



ADDRESSING DAILY LIVING SKILLS, HEARING HANDICAPS, AND QUALITY OF LIFE IN CLINICAL PRACTICE

UNAPREĐENJE SVAKODNEVNIH ŽIVOTNIH VJEŠTINA, OŠTEĆENJA SLUHA I KVALITETA ŽIVOTA U KLINIČKOJ PRAKSI

Juliana Bell¹, Blair Carsone^{1*}

¹Gannon University of Ruskin, Florida, United States

Original Scientific Article

Received: 12/06/2025

Accepted: 13/07/2025

ABSTRACT

To explore how qualitative responses from adults who are deaf and hard of hearing contribute to a more comprehensive and nuanced understanding of the predictive quantitative relationship between age, gender, hearing handicap, and instrumental activity of daily living performance. Mixed-methods research design utilizing a concurrent triangulation strategy. The survey was conducted on a web-based platform. Participants had one month to respond. 636 adults aged 18-64 with hearing loss and English proficiency were recruited through convenience sampling. Measures included two open-ended questions to understand the participants' lived experiences, the Hearing Handicap Inventory for Adults, Assessment of Quality of Life-8D, and Lawton Instrumental Activities of Daily Living Scale. Qualitative thematic analysis revealed varied impacts on quality of life and daily living performance, with adaptive strategies and assistive devices playing crucial roles. Quantitative analysis indicated significant correlations between hearing handicap, instrumental activities of daily living, and quality of life. This study highlights the need to comprehensively address daily living skills, hearing handicaps, and quality of life in clinical practice. Clinical practitioners must adopt a multifactorial approach when working with adults who are deaf or hard of hearing. Future research should determine effective intervention approaches.

Key words: rehabilitation, strategies, techniques.

SAŽETAK

Cilj ovog istraživanja bio je istražiti kako kvalitativni odgovori odraslih osoba koje su gluhe ili nagluhe doprinose sveobuhvatnijem i nijansiranim razumijevanju kvantitativnih prediktivnih odnosa između dobi, spola, oštećenja sluha i sposobnosti obavljanja instrumentalnih aktivnosti svakodnevnog života. Korišten je istraživački dizajn mješovitih metoda sa strategijom istovremene triangulacije. Anketa je provedena putem internetske platforme, a učesnici su imali mjesec dana da odgovore. Uzorak je činilo 636 odraslih osoba,

* Correspondence author: Blair Carsone, Gannon University of Ruskin, Florida, United States
E-mail: carsone001@gannon.edu

starosti od 18 do 64 godine, s oštećenjem sluha i poznavanjem engleskog jezika, koji su regrutovani metodom pogodnog uzorka. Instrumenti su uključivali dva otvorena pitanja s ciljem razumijevanja životnog iskustva učesnika, Inventar oštećenja sluha za odrasle (HHIA), procjenu kvaliteta života (Assessment of Quality of Life-8D) i Lawtonovu skalu instrumentalnih aktivnosti svakodnevnog života. Tematska analiza kvalitativnih podataka otkrila je različite uticaje na kvalitet života i funkcionisanje u svakodnevnim aktivnostima, pri čemu su adaptivne strategije i asistivne tehnologije igrale ključnu ulogu. Kvantitativna analiza pokazala je značajne korelacije između oštećenja sluha, instrumentalnih aktivnosti svakodnevnog života i kvaliteta života. Ova studija naglašava potrebu za sveobuhvatnim pristupom u radu sa svakodnevnim vještinama, oštećenjima sluha i kvalitetom života u kliničkoj praksi. Kliničari trebaju usvojiti multifaktorski pristup u radu s odraslim osobama koje su gluhe ili nagluhe. Buduća istraživanja trebala bi se usmjeriti na utvrđivanje učinkovitih pristupa intervenciji.

Ključne riječi: rehabilitacija, strategije, tehnike.

INTRODUCTION

Hearing loss is a common issue worldwide. Approximately 70 million people globally have complete hearing loss (National Council on Aging [NCOA], 2023). In the United States (U.S.), hearing loss is the third most common chronic physical condition, twice as prevalent as diabetes or cancer (Centers for Disease Control and Prevention [CDC], 2019; Mahboubi et al., 2017). Almost 40 million, or approximately 15% of adults living in the U.S. have some degree of hearing loss or report trouble hearing (Michels et al., 2019; National Center for Health Statistics, n.d.; National Institute on Deafness and Other Communication Disorders [NIDCD], 2024). Due to the aging population, the number of American adults with hearing loss is expected to nearly double by 2060 (Goman et al., 2017; Hernandez, 2023).

On an individual level, hearing loss is associated with negative physical, social, cognitive, economic, and emotional consequences (Hernandez, 2023; Mahboubi et al., 2017; Michels et al., 2019; National Academies Press, 2020; Rutherford et al., 2018; Shukla et al., 2020; World Health Organization [WHO], 2023). It often leads to social withdrawal, isolation, and cognitive decline (Hernandez, 2023; National Academies Press, 2020; Rutherford et al., 2018; Shukla et al., 2020; WHO, 2023). This study sought to understand how the personal experiences of adults who are deaf or hard of hearing (DHH) contribute to a better understanding of the predictive relationship between age, gender, hearing handicap, and IADL performance.

To maintain inclusive writing styles, the acceptable terminology used throughout the paper includes DHH and hearing loss. These terms were chosen to reflect the cultural norms of the current time. DHH is a term intended to encompass individuals regardless of their hearing level and includes an entire spectrum of individuals with different hearing levels and types (Educational Audiology Association, 2023). Hearing loss is a term used to describe various levels of hearing, specifically hearing thresholds outside the range of typical hearing (Educational Audiology Association, 2023).

According to the Educational Audiology Association (2023), the term ‘hearing handicap’ is unacceptable due to its negative assumption of hearing differences. The authors acknowledge that hearing differences in individuals who are DHH are not viewed as handicapped or of negative value. However, the term ‘hearing handicap’ is utilized because it is the title of an outcome measure, Hearing Handicap Inventory for Adults, used in the current study (Newman et al., 1990).

Hearing loss increases with age, particularly among individuals over age 60 (Hoffman et al., 2017; WHO, 2023). Much of the research on hearing loss in the adult population focuses on older adults (Bainbridge & Wallhagen, 2014; Borda et al., 2019; Chen et al., 2014; Ciorba et al., 2012; Gopinath et al., 2012; Lin et al., 2019; Mikkola et al., 2015a; Mikkola et al., 2015b; Niazi et al., 2020; Yévenes-Briones et al., 2021; WHO, 2023). Despite recent data from the National Center for Health Statistics, CDC, and the National Health Interview Survey on hearing loss in adults, existing literature does not capture its effects on younger and middle-aged adults (CDC, 2019; National Center for Health Statistics, n.d.). Therefore, this study targeted adults who are DHH aged 18 to 64 to fill this gap in knowledge. Additionally, research shows that men are almost twice as likely to have hearing loss as women (NIDCD, 2024). Hearing ability declines faster in men, who often work in jobs with a higher risk for occupational noise exposure than women (Villavisanis et al., 2020).

The definition of hearing handicap is complex due to the multifaceted nature of hearing impairments (American Speech-Language-Hearing Association [ASHA], 1981). According to ASHA, hearing handicap is the disadvantage imposed by a hearing impairment on a person's communicative performance in daily activities. It should be assessed comprehensively, considering factors like age, extent of impairment, and related physical or mental impairments (ASHA, 1981; Campos & Launer, 2020; Maidment & Wallhagen, 2023). Hearing difficulty impairs communication, affecting necessary auditory cues for navigating environments (Brenowitz & Wallhagen, 2021). The severity and type of hearing loss are significantly associated with hearing handicaps and self-reported communication difficulties (Aryal et al., 2022).

Hearing loss can lead to loneliness, isolation, a decline in social activities, communication disorders, and dissatisfaction with family life (Ciorba et al., 2012). These social and emotional implications can affect physical and mental health (Bainbridge & Wallhagen, 2014; Gopinath et al., 2012). Hearing loss has also been shown to negatively impact daily activities, social engagement, and emotional state, leading to poorer quality of life (Alrasheed et al., 2023; Brenowitz & Wallhagen, 2021; Ciorba et al., 2012; Gopinath et al., 2012; Niazi et al., 2020; WHO, 2023). Individuals who are DHH are more likely to experience emotional distress, depression, dementia, and debility (Gopinath et al., 2012; Li et al., 2014; Michels et al., 2019). A strong association between hearing impairment and depression, especially among women and those younger than 70, has been identified in the literature (Li et al., 2014). Furthermore, those with hearing loss experiencing loneliness and isolation often face restrictions in social participation and activities (Agrawal, 2008; Brenowitz & Wallhagen, 2021; Ciorba et al., 2012; Gopinath et al., 2012; Michels et al., 2019; Mikkola et al., 2015b).

Greater hearing impairment has been linked to physical disability and reduced functioning in activities of daily living (ADLs), IADLs, leisure, and social activities (Borda et al., 2019;

Chen et al., 2014; Lin et al., 2019; Mikkola et al., 2015a; Yévenes-Briones et al., 2021). Research has shown that severe hearing loss impairs ADL and IADL performance more in individuals with hearing loss compared to those without hearing loss (Borda et al., 2019; Dalton et al., 2003; Gopinath et al., 2011; Lin et al., 2019; Mikkola et al., 2015a). Yévenes-Briones et al. (2021) linked hearing loss to IADL disability in older adults using the Lawton and Brody IADL Scale. Using a mixed-methods study design, this study aims to inform healthcare practitioners, including speech-language pathologists and occupational therapists, about the predictive relationship between age, gender, hearing handicap, and IADL performance, and to understand how personal experiences regarding the impact of hearing loss on daily functioning and quality of life contribute to this relationship.

Research question and hypotheses

The research question guiding the study was: To what extent and in what ways do qualitative responses from adults who are DHH contribute to a more comprehensive and nuanced understanding of the predictive relationship between age, gender, hearing handicap, and IADL performance via integrative mixed methods analysis? The hypothesis was that the qualitative responses from individuals with hearing handicaps would contribute to a more comprehensive and nuanced understanding of the predictive relationship between age, gender, hearing handicap, and IADL performance. The null hypothesis was that the qualitative responses from individuals with hearing handicaps would not contribute to a more comprehensive and nuanced understanding of the predictive relationship between age, gender, hearing handicap, and IADL performance.

MATERIAL AND METHODS

Sample of participant

This study employed a mixed-methods survey design. A concurrent triangulation strategy was utilized, one of the most common mixed methods models, where quantitative and qualitative data are collected simultaneously during a single phase of the research (Creswell & Creswell, 2023). The survey was administered electronically via Google Forms. Participants were not restricted to a physical location, as recruitment and survey completion occurred entirely online. A total of 636 survey respondents were recruited through convenience sampling. Eligible participants included adults aged 18 to 64 with some degree of hearing loss and proficiency in the English language. All participants provided informed consent at the beginning of the survey and were informed of their right to withdraw at any time without consequences.

Method of conducting research

Ethical approval was obtained from a University Institutional Review Board (GUIRB-2024-1-7198) prior to data collection. Data were gathered through an electronic survey on the Google Forms platform, and responses were organized in a password-protected Google spreadsheet. The survey was distributed across thirteen different hearing loss community support Facebook groups. A link to the Google Forms survey and a flyer with inclusion criteria were posted with administrative approval. Participants were incentivized to complete the survey, with the first twenty-five individuals receiving a ten-dollar electronic Amazon gift card. Data collection spanned for a total of thirty days.

Measuring instruments

In addition to demographic information, three instruments were used to quantitatively measure participants' responses. These included the Hearing Handicap Inventory for Adults (HHIA), Assessment of Quality of Life-8D (AQoL-8D), and the Lawton Instrumental Activities of Daily Living Scale. The HHIA is a 25-item self-assessment scale with two subscales (emotional and social/situational) focusing on the occupational effects of hearing loss which illustrate individuals' engagement or disengagement in activities (Newman et al., 1990). Scores range from no handicap (0%) to significant handicap (>44%), with a maximum score of 100. The HHIA has demonstrated high internal consistency reliability and a low standard error of measurement (Newman et al., 1990).

The AQoL-8D consists of 35 Likert-style questions, this tool assesses parameters of well-being, emphasizing the psychosocial elements of health in adults (Richardson et al., 2014). It evaluates eight domains: independent living, happiness, mental health, coping, relationships, self-worth, pain, and senses. Scores range from 35 to 175, with higher scores indicating poorer quality of life (Shirley Ryan Ability Lab, 2021). Researchers completed an AQoL user registration form with the Centre for Health Economics prior to data collection to adhere to the instrument's policies.

The Lawton IADL Living Scale assesses everyday living skills across eight domains, with scores ranging from 0 (low function) to 8 (high function) (Graf, 2008). It is useful for identifying functional status and monitoring changes over time, with established inter-rater reliability at 0.85 (Lawton & Brody, 1969).

In addition to the quantitative measures, the survey had two optional open-ended questions. The questions, listed in Appendix A, were used to gather qualitative data on participants' perceptions of the impact of hearing loss IADL performance and QoL. The questions were phrased to avoid any potential author biases and eliminate any assumption of impact.

Data processing methods

This study employed a mixed-methods survey design. A concurrent triangulation strategy was utilized, one of the most common mixed methods models, where quantitative and qualitative

data are collected simultaneously during a single phase of the research (Creswell & Creswell, 2023).

Qualitative analysis

Of the 636 total participants included in the study, more than seventy percent completed the two optional open-ended questions. A thematic analysis was conducted to identify common themes and patterns to understand how the responses to the impact of hearing loss on IADL performance and quality of life contribute to a better understanding of the quantitative data. Two researchers independently reviewed the qualitative survey responses, using Microsoft Excel to code the data and categorize themes. Through a series of steps that included familiarization with the data, initial coding, searching for themes, reviewing themes, and defining and naming themes, two researchers independently reviewed the data to determine appropriate coding and themes. The researchers searched responses for code frequency, then searched again with emergent codes and by re-reading for the context of codes to more accurately identify themes. All participant responses were scanned for spelling errors; researchers corrected spelling errors in which the intended word was easily identifiable to support accuracy in coding. Themes were compared and the researchers identified significant themes. The researchers came to a final consensus after one discussion due to minor discrepancies. There were no major discrepancies; therefore, an outside third party was not required. To enhance reliability and validity, the data analysis incorporated several strategies. Independent coding by the two researchers ensured inter-rater reliability, with differences being resolved through discussion, as mentioned earlier. Methodological triangulation was also used, cross-verifying the qualitative findings with the quantitative data from the study. These steps ensured a thorough and rigorous qualitative analysis.

Quantitative analysis

The study's ideal sample size was determined using G*Power, which computed a total sample size of 176, with an effect size of 0.5 and power of 0.95 (Faul et al., 2009). The G*Power for the multiple linear regression required a total sample size of 129, and the power and effect size remained the same. Participants were split into two groups based on gender for statistical analyses, given the research on gender differences discussed previously (NIDCD, 2024; Villavisanis et al., 2020). Statistical analyses were performed using Statistical Package for Social Sciences (SPSS) Version 29. The final sample size for the quantitative analysis was 633, with three participants excluded for not disclosing their gender. The results were used to reject the null hypothesis.

RESULTS AND DISCUSSION

A total of 636 participants, aged 18 to 64, completed the survey. Over half of the respondents were aged 26 to 44. Nearly 90% reported moderate to severe hearing loss, with sensorineural and conductive hearing loss being the most common types. About 60% had been diagnosed

with hearing loss for one to ten years, and around 15% for over 21 years. Detailed demographic information is presented in Table 1. Qualitative thematic analysis revealed varied impacts on quality of life and daily living performance, with adaptive strategies and assistive devices playing crucial roles.

Table 1. Demographic Information

Participant Characteristics	N	%
Gender		
Female	370	58.2
Male	263	41.4
Prefer not to disclose	3	0.5
Age		
18-25	86	13.5
26-44	364	57.2
45-59	151	23.7
60-64	35	5.5
Highest Level of Education		
None at all	1	0.001
Elementary School	53	8.3
High School	118	18.6
College	267	42.0
Graduate/Professional Degree	197	31.0
Severity of Hearing Loss		
Mild	55	8.6
Moderate	311	48.9
Severe	252	39.6
Unsure	18	2.8
Length of Time Diagnosed		
< 1 year	54	8.5
1-5 years	177	27.8
6-10 years	195	30.7
11-15 years	82	12.9
16-20 years	29	4.6
> 21 years		
Type of Hearing Loss		
Sensorineural	262	41.2
Conductive	183	28.8
Mixed	119	18.7
Other	25	3.9
Unsure	47	7.4

Note. Total sample size (n=636)

Impact on instrumental activities of daily living

A total of 453, or seventy-one percent of participants, responded to the open-ended question about IADLs. The themes derived from this question included a negative impact, little to no impact, and preference not to answer. Participants who felt hearing loss negatively impacted IADLs reported a decline in independence, requiring greater assistance, increased time to complete tasks, and safety concerns. Participants who reported a negative impact on IADL performance described difficulties and the inability to perform various tasks, contributing to a decline in independence. Specific difficulties mentioned included hearing cooking utensils and timers during food preparation, challenges with household appliances such as laundry machines and vacuums, missed phone calls and doorbells impacting home and financial management, and challenges with medication and health management.

Although some responses emphasized the negative impact of hearing loss on various IADLs, many participants explained how appropriate supports and assistive devices helped mitigate the negative effects and increase independence in IADL performance. Those who described minimal or no impact on IADL performance endorsed the use of other senses, such as visual and touch (vibration) input, hearing devices like hearing aids and cochlear implants, assistive technologies, and adaptive strategies to maximize IADL independence. Additionally, those who noted minimal impact relied on other senses for tasks such as medication management, food preparation, laundry, and home management. Additionally, some participants utilized technology, support systems, and adaptive strategies to effectively accomplish IADLs and maintain their independence. Overall, the responses reflected participants' resilience and adaptability.

Impact on quality of life

Seventy-seven percent, or 496 out of 636, participants responded to the open-ended question regarding QoL. Similar to the IADL question, categories for themes derived from this question included a negative impact, little to no impact, and preference not to answer. Themes reflecting the impact of hearing loss on QoL are listed in Table 2. Participants who reported negative impacts on QoL discussed challenges in social situations leading to social withdrawal, missed conversations due to communication difficulties, and a decline in relationships. Others reported lower self-esteem and increased anxiety and depression due to hearing loss. Furthermore, participants' QoL was impacted by reduced productivity and misunderstandings in both work and educational settings, affecting professional and academic performance and growth. Many QoL responses shed light on the hardships and lived experiences of individuals with hearing loss. Participants who felt their QoL was impacted by hearing loss frequently mentioned diminished mental health and emotional issues. These participants often avoided social and leisure activities and missed opportunities in the workplace. Feelings of sadness, pessimism, and a sense of being held back were common. Some respondents acknowledged the negative and positive impacts of hearing loss but explained how they learned to cope with their condition, minimizing its impact on daily life. Participants who felt their QoL was minimally impacted attributed their improved QoL to

coping skills, accommodations, and assistive hearing devices. They also relied on other senses, timing, and routines to mitigate the negative impact on QoL. While the degree of impact varied, many respondents indicated that hearing loss negatively affected their QoL, particularly in terms of social interaction, mental health, and daily enjoyment.

Common themes that emerged in both qualitative questions included mental health, safety, and independence concerns. Negative emotions, such as depression, anxiety, embarrassment, and feelings of isolation were commonly described. Clinical practitioners must always consider the psychosocial aspects that may be attributed to a client's diagnosis and incorporate comprehensive, client-centered approaches to support these clients. Concerns regarding safety and independence were reflected as participants expressed concerns about missing important sounds like alarms or alerts in daily life and emergencies.

Table 2. Qualitative Thematic Analysis

Category of Themes	Themes
Question One: IADL	
Negative Impact	Reliance on others, difficulty conversing/communicating with others, difficulty with social interactions, negative emotions, negative impact on food preparation/cooking, medication, financial, and health management, safety, balance difficulties, incomplete tasks, requires increased time
Little to No Impact	Utilization of timing/routines, utilizing other senses, adaptive/compensatory strategies, utilizing hearing devices (aids and implants) and assistive technology
Preferred not to answer	
Question Two: QoL	
Negative Impact	Negative emotions, social interaction and communication difficulty, missing reminders, alarms, and important messages/information, things sounding strange, missed opportunities and events, limitations at work, diminished professional growth
Little to No Impact	Aids and implants minimized impact, learned how to adapt over time, accommodations, planning ahead, development of coping skills
Preferred not to answer	

Note. Question One: Please describe if you feel your hearing loss impacts your quality of life. Question Two: Please describe if you feel your hearing loss impacts your ability to independently perform instrumental activities of daily living (food preparation, housekeeping, and laundry, managing finances and medications).

Quantitative results

A multiple linear regression was run to predict QoL (AQoL-8D scores) from age, gender, hearing handicap (HHIA scores), and IADL performance (Lawton IADL scores) for participants who disclosed their gender ($n = 633$). In the model, the dependent variable was QoL, and the independent variables were age, gender, hearing handicap, and IADL performance. The overall regression model was significant [$F(4, 628) = 51.009$, $p < .001$, $R^2 = .245$], determined to be a good fit for the data, and depicted in Table 3. The independent variables collectively had a significant effect on the dependent variable, and three (age, HHIA scores, and IADL performance) of the four independent variables statistically significantly predicted the dependent variable, QoL, ($p < .05$).

An equation was derived from the multiple linear regression analysis, which aimed to predict the dependent variable (QoL) based on several independent variables (age, gender, hearing handicap, and IADL performance) as illustrated in Table 4. Based on the data, the estimated model coefficients are as follows: Quality of Life = $105.754 + (3.187 \times \text{age}) - (1.275 \times \text{gender}) + (.189 \times \text{HHIA}) - (5.551 \times \text{IADL})$. The two following equations listed can be used by clinical practitioners to predict QoL for individuals based on the variables of age, gender, hearing handicap (HHIA scores), and IADL performance (Lawton IADL scores). The equation for females is: Quality of Life = $105.754 + (3.187 \times \text{age}) - (1.275 \times 1) + (.189 \times \text{HHIA}) - (5.551 \times \text{IADL})$. For males, the equation is: Quality of Life = $105.754 + (3.187 \times \text{age}) - (1.275 \times 2) + (.189 \times \text{HHIA}) - (5.551 \times \text{IADL})$. This equation allows for the prediction of the quality of life based on the given values of age, gender, hearing handicap, and IADL performance.

Table 3. ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	51978.943	4	12994.736	51.009	<.001 ^b
Residual	159985.901	628	254.755	0.00	
Total	211964.844	632			

a. Dependent Variable: AQoL-8D

b. Predictors: (Constant), IADL, HHIA, Ages, Gender

Table 4. Coefficients

Variable	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95.0% CI (Lower; Upper)
	B	Std. Error				
(Constant)	105.754	5.066	-	20.877	<.001	95.807; 115.702
Ages	3.187	1.436	.079	2.220	.027	.368; 6.007
Gender	-1.275	1.422	-.034	-.897	.370	-4.067; 1.516
HHIA	.189	.030	.223	6.410	<.001	.131; .247
IADL	-5.551	.471	-.450	-11.778	<.001	-6.476; -4.625

Dependent Variable: AQoL-8D; CI = Confidence Interval

DISCUSSION

Despite the notable gap in the literature regarding this topic, research in other healthcare disciplines has highlighted the importance of addressing self-perceived hearing difficulties and their impact on QoL and IADL performance in adults (Aryal et al., 2022; Dalton et al., 2003; Dixon et al., 2020; Neves et al., 2022). The objective of the current study was to understand how qualitative responses from individuals with hearing loss would contribute to a more comprehensive and nuanced understanding of the predictive relationship between age, gender, hearing handicap, and IADL performance.

The quantitative results of this study revealed that variables such as age, hearing handicap, and IADL performance are significant predictors of QoL. When working with DHH clients, clinical practitioners should consider client factors including age, IADL performance, and hearing handicap, as these factors significantly predict QoL and should be comprehensively considered. Consideration of key client factors and integration of hearing, IADL, and QoL assessments allows for a comprehensive understanding of individual needs. Utilization of the equation identified in the study can help identify factors that may influence QoL. Although gender did not significantly predict QoL in this study, other research indicates that the impact of hearing loss on QoL may be associated with gender (Aryal et al., 2022; Dalton et al., 2003). One study demonstrated a significantly more negative impact on women's QoL than men's (Turunen-Taheri et al., 2018). As client-centered providers, clinical practitioners should personalize approaches based on individual needs rather than assuming differences based on gender alone. An individualized approach ensures that each patient's unique circumstances and challenges are addressed equally regardless of gender (Turunen-Taheri et al., 2018). Individualized approaches to ensure comprehensive and equitable treatment regardless of gender, aligning with the client-centered nature of rehabilitative practice. Similarly, the variety of impacts on IADLs and QoL noted in the qualitative analysis highlights the importance of client-centered practice to address all client needs.

In the qualitative results of the study, participants elaborated on the impact of hearing loss on IADL performance and QoL, contributing to a better understanding of the predictive relationship. Overall, the responses to the IADL question emphasized the impact of hearing loss on various IADLs and the role of assistive measures in mitigating these impacts. By understanding the positive and negative impacts discussed, clinical practitioners can support individuals with IADL performance limitations that may be impacted by hearing loss. Clients can be supported through rehabilitative therapy to learn to maintain their IADL independence in a variety of ways. For example, interventions can include education on implementing visual or vibratory alerting systems and timers to compensate for decreased auditory input. Training in alternative scheduling (text and web-based versus phone calls) can provide individuals with simple alternative methods of communication for financial and health management. Clinical practitioners are equipped with the skills to support individuals with social and leisure participation, mental health challenges, work and education issues, and participation in meaningful activities. With the hardships and lived experiences pertaining to social interaction, mental health, and enjoyment of daily activities reflected in the QoL question, practitioners must understand the importance of addressing mental health, well-being, and

QoL among clients to mitigate its impact on daily occupations. Participants who reported improved QoL and better coping mechanisms for their hearing loss, along with maintained IADL independence, often attributed their positive outcomes to the use of assistive technology and adaptive strategies. Clinical practitioners, with their expertise in these areas, should lead the provision of client-centered care to support individuals with hearing loss, addressing both functional and psychosocial needs.

The study's objectives were met, as the regression results supported the researchers' hypothesis that there was a significant relationship between age, hearing handicap, IADL performance, and quality of life in adults. The importance of holistic, client-centered care approaches in enhancing QoL for DHH individuals was highlighted, given that age, hearing handicap, and IADL performance significantly predict QoL. Clinical practitioners must understand how these factors interconnect to adopt a comprehensive approach to evaluation and intervention. The qualitative analysis underscored the varied effects of hearing loss on functional performance in daily activities and overall well-being and QoL. Participants who reported an increased QoL and greater ability to cope with their hearing loss and maintain IADL independence often commended using assistive technology and adaptive strategies. Clinical practitioners, well-versed in these areas, must be at the forefront of providing client-centered care to support individuals with hearing loss, both functionally and psychosocially.

Recommendations for future studies

Future research should explore the psychosocial impacts of hearing loss in greater depth, particularly focusing on QoL, social isolation, mental health, and the role of rehabilitative therapy in mitigating these issues. Research on the effectiveness of client-centered approaches in rehabilitative therapy interventions for hearing loss, with a focus on individual preferences, goals, and participation in meaningful activities, will provide valuable insights into personalized care strategies and promote greater engagement and satisfaction among individuals with hearing loss. Additional research should identify specific intervention strategies that are most effective in enhancing IADL performance and QoL for clients with hearing loss. This can help clinical practitioners tailor interventions to improve function and QoL. Overall, additional research and increased advocacy for clinical practitioners' roles within the DHH community is necessary to raise awareness of the holistic skills clinical practitioners provide to support this population's physical, psychosocial, and functional needs.

Implications for rehabilitative therapy

Clinical practitioners can address QoL and IADL performance in adults, particularly those with hearing difficulties, and this study provides important insights for practitioners working with this population. Key implications for clinical therapy practice include comprehensive and holistic assessments, individualized care approaches, and support for IADLs and QoL. By incorporating these approaches into practice, clinical practitioners will be equipped to support individuals with hearing loss while promoting greater independence and an improved quality of life.

Strengths and limitations

The current study has several strengths, including the use of three valid and reliable outcome measures to assess perceived hearing handicap, IADL performance, and QoL. The study ensured reliability and validity through an adequate sample size and by applying well-established statistical techniques using SPSS. To enhance accessibility, the researchers employed a mixed-methods research design through an electronic survey platform, aiming to eliminate accessibility barriers, including verbal reception resulting from hearing loss that may have interfered with DHH participants' understanding of the spoken questionnaire item. Additionally, the use of convenience sampling enabled the researchers to efficiently recruit a sufficient number of participants. While convenience sampling is cost-effective, efficient, and easy to implement, it is important to note that it lacks generalizability (Jager et al., 2017).

The researchers acknowledge several limitations of the study. First, the measures of perceived hearing handicap, IADL, and QoL were all obtained by self-report, which could have led to overestimation or underestimation depending on contextual factors. The researchers did not utilize a standardized audiometric testing protocol to measure participants' hearing thresholds. Second, residual confounding is a concern in association studies, and the researchers could not rule out the possibility of residual confounding. There could have been several unmeasured parameters, such as societal or lifestyle factors, that could have influenced the association between perceived hearing handicap, IADL performance, and QoL. These variables could impact the strength of the reported association, and our results should be interpreted with caution. Finally, limitations associated with a mixed-methods model chosen as the research design include difficulty comparing the results of two analyses using different data forms (Creswell & Creswell, 2023). The researchers in the current study addressed this by including quantitative and qualitative data in a singular survey format.

Hearing loss is a global public health issue. Without a multidisciplinary intervention approach, individuals with hearing loss may experience isolation, social withdrawal, and physical and psychosocial difficulties that negatively impact daily life. In this study, the researchers explored the predictors of QoL through a multiple linear regression analysis and the impact of QoL and IADL performance through qualitative thematic analysis. The study's objective was met, as the qualitative responses from those with a hearing handicap contributed to a more comprehensive and nuanced understanding of the predictive relationship between age, gender, hearing handicap, and IADL performance. The qualitative analysis highlighted the varied ways hearing loss can affect functional performance in daily activities and overall well-being.

CONCLUSION

Overall, the study emphasizes the importance for clinical practitioners to consider client-specific factors such as IADL performance, QoL, and hearing handicap in their assessments and interventions. The findings underscore the importance of holistic, client-centered care in enhancing QoL for individuals who are DHH. Given that age, hearing handicap, and IADL performance significantly predict QoL, clinical practitioners must understand how these factors interconnect. This understanding will better equip clinical practitioners in their

adoption of a comprehensive approach to evaluation and intervention. Future research should further investigate the psychosocial impacts of hearing loss and the effectiveness of tailored interventions, thereby enhancing the role of practitioners in addressing the physical, psychosocial, and functional needs of the DHH community.

Data Availability Statement: The data that supports the findings of this study are available from the primary author, JB, upon reasonable request.

Funding: This work was supported by the Gannon University Professional Development Grant.

ACKNOWLEDGEMENTS

This work was supported by the Gannon University Professional Development Grant.

REFERENCES

1. Agrawal, Y. (2008). Prevalence of hearing loss and differences by demographic characteristics among US adults data from the national health and nutrition examination survey, 1999-2004. *Archives of Internal Medicine*, 168(14), 1522. <https://doi.org/10.1001/archinte.168.14.1522>
2. Alrasheed, A. M., Junaid, M., Ardi, K. T., Ebraheem, F. A. M., & Alaidaroos, O. Z. (2023). Quality of life among adults with hearing loss who were prescribed hearing aids in Aseer Province, Saudi Arabia: A cross-sectional tertiary center-based study. *Cureus*. <https://doi.org/10.7759/cureus.45922>
3. American Speech-Language-Hearing Association. (1981). *On the definition of hearing handicap*. <https://www.asha.org/policy/rp1981-00022/>
4. Aryal, S., Bhattarai, B., Prabhu, P., & Bhattarai, B. (2022). Impact of hearing loss on the quality of life in adults with hearing impairment. *Nepalese Medical Journal*, 5(2), 597-601. <https://doi.org/10.3126/nmj.v5i2.48294>
5. Bainbridge, K. E., & Wallhagen, M. I. (2014). Hearing loss in an aging American population: Extent, impact, and management. *Annual Review of Public Health*, 35(1), 139-152. <https://doi.org/10.1146/annurev-publhealth-032013-182510>
6. Baum, C. M., Christiansen, C. H., & Bass, J. D. (2015). The Person-Environment-Occupation- Performance (PEOP) model. In C. H. Christiansen, C. M. Baum, & J. D. Bass (Eds.), *Occupational therapy: Performance, participation, and well-being* (4th ed., pp. 49-56). Thorofare, NJ: SLACK Incorporated.
7. Borda, M. G., Reyes-Ortiz, C. A., Heredia, R. A., Castellanos-Perilla, N., Ayala Copete, A. M., Soennesyn, H., Cano-Gutierrez, C. A., & Perez-Zepeda, M. U. (2019). Association between self-reported hearing impairment, use of a hearing aid and performance of instrumental activities of daily living. *Archives of Gerontology and Geriatrics*, 83, 101-105. <https://doi.org/10.1016/j.archger.2019.04.001>
8. Brenowitz, W. D., & Wallhagen, M. I. (2021). Does hearing impairment affect physical function?. *JAMA Network Open*, 4(6), e2114782. <https://doi.org/10.1001/jamanetworkopen.2021.14782>
9. Campos, J. L., & Launer, S. (2020). From healthy hearing to healthy living: A holistic approach. *Ear & Hearing*, 41. <https://doi.org/10.1097/aud.0000000000000931>

10. Centers for Disease Control and Prevention. (2019). Statistics about the public health burden of noise-induced hearing loss. https://www.cdc.gov/ncchh/hearing_loss/public_health_scientific_info.html#:~:text=Hearing%20loss%20is%20the%20third,prevalent%20as%20diabetes%20or%20cancer.
11. Centers for Disease Control and Prevention. (2021). *Hearing difficulties among adults: United States, 2019*. <https://www.cdc.gov/nchs/products/databriefs/db414.htm>
12. Chen, D. S., Genther, D. J., Betz, J., & Lin, F. R. (2014). Association between hearing impairment and self-reported difficulty in physical functioning. *Journal of the American Geriatrics Society*, 62(5), 850-856. <https://doi.org/10.1111/jgs.12800>
13. Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). Sage Publications, Inc.
14. Dalton, D. S., Cruickshanks, K. J., Klein, B. E. K., Klein, R., Wiley, T. L., & Nondahl, D. M. (2003). The impact of hearing loss on quality of life in older adults. *The Gerontologist*, 43(5), 661-668. <https://doi.org/10.1093/geront/43.5.661>
15. Dixon, P. R., Feeny, D., Tomlinson, G., Cushing, S., Chen, J. M., & Krahn, M. D. (2020). Health-related quality of life changes associated with hearing loss. *JAMA Otolaryngology–Head & Neck Surgery*, 146(7), 630. <https://doi.org/10.1001/jamaoto.2020.0674>
16. Educational Audiology Association. (2023). *Recommended terminology when referring to hearing differences* [PDF]. <https://edaud.org/wordpress/wp-content/uploads/2023/10/RecommendedTerminology2023.pdf>
17. Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41, 1149-1160.
18. Goman, A. M., Reed, N. S., & Lin, F. R. (2017). Addressing estimated hearing loss in adults in 2060. *JAMA Otolaryngology–Head & Neck Surgery*, 143(7), 733. <https://doi.org/10.1001/jamaoto.2016.4642>
19. Gopinath, B., Hickson, L., Schneider, J., McMahon, C. M., Burlutsky, G., Leeder, S. R., & Mitchell, P. (2012). Hearing-impaired adults are at increased risk of experiencing emotional distress and social engagement restrictions five years later. *Age and Ageing*, 41(5), 618-623. <https://doi.org/10.1093/ageing/afs058>
20. Graf, C. (2008). The Lawton instrumental activities of daily living scale. *American Journal of Nursing*, 108(4), 52-62. <https://doi.org/10.1097/01.naj.0000314810.46029.74>
21. Granberg, S., & Gustafsson, J. (2021). Key findings about hearing loss in the working-life: A scoping review from a well-being perspective. *International Journal of Audiology*, 1-11. <https://doi.org/10.1080/14992027.2021.1881628>
22. Guo, H. J., & Sapra, A. (2020). *Instrumental Activity of Daily Living (IADL)*. PubMed; StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK553126/>
23. Hernandez, N. (2023). Hearing loss statistics 2023: Numbers we can't ignore. National Council on Aging. <https://www.ncoa.org/adviser/hearing-aids/hearing-loss-statistics/#:~:text=May%202023>.
24. Hoffman, H. J., Dobie, R. A., Losonczy, K. G., Themann, C. L., & Flamme, G. A. (2017). Declining prevalence of hearing loss in US adults aged 20 to 69 years. *JAMA*

- Otolaryngology–Head & Neck Surgery*, 143(3), 274.
<https://doi.org/10.1001/jamaoto.2016.3527>
25. Jager, J., Putnick, D. L., & Bornstein, M. H. (2017). More than just convenient: The scientific merits of homogeneous convenience samples. *Monographs of the Society for Research in Child Development*, 82(2), 13–30. NCBI. <https://doi.org/10.1111/mono.12296>
 26. Lawton, M., & Brody, M. (1969). Assessment of older people: Self-maintaining and instrumental activities of daily living. *The Gerontologist*, 9(3), 179-186
 27. Li, C.-M., Zhang, X., Hoffman, H. J., Cotch, M. F., Themann, C. L., & Wilson, M. R. (2014). Hearing impairment associated with depression in US adults, national health and nutrition examination survey 2005-2010. *JAMA Otolaryngology–Head & Neck Surgery*, 140(4), 293. <https://doi.org/10.1001/jamaoto.2014.42>
 28. Lin, T. C., Yen, M., & Liao, Y. C. (2019). Hearing loss is a risk factor of disability in older adults: A systematic review. *Archives of Gerontology and Geriatrics*, 85, 103907. <https://doi.org/10.1016/j.archger.2019.103907>
 29. Mahboubi, H., Lin, H. W., & Bhattacharyya, N. (2017). Prevalence, characteristics, and treatment patterns of hearing difficulty in the United States. *JAMA Otolaryngology–Head & Neck Surgery*, 144(1), 65-70. <https://doi.org/10.1001/jamaoto.2017.2223>
 30. Maidment, D. W., Wallhagen, M. I., Dowd, K., Mick, P., Piker, E., Spankovich, C., & Urry, E. (2023). New horizons in holistic, person-centred health promotion for hearing healthcare. *Age and Ageing*, 52(2). <https://doi.org/10.1093/ageing/afad020>
 31. Michels, T. C., Duffy, M. T., & Rogers, D. J. (2019). Hearing loss in adults: Differential diagnosis and treatment. *PubMed*, 100(2), 98-108.
 32. Mikkola, T. M., Polku, H., Portegijs, E., Rantakokko, M., Rantanen, T., & Viljanen, A. (2015a). Self-reported hearing status is associated with lower limb physical performance, perceived mobility, and activities of daily living in older community-dwelling men and women. *Journal of the American Geriatrics Society*, 63(6), 1164-1169. <https://doi.org/10.1111/jgs.13381>
 33. Mikkola, T. M., Polku, H., Portegijs, E., Rantakokko, M., Tsai, L.-T., Rantanen, T., & Viljanen, A. (2015b). 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*, 28(2), 297-302. <https://doi.org/10.1007/s40520-015-0389-1>
 34. Monash University. (2024). *Scoring*. Centre for Health Economics. <https://www.monash.edu/business/che/aqol/using-aqol/scoring>
 35. National Academies Press. (2020). Social isolation and loneliness in older adults: Opportunities for the health care system. In *PubMed*. National Academies Press (US). <https://pubmed.ncbi.nlm.nih.gov/32510896/>
 36. National Center for Health Statistics. (n.d.). *Percentage of any difficulty hearing for adults aged 18 and over, United States, 2019-2022*. https://wwwn.cdc.gov/NHISDataQueryTool/SHS_adult/index.html
 37. National Institute on Deafness and Other Communication Disorders. (2024) *Quick statistics about hearing, balance, & dizziness*. NIDCD.NIH.org. <https://www.nidcd.nih.gov/health/statistics/quick-statistics-hearing>

38. Neves, A., Soares, A., Skarżyńska, M. B., Piotr Henryk Skarzyski, Milaine Dominici Sanfins, & Gil, D. (2022). Self-perception of hearing difficulties and quality of life in individuals with hearing loss. *Audiology Research*, 12(5), 527-538. <https://doi.org/10.3390/audiolres12050053>
39. Newman, C. W., Weinstein, B. E., Jacobson, G. P., & Hug, G. A. (1990). The hearing handicap inventory for adults: Psychometric adequacy and audiometric correlates. *Ear and Hearing*, 11(6), 430-433. <https://doi.org/10.1097/00003446-199012000-00004>
40. Niazi, Y., Ejaz, B., & Muazzam, A. (2020). Impact of hearing impairment on psychological distress and subjective well-being in older adults. *Pakistan Journal of Medical Sciences*, 36(6), 1210-1215. <https://doi.org/10.12669/pjms.36.6.2457>
41. Nordvik, Ø., Laugen Heggdal, P. O., Brännström, J., Vassbotn, F., Aarstad, A. K., & Aarstad, H. J. (2018). Generic quality of life in persons with hearing loss: A systematic literature review. *BMC Ear, Nose and Throat Disorders*, 18(1). <https://doi.org/10.1186/s12901-018-0051-6>
42. Olusanya, B. O., Davis, A. C., & Hoffman, H. J. (2019). Hearing loss grades and the international classification of functioning, disability and health. *Bulletin of the World Health Organization*, 97(10), 725-728. <https://doi.org/10.2471/blt.19.230367>
43. Richardson, J., Iezzi, A., Khan, M. A., & Maxwell, A. (2014). Validity and Reliability of the Assessment of Quality of Life (AQoL)-8D Multi-Attribute Utility Instrument. *The Patient - Patient-Centered Outcomes Research*, 7(1), 85-96. <https://doi.org/10.1007/s40271-013-0036-x>
44. Russ, S. A., Tremblay, K., Halfon, N., & Davis, A. (2017). A life course approach to hearing health. *Handbook of Life Course Health Development*, 349-373. https://doi.org/10.1007/978-3-319-47143-3_15
45. Rutherford, B. R., Brewster, K., Golub, J. S., Kim, A. H., & Roose, S. P. (2018). Sensation and psychiatry: Linking age-related hearing loss to late-life depression and cognitive decline. *American Journal of Psychiatry*, 175(3), 215-224. <https://doi.org/10.1176/appi.ajp.2017.17040423>
46. Shirley Ryan Ability Lab. (2021, August 27). *Assessment of quality of life-8 dimensions*. <https://www.sralab.org/rehabilitation-measures/assessment-quality-life-8-dimensions>
47. Shukla, A., Harper, M., Pedersen, E., Goman, A., Suen, J. J., Price, C., Applebaum, J., Hoyer, M., Lin, F. R., & Reed, N. S. (2020). Hearing loss, loneliness, and social isolation: A systematic review. *Otolaryngology-Head and Neck Surgery*, 162(5), 622-633. <https://doi.org/10.1177/0194599820910377>
48. Villavisanis, D. F., Berson, E. R., Lauer, A. M., Cosetti, M. K., & Schrode, K. M. (2020). Sex-based differences in hearing loss: Perspectives from non-clinical research to clinical outcomes. *Otology & Neurotology*, 41(3), 290-298. <https://doi.org/10.1097/mao.0000000000002507>
49. Wallhagen, M. (2014). The current U.S. hearing health care model. In Lustig, T. A., Olson, S., Forum on Aging, Disability, and Independence, National Research Council (U.S., & Institute of Medicine (U.S. (2014). *Hearing loss and healthy aging: workshop summary* (pp. 38-39). The National Academies Press.

50. Wallhagen, M. I., Strawbridge, W. J., & Tremblay, K. (2021). Leveraging the age friendly healthcare system initiative to achieve comprehensive, hearing healthcare across the spectrum of healthcare settings: an interprofessional perspective. *International Journal of Audiology*, 1-13. <https://doi.org/10.1080/14992027.2020.1853263>
51. World Health Organization. (2024). *Deafness and hearing loss*. WHO. <https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss>
52. Yévenes-Briones, H., Caballero, F. F., Struijk, E. A., Rey-Martinez, J., Montes-Jovellar, L., Graciani, A., Rodríguez-Artalejo, F., & Lopez-Garcia, E. (2021). Association between hearing loss and impaired physical function, frailty, and disability in older adults. *JAMA Otolaryngology–Head & Neck Surgery*, 147(11), 951. <https://doi.org/10.1001/jamaoto.2021.2399>