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Exploring Attitudes Towards Hearing Aid Use Among Middle-Aged Adults with Hearing Loss: A Quantitative and Validation Study

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Abstract

Objectives: translate and validate the Attitude Toward Loss of Hearing Questionnaire (ALHQ) in Arabic language and explore attitudes of working-aged adults towards their hearing loss (HL) and hearing aids.

Methods: A cross-sectional investigation of 237 middle-aged Jordanians (18-65 years old) who have HL using an online questionnaire during the period of Oct to Dec 2023.

Results: The specialized experts in the field had an 88% acceptance rate on all items of ALHQ. Five factors were loaded and explained a total of 58.37%, confirming the validity of the ALHQ Arabic version. All subscales of ALHQ surpass the normal values of Cronbach alpha. Several predictors of attitude toward loss of hearing were noted including educational level, age, family members, income, and marital status.

Conclusion: Addressing barriers to hearing aid use, such as psychosocial and economic, can improve hearing support and increase healthcare focus and collaboration among clinicians and stakeholders globally.

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Keywords: Hearing loss, hearing aids, occupations, psychology, sensorineural hearing loss.

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Introduction

Hearing loss (HL) has developed as a significant public health concern, affecting an estimated 466 million individuals globally.[1] This invisible disability employs a deep influence on individuals across all ages and affects multiple aspects of life and health including overall quality of life,[2] behavioral patterns,[3] social skills,[4] and mental well-being.[5] Despite the availability of hearing aids and their associated benefits, a significant percentage of the population encounters challenges in both accessing and utilizing these assistive devices.[6]

Several barriers have been identified in relation to the adoption of hearing aids including financial restraints, social factors, cultural influences, medical considerations, and technical particulars.[7,8] Among these complicated obstacles, psychological factors emerge as a challenge encountered by individuals grappling with hearing difficulties. A recent study carried out in the United States revealed an association between psychological distress and hearing aids use.[9] Previous studies have documented both the positive and negative effects of hearing aids among children and elderly who have hearing problems.[10,11] Yet, knowledge about middle-aged adults remains uncommon, particularly their attitudes and barriers in the adoption of hearing aids.[12] It is essential to recognize that this age group has different responsibilities/commitments, occupational obligations, and familial duties, thus, middle age group is under pressures compared to younger and older groups who have HL.

Approximately 80% of individuals with HL reside in low and middle income nations like Jordan.[13] Individuals with HL in these countries often face challenges compared to their counterparts in

developed countries.[14] For example, a study identified three primary barriers in these countries, namely, the scarcity of adequately trained personnel, the unaffordable cost associated with hearing devices available, and limited public awareness regarding the advantages of hearing technologies.[15] As a consequence of these impairments, only a minority of Jordanian individuals have the financial means to obtain hearing aids, and despite efforts for hearing care improvements, coverage by the Ministry of Health remains limited, leaving a portion of population without access to this essential hearing technology. Thus, the burden of HL often falls on the patient and may not always be apparent[16] with unmet needs and especially for self-management support among working age adults in particular.[17,18]

Several scales have been identified to understand the psychological issues affecting people with HL who wear hearing aids, such as the hearing aid selection profile scale[19] and satisfaction with amplification in daily life scale.[20] Among them, the attitude toward loss of hearing questionnaire (ALHQ) is widely used in several studies.[21,22] This scale has been translated into several languages, including a Persian version[23] and American-English version.[24] An Arabic language version, validated for its reliability and validity, is needed to understand the attitudes of patients with HL in the Arabic context. This is the first study in the Arabic context to validate ALHQ into Arabic language and to discover the attitudes of middle-aged adult workers in Jordan who are suffering from HL towards the utilization of hearing aids. Moreover, this study aims to explore the attitude of working middle-aged adults towards HL and hearing aids, differentiate between users and non-users, and to identify predictor factors of their attitudes toward HL based on several demographic factors.

Materials and methods

Study design & participants

A cross-sectional methodological design was used. Inclusion criteria targeted the Jordanian working middle-aged adults, specifically individuals aged between 18 and 65 years, who have experienced HL and their hearing was confirmed by pure tone audiometry, regardless of the degree of HL or whether they use hearing aids or not. Individuals outside the selected age group or those unwilling to participate were excluded. To determine the sample size, we utilized G*Power software, which indicated a minimum requirement of 200 participants with HL. Purposive sampling procedure from JUH, Amman-Jordan was selected to represent the study sample. We created an online Google Form to collect the data from the patients. Then, we send it to the patients' phone number according to JUH database, asking their permission to voluntary participate, obtaining the aim of the study, filling demographic information, and answering the ALHQ. The Google Form was closed upon reaching a total of 237 participants. The period of collecting the data was from October to December/2023. The time taken to fill the questionnaire did not exceed 3 minutes.

Study tools

Demographic data: Participants completed a questionnaire covering demographic data including age, gender, region, educational level, employment status, smoking status, income, marital status, number of people living in the house, comorbidities, period of HL, use of hearing aids, and period of using hearing aids.

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Attitudes toward Loss of Hearing Questionnaire (ALHQ): It is used to measure the attitudes of people who have hearing difficulties, whether they use hearing aids or not. The original version of the scale (version 1) was developed by[24] and consists of 24 items. Version 3, published in 2005, consists of 23 items divided into five subscales.[25] The first subscale is denial of HL (6 items), which refers to the level of acceptance of hearing aids. Negative associations (4 items) discuss the embarrassment related hearing aids use. The third subscale is negative coping strategies (8 items), which interact with emotional and social reactions. Manual dexterity and vision (3 items) refer to the ability to use a hearing aid. The last subscale is hearing-related esteem (2 items), which refers to self-esteem and confidence. The participants were asked to respond to this scale as in the original scale by using a five-point Likert scale ranging from 5 "Strongly Agree" to 1 "Strongly Disagree". For hearing aid users, we replaced questions (3, 4, 7, 9, and 18) with relative items to be align as in the original version scale. The highest mean score of items indicates higher denial, low self-esteem, negative association and strategies, and lower use of manual dexterity & vision. However, we examined the validity and reliability of the translated Arabic version of ALHQ as illustrated below.

Ethics approval

Ethics approval was obtained from the Institutional Review Board of Jordan University Hospital (JUH) to access the data of patients in the audiology department (Reference: 10/2024/4429) as well as obtaining ethics approval from the Ethics Committee at the School of Medicine, the University of Jordan (Reference: 7498/2023/67). Participant consent was included as the first page in our Google Form, which outlines the nature of the study, its purpose, and ensuring the anonymity of the participants' information, which was used solely for research purposes.

Results and analysis

Analysis plan

First, to validate the ALHQ into Arabic language, we involved translation and back-translation, validity checked by face, content, and construct, and reliability checked by Cronbach's alpha. In construct validity, we calculated the correlation coefficient (> 0.40). A Kaiser-Meyer-Olkin (KMO) value close to 1 indicates better sample adequacy, and Bartlett's test of sphericity suggests that variables are correlated and significant. Second, the quantitative data were entered into SPSS and analyzed for normality, descriptive statistics, independent sample t-test, and Pearson correlation coefficients (r), considering a significance threshold of $p \leq 0.05$. For prediction analysis, we employed a stepwise linear regression model.

Translation, validity, and reliability of the Arabic version of ALHQ

The translation process began with the translation of the ALHQ English version into Arabic by two experts specialized in English-Arabic translation. Subsequently, another two experts specialized in Arabic-English translation were engaged to translate the Arabic ALHQ back into English. All experts approved the final Arabic version of ALHQ.

We started the validity process by conducting first: Face validity. It was checked by distributing the Arabic ALHQ to 20 patients who have HL to ensure clarity and ease of understanding of all items. Feedback by participants did not raise any comments regarding the Arabic version of ALHQ. Second: Content validity. It was performed by presenting the Arabic ALHQ to 7 experts specialized in audiology, medicine, and psychotherapy. The acceptance rate for the 7 experts,

based on Lawshe's Table, is 71%[26] to measure the content validity ratio (CVR). After assessing the Arabic version of ALHQ, the acceptance rate was 88%, affirming its content validity. Third: Construct validity. The KMO test was 0.87, Bartlett's test was (Chi-square= 2122.7, p-value= 0.001), correlation coefficients ranged between 0.44 and 0.88, indicating proper results.[27] The scree plot in Figure 1 and Table 1 illustrates that a total of 5 factors were loaded (6-items in denial explained 29.62% of variance, 4-items in negative associations explained 13.16% of variance, 8-items in negative coping strategies explained 5.97% of variance, 3-items in dexterity explained 5.19% of variance, and 2-items in hearing-related esteem explained 4.42% of variance) with eigenvalues greater than 1, confirming the result. The total Cronbach alpha for all items of the translated ALHQ was 0.876. All subscales were above 0.72 indicated that achieved the required level of reliability.[28]

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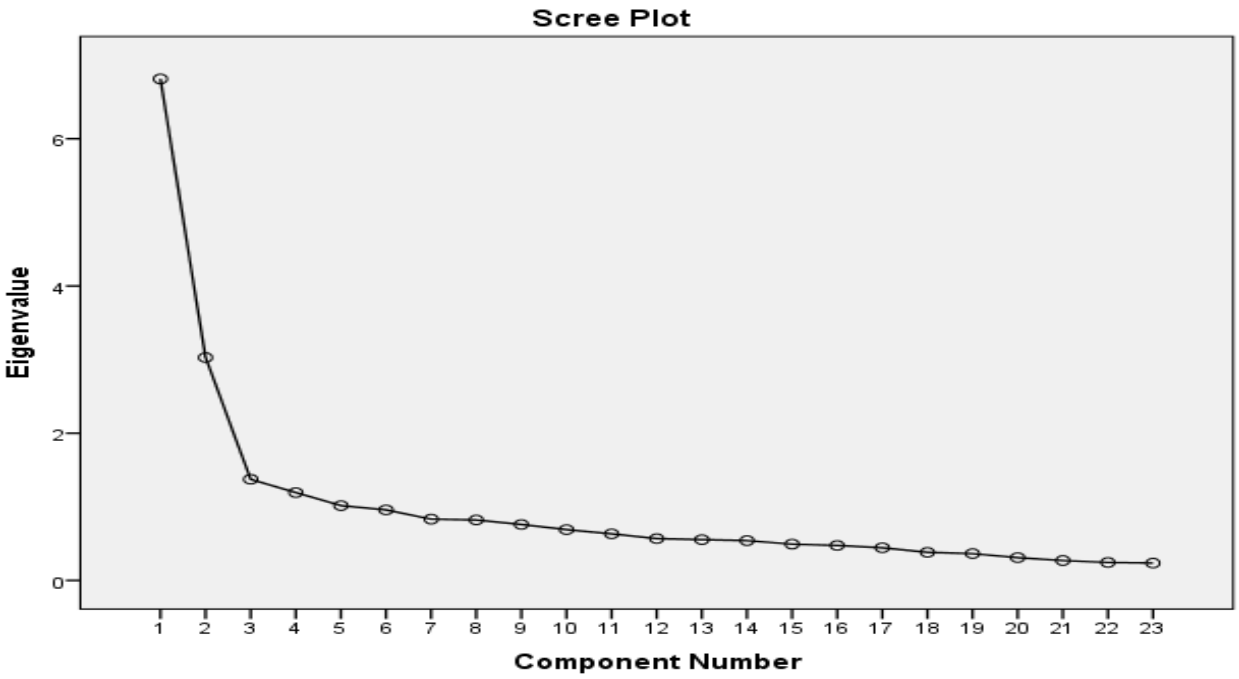

Figure 1: Scree plot of the Arabic ALHQ version.

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Table 1: Total Variance and Factor Loading for the Dimension of The Arabic ALHQ.

Constructs	Item numbers	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Denial of HL	Q1	0.42				
	Q2	0.48				
	Q3	0.54				
	Q7	0.60				
	Q13	0.62				
	Q17	0.64				
	Cronbach Alpha	***0.83***				
Negative associations	Q4		0.59			
	Q9		0.67			
	Q11		0.63			
	Q18		0.69			
	Cronbach Alpha		***0.87***			
Negative coping strategies	Q5			0.44		
	Q10			0.58		
	Q12			0.72		
	Q15			0.62		
	Q17			0.59		
	Q19			0.67		
	Q22			0.72		
	Q23			0.54		
	Cronbach Alpha			***0.80***		
Manual dexterity & vision	Q8				0.68	
	Q14				0.71	
	Q20				0.43	
	Cronbach Alpha				***0.77***	
Hearing-related Esteem	Q6					0.57
	Q21					0.72
	Cronbach Alpha					***0.72***
	Initial eigenvalues	6.81	3.01	1.37	1.19	1.02
	Percentages of variance explained	29.62	13.16	5.97	5.19	4.42
	Cumulative variance	29.62	42.78	48.76	53.95	58.37

Note: HL: Hearing loss, ALHQ: Attitudes toward Loss of Hearing Questionnaire. Factor 1: Denial. Factor 2: Negative associations. Factor 3: Negative coping strategies. Factor 4: Dexterity, Factor 5: Hearing-related esteem.

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Demographic information

Among the 237 participating patients, more than half of them were male, single, living in the central part of the country, had a bachelor's degree, had a low income level (< 400 JD equal to <550$), and were non-smokers. Almost half of the participants were aged between 18 and 34 years old. The average number of family members was 4.1 ± 2.4. Despite having HL, 67.5% were not using hearing aids, and the highest percentage for the duration of HL was 1 to 5 years. Finally, a quarter of patients were using hearing aids for more than 3 years (Table 2).

Table 2: Demographic information of participants (N= 237).

Variables	Descriptive	Frequency (%)
Gender	Male	121 (51.1)
	Female	116 (48.9)
Marital status	Single	122 (51.5)
	Married	101 (42.6)
	Widow/divorce	14 (5.9)
Age (Years)	18-34 Y	116 (48.9)
	35-49 Y	69 (29.1)
	50-65 Y	52 (21.9)
Region	South	31 (13.1)
	Center	131 (55.3)
	North	75 (31.6)
Educational levels	High school or less	75 (31.6)
	Bachelor's degree	122 (51.5)
	Master's degree	29 (12.2)
	PhD degree	11 (4.6)
Employment status	Full time	66 (27.8)
	Part time	44 (18.6)
	Self-employed	10 (4.2)
	Unemployed	47 (19.8)
	Retired	26 (11)
	Student	44 (18.6)
Income (JD equal to 0.71$)	400 JD or less	173 (73)
	401-800 JD	44 (18.6)
	More than 800 JD	20 (8.4)
Comorbidities	Non	156 (65.8)
	Diabetes mellitus	7 (3)
	Hypertension	13 (5.5)
	Arthritis	10 (4.2)
	Obesity	26 (11)
	Seizure	2 (0.8)
	Chronic Kidney Disease	2 (0.8)

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	Cancer Others	3 (1.3) 18 (7.6)
Family members	Mean ± Standard deviation	4.1± 2.4
Smoking status	Smoker Ex-smoker Non-smoker	74 (31.2) 18 (7.6) 145 (61.2)
How long have you had hearing loss?	Less than 6 Months 6 Months to 1 Year 1-5 Years 6-10 Years More than 10 years	35 (14.8) 58 (24.5) 74 (31.2) 38 (16) 32 (13.5)
Do you use hearing aids?	Users Non-users	77 (32.5) 160 (67.5)
For how long you have been using hearing aids?	On-off Always (period less than 6 Months Always (period from 6 Months to 3 Years Always (period More than 3 Years)	93 (39.2) 51 (21.5) 34 (14.3) 59 (24.9)

Negative coping strategies and associations were found to be the highest mean scores, indicating serious issues toward the way of coping among middle-aged adult workers. Hearing-related esteem exhibited the lowest mean score, indicating the lowest effect toward self-efficacy and confidence Table 3. We demonstrated the average score of all participants based on their use of hearing aids (N=77) and non-using (N= 160) to explore their attitude differences in HL. Results found that no statistically significant differences were noted between the two groups (users vs. non-users) toward their attitude of HL. Non-users generally demonstrated a higher level of denial, more negative coping strategies, lower manual dexterity & vision, and lower self-confidence. Negative associations were found to be higher among users of hearing aids. The average score of negative coping strategies was equal between the two groups (users vs. non-users).

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Table 3: The comparison between users (N= 77) and non-users of hearing aids (N= 160).

Variables	All participants (N= 237) M ± SD	Non-users (N= 160) M ± SD	Users (N= 77) M ± SD	t-test	p-value
Denial of HL	3.59 ± 0.7	3.62 ± 0.7	3.54 ± 0.8	0.77	0.44
Negative associations	3.62 ± 0.9	3.61 ± 0.9	3.65 ± 0.9	0.25	0.80
Negative strategies	3.66 ± 0.7	3.66 ± 0.7	3.66 ± 0.7	0.03	0.97
Manual dexterity & vision	3.59 ± 0.8	3.61 ± 0.9	3.55 ± 0.8	0.47	0.64
Hearing-related esteem	3.51 ± 0.9	3.56 ± 0.9	3.38 ± 0.9	1.26	0.21

Note: HL: Hearing loss, M ± SD: Mean ± Standard deviation.

Significant positive correlations ($p< 0.001$) revealed between all subscales of ALHQ. Denial of HL is positively associated with negative associations ($r= 0.54$, $p< 0.001$), negative coping strategies ($r= 0.63$, $p< 0.001$), manual dexterity & vision ($r= 0.51$, $p< 0.001$), and hearing-related esteem ($r= 0.78$, $p< 0.001$). The negative associations subscale is positively associated ($r= 0.65$, $p< 0.001$; $r= 0.49$, $p< 0.001$; $r= 0.46$, $p< 0.001$) with negative coping strategies, manual dexterity & vision skills, and hearing-related esteem, respectively (Table 4).

Table 4: Correlation coefficient for the overall and its subscales of ALHQ (N= 237).

#	**Variables**	**1**	**2**	**3**	**4**	**5**	**6**
1	Denial of HL	1.00	0.54***	0.63***	0.51***	0.46***	0.78***
2	Negative associations		1.00	0.65***	0.49***	0.38***	0.82***
3	Negative coping strategies			1.00	0.63***	0.46***	0.89***
4	Manual dexterity & vision				1.00	0.43***	0.75***
5	Hearing-related esteem					1.00	0.63***
6	Total Score of ALHQ						1.00

Note: ALHQ: Attitudes toward Loss of Hearing Questionnaire, HL: Hearing loss, ***p< 0.001.

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Prediction models are presented in Table 5. Dependent variables were the subscales of ALHQ, while the independent variables were demographic data including age, gender, region, educational levels, employment status, income, marital status, number living in the house, smoking status, and period of HL, using the stepwise regression method. We found four predictor factors predict the denial of HL subscale, which are educational levels, income, period of HL, and marital status, explaining a total of 16% of the variance. Marital status, income, and educational levels are predictors of negative associations, explaining 10% of the variance. Regarding the negative coping strategies subscale, we found that marital status and the number of people living in the house are the main predictors, explaining a total variation of 11%. Furthermore, we found five predictor factors for manual dexterity and vision, which are income, educational level, smoking, marital status, and age, explaining a total variation of 15%. Income and educational level account for 7% of the variance in hearing-related esteem.

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Table 5: Predictors of attitude toward HL among middle-aged adult workers (N= 237).

Variables/ Model	R	R^2	R^2 change	t	p-value
Denial of HL					
1.Income (JD)	0.23	0.05	0.05	3.49	<0.001***
2.Period of using hearing aids	0.27	0.07	0.02	4.31	<0.001***
3.Marital status	0.32	0.09	0.03	2.68	<0.001***
4.Family members	0.35	0.12	0.02	2.34	0.02*
Total variance explained= 12%					
Negative associations					
1.Marital status	0.21	0.04	0.04	3.25	<0.001***
2.Income	0.26	0.07	0.03	2.59	<0.001***
3.Educational level	0.32	0.10	0.03	2.80	0.006**
Total variance explained= 10					
Negative coping strategies					
1.Marital status	0.25	0.06	0.06	3.91	<0.001***
2. Family members	0.31	0.10	0.04	2.97	0.003**
3.Income	0.34	0.11	0.02	2.18	0.03*
Total variance explained= 12					
Manual dexterity & vision					
1.Income	0.23	0.05	0.05	3.67	<0.001***
2.Educational level	0.29	0.08	0.03	2.84	0.005**
3.Smoking	0.33	0.11	0.03	2.51	0.013*
4.Marital status	0.35	0.13	0.02	2.06	0.04*
5.Age	0.38	0.15	0.02	2.37	0.02*
Total variance explained= 15%					
Hearing-related esteem					
1.Income	0.23	0.05	0.05	3.57	<0.001***
2.Educational level	0.27	0.07	0.02	2.24	0.02*
Total variance explained= 7%					

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Discussion

This study represents the first translation and validation of ALHQ third version from English to Arabic language. Also, it highlights middle-aged adult workers who have HL toward using hearing aids or not. More than two-thirds of participants did not use hearing aids despite having HL for over 6 months. We noted that several demographic factors perform a major role toward the attitude of participating workers. This study added value to international research, literature, and clinical practice guidelines for middle-aged adult workers who have HL, despite a lack of previous studies among them.[17,18]

The validation process, including specialized experts, variance analysis and correlation coefficients, aligns with previous studies on ALHQ in different cultural contexts.[23,25,29-30] Experts added their comments with accepting in all items, highlighting the need of such scale among Arabic speaking population due to lack of Arabic scales used to measure attitudes of HL. All five subscales of ALHQ were found to be correlated and explained a percentage of 58.37%, further confirming its validity. Regarding reliability, the total Cronbach alpha 0.876 was higher than what was reported in a previous study 0.798.[23] The Arabic version produce a nuance understanding of the attitude of patients with HL in hospitals, organizations, and among the Arabic researchers.

Negative coping strategies and associations were notably observed among participating middle-aged adult workers. This may be interpreted by their fear of being seen wearing hearing aids, feelings of inadequacy, and excessive concerns about being perceived as elderly, foolish, or

ignored. Coping strategies are needed to support middle-aged adult workers. A recent study found that a lack of coping mechanisms is associated with decreased happiness and well-being.[31]

Stigma, age-related stereotypes, and perceptions of disability contribute to HL denial, particularly prevalent among adults experiencing HL.[32,33] Unexpectedly, this study observed a higher rate of negative associations among users, possibly attributed to their negative experiences within their social and work environments due to public lack of awareness of HL and cultural influences. Up to 23% of professionals with HL' psycho-emotional utterance units deal with the issue of humiliation, self-consciousness, or shame.[34,35] However, the differences between users and non-users' groups based on their attitude of hearing aids were not observed, but non-users generally demonstrated a higher level of denial, more negative coping strategies, lower manual dexterity & vision, and lower self-confidence. Negative associations and denial of HL are known issues among non-users compared to users.[20,30,34] This investigation provides some understanding of their attitudes and coping processes among users and non-users, revealing that both groups have the same source of limitations, difficulties, and negative coping styles toward workplace, along diminished hearing-related esteem and manual dexterity and visual problems, consistent with existing literature.[36]

Various demographics factors and HL-related variables, influencing attitudes of middle-aged workers towards HL and hearing care seeking behaviours.[7] Educational level, income, and marital status emerged as significant predictors, with higher education associated with higher negative associations and worse hearing-related esteem. At the same time, higher income seems to be linked to less denial and potentially a greater likelihood of seeking hearing aids.[37] Recent systematic review studies revealed that individuals with higher socioeconomic status are more inclined to

adopt hearing aids.[38,39] Also, workers with advanced educational levels are more inclined to have higher incomes, facilitating the affordability of hearing aids and additional expenses such as batteries.[40]

Married workers exhibited better attitudes towards HL and hearing aids, including less denial, less negative associations and better coping strategies compared to single people. Marriage could be influential on hearing aid adoption rates, potentially influenced by communication dynamics within couples affected by HL. The compromised communication within couples due to HL, could be impacting the relational aspect significantly and constituting a motivational factor for help seeking.[41] Other demographics that were not reported in this study could have bearings on adults' attitudes toward their HL and hearing aids such as work contextual factors. Examples are work type and job demand,[42] and these need to be explored in future studies.

Strength and limitation

The strength of this study is validation of the Arabic version of ALHQA, making it available for future researchers who need to apply it among patients with HL. Furthermore, we deeply investigated the differences between two important groups: hearing aid users and non-users. Finally, we examined several factors that contribute to the attitudes of middle-aged adult workers with HL. One limitation is the selection of an online form during the distribution process. Another limitation is the lack of questions concerning work-life and hearing-related issues. Future studies utilizing mixed-method approaches, focusing on middle-aged adult workers could assist in understanding the barriers and burdens of HL.

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Summary

- Hearing loss is on the rise among working-aged adults globally, posing daily challenges, particularly in the workplace. Recent evidence indicates that workers with hearing loss require improvements in their work life and healthcare support.
- The attitudes of working-aged adults towards their hearing loss and hearing aids remain under-researched indicating a significant gap in understanding how to improve healthcare support for this demographic.
- This study validated the attitude toward loss of hearing questionnaire (ALHQ) into the Arabic language and brought to light the attitudes of working-aged adults towards their hearing loss and hearing aids including demographic predictors such as educational level and marital status.
- Addressing barriers to hearing aid use, such as psychosocial, economic, and demographic factors, can improve hearing support.

Conclusion

This study highlights the validated ALHQ into the Arabic language, revealing attitudes towards HL in middle-aged Arabic speakers. No significant differences were found between attitudes of hearing aid users and non-users, but non-users scored higher in denial, manual dexterity, and esteem. Several predictors of attitude toward loss of hearing were noted based on the selected demographic factors including educational level, income, and marital status. Addressing barriers

to hearing aid use, such as psychosocial, economic, and demographic factors, can improve hearing support. The underexplored demographic of middle-aged adult workers with HL warrants increased healthcare focus and collaboration among researchers, clinicians, and stakeholders globally.

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Competing Interests

The author(s) declare none.

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