



Original article

Functional assessment of elderly patients with hearing impairment: A preliminary evaluation



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ABSTRACT

Background: The consequence of hearing impairment in elderly patients may affect daily living activities functions. This study assessed whether hearing impairment (HI) has an effect, and the extent of the effect, on the functionality of elderly patients. It also explored factors that may be associated with impaired functionality in hearing-impaired elderly patients.

Methods: This was a cross-sectional, comparative study of elderly patients (aged ≥ 60 years) with HI. The study was conducted in a specialist tertiary hospital in a suburban town in southwestern Nigeria. The study participants were administered a structured questionnaire to obtain information on sociodemographics, clinical and audiometric profiles, and functional capabilities relating to physical, cognitive, and emotional functioning. Differences in the functional capabilities between the test patients and the controls were explored using the Student *t* test and Chi-square test, based on the data generated by statistical software.

Results: One hundred and thirty individuals (78 test patients, 52 controls), aged 60–94 years (mean \pm standard deviation, 71.4 ± 7.4 years) completed the study. In the physical and cognitive domains, the prevalence of functional impairment was 52.6%. Functions were different between hearing-impaired patients and normal hearing elderly patients. The HI patients had associated significant impairment in two domains of functional assessment ($\chi^2 = 10.5$, $p = 0.001$). The factors associated with functional impairment included an age older than 70 years, unmarried status, the presence of combined distressing symptoms, the loss of right ear advantage, the presence of multiple comorbid systemic diseases, and the need for hearing aids.

Conclusion: Elderly patients with HI have vital functional limitations in daily living activities in Nigeria. The factors associated with the limitations deserve urgent attention.

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1. Introduction

Since the turn of the 21st century, the growing interest of medical research in the elderly and age-related changes in humans may be attributed to two major reasons. The first reason is that the elderly constitute an emerging population. Epidemiological data from the United Nations Population Division has projected that the elderly population—which was 11.0% of the world's total population in the year 2010—may double by the year 2050.¹ The second

reason is that elderly people are prone to having coexisting diseases and morbidities by virtue of generalized degeneration in tissues and a reduction in sensory, neural, and immunological activities.² This coexistence tends to limit the functional capability of the elderly in performing activities of daily living and thus influence the quality of their lives.

Among the elderly, age-related hearing loss is the most common form of sensory hearing impairment (HI) and communication disorders associated with aging.³ It constitutes the third most prevalent chronic medical condition in older Americans.⁴ The increasing number of elderly will translate into an increased population of hearing-impaired elderly patients. If left untreated, the impact of HI on patients, caregivers, and society as a whole will be considerable. The effects of the HI transcend different aspects of life of the

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affected individual, which may include physical, cognitive, emotional, psychological, and social activities. Thus, HI can accentuate precarious functional capabilities in the elderly. What effects the impairment has on the regular daily living activities on elderly patients may be pondered.

This study therefore aimed to assess whether HI has an effect, and the extent of the effect, on the functionality of elderly patients. Furthermore, it assesses various factors that may be associated with impaired functionality in hearing-impaired elderly patients. The study will help discern parameters that should be focused on when assisting hearing-impaired elderly maintain independent living.

2. Methods

This was a 5-year (2008–2012) cross-sectional, comparative study conducted at the ear, nose, and throat (ENT) clinic of the Olabisi Onabanjo University Teaching Hospital (Sagamu, Nigeria). The patients of the study were elderly patients (aged ≥ 60 years) who were clinically diagnosed with HI, which was confirmed by audiometric findings of bilateral sensorineural hearing loss. Comparable elderly patients attending the clinic but who did not have a history of HI and in whom pure tone audiometry (PTA) confirmed normal hearing were recruited as the control patients. Informed consent was obtained from the test patients and the controls. Patients excluded were those who did not give consent, did not have audiometric assessment, or had other forms of HI such as conductive hearing loss or mixed hearing loss.

The study protocol was approved by the Health Research and Ethics Committee of the Olabisi Onabanjo University Teaching Hospital (Sagamu, Nigeria). The study was conducted in accordance with the principles of the Helsinki declaration.

The study instrument was a structured questionnaire comprising three sections. Section A obtained information about the patients' sociodemographics such as the patients' age, sex, marital status, level of education, and class of occupation (i.e., skilled or trained specifically for a particular duty and vocation, or unskilled or no specific training). Section B elicited information on the clinical profile and the audiometric findings of the patients. The clinical parameters included other symptoms associated with HI, the duration of symptoms of HI prior to presentation, and the presence of other systemic diseases. Multiple comorbidities were at least two other systemic diseases in the patients besides HI. The questionnaires were administered by the interviewers (O.A.S. and T.O.M.) and some responses, particularly chronic systemic diseases, prolonged use of medications and the number of medications and their combinations, and past medical records were corroborated by checking the case record files of the patients. The patients were asked questions relating specifically to the use of potentially ototoxic medications that can cause HI such as acetylsalicylic acid and loop diuretics used as antihypertensive drugs. Pure tone audiometry was performed in a sound-proof booth using the diagnostic audiometer GS I67 (Kaplan) (Entomed AB Bariumgatan 29, S-213 64, Malmo, Sweden), and performed by the same audiologist on all patients. Pure tone audiometry assessed the air conduction and bone conduction thresholds at frequencies ranging 125–8000 Hz for the air conduction and 250–4000 Hz for bone conduction hearing.

The pure tone average (PTAv) was calculated by the arithmetic mean of the air conduction hearing thresholds of each ear. Hearing impairment was indicated by a PTAv of ≥ 25 decibel hearing level (dB HL) in the better ear. For the controls, normal hearing was indicated by PTAv of < 25 dB HL in both ears. The need for hearing aids was indicated by an audiometric PTAv of ≥ 40 dB HL in the better ear. In the audiograms, we noted the presence, extent, and laterality of the HI.

Section C contained information, based on interviewer-administered questions, related to the functional ability and capability of the patients in three functional domains: physical functioning, cognitive functioning, and emotional functioning. All patients were encouraged to come with their spouses or other close relatives to corroborate their responses, especially on functional capabilities. The Katz index³⁵ was used in assessing the physical functional domain; patients were classified by the scores obtained from the six item questionnaire as “independent” (6) or “dependent” (5–0). Cognitive function was assessed using the short portable mental status questionnaire,³⁶ modified as applicable to the patients and the local setting. The cognitive scores were classified, based on wrong answers on a total of ten questions, as “good” (0–3) or “poor” (4–10). Emotional function was assessed and scored using the short form of the Geriatric Depression Scale–15.³⁷ Responses on emotional function were classified, based on the scores on the 15-item questionnaire, as “not depressed” (i.e., interested in most living activities) (0–5) or as “depressed” (i.e., loss of interest in most living activities) (6–15). Comparisons were based on independent/dependent (physical), good/poor (cognition), and not depressed/depressed (emotional). The patients had PTA and the questionnaires administered during the same visit.

The study data were managed on a spreadsheet and presented in simple descriptive forms as proportions in tabular form. The patients were categorized, based on their hearing status, as “test” (i.e., patients with HI) or “control” (i.e., patients without HI). The second category was based on functional status: “no functional impairment” (i.e., impairment in no or 1 functional parameters) or “functional impairment” (i.e., impairment in 2 functional parameters—namely, the physical and cognition parameters). Differences between discrete variables were analyzed using the Chi-square test, whereas differences between continuous variables were explored using the sample *t* test. The level of statistical significance was set at $p < 0.05$. Statistical analyses were performed using SPSS version 17.0 software (SPSS Inc., Chicago, IL, USA).

3. Results

One hundred and thirty patients, which comprised 78 test patients (i.e., with HI) and 52 controls (i.e., no HI), participated in the study. Most (63.8%) patients were male. The age of the patients ranged 60–94 years with a median age of 71 years [mean \pm standard deviation (SD), 71.4 ± 7.4 years]. Approximately one-third (36.2%) of participants were unmarried at the time of the study. Nearly three-fourths (72.3%) of patients had at least a secondary school education and one-third (33.9%) of the patients were retired. Table 1 shows the sociodemographic characteristics of the patients, based on the hearing status. The parameters were well matched between the two categories of patients.

Besides hearing loss, other common symptoms experienced by the patients were tinnitus (58.5%, which comprised 18 controls with no hearing impairment and 58 test patients with HI); heaviness in the ear (21.5%, which comprised 9 control and 19 test group patients); and vertigo (18.5%, which comprised 2 controls and 22 test group patients). Furthermore, 13.8% of patients with HI had a combination of at least two of these distressing symptoms. The duration of HI symptoms prior to presentation ranged between 3 months and 22 years with a median duration of 36 months, which was used as the dividing line between early and late presentation. Less than one-half (42.6%) of our patients presented late. Common comorbid systemic diseases in our patients were hypertension (36.9%, which comprised 15 controls and 33 test group patients); diabetes (20.8%, which comprised 16 controls and 11 test group patients); and osteoarthritis of the knee joints (16.9%, which comprised 9 controls and 13 test group patients).

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