

Original Research



Influence of hearing impairment on quality of life among older adults: a descriptive study in Sri Lanka

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Abstract

Introduction: Hearing impairment is an important global public health concern. It negatively impacts the communication and quality of life (QoL), particularly among older adults.

Objectives: To describe the QoL of hearing-impaired adults above 65 years living in the Regional Directorate of Health Services (RDHS) area, Colombo, Sri Lanka in comparison with normal hearing

Methods: A community-based descriptive study was conducted in a sample of 36 *Grama Niladhari* divisions within Colombo District. Hearing impairment was assessed using the Portable Screening Audiometry (PSA) test, with positive cases defined using a validated cutoff as hearing impairment in one or both ears. The interviewer-administered Elderly Quality of Life (EQULI) questionnaire consisting of 30 questions across six different domains was used to evaluate QoL. Comparison of differences in domain scores were assessed for significance using non-parametric tests and regression analysis.

Results: The prevalence of hearing impairment was 52.6%, with 454 hearing impaired persons. The older adults with normal hearing showed significantly higher domain scores of QoL compared to those with impaired hearing in the domains of mental (mean=71.2; SD=68.7; p=0.01), functional (mean=59.2; SD=56.7; p<0.001), environmental (mean=56.2; SD=53.5; p=0.01) and spiritual (mean=61.2; SD=57.2; p<0.001). Multiple linear regression revealed male sex, high income and hearing aid use were positively associated with high QoL, while age 75 years and above and presence of comorbidities were negatively associated with QoL.

Conclusions & Recommendations: Establishing community-based hearing screening, subsidising hearing aids, and strengthening family and community supported psychosocial interventions to reduce social isolation could be recommended to ensure better QoL.

Key words: *Quality of life, Hearing impairment, Older adults*

Introduction

Hearing is one of the fundamental senses essential for human survival by facilitating effective communication. The World Health Organization has identified hearing impairment as the fourth leading cause of disability globally (1). Normal hearing is defined by a hearing threshold between -10 dB and 25 dB, while a person having hearing level beyond 25 dB is classified as hearing impaired. Hence, the inability to detect sound levels at 25 dB in one or both ears is categorized as impaired hearing.

Hearing impairment influences all aspects of quality of life (QoL), namely psychological, social, physical, environment and spiritual aspects. The older adults with hearing impairment have difficulty in interpreting speech which hampers effective communication and impacts different facets of their lives. Of the impaired psychological functions, mood disturbances, social isolation and stigmatization (2) are more predominant impediments. In addition, hearing impairment is strongly associated with poor self-assessed health (3) and many other age-related health issues such as falls (4) and difficulty in performing activities of daily living (ADL) (5). These effects vary with the severity of hearing impairment (3). Hence, impaired hearing degrades the overall QoL of the elderly.

In the Sri Lankan context, older adults constitute 12.4% of the total population and it is expected to rise to 21% by 2045 (6). This demographic shift underscores the vital need to strengthen healthcare systems to address the growing health needs of the elderly. Hearing impairment is one of the most disabling conditions affecting this population (7). With increasing numbers, managing this condition effectively will become critical to promote health and active aging (8).

In Sri Lanka, the prevalence of hearing impairment varies. A community-based study conducted in the Colombo District among 864 adults over 65 years of

age estimated it to be 52.6% (9-10). Despite its substantial impact, there is a notable lack of comprehensive studies exploring the QoL among older adults in Sri Lanka, particularly at the community settings. Conducting comprehensive studies is essential to better understand the challenges faced by hearing-impaired individuals in order to advocate targeted interventions. These interventions will not only improve the QoL of older adults but also provide valuable insights for policymakers and healthcare professionals striving to address the necessities for them. Therefore, the objective of this study was to describe the QoL among hearing-impaired adults above 65 years of age in comparison with those with normal hearing in the Colombo District, Sri Lanka.

Methods

A community-based cross-sectional analytical study was conducted from October to December 2022 in six randomly selected divisional secretariat (DS) divisions in the Colombo District among older persons aged 65 years and above. Colombo is one of the 25 districts in Sri Lanka. It is composed of designated 13 DS divisions, which are further divided into 536 *Grama Niladhari* (GN) divisions.

Older persons who were cognitively impaired were excluded from the study as cognition, concentration and attention were required to respond to the test. Furthermore, those with upper respiratory tract infection (URTI) and cerumen impaction which can result in temporary hearing impairment were screened using otoscopic examination and excluded. Bulging of the tympanic membrane in examination was considered as URTI caused by ear infection. In addition, the older individuals who were bed-bound, immobile and not able to visit community places were also excluded.

The sample size for estimation of the prevalence of hearing impairment was calculated using the standard

formula (11). The expected prevalence of hearing impairment was taken as 0.631 (12). After considering a margin of error of 0.05, design effect of 2 and non-response rate of 15%, the calculated sample size was 841. Hence, the final sample size was 900. A two-stage cluster sampling was employed to randomly select six DS divisions in the first stage, and then 36 clusters adopting the probability proportional to size (PPS) method. Each GN area was considered as a cluster. The average size of the cluster was determined as 25.

Portable screening audiometer test (PSA) and interviewer-administered-questionnaire (IAQ) were utilized to gather data from participants who fulfilled the eligibility criteria. The IAQ consisted of personal information and the EQULI tool, which is a 30-item questionnaire covering all six domains of QoL, namely physical, mental, social, functional, environmental and spiritual (13). The PSA test, which has been validated for Sri Lanka, was administered to determine hearing impairment, where hearing limited to a sound level less than 60 dB was identified as having hearing impairment (10). Data collection was done by three pre-intern medical graduates who were trained in screening participants on eligibility criteria, administration of study instruments and mock sessions. Privacy and confidentiality were maintained at the place of interview.

Data analysis

Items relevant to each domain of QoL of the EQULI were rated on a 1–5 scale, where 1 meant "not at all" and 5 meant "extremely," indicating respondents' level of agreement with their experience. Each domain score was transformed to 0-100 scale and their normalcy assessed using Shapiro test, Kolmogorov-Smirnov and P-P plot and Q-Q plots. Since the domain scores did not follow a normal

distribution, non-parametric tests were used to compare the scores between those with hearing impairment and those with normal hearing. The level of statistical significance was kept at 0.05 ($p < 0.05$) level. Bivariable analysis and multiple linear regression analysis was performed to determine the factors associated with QoL among hearing impaired older adults.

Results

Of the 900 participants recruited, 862 completed the study contributing to a response rate of 95.8%. Among them, 454 had hearing impairment, giving a prevalence of hearing impairment of 52.6% (95% CI: 51.8, 53.5) in the sample.

Distribution of hearing status by socio-demographic characteristics of the participants is shown in Table 1. There is a statistically significant association between living status and hearing impairment ($p = 0.01$), with a 65.4% proportion of older adults living alone experiencing impaired hearing while age, sex, ethnicity, and religion showed no statistically significant associations compared to their counterparts ($p > 0.05$).

Distribution of the overall and domain-specific QoL scores of the hearing-impaired group ($n = 454$) and the group with normal hearing ($n = 408$) is shown in Table 2. The overall scores were lower in the hearing-impaired group compared to the group with normal hearing. In relation to domain-specific QoL, those with normal hearing showed significantly higher scores compared to those with hearing-impairment in the mental ($p < 0.01$), functional ($p < 0.01$), environmental ($p = 0.01$) and spiritual ($p < 0.01$) domains.

Table 1: Distribution of hearing status by socio-demographic characteristics of the elders (N=862)

Characteristic	Impaired hearing (n=454)		Normal hearing (n=408)		Odds ratio (95% CI)	Significance
	No.	%	No.	%		
Age						
≥ 75 Years	130	53.3	114	46.7	1.0 (0.8, 1.3)	$\chi^2=0.1$; df=1 p=0.8
< 75 Years	324	52.4	294	47.6		
Sex						
Male	189	41.6	169	41.4	1.0 (0.8, 1.3)	$\chi^2=0.0$; df=1 p=1.0
Female	265	58.4	239	58.6		
Ethnicity						
Sinhala	424	53.4	370	46.6	1.5 (0.9, 2.0)	$\chi^2=2.2$; df=1 p=0.1
Other*	30	44.1	38	55.9		
Religion						
Buddhist	392	52.9	349	47.1	1.1 (0.7, 1.5)	$\chi^2=0.1$; df=1 p=0.7
Other**	62	51.2	59	48.8		
Marital status						
Ever married***	433	52.5	392	47.5	0.8 (0.4, 1.5)	$\chi^2=0.3$; df=1 p=0.6
Other	21	56.8	16	43.2		
Living status						
With family	401	51.3	380	48.7	0.6 (0.4, 0.9)	$\chi^2=5.8$; df=1 p=0.01
Alone	53	65.4	28	34.6		

*Tamil, Muslim, Christian and other ethnicities combined; **Hindu, Islam, Christian and other religions combined; ***Married, separated/divorced and widowed combined

Distribution of the domain-specific QoL scores by personal characteristics of those with hearing impairment (n=454) is shown in Table 3. Older adults with normal hearing scored statistically significant differences across the mental, functional, environmental and spiritual domains than those with impaired hearing ($p<0.01$), whereas no significant differences were observed between the two groups in relation to physical and social domains ($p>0.01$). Males showed significantly higher QoL scores than females across all

measured domains, older adults with a monthly income above LKR 20,000 also showed significantly higher scores than their lower-income counterparts in all the domains except for physical QoL domain. Males showed significantly higher scores than their female counterparts in relation to all domains of QoL. Also, scores of all except the physical domain were significantly higher among those with a monthly income greater than LKR 20,000 compared to those with a lower income.

Table 2: Distribution of the domain-specific quality of life scores among elders with hearing impairment and normal hearing (N=862)

Domain	Normal hearing (n=454)				Hearing impaired (n=408)				Z	Significance
	Mean	SD	Median	IQR	Mean	SD	Median	IQR		
Physical	56.9	13.4	56.3	18.1	55.3	12.6	56.3	17.0	3.1	0.1
Mental	71.2	14.6	75.0	19.7	68.7	16.0	70.8	21.6	6.1	<0.01
Social	61.6	11.4	62.5	15.4	60.6	12.3	62.5	16.6	2.0	0.2
Functional	59.2	11.0	62.5	14.8	56.7	13.3	56.3	17.9	8.7	<0.01
Environmental	56.2	15.2	58.3	20.5	53.5	15.3	58.3	20.6	6.7	0.01
Spiritual	61.2	14.3	66.7	19.3	57.2	16.8	58.3	22.7	13.7	<0.01

Factors associated with domain-specific QoL scores in those with hearing-impairment after adjustment for confounders in regression models are shown in Table 4. Males showed significantly higher association with mental, social, environmental and spiritual domains, while monthly income LKR >20,000 conferred

significantly higher association in the mental, social and environmental domains. The presence of other comorbidities demonstrated lower association with mental, social and environmental domains, while age 75 years and above revealed significant lower association only with social domain.

Table 3: Distribution of the domain-specific quality of life scores by personal characteristics of the hearing-impaired elders (n=454)

Characteristic	Domain-specific quality of life											
	Physical		Mental		Social		Functional		Environmental		Spiritual	
	Score	Sig.*	Score	Sig.*	Score	Sig.*	Score	Sig.*	Score	Sig.*	Score	Sig.*
Age category												
< 75 years	55.6	0.52	69.5	0.08	61.4	0.03	57.1	0.35	54.2	0.13	58.1	0.1
≥ 75 years	54.7		66.5		58.6		51.7		51.7		55.1	
Sex												
Male	55.8	0.05	69.8	<0.01	61.3	0.04	54.3	0.43	54.3	0.01	58.4	<0.01
Female	52.6		62.2		56.6		55.5		48.6		50.5	
Ethnicity												
Sinhala	57.3	0.12	68.9	0.19	60.8	0.12	53.6	0.84	53.6	0.46	57.6	0.07
Other	55.5		65.1		57.3		56.3		51.6		52.1	
Average monthly income (LKR)												
> 20,000	56.6	0.14	70.1	0.04	61.2	0.01	60.3	0.14	54.6	0.01	57.3	0.39
≤ 20,000	54.8		68.1		60.3		55.3		53		57.1	
Using a hearing aid												
Yes	56.5	<0.01	70.1	0.04	57.0	0.02	59.4	0.02	54.9	<0.01	56.4	0.07
No	55.3		66.8		55.7		54.5		49.2		53.8	
Comorbidities**												
Present	54.6	0.06	61.1	0.03	59.7	0.03	54.6	0.61	51.2	0.04	53.7	0.08
Absent	56.7		67.4		63.4		56.7		53.8		56.5	

*Significance tested using Mann-Whitney test; **Comorbidities such as diabetes, hypertension, cardiovascular diseases, hypercholesterolemia and cancers

Table 4: Factors associated with domain-specific quality of life in hearing-impaired elders (n=454)

Characteristic	Quality of life domains, β co-efficient (95% CI) *					
	Physical	Mental	Social	Functional	Environmental	Spiritual
Age						
≥ 75 years	-0.04 (-0.11, 0.03)	-0.1 (-0.15, 0.01)	-0.11 (-0.17, -0.05)	-0.07 (-0.14, 0.02)	-0.08 (-0.15, 0.01)	-0.1 (-0.2, 0.01)
<75 years (ref)						
Sex						
Male	0.09 (0.0, 0.18)	0.28 (0.21, 0.35)	0.2 (0.13, 0.27)	-0.03 (-0.1, 0.04)	0.19 (0.12, 0.26)	0.3 (0.2, 0.32)
Female (ref)						
Ethnicity						
Sinhala	0.08 (-0.01, 0.17)	0.07 (-0.02, 0.16)	0.09 (0.00, 0.18)	-0.02 (-0.09, 0.05)	0.05 (-0.02, 0.12)	0.1 (0.1, 0.18)
Other (ref)						
Average monthly income (LKR)						
> 20,000	0.07 (-0.02, 0.16)	0.14 (0.07, 0.21)	0.21 (0.14, 0.28)	0.08 (-0.01, 0.17)	0.18 (0.12, 0.25)	0.04 (0.03, 0.11)
$\leq 20,000$ (ref)						
Using a hearing aid						
Yes	0.22 (0.15, 0.29)	0.13 (0.07, 0.2)	0.15 (0.09, 0.22)	0.15 (0.08, 0.22)	0.26 (0.19, 0.33)	<0.01 (-0.1, 0.18)
No (ref)						
Comorbidities						
Present	-0.11 (-0.19, -0.01)	-0.2 (-0.22, -0.1)	-0.14 (-0.21, -0.08)	-0.04 (-0.11, 0.03)	-0.13 (-0.19, -0.07)	-0.1 (-0.2, -0.02)
Absent (ref)						

*Standardized beta co-efficient; R^2 - 0.15 - 0.23; ref = reference category

Discussion

This present study assessed the QoL among older adults with and without hearing impairment in the Colombo District, Sri Lanka. Study findings reveal that older adults with hearing impairment scored significantly lower scores across mental ($p=0.01$), environmental ($p=0.01$), functional ($p<0.001$) and spiritual ($p<0.001$) domains of QoL. Further analysis exhibited that males, income more than LKR 20,000 and using a hearing aid were the factors positively associated with QoL, whereas presence of comorbidities was negatively associated. These findings are coherent with both international and national evidence. A systematic review executed by

Henderson et al. (2024) also reported lower QoL scores particularly in the physical, social and mental health domains among older adults with hearing impairment (14). This is further reiterated by findings of Sun et al (2021), who demonstrated that social participation is influenced by hearing impairment in older adults (15).

The influence of gender on QoL was emphasized by Krupa et al 2025 (16) who identified male gender as a significant predictor of QoL among sensory impaired older adults. This pattern was consistent with the present study. It was also supported by findings of another study by Zaninotto et al. (2023) (17).

The presence of comorbidities is one crucial factor affecting various consequences particularly during older age. In the current study, comorbidities were a significant negative predictor of QoL among hearing impaired older adults. Similarly, older adults without chronic conditions reported higher QoL in a study from Jaffna District, Sri Lanka (18). In contrast, monthly income level more than LKR 20,000 emerged as a socio-economical determinant of better QoL. This is consistent with findings by Senanayake et al. (2020) who emphasized that higher income was significantly associated with better QoL of patients with chronic kidney disease (19) and by Shanthalingam et al. (2021) who identified that higher income as a positive predictor of QoL among older adults in Jaffna District (18).

As expected, the present study found that hearing aids use was significantly associated with higher QoL. This is consistent with Wolfs et al. (2023) who demonstrated improved hearing-related QoL after adaptation to hearing aid (20). However, utilization of hearing aid remains low in lower income countries owing to various barriers (21).

Hearing impairment affects QoL of older adults across different domains, with communication difficulties among them leading to frustration, social withdrawal and isolation (2), which may contribute to depression and anxiety, thereby impacting mental or psychological wellbeing. Moreover, impaired hearing limits the activities of daily living (22) since impairment of hearing can reduce the ability to detect vehicle horns, doorbells, alarms or phone calls, restricting independence and increasing their risk of accidents. Older adults may avoid or feel unsafe in public or noisy environments, restricting community engagements, which could in turn affect their psychological and social wellbeing (23) particularly in South Asian countries like Sri Lanka. The Colombo District, where the present study was executed, has a high density of older adults (6) and the reported prevalence of hearing impairment was 52.6% (9). This study highlights a crucial public

health challenge, as reduced QoL among hearing-impaired older adults influences a considerable care burden on both families and the healthcare system. Hence, it necessitates targeted, tailored, economically affordable, culturally appropriate and adoptable and sustainable interventions at the individual, family and societal levels particularly in the formulation of geriatric policies. Such measures enhance the overall wellbeing among older adults.

Strengths and limitations

The study sample was generalizable to the Sri Lankan elderly population in terms of age and sex. It also used a validated tool for QoL assessment in Sri Lanka and provided domain-specific insights relevant for targeted interventions. However, older people with cognitive impairment and dementia were excluded from the study as obtaining appropriate insight from them would be challenging, which could have led to an underestimation of the QoL among hearing-impaired older adults. Assessing their QoL is difficult due to its multidimensional nature. Although the QoL assessment tool includes an overall perspective, it may not be capturing the holistic picture, highlighting the need for mixed method approaches for more comprehensive exploration. Further, longitudinal studies need to be executed to establish causation between hearing impairment and QoL decline.

Conclusions & Recommendations

The hearing impairment is found to be one key determinant of lowered QoL among the older adults. The findings revealed that older age and presence of comorbidities are associated with lower QoL in hearing-impaired older adults. Conversely, male gender, higher income level and the use of hearing aids were significantly associated with higher QoL. This study recommends screening for hearing at primary care settings, family and community-led interventions designed to reduce social isolation and psychological distress and providing affordable and subsidized hearing aids in low-resource settings.

Public Health Implications

- Identified declining quality of life among hearing-impaired older adults and its association reflects the necessity of public health strategies which should prioritize early detection and strengthening community-based interventions and incorporating screening for hearing into non-communicable disease programs. These measures will reduce the care burden on families and the healthcare system to promote overall well-being of the aging population.

Author Declarations

Competing interests: The authors declare that they have no competing interests.

Ethics approval and consent to participate: Ethics approval for this study was granted by the Ethics Review Committee of the Faculty of Medicine, University of Colombo (Reference number: EC-22-032). Prior to conducting the study, permission was obtained from the Provincial Director of Health Service Western province, Regional Director of Health, Colombo and District secretariat of Colombo. Informed written consent was obtained from all participants.

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