


Hearing aid Experiences of Adult Hearing aid Owners During and After Fitting: A Systematic Review of Qualitative Studies

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Abstract

There has been an increasing number of qualitative studies exploring the experiences and perceptions of adult hearing aid owners throughout their hearing aid journey. As these studies and reported experiences vary greatly, a systematic review was conducted to identify and synthesize the key concepts in adult hearing aid owners' experiences during and after fitting. A systematic search of three electronic databases was conducted, yielding 443 results. Articles were evaluated for inclusion based on pre-determined eligibility criteria, including conventional, smartphone-connected, and direct-to-consumer hearing devices. Twenty-five studies met the inclusion criteria. The quality of the included articles was evaluated using the Rating of Qualitative Research scale. Guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) and the Synthesis Without Meta-Analysis (SWiM) were followed. A narrative synthesis was conducted, and studies were grouped into three main domains, namely experiences of owners related to a) hearing aid adoption and fitting ($n = 3$), b) hearing aid use ($n = 20$), and c) hearing aid sub-optimal use ($n = 25$). Hearing aid owners mainly reported on how their attitude towards hearing aids affected experiences during the fitting stage. Improved psychosocial functioning was the most prevalent perceived benefit of hearing aid use. Owners described sub-optimal use in terms of hearing device-related and non-device-related concepts. The COM-B (capability, opportunity, motivation-behavior) model is used to discuss specific service-delivery, hearing-device, and hearing-aid-owner related concepts and clinical implications, including behavior change techniques to enhance understanding of the concepts that hearing aid owners perceive as essential to improve hearing aid experiences.

Keywords

hearing loss, hearing aid, owner experiences, qualitative research, mixed-methods research

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Introduction

The World report on hearing from the World Health Organization (WHO, 2021) estimates that by 2050 nearly 2.5 billion people will be living with some degree of hearing loss and of these, at least 700 million will require rehabilitation services. Hearing aids (HAs) are a common treatment for hearing loss. However, owning a HA does not necessarily result in using it. Studies suggest that 20 to 50% of adults who own a HA use it sub-optimally (i.e., non-use, limited use) (Dillon, Day, Bant, & Munro, 2020; Hartley et al., 2010; Hougaard & Ruf, 2011). Furthermore, universal HA use is concerning low, as only 17% of people needing HAs use them (Orji et al., 2020). HA use may be affected by various experiences of HA owners throughout their hearing healthcare journey. This journey can be divided into three stages: 1) the stage prior to help-seeking and uptake of HAs (i.e., pre-fitting); 2) the period covering the fitting process; and 3) the short- or long-term period after the HA fitting (Knudsen et al., 2010).

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To date, most research on factors contributing to the HA journey has been conducted using quantitative methods (Knudsen et al., 2010). Various quantitative studies have examined HA benefit (i.e., improvements in hearing function and communication ability as a result of HA use) and HA satisfaction (i.e., pleasurable emotional experience as an outcome of an evaluation of performance) for adult HA users (e.g., Cox & Alexander, 1992; Cox et al., 2007; Humes et al., 2002; Munro & Lutman, 2004; Takahashi et al., 2007; Uriarte et al., 2005). However, qualitative research is emerging in the field of audiology (Knudsen et al., 2012) as a method for exploring the experiences and perceptions of HA owners throughout their HA journey (Manchaiah et al., 2011), with the potential to assist researchers and hearing care professionals in gaining knowledge and insight from the patients' perspective. This may contribute to improving hearing health care delivery (Knudsen et al., 2012) and achieving patient- or consumer-driven healthcare (Cox, 2003). Several qualitative studies have been published on many aspects of adult HA owners' experiences, including perceived benefit and satisfaction (e.g., Dawes et al., 2014; Laplante-Lévesque et al., 2012), HA management (Bennett, Meyer et al., 2018), HA use and difficulties associated with use (e.g., Bennett, Laplante-Lévesque et al., 2018; Gallagher & Woodside, 2018; Laplante-Lévesque et al., 2013; Lockey et al., 2010), and residual psychosocial impacts of hearing loss (e.g., Bennett et al., 2021; Heffernan et al., 2016; Holman et al., 2019).

Adults constitute the majority of patients attending audiology practices and report diverse HA experiences. Consequently, it is difficult to ascertain how these experiences relate to and how different stages influence them in the HA journey (audiological rehabilitation). Therefore, there is a need to systematically review qualitative studies on HA experiences of adult HA owners. Systematic reviews of qualitative studies consolidate the findings from primary qualitative research studies. Within the context of health and social care, these reviews can help to identify factors that affect the successful implementation and outcomes of interventions from the patients' perspectives (Harris et al., 2018). A narrative approach is used to synthesize and describe the identified factors to facilitate understanding the concepts HA owners report contributing to their HA experiences. To further enhance our understanding of these concepts from the HA owners' perspectives, findings here are discussed using the Capability, Opportunity, Motivation, Behaviour (COM-B) model (Michie et al., 2011). The COM-B model specifies that for a given health behavior (here, HA use) to occur, the person (here, HA owner) needs sufficient capabilities, opportunities, and motivation. Capabilities refer to physical and/or psychological abilities to engage in or perform the behavior (HA use) and thus include the necessary knowledge and skills. Opportunity is defined as external factors that make the desired behavior (here, HA use) possible or prompt it.

These include physical environmental factors and factors from the societal and/or cultural context that determine the way we think about things. Motivation refers to the cognitive processes that drive and direct behavior, including emotions (automatic processes) and analytical decision-making (reflective processes). This behavior change model has been applied successfully in various previous studies to describe and understand patient behavior from different perspectives, e.g., audiologists (e.g., Barker et al., 2016), audiology practice staff members (e.g., Ekberg et al., 2020), and patients (e.g., Coulson et al., 2016; Gomez et al., 2021; Maidment et al., 2019).

This systematic review aims to identify and synthesize the key concepts of HA owners when describing their experiences of HAs and to map or link these concepts to the components of the COM-B model. For this review, HA experiences relate to the second and third stages of the patient journey. Consequently, it includes experiences of HA fitting (second stage) and experiences in the third stage, including the initial days of HA use (e.g., acclimatization or adjustment to the HAs), experiences with specific features and functionalities (e.g., smartphone connectivity), and over longer periods of HA use (e.g., persistent challenges, factors influencing HA experiences and effect on quality of life).

Methods

This review is reported in accordance with the Preferred Reporting Items for Systematic

Review and Meta-Analyses (PRISMA 2020) statement (Page et al., 2021) and the Synthesis Without Meta-analysis (SWiM) reporting guideline (Campbell et al., 2020). The PRISMA 2020 and SWiM checklists can be found in Supplemental Tables 1 and 2. The study was registered in the Prospero international prospective register of systematic reviews (Record ID 260489).

Eligibility Criteria

Articles reporting on qualitative studies describing HA experiences from HA owners' perspectives were included in this review. The Population Intervention Comparison Outcome Study Design Timeline (PICOST) framework was used to select the studies' inclusion and exclusion criteria. Table 1 displays the inclusion and exclusion criteria. Note that the terminology of HA owners was chosen to include lived experiences from both HA users and non-users specifically.

Search Strategy

The review was conducted using keyword searches in the Scopus, PubMed, and CINAHL electronic databases from their inception until the date the search was concluded (06 December 2021). The search strategy used a list of single

Table 1. The Population Intervention Comparison Outcome Study Design Timeline (PICOST) Eligibility Criteria

Study characteristic	Inclusion criteria	Exclusion criteria
Population	Adults (18+ years of age) with unilateral or bilateral hearing loss, of any degree and type, owning HA(s). Studies that have HA owners and clinicians or HA owners and significant others as participants only if the HA owners' and the clinicians' / significant others' content are reported separately.	Data focused on children and adolescents (< 18 years of age). Studies including only participants with cognitive or neurogenic conditions such as dementia, Alzheimer, cognitive problems, and mental health disorders.
Intervention/Exposure	Unilateral or bilateral HA(s): conventional or direct-to-consumer hearing devices such as the Personal Sound Amplification Systems (PSAPs), over-the-counter (OTC) and/or self-fitting, air-conduction type of HAs.	Studies focused other than air conduction/conventional type of HAs (e.g., bone-conduction hearing devices, cochlear implants etc.).
Context	Potential settings include laboratory and clinical environments.	No exclusions
Outcome	Hearing aid experience	Hearing disability, hearing handicap, hearing difficulties. Studies focusing on individuals with tinnitus as their main complaint.
Study designs	Qualitative research methods: these could be responses to open-ended questions, interviews, focus groups or conversations. Mixed-method studies: only the qualitative part was included in the review, e.g., surveys with open-ended text responses if raw transcripts/direct quotes were available or could be resourced from the authors.	Studies with quantitative research methods only reporting quantitative research data including standardized outcomes measures of HA benefit and satisfaction (e.g., IOI-HA, SADL).
Timeline	Any	No restrictions
Other: Publication type	Primary studies published in peer-reviewed journals	Non-peer reviewed publications, Reviews, Discussion papers, Dissertation/ Thesis, Conference papers
Other: Language	Only research reports available in English were included.	Studies published in languages other than English.

Note: HA = hearing aid(s)

keywords and combinations based on two key concepts, as illustrated in Table 2. Furthermore, a hand search of the references of the included articles was carried out, although no additional eligible studies were identified. In accordance with the recommendations of Thomas et al. (2004), two reviewers independently completed the searches (IO and Graduate Student) and study selection (IO and Graduate Student). If necessary, the second author (VM) resolved the disagreement (8/59 articles assessed for full-text review and eligibility) and made a final decision.

Study Selection

Electronic search results were exported to Rayyan software (<https://www.rayyan.ai/>) (Ouzzani et al., 2016). The search yielded 1,130 articles, of which 687 duplicates were deleted, leaving 443 unique references. The Rayyan software was used to screen these individual references and record inclusion decisions. The initial screening was based on the content of the title and abstract. A full-text review followed. Studies were included if they met the inclusion criteria (see

Table 1). Further details of the selection process are shown in Figure 1.

Data Extraction

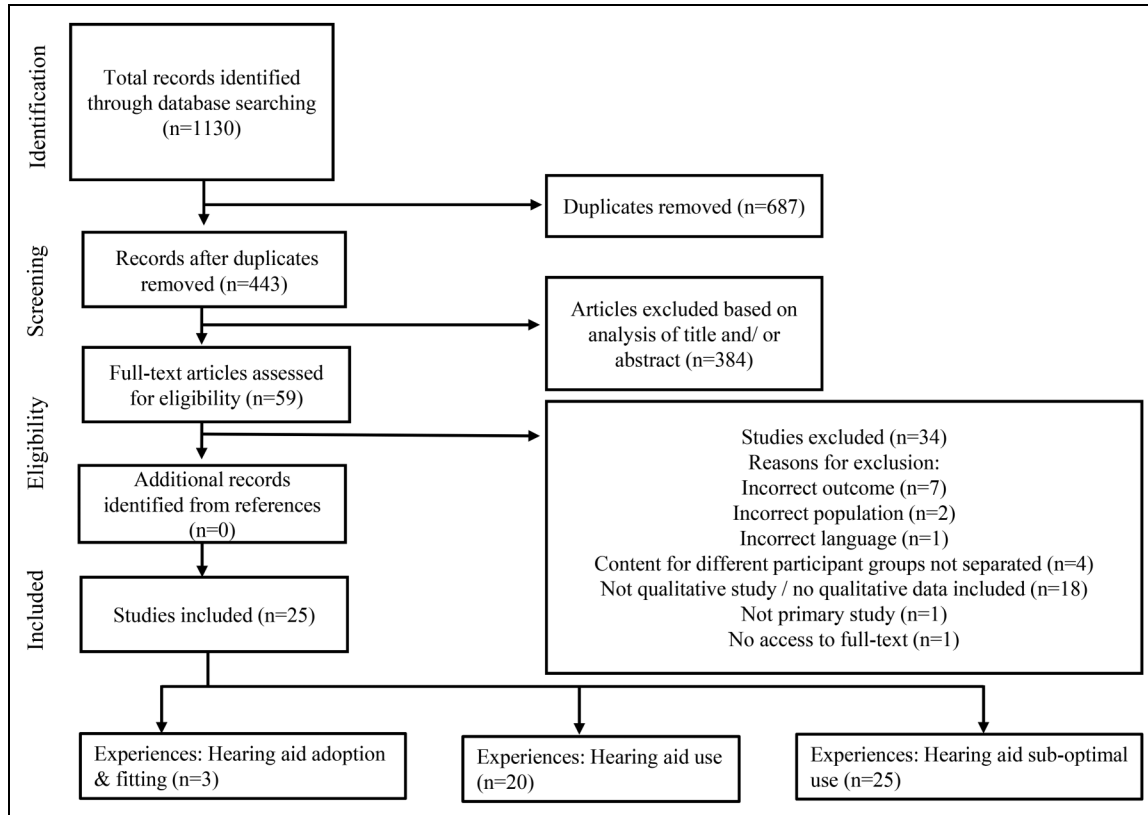
For each article included in the review, the first author (IO) extracted the main study features and data. Information extracted included study authors, title, publication year, study aims relating to HA experiences from HA owners' perspectives, study sample description, data collection methods, data analysis methods, and summary of key findings. The second author (VM) cross-checked the extracted data of 32% of the included studies.

Synthesis of Results

A narrative synthesis was undertaken following guidelines by Campbell et al. (2020), Popay et al. (2006), and Noblit and Hare (1988) to summarize and explain the findings of the included studies and to explore possible relationships in the data. The narrative synthesis approach is appropriate as

Table 2. Key Concepts and Keywords for Database Search

Concept 1: Intervention "hearing aid*" OR "hearing device*"	AND	Concept 2: Study design "qualitative" OR "mixed method" OR "mixed design" OR "interview*" OR "open-ended question*" OR "focus group*" OR "brainstorm" OR "workshop" OR "online review*"
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**Figure 1.** PRISMA (preferred reporting items for systematic review and meta-analyses) flow diagram details the search and selection process applied during the systematic review.

Note: Sum of studies from domains > 25, as some studies addressed more than one domain.

it relies on a textual approach rather than the manipulation of statistical data to synthesize and explain the findings from the included studies (Popay et al., 2006). Narrative methods have been recognized as helpful in investigating heterogeneity across primary studies and understanding which aspects of an intervention may be responsible for its success (Light & Pillemer, 1984; Popay et al., 2006). Following the guidelines mentioned earlier, the process of synthesizing the results was as follows:

1. Grouping the 25 included studies to organize common domain-level concepts (HA owners' experiences) across studies: studies were grouped into three main domains: (a) experiences related to HA fitting, (b) experiences related to HA use, and (c) experiences related to HA sub-optimal use.
2. For each specific domain, searching for and grouping the domain-level data reported by HA owners under

descriptive labels ("codes") that contained recurring keywords, e.g., "getting used to", "benefits", and "facilitators" for the domain of experiences related to HA use. The results section discusses these "codes" as sub-domains to the main domains.

3. Considering themes and sub-themes from the included articles that corresponded to these "codes"; domain and sub-domain levels were reviewed and re-grouped where necessary. Thus, this step entailed translating primary themes or concepts reported across studies to explore similarities and/or differences between studies (Noblit & Hare, 1988; Popay et al., 2006). Consequently, thematic analysis can be applied during this process (Popay et al., 2006). The guidelines of Braun and Clarke (2006) were followed to systematically identify the main, recurrent and/or most important themes or concepts relating to HA experiences from the owners'

- perspectives across the included studies. Thematic analysis provided a means of organizing and synthesizing concepts from the studies' themes and sub-themes. The analysis was inductive, i.e., without a complete set of a priori themes to guide data extraction and analysis.
4. The same coding scheme was applied to the other domain-level data relating to experiences of HA fitting and experiences of HA non-use, adding new descriptive labels ("codes"/sub-domains) as required.
 5. An iterative process and ongoing analysis were followed to identify any overlap or differences in the emerging codes and domain-level groupings. The process was complete once all authors reached a consensus on the synthesized concepts for each main domain and sub-domain.

Author IO conducted the synthesis, and the combined results (as agreed by all authors) are reported in the results section.

Quality Assessment

Quality appraisal of the included studies was done using the Rating of Qualitative Research (RQR; Cherney et al., 2013; Simmons-Mackie et al., 2010) scale. The RQR scale was developed specifically for use in communication disorders, is valid and reliable (Cherney et al., 2013), and has previously been used in systematic reviews of hearing healthcare (Manchaiah et al., 2019b). The RQR consists of 16 items that examine rigor and bias in the study design, methods of data extraction, and analysis methods. However, the last two items (treatment fidelity and replicability) were not included in the current rating as they were irrelevant to the studies included. Each of the articles was reviewed by the first author (IO), and a score (yes, no) was assigned to each criterion. The result was a final "quality score" (highest achievable score of 14) for each article. The second author (VM) cross-checked the quality assessment scores of 32% (8/25) of the included studies. There were no discrepancies to be resolved.

Results

From the 443 unique records identified in the searches, 25 studies were deemed appropriate for inclusion (Figure 1). The number of studies excluded for each reason for exclusion is shown in Figure 1. For example, 18 studies appeared to meet the inclusion criteria, but after full-text reviewing, they were excluded as they were not truly qualitative or did not contain qualitative data (e.g., Leek et al., 2008; Lund et al., 2020; Solheim et al., 2018b).

Study Characteristics

Table 3 summarizes the key characteristics (study sample, data collection, data analysis) and classification of the studies in the review. All studies explored the HA owner's

experience with HAs during the fitting and/or post-fitting stage of the hearing care journey. Four studies additionally questioned hearing health care professionals/audiologists (Greasley et al., 2020; Guerra-Zúñiga et al., 2014; Laplante-Lévesque et al., 2013; Ng et al., 2017). However, only qualitative data from HA owners were extracted following the eligibility criteria. In total, the data collected were from 2,526 adult HA owners. From Table 3, it is clear that most studies' participants were owners of conventional HAs (18 studies). In comparison, only four and three studies investigated the experiences of the owners of smartphone-connected and direct-to-consumer (DTC) HAs, respectively. Smartphone-connected HAs connect wirelessly via Bluetooth to smartphones, allowing the user to adjust and personalize their HA (e.g., gain, frequency response, programs, and volume) through an accompanying smartphone application (Maidment et al., 2019). DTC hearing devices can be purchased without prior consultation by a hearing care professional (HCP) and can include personal sound amplification products (PSAPs), direct-mail HAs, and OTC HAs (Manchaiah et al., 2017). Most of the studies' participants' HA experience ranged from first-time users to experienced users, with only three studies focusing on HA owners but non-users. Most of the studies used interviews (e.g., individual, face-to-face semi-structured interviews) as the primary data collection method (see Table 3). Four studies collected data using focus groups, and three used open-ended questions. A combination of data collection methods (e.g., interviews and focus groups) was employed in two studies. Data were mostly analyzed by means of thematic (n = 10) or content (n = 10) analysis procedures, with two studies analyzing according to constant comparative methods. Four studies stated that data collection and analysis were underpinned by additional theoretical frameworks, namely the Behaviour Change Wheel used by Gomez et al. (2021), the Capability, Opportunity, Motivation, Behaviour (COM-B) framework applied by Maidment et al. (2019), an attribution theory used by Ritter et al. (2020), and the Social Representations Theory (Chundu et al., 2021)

Synthesis of Results

Following guidelines for narrative synthesis in systematic reviews (Noblit & Hare, 1988; Popay et al., 2006), the studies were classified into three main domains and sub-domains (Table 3):

1. Experiences related to HA adoption and fitting
2. Experiences related to HA use
 - 2a. Getting used to HAs
 - 2b. Benefits associated with HA use
 - 2c. Facilitators of HA use
3. Experiences related to HA sub-optimal use
 - 3a. Device-related challenges
 - 3b. Non-device-related challenges

Table 3. Summary of key Characteristics and Classification of Studies Included in the Review (n = 25)

Study	Study sample			Type of HA			HA owner experience			Data collection	Data analysis	Classification
	Sample size (adults)	Mean age (years)	Gender	Hearing condition	Conventional	Smartphone-connected	DTC	First time user	Experienced			
Choi et al. (2019)	15	67.9	5 F 10 M	Majority bilateral mild-moderate HL SR hearing; Good to lot of trouble			✓	✓ (n = 12)	✓	FG	Inductive content analysis	2b,c 3a,b
Chundu et al. (2021)	424	58.5	163 F 261 M	-	✓*			✓	✓	Free association task	Content analysis	2a,b,c 3a,b
Dawes et al. (2014)	16	72.9	7 F 9 M	Mild to severe HL SR hearing: scale 1-5 (1 = no difficulty; 5 = very large difficulty)	✓			✓	✓	FG	Content analysis	1 2a,b 3a,b
Gallagher & Woodside (2018)	32 in total, only 22 HA users	71.6	19 F 13 M	SR HL	✓*				✓	Individual, face-to-face semi structured interviews	Thematic analysis	1 2b,c 3a,b
Gomez et al. (2021)	8	71.75	-	Moderate HL in better ear			✓	✓	✓	FG	Thematic analysis	2b,c 3b
Greasley et al. (2020)	176	60.56	78 F 94 M	-	✓*			-	-	Open-ended question	Thematic analysis	2b 3a,b
Guerra-Zúñiga et al. (2014)	16	(65 years +)		Slight to profound HL	✓*			-	-	Individual interviews & FG	Content analysis	2b,c 3a,b
Holman et al. (2019)	14	58	10 F 4 M	Better ear 4FAHL: 16-61 dB HL (M = 36) Worse ear 4FAHL: 21-65 dB HL (M = 42)	✓*			-	-	Individual, face-to-face semi structured interviews	Thematic analysis	2b 3a,b
Keidser et al. (2019)	11	73.2	3 F 8 M	Symmetrical SNHL, very mild to moderately severe (average 4FPTA = 42.5 dB HL)			✓	✓	✓	Face-to-face semi structured interviews	Template analysis of thematic analysis	2a,b,c 3b

(continued)

Table 3. Continued.

Study	Study sample			Type of HA			HA owner experience			Data collection	Data analysis	Classification	
	Sample size (adults)	Mean age (years)	Gender	Hearing condition	Conventional	Smartphone-connected	DTC	First time user	Experienced				Owner, non-user
Koskela et al. (2016)	13	Range: 45–63	5 F 8 M	Bilateral, mild to moderate (26–60 dB HL) SNHL	✓*			✓		Owner	Interviews & case analysis	Content analysis	1 2b,c 3b
Laplante-Lévesque et al. (2012)	34 in total; 23 had HAs	–	19 F 15 M	Majority mild or moderate HL in better ear	✓			✓		Owner	Individual semi-structured interviews	Inductive content analysis	2b,c 3a
Laplante-Lévesque et al. (2013)	17	67 (median)	6 F 11 M	4FPTA in better ear median = 42.5 dB	✓			✓		Owner	FG	Inductive content analysis	2a,c 3a,b
Linssen et al. (2013)	11	Range: 54–80	6 F 5 M	3FPTA (1 kHz + 2 kHz + 4 kHz) ranged 30–65 dB and 28–65 dB in R and L ears respectively.	✓				✓	Owner	Face-to-face semi structured interviews	Inductive thematic analysis	2b,c 3a,b
Lockey et al. (2010)	4	Range: 61–83	4 F	Mild to moderate-severe SNHL	✓			✓		Owner	Face-to-face narrative interviews	Holistic and thematic analysis	1 2b,c 3a,b
Maidment et al. (2019)	20	62.25	7 F 13 M	Mild to moderate HL (mean better ear PTA 0.25–4 kHz = 30.94 dB HL)		Participants all owned conventional HA but for study purposes trialed 1 of the following for 2 weeks; equal number of participants (n = 5) randomly assigned to one of the 4 options: Made-for-smartphone HA; PSAP; Smart-phone “HA” app with wired earphones; Smartphone “HA” app with wireless hearable		✓	✓	Owner	Individual semi-structured interviews	Deductive thematic analysis (COM-B model)	2b,c 3a
Manchaiah et al. (2019a)	1125 online consumer reviews	–	–	–				–	–	Owner	Online consumer reviews	Content analysis and constant comparison methods	2b,c 3a,b
McPherson & Wong (2005)	19	73	13 F 6 M	Majority: mild-moderate SNHL				✓	Not current HA users	Owner	Open-ended interview	–	2b 3a,b

(continued)

Table 3. Continued.

Study	Study sample			Type of HA			HA owner experience			Data collection	Data analysis	Classification
	Sample size (adults)	Mean age (years)	Gender	Hearing condition	Conventional	Smartphone-connected	DTC	First time user	Experienced			
Moroe & Yazanna (2019)	10	Range: 74–85	7 F 3 M	–	✓*				✓	Face-to-face semi-structured interviews	Inductive thematic analysis	3a,b
Ng et al. (2017)	11	Range: 44–74	2 F 9 M	–		✓			✓	Interviews	Constant comparative method	2b,c 3a,b
Ritter et al. (2020)	20	65.6	10 F 10 M	3FPTA (500 Hz + 1 kHz + 2 kHz) ranged 15–50 dB for better hearing ear	✓*				✓	Narrative interview: face-to-face or telephonically	Thematic analysis	3a,b
Skagerstrand et al. (2014)	60	68	21 F 39 M	Bilateral SNHL PTA4 25–81 dB HL	✓				✓	Diary notations	Content analysis	3a
Solheim et al. (2018a)	181	79.2	98 F 83 M	Average HL 49.3 dB	✓				✓	Structured individual interviews	No specific qualitative data analysis; responses obtained during interviews coded according to preset categories	3a,b
Stephens & Meredith (1991)	63; only 38 completed	76.2	37 F 26 M	Mean HL (500–4000 Hz) not exceeding 70 dB in aided ear	✓			✓		Open-ended questionnaire	Individual responses analyzed by weighting system	2b 3a,b
Tyler et al. (1983)	250	67.5	145 F 105 M	Average HL 50 dB HL	✓				✓	Open-ended questionnaire	Weighting system (similar to Stephens & Meredith, 1991)	3a

(continued)

Table 3. Continued.

Study	Study sample			Type of HA			HA owner experience		Data collection	Data analysis	Classification	
	Sample size (adults)	Mean age (years)	Gender	Hearing condition	Conventional	Smartphone-connected	DTC	First time user				Experienced
Vaisberg et al. (2019)	12	67.8	5 F 7 M	Mild to severe SNHL	✓				✓		Semi structured interviews with open-ended interview guide	Content analysis 2b 3a

Note: Classification codes: 1) Experiences related to HA adoption and fitting; 2a) Getting used to HAs; 2b) Benefits associated with HA use; 2c) Facilitators for HA use; 3a) Device related challenges; 3b) Non-device related challenges

*Data available in the manuscript did not specify the type of hearing aids, therefore the authors assumed it to be conventional hearing aids.

HA = hearing aid; DTC = direct-to-consumer; F = female; M = male; HL = hearing loss; SR = self-reported; FG = focus group; dB HL = decibel hearing level; 4FAHL = four frequency average hearing loss; M = mean; SNHL = sensorineural hearing loss; 4FPTA/PTA4 = four frequency pure tone average; 3FPTA = three frequency pure tone average; R = right; L = left; PTA = pure tone average; PSAP = personal sound amplification product; COM-B model = Capability, Opportunity, Motivation, Behaviour model; - = data not available

Table 4. Synthesized Concepts That Adult HA Owners use to Describe HA Experiences During and After Fitting

DOMAIN 1: Experiences related to HA adoption and fitting (n*)	DOMAIN 2: Experiences related to HA use (n*)	DOMAIN 3: Experiences related to HA sub-optimal use (n*)
Attitude of HA owner (2) Audiological service delivery (1) Information counselling (1) Self-perceived hearing loss (1)	<p>2a. Getting used to HAs Acclimatization (4) Information counselling (3) Accepting hearing loss (1) Consistent use (1) Attitude of HA owner (1) Significant others (1) Audiological service delivery (1)</p> <p>2b. Benefits associated with HA use Psychosocial (12) Improved hearing & communication (7) Hearing loss or HA self-management (5) Positive impact on daily life (4) Listening situation specific benefits (4) Education or occupation (4) Beneficial (3) Satisfaction (2) Empowerment (1)</p> <p>2c. Facilitators of HA use Social/ environmental influences (5) Self-perceived hearing loss or self-perceived need (4) Significant others (4) Appearance and design (4) Cost (4) Audiological service delivery (3) Attitude of HA owner (3) Impact on daily life (3) Digital literacy skills (3) Psychosocial (3) Handling (3) Self-perceived benefit or satisfaction (2) Necessity (2) Features/functions/ technology (2) Physical fit (2) Sound quality (2) Accessibility (2) Hearing loss severity (1) Information counselling (1) Capabilities of HA owner (1) Hearing loss or HA self-management (1) HA owner's goals (1) Group aural rehabilitation (1) Support service (1)</p>	<p>3a. Device-related challenges Handling & continuous care (13) Background noise & group conversations (13) Sound quality (11) Physical fit: hearing aid, sound delivery system (9) Listening situation specific challenges (6) Appearance and design (4) Acoustic feedback (4) Device limitations (2) Cost (2) Additional use challenges: smartphone related (1)</p> <p>3b. Non-device-related challenges Psychosocial (stigma) (8) Attitude of HA owner (7) Self-perceived hearing loss or self-perceived need (6) Lack of information counseling (5) Audiological service delivery (5) Lack of self-perceived benefit or satisfaction (4) Social /environmental influences (3) Significant others (3) Digital literacy skills (3) Health-related factors (2) Acclimatization (2) Lack of integration into daily life (1) Dependency (1) Hearing loss severity (1) Capabilities of HA owner (1)</p>

* Number in brackets indicate the number of studies from which the concepts were extracted from. Ordered from most to least often reported. More dense concepts at domains 2 and 3 are indicated in bold print and discussed in the text.

HA = hearing aid

Table 4 summarizes the concepts synthesized from the reported themes and sub-themes of the studies by domain or sub-domain. Supplemental tables 3 to 8 contain domain

or sub-domain specific concepts, the HA categories for which the concepts were reported, and a list of studies from which each concept was extracted and synthesized.

Domains and sub-domains were further classified according to the density of the synthesized concepts. High-dense concepts were synthesized from the themes/sub-themes and reports from many studies, while less-dense concepts were reported by two or fewer studies. Concept density was discussed and agreed upon by all authors. Less dense concepts are listed in the tables, but due to limited space, the description of the results of the second and third domains with their sub-domain below focuses on more dense concepts (reported by three or more studies).

1. Experiences Related to HA Adoption and Fitting:

Three studies reported on owners' experiences during the adoption and fitting of conventional HAs, and four concepts were synthesized from these studies (Table 4 and Supplemental Table 3). A positive, negative or ambivalent attitude of the HA owner towards hearing loss and HAs might result in subsequent positive, negative, or equivocal experiences during this stage of the hearing care journey (Gallagher & Woodside, 2018; Koskela et al., 2016). HA owners report positive experiences when audiological service delivery is perceived as adequate (Gallagher & Woodside, 2018). In contrast, when HA owners describe clinical service delivery as inadequate and information counseling as limited during the adoption and fitting of HAs, this affect their experiences negatively. From the narratives in the study by Lockey et al. (2010), it can be inferred that owners' self-perceived hearing loss, specifically a lack of self-awareness of hearing loss and the consequent effects of hearing loss (e.g., reduced social interaction and isolation) be a barrier to HA adoption and fitting.

2a. Experiences Related to HA Use: Getting Used to Has:

Four studies explored HA owners' experiences during the early stages of HA use, i.e., when they get used to and adjust to HAs. Seven concepts were synthesized across these studies to summarize the key factors described by owners of conventional and smartphone-connected HAs (Table 4 and Supplemental Table 4). Acclimatization (i.e., adaptation through experience over time) was most often reported in owners' experiences of getting used to conventional HAs (Chundu et al., 2021; Dawes et al., 2014; Laplante-Lévesque et al., 2013) and smartphone-connected HAs (Keidser et al., 2019). Findings from three studies indicated that owners describe information counseling, including the provision of information, advice and training, and managing their expectations as prerequisites for positive early experiences with conventional HAs (Chundu et al., 2021; Dawes et al., 2014) and smartphone connected HAs (Keidser et al., 2019). In addition, the concepts of acceptance of hearing loss, consistent use, attitude of HA owner, support from significant others (i.e., family and friends), and a good relationship with the hearing care professional were reported by the

participants in the study by Dawes et al. (2014) to affect these initial experiences with HAs.

2b. Experiences Related to HA Use: Benefits Associated with HA Use:

Table 4 displays the nine concepts synthesized from HA owners' reports when describing the benefits of using HAs. These concepts were synthesized across results from 19 studies, covering all HA categories (see Supplemental Table 5). Improved psychosocial factors were the most frequently described benefit of HA use across all HA categories. This concept specifically included reports of the benefits of improved participation in social or group settings (Chundu et al., 2021; Dawes et al., 2014; Gomez et al., 2021; Guerra-Zúñiga et al., 2014; Holman et al., 2019; Koskela et al., 2016; Laplante-Lévesque et al., 2012; Lockey et al., 2010; Maidment et al., 2019; Ng et al., 2017; Stephens & Meredith, 1991), improved confidence in communicative abilities (e.g., Dawes et al., 2014; Gomez et al., 2021; Maidment et al., 2019; McPherson & Wong, 2005; Stephens & Meredith, 1991), enhanced emotional connectedness with communication partners (Lockey et al., 2010), and managing HA-related stigma (Dawes et al., 2014). Smartphone-connected HA owners explicitly reported the latter. As smartphones are ubiquitous, owners stated that these types of HAs are seen as socially more acceptable and thus may potentially expand the typical profile of HA users by encouraging people to seek help for their hearing loss sooner (Gomez et al., 2021; Maidment et al., 2019; Ng et al., 2017). Owners of conventional HAs commonly discussed improved hearing and communication (i.e., conversations) (e.g., Chundu et al., 2021; Holman et al., 2019; Koskela et al., 2016; Linssen et al., 2013) and DTC HAs (Choi et al., 2019; McPherson & Wong, 2005). Inherent to the greater autonomy and control that smartphone-connected and DTC HAs offer, the concept of being able to self-manage one's hearing loss and/or HAs was only reported by owners of smartphone-connected (Gomez et al., 2021; Keidser et al., 2019; Maidment et al., 2019; Ng et al., 2017) and DTC HAs (Choi et al., 2019). The concepts of HAs positively affecting owners' everyday life, listening situation-specific benefits, and benefits experienced in educational and/or occupational contexts were each reported by four studies concerning conventional HAs. Descriptions of HAs as being beneficial, helpful, or useful were found in some reports of conventional HA users (Chundu et al., 2021; Laplante-Lévesque et al., 2012). Benefits reported less often (reported in the results of two or fewer studies) included descriptions of HAs as satisfactory and empowering.

2c. Experiences Related to HA Use: Facilitators of HA Use:

Reports from 15 studies included descriptions of facilitators of HA use from the owners' perspectives (Table 4 and Supplemental Table 6). Twenty-four

concepts were synthesized across reports from owners of conventional, smartphone-connected, and DTC HAs. The concept of social/environmental influences was reported most consistently. This concept included reports that HA use itself can help to manage HA-related stigma, as peer use of HAs may lead to HAs being perceived as socially more acceptable (e.g., Chundu et al., 2021; Lockey et al., 2010). Owners of smartphone-connected HAs specifically reported on how these types of HAs helped to reduce individual and societal stigma (Gomez et al., 2021), even though environmental influences in terms of perceived norms for the use of smartphones may affect the use in different listening situations, e.g., adjusting HA settings via the smartphone app may be less acceptable during a meeting at work than during a more informal social interaction with family or friends (Gomez et al., 2021; Maidment et al., 2019). Another factor that owners of smartphone-connected HAs specifically reported supporting device use was digital literacy skills (Gomez et al., 2021; Maidment et al., 2019; Ng et al., 2017). Self-perceived hearing loss (i.e., acceptance of hearing loss) and/or the self-perceived need to address one's hearing loss by means of HAs (Chundu et al., 2021; Gallagher & Woodside, 2018; Guerra-Zúñiga et al., 2014; Linssen et al., 2013), as well as support from significant others (Guerra-Zúñiga et al., 2014; Laplante-Lévesque et al., 2013; Laplante-Lévesque et al., 2012; Lockey et al., 2010), also constitute key factors influencing conventional HA use. When owners of conventional HAs (Laplante-Lévesque et al., 2012), smartphone-connected (Keidser et al., 2019), and DTC HAs (Manchaiah, Amlani, Bricker, Whitfield, & Ratinaud, 2019a; McPherson & Wong, 2005) reported satisfaction with regard to the appearance and design of the HA (e.g., cosmetically appealing, quality of the device), this was perceived as a facilitator of HA use. Cost as a facilitator of HA use (i.e., greater affordability) was reported only by smartphone-connected (Keidser et al., 2019; Maidment et al., 2019) or DTC (Choi et al., 2019; Manchaiah et al., 2019a) HA owners. Clinical support in terms of audiological service delivery was also often reported by owners of conventional HAs (Chundu et al., 2021; Laplante-Lévesque et al., 2013) and DTC HAs (Choi et al., 2019) to enable and support continuous HA use. Three studies concluded that a positive attitude of HA owners supported perseverance in using HAs in their daily lives and improved assertiveness in HA use (Chundu et al., 2021; Gallagher & Woodside, 2018; Lockey et al., 2010). Reports of increased, meaningful participation in everyday life activities were perceived to facilitate HA use for owners of conventional HAs (Koskela et al., 2016; Lockey et al., 2010) and smartphone-connected devices (Gomez et al., 2021) and were collectively

synthesized under the concept of the impact on daily life. Experiencing greater participation in social situations and improved confidence in such contexts with increased HA use resulted in the synthesized concept labelled psychosocial (Gomez et al., 2021; Guerra-Zúñiga et al., 2014; Lockey et al., 2010). Owners of conventional (Chundu et al., 2021), smartphone-connected (Maidment et al., 2019), and DTC HAs (Manchaiah et al., 2019a) perceived ease of handling of hearing devices as a facilitator of HA use. Additional factors reported by two or fewer studies are listed in Table 4 (also see Supplemental Table 6).

3a. Experiences Related to HA Sub-optimal Use: Device-Related Challenges: Twenty-two studies contained descriptions by HA owners of device-related challenges (Table 4 and Supplemental Table 7). Themes and sub-themes from these studies were synthesized into ten concepts. From Table 4, it is clear that the two most prevalent device-related difficulties were handling and continuous care, i.e., practical use challenges, including maintenance and repairs (e.g., Chundu et al., 2021; Laplante-Lévesque et al., 2012; Moroe & Vazzana, 2019; Ritter et al., 2020; Stephens & Meredith, 1991) and listening in background noise and group conversations (e.g., Gallagher & Woodside, 2018; Holman et al., 2019; Linssen et al., 2013; Maidment et al., 2019; McPherson & Wong, 2005). Several reports by HA owners indicated that challenges with the handling and continuous care of hearing devices impeded HA use, ultimately leading to non-use (Choi et al., 2019; Guerra-Zúñiga et al., 2014; Linssen et al., 2013; Ritter et al., 2020; Solheim, Gay, & Hickson, 2018a). There were numerous reports of poor, unclear, or unpleasant sound quality of HAs across studies of owners of conventional and DTC HAs (e.g., Dawes et al., 2014; Holman et al., 2019; Manchaiah et al., 2019a; McPherson & Wong, 2005; Skagerstrand et al., 2014). Difficulties experienced with the physical fit of the hearing device and/or the accompanying sound delivery system (e.g., ear molds, slim-tube with dome) causing discomfort, irritation, or even physical pain were identified from reports of conventional (e.g., Holman et al., 2019; Moroe & Vazzana, 2019; Ritter et al., 2020) and DTC HA owners (Choi et al., 2019). Such difficulties may subsequently lead to less or non-use of the HA. Conventional HA owners reported difficulties in specific listening situations, e.g., when listening to or performing music (Greasley et al., 2020; Skagerstrand et al., 2014; Vaisberg, Martindale, Folkeard, & Benedict, 2019) and during telephone conversations (Gallagher & Woodside, 2018; Linssen et al., 2013; Skagerstrand et al., 2014; Stephens & Meredith, 1991). This often resulted in upset and frustration and ultimately affected HA owners' quality of life. Negative descriptions regarding the appearance and design of HAs (e.g., too visible or

too big) were also reported as a barrier to HA use in four studies (Chundu et al., 2021; Ritter et al., 2020; Stephens & Meredith, 1991). Difficulty with HAs producing acoustic feedback was also experienced as a challenge for HA use by owners of conventional (Linssen et al., 2013; Solheim et al., 2018a; Tyler, Baker, & Armstrong-Bednall, 1983) and DTC HAs (Choi et al., 2019; McPherson & Wong, 2005). Less dense concepts included challenges regarding device limitations (e.g., not water resistant, cannot wear while sleeping), cost, and additional use challenges with smartphone-connected HAs (see Table 4).

3b. Experiences Related to HA Sub-optimal Use: Non-device-related Challenges: Twenty studies with 15 synthesized concepts associated with non-device-related challenges (i.e., challenges related to clinical service delivery and/or HA owners themselves) to HA use were included in this sub-domain (Table 4 and Supplemental Table 8). The long-standing issue of the stigma related to HAs (i.e., HAs being associated with aging and disability) was the most consistently reported psychosocial challenge for owners of both conventional (e.g., Chundu et al., 2021; Dawes et al., 2014; Gallagher & Woodside, 2018; Laplante-Lévesque et al., 2012; Ritter et al., 2020) and DTC HAs (Choi et al., 2019). The HA owners' attitude was also a common concept in reports of HA owners related to experiences of sub-optimal HA use. Reports reflecting a negative attitude and/or negative emotional state or hesitation towards HA use by owners of conventional HAs were associated with avoidance of or reduced use of HAs (Chundu et al., 2021; Gallagher & Woodside, 2018; Greasley et al., 2020; Laplante-Lévesque et al., 2012; Linssen et al., 2013). Hesitation toward user-driven hearing devices was also identified as a challenge to the use of smartphone-connected, app-controlled HAs (Keidser et al., 2019; Ng et al., 2017), revealing these owners' concerns about the outcomes with HAs due to lesser involvement of a hearing care professional (HCP). Studies exploring reasons for HA non-use revealed HA owners reporting either severe self-perceived hearing difficulty (Linssen et al., 2013) or those with an apparent lack of self-awareness of their hearing loss (Lockey et al., 2010) had less or no use of their HAs. Similarly, studies by Gallagher and Woodside (2018), Guerra-Zúniga et al. (2014), Linssen et al. (2013), Ritter et al. (2020), and Solheim et al. (2018a) indicated that HA owners who perceived no need to address their hearing loss or no need for HAs, often did not use their HAs. Lack of information counseling as a non-device challenge to HA use was only identified from reports by conventional HA owners, leading to disappointment (unrealistic expectations) and non-use of HAs (Gallagher & Woodside, 2018; Koskela et al., 2016; Linssen et al., 2013; Moroe & Vazzana, 2019; Ritter et al., 2020). In addition, HA owner reports of inadequate audiological service delivery

were identified in studies reporting on reasons for HA non-use (e.g., Linssen et al., 2013; Ritter et al., 2020). Limited perceived benefit or satisfaction by the HA owner was reported in four studies as another non-device related challenge to HA use (Laplante-Lévesque et al., 2012; Manchaiah et al., 2019a; Ritter et al., 2020; Solheim et al., 2018a). The concept of social/environmental influences was synthesized from three studies, including factors such as undecided group membership (i.e., HA owners who fluctuated in their decision between belonging to a hearing vs hard-of-hearing group), which was perceived as a challenge to the use of conventional HAs (Koskela et al., 2016). Likewise, smartphone-connected HA owners perceived generational smartphone behaviours (e.g., younger adults were perceived to have better digital and technology knowledge and skills; smartphone use behaviours differed between younger and older adults) and perceived smartphone use norms (i.e., acceptable occasions or situations to use smartphones) as reasons for non-use (Gomez et al., 2021; Keidser et al., 2019). Negative reactions and/or attitude of significant others towards HAs use were also described by conventional HA owners as a cause of HA non-use (Chundu et al., 2021; Laplante-Lévesque et al., 2012; Linssen et al., 2013). Insufficient digital literacy skills were perceived as a challenge to use smartphone-connected hearing devices (Gomez et al., 2021; Keidser et al., 2019; Michie et al., 2011; Ng et al., 2017). Six less dense concepts were included in this sub-domain, namely health-related factors, inability to integrate HA use in daily life, acclimatization, dependency, hearing loss severity, and capabilities of HA owners (see Table 4).

Certain concepts featured across all three main domains with either a positive or negative reported effect on HA owners' experiences, as summarized in Figure 2. These concepts are related to clinical service delivery, the hearing device, and the HA owner.

Quality Assessment

A quality assessment of the included studies was conducted using the RQR scale (see Supplemental Table 9). The majority of studies (72%) covered 11 or more of the 14 quality metrics specified by the RQR scale. All 25 studies selected an appropriate design and data collection methods and detailed their data collection procedures. Most studies (21/25) provided detailed descriptions of the analysis procedure and adequate descriptions of the participants (24/25) and the setting (23/25). Almost all studies (24/25) discussed findings that logically emerged from the data. Approximately one-third of studies (8/25) did not include thick descriptions (e.g., verbatim quotes from participants related to categories or themes reported in the study). Thick description is an important practice in qualitative research that includes

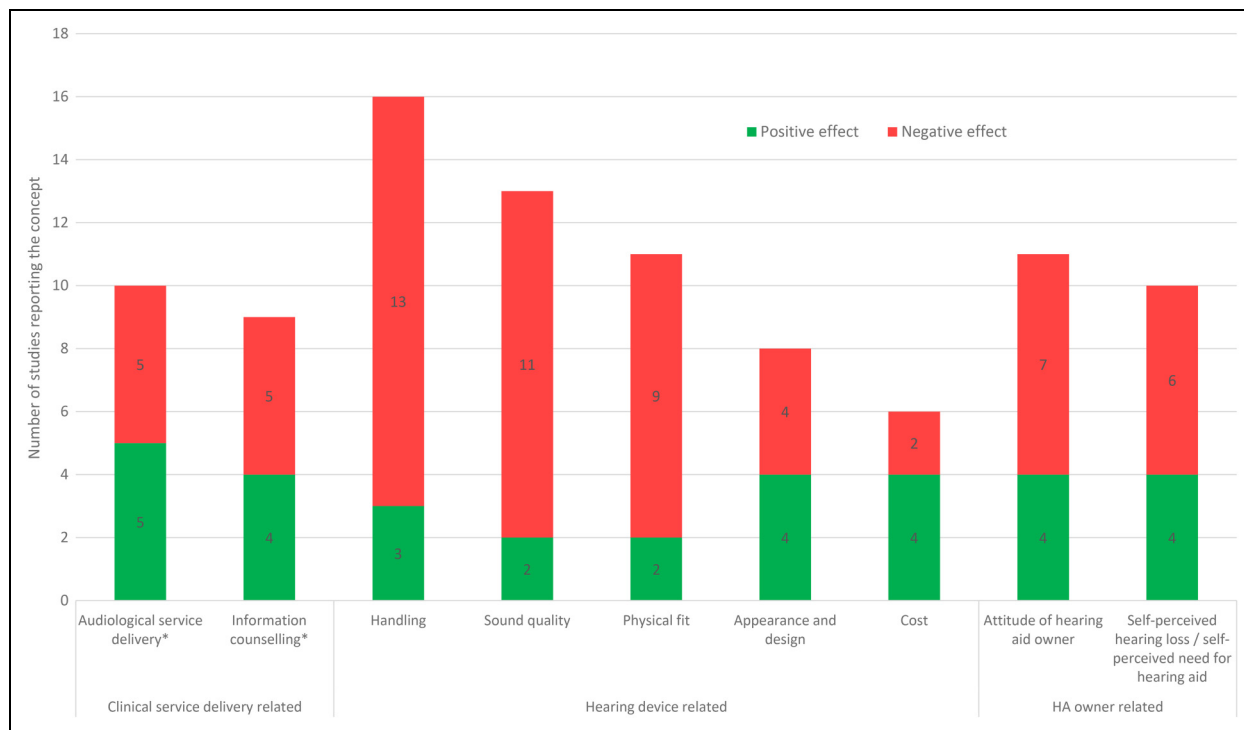


Figure 2. Concepts related to clinical service delivery, the hearing device, and the HA owner, as identified across the main domains, with either a positive or negative reported effect on HA owners' experiences.

Note: *Audiology service delivery dimension refers to e.g., quality of service, HCP-patient relationship, perceived trust in HCP etc.

Information counselling dimension refers to, e.g., expectation management, orientation and support in terms of HA care and management. The numbers in the bars indicate the number of studies reporting either a positive (green) or negative (red) effect.

HA = hearing aid; HCP = hearing care professional.

providing readers with sufficient contextual details, emotions, and meanings for interpretation and generalization (Geertz, 1973). Some studies did not present clearly interpreted themes (9/25) to explain the phenomenon under study. Only five studies reported the research tradition, i.e., the approach followed in conducting the qualitative research (e.g., grounded theory, narrative research). Almost two-thirds of the included studies (16/25) stated the role of the investigator or relationship to the participants. Triangulation techniques were used by the majority of the included studies (21/25) while verification techniques commonly used in qualitative research were also reported for 18 of the studies. Triangulation refers to using multiple methods or data sources in qualitative research to comprehensively understand the phenomena under study (Patton, 1999). Denzin (1978) and Patton (1999) identified four types of triangulation, namely method triangulation (i.e., using multiple data collection methods), investigator triangulation (i.e., two or more researchers providing observations and conclusions in the same study), theory triangulation (i.e., the use of different theories to analyse and interpret the data), and data source triangulation (i.e., collection of data from different individuals, groups, communities). Types of triangulation used in this review's studies included method, investigator and data

source triangulation, with investigator triangulation used in 13 of the 25 studies.

Discussion

This systematic review synthesized qualitative research findings to provide a comprehensive narrative description of the most prominent factors from HA owners' perspectives that affect their experiences throughout the HA journey. Most of these concepts are well-known to hearing care professionals (HCPs) and discussed in the extant literature and standard HA fitting textbooks (e.g., Taylor & Mueller, 2021). Concepts that featured in HA owners' experiences across all three main domains (i.e., HA fitting, HA use, HA sub-optimal use) are discussed here by mapping them to the COM-B model components of capability (C), opportunity (O), and motivation (M). These concepts are related specifically to clinical service delivery, the hearing device, or the HA owners themselves, indicating a continuous interaction between the HA owner, the HAs, and the HCP that affects HA use behavior and HA experiences. Hence, the COM-B model provides a theoretical framework to discuss and understand these concepts. Furthermore, this framework offers a behavioral science approach that could be used to

systematically investigate and address the device- and non-device-related challenges reported in future studies. From the HA owners' perspective, these factors are essential for researchers and clinicians to consider for optimal HA use and maintenance (Figure 3). In addition, the capabilities and motivational concepts are also linked to behavior change techniques (BCTs) from the Behavior Change Technique Taxonomy version 1 (BCTTv1) (Michie et al., 2013) to identify strategies to support optimal hearing aid use and maintenance (Figure 3). No specific BCTs are linked to the opportunities concepts as these factors do not relate to particular patient behavior in this study's findings.

Capabilities. To improve HA owners' knowledge and skills to engage in and sustain HA use, comprehensive, patient-centered counseling, a concept related to clinical service delivery, is important. Patient-centered care refers to HCPs that respect and acknowledge the individual patient's preferences, needs, and values to actively involve the patient in shared decision-making in all stages of the hearing aid journey (Institute of Medicine, 2001; Laplante-Lévesque et al., 2010a). The main benefits include adherence by the HCP to the ethical principles of respect for the patient's right to autonomy and informed consent and improved commitment to intervention and outcomes (i.e., optimal HA use) for the patient (Laplante-Lévesque et al., 2010b). Indeed, reports of HA owners reviewed in this study indicate that patient-centered counseling could positively influence experiences of the fitting of, adjustment to, and use of HAs (Chundu et al., 2021; Dawes et al., 2014; Keidser et al., 2019; Laplante-Lévesque et al., 2013). Furthermore, patient-centered counseling can improve trust in the patient-HCP relationship. Trust and patient-centeredness have similar positive benefits of increased intervention adherence and outcomes (Rolfe et al., 2014). The use of BCTs to provide information on health (5.1), social (5.3), and emotional consequences (5.6) of HA use can be included to counsel current and prospective HA users on the benefits of HA use to improve their well-being and, ultimately, quality of life. Additional patient-centered counseling aspects include expectation management regarding the benefits, capabilities, and limitations of HAs and the management of hearing devices (i.e., HA use orientation and long-term care and maintenance). Expectation management and patient understanding of their HAs were also highlighted in the results of the recent MarkeTrak 10 survey as an area for improvement to increase HA owners' satisfaction (Picou, 2020).

Handling (e.g., physical manipulation of the HA and sound delivery system, changing the battery) was consistently reported by HA owners as a barrier to optimal HA use. This corresponds with findings from previous research that suggest many HA owners' are not efficient in their HA handling skills (Bennett, 2017; Desjardins & Doherty, 2009). Thus, HCPs should ensure that HA owners are

confident and efficient in handling their HAs (e.g., inserting and removing HAs from the ears), in taking care of HAs to improve the longevity of their HAs, and knowing who to consult concerning maintenance and repair issues (e.g., replacing of tubing or domes). We suggest that HCPs employ BCTs that focus on education, hands-on training, and enablement, e.g., instruction on how to perform handling of HAs (4.1), demonstration of handling HAs (6.1), behavioral practice and rehearsal of handling skills (8.1), and verbal persuasion about their capability to handle their HAs (15.1). Scheduled follow-up appointments (in-person or virtual) are ideally situated to improve HA owners' knowledge and skills. From the synthesized reports of HA owners, it is clear that support from significant others is essential to facilitate HA adoption and use (e.g., Dawes et al., 2014; Laplante-Lévesque et al., 2013; Lockey et al., 2010). Therefore, the BCTs of social support (3.1) and practical social support (3.2) can be implemented by involving significant others or frequent communication partners during patient-centered counseling, training, and follow-up consultations.

Opportunities. HA owners consistently reported audiology service delivery and various hearing device-related aspects to affect their HA experiences. These are all external factors that can enable or prompt HA use. The quality of audiological services received, the perceived trust in the HCP and HCP-patient relationship are concepts that HA owners often use to describe their experiences of clinical service delivery during the fitting and post-fitting stages of the HA journey (Chundu et al., 2021; Dawes et al., 2014; Gallagher & Woodside, 2018; Laplante-Lévesque et al., 2013). Although the proportion of studies indicating a positive effect of service-delivery-related factors on HA owners' experiences is similar to the proportion of studies showing a negative impact (Figure 2), HCPs should continuously strive to improve the quality of service delivery and HCP-patient trust. Positive patient outcomes are associated with the quality of clinical interactions based on patient-centered care (Laplante-Lévesque et al., 2010c). It is interesting to note that owners of DTC hearing devices also value support services received from HCPs to encourage the use and enhance the management of these devices (e.g., Choi et al., 2019).

Hearing-device sound quality, physical fit, appearance and design, and cost are all factors that can either have a positive or negative impact on HA owners' experiences. The results of this review indicate that HA owners use these concepts mostly in descriptions of negative HA experiences. This is in contrast to the findings of recent large-scale survey studies, demonstrating high levels of HA satisfaction from owners (Picou, 2020). This discrepancy could depend on the questions researchers formulate and include in qualitative studies. Manufacturers strive for continuous improvement in HA technology, which can result in more positive

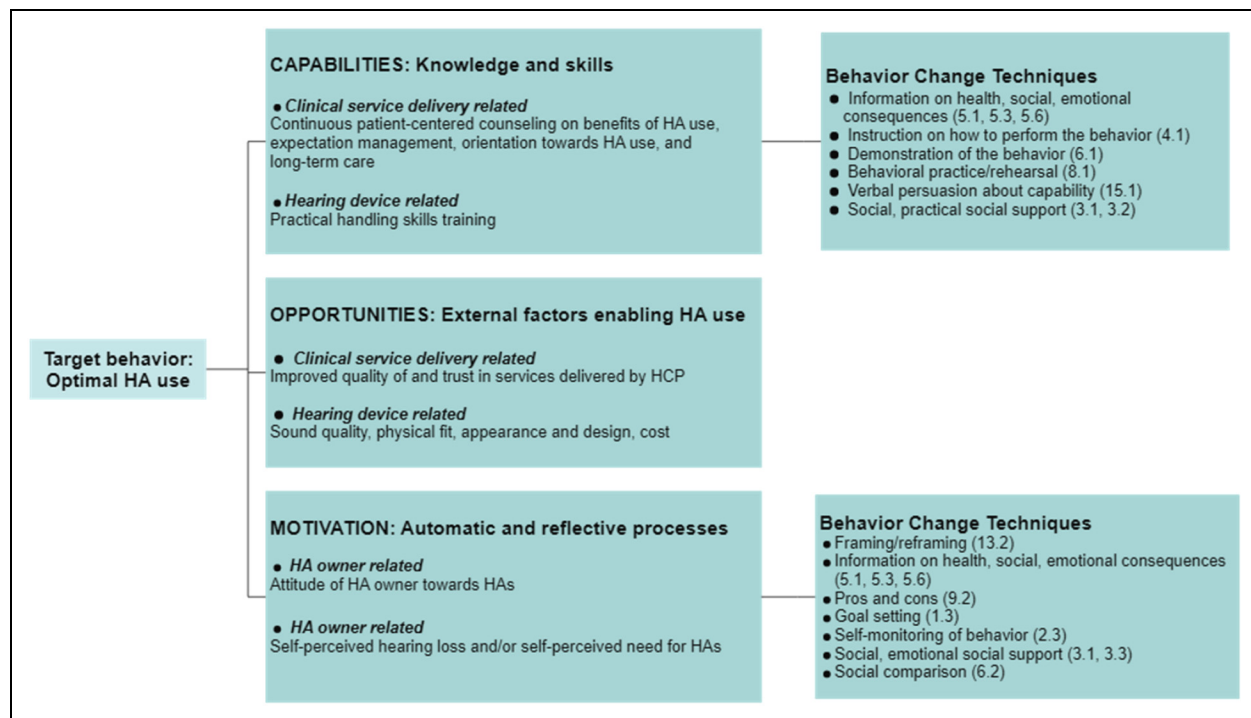


Figure 3. Concepts linked to the components of the COM-B model (capabilities, opportunity, motivation – behavior) with suggested behavior change techniques (behavior change technique taxonomy, version 1) to support optimal ha use. Note: HA = hearing aid; HCP = hearing care professional.

experiences of the sound quality and performance of HAs. The difficulties that HA owners experience when they need to listen and communicate amidst background noise and in group situations seem to be a persistent challenge, as commonly reported from the earliest (e.g., Stephens & Meredith, 1991; Tyler et al., 1983) to the most recently published studies in this review (e.g., Ritter et al., 2020). A recent large-scale consumer survey (MarkeTrak 10) also identified continued difficulty understanding speech in noise and large groups as a notable area for improvement in HAs (Picou, 2020).

HCPs should follow best practice, and evidence-based guidelines during the fitting of HAs, for example, the recently published guidelines on HA fitting of the adult population by the International Organization for Standardization (ISO, 2020). Ensuring appropriately fitted HAs based on verification and validation procedures can improve the perceived sound quality and performance of HAs. Subsequently, it can contribute to improved hearing and communication, commonly reported benefits of HA use (e.g., Chundu et al., 2021; Holman et al., 2019). Although the appearance and design of HAs have improved considerably over the years, manufacturers need to note that their end users (i.e., HA owners) still perceive the appearance and ease of use of HAs as decisive factors for either facilitating or restricting HA use. The cost factor featured in only six of the 25 included studies. In this review, lower cost was identified as having a positive effect on HA use for owners of smartphone-

connected and DTC HAs (Choi et al., 2019; Keidser et al., 2019; Maidment et al., 2019; Manchaiah et al., 2019a). In contrast, owners of conventional HAs often perceived cost as a barrier to HA use, especially when HAs are viewed as expensive or when financial difficulties in obtaining HAs are experienced (Chundu et al., 2021; Ritter et al., 2020). With alternative service delivery models emerging in audiology (e.g., DTC and over-the-counter models), cost and cost-benefit analysis will be increasingly prevalent in reports of HA experiences.

The COM-B model integrates the HA owner's context naturally, as the 'opportunity' component of the behavioral model also refers to the patient's context (Michie et al., 2011). Therefore, HA use behavior can only be understood in relation to the HA owner's context. The amount of daily HA use (e.g., number of hours per day) is often a key clinical outcome for audiologists, as it is well-known that HA use time is correlated with HA benefit and satisfaction (Mueller & Powers, 2001; Wong et al., 2003). However, from the collective reports of HA users in the included studies (e.g., Laplante-Lévesque et al., 2013; Lockey et al., 2010), it is clear that users report on HA use in terms of individualized patterns of daily HA use according to their unique needs and listening contexts, not necessarily corresponding to or related to specific hours of daily use. This highlights the valuable findings from qualitative studies, focusing on the patient's perspective rather than general, group-based trends for HA outcomes.

Motivation. HA owners' attitude and their self-perception of their hearing loss and/or their self-perceived need for HAs relate to emotional (automatic) and cognitive (reflective) processes that can drive and direct the behavior of HA use. To improve current and prospective HA owners' motivation to use HAs, the BCT of framing/reframing HAs positively (13.2) can be used to emphasize the most frequently reported benefit of HA use, namely improved psychosocial functioning, as well as the other benefits identified in this review. From the reports of HA owners in the included studies (Chundu et al., 2021; Gallagher & Woodside, 2018; Guerra-Zúñiga et al., 2014) and previous studies (Meyer & Hickson, 2012; Solheim et al., 2012), it is clear that acceptance of hearing loss and the recognition of the need for HAs are essential determiners of HA use. Therefore, we suggest BCTs for counseling patients on the health, social, and emotional consequences (5.1, 5.3, 5.6) of hearing loss acceptance and acknowledgment of their need for a HA(s). Discussing the pros and cons (9.2) of HA use vs. non-use in a patient-centered way may facilitate patients' understanding that the benefits of HA use extend beyond improvement in hearing abilities and can have a direct, positive impact on HA owners' quality of life. This is in agreement with the models proposed by Vercammen et al. (2020) and Saunders et al. (2021) based on the idea that improved hearing (using HAs) can positively affect socio-emotional well-being (e.g., improved social interaction) and cognitive well-being (e.g., reduced perceived listening effort and resultant fatigue), leading to improved overall well-being. Joint goal setting (1.3) for optimal HA use tailored to the patient's unique needs and preferences and supporting patients to self-monitor their HA use (2.3) may encourage HA use despite experienced challenges. Furthermore, HCPs can also utilize BCTs of social comparison (6.2) and social and emotional support (3.1, 3.3) to connect prospective HA users and those with sub-optimal use with successful HA users. This may elicit positive feelings and perspectives towards HA use, help address the societal stigma towards HAs, and ultimately lead to sustained use.

Limitations and Future Directions

Following the eligibility criteria, data from the grey literature and studies not published in English were not included in this review. Therefore, some relevant work might have been missed. The quality assessment scores reported should be interpreted with caution. Although the RQR is a valid and reliable tool for assessing the overall methodological integrity of qualitative research (Cherney et al., 2013), seven of the included studies had a mixed methodology approach, and the appropriateness of this tool for such studies may be questioned. The criterion least reported in the studies was the specific qualitative research philosophy or tradition. The rigor of qualitative research depends on how the researcher attends to

theoretical aspects of the chosen research tradition at different stages of the research (Kelly, 2010). Therefore, it is recommended that future qualitative research studies should report the guiding qualitative research tradition. It is encouraging to note that more recently published studies (2011–2021) received higher ratings than the earliest published studies, suggesting that methodological quality and reporting standards have improved over time. The use of methodological rating scales specific to the study design type should be encouraged in future studies, e.g., RQR or the Consolidated criteria for reporting qualitative research (COREQ) checklist (Tong, Sainsbury, & Craig, 2007).

A few studies (6/25) included descriptions of HA owners reporting on the issue of the cost of HAs. Cost is more often considered in studies focused on the stage before fitting, i.e., the stage of deciding whether to obtain HAs (e.g., Ekberg et al., 2017; Jorgensen & Novak, 2020). This review did not include studies focusing on the stage prior to fitting. However, it is clear that cost might even affect experiences post-fitting and may be perceived as a driver either for or against HA use. The cost factor and how it affects experiences and outcomes throughout the HA journey should be further explored in future studies. Owners' experiences during HA fitting is another area that only a few studies (3/25) reported on. In their review of empirical studies reporting on factors influencing help-seeking, HA uptake, HA use, and satisfaction Knudsen et al. (2010) also reported a scarcity of studies addressing factors affecting HA fitting. Therefore, future qualitative studies should consider exploring HA owners' experiences during the fitting stage, as this constitutes the owners' first experiences with their HAs and might influence HA use.

Although qualitative audiological research has increased, there is a need for more studies to understand better the needs, beliefs, and experiences of HA owners (users and non-users; and different types of HAs) in daily life. However, qualitative data analysis can be more time-consuming than quantitative data analysis. Future studies should explore novel methodological approaches to analyze qualitative data, including natural language processing techniques using automated textual analysis.

Conclusions

Adult HA owners use multiple concepts when describing their lived experiences of HAs during the fitting and post-fitting stages of the HA journey. Specific concepts related to clinical service delivery, the hearing device itself, and the HA owner can positively or negatively impact HA owners' experiences. These concepts can be mapped to the COM-B model regarding capability, opportunity, and motivational aspects perceived by HA owners as essential to improving HA use and outcomes. These components should be addressed using suggested BCTs to support optimal HA outcomes in a patient-centered care approach.

Consequent implications for HCPs include improving the quality of services and HCP-patient trust, providing patient-centered counseling and practical handling skills training, and acknowledging and integrating the patient's point of view and their attitude towards HAs throughout the hearing care journey. Implications for HA manufacturers center around concepts related to the hearing device, including improvements in sound quality, the comfort of the physical fit, appearance and design, as well as the affordability of hearing devices. This review can supplement clinical perspectives and empirical research findings to enrich HCPs' understanding of adult HA owner experiences to support optimal HA outcomes.

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Supplemental Material

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References

- Barker, F., Atkins, L., & de Lusignan, S. (2016). Applying the COM-B behaviour model and behaviour change wheel to develop an intervention to improve hearing-aid use in adult auditory rehabilitation. *International Journal of Audiology*, 55(Suppl. 3), S90–S98. <https://doi.org/10.3109/14992027.2015.1120894>
- Bennett, R. J., Barr, C., Cortis, A., Eikelboom, R. H., Ferguson, M., & Gerace, D., ... J Montano. (2021). Audiological approaches to address the psychosocial needs of adults with hearing loss: Perceived benefit and likelihood of use. *International Journal of Audiology*, 60(Suppl. 2), 12–19. <https://doi.org/10.1080/14992027.2020.1839680>
- Bennett, R. J., Laplante-Lévesque, A., Meyer, C. J., & Eikelboom, R. H. (2018). Exploring hearing aid problems: Perspectives of hearing aid owners and clinicians. *Ear and Hearing*, 39(1), 172–187. <https://doi.org/10.1097/AUD.0000000000000477>
- Bennett, R. J., Meyer, C., Olaithe, M., Schmulian, D., & Eikelboom, R. H. (2017). Are hearing aid owners able to identify and self-report handling difficulties? A pilot study. *International Journal of Audiology*, 56(11), 887–893. <https://doi.org/10.1080/14992027.2017.1347289>
- Bennett, R. J., Meyer, C. J., Eikelboom, R. H., & Atlas, M. D. (2018). Investigating the knowledge, skills, and tasks required for hearing aid management: Perspectives of clinicians and hearing aid owners. *American Journal of Audiology*, 27(1), 67–84. https://doi.org/10.1044/2017_AJA-17-0059
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research In Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp0630a>
- Campbell, M., McKenzie, J. E., Sowden, A., Katikireddi, S. V., Brennan, S. E., & Ellis, S., ... H Thomson. (2020). Synthesis without meta-analysis (SWiM) in systematic reviews: reporting guideline. *BMJ*, 368, 16890. <https://doi.org/10.1136/bmj.16890>
- Cherney, L. R., Simmons-Mackie, N., Raymer, A., Armstrong, E., & Holland, A. (2013). Systematic review of communication partner training in aphasia: Methodological quality. *International Journal of Speech-Language Pathology*, 15(5), 535–545. <https://doi.org/10.3109/17549507.2013.763289>
- Choi, J. S., Shim, K. S., Shin, N. E., Nieman, C. L., Mamo, S. K., Han, H. R., & Lin, F. R. (2019). Cultural adaptation of a community-based hearing health intervention for Korean American older adults with hearing loss. *Journal of Cross-Cultural Gerontology*, 34(3), 223–243. <https://doi.org/10.1007/s10823-019-09376-6>
- Chundu, S., Allen, P. M., Han, W., Ratinaud, P., Krishna, R., & Manchaiah, V. (2021). Social representation of hearing aids among people with hearing loss: An exploratory study. *International Journal of Audiology*, 60(12), 964–978. <https://doi.org/10.1080/14992027.2021.1886349>
- Coulson, N. S., Ferguson, M. A., Henshaw, H., & Heffernan, E. (2016). Applying theories of health behaviour and change to hearing health research: Time for a new approach. *International Journal of Audiology*, 55(Sup3), S99–S104. <https://doi.org/10.3109/14992027.2016.1161851>
- Cox, R. M. (2003). Assessment of subjective outcome of hearing aid fitting: Getting the client's point of view. *International Journal of Audiology*, 42(sup1), 90–96. <https://doi.org/10.3109/14992020309074629>
- Cox, R. M., & Alexander, G. C. (1992). Maturation of hearing aid benefit: Objective and subjective measurements. *Ear and Hearing*, 13(3), 131–141.
- Cox, R. M., Alexander, G. C., & Gray, G. A. (2007). Personality, hearing problems, and amplification characteristics: Contributions to self-report hearing aid outcomes. *Ear and Hearing*, 28(2), 141–162. <https://doi.org/10.1097/AUD.0b013e31803126a4>
- Dawes, P., Maslin, M., & Munro, K. J. (2014). 'Getting used to' hearing aids from the perspective of adult hearing-aid users. *International Journal of Audiology*, 53(12), 861–870. <https://doi.org/10.3109/14992027.2014.938782>
- Denzin, N. (1978). *Sociological Methods: A Source Book*. McGraw-Hill.
- Desjardins, J. L., & Doherty, K. A. (2009). Do experienced hearing aid users know how to use their hearing aids correctly? *American Journal of Audiology*, 18(1), 69–76. [https://doi.org/10.1044/1059-0889\(2009\)08-0022](https://doi.org/10.1044/1059-0889(2009)08-0022)
- Dillon, H., Day, J., Bant, S., & Munro, K. J. (2020). Adoption, use and non-use of hearing aids: A robust estimate based on Welsh national survey statistics. *International Journal of Audiology*, 59(8), 567–573. <https://doi.org/10.1080/14992027.2020.1773550>
- Ekberg, K., Barr, C., & Hickson, L. (2017). Difficult conversations: Talking about cost in audiology consultations with older adults.

- International Journal of Audiology*, 56(11), 854–861. <https://doi.org/10.1080/14992027.2017.1339128>
- Ekberg, K., Schuetz, S., Timmer, B., & Hickson, L. (2020). Identifying barriers and facilitators to implementing family-centred care in adult audiology practices: A COM-B interview study exploring staff perspectives. *International Journal of Audiology*, 59(6), 464–474. <https://doi.org/10.1080/14992027.2020.1745305>
- Gallagher, N. E., & Woodside, J. V. (2018). Factors affecting hearing aid adoption and use: A qualitative study. *Journal of the American Academy of Audiology*, 29(4), 300–312. <https://doi.org/10.3766/jaaa.16148>
- Geertz, C. (1973). *The interpretation of cultures*. Basic Books.
- Gomez, R., Habib, A., Maidment, D. W., & Ferguson, M. A. (2021). Smartphone-connected hearing aids enable and empower self-management of hearing loss: A qualitative interview study underpinned by the behavior change wheel. *Ear and Hearing*, 43(3), 921–932. <https://doi.org/10.1097/AUD.0000000000001143>
- Greasley, A., Crook, H., & Fulford, R. (2020). Music listening and hearing aids: Perspectives from audiologists and their patients. *International Journal of Audiology*, 59(9), 694–706. <https://doi.org/10.1080/14992027.2020.1762126>
- Guerra-Zúñiga, M., Cardemil-Morales, F., Albertz-Arévalo, N., & Rahal-Espejo, M. (2014). Explanations for the non-use of hearing aids in a group of older adults. A qualitative study. *Acta Otorrinolaringologica Espanola*, 65(1), 8–14. <https://doi.org/10.1016/j.otorri.2013.09.004>
- Harris, J. L., Booth, A., Cargo, M., Hannes, K., Harden, A., & Flemming, K., ... J Noyes. (2018). Cochrane qualitative and implementation methods group guidance series—paper 2: Methods for question formulation, searching, and protocol development for qualitative evidence synthesis. *Journal of Clinical Epidemiology*, 97, 39–48. <https://doi.org/10.1016/j.jclinepi.2017.10.023>
- Hartley, D., Rochtchina, E., Newall, P., Golding, M., & Mitchell, P. (2010). Use of hearing aids and assistive listening devices in an older Australian population. *Journal of the American Academy of Audiology*, 21(10), 642–653. <https://doi.org/10.3766/jaaa.21.10.4>
- Heffernan, E., Coulson, N. S., Henshaw, H., Barry, J. G., & Ferguson, M. A. (2016). Understanding the psychosocial experiences of adults with mild-moderate hearing loss: An application of leventhal's self-regulatory model. *International Journal of Audiology*, 55(sup3), S3–S12. <https://doi.org/10.3109/14992027.2015.1117663>
- Holman, J. A., Drummond, A., Hughes, S. E., & Naylor, G. (2019). Hearing impairment and daily-life fatigue: A qualitative study. *International Journal of Audiology*, 58(7), 408–416. <https://doi.org/10.1080/14992027.2019.1597284>
- Hougaard, S., & Ruf, S. (2011). Eurotrak I: A consumer survey about hearing aids in Germany, France, and the UK. *Hearing Review*, 18(2), 12–28.
- Humes, L. E., Wilson, D. L., Barlow, N. N., & Garner, C. (2002). Longitudinal changes in hearing aid satisfaction and usage in the elderly over a period of one or two years after hearing aid delivery. *Ear and Hearing*, 23(5), 428–438.
- Institute of Medicine. (2001). *In Crossing the Quality Chasm: A New Health System for the 21st Century*. National Academies Press.
- International Organization for Standardization. (2020). ISO 21388:2020 Acoustics — Hearing aid fitting management (HAFM). Retrieved from <https://www.iso.org/standard/74602.html>
- Jorgensen, L., & Novak, M. (2020). Factors influencing hearing aid adoption. *Seminars in Hearing*, 41(01), 6–20. <https://doi.org/10.1055/s-0040-1701242>
- Keidser, G., Matthews, N., & Convery, E. (2019). A qualitative examination of user perceptions of user-driven and app-controlled hearing technologies. *American Journal of Audiology*, 28(4), 993–1005. https://doi.org/10.1044/2019_AJA-19-0022
- Kelly, M. (2010). The role of theory in qualitative health research. *Family Practice*, 27(3), 285–290. <https://doi.org/10.1093/fampra/cmp077>
- Knudsen, L., Öberg, V., Nielsen, M., Naylor, C., & Kramer, G., & E, S.. (2010). Factors influencing help seeking, hearing aid uptake, hearing aid use and satisfaction with hearing aids: A review of the literature. *Trends in Amplification*, 14(3), 127–154. <https://doi.org/10.1177%2F1084713810385712>
- Knudsen, L. V., Laplante-Levesque, A., Jones, L., Preminger, J. E., Nielsen, C., & Lunner, T., ... S E Kramer. (2012). Conducting qualitative research in audiology: A tutorial. *International Journal of Audiology*, 51(2), 83–92. <https://doi.org/10.3109/14992027.2011.606283>
- Koskela, I., Ruusuvoori, J., Juvonen-Posti, P., Nevala, N., Husman, P., & Aaltonen, T., ... M Laakso. (2016). Dilemmatic group memberships of hard-of-hearing employees during the process of acquiring and adapting to the use of hearing aids. *International Journal of Rehabilitation Research*, 39(3), 226–233. <https://doi.org/10.1097/MRR.000000000000173>
- Laplante-Lévesque, A., Hickson, L., & Worrall, L. (2010a). Factors influencing rehabilitation decisions of adults with acquired hearing impairment. *International Journal of Audiology*, 49(7), 497–507. <https://doi.org/10.3109/14992021003645902>
- Laplante-Lévesque, A., Hickson, L., & Worrall, L. (2010b). Promoting the participation of adults with acquired hearing impairment in their rehabilitation. *Journal of the Academy of Rehabilitative Audiology*, 43, 11–26.
- Laplante-Lévesque, A., Hickson, L., & Worrall, L. (2010c). A qualitative study of shared decision making in rehabilitation audiology. *Journal of the Academy of Rehabilitative Audiology*, 43, 27–43.
- Laplante-Lévesque, A., Jensen, L. D., Dawes, P., & Nielsen, C. (2013). Optimal hearing aid use: Focus groups with hearing aid clients and audiologists. *Ear and Hearing*, 34(2), 193–202. <https://doi.org/10.1097/AUD.0b013e31826a8ecd>
- Laplante-Lévesque, A., Knudsen, L. V., Preminger, J. E., Jones, L., Nielsen, C., & Öberg, M., ... S E Kramer. (2012). Hearing help-seeking and rehabilitation: Perspectives of adults with hearing impairment. *International Journal of Audiology*, 51(2), 93–102. <https://doi.org/10.3109/14992027.2011.606284>
- Leek, M. R., Molis, M. R., Kubli, L. R., & Tufts, J. B. (2008). Enjoyment of music by elderly hearing-impaired listeners. *Journal of the American Academy of Audiology*, 19(06), 519–526. <https://doi.org/10.3766/jaaa.19.6.7>
- Light, R. J., & Pillemer, D. B. (1984). *Summing up: the science of reviewing research*. Harvard University Press.
- Linssen, A. M., Joore, M. A., Minten, R. K. H., Van Leeuwen, Y. D., & Anteunis, L. J. C. (2013). Qualitative interviews on the beliefs and feelings of adults towards their ownership, but

- non-use of hearing aids. *International Journal of Audiology*, 52(10), 670–677. <https://doi.org/10.3109/14992027.2013.808382>
- Lockey, K., Jennings, M. B., & Shaw, L. (2010). Exploring hearing aid use in older women through narratives. *International Journal of Audiology*, 49(8), 542–549. <https://doi.org/10.3109/14992021003685817>
- Lund, K., Ordoñez, R., Nielsen, J. B., & Hammershøi, D. (2020). Sentence-based experience logging in new hearing aid users. *American Journal of Audiology*, 29(3S), 631–637. https://doi.org/10.1044/2020_AJA-19-00077
- Maidment, D. W., Ali, Y. H. K., & Ferguson, M. A. (2019). Applying the COM-B model to assess the usability of smartphone-connected listening devices in adults with hearing loss. *Journal of the American Academy of Audiology*, 30(5), 417–430. <https://doi.org/10.3766/jaaa.18061>
- Manchaiah, V., Amlani, A. M., Bricker, C. M., Whitfield, C. T., & Ratinaud, P. (2019a). Benefits and shortcomings of direct-to-consumer hearing devices: Analysis of large secondary data generated from Amazon customer reviews. *Journal of Speech, Language, and Hearing Research*, 62(5), 1506–1516. https://doi.org/10.1044/2018_JSLHR-H-18-0370
- Manchaiah, V., Bellon-Harn, M. L., Dockens, A. L., Azios, J. H., & Harn, W. E. (2019b). Communication between audiologist, patient, and patient's family members during initial audiology consultation and rehabilitation planning sessions: A descriptive review. *Journal of the American Academy of Audiology*, 30(9), 810–819. <https://doi.org/10.3766/jaaa.18032>
- Manchaiah, V., Taylor, B., Dockens, A. L., Tran, N. R., Lane, K., Castle, M., & Grover, V. (2017). Applications of direct-to-consumer hearing devices for adults with hearing loss: A review. *Clinical Interventions in Aging*, 12, 859–871. <https://doi.org/10.2147/CIA.S135390>
- Manchaiah, V. K., Stephens, D., & Meredith, R. (2011). The patient journey of adults with hearing impairment: The patients' views. *Clinical Otolaryngology*, 36(3), 227–234. <https://doi.org/10.1111/j.1749-4486.2011.02320.x>
- McPherson, B., & Wong, E. T. L. (2005). Effectiveness of an affordable hearing aid with elderly persons. *Disability and Rehabilitation*, 27(11), 601–609. <https://doi.org/10.1080/09638280400019682>
- Meyer, C., & Hickson, L. (2012). What factors influence help-seeking for hearing impairment and hearing aid adoption in older adults? *International Journal of Audiology*, 51(2), 66–74. <https://doi.org/10.3109/14992027.2011.611178>
- Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., & Hardeman, W., ... C. E Wood. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: Building an international consensus for the reporting of behavior change interventions. *Annals of Behavioral Medicine*, 46(1), 81–95. <https://doi.org/10.1007/s12160-013-9486-6>
- Michie, S., Van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, 6(1), 1–12. <https://doi.org/10.1186/1748-5908-6-42>
- Moroe, N., & Vazzana, N. (2019). The disuse of hearing aids in elderly people diagnosed with a presbycusis at an old age home, in johannesburg, South Africa: A pilot study. *African Health Sciences*, 19(2), 2183–2188. <https://doi.org/10.4314/ahs.v19i2.43>
- Mueller, H. G., & Powers, T. A. (2001). Consideration of auditory acclimatization in the prescriptive fitting of hearing aids. *Seminars in Hearing*, 22(02), 103–124. <https://doi.org/10.1055/s-2001-14976>
- Munro, K. J., & Lutman, M. E. (2004). Self-reported outcome in new hearing aid users over a 24-week post-fitting period. *International Journal of Audiology*, 43(10), 555–562. <https://doi.org/10.1080/14992020400050071>
- Ng, S. L., Phelan, S., Leonard, M., & Galster, J. (2017). A qualitative case study of smartphone-connected hearing aids: Influences on patients, clinicians, and patient-clinician interactions. *Journal of the American Academy of Audiology*, 28(6), 506–521. <https://doi.org/10.3766/jaaa.15153>
- Noblit, G., & Hare, R. (1988). *Synthesising qualitative studies. Qualitative research method series 11*. Sage Publications.
- Orji, A., Kamenov, K., Dirac, M., Davis, A., Chadha, S., & Vos, T. (2020). Global and regional needs, unmet needs and access to hearing aids. *International Journal of Audiology*, 59(3), 166–172. <https://doi.org/10.1080/14992027.2020.1721577>
- Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan - a web and mobile app for systematic reviews. *Systematic Review*, 5(210), 1–10. <https://doi.org/10.1186/s13643-016-0384-4>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., & Mulrow, C. D., ... S. E Brennan. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *International Journal of Surgery*, 88, 105906. <https://doi.org/10.1016/j.ijsu.2021.105906>
- Patton, M. Q. (1999). Enhancing the quality and credibility of qualitative analysis. *Health Services Research*, 34(5 Pt 2), 1189–1208.
- Picou, E. M. (2020). Marketrak 10 (MT10) survey results demonstrate high satisfaction with and benefits from hearing aids. *Seminars in Hearing*, 41(01), 21–36. <https://doi.org/10.1055/s-0040-1701243>
- Popay, J., Roberts, H., Sowden, A., Petticrew, M., Aria, L., & Rodgers, M., ... S Duffy. (2006). *Guidance on the conduct of narrative synthesis in systematic reviews. Final report*. ESRC methods programme. Retrieved from <http://www.esrc.ac.uk/ESRCInfoCentre/index.aspx>
- Ritter, C. R., Barker, B. A., & Scharp, K. M. (2020). Using attribution theory to explore the reasons adults with hearing loss do not use their hearing aids. *PLoS ONE*, 15(9), e0238468. <https://doi.org/10.1371/journal.pone.0238468>
- Rolfe, A., Cash-Gibson, L., Car, J., Sheikh, A., McKinsty, B. (2014). Interventions for improving patients' trust in doctors and groups of doctors. *Cochrane Database of Systematic Reviews*, (3), Art. No. CD004134. <https://doi.org/10.1002/14651858.CD004134.pub3>
- Saunders, G. H., Vercammen, C., Timmer, B. H., Singh, G., Pelosi, A., & Meis, M., ... A Bott. (2021). Changing the narrative for hearing health in the broader context of healthy living: A call to action. *International Journal of Audiology*, 60(sup2), 86–91. <https://doi.org/10.1080/14992027.2021.1905892>
- Simmons-Mackie, N., Raymer, A., Armstrong, E., Holland, A., & Cherney, L. R. (2010). Communication partner training in aphasia: A systematic review. *Archives of Physical Medicine and Rehabilitation*, 91(12), 1814–1837. <https://doi.org/10.1016/j.apmr.2010.08.026>
- Skagerstrand, A., Stenfelt, S., Arlinger, S., & Wikström, J. (2014). Sounds perceived as annoying by hearing-aid users in their daily soundscape. *International Journal of Audiology*, 53(4), 259–269. <https://doi.org/10.3109/14992027.2013.876108>

- Solheim, J., Gay, C., & Hickson, L. (2018a). Older adults' experiences and issues with hearing aids in the first six months after hearing aid fitting. *International Journal of Audiology*, *57*(1), 31–39. <https://doi.org/10.1080/14992027.2017.1380849>
- Solheim, J., Gay, C., Lerdal, A., Hickson, L., & Kvaerner, K. J. (2018b). An evaluation of motivational interviewing for increasing hearing aid use: A pilot study. *Journal of the American Academy of Audiology*, *29*(08), 696–705. <https://doi.org/10.3766/jaaa.16184>
- Solheim, J., Kværner, K. J., Sandvik, L., & Falkenberg, E.-S. (2012). Factors affecting older adults' hearing-aid use. *Scandinavian Journal of Disability Research*, *14*(4), 300–312. <https://doi.org/10.1080/15017419.2011.640411>
- Stephens, S. D. G., & Meredith, R. (1991). Qualitative reports of hearing aid benefit. *Clinical Rehabilitation*, *5*(3), 225–229. <https://doi.org/10.1177/026921559100500309>
- Takahashi, G., Martinez, C. D., Beamer, S., Bridges, J., Noffsinger, D., & Sugiura, K., ... D. W Williams. (2007). Subjective measures of hearing aid benefit and satisfaction in the NIDCD/VA follow-up study. *Journal of the American Academy of Audiology*, *18*(4), 323–349. <https://doi.org/10.3766/jaaa.18.4.6>
- Taylor, B., & Mueller, H. G. (2021). *Fitting and dispensing hearing aids* (3rd ed.). Plural Publishing.
- Thomas, B., Ciliska, D., Dobbins, M., & Micucci, S. (2004). A process for systematically reviewing the literature: Providing the research evidence for public health nursing interventions. *Worldviews on Evidence-Based Nursing*, *1*(3), 176–184. <https://doi.org/10.1111/j.1524-475x.2004.04006.x>
- Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, *19*(6), 349–357. <https://doi.org/10.1093/intqhc/mzm042>
- Tyler, R. S., Baker, L. J., & Armstrong-Bednall, G. (1983). Difficulties experienced by hearing-aid candidates and hearing-aid users. *British Journal of Audiology*, *17*(3), 191–199. <https://doi.org/10.3109/03005368309107884>
- Uriarte, M., Denzin, L., Dunstan, A., Sellars, J., & Hickson, L. (2005). Measuring hearing aid outcomes using the satisfaction with amplification in daily life (SADL) questionnaire: Australian data. *Journal of American Academy Audiology*, *16*(6), 383–402. <https://doi.org/10.3766/jaaa.16.6.6>
- Vaisberg, J. M., Martindale, A. T., Folkeard, P., & Benedict, C. (2019). A qualitative study of the effects of hearing loss and hearing aid use on music perception in performing musicians. *Journal of the American Academy of Audiology*, *30*(10), 856–870. <https://doi.org/10.3766/jaaa.17019>
- Vercammen, C., Ferguson, M., Kramer, S. E., Meis, M., Singh, G., & Timmer, B., ... I Holube. (2020). Well-hearing is well-being. *Hearing Review*, *27*(3), 18–22.
- Wong, L. L., Hickson, L., & McPherson, B. (2003). Hearing aid satisfaction: What does research from the past 20 years say? *Trends in Amplification*, *7*(4), 117–161. <https://doi.org/https://doi.org/10.1177%2F108471380300700402>
- World Health Organization. (2021). *World Report on Hearing*. World Health Organization.