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Clinical Otologic Profile, Awareness, Knowledge, and Literacy on Hearing Health Among Employees of the Philippine General Hospital

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ABSTRACT

Objectives: To estimate the prevalence of hearing loss and otologic diseases and to establish the awareness, knowledge, and literacy towards hearing care among University of the Philippines – Philippine General Hospital employees.

Methods: A non-probability voluntary sampling design included 235 employees regardless of contract-type of the Philippine General Hospital, University of the Philippines Manila. Outsourced personnel were excluded. The participants were interviewed with a pretested questionnaire to assess the knowledge, awareness, and prioritization of hearing health. Otoscopic assessment was done and hearing was evaluated using pure tone audiometry (PTA).

Design:	Cross-Sectional Study
Setting:	Tertiary National University Hospital
Participants:	235 employees

Results: The prevalence of mild or worse hearing loss across the whole sample was 51.5% with 5.5% having disabling hearing loss. Whereas, the majority of respondents knew the normal range for vision and blood pressure, only 14.5% reported knowing the "normal" hearing level. Despite more than 1/4 of the employees having a subjective complaint of hearing loss, hearing health was a low priority for the respondents when compared to other health conditions and life activities. Majority would go to their healthcare providers for information about hearing loss but 71.9% had never discussed their hearing with a doctor in the past 10 years. Furthermore, the most commonly cited reasons for not having their hearing evaluated were: (1) not experiencing hearing loss and (2) not having their physician recommend a hearing evaluation. Majority of the respondents strongly acknowledged the potential impacts of hearing loss on their safety, quality of life, and overall health and were aware that it is treatable and preventable. However, there was limited awareness on the long-term negative health sequelae of hearing loss.

Conclusion: This study highlights limited awareness and prioritization of hearing health among participants. The population's lack of appreciation of the long-term health sequelae of untreated hearing loss should be addressed. Concerted efforts to improve patient's understanding of hearing health and their healthcare providers' effort to discuss and evaluate hearing should be improved.

Keywords: *clinical otologic profile; tertiary hospital employees; Philippines; hearing health; hearing literacy*

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Over 1.5 billion people globally experience hearing loss, with the highest burden found in low- and middle-income countries (LMICs), where preventable and treatable causes are common.[1] In the Philippines, national data shows a comparatively high prevalence of hearing loss and middle and outer ear diseases relative to high-income countries. A cross-sectional study involving 2,275 Filipino adults reported a 15% prevalence of moderate or worse hearing loss and common otologic findings included cerumen impaction (17.8%), tympanic membrane perforation (6.2%), and tympanic membrane abnormalities (5.1%).[2] A regional study in Southern Tagalog (Region IV-A) found even higher rates of hearing loss compared to the nationwide study, but low compared to other low- and middle-income countries in Southeast Asia; in this group, hearing loss was commonly linked to cerumen impaction, chronic otitis media, presbycusis, and noise exposure.[3]

There is a growing global burden of hearing loss, projected to affect 2.45 billion people by 2050, but it remains underdiagnosed and untreated due to limited screening, stigma, and misconceptions with many individuals perceiving it as an inevitable consequence of aging rather than a preventable or manageable condition.[4] Previous studies have demonstrated low awareness and limited hearing health literacy even among individuals in healthcare settings, including poor understanding of normal hearing thresholds, early symptoms, and long-term consequences.[5] However, there is a significant lack of epidemiologic data and hearing health literacy research in low- and middle-income countries such as the Philippines, particularly among specific populations like hospital employees. While general health literacy has been extensively studied, hearing-specific literacy remains poorly characterized, highlighting a critical gap in local evidence needed to inform targeted screening programs, educational interventions, and hearing health policies.[4]

This study aims to address the lack of data on the prevalence of otologic conditions and the current awareness, knowledge, and perceptions about hearing loss within the local population, specifically among UP-PGH employees. The study objectives include determining the prevalence of ear symptoms and hearing loss, comparing employees' knowledge of hearing loss to other health metrics, evaluating their prioritization of hearing health, and assessing their awareness and perceptions of hearing loss.

METHODS

The minimum sample size computed was 235 employees, based on a 15% prevalence of moderate or worse hearing loss, 95% confidence level, 5% margin of error, and 20% dropout rate.[6] A non-probability sampling design (voluntary sampling) was used in this study. Participants were recruited through passive strategies, including the poster display of the study on bulletin boards throughout the hospital and through electronic invitations disseminated via the hospital's internal email announcement system.

Prospective participants included employees of the University of the Philippines–Philippine General Hospital regardless of employment or contract status, who provided voluntary informed consent. Outsourced personnel and individuals unable to follow instructions were excluded from the study.

Data collection was conducted over two appointments. During the first appointment, the investigators obtained written informed consent and performed a structured interview, followed by otoscopic examination to assess for external and middle ear pathology. Ear cleaning was performed when cerumen occlusion was present. The second appointment consisted of pure tone audiometry with speech testing using a MADSEN Xeta Diagnostic Audiometer (Natus, USA), conducted at the UP-PGH Ear Unit by an experienced audiologist. Participants with incidental findings of chronic otitis media or moderate or worse hearing loss with unknown etiology were subsequently referred to an otologist for further evaluation and management.

Awareness was defined as the general recognition of the impact of hearing loss on health, safety and quality of life. Under this domain, participants were asked 12 Likert-scale agreement (e.g. strongly agree to strongly disagree) questions about associations of hearing loss and social isolation, cognitive decline/dementia, and depression. Knowledge was defined as familiarity with hearing-related concepts, such as normal thresholds and treatability of hearing loss. This domain included a total of six multiple choice questions on normal hearing range and other health metrics and Likert-scale agreement statements regarding general hearing loss-related facts. Literacy was defined more broadly to include the ability to obtain, understand, and act upon hearing health information through 11 questions about sources of information, protective behaviors, prioritization of hearing health vs other conditions, and reasons for not seeking care. These domains were assessed using a modified questionnaire based on previously published hearing health literacy instruments, including concepts described by Carlson et al.[7] It was pretested by a panel of five randomly chosen employees that were excluded from the study to ensure clarity and understandability by identifying issues in wording, question interpretation, formatting, and response options.

Hearing evaluation involved pure tone audiometry at frequencies from 250 to 8000 Hz, and audiogram results were categorized based on hearing impairment severity. Speech testing was used to verify the validity of the PTA but was not used in the analysis. Audiogram results were computed by obtaining the average threshold for 500, 1000, 2000

and 4000 Hz on each ear, and interpreted based on the following scale of hearing impairment: normal <20 dB, mild 20-<35 dB, moderate 35-<50 dB, moderately severe 50-<65, severe 65-<80 dB HL, or profound >80 dB HL in the better ear. Disabling hearing loss was defined as a hearing level of 40 dB HL or more for adults in the better ear.[8] The prevalence of hearing loss and otologic conditions was calculated.

Data Analysis

Demographic data was summarized using descriptive statistics. Continuous variables such as age were summarized using means and standard deviations. Categorical variables, including sex, educational attainment, comorbidities, otoscopic findings, and hearing loss severity, were summarized using frequencies and percentages. Interview data was collected using a google form and was tabulated by the investigators using a Microsoft® Excel for Mac version 16.78.3 (Microsoft Corp., Redmond WA, USA). Questionnaire responses, including factual recall, multiple-response items, and Likert-scale responses, were treated as categorical variables and tabulated using frequency distributions. For selected items, Likert-scale responses were grouped. The prevalence of hearing loss and otologic conditions was calculated based on audiometric and otoscopic findings.

RESULTS

Of the 282 employees who volunteered for the study, only 235 participants completed the interview, otoscopic examination, and hearing test and were included in the study. Forty-seven (47) participants dropped out and were excluded due to refusal to undergo otoscopic examination and hearing tests after completing the interview. A total of 235 employees were included in the analysis with a mean age of 44.0 years (SD 11.9). There were more females (53.6%) than males (46.4%). Most participants had attained a college degree (75.7%), followed by high school education (13.6%) and postgraduate studies (10.6%). The majority of employees were engaged in administrative, service, or clerical work (80.9%), while 17.5% were allied health professionals and 1.7% were medical staff. Most participants were non-smokers (74.9%), and occasional alcohol consumption was reported by 58.7%, while 38.3% were non-drinkers and 3.0% were regular drinkers.

Most participants were asymptomatic (39.6%), but common complaints included decreased hearing (26.8%), ear pruritus (23.0%), and tinnitus (21.7%). Otoscopic assessment revealed that wax occlusion was the most common finding, with a prevalence of 14.4%. Other notable otoscopic findings included: myringosclerosis (10.6%), effusion (1.7%), retracted tympanic membrane (1.7%), perforated tympanic membrane (0.9%), otorrhea (0.4%), and middle ear atelectasis (0.4%). Nine participants had abnormal findings such as attic granulation tissue, external auditory canal stenosis, preauricular sinus, and central thinning of the tympanic membrane. The overall prevalence of outer or middle ear disease was 14.69%.

The prevalence of hearing loss based on pure tone audiometry, regardless of severity, across the entire sample was 52.3%. Overall, mild hearing loss was the most common degree of hearing impairment in the population. There was a small proportion with disabling hearing loss (5.5%).

Only 14.5% of respondents correctly identified the normal range for hearing, while 68.5% reported being unsure. In contrast, correct identification of normal ranges was substantially higher for blood pressure (92.8%) and vision (69.4%), while knowledge of total cholesterol was correct in 27.7% of participants. Hearing ranked last among these conditions in terms of familiarity with normal ranges. *(Table 1)*

Most respondents demonstrated high awareness of the broader impact of hearing loss. The majority agreed that hearing is important to overall health (96.6%), that hearing loss impacts quality of life (94.0%), and that it affects personal safety (91.9%). Awareness was also high for preventability (78.7%) and treatability (69.4%). However, recognition of specific medical associations was lower: 46.0% associated hearing loss with depression, and 23.0% with dementia. *(Table 1)*

Healthcare providers were the most common source of hearing health information (85.5%), followed by Google (59.1%), YouTube (39.1%) and Facebook (23.8%). Regarding preventive practices, common measures included limiting the volume of music or television (74.0%) and avoiding loud environments (54.5%). Despite high reported awareness of the importance of hearing, formal hearing evaluation remained a comparatively low-priority preventive health behavior. *(Table 2)*

The most commonly cited reasons for not having hearing evaluated were the belief that they were not currently experiencing hearing loss (74.0%), having hearing checked only when recommended by a doctor (53.6%), and the absence of provider-initiated discussion (42.6%). *(Table 2)*

Seventy-three percent (73.2%) of participants reported that their hearing had never been evaluated or discussed with a physician in the past 10 years, while 80% has never consulted for hearing evaluation ever in their lives. Only 7.2% had hearing evaluated every 3–5 years or more often. In comparison, more frequent evaluations were reported for blood pressure (60.4%), blood glucose (56.6%), vision (46.8%), and body mass index (37.4%). When asked about plans for the next 12 months, only 24.7% reported being very likely to have their hearing checked, compared to 48.5% who planned to have their eyes checked. As both hearing and vision represent primary sensory functions, this

Table 1. Knowledge of normal health metrics and awareness of the health impact of hearing loss among employees

	Frequency N=235 (%)
A. Knowledge of normal health metrics	
Hearing	
Correctly identified	34 (14.5)
Incorrectly identified	40 (17.0)
Unsure	161 (68.5)
Blood pressure	
Correctly identified	218 (92.8)
Incorrectly identified	10 (4.3)
Unsure	7 (3.0)
Total cholesterol	
Correctly identified	65 (27.7)
Incorrectly identified	24 (10.2)
Unsure	146 (62.1)
Vision	
Correctly identified	163 (69.4)
Incorrectly identified	39 (16.6)
Unsure	33 (14.0)
B. Awareness of the impact of hearing loss on health, safety and quality of life*	
Increased risk for depression	108 (46.0)
Reduced income/job opportunity	164 (69.8)
Increased risk of falling	136 (57.9)
Increased risk for dementia	54 (23.0)
Hearing loss can impact one's personal safety	216 (91.9)
Hearing loss impacts the quality of one's life	221 (94.0)
Hearing is important to my overall health	227 (96.6)
Hearing loss can lead to social isolation	157 (66.8)
Hearing loss is treatable	163 (69.4)
Hearing loss is a normal part of aging	132 (56.2)
Hearing loss is preventable	185 (78.7)

*Responses of "very aware" and "strongly agree" summarized with counts and percentages

twofold difference suggests that visual health is prioritized substantially more than auditory health among respondents. Similarly, undergoing a hearing evaluation ranked lower than several routine health behaviors, including annual physical examinations (69.4%) and cholesterol testing (63.8%). *(Table 2)*

In the next 12 months, hearing evaluation was among the least prioritized health behaviors, with only 24.7% reporting they were very likely to have their hearing checked. This was substantially lower than plans for annual physical examinations (69.4%), cholesterol testing (63.8%), and vision assessment (48.5%). Notably, hearing evaluation ranked below several routine lifestyle activities, including dining out (50.6%) and outdoor recreation (46.8%), highlighting the relatively low prioritization of auditory health among respondents. *(Table 2)*

DISCUSSION

The overall prevalence of moderate or greater hearing loss in our population was 5.68%, which is lower than the findings in the 2020

Table 2. Hearing health literacy: information sources, health-seeking behaviors and physician engagement

	Response frequency N=235 (%)
A. Sources of Hearing Health Information**	
Healthcare provider	201 (85.5)
Google	139 (59.1)
YouTube	92 (39.1)
Facebook	56 (23.8)
Hearing aid manufacturer websites	29 (12.3)
WebMD	30 (12.8)
Instagram	8 (3.4)
B. Reasons for Not Undergoing Hearing Evaluation**	
I do not think I am currently experiencing hearing loss	174 (74.0)
I get my hearing checked as recommended by my doctor	126 (53.6)
My healthcare provider has never mentioned getting	100 (42.6)
my hearing tested	
I have other health priorities	69 (29.4)
I am too young to get my hearing tested	46 (26.4)
C. Planned Activities in the Next 12 Months**	
Have an annual physical	163 (69.4)
Have cholesterol checked by a doctor	150 (63.8)
Go on a diet or start an exercise regimen	137 (58.3)
Take a loved one to the doctor	134 (57.0)
Go to a restaurant or party	119 (50.6)
Have my eyes checked by a doctor or optometrist	114 (48.5)
Take a nature walk in the park or hike	110 (46.8)
Listen to the radio or a podcast	84 (35.7)
Have my hearing checked by a doctor or audiologist	58 (24.7)
Have a mammogram or prostate exam	48 (29.4)
Attend a concert	21 (8.9)
D. Frequency of Physician Evaluation and Discussion (Past 10 Years)	
Hearing	
Every 3 to 5 years or more often	17 (7.2)
Only as needed	46 (19.6)
Never	172 (73.2)
Vision	
Every 3 to 5 years or more often	110 (46.8)
Only as needed	54 (27.2)
Never	48 (26.0)
Body Mass Index	
Every 3 to 5 years or more often	88 (37.4)
Only as needed	72 (30.6)
Never	75 (31.9)
Blood Pressure	
Every 3 to 5 years or more often	142 (60.4)
Only as needed	75 (31.9)
Never	18 (7.7)
Blood Cholesterol	
Every 3 to 5 years or more often	149 (62.6)
Only as needed	46 (19.6)
Never	40 (17.0)
Blood Glucose	
Every 3 to 5 years or more often	133 (56.6)
Only as needed	54 (23.0)
Never	48 (20.4)

**responses for these questions are not mutually exclusive

nationwide study by Newall *et al.*[2] and the 2022 study by Pardo *et al.*[3] among Filipinos in Region IV-A. This difference may be explained by the "healthy worker effect," a type of selection bias common in occupational cohort studies. Employed populations will have better overall health outcomes compared to the general population, because individuals who are severely ill, disabled, or have significant functional impairments are less likely to be employed or to remain in the workforce. Hence, occupational cohorts will have a lower prevalence of a condition compared to the general population, due to the selective inclusion at hiring and continued retention of healthier individuals over time.[9] This bias leads to underestimation of disease burden in employed populations and may partly account for the lower prevalence of hearing loss observed among UP-PGH employees.

Our otoscopic assessment revealed similar findings to the nationwide study with wax occlusion being the most common issue. The overall prevalence of outer or middle ear disease was also comparable, though still high relative to WHO data for Southeast Asia.[10] Contributing factors to the relatively high prevalence of hearing loss in the Philippines include limited access to preventive ear care, poor healthcare services, infectious diseases, lifestyle factors such as smoking, inadequate noise exposure regulations, and poor health education.[2]

Our study highlights limited knowledge and literacy of hearing health among participants, as evinced by lower familiarity with normal hearing thresholds and lower intent to seek hearing evaluation, compared to other routine medical assessments like cholesterol, vision, blood pressure, body mass index, and blood glucose monitoring. This finding is similar to the results from the studies conducted by Sydlowski *et al.*[5] and Carlson *et al.*[7] which revealed that both the general population and healthcare providers in the United States had a significantly limited understanding of the implications of hearing loss in comparison to other prevalent medical conditions This disparity may also be due to a general lack of awareness about the long-term health consequences of untreated hearing loss.[5] Furthermore, unlike health metrics like blood pressure and vision, adult hearing screening is not routinely integrated into health systems contributing to low awareness and underdiagnosis.[10] Lower prioritization suggests low perceived relevance of hearing loss by the participants, which may correlate with poor understanding, but does not conclusively prove it. Participants without subjective hearing concerns may therefore reasonably deprioritize hearing evaluation, a contextual factor that should be considered when interpreting these findings. Hearing loss typically develops slowly and is not life-threatening, so individuals may not perceive it as a health priority or seek information about normal hearing levels.[11,12] Because of this, the perceived immediacy of hearing loss may be reduced compared to other chronic conditions. It is expected that respondents would prioritize metabolic and cardiovascular conditions given their established associations with morbidity and mortality. However, our study highlights that hearing health is disproportionately deprioritized as further illustrated by comparison with vision, another sensory health domain, which consistently ranked higher in terms of knowledge, screening, and future intent for evaluation.

Despite most of them being aware of the impacts of hearing loss on health, safety, and quality of life, there is low action as evinced by 80% had never had a hearing evaluation and 71.9% never discussed hearing with a doctor in 10 years. This shows that there is a demonstrated disconnect between knowledge of impact and actual behavior among the participants, which is a phenomenon in health psychology known as the intention-action gap.[13]

Our findings highlight the pivotal influence of healthcare providers in shaping the employees' hearing health behaviors. This emphasizes the critical role healthcare providers play in educating patients and encouraging proactive care. When providers fail to discuss relevant topics or addressed them only briefly, participants often assumed they should maintain their current behaviors.[14] Likewise, if healthcare providers overlook hearing loss or fail to offer meaningful guidance on its management, patients may unknowingly be at risk for harmful long-term consequences. Even small changes during physician consults like hearing screening questions significantly increase the detection rate of hearing loss and subsequent interventions.[15] Failure to integrate hearing health into routine clinical care may therefore contribute to delayed recognition and management.

Despite healthcare providers' influence on patient behavior, many are not addressing hearing loss adequately, possibly due to limited knowledge about normal hearing levels.[5] This lack of discussion may stem from a belief that treatment options for hearing loss are limited.[5] To address this, healthcare providers need to understand the educational challenges in advancing hearing healthcare and the importance of early detection and intervention.

A limitation of our study is potential recall bias. Additionally, the questionnaire was adapted from a US-based survey and pretested for local context, because no validated surveys could be found addressing the study objectives. This may limit the reliability and generalizability of the findings and future studies should develop and validate culturally appropriate instruments to assess hearing health knowledge and behaviors and incorporate objective measures, such as medical record review to improve accuracy. Another limitation concerns the study sample, largely composed of college graduates, that may not reflect the broader Philippine population, as higher education is linked to better hearing health knowledge and behaviors.[16] Another limitation is that

the prioritization of conditions was not analyzed in the context of their actual comorbidities. The employees may have reasonably prioritized other medical conditions based on existing diagnoses or perceived health risks, which could have in turn influenced their health-seeking behavior. Hence, future analysis comparing prioritization of hearing health with the presence of specific comorbidities could be done to further clarify the drivers of health behavior.

In conclusion, our study found a high prevalence of audiometric confirmed hearing loss among UP-PGH employees, most of which was mild and previously undiagnosed. Despite high awareness of the general importance of hearing, participants demonstrated limited knowledge of normal hearing thresholds, low engagement in hearing evaluation, and low prioritization of hearing care compared with other health conditions, suggesting gaps in hearing health knowledge, prioritization, and health-seeking behavior within this hospital-based population.

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