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Health-related quality of life in elderly hearing aid users vs. non-users

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ABSTRACT

Background and aim: Presbycusis, is usually a harbinger of aging. The negative consequences are not limited to an auditory impairment but influences a range of psychosocial and physical health concerns. The cornerstone of audiologic intervention is the use hearing aids. Optimal management should include an evaluation of quality of life (QoL) status and its assessment. Aim of this work: To quantify the quality of life of hearing impaired elderly individuals (HIEI) and to assess hearing aids impact on QoL.

Subjects: Elderly patients (127) above 60 years had sensorineural hearing loss ranged from mild to severe degree of hearing loss, only 24 of them (21.1%) were fitted with monaural hearing aid.

Methods: Each subject of this study underwent basic audiologic evaluation, speech perception in noise, aided tonal sound field threshold and aided speech tests. Generic WHOQOL-BREF and hearing handicap inventory for the elderly (HHIE).

Results: There were significant lower aided tonal sound field thresholds (ATSFTs) at 0.5, 1, 2 and 4 kHz of hearing aid users when compared with values of non-users at all tested frequencies. Hearing aid users perform better in all domains of WHO QOL-BREF with significant reductions in emotional, social and total scores of HHIE in users group compared with non-users indicated improvement in their QoL. There were no significant differences between scores of males and scores of females. The severity of the hearing loss had statistically significant effects on these scores for non-users but not in users group.

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1. Introduction

Age related hearing loss, or Presbycusis, is usually a harbinger of aging. It is bilateral, high frequencies, symmetrical, and slowly progressive.^{1–3} It affects approximately one-third of adults 61 to 70 years of age and more than 80% of those older than 85 years¹ after hypertension and arthritis, it is the most common chronic health problem in older persons.² The prevalence of presbycusis is not the same in different parts of the world. In the Egyptian elderly (>65 years) is reported to be 44.3%³ while in Taiwan, its prevalence is reported to be 27.3% (>65 years).⁴ The population of elderly people and therefore presbycusis is increasing worldwide due to improvements in public health conditions, and control of new birth and infectious diseases. Therefore, attention to their health must be a part of governmental policies and considered a significant health care concern.⁵

The lack of understanding of this disease process and the inability to remediate its progression are important parts of the prob-

lem.⁶ It may be under recognized because it is a slowly developing problem and may be undertreated because it is not addressed in routine health evaluations, many older adults, as well as professionals, attribute hearing loss to normal aging rather than seeing it as a condition that influences a range of psychosocial and physical health concerns.^{7,8}

The negative consequences are not limited to an auditory impairment; they can also involve according to the WHO-ICF activity limitations by an individual (e.g., inability to understand conversations) and participation restrictions on broader aspects of life (e.g., withdrawing from social situations). Consequently, reductions in participation can negatively impact an individual's health related quality of life (HRQOL).⁹

Interest in health-related quality of life (HRQOL) measurement arises from several factors including (1) a shift in the focus from life prolongation to maintenance of an adequate HRQOL as one ages (i.e., living well; not merely living longer), (2) a general agreement about the importance of patients' self-perceptions of health, and (3) the use of HRQOL measures to conduct health status comparisons across different conditions and/or target populations.^{10,11}

Quantitative measurements of HRQOL can be made using generic and/or disease specific instruments.¹² Generic instruments

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are broad in scope and applicability. They are needed to compare improvements in functional health status, while disease-specific instruments focus on one condition, attempting to define hearing impairment effects on daily functioning and well-being and to evaluate the benefits of hearing aid use, because they are highly responsive to interventions designed to manage a particular disease or disorder.¹³

The cornerstone of the process of primary audiologic intervention for adult-onset hearing loss is the use of amplification through hearing aids, which is aimed at reducing the auditory impairment, optimizing the individual's auditory activities and minimizing participation restrictions.¹⁴ On the other side, optimal management of this condition also should include an evaluation of QOL status and its assessment.^{15–17}

Aim of the work:

- To measure hearing aid outcomes for hearing-impaired elderly individuals (hereafter, HIEI) who referred to Assiut Audiology Unit using objective aided sound field audiologic tests (tonal, Word recognition score and speech perception in noise).
- To quantify QOL of HIEI both hearing aids users (HA users) and non-users using WHO QOL-BREF and HHIE.

2. Patients and methods

The participants in this research were 127 HIEI aged above 60 years, (who referred to Audiology unit Assiut university hospital from January 2015 through June 2016 with mild to severe degree of sensorineural hearing loss (SNHL), only 24 of them (21.1%) were fitted with monaural hearing aid for more than 6 months (served as study group) by examining group and individual differences as a function of hearing aid intervention.

All subjects were healthy and should meet the following criteria to participate in the study:

- 1- No, history of otologic disease, exposure to high intensity occupational noise or ototoxic drugs
- 2- Degree of hearing loss didn't interfere with patient communication during questioner
- 3- Intact cognitive and linguistic abilities as evidenced on the Mental Status Questionnaire (Khan, et al. 1960)¹⁸ this consisted of 10 questions of orientation to place, time, recent memory, and calculation questions, such as date, what year it is, age, where is this place and name of the president.

Those who had known neurologic, psychiatric disorders or known comorbid diseases that would preclude completion of the study. Also, those with conductive or retrocochlear pathology were excluded.

Only 114 HIEI (80 were males and 34 were females) who met these inclusion criteria and 13 were excluded due to Death (1), Illness (2), Withdrew consent (2) Relocation (2) unknown (4) and 2 didn't complete the questioner

Informed consent was obtained from all participants of the study. The study was approved by the Ethics Committee of Assiut Medical University

2.1. Subjects and methods

Two groups of participants, HA users and non-users groups were submitted to the following: Detailed history of ear and hearing problem, history of hearing aid (duration of use, type, make, and history of satisfaction of his current aid), otoscopic examination.

- Audiological evaluation was performed for both groups to ensure normal hearing sensitivity. Two channel audiometer equipped with a sound field loud speaker. (Madsen model Orbiter 922, headphones TDH 39P, GN Otometrics, Copenhagen, Denmark) calibrated to reception accepted standards.¹⁹ Pure tone audiometry, speech audiometry: including Arabic speech threshold (SRT) using Arabic spondee words²⁰ and word discrimination score (WDS) using Arabic phonetically balanced words²¹ at most comfortable level in an acoustically designed booth and interacoustics AZ 26 tympanometer were used.
- Arabic version of speech perception in noise (SPIN) test²²: It is open set test was performed in a sound field. Patients positioning in the test environment was about a distance of 1 m far from the loudspeaker (s) with 45 degrees azimuth behind them. The recorded speech materials were presented to HA users at a fixed intensity level of 65 dB HL and a background noise (multi-talker babbles) was delivered at an intensity level of 60 dB HL to take an idea of how the patient would hear in a noisy environment. Meanwhile, the presentation levels of the speech stimuli to those non-HA users, were set at 50 dB above the estimated threshold for the speech yet still be presented at or below 90 dB HL with background speech noise at S/N = 10 dB.
- Hearing aid outcomes for the hearing aid users group
Digital hearing aids were evaluated using a desk top personal computer (PC) with installed fitting formula with the manufacturer's hearing-aid fitting software, on a NOAH 3 platform, a HI-PRO (Hearing Instrument Programmer) USB unit (Universal Serial Bus) port is used for communication between a PC. For all fitting rationales, the targets will be kept below the measured or calculated UCL of the client.
 - 1- Aided tonal sound field threshold for warble tones were obtained by a sound field testing within the sound treated room with the patient seated at a 45° behind the loud speaker. Testing was performed with an ascending method by a 5 dB step size with appropriate interstimulus pauses for all octave frequencies from 0.5 to 4 kHz.
 - 2- Aided sound field speech testing including aided: SRT, WDS and SPIN tests.
 - 3- The participants were required to take a break of at least 30-min before questionnaire administration.
 - 4- After the break, both WHOQOL-BREF²³ and HHIE²⁴ instruments were used to evaluate the impact of hearing loss on QOL of non-hearing aid users group and to study the effects of hearing aid intervention (hearing aid users group).

Questionnaires were administered in a face-to face format in which the examiner read aloud each question to the participant who chose the possible response for a specific item. The participant verbally responded and the examiner keyed the response into a questionnaire sheet.

3. Generic instrument (WHOQOL-BREF)

Recent analysis of WHOQOL-100 structure has suggested the possibility of merging domains 1 and 3, and also merging domains 2 and 6, thereby creating four domains of quality of life. The WHOQOL-BREF is currently being field tested; it contains two items from the overall quality of Life and general Health and 4 domains of quality of life: (Physical Health, Social Relations, Psychological and Environmental) Scoring system:

For WHOQOL-BREF scale, the response categories were reduced from five to three to better suit the elderly respondent's scores ranging (0, 1, and 2) were respectively given to the responses of (never, sometimes, and always) and the scoring was reversed for negative items. The scores of the items were summed up and the

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