Stigmatization of hearing aids in Germany – a data-driven analysis

Stigmatisierung von Hörgeräten in Deutschland – eine datengestützte Analyse

Abstract

Hearing loss (HL) is increasingly prevalent, yet uptake of hearing aids (HA) remains low – partly due to stigma. This study explored in an online survey the HL and HA stigma in Germany and their relationships with mental health, self-concept, and age perception using validated scales. Stigma levels were generally low, with no significant differences across hearing status groups. However, stigma towards HL was consistently higher than towards HAs, and both types of stigmata were moderately correlated. Random Forest modeling identified HL stigma, anxiety, self-esteem, and age as key predictors of HA stigma. Correlation analyses showed that higher stigma was associated with poorer mental health and lower self-concept, particularly among those with HL. Negative age perceptions were also linked to higher stigma levels.
The representativeness of the results is limited by the highly educated sample and the under-representation of individuals with untreated HL. Future research and counseling practices should holistically address the psychological impact of internalized stigma and shift focus on acceptance of HL itself to improve hearing health outcomes.

Keywords: stigma, hearing loss, hearing aids, self-concept, mental health, age perception

Zusammenfassung

Hörverlust (HV) tritt zunehmend häufiger auf, dennoch bleibt die Versorgung mit Hörgeräten (HG) gering – unter anderem aufgrund von Stigmatisierung. Diese Studie untersuchte mithilfe einer Online-Umfrage in Deutschland das Stigma gegenüber HV und HG sowie dessen Zusammenhänge mit psychischer Gesundheit (Ängstlichkeit, Depressivität), Selbstkonzept (Selbstwertgefühl, Selbstwirksamkeit) und Alterswahrnehmung anhand validierter Skalen.
Die Stigmatisierungswerte waren insgesamt niedrig, ohne signifikante Unterschiede zwischen den Gruppen mit unterschiedlichem Hörstatus. Allerdings war das Stigma gegenüber HV höher als gegenüber HG, wobei beide Formen des Stigmas moderat miteinander korrelierten. Ein Random-Forest-Modell identifizierte HV-Stigma, Ängstlichkeit, Selbstwertgefühl und Alter als zentrale Prädiktoren für HG-Stigma. Korrelationsanalysen zeigten, dass höheres Stigma mit einer schlechteren psychischen Gesundheit und einem schwächeren Selbstkonzept einherging – insbesondere bei Personen mit HV. Auch negative Alterswahrnehmungen standen im Zusammenhang mit erhöhtem Stigma.
Die Aussagekraft der Ergebnisse ist durch den hohen Bildungshintergrund der Stichprobe sowie der Unterrepräsentation von Personen mit unbehandeltem HV eingeschränkt. Zukünftige Forschung und audiologische Beratung sollten die psychologischen Auswirkungen internalisierter Stigmatisierung berücksichtigen und den Fokus stärker auf die Akzeptanz des HV selbst richten, um die Hörgesundheit zu fördern.

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Schlüsselwörter: Stigma, Hörverlust, Hörgeräte, Selbstkonzept, Wohlbefinden, Alternswahrnehmung

Introduction

Hearing loss (HL) affects around 1.5 billion people globally [1]. As the prevalence of HL increases with age [2], the number of affected people is rising in the aging population [1]. Interventions such as hearing aids (HA) and cochlear implants (CI) improve communication and quality of life [3], but adoption rates are still low [2]. Besides device related reasons like discomfort or low trust in the benefit from HAs, stigma associated with HL and HA use may be another barrier for help seeking and HA uptake [4], [5].
Public stigma refers to negative judgment held by an unaffected group towards those with certain characteristics, such as HL. Internalized stigma occurs when affected individuals adopt stereotypes as their own beliefs, probably resulting in high stress levels, poorer self-concept, or even depression and anxiety, eventually impacting seeking hearing rehabilitation or social interactions [4]. People with HAs are often perceived as senile, less capable, or undesirable communication partners, leading to discrimination and social rejection [4]. Despite advances in technology, stereotypes on HAs persist [5].
Although the significance of stigma in hearing healthcare is increasingly recognized, research on stigma's impact on self-concept and mental health is limited, and cultural differences suggest that findings from one country may not apply universally [6]. To our knowledge, no recent comprehensive study in Germany has examined the level of HL and HA stigma and its relationship with mental health, self-concept, and age perception. A deeper understanding of these factors is essential to inform interventions aimed at reducing stigma and improving access to hearing healthcare.
The current study aimed to explore 1) the stigma towards HL and HAs in Germany and its predictors, 2) their relations to mental health and self-concept, and 3) their associations to age perception.

Methods

Data collection ran from August to November 2024 by an anonymous 30-min online survey operated on LimeSurvey platform. Participants were required to be at least 18 years old and proficient in German. They were approached through targeted recruitment via online forums and email distribution lists of various institutions, some specific for elderly or people with HL. The study has been voted by the ethics committee of FAU (Friedrich-Alexander-University Erlangen, Faculty of Medicine) and granted exemption from requiring ethics approval. We confirm that informed consent was obtained from all human research participants.
HA stigma was measured by HARQ [7]. SCQ-HL [8] was used for HL stigma for people with HL and an adapted and pretested version (Cronbach's α=0.61) for people without HL. Mental health was measured by BSI-18 [9]. Self-concept was conceptualized through self-esteem, measured with RSE [10], and self-efficacy rated by SWE [11]. Age perception was evaluated by age stereotypes [12] for people under 50, while age perception questionnaire [13] was used for the 50 and older group.
Data preprocessing included min-max normalization (0–1), enabling comparing values across different response scales. Participants with missing data over 80% of all items were excluded (n=1).

Results

The final sample consisted of 370 participants with an age range of 18–88 years (M=46, SD=19). Ninety-six participants were females, 62 males, and 2 of diverse gender. The sample was highly educated, with 68% having a high-level education and 17% were working in the audiological field. Age groups were almost balanced, however people without HL were predominant in the age group under 50 and people with HL in the group of 50 and above. People with untreated HL were underrepresented (Figure 1). Among people with treated HL, 72% owned HAs and 28% CIs.

Stigma towards HL and HA

As shown in Table 1, people without HL showed HL and HA stigma values below 0.5, indicating a generally low level of public stigma. The same was true for the internalized stigma of people with treated and untreated HL. There were no differences among the subgroups for HL stigma ($F_{[2,363]}$=1.47; p=n.s.) or HA stigma ($F_{[2,364]}$=0.96; p=n.s.). It thus suggests that, as the levels of public and internalized stigmata are equal, the HA uptake is not related to a change in stigmata. In all subgroups, HL stigma was significantly higher than HA stigma, implying that public and internalized stigma towards technical aids is lower than to the condition of HL itself. Spearman correlation analyses showed for all subgroups moderate associations (Table 2), indicating that HA and HL stigma are related but distinct constructs.

Predictors for HA stigma

A Random Forest classifier was implemented, using demographics and questionnaire scores, with the goal to identify the most important features to predict HA stigma. The test classification accuracy was 85%. SHapley Additive exPlanations (SHAP) values were calculated for each participant's prediction to quantify the importance of each feature. Anxiety, self-esteem and age played the most significant roles, behind HL stigma. It suggests that indi-

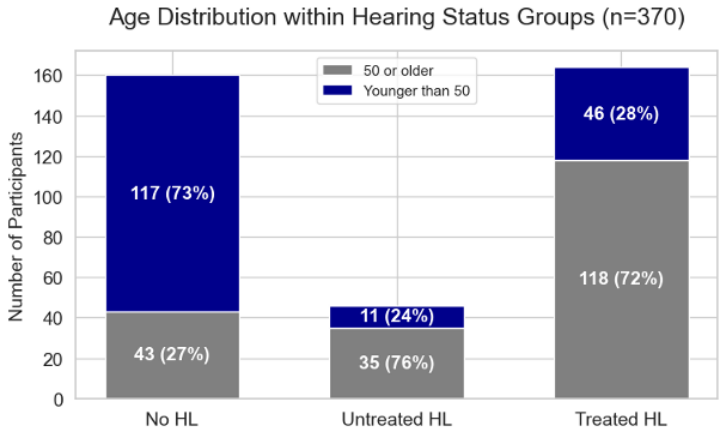

Figure 1: Number of study participants categorized by age group and hearing status

Table 1: Descriptive statistics and comparison of hearing loss (HL) and hearing aid (HA) stigma categorized by hearing status

HL groups	HL stigma mean (SD)	HA stigma mean (SD)	Welch's t-tests
No HL	0.38 (0.14)	0.24 (0.17)	t(301)=–7.98, p<.001
Untreated HL	0.33 (0.16)	0.20 (0.17)	t(90)=–3.80, p<.001
Treated HL	0.38 (0.18)	0.18 (0.15)	t(326)=–11.02, p<.001

Table 2: Spearman correlation results assessing relationships between HA stigma (HA-S) and HL stigma (HL-S) and depression, anxiety, self-esteem, self-efficacy and age perception categorized by hearing status. Significance: p<.05(*), p<.01(**), p<.001(***)

		Depression	Anxiety	Self-esteem	Self-efficacy	Age perception	HA-S
HL-S	no HL	0.13	0.07	-0.17*	-0.13	0.15	0.39***
	untreated HL	0.27	0.19	-0.41**	-0.29	0.4**	0.42**
	treated HL	0.34***	0.38***	-0.45***	-0.33***	0.28***	0.58***
HA-S	no HL	0.33***	0.24**	-0.25**	-0.22**	0.25**	1.0
	untreated HL	0.46**	0.19	-0.45**	-0.02	0.25	1.0
	treated HL	0.30***	0.32***	-0.35***	-0.36***	0.34***	1.0

viduals with higher anxiety and lower self-esteem were more likely to be predicted with higher HA stigma as well as younger participants.

Relation to mental health and self-concept

Spearman correlation analyses revealed that both HA and HL stigma were associated with poor mental health, i.e. higher depression and anxiety, and low self-concept, i.e. reduced self-esteem and self-efficacy, especially in individuals with HL (Table 2). The strongest effects of HA stigma were observed in the untreated HL group regarding depression and self-esteem. The effects of HL stigma were strongest in the treated HL group related to self-concept and mental health, while associations were weaker or absent in other subgroups. These findings highlight the psychological burden of stigma, particularly for those affected by hearing difficulties.

Relation to age perception

Spearman correlation analyses revealed positive relations between age perception and HA stigma across all subgroups (Table 2), indicating that negative age perception is playing a role in HA stigma formation. Overall, this association is also shown for stigma towards HL. Interestingly, the only moderate correlation was shown by people with untreated HL, suggesting that for them negative age perception might have a stronger influence in the process of accepting HL.

Discussion

The present study revealed consistently low levels of internalized stigma with some individuals still reporting stigma-related experiences, similar to the findings of Timmer et al. [14]. Further, we revealed analogous trends regarding public stigma.

Despite stigma levels were low, HL stigma was more pronounced than HA stigma. This is consistent with results

presented by Meyer et al., who also reported stronger perceived stigma related to HL than to HAs [15]. Together with their moderate correlations revealed in our study, these results suggest that HA and HL stigma are related but distinct concepts that should be analyzed separately. The lower HA stigma compared to the HL stigma may be attributed to the modernization and miniaturization of HAs and contradicts other results [5]. This may have contributed to improve the image of HAs, hide them better and reintegrate HA wearers into social life. However, untreated HL and the residual limitations despite HA use are not always concealable, and can still be stigmatizing. Further analyses should evaluate discrepancies between reports on stigma-related experiences and existing scales to develop improved instruments that comprehensively conceptualize HA and HL stigma. The representativeness of the results is limited due to the highly educated sample and underrepresentation of individuals with untreated HL, but not by the inclusion of people working in the audiological field, who did not report differently from people without professional relation to HAs or hearing research. Consistent with Ekberg and Hickson's observation that the decision to disclose HL is shaped by social stigma [8], our findings indicate that internalized stigma is strongly associated with mental health, self-concept, and negative age perception – particularly among individuals with untreated HL. This suggests that even as public stigma declines, its internalized forms remain impactful and should be addressed through targeted interventions that foster positive mindsets and promote hearing health. Nickbakht et al. pointed out that acousticians, in contrast to above mentioned and our results, still see stigma towards HAs as the primary barrier for HA uptake [16]. This implies that acousticians should be educated to shift their counselling focus towards concerns related to HL rather than HA appearance.

Notes

Conference presentation

This contribution was presented at the 27th Annual Conference of the German Society of Audiology and published as an abstract [17].

Competing interests

The authors declare that they have no competing interests.

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