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Prevalence of Hearing Loss and Its Associations with Anxiety and Depression among Older People in Kuantan, Pahang

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ABSTRACT

Background: The prevalence of hearing loss (HL) increases with age, and globally more than 25% of older people aged 60 years and older are affected by HL. Studies consistently demonstrate that HL is associated with anxiety, depression, and diminished quality of life. However, there is limited data on these associations among older people in Malaysia. This study is aimed to determine the prevalence of hearing loss and examine its association with anxiety and depression among older people.
Methods: This cross-sectional study involved 273 older people aged 60 years and older living in the community in Kuantan, Pahang, Malaysia from February to May 2022. The participants were selected by convenience sampling. The instrument used for data collection was a self-administered questionnaire consisting of four parts; sociodemographic background, Hearing Handicap Inventory Elderly (HHIE), Geriatric Anxiety Inventory (GAI), and Malay version of Geriatric Depression Scale (MGDS-14). Data were analysed as descriptive and inferential analysis (Chi-square test) using SPSS version 24.0.
Results: The prevalence of mild to moderate HL was 35.5% and severe HL was 55.7%. It was found that age (p=0.002), gender (p=0.023), marital status (p=0.007), and self-reported health status (p=0.001) were significantly associated with hearing loss. Anxiety (p=0.001) and depression (p=0.001) were significantly associated with hearing loss.
Conclusion: The prevalence of HL was consistent with previous studies, which is considered high in Malaysia. Given the significant associations between anxiety and depression with HL, early detection and effective management of hearing loss are important to improve the quality of life of older people.

Keywords: Aged; Hearing loss; Anxiety; Depression

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INTRODUCTION

Hearing loss, a common issue that constitutes the third-most prevalent chronic health condition among older people (1), can negatively affect multiple aspects of an individual's life when unaddressed or when there is a lack of support for an individual's communication. Of the 1.57 billion people worldwide with hearing impairment, 62.1% were above 50 years old (2). Hearing loss ranks as the second-most common chronic health condition among older people in Australia, impacting 74% of those aged over 70 (3). Among people aged 60 and above in Malaysia, the prevalence of self-reported hearing loss was approximately 73.6% (4). The 2018 National Health Morbidity Survey (NHMS) found that the prevalence of older people diagnosed with hearing impairment was 6.4%, while 1.5% of this group were reported to be using hearing aids (5). The provision of hearing aids is the primary approach for individuals with newly diagnosed mild or moderate hearing loss. Their use does not slow the progression of hearing loss; the goal is to amplify the sound reaching the middle or inner ear to improve communication and function associated with hearing impairment (6). However, the high cost of hearing aids means global availability and utilisation rates are relatively low (7).

Hearing loss has no single definition because frequency and intensity (measured in decibels) thresholds vary based on the reference criteria employed. However, most studies define mild hearing loss as the inability to hear frequencies related to speech processing below 25 dB and moderate hearing loss as the inability to perceive those frequencies below 40 dB (8). Hearing loss in older people can result from physiological and pathological changes related to increasing age, or it can be revealed to be presbycusis, an age-related hearing disorder (9). Hearing loss can even result from the long-term pharmacological intake of, for example, multiple ototoxic drugs (10). The characteristics of hearing impairment among older people are progressive. A significant association between ageing and hearing impairment is clear, given that the majority of those with hearing impairment are above 50 years old (2). Hearing impairment was reported as being most severe in those over 70 (2). Since hearing impairment develops with age and due to the ageing populations in high-income countries, these nations have the highest prevalence of hearing impairment among all age groups (2).

Hearing loss has negative impacts on the quality of life, physical health and psychosocial health of older people including anxiety and depression. As it affects various everyday life situations, hearing loss is strongly associated with a poorer quality of life among older people (11). Hearing loss affects access to spoken language, which can negatively impact cognition, development and social well-being in older people (12). Older people may become frustrated with their hearing loss problems because they are forced to cope with the difficulties linked to the condition, which may lead to greater isolation (9). This isolation may partially contribute to delays in the treatment of hearing loss. In relation to physical health, a study found that as their hearing loss became more severe, older people were likely to experience impaired activities of daily living (7). The psychological consequences of hearing loss include more negative feelings, loneliness and social isolation; loss of independence; as well as greater vulnerability and anxiety levels (13). Hearing loss in older people has also been linked to depression (1,12), suicidal ideation (13), increased risk of hospitalisation and mortality (14), and such individuals are five times more likely to develop dementia (3).

Although several studies have examined the association between anxiety and depression, few of these have involved older people in Malaysia. Therefore, this study aimed to determine the prevalence of hearing loss among older people and examine the associations between anxiety, depression, sociodemographic factors, and hearing loss. A clear understanding of these relationships is essential for developing interventions aimed at improving the mental health and overall quality of life of older people with hearing loss. to immunization. Additionally, the data from this study can serve as evidence for policymakers and public health authorities to develop and implement effective immunization policies and programs that can address the barriers to vaccination services for vulnerable populations. This includes strategies to strengthen vaccination infrastructure, enhance vaccine delivery systems, and address socio-economic disparities in immunization coverage.

METHODS

Population and Setting

This cross-sectional study design involved older people living in the community of Kuantan, Pahang, Malaysia from February to May 2022. The inclusion criteria were people aged 60 or above. The exclusion criteria were those with illnesses that might affect their judgement, Alzheimer's disease or Parkinson's disease. Those who were illiterate may have received assistance from their caregivers to fill in the online questionnaire form.

Sampling Method

Participants were selected using the convenience sampling method through local community organizations and social media groups. This sampling method was selected as it was economical and the participants were readily approachable.

Sample Size Calculation

Raosoft. Inc. software was 73 tilized to determine the sample size for the present study. The recommended sample size was 273 participants, based on the population of 22,120 older people living in the community in Pahang (15); this incorporated a 5% margin of error, a 95% confidence level and a 50% response distribution. After adding the expected 10% drop-out rate for the population, as stated in the calculation below, the total sample size came to 300.

Research Instrument

The questionnaire consists of four parts: Part A: Sociodemographic background; Part B: Hearing loss [using the Hearing Handicap Inventory for Elderly (HHIE), (15)]; Part C: Anxiety [using the Geriatric Anxiety Inventory (16)] and Part D: Depression [using the Malay Geriatric Depression Scale -14 (MGDS-14) (17)]. A pilot study was conducted on 33 older people. The Cronbach's alpha index values were 0.87 for Part B, 0.92 for Part C and 0.62 for Part D which indicated good internal consistency for Parts B and C, while Part D showed an acceptable level of reliability.

Part A contained questions related to the sociodemographic backgrounds of the participants, including their gender, age, race, marital status, self-reported health status, income and living status. Part B involved the Hearing Handicap Inventory for the Elderly Screening Version (HHIE-S) (15), a 10-item questionnaire designed for hearing loss screening. The answers are scored as follows: "No" = 0; "Sometimes" = 2; Yes = "4". To interpret the answers, the overall score ranges are from 0 to 8 (indicating no hearing loss), from 10 to 24 (mild to moderate hearing loss) and from 26 to 40 (severe hearing loss). A higher score reflects a greater probability that a respondent has hearing loss. Part C: Anxiety was evaluated using the 20-item Geriatric Anxiety Inventory (16). A score of 1 is allocated to each item for which the participant selects "Agree". To interpret the totals, scores from 0 to 8 indicate the absence of clinically significant anxiety, while scores of 9 and above indicate the presence of clinically significant anxiety. Part 4: Depression was measured using the Malay Geriatric Depression Scale-14 (MGDS-14) (17), an instrument containing 14 items. Those scoring 0 to 4 are considered normal, scores of 5 to 8 indicate mild depression, scores of 9 to 11 indicate moderate depression and scores of 12 to 14 indicate severe depression.

Ethical Consideration

Ethical approval was received from the Kulliyyah of Nursing Postgraduate and Research Committee (KNPGRC) and the International Islamic University Malaysia (IIUM) Research Committee (IREC): IREC 2022-KON/52. Furthermore, the data were anonymised and not revealed to anyone unconnected to the research team. The obtained data were solely used for the present study, and no part would be utilised by others for research or non-research reasons without the participants' consent.

Data Collection

Upon ethical approval, an online self-administered questionnaire was disseminated on a social media platform. The online questionnaire was advertised through regional community organisations and social media groups unique to the Kuantan community, and there was clear instruction that the questionnaire was only for Kuantan residents. The questionnaire stated the inclusion criteria at the beginning, and participants who fulfilled these criteria proceeded to the next section (the consent form and questionnaire); those who

did not fulfil the criteria could withdraw. The researcher's contact details were provided in the questionnaire so that feedback or queries could be sent. The research topic was explained clearly in the online questionnaire to ensure the participants came from the targeted population. A participant could also complete the questionnaire with their caregiver's help if they could not answer the questionnaires independently or understand the questions.

Data Analysis

Data analysis was conducted using IBM Statistical Package for Social Sciences (SPSS) software, version 26.0. The sociodemographic data and the prevalence of hearing loss were analysed by descriptive analysis. The associations between sociodemographic data, anxiety, depression with hearing loss were analysed using Chi-squared and Fisher's exact tests. The statistical significance level was set at $p<0.05$.

RESULTS

The response rate of the present study was 91%. **Table 1** shows the sociodemographic background of the participants. Of the 273 participants, 51.3% were female and 48.7% were male. The majority were between 60 and 69 years old (41%). Over half of the participants were Malay (77.3%). Based on the self-reported health status, 28.6% of the participants had an excellent health status with no comorbid disease, 34.4% had a good health status with one comorbid disease, 31.5% had a fair health status with two comorbid diseases, and 5.5% of the participants had a poor status with three or more comorbid diseases. Of the 273 participants, 33.3% lived alone, while the rest lived with other people such as family members. Meanwhile, 54.2% of the participants claimed that they had an income. In terms of marital status, 27.8% of the participants were widows or widowers, 40.7% were married.

Hearing Loss, Anxiety and Depression

Of the 273 participants, 8.8% had no hearing loss, 35.5% had mild to moderate hearing loss, and 55.7% had severe hearing loss. Over 57.5% of the participants stated the presence of anxiety. The results showed that 12.5% of participants reported no depression, 52.4% had mild depression, 25.3% had moderate depression, and 9.8% had severe depression.

Table 1: Sociodemographic backgrounds (N=273)

Sociodemographic Data		Frequency	Percentage (%)
Race	Malay	211	77.3
	Chinese	33	12.1
	Indian	17	6.2
	Others	12	4.4
Gender	Male	133	48.7
	Female	140	51.3
Self-reported health status	Excellent (no comorbid disease)	78	28.6
	Good (1 comorbid disease)	94	34.4
	Fair (2 comorbid diseases)	86	31.5
	Poor (3 comorbid diseases)	15	5.5
Living status	Alone	91	33.3
	With others (e.g., family)	182	66.7
Income	Yes	148	54.2
	No	125	45.8
Marital status	Widow/widower	76	27.8
	Married	111	40.7
	Unmarried	86	31.5

The Association Between Sociodemographics and Hearing Loss Among Older People Living in Community

The Chi-squared test was used; if the assumption was not met, whereby the expected frequency was over 20% and the minimum value was 5, then the Fisher Exact test was used. Age (p=0.002), gender (p=0.023), self-reported health status (p=0.001) and marital status (p=0.007) were found to be significantly associated with hearing loss. The detailed results are presented in **Table 2**.

The Association Between Anxiety and Hearing Loss

Table 3 illustrates the significant association between anxiety and hearing loss among older people, (p=0.0001). A higher percentage of participants with hearing loss reported experiencing anxiety (56.8%) compared to those without anxiety (34.4%).

Table 2: Association between sociodemographic factors and hearing loss (N=273)

Sociodemographic data	Hearing Handicap Inventory Elderly (HHEI) n (%)		*p*-value
	Absence of hearing loss	Presence of hearing loss	
Age			
60-69 years old	18 (6.6)	94 (34.4)	0.002*
70-79 yearls old	2 (0.7)	73 (26.7)	
80 years old and above	4 (1.5)	82 (30.0)	
Race			
Malay	22 (8.1)	189 (69.2)	0.508
Chinese	1 (0.4)	32 (11.7)	
Indian	1 (0.4)	16 (5.9)	
Others	0 (0)	12 (4.4)	
Gender			
Male	17 (6.2)	116 (42.5)	0.023*
Female	7 (2.6)	133 (48.7)	
Self-reported health status			
Excellent	18 (6.6)	69 (22.0)	0.001*
Good	2 (0.7)	92 (33.7)	
Fair	3 (1.1)	83 (30.4)	
Poor	1 (0.4)	14 (5.1)	
Living status			
Alone	5 (1.8)	86 (31.5)	0.174
With others	19 (7.0)	163 (59.7)	
Income			
Yes	14 (5.1)	111 (40.7)	0.196
No	10 (3.7)	138 (50.5)	
Marital status			
Widow/widower	6 (2.2)	70 (25.6)	0.007*
Married	4 (1.5)	107 (39.2)	
Not married	14 (5.1)	72 (26.4)	

*significant at p-value<0.05

Table 3: Association between anxiety and hearing loss (N=273)

Anxiety	Hearing loss, n (%)		*p*-value
	No	Yes	
No	22 (8.1)	94 (34.4)	0.0001*
Yes	2 (0.7)	155 (56.8)	
Total	24 (8.8)	249 (91.2)	

*significant at *p*-value<0.05

The Association Between Depression and Hearing Loss Among Older People

Table 4 illustrates the significant association between depression and hearing loss among older people (*p*=0.0001). Specifically, a higher proportion of participants with hearing loss reported the absence of depression (56.0%) as compared to those who had both hearing loss and depression (35.2%).

Table 4: Association between depression and hearing loss (N=273)

Malay-Geriatric Depression Scoring	Hearing Handicap Inventory Elderly (HHEI) n (%)		*p*-value
	Absence of hearing loss	Presence of hearing loss	
Absence depression	24 (8.8)	153 (56.0)	0.0001*
Presence depression	0 (0.0)	96 (35.2)	
Total	24 (8.8)	249 (91.2)	273 (100.0)

*significant at *p*-value<0.05

DISCUSSION

Overall, the results presented that the prevalence of mild to moderate hearing loss in older people was 91.2% (35.5% mild, 55.7% moderate), slightly higher than had been obtained in a previous study in which 76.2% of older people in Selangor, Malaysia reportedly had hearing loss (18). The high prevalence might be because 71.4% of the older people in this study had at least one health problem that can increase the possibility of developing hearing loss. Furthermore, the high prevalence could be attributed to differences in survey methodology and the use of different measurement scales for assessing hearing loss in the current study compared to the previous study (19) (utilizing pure-tone audiometry, known for its higher precision in detecting hearing loss). The prevalence was also higher than the rate obtained in the 2018 National Health and Morbidity Survey (NHMS), possibly because many older people with mild to moderate hearing loss believe this problem to be natural and do not approach audiologists for examination (19).

The present study identified a significant association between age and hearing loss, possibly because age-related hearing loss typically arises from age-related pathological changes, which involve the loss of hair cells from the basilar membrane resulting in reduced high-frequency hearing (1). Moreover, the present study revealed that health status was significantly associated with hearing loss. A possible explanation is that those with chronic illnesses such as diabetes mellitus, cardiovascular diseases and hypertension face a higher risk of developing hearing loss due to reduced blood flow in the inner ear, which contributes to hearing loss (20).

Gender was reported to be significantly associated with hearing loss, whereby females reported a higher percentage of hearing loss than males. Menopause could potentially be a contributing factor to the risk of developing hearing loss because the hormonal changes during menopause, particularly the decrease in estrogen, contribute to various factors that may increase the risk of hearing loss (21). Marital status was also significantly associated with hearing loss among older people, whereby married participants reported a higher percentage of hearing loss than those who were single, widows or widowers. Married people might be more likely than unmarried people to report hearing loss, perhaps due to their greater awareness of this and other health problems. Furthermore, the results revealed that anxiety and depression were significantly associated with hearing loss. Further analysis showed that older people with hearing loss are more prone to experiencing anxiety, while, interestingly, they are less inclined to suffer from depression. Older people with hearing loss experienced reductions in social activity because their interaction with others was disrupted (12), which could lead to anxiety.

Nevertheless, the present study has some limitations. Response bias might have occurred while the questionnaire was being distributed as it was not issued equally to each race. Unequal racial distribution can distort the study findings by underrepresenting certain racial groups, which may lead to conclusions that are less generalizable and inaccurate in identifying the risk factors of hearing loss within Malaysia's diverse population. Caregivers who helped participants to answer the questionnaire may have contributed a limitation as questions might have been wrongly answered by the participants. The results of this study indicate that when using the Hearing Handicap Inventory Elderly (HHIE) tool, the prevalence of hearing loss in older people was high, but this is not an accurate tool for diagnosing hearing loss. Proper ways to diagnose hearing loss are recommended to raise awareness among older people so they seek treatment for hearing loss as early as possible, such as through hearing aids, cochlear implants, and other methods. The absence of multiple regression analysis to take into account any confounding factors that could affect the prevalence rates is another limitation. Co-morbidity, ear conditions, medication-induced ototoxicity, and noise-induced hearing loss are a few factors that can affect hearing loss and may have contributed to the prevalence rates.

CONCLUSION

The prevalence of hearing loss obtained in the present study was considered high for Malaysia. Given that anxiety has a significant association with the presence of hearing loss, early detection and management of hearing loss are important to prevent anxiety in older people For instance, raising awareness about hearing loss, implementing routine hearing screening, and providing access to hearing aids can help detect issues early and improve quality of life as well as reducing the risk of anxiety.

CONFLICT OF INTEREST

There are no conflicts of interest to declare.

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AUTHOR CONTRIBUTIONS

SNAMA: Recruitment of participants, data analysis, and manuscript writing.
SMSE: Data analysis and manuscript writing.

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