated with hearing loss[25]

A study conducted in the USA demonstrated that there were no discernible disparities in levels of social interaction between those with and without hearing impairments[26].

Women are significantly affected by social isolation due to hearing loss. [27]

The high ratings in the social dimension may be attributed to their active social engagement, influenced by cultural norms, and the support from their family and friends. [28]

Table (2): shows that adults with hearing loss have moderate level of environmental quality of life as reported among 65% of them.

This tables reveals that adults with hearing loss have moderate

Due to patient who have hearing loss may have developed effective techniques to manage their condition

Adults experiencing hearing impairment may struggle to identify environmental sounds, such as those related to safety, leading to heightened safety hazards [29] Hearing loss is linked to economic challenges such as limited learning, low wages, and lack of career opportunities [30]

Environmental elements including ambient noise, acoustics, and illumination can greatly influence people with hearing impairments, hindering their communication skills [31]

hearing problems can lead to reduced participation in leisure activities and time spent out-of-home [32]

Studies have shown different factors that affect persons' access to hearing healthcare, such as motivators, challenges, and problems with compliance. [33]

Thorslund discovered that although hearing loss can affect the selection of transportation mode, it does not have a major effect on the actual utilization of various modes. [34]

These findings indicate that people who have hearing loss may have developed effective techniques to manage their condition.

Table (3-11): manifests that adult with hearing loss have moderate quality of life

Because most of patient have a moderate HI in the study and Hearing loss is an invisible ailment that is not visually apparent.

Unlike other disabilities, many individuals often do not view hearing loss as a disabling condition [35]

The patient with hearing impairment experiences a worse quality of life compared to individuals with normal hearing [36]

There are strong associations between HL and QOL while others find less strong [37],or no relationships at all [38].

Conclusion

Hearing loss significantly impacts the quality of life by affecting social and environmental interactions, necessitating further research to explore interventional strategies and underlying causes. This descriptive study, conducted at the Otolaryngology Department of Al-Diwaniyah Teaching Hospital, Iraq, from December 25, 2023, to March 1, 2024, involved 200 participants aged 18 and older. Using nonprobability-purposive sampling, participants underwent pure tone audiometry, and their quality of life was assessed using the Arabic version of the WHOQOL-BREF tool. Data analysis with SPSS version 27 revealed that the average age of participants was 45.5 ± 15.5 years, with 60.5% females and 39.5% males. The results indicate a moderate impact of hearing loss on social and environmental quality of life. The study underscores the need for tailored interventions to ameliorate the adverse effects of hearing loss and enhance service provision for the hard of hearing. Future research should focus on longitudinal studies to track the progression of hearing loss and evaluate the effectiveness of targeted interventions over time.

References

1. M. K. Hamid, "Impact of COVID-19 Vaccine on Hearing Status of Young Ages (Medical College Students as a Sample)," *Baghdad Science Journal*, vol. 20, no. 4 (SI), pp. 1498-, Aug. 2023.
2. M. Sallam, "Occupational Preferences of People with Hearing Disabilities-Deaf and Hard of Hearing Who Are Enrolled in University Studies (According to Holland's Theory) and Their Relationship to Some Variables," *Al-Adab Journal*, vol. 1, no. 144, 2023.
3. A. Jasim and M. Khalifa, "Evaluation of Students' Communication Skills and Academic Performance in the University of Baghdad," *Iraqi National Journal of Nursing Specialties*, vol. 32, no. 2, pp. 1-0, Dec. 2019.
4. R. Atiyah, "Effectiveness of an Instructional Program on Pulmonary Tuberculosis Patients Quality of Life Concerning General Health-Related Among Sample in Baghdad City," *Iraqi National Journal of Nursing Specialties*, vol. 30, no. 1, pp. 66-75, Jun. 2017.
5. K. S. Dawood and A. K. Khudhair, "Assessment of Quality of Life for Parents of Autistic Child," *Iraqi National Journal of Nursing Specialties*, vol. 29, no. 1, 2016.
6. N. Y. Saadon, "Evaluation of Adolescents' Quality of Life in Hilla City," *Iraqi National Journal of Nursing Specialties*, vol. 30, no. 1, 2017.
7. A. Alawe, "Assessment of Quality of Life for Patients with Permanent Pacemaker in Baghdad City," *Iraqi National Journal of Nursing Specialties*, vol. 21, no. 2, pp. 90-102, 2008.
8. Y. Mussa, "Quality of Life Among Adult Patients with Peptic Ulcer in the City of Sulaimani," *Iraqi National Journal of Nursing Specialties*, vol. 1, no. 24, pp. 81-7, 2011.
9. S. Abd Muhsin, "Impact of Different Sources of Noise Exposure on Hearing Impairment: A Cross-Sectional Study," *Al-Kindy College Medical Journal*, vol. 17, no. 3, pp. 163-7, Dec. 2021.
10. A. Brodie, B. Smith, and J. Ray, "The Impact of Rehabilitation on Quality of Life After Hearing Loss: A Systematic Review," *European Archives of Oto-Rhino-Laryngology*, vol. 275, pp. 2435-40, Oct. 2018.
11. M. Amlani, "Effect of Determinants of Health on the Hearing Care Framework: An Economic Perspective," *Seminars in Hearing*, Thieme Medical Publishers, Inc., New York, NY, USA, vol. 18, Jun. 2023.
12. N. Natarajan, S. Batts, and K. M. Stankovic, "Noise-Induced Hearing Loss," *Journal of Clinical Medicine*, vol. 12, no. 6, pp. 2347, Mar. 2023.
13. O. Hong, M. J. Kerr, G. L. Poling, and S. Dhar, "Understanding and Preventing Noise-Induced Hearing Loss," *Disease-a-Month*, vol. 59, no. 4, pp. 110-8, Apr. 2013.
14. P. Campo, T. C. Morata, and O. Hong, "Chemical Exposure and Hearing Loss," *Disease-a-Month*, vol. 59, no. 4, pp. 119-38, Apr. 2013.
15. M. D. Hameed, "Assessment of Noise Induced Hearing Loss (NIHL) in Wasit, Iraq," *Journal of Health, Medicine and Nursing*, vol. 15, 2015.
16. R. V. Krejcie and D. W. Morgan, "Determining Sample Size for Research Activities," *Educational and Psychological Measurement*, vol. 30, no. 3, pp. 607-10, Sep. 1970.
17. World Health Organization, "WHOQOL-BREF: Introduction, Administration, Scoring and Generic Version of the Assessment: Field Trial Version, December 1996," Geneva: World Health Organization, 1996.
18. D. Monzani, G. M. Galeazzi, E. Genovese, A. Marrara, and A. Martini, "Psychological Profile and Social Behaviour of Working Adults with Mild or Moderate Hearing Loss," *Acta Otorhinolaryngologica Italica*, vol. 28, no. 2, pp. 61, Apr. 2008.
19. A. Prieur Chaintré, Y. Couturier, T. T. Nguyen, and M. Levasseur, "Influence of Hearing Loss on Social Participation in Older Adults: Results From a Scoping Review," *Research on Aging*, vol. 46, no. 1, pp. 72-90, Jan. 2024.
20. A. Alattar, J. Bergstrom, G. A. Laughlin, D. Kritz-Silverstein, E. L. Richard, E. T. Reas, J. P. Harris, and E. Barrett-Connor, "Hearing Impairment and Cognitive Decline in Older, Community-Dwelling Adults," *The Journals of Gerontology: Series A*, vol. 75, no. 3, pp. 567-73, Feb. 2020.
21. N. de Andrade, A. Soares, M. B. Skarzynska, P. H. Skarzynski, M. D. Sanfins, and D. Gil, "Self-Perception of Hearing Difficulties and Quality of Life in Individuals with Hearing Loss," *Audiology Research*, vol. 12, no. 5, pp. 527-38, Sep. 2022.
22. M. S. Harris, N. Luzum, and V. Shafiro, "Environmental Sound Perception in Adults with Hearing Loss and Cochlear Implants," *The Journal of the Acoustical Society of America*, vol. 153, no. 3 supplement, pp. A365-, Mar. 2023.
23. P. V. Pierre, A. Fridberger, A. Wikman, and K. Alexanderson, "Self-Reported Hearing Difficulties, Main Income Sources, and Socio-Economic Status; A Cross-Sectional Population-Based Study in Sweden," *BMC Public Health*, vol. 12, no. 1, pp. 1-2, Dec. 2012.
24. J. Swann, "Hearing Impairment: Environmental Considerations," *British Journal of Healthcare Assistants*, vol. 3, no. 11, pp. 530-3, Nov. 2009.
25. T. M. Mikkola, H. Polku, E. Portegijs, M. Rantakokko, L. T. Tsai, T. Rantanen, and A. Viljanen, "Self-Reported Hearing Is Associated with Time Spent Out-of-Home and Withdrawal from Leisure Activities in Older Community-Dwelling Adults," *Aging Clinical and Experimental Research*, vol. 28, pp. 297-302, Apr. 2016.
26. M. Barnett, B. Hixon, N. Okwiri, C. Irungu, J. Ayugi, R. Thompson, J. B. Shinn, and M. L. Bush, "Factors Involved in Access and Utilization of Adult Hearing Healthcare: A Systematic Review," *The Laryngoscope*, vol. 127, no. 5, pp. 1187-94, May 2017.
27. Thorslund, B. Peters, B. Lyxell, and B. Lidestam, "The Influence of Hearing Loss on Transport Safety and Mobility," *European Transport Research Review*, vol. 5, no. 3, pp. 117-27, Sep. 2013.
28. S. Aryal, B. Bhattarai, P. Prabhu, and B. Bhattarai, "Impact of Hearing Loss on the Quality of Life in Adults with Hearing Impairment," *Nepalese Medical Journal*, vol. 5, no. 2, pp. 597-601, Dec. 2022.
29. Sanhueza, R. Manrique-Huarte, D. Calavia, A. Huarte, and M. Manrique, "Hearing Impairment and Quality

- of Life in Adults with Asymmetric Hearing Loss: Benefits of Bimodal Stimulation," *The Journal of International Advanced Otolaryngology*, vol. 15, no. 1, pp. 62, Apr. 2019.
30. S. Dalton, K. J. Cruickshanks, B. E. Klein, R. Klein, T. L. Wiley, and D. M. Nondahl, "The Impact of Hearing Loss on Quality of Life in Older Adults," *The Gerontologist*, vol. 43, no. 5, pp. 661-8, Oct. 2003.
 31. T. Miyakita, A. Ueda, H. Zusho, and Y. Kudoh, "Self-Evaluation Scores of Hearing Difficulties and Quality of Life Components Among Retired Workers with Noise-Related Hearing Loss," *Journal of Sound and Vibration*, vol. 250, no. 1, pp. 119-28, Feb. 2002.
 32. K. Espmark, U. Rosenhall, S. Erlandsson, and B. Steen, "The Two Faces of Presbycusis: Hearing Impairment and Psychosocial Consequences," *International Journal of Audiology*, vol. 41, no. 2, pp. 125-35, Jan. 2002.
 33. M. Chia, J. J. Wang, E. Rochtchina, R. R. Cumming, P. Newall, and P. Mitchell, "Hearing Impairment and Health-Related Quality of Life: The Blue Mountains Hearing Study," *Ear and Hearing*, vol. 28, no. 2, pp. 187-95, Apr. 2007.
 34. L. R. Hallberg, U. Hallberg, and S. E. Kramer, "Self-Reported Hearing Difficulties, Communication Strategies and Psychological General Well-Being (Quality of Life) in Patients with Acquired Hearing Impairment," *Disability and Rehabilitation*, vol. 30, no. 3, pp. 203-12, Jan. 2008.
 35. R. Niemensivu, V. Manchaiah, R. P. Roine, E. Kentala, and H. Sintonen, "Health-Related Quality of Life in Adults with Hearing Impairment Before and After Hearing-Aid Rehabilitation in Finland," *International Journal of Audiology*, vol. 54, no. 12, pp. 967-75, Dec. 2015.
 36. M. F. Mondelli and P. J. de Souza, "Quality of Life in Elderly Adults Before and After Hearing Aid Fitting," *Brazilian Journal of Otorhinolaryngology*, vol. 78, no. 3, pp. 49-56, May 2012.
 37. H. S. Chew and S. Yeak, "Quality of Life in Patients with Untreated Age-Related Hearing Loss," *The Journal of Laryngology & Otolaryngology*, vol. 124, no. 8, pp. 835-41, Aug. 2010.
 38. M. Meyer and S. Kashubeck-West, "Well-Being of Individuals with Late-Deafness," *Rehabilitation Psychology*, vol. 58, no. 2, pp. 124, May 2013.