

BMJ Open The acceptance of hearing disability among adults experiencing hearing difficulties: a cross-sectional study

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ABSTRACT

Objective: This study developed the Hearing Disability Acceptance Questionnaire (HDAQ) and tested its construct and concurrent validities.

Design: Cross-sectional.

Participants: A total of 90 participants who were experiencing hearing difficulties were recruited in the UK.

Outcome measures: The HDAQ was developed based on the Tinnitus Acceptance Questionnaire (TAQ). Participants completed self-report measures regarding hearing disability acceptance, hearing disability, symptoms of anxiety and depression and a measure of stages of change.

Results: The HDAQ has a two-factor structure that explains 75.69% of its variance. The factors identified were *activity engagement* and *avoidance and suppression*. The scale showed a sufficient internal consistency (Cronbach's $\alpha=0.86$). The HDAQ also had acceptable concurrent validity with regard to self-reported hearing disability, self-reported anxiety and depression and readiness to change measures.

Conclusions: Acceptance is likely an important aspect of coping with chronic health conditions. To our knowledge, no previously published and validated scale measures the acceptance of hearing disability; therefore, the HDAQ might be useful in future research. However, the role of acceptance in adjusting to hearing disability must be further investigated.

INTRODUCTION

An individual with hearing loss might pass through several stages when seeking help.¹ Edgett² emphasised that the decision-making process to seek help involves four major stages: (1) understanding hearing loss, (2) personal experience, (3) interactions with society and (4) taking action. In another study, Englund³ suggested that patients proceed through four major stages while making a decision to seek help: (1) attracting attention, (2) becoming suspicious, (3) sensing tribulation and (4) jeopardising the fundamental self. In our previous studies of

Strengths and limitations of this study

- Owing to its online recruitment, the sample might not represent the general population.
- Online questionnaires might differ from a pen-and-paper format in terms of data quality.
- Although there are measures that study coping indirectly, no well-established acceptance scale to examine the concurrent validity of the Hearing Disability Acceptance Questionnaire using the same construct (ie, acceptance).

the 'patient's journey' regarding people with hearing impairment (PHI), we took this idea further and studied this journey from the initial onset of problems through successful rehabilitation, thereby developing a patient journey model.⁴⁻⁵ This model suggests that PHI experience seven major stages before, during and after their audiological rehabilitation: (1) preawareness, (2) awareness, (3) movement, (4) diagnostics, (5) rehabilitation, (6) self-evaluation and (7) resolution. On an average, PHI can take 10 years or more to seek help after first noticing hearing difficulties; hence, this process might take many years.⁶ Although additional research is necessary to better understand this process,⁷ these previous studies nevertheless provide an insight regarding the stages of adjusting to hearing loss, which might be an indirect (or secondary) indicator of the process of acceptance. In addition, it is clear from the aforementioned studies that becoming aware of and accepting a hearing disability play important roles in further progressing in their journey to manage their condition.

A few studies in the audiology literature have focused on the self-assessment of hearing loss,⁸ immediate reactions to the diagnosis of hearing loss,⁹⁻¹⁰ actions taken after failing screening tests,¹¹ attitudes towards hearing loss and the use of hearing

aids^{12–13} and the ways in which PHI cope with their condition.^{14–16} These studies provide further insights into the initial onset of the condition and how PHI manage their condition. A recent literature review suggested that the acceptance of hearing loss prior to hearing aid fitting positively influences hearing aid acquisition and subsequent hearing aid use.¹⁷ However, numerous PHI who are aware that they have a problem but continue not to seek help or use intervention strategies, or both remain. The literature can be confusing because the term ‘acceptance’ is used synonymously with the treatment/management adherence, rather than studying this construct using validated scales that capture different dimensions of this construct.

In psychological terms, acceptance is a *process of actively taking in thoughts, memories, feelings and bodily sensations in a specific situation without having to follow or change them*.¹⁸ Acceptance can have various dimensions including self-acceptance and social acceptance that require the emotional and behavioural adaptations. For instance, the different views of what acceptance actually involves are evident from examining studies of education and academic success, where the term *peer acceptance* refers to a pupil who is judged to be a desirable interaction partner.¹⁹ Disability studies have proposed that acceptance is the key component to adjusting to a disabling condition.²⁰ Although the acceptance of chronic conditions has often been studied from the perspectives of grief and loss, studying the acceptance of chronic conditions with regard to the perspectives of those living with it, with a focus on adaptation to and accepting change in one’s life, is also important.²¹

Experiential avoidance is similar to the concept of avoidance coping and can be defined as the opposite reaction to acceptance; that is, a person attempts to ignore and minimise the problems caused by hearing impairment.²² However, some researchers have argued that coping and experiential avoidance are unique but overlapping constructs.²³ For example, although acceptance (ie, experiential avoidance) loaded onto the same factors as emotion-focused and avoidant coping in a recent study of anxiety disorders, acceptance explained additional variance when predicting psychological distress and well-being.²³ With regard to hearing impairment, acceptance and experiential avoidance can be interpreted in light of stigma theory,²⁴ which has previously been applied in hearing impairment research.^{25–26}

Acceptance, in relation to hearing disability, has not been well defined; often this term is used to refer the help-seeking behaviour and intervention (eg, hearing aids) adoption. In effect, differences exist in terms of the psychological and audiological ways of defining acceptance with regard to hearing disability. However, various scales examine the acceptance of other disabilities and chronic conditions.^{20–21, 27–30} Past audiology studies have focused on coping; however, coping is generally measured indirectly via questions related to communication problems²² (eg, the Communication

Strategies Subscale (CSS) in the Communication Profile for the Hearing Impaired (CPHI) questionnaire).³¹ The CPHI-CSS focuses on maladaptive behaviours as well as verbal strategies and non-verbal strategies, and it provides insight concerning poor adjustment to hearing impairment and poor social support.³² To our knowledge, however, no published and validated scale examines the acceptance of hearing disability.

The current study developed a self-report measure of hearing disability acceptance and investigated its construct and concurrent validities. We focused on the psychological aspects of acceptance in this study (ie, experiential avoidance, which is the opposite of acceptance).

METHOD

Study design and participants

The current study used cross-sectional data obtained during a clinical trial (ie, preintervention data) of a pre-fitting counselling programme.^{33–34} A study advertisement was made in the UK through various sources including national newspapers, hearing loss charity websites (ie, Action on Hearing and Hearing Link) and local general practitioner practice notice boards, inviting those who were experiencing hearing difficulties but not using hearing aids and also those who had access to the Internet to participate in this study. Interested participants were encouraged to access the study website using the URL supplied. A total of 90 participants completed the informed consent form, provided demographic information and completed four online questionnaires. These questionnaires included the Hearing Disability Acceptance Questionnaire (HDAQ), the Hearing Handicap Questionnaire (HHQ), the Hospital Anxiety and Depression Scale (HADS) and the University of Rhode Island Change Assessment (URICA) Scale.

Development of the HDAQ

The HDAQ was developed based on the Tinnitus Acceptance Questionnaire (TAQ), which was developed in Sweden to study tinnitus acceptance.³⁰ The TAQ was based on the Acceptance and Action Questionnaire (AAQ)³⁵ and the Chronic Pain Acceptance Questionnaire-Revised (CPAQ-R)²⁸; some additional questions were included. The 12-item TAQ has two factors (*activity engagement* and *tinnitus suppression*), and it has sufficient internal consistency (Cronbach’s $\alpha = 0.89$).³⁰ Like the TAQ, the HDAQ is a measure of experiential avoidance/acceptance. Its 12 items were taken from the TAQ, and the word ‘tinnitus’ was replaced with ‘hearing problem’. However, the 12 items were further reduced to 7 items (see the results section). Each item was rated on a 7-point Likert scale (1=never true, 7=always true). Total scores ranged from 7 to 49; higher scores indicate greater acceptance of hearing disability (see online supplementary appendix 1).

Other questionnaires

The HHQ measures personal and social effects (ie, emotional distress and discomfort, social withdrawal and general participation restrictions).³⁶ The 12 questions of the HHQ are scored on a 5-point Likert scale (1=never, 5=almost always). Total scores range from 12 to 60, and higher scores indicate a greater disability. The HHQ has acceptable internal consistency, with Cronbach's α of 0.95 and 0.93 for the emotional and social scales, respectively.

The HADS was used to screen for symptoms of anxiety and depression. The HADS consists of 14 items, divided into two subscales: anxiety and depression.³⁷ Each item is scored from 0 to 3 (0=not at all, 3=most of the time) with a total score ranging from 0 to 42; higher scores indicate more self-reported anxiety and depressive symptoms. The HADS has acceptable reliability ($r=0.84$) and internal consistency ($\alpha=0.83$),³⁸ including Internet administration.³⁹ In addition, the HADS also has acceptable sensitivity and specificity (AUC=0.80) as indicated in the receiver operator characteristic curves.

The URICA measures stages of change across four subscales: precontemplation, contemplation, action and maintenance.^{40–41} The original URICA scale consists of 32 items; however, the current study used a modified version (*the problem* was replaced with *the hearing problem*) consisting of a 24-item scale.⁴² Each item was rated on a 5-point Likert scale (1=strong disagreement, 5=strong agreement), and each subscale measured specific aspects. Most of the study participants were in the early help-seeking stages and had not received interventions for their hearing disabilities; therefore, the eight URICA items regarding maintenance were excluded because they were considered irrelevant for the sample. The total scores of each subscale ranged from 8 to 40. The subscale scores concerning the contemplation and action stages were added, from which the precontemplation stage scores were subtracted to obtain a readiness-to-change composite score (ie, contemplation+action–precontemplation). A recent study used this modified scale to investigate the use of the URICA scale among adults with acquired hearing impairments seeking help for the first time. This scale showed acceptable construct, concurrent and predictive validities.⁴²

Data analyses

All data analyses were performed using IBM SPSS V.19 for Windows. Descriptive statistics were applied to examine demographic factors, and the assumption of normality (ie, Shapiro-Wilk test values of 0.05) was tested before conducting a principal components analysis (PCA). A PCA was performed to reduce the correlated variables to a smaller set of important composite variables and examine the factor structure.⁴³ Cronbach's α was calculated to assess the internal consistency of the HDAQ.⁴⁴ Pearson's correlations were performed to examine the association among the following factors: hearing disability acceptance, self-reported hearing

disability, self-reported anxiety and depression and readiness to change.

RESULTS

The data were normally distributed. Table 1 displays the sample characteristics. The average age of participants and the average duration of hearing disability were 63.41 and 11.67 years, respectively. The number of men and women in the sample was equal. In addition, nearly two-thirds of participants had consulted healthcare professionals specialised in hearing (eg, audiologists, hearing aid dispensers or ear, nose and throat specialists) at least once.

HDAQ factor structure

A PCA with Varimax rotation was performed to examine the factor structure. Eigenvalues were set at 1.0, and the limit for factor loadings was set at 0.40.⁴³ The relevant items were reverse scored before analysis. The initial number of factors of interest was determined using Kaiser's rule of eigenvalues greater than 1.0.⁴⁵ Subsequently, a scree plot was examined to determine the number of factors to extract.⁴⁶

In the first instance, the PCA resulted in a three-factor model for the 12 items. However, cross-loadings were noted for some items (ie, items that loaded at 0.40 or above on two or more factors). A PCA was also performed using Direct Oblimin rotation to determine whether these cross-loadings were due to the high correlations among items. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.86 with a reference value of 0–1.0, and Bartlett's test of sphericity was significant ($\chi^2(66)=370.89$, $p<0.001$). The three factors explained 72.90% of the variance in the 12-item HDAQ. Factor 1 accounted for 49.65% of the variance (with an eigenvalue of 3.40); factor 2 accounted for 13.95% of the variance (with an eigenvalue of 3.32) and factor 3 accounted for 9.30% of the variance (with an eigenvalue of 2.01). The Cronbach's α was 0.54, 0.50, 0.72 and 0.79 for factors 1, 2, 3 and the overall 12 items, respectively. The internal consistency of the overall scale was acceptable, although it was not high for factors 1 and 2.

In the next stage, all items that resulted in cross-loadings were removed from the analysis; thus, five items were removed from the original 12-item scale (see online supplementary appendix 2 for the removed items). Item reduction (ie, minimising the set of variables while still accounting for most of the variance) is one of the key goals of PCA. Moreover, removing the items with complex psychometric properties (ie, cross loadings) can improve the construct validity of self-report measures.⁴⁷ Subsequently, the seven-item HDAQ resulted in a two-factor model with no cross-loading or outliers (see table 2). The KMO measure of sampling adequacy was 0.82, and Bartlett's test of sphericity was significant ($\chi^2(21)=363.93$, $p<0.001$). These factors explained 75.69% of the variance in the HDAQ. Factor

Table 1 Participants demographics

Age in years (M±SD)	63.41±10.49
Gender (% male)	50
Duration of hearing difficulties in years (M±SD)	11.67±10.83
Consulted a healthcare professional specialising in hearing regarding hearing difficulties (%)	
Yes	65.6
No	34.4
Education (%)	
Compulsory education	13.3
Secondary education	48.9
Tertiary education	37.8
Self-reported hearing disability acceptance (HDAQ; M±SD)	36.88±7.85
Activity engagement	22.72±4.36
Avoidance and suppression	14.16±4.65
Self-reported hearing disability (HHQ; M±SD)	34.96±9.95
Emotional	20.61±5.75
Social	14.32±4.85
Self-reported anxiety and depression (HADS; M±SD)	14.77±7.50
Anxiety	7.04±4.43
Depression	7.70±3.81
Stages of change (URICA)	
Readiness-to-change composite (M±SD)	39.41±8.63

HADS, Hospital Anxiety and Depression Scale; HDAQ, Hearing Disability Acceptance Questionnaire; HHQ, Hearing Handicap Questionnaire; URICA, University of Rhode Island Change Assessment.

1 accounted for 42.94% of the variance (with an eigenvalue of 3.00) and factor 2 accounted for 32.75% of the variance (with an eigenvalue of 2.29). The factors were identified as: (1) *activity engagement* (ie, the pursuit of life activities regardless of hearing disability) and (2) *avoidance and suppression* (ie, attempts to avoid difficult listening situations as well as those to control and suppress the thoughts and feeling related to hearing disability). A low *avoidance and suppression* score indicates more avoidance and suppression because the items are reverse scored. The Cronbach's α were 0.90, 0.82 and 0.86 for factors 1, 2 and the overall HDAQ, respectively, showing an acceptable internal consistency.⁴⁴ The correlation

between the factors was $r(90)=0.51$, $p<0.001$, which suggests that the two subscales were distinguishable but related.

Furthermore, we performed a PCA on the split sample to test for the generalisability (ie, split-sample validation). The sample of 90 was randomly divided into two groups of 45. The PCA for the first split sample of 45 on 12 items resulted in a three-factor model with cross-loadings. However, the PCA with seven items (after the removal of the items with cross loadings) resulted in a two-factor structure that explained 76.41% of the variance without cross-loadings. A PCA was also performed on the second-split sample of 45 that also resulted in a

Table 2 HDAQ principle components analysis (n=90)

Scale: 7-item HDAQ	Factor 1: activity engagement	Factor 2: avoidance and suppression
1. I am leading a full life, even though I have a hearing problem	0.854	
2. My life is going well, even though I have a hearing problem	0.891	
3. Despite hearing problem, I can draw up and stick to a certain course in my life	0.857	
4. When my hearing problem increases, I can still take care of my responsibilities	0.763	
5. My hearing problem leads me to avoid certain situations		0.885
6. My hearing problem changes me as a person		0.862
7. I spend a lot of time thinking about how things would be for me without a hearing problem		0.734
Cronbach's α	0.90	0.82
Percentage of variance	42.94	32.75
Eigenvalue	3.0	2.29

HDAQ, Hearing Disability Acceptance Questionnaire.

two-factor structure that explained 75.93% of the variance without cross-loadings. The results from the split samples and the total sample were in close agreement (see table 3), strongly supporting the two-factor model.

Correlations between the HDAQ and other scales

Table 4 shows the Pearson's correlation coefficients between the HDAQ and other scales. The two HDAQ subscales were moderately associated with each other and strongly associated with the full scale. The results revealed the following significant correlations: a moderately strong negative correlation between acceptance and hearing disability; a moderate negative correlation between acceptance and symptoms of anxiety and depression and a weak negative correlation between acceptance and readiness to change. These results suggest that those people with higher hearing disability acceptance had less self-reported hearing disability, fewer self-reported symptoms of anxiety and depression and lower readiness to change. In addition, a weak positive correlation was found between self-reported hearing disability and self-reported symptoms of anxiety and depression, which indicates that people with higher self-reported hearing disability are likely to have higher self-reported symptoms of anxiety and depression. Although differences were observed, the relationships between the individual subscales and other factors (ie, hearing disability, symptoms of anxiety and depression and readiness to change) did not differ much compared with the full HDAQ scale.

DISCUSSION

Recent research has indicated the utility of psychological acceptance with regard to reducing the impact of chronic health conditions.^{29 48–50} The current paper is the first known attempt to extend this concept to hearing disabilities. After the necessary psychometrical modifications, a two-factor structure emerged for the HDAQ that was in line with the TAQ³⁰ and similar self-report measures related to acceptance.⁵¹ Its internal

consistency was equal to that of the most commonly used general acceptance scale, the AAQ-I.⁵² However, research on an updated version of this scale rejected a two-factor structure with regard to measuring acceptance and suggested a unidimensional structure for the AAQ-II.⁵³ Our study did not reveal a single-factor structure for the HDAQ. The first factor, *activity engagement*, was assumed to reflect whether participants maintain a desired level of activity despite facing obstacles. For example, a low level of activity engagement might be observed in a person who stops dining with his or her friends at restaurants because they fear they might not be able to follow the conversation. The other factor, *avoidance and suppression*, is the unwillingness to experience events due to their related emotional distress. This concept is the opposite of acceptance.⁵⁴

The HDAQ items were taken from the scale used to study acceptance in people with tinnitus, which, in turn, was based on the AAQ and CPAQ-R. Although differences most likely exist with regard to how people cope with tinnitus and hearing disability, similarities are found in terms of how people cope with general chronic conditions. Acceptance is likely a key component of adjusting to a disabling condition.²⁰ Thus, the study of acceptance in various chronic conditions including hearing disability using the general framework applied in 'contextual psychology' is valuable to the researchers and clinicians.

The study results indicate that less acceptance was associated with increased emotional distress. The relationship between the HDAQ and the HADS is interesting when compared with similar studies that have indicated the pivotal role of acceptance with regard to suffering. For instance, McCracken⁵⁵ found that acceptance was a stronger predictor of psychosocial disability among patients with chronic pain than the degree of pain they experienced. Numerous other studies have also found that greater acceptance is related to psychological well-being (for a summary, see the review by Ruiz⁵⁶). In the present study, greater acceptance was

Table 3 Split-sample validation for the seven-item Hospital Anxiety and Depression Scale, Hospital Anxiety and Depression Scale

	Full sample (n=90)	Split sample 1 (n=45)	Split sample 2 (n=45)
Percentage of variance explained			
Factor 1: activity engagement	42.94	43.48	44.13
Factor 2: avoidance and suppression	32.75	32.93	31.80
Combined	75.69	76.41	75.93
Eigenvalue			
Factor 1: activity engagement	3.0	3.0	3.0
Factor 2: avoidance and suppression	2.29	2.3	2.2
Cronbach's α			
Factor 1: activity engagement	0.90	0.83	0.82
Factor 2: avoidance and suppression	0.82	0.89	0.90
Combined	0.86	0.88	0.86


Table 4 Correlations between different scales

	HDAQ	HDAQ-1	HDAQ-2	HHQ	HADS	URICA-R
Self-reported hearing disability acceptance (HDAQ)	1.00					
HDAQ Factor 1: Activity engagement	0.86*	1.00				
HDAQ Factor 2: Avoidance and suppression	0.88*	0.51*	1.00			
Self-reported hearing disability (HHQ)	-0.70*	-0.50*	-0.71*	1.00		
Self-reported anxiety and depression (HADS)	-0.58*	-0.62*	-0.39*	0.36*	1.00	
Readiness to change (URICA-R)	-0.27*	-0.26*	-0.29*	0.20	0.18	1.00

*p<0.01.

HADS, Hospital Anxiety and Depression Scale; HDAQ, Hearing Disability Acceptance Questionnaire; HHQ, Hearing Handicap Questionnaire; URICA, University of Rhode Island Change Assessment.

correlated with a more modest rating of hearing problems; therefore, it might be analogous to the aforementioned findings regarding pain. Moreover, a recent systematic review showed that self-reported hearing disability is a robust predictor of hearing help-seeking, hearing aid acquisition, hearing aid use and satisfaction with hearing rehabilitation,¹⁷ which suggests that self-reported hearing disability is an important factor in the processes of accepting hearing loss and seeking appropriate interventions. Furthermore, symptoms of depression and anxiety were elevated among those who scored higher on the HHQ, which illustrates the far-reaching consequences that hearing loss might have. The relationship between the HDAQ and readiness to change was negative and significant, which implies that those who were more accepting of their current status were less prone to seek a change in their current situation. The association between the HDAQ subscales and other factors did not differ much. This finding might be because both subscales were found to have strong associations with the full scale and moderate associations with each other.

Interestingly, although participants did not use hearing aids, two-thirds of the sample had consulted hearing specialists on at least one occasion. The reasons for these consultations are likely to include: (1) acceptance of their condition (ie, hearing disability); (2) a dilemma regarding whether they had the condition and a desire to confirm this supposition with clinicians or (3) urging from their social partners. Although the reasons for not accepting intervention (eg, hearing aids) are not clear, they might be related to the perceived seriousness of their hearing problems. Previous research suggests that a linear relationship does not exist between hearing disability and its effects on activities and participation,^{8 57} which might help explain why not all people with hearing disabilities seek interventions. Thus, studying hearing disability acceptance in psychological terms is important. Importantly, becoming suspicious or aware of a hearing disability does not mean that PHI perceives their difficulties as significant enough to affect their communication and quality of life. This gap between awareness and action is something that clinicians must be aware of when they plan and recommend

interventions, especially for patients coming to the hearing clinic for the first time. In addition, much work is needed to understand how hearing disability acceptance either facilitates or hinders the journey through this condition.

Study limitations

Although the current study focused on an important area of limited research, it nevertheless has certain limitations. Acceptance with regard to hearing disability is not well defined, and this scale might only focus on certain components of acceptance (ie, psychological acceptance). This limitation might partially explain why people with greater acceptance show less readiness to change. However, this component is important to understand because it might explain why many people who are aware of their hearing disability continue to refrain from seeking professional help and appropriate interventions. Owing to the online recruitment method, the sample might not represent the general population, and caution must be used in generalising the results.^{58 59} Moreover, the relatively small sample size was surprising, given that the advertisement was published in a national newspaper. The smaller sample size might also be a limitation of this study. Validating this scale with a larger population is necessary, although the split-sample validation strongly supported the two-factor model. The online format of the questionnaire might differ from a pen-and-paper format, although web-based questionnaires have been found to be reliable and valid.^{60 61} The study results are only relevant with regard to participants who experience hearing difficulties rather than typical participants in clinical situations, although there might be some overlap because nearly two-thirds of the current sample had previously consulted hearing specialists. Although indirect coping measures exist, no well-established acceptance scale examines the concurrent validity of the HDAQ using acceptance. Studying the associations between *acceptance* and other factors such as *cognitive functions, personality, quality of life* and *psychological well-being* would have been interesting and useful; however, these factors were not included in the current study. Furthermore, the predictive validity of the scale must be explored.

CONCLUSIONS

In summary, our results suggest that additional exploration of the potential role that acceptance plays in the process of adjusting to hearing problems would be a fruitful endeavour, particularly with regard to understanding the role that acceptance plays in the journey of PHI. However, much work remains to be performed. Specifically, a coherent theoretical framework is needed to account for what role, if any, acceptance plays with regard to adjusting to hearing problems. One cannot take for granted the fact that the successful management of other conditions, which all entails painful experiences (eg, tinnitus, chronic pain and anxiety), is relevant to hearing disability, which instead is characterised by the loss of (auditory) experiences. In addition, future research must examine the longitudinal stability of acceptance and its relevance to objective measures of hearing disability as well as the utility of the current structure of the HDAQ and whether it can successfully alleviate the suffering usually associated with hearing disability.

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