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Telehealth utilization and perceptions among deaf or hard of hearing adults: A cross-sectional analysis of the HINTS6 national dataset

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ABSTRACT

Objective: Telehealth has emerged as a vital medium for healthcare delivery and has been integrated increasingly in clinic and hospital settings in the post-COVID-19 era. However, accessibility of telehealth for individuals who are deaf or hard of hearing (DHH) remains underexplored. As effective communication is critical to high-quality healthcare, a deeper understanding of how DHH individuals interact with telehealth and identifying specific barriers they face can inform targeted interventions to improve care.

Methods: We conducted a cross-sectional analysis of the 2022 Health Information National Trends Survey (HINTS 6), a nationally representative dataset. Respondents were stratified by self-identified DHH status. Demographic, internet access, health behavior, and telehealth perception variables were compared between DHH and normal hearing individuals. Statistical analyses were performed using chi-square tests and *t*-tests.

Results: Among 5694 respondents, 521 identified as DHH. Chi-square testing found that DHH patients reported poorer general health ($p < 0.01$), lower internet use ($p < 0.01$), and less engagement with online health resources ($p < 0.01$), with similar rates of telehealth being offered and utilized. However, DHH individuals were less likely to perceive telehealth as convenient ($p = 0.04$) and more likely to cite difficulty using the platform ($p = 0.01$). They were also more likely to value the inclusion of others in their telehealth visits ($p < 0.01$) and report technical issues ($p < 0.01$).

Conclusions: While DHH individuals use telehealth at similar rates to the general population, they face significant barriers related to convenience, usability, and communication. Enhancing platform accessibility and expanding support for these patients can help reduce difficulties and further promote equity in telehealth.

1. Introduction

As telehealth and remote healthcare have emerged as critical tools in expanding access to healthcare, especially since the COVID-19 pandemic, ensuring equitable access for all patient groups has become increasingly important. However, the efficacy and accessibility of telehealth among patients who are deaf or hard of hearing (DHH) remain understudied. Given that effective communication is central to patient-centered care and that auditory communication difficulties may be magnified during telehealth, it is vital to understand how telehealth may accommodate or hinder populations with communication-related disabilities [1]. DHH individuals may face unique structural, technological, and engagement barriers when participating in telehealth [1–3].

Previous studies have reported that individuals with hearing loss have decreased satisfaction with healthcare and experience greater disparities in access and outcomes [4–7]. DHH patients frequently experience systemic healthcare inequities, including reduced access to preventive services and poorer health literacy outcomes [8–10]. Furthermore, there is substantial evidence suggesting that DHH patients frequently rely on visual cues or sign language interpreters, which may not be effectively supported in current telehealth platforms [11–13]. Recent qualitative analyses have found that DHH patients often experienced communication challenges, especially with regards to poor interpretation during telehealth [3,14] or increased avoidance of digital health communication tools [15], which further underscores potential gaps in digital health accessibility. Specifically, video remote interpreting, which is inconsistently used, has been shown to have poor satisfaction, with one study reporting that only 41 % of DHH patients

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were satisfied with video remote interpreting quality in healthcare settings [14]. Despite the proliferation of telehealth technologies, national-level data evaluating the experience of DHH individuals with these services is limited. Identifying barriers specific to DHH patients, including those related to technology access, usability, communication, or demographics, can guide the development of inclusive policies and interventions.

In this study, we compared telehealth use and perceptions between DHH and normal hearing (NH) patient populations using the Health Information National Trends Survey (HINTS6), a nationally representative dataset from the United States. By investigating differences in telehealth access, utilization, and satisfaction between DHH and NH individuals, we aim to evaluate how emerging remote healthcare technologies may impact vulnerable patient populations.

2. Methods

2.1. Data source

We used publicly available data from the Health Information National Trends Survey (HINTS 6), administered by the National Cancer Institute [16]. The HINTS 6 dataset, released in 2022, collected a nationally representative dataset on access and use of health-related information, including questions on telehealth use, technology access, and self-reported health behaviors [17].

2.2. Outcomes

Patients were stratified based on their response to the survey question: “Are you deaf or do you have serious difficulty hearing?” The analyzed data was further restricted to individuals with valid responses regarding telehealth use and preferences. Other extracted variables included age, birth gender, race/ethnicity, education level, employment status, insurance coverage, self-reported general health status, internet use, and whether they had used the internet for health information.

Key telehealth questions included whether care was received via telehealth, subsequent positive motivations of telehealth (such as it being perceived as convenient), the ability to include others, and if negative concerns like privacy or technological difficulty created additional barriers. Telehealth-specific questions were further analyzed to summarize the proportion of respondents in each group who endorsed each perception, and statistical significance was calculated for group comparisons.

2.3. Statistical analysis

Descriptive statistics were used to compare the DHH and NH patients in terms of sociodemographic and telehealth experiences. Group differences in categorical variables were tested using chi-square tests and *t*-tests for continuous variables. All statistical analyses were performed using RStudio (Posit PBC, Boston, MA. R version 4.3.1). A *p*-value <0.05 was considered statistically significant.

3. Results

A total of 5694 respondents to the HINTS6 survey were included in analysis, comprising 521 individuals who identified as DHH and 5173 who did not identify as DHH. Across survey respondents, the DHH group was significantly older than the NH group (DHH mean age = 69.4 years [SD = 16.9]; NH mean age = 54.8 years [SD = 16.9], $p < 0.01$) and were more likely to be male (51.6 % vs 38.4 %, $p < 0.01$) and Caucasian (62.0 % vs. 54.5 %, $p < 0.01$). Additionally, DHH respondents were more likely to report lower educational attainment levels (11.3 % vs. 5.9 %), less likely to hold a college degree (35.5 % vs. 47.7 %, $p < 0.01$), and more likely to be unemployed (78.9 % vs 45.8 %, $p < 0.01$). Insurance coverage was slightly higher among DHH individuals (95.4 % insured) than NH individuals (91.7 %, $p < 0.01$). General health ratings showed DHH respondents were less likely to report excellent or very good health ($p < 0.01$).

3.1. DHH patients reported lower digital health engagement at baseline

DHH patients were less likely to use the internet (69.3 % vs 83.6 %, $p < 0.01$) and less likely to have used the internet to look for health or medical information in the last 12 months (55.7 % vs 72.0 %, $p < 0.01$, Table 1). Furthermore, DHH patients reported lower usage of patient portals to access online medical records ($p < 0.01$). However, there were no significant differences when patients were asked if they felt they had received high-quality care ($p = 0.17$) or delayed care in the last 12 months ($p = 0.67$). Notably, a strong preference for in-person visits over telehealth was observed in both groups, with 91.5 % of DHH participants and 88.4 % of NH participants indicating this preference ($p = 0.612$).

DHH Patients Experienced Greater Telehealth Challenges Despite Similar Utilization Rates.

Utilization of telehealth care in the past 12 months was similar between DHH and NH groups (43.0 % vs. 41.1 %, $p = 0.44$, Table 2). Both groups had been offered telehealth services at similar rates (22.5 % vs. 20.7 %, $p = 0.5$). Motivations for using telehealth were also comparable between groups, including avoiding exposure to illness (49.5 % vs. 47.3 %, $p = 0625$) and acting on healthcare provider recommendations (74.5

Table 1
Demographics of cohort stratified by hearing status.

Parameter	DHH (*n* = 521)	NH (*n* = 5173)	P-Value
Age (Mean, SD)	69.4 ± 14.6	54.8 ± 16.9	<0.01
Sex (N, %)			<0.01
Male	269 (51.6 %)	1987 (38.4 %)	
Female	252 (48.4 %)	3186 (61.6 %)	
Ethnicity (N, %)			<0.01
Non-White	198 (38.0 %)	2354 (45.5 %)	
White	323 (62.0 %)	2819 (54.4 %)	
Education (N, %)			<0.01
Less than high school	59 (11.3 %)	307 (5.9 %)	
High school graduate	117 (22.5 %)	920 (17.8 %)	
Some college	160 (30.7 %)	1478 (28.6 %)	
College graduate or more	185 (35.5 %)	2468 (47.7 %)	
Employed (N, %)	110 (21.1 %)	2803 (54.2 %)	<0.01
Health Insured (N, %)	497 (95.4 %)	4742 (91.7 %)	<0.01
General health (N, %)			<0.01
Excellent	31 (6.0 %)	540 (10.4 %)	
Very good	142 (27.3 %)	1834 (35.5 %)	
Good	200 (38.4 %)	1924 (37.2 %)	
Fair	119 (22.8 %)	752 (14.5 %)	
Poor	29 (5.6 %)	123 (2.4 %)	
Delayed needed care (N, %)	150 (28.8 %)	1541 (29.8 %)	0.67
Use internet (N, %)	361 (69.3 %)	4375 (86.4 %)	<0.01
Used internet to look for health/medical information (N, %)	290 (55.7 %)	3725 (72.0 %)	<0.01
PCC Scale (Mean, SD)	76.5 ± 23.6	77.5 ± 22.2	<0.01

Table 2
Perceptions of telehealth stratified by hearing status.

Parameter (N responses)	DHH	NH	P-Value
Received telehealth care ($n = 5612$) (N, %)	222 (43.0 %)	2097 (41.1 %)	0.44
Offered telehealth option ($n = 2617$) (N, %)	56 (22.5 %)	489 (20.7 %)	0.55
Reasons for telehealth (N, %)			
Avoid exposure ($n = 2217$)	93 (49.5 %)	980 (47.3 %)	0.62
Convenience ($n = 2211$)	105 (56.1 %)	1292 (63.8 %)	0.04
HCP Recommended ($n = 2216$)	140 (74.5 %)	1443 (71.2 %)	0.38
Include Others ($n = 2207$)	52 (33.2 %)	377 (18.7 %)	<0.01
Wanted Advice ($n = 2205$)	47 (25.4 %)	557 (27.6 %)	0.58
Reasons against telehealth (N, %)			
Concerned about privacy ($n = 547$)	11 (19.6 %)	76 (15.5 %)	0.54
Prefer in person (n = 547)	52 (92.9 %)	545 (88.4 %)	0.43
Too difficult ($n = 544$)	19 (34.5 %)	95 (19.4 %)	0.01
Telehealth care as good as in-person ($n = 2133$) (N, %)			0.36
Strongly agree	54 (30.7 %)	719 (36.7 %)	
Somewhat agree	77 (43.8 %)	738 (37.7 %)	
Somewhat disagree	28 (15.9 %)	314 (16.0 %)	
Strongly disagree	17 (9.7 %)	186 (9.5 %)	
Had technical problems with telehealth visit (n = 2133) (N, %)			<0.01
Strongly agree	22 (12.5 %)	103 (5.3 %)	
Somewhat agree	37 (21.0 %)	284 (14.5 %)	
Somewhat disagree	25 (14.2 %)	298 (15.2 %)	
Strongly disagree	92 (52.3 %)	1272 (65.0 %)	

% vs. 71.2 %, $p = 0.38$).

However, DHH participants were significantly less likely to cite convenience as a benefit of telehealth compared to NH participants (56.1 % vs 63.8 %, $p = 0.04$). Conversely, DHH patients more frequently reported that the ability to include others, such as family or other caregivers, as a motivating factor for telehealth use (34.7 % vs. 18.5 %, $p < 0.01$). Lastly, DHH individuals were also more likely to report that telehealth platforms were too difficult to use (34.5 % vs. 19.6 %, $p = 0.01$). Perceptions of telehealth care quality relative to in-person care were similar between groups ($p = 0.36$), although DHH participants were significantly more likely to report technical difficulties ($p < 0.01$).

4. Discussion

In this study, we highlight critical disparities in telehealth access, engagement, and perception between DHH and NH individuals. Among 5694 HINTS6 survey respondents, DHH individuals had lower internet use, less engagement with online health resources, were less likely to perceive convenience as a benefit of telehealth services, and more likely to view platform difficulty as a barrier and experience technical problems.

DHH patients often rely on visual cues, written text, lip-reading, and/or sign language. Telehealth platforms, which typically prioritize verbal rather than visual communication, may not adequately support these needs. Inadequate interpreter availability, poor video quality, and lack of visual accommodations can further hinder care delivery during telehealth, which may partially explain why DHH patients reported higher rates of technical difficulties. These challenges may contribute to increasing disparities in health outcomes for DHH individuals engaging in remote healthcare. In addition, our analysis found that the ability to include family or other caregivers was a motivating factor for telehealth, suggesting reliance on social support mechanisms to be a unique positive characteristic of telehealth.

We used the HINTS6 nationally representative dataset, which provides broad generalizability across U.S. adult populations and includes a sizable sample of DHH individuals. Our findings highlight not only accessibility issues, but also broader communication and increased support needs specific to the DHH population, suggesting that telehealth platforms must be adapted to reduce usability barriers and to better accommodate the inclusion of DHH individuals. These considerations are critical for equitable digital health integration among patients with hearing loss, especially as telehealth continues to evolve into a mainstream mode of healthcare delivery.

Much of the prior research on DHH experiences with telehealth consists of qualitative studies focusing on identifying specific communication barriers or general access and has not specifically evaluated barriers unique to DHH individuals [8,18]. Our study addresses not only access (e.g., whether telehealth was received or offered), but also perception (convenience, need to include others in care), offering a richer understanding of how telehealth is experienced by DHH individuals compared to hearing populations. Currently, there is no set of institutional standards in the telehealth care of DHH patients. The National Association of the Deaf recommendation statement on COVID-19 DHH communication access, developed with a consensus by deaf and hard of hearing consumer groups, deaf healthcare providers and other subject matter experts, is that providers assess each patient's communication needs individually and prioritize preferred method(s) of communication, whether through remote interpreting, captioning, or use of accessibility devices [19,20]. Based on our findings, future telehealth design and policy improvements may enhance accessibility and communication equity by assessing specific technological difficulties faced by DHH patients, as well as further analysis on how to improve video remote interpretation. A deeper understanding of these dynamics is essential for crafting telehealth systems that are inclusive and compliant with accessibility standards.

Our study has several limitations. First, the analysis is based on cross-sectional data from the HINT6 survey and relies on self-reported responses, which may be subject to recall bias and limit causal interference. Notably, the classification of participants as "deaf or hard of hearing," lacks granularity regarding the degree or type of hearing loss, age of onset, primary communication method, or use of assistive technologies, all of which may shape telehealth experiences. In addition, the survey did not capture details about the telehealth modality used (e.g., video vs. phone) or the presence of accessibility features, which may have provided important context for understanding user experiences. Future studies should incorporate qualitative methods to further explore the telehealth experiences of DHH individuals and identify specific communication barriers and opportunities for improvement.

5. Conclusions

This study addresses an urgent and timely issue: the accessibility of telehealth for DHH individuals, particularly as virtual care continues to expand and becomes a vital feature in modern healthcare systems. Overall, while DHH and NH individuals had similar levels of telehealth use and were equally likely to be offered remote care, key differences emerged in ease of use, perceived convenience, and the importance of including others during virtual consultations.

CRediT authorship contribution statement

Andrew W. Liu: Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Sara J. Yi:** Data curation, Formal analysis, Writing – original draft. **Divya A. Chari:** Conceptualization, Data curation, Formal analysis, Supervision, Writing – original draft, Writing – review & editing.

Level of evidence

4.

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None.

Declaration of competing interest

The authors declare that they do not have any conflicts of interest.

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