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Optimal hearing aid use: Focus groups with hearing aid clients and audiologists

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ABSTRACT

Objectives: This study explored the meaning and determinants of optimal hearing aid use from the perspectives of hearing aid clients and audiologists. An additional objective was to contrast the perspectives of the clients and audiologists.

Design: Four focus groups were conducted: i) clients (n=7) in Denmark, ii) clients (n=10) in the United Kingdom (UK), iii) audiologists (n=6) in Denmark, and iv) audiologists (n=7) in the UK. Clients owned hearing aids and audiologists had regular contact with clients. The focus group facilitators used a topic guide to generate the participants' views on optimal hearing aid use. The focus groups were audio-recorded, transcribed verbatim, translated into English if conducted in Danish, and qualitatively analyzed with content analysis.

Results: Both clients and audiologists described optimal hearing aid use as being frequent and regular and driven by the individual needs of the clients. When describing determinants of optimal hearing aid use, both clients and audiologists mentioned the role of the client (e.g., adjustment to hearing aids), the role of the audiologist (e.g., audiologic practice and profession), and the role of the hearing aid (e.g., benefits and limitations of the hearing aid). They both highlighted the importance of client access to information. However, how clients and audiologists described the influence of these determinants varied somewhat. Clients emphasized the role of the hearing aid in achieving optimal hearing aid use. From a client perspective, hearing aids which performed well and which had relevant features were most central. In contrast, audiologists emphasized the role of a good client-audiologist relationship in achieving optimal hearing aid use. From the audiologist's perspective, audiologists who were able to understand the needs of the clients and to instruct clients appropriately were most central.

Conclusions: This study highlights similarities and differences in how clients and audiologists describe optimal hearing aid use and its determinants. It is commendable that audiologists acknowledge the importance of the client-audiologist relationship, but given clients' focus on hearing aids, audiologists might wish to describe more explicitly to their clients how their intervention can extend beyond provision of the optimal hearing aid.

INTRODUCTION

Whether it is justified or not, amount of hearing aid use time has been typically seen as an intervention outcome measure; amount of use is commonly regarded as an indicator of hearing aid success in the audiologic community. Hearing aid use time can be measured in different ways. Earlier studies determined objective hearing aid use time via hearing aid battery weight (Brooks 1979, 1981) or via internal clocks in experimental hearing aids (Haggard et al. 1981). Current technology allows data logging, in which hearing aids record the number of hours they are turned on in a given time period (Humes et al. 1996; Taubman et al. 1999; Gaffney 2008). Hearing aid use time may also be measured via self-report, either by the hearing aid client or their significant other(s). Self-report of hearing aid use time is typically assessed with a single item on a questionnaire (Vestergaard Knudsen et al. 2010). For example, the first item of the International Outcome Inventory - Hearing Aids (IOI-HA; Cox et al. 2000), a widely used hearing aid outcome questionnaire available in 23 languages, asks: "Think about how much you used your present hearing aid(s) over the past two weeks. On an average day, how many hours did you use the hearing aid(s)?" The response options are: a) none; b) less than 1 hour a day; c) 1 to 4 hours a day; d) 4 to 8 hours a day, and; e) more than 8 hours a day. Responses are typically interpreted as the greater the number of hours a day hearing aids are used for, the better the hearing aid outcome (Cox et al. 2000; Noble 2002). However, actual amounts of hearing aid use and patterns of use vary widely amongst hearing aid clients. For example, a recent survey of 8381 Swiss adults reported that in terms of average daily use, 50% of the sample reported wearing their hearing aids more than 8 hours/day, 26% for 4-8 hours, 21% for 1-4 hours, and 3% for less than 1 hour. On days when hearing aids were worn, 47% of participants reported wearing them all day long, 23% for most of the day, 15% for about half of the day, 10% for less than half of the day, and 5% for only short periods (Staehelin et al. 2011). According to a recent systematic literature review, factors associated with greater hearing aid use include positive prefitting attitudes toward hearing loss and hearing aids and, most importantly, greater self-reported hearing disability (Vestergaard Knudsen et al. 2010). In the study of Staehelin et al. (2011), good self-reported hearing aid handling and high hearing aid satisfaction

1 were associated with using hearing aids at least one day per week. Some evidence also suggests
2 that, after controlling for covariates, adults with hearing impairment who have had hearing aids for
3 over 5 years are more likely to use their hearing aids at least one day per week (Bertoli et al.
4 2009). This supports the common belief that hearing aid use is likely to increase over time,
5 perhaps as a result of acclimatization.

6 However, frequent use does not necessarily equate with benefit. In a previous
7 qualitative interview study, some participants reported low hearing aid use time and high hearing
8 aid satisfaction, and some reported the opposite pattern (Laplante-Lévesque et al. 2012). Although
9 it is well known that hearing aid use time correlates with hearing aid satisfaction (Wong et al.
10 2003), such findings represent group-based trends, and this may mask important variance among
11 hearing aid users; use time does not always signify satisfaction. For example, Kochkin (1997)
12 found that 33% of very dissatisfied clients and 60% of dissatisfied clients wore their hearing aids at
13 least four hours per day. This study highlighted how drivers of hearing aid use time and drivers of
14 hearing aid satisfaction may be somewhat different. Previous research has recognized that hearing
15 aid success is multi-factorial (Humes 1999). Therefore, number of hours of use may not be an
16 accurate (or at least a complete) reflection of hearing aid success. For this reason, the concept of
17 “optimal hearing aid use” might be a better metric of hearing aid success than the absolute number
18 of hours of daily use.

19 There is currently no clear consensus on what optimal hearing aid use means to
20 clients and to audiologists. The literature is scarce on this topic. A narrative study of four women
21 who were consistent users of hearing aids found that purpose and meaningful life participation
22 drove hearing aid use (Lockey et al. 2010). Accordingly, optimal hearing aid use might not equate
23 frequent hearing aid use for all hearing aid clients. The critical issue is that if optimal hearing aid
24 use is to be an intervention outcome and therefore a shared goal for clients and audiologists, then
25 both parties must have an a priori agreement regarding what this intervention goal entails. In other
26 words, clients and audiologists must agree on what constitutes optimal hearing aid use. Using a

1 qualitative methodology, this study investigated and contrasted the perspectives of clients and
2 audiologists regarding the meaning and determinants of optimal hearing aid use.

3 Qualitative research is increasingly applied in audiology, especially for research
4 questions where an open-ended approach to generating new knowledge is appropriate (Knudsen
5 et al. 2012). One method of qualitative data collection involves focus groups, consisting of a
6 structured discussion between 6-10 participants (Morgan 1996). A facilitator introduces questions
7 and exercises to the group whilst a note-taker documents non-verbal behaviors, contextual cues,
8 and interactions. Focus group sessions are typically recorded (audio or audiovisual) for later
9 analysis. Compared to individual interviews, focus groups better contrast participant viewpoints
10 and reduce potential social desirability bias (Morgan 1996).

11 Focus groups have previously been used successfully with adults with hearing
12 impairment, for example, in a study of attitudes toward hearing impairment in the workplace (Hétu
13 et al. 1994) or in a study of consequences of hearing impairment on work life (Tye-Murray et al.
14 2009). Stika (1997) conducted an extensive series of focus groups with adults with hearing
15 impairment (n=107) and family members (n=37) to compare and contrast the impact of hearing
16 impairment on social interactions. Focus groups have also been conducted regarding audiologists'
17 attitudes in relation to cochlear implantation (Fitzpatrick & Schramm 2006; Fitzpatrick et al. 2009)
18 and with both audiologists and adults with hearing impairment regarding barriers to work
19 integration which people with hearing impairment face (Laroche et al. 2000). Laroche et al. (2000)
20 conducted separate focus groups for audiologists and adults with hearing impairment. Similarly,
21 the present study investigated optimal hearing aid use from the perspective of both clients and
22 audiologists. The aim was to explore the meaning and determinants of optimal hearing aid use
23 from the perspective of hearing aid clients and audiologists. It also contrasted the perspectives of
24 the clients and audiologists on these topics.

25

MATERIALS AND METHODS

This descriptive qualitative research was conducted in 2011 in two sites to increase its transferability (Guba 1981): Denmark and United Kingdom (UK). Ethical clearance was obtained from the University of Manchester (UK). The study adhered to the Declaration of Helsinki ethical principles.

Participants and Recruitment

Four groups of participants were recruited: 1) clients (n=7) in Denmark; 2) clients (n=10) in the UK; 3) audiologists (n=6) in Denmark, and; 4) audiologists (n=7) in the UK. All participants were at least 18 years of age and were able to communicate verbally in the language of the focus group (Danish or English) and to travel to the location of the focus group. Adequate focus group size varies depending on the research question, but Krueger (1988) describes 6-8 participants per focus group as ideal and warns against conducting focus groups with more than 10 participants.

Clients were recruited in the Copenhagen area (Denmark) and in the Manchester area (UK) via advertisements on public and online notice boards, via registries of research participants, and via word-of-mouth. Clients owned hearing aids which were less than five years old (as differences in perceptions regarding optimal hearing aid use that may have been due to defective hearing aids or to differences in hearing aid technology were not the focus of this study), had worn them at least once in the past three months, never had ear surgery, and did not have a cochlear implant. Clients were asked to provide a copy of their recent hearing test results (less than 12 months old). If they could not provide a copy of their recent hearing test results, they completed a hearing screening immediately after the focus group.

Audiologists were recruited via professional contacts with the Eriksholm Research Centre (Denmark) and with the Audiology and Deafness Research Group at the University of Manchester (UK). Audiologists had regular contact with clients.

Sampling was driven by maximum variation (Sandelowski 1995) to recruit participants with a wide range of perspectives regarding optimal hearing aid use. Clients were recruited for maximum variation on the following variables: age, gender, years of hearing aid experience, setting in which current hearing aids were obtained (e.g., from a publicly- or privately-funded provider), self-reported hearing aid use pattern, self-reported hearing disability, occupational status, and living arrangement. Audiologists were recruited for maximum variation on the following variables: age, gender, years of experience as audiologist, primary current setting, and level of education. These variables were chosen as they were deemed to be likely to influence perspectives on optimal hearing aid use. Table 1 provides an overview of all 30 participants.

[Insert Table 1 about here.]

Focus Group Sessions

Each participant took part in one focus group session which lasted approximately three hours. Four separate focus group sessions were conducted (i.e., Danish clients, UK clients, Danish audiologists, and UK audiologists). To preserve neutrality as much as possible, none of the focus groups took place in a clinical setting: focus groups took place at the University of Manchester in Manchester (n=2), at a conference centre in the Copenhagen area (n=1; focus group with Danish clients), or at a hearing aid manufacturer's headquarters in the Copenhagen area (n=1; focus group with Danish audiologists). All focus groups took part in small and quiet meeting rooms. The participants and the facilitator's chairs were arranged in a circle around a table whilst the note-taker sat apart. The participants and the facilitators could see each other at all times. One participant with hearing impairment used hearing assistive technology (FM system). All focus groups were audio-recorded with a Roland Edirol R-09HR digital recorder (www.roland.com). Each focus group followed the same procedure, described in Table 2.

[Insert Table 2 about here.]

Two researchers were present at each focus group: one facilitator (i.e., moderator) and one note-taker (i.e., observer). Facilitators were trained in focus group facilitation and were experienced in interacting with people with hearing impairment and audiologists. Facilitators introduced questions from a topic guide (see Table 3 for excerpts) and exercises. The topic guide and exercises had previously been piloted for adequacy on a focus group of five hearing aid researchers. Note-takers documented non-verbal behaviors, contextual cues, and interactions occurring during the focus groups. Note-takers were not active participants during the focus groups, however at the end of the focus groups they had the opportunity to request further discussion or clarification of topics the focus group had raised but not exhausted.

[Insert Table 3 about here.]

Data Analysis

Focus group audio-recordings were transcribed verbatim. Note-takers and a second researcher reviewed the focus group transcripts and expanded them with turn-taking and other relevant contextual information. A professional translator translated the two Danish focus group transcripts to English. Two bilingual Danish-English researchers (LDJ and CN) compared the English translations against the Danish transcripts to ensure translation quality.

The qualitative research software NVivo 8 (www.qsrinternational.com) served as a platform for data analysis. The four focus group transcripts were analyzed with inductive qualitative content analysis (Graneheim & Lundman 2004; Knudsen et al. 2012). The research aim informed the definition of content areas (i.e., explicit areas of relevant content). Identifying content areas allows the exclusion of transcript sections which have no direct relevance to the research aim. The two content areas were: 1) the meaning of optimal hearing aid use and 2) the determinants of optimal hearing aid use. All transcript sections addressing at least one of the content areas were identified as units of content. The transcript sections which were relevant to the content areas were divided into meaning units (i.e., words or statements that relate to the same meaning). An example

1 of a meaning unit is “I use mine as much as I can, but I accept that there are deficiencies with the
2 way it functions and you just accept those and live with them, don’t you, basically?”

3 Each meaning unit was given a code (i.e., a label describing the content of the
4 meaning unit). Using the meaning unit example presented above, a code could be “optimal hearing
5 aid use involves accepting hearing aid limitations”. Each code was as concrete and close to the
6 meaning unit as possible. When necessary, codes included information about non-verbal
7 information and referents external to the meaning unit (e.g., when the meaning unit was in
8 response to a comment expressed earlier in the focus group). This is especially important in focus
9 groups, where interactions between the participants are commonplace and form part of the data.
10 Open coding was used so that as many different codes as necessary were created to describe all
11 aspects of the content. If a meaning unit conveyed more than one concept, the same meaning unit
12 was coded as many times as necessary to capture all concepts it conveyed. Two researchers (ALL
13 and LDJ) identified and coded all meaning units. A third researcher (CN) who had not been
14 involved in the open coding independently coded transcript excerpts. More specifically, three
15 separate excerpts were randomly chosen for each of the four transcripts, accounting for >10% of
16 each transcript. Similarities and discrepancies between the two independent sets of codes helped
17 refine the open coding.

18 All codes emerging from the two focus groups with clients were merged together to
19 form a client data set. All codes emerging from the two focus groups with audiologists were
20 merged together to form an audiologist data set. For each data set, one researcher (ALL or LDJ)
21 clustered the codes into categories (i.e., groups of content which share a commonality). Using an
22 inductive and iterative approach, results were initially organized into small and concrete categories
23 and were later clustered under larger and more abstract categories. For each data set, all meaning
24 units were organized into a multi-leveled hierarchical structure. For example, the example meaning
25 unit and code described above were organized into the concrete category “not hearing well with
26 hearing aids” which was clustered under the more abstract category “(hearing aid) benefits and
27 limitations”.

1 The outcome was two sets of results, one emerging from the client data set and one
2 emerging from the audiologist data set. All authors reviewed both sets of results and discussed
3 conceptual commonalities and differences between categories and between sets of results. An
4 independent group of three researchers also reviewed and commented on the two results sets.
5 This helped refine the two multi-leveled structures in which the results were arranged.

6 A randomly selected sample of 10% of codes of the UK client focus group and 10%
7 of codes of the UK audiologist focus group were used to assess saturation. A study is said to have
8 reached saturation when collecting new data does not result in new information (Morse 1995).
9 Practically, this occurs when the categorization of new codes does not require the creation of new
10 categories. In the present study, the codes used for the saturation test did not generate new
11 categories and they required only minimal categorization changes (two for the client results and
12 two for the audiologist results). Therefore saturation was deemed to have been reached, and
13 further data collection and analysis would be unlikely to generate different perspectives from clients
14 and audiologists regarding the meaning and determinants of optimal hearing aid use.

15 In total, the four focus groups generated 5625 meaning units referring to is the
16 meaning and determinants of optimal hearing aid use. From the two client focus groups emerged
17 2613 meaning units, 1100 codes which were clustered into 62 sub-categories, 13 categories, and 3
18 main categories. From the two audiologist focus groups emerged 3012 meaning units, 878 codes
19 which were clustered into 62 sub-categories, 13 categories, and 3 main categories.

20 Each category's density was determined. Density refers to the qualitative richness of
21 the category content. A dense category includes several sub-categories relating to complementary
22 aspects of the same concept (e.g., addressing a perspective, describing reasons for this
23 perspective, actors involved, and consequences on hearing aid use). Category density was
24 identified by means of consensus with all four authors. Due to limited space, only dense categories
25 are described in the following section.

26

RESULTS

Table 4 shows the main categories and subcategories describing the perspectives of clients and audiologists on the meaning and determinants of optimal hearing aid use. The 3 main categories were the same for both clients and audiologists and related to i) the client, ii) the audiologist, and iii) the hearing aid. Denser categories are in bold in Table 4. As seen in Table 4, the 13 subcategory labels were similar between groups but not identical. Similar category names for client and audiologist data sets merely point to the fact that the same topic was discussed as relating to optimal hearing aid use, but that their respective views on the topic could be very different. For this reason, the following section presents each dense category with selected focus group excerpts illustrating the perspectives of clients and audiologists. For clients, the participant's years of experience with hearing aids and self-reported hearing aid usage pattern follow each excerpt. For audiologists, the participant's current clinical setting and years of experience interacting with clients follow each excerpt.

[Insert Table 4 about here.]

Meaning of Optimal Hearing Aid Use

There was agreement between clients and audiologists regarding the meaning of optimal hearing aid use. In terms of amount of hearing aid use, they described the more time spent using the hearing aid the better. However, both clients and audiologists also described optimal hearing aid use holistically, relating to the whole person and to hearing and communication function in general, so that optimal use did not necessarily correspond to wearing the hearing aid all or most of the time. Optimal hearing aid use was defined as related to clients' needs; optimal hearing aid use could be less than all waking hours and perhaps only in specific situations if this adequately answered the clients' needs. Clients and audiologists agreed that misinformed clients could not use their hearing aids optimally. For clients, the hearing aid itself, rather than the audiologic services surrounding its provision, was the main determining influence toward attaining optimal hearing aid use. For audiologists, the client-audiologist relationship was seen as having

primary importance. Determinants of optimal hearing aid use are described in more detail below. Dense categories are presented in the same order as in Table 4 from top to bottom. When a category was dense for only clients or audiologists but not both, the perspectives on this topic of the counterpart are briefly summarized in the text.

Client Determinants

Dependence on Hearing Aids • Clients described their dependence on hearing aids or lack thereof. Some clients described how they did not depend on their hearing aids. They depicted situations where they heard easily unaided, where they used coping strategies successfully, or where their hearing-related activity limitations did not result in participation restrictions. These aspects all related to their perception of dependence and need for hearing aids:

In a one to one situation I really don't need [my hearing aid]. So I don't wear it. (Client had two hearing aids for 10 years, reported using them occasionally)

On the other hand, some felt a high level of reliance on their hearing aids, being uneasy without their hearing aids on, or keeping old hearing aids in case of emergency. They also listed the disability they experienced without their hearing aids:

I don't hear consonants at all without [my hearing aids]. (Client had two hearing aids for 3 years, reported using them all day)

A few clients linked dependence on hearing aids with degree of hearing impairment, either as self-perceived or as measured by the audiologist. This client perceived his hearing impairment as not severe and therefore he did not feel dependent on his hearing aids:

Because my hearing loss is not severe, coping [without hearing aids] is not a severe problem. (Client had one hearing aid for 2 years, reported using it occasionally)

Client dependence on hearing aids did not develop as its own topic in the audiologist focus groups, but was mentioned briefly as part of the discussion surrounding hearing aid use being driven by client needs. Audiologists suggested, as clients did, that hearing aid dependence was related to hearing impairment type and degree, but also to general health status. For instance,

some audiologists indicated that vision impairment made clients more dependent on their hearing, thus promoting hearing aid use. One audiologist also mentioned that some clients do not use hearing aids for fear of becoming dependent on them.

Knowledge and Personal Factors / Lifestyle and Personal Factors • According to clients, some of the influences on hearing aid use were personal in nature. For example, perception of stigma played a role in their hearing aid use. Most importantly, clients emphasized the importance of knowledge, for example being informed about their hearing and their hearing aids' capabilities. They recollected situations where their lack of experience and knowledge was detrimental for optimal hearing aid use. For example, this woman described how her audiologist had kindly welcomed her questions at the initial hearing aid fitting appointment, but that she did not know where her lack of knowledge lay:

And then you can ask all you want. But as a new user you don't really know what it is you should ask. (Client had one hearing aid for 2 years, reported using it all day)

For clients, knowledge led to empowerment. For example familiarity with and use of communication strategies was seen as vital for successful coping with hearing impairment:

[Using communication strategies] is really important. If you are out to dinner, for example... It's the whole dinner, which can be a ruined or rescued, just because of it. (Client had one hearing aid for 2 years, reported using it all day)

Clients describe the role of significant others as mostly limited to hearing aid uptake motivators. For audiologists, client's personality and attitude, motivation, ability to manage hearing aids (with emphasis on required dexterity rather than required knowledge), and the role of the client's family were seen as influencing optimal hearing aid use. Audiologists believed that a client's lifestyle, activities, and hobbies had implications for when and where hearing aids were and should be used. Audiologists argued that hearing aid use in diverse listening situations was more optimal than hearing aid use in only one environment. Audiologists found young clients in the workforce more likely to use hearing aids:

1 *Young adults are normally more motivated, aren't they? If they're at work, motivation is key.* (Public
2 audiologist with 4 years experience)

3 Audiologists stated that it was difficult to motivate clients who had had disappointing
4 early hearing aid experiences to use hearing aids again. Several audiologists found it important
5 that clients were convinced that their hearing aids had optimal technology and features. Clients'
6 ability to manage the hearing aids (insertion and removal, battery change, cleaning, etc.) was seen
7 as important for optimal hearing aid use:

8 *A: Cleaning and maintenance of the device is also extremely important. Because you see some*
9 *[hearing aids] which are really poorly maintained devices with microphone filters that are*
10 *completely covered [in ear wax]. And [the clients] have them [in the ears] at all times, but...*

11 (Research audiologist with 5 years experience)

12 *B: How big is the effect?* (Private audiologist with 23 years experience)

13 *A: Yes, exactly. They must also be maintained. It's extremely important.*

14 Audiologists described the role of significant others as being more important than
15 clients did. However, audiologists still found it important that clients used their hearing aids for their
16 own sake rather than that of others.

18 **Audiologist Determinants**

19 **Audiologic Practice and Profession** • Audiologists discussed work methods and tools in their
20 clinical work, and reflected on the wider audiologic profession. They found that hearing thresholds
21 alone were not a sufficient basis for adequate hearing aid fittings. Believing that more advanced
22 tests could lead to more personalized and effective hearing aid fittings, the audiologists wanted
23 better assessment methods of hearing aid outcomes beyond prescribed gain targets:

24 *Some people prefer fast, some people prefer slow [compression]. And we don't have any tests in*
25 *our arsenal to actually test for that in the clinic. Or we don't do it, if we have.* (Public audiologist
26 with 4 years experience)

Some audiologists acknowledged not always feeling confident in their practices. This audiologist felt insecure about how to select technology to address her clients' problems and wondered if doing her best was satisfactory:

Which way do they hear better? You're just making a judgment all the time. I think that's hard. What if it's wrong? What if we fit them with all the wrong things and they don't really want noise reduction? Are we making it worse for them? (Research audiologist with 10 years experience)

Professional uncertainty and lack of scientific evidence also arose in relation to acclimatization. Whether the neurological changes of acclimatization resulted in clinically meaningful improvements in hearing aid benefit was debated:

Are those physiological changes adding benefit or not? We tend to assume at the moment that they do, but we don't really know that. (Public audiologist with 5 years experience)

On the other hand, clients did not comment extensively on their audiologist's practice and they did not discuss the audiologic profession at all. Clients discussed briefly the provision of after-care and the use of technology by their audiologist: both were perceived as positive aspects of audiologic practice.

Reception of Information and Advice / Giving of Information and Advice • Audiologists discussed how they counseled their clients regarding optimal hearing aid use. Many audiologists recommended using hearing aids all waking hours, if not as much as possible:

We say to [the clients] "I want you to use the hearing aid as much as you possibly can." (Public audiologist with 22 years experience)

In contrast, some audiologists recommended clients to use hearing aids only according to their needs:

I tell [clients] "[Try the hearing aid in] all situations, then maybe there are some situations where you feel that you don't need them. Then you can take them off. But it's very important that you use them a certain number of hours a day. Then you must sort through what's most important, if you don't use it all the time". (Research audiologist with 24 years experience)

Audiologists explained making efforts to maintain a balance between giving too little and too much information. They found they could contribute to optimal hearing aid use if they succeeded in instilling optimistic and realistic expectations in their clients. This applied to counseling regarding hearing aid uptake, hearing aid use, and acclimatization to hearing aids.

Audiologists described strategies they used to deliver an optimistic, yet honest message about hearing aids and acclimatization. They reported adjusting clients' expectations by carefully selecting the best level of instructions and counseling for each client. Audiologists found it important that counseling should lead clients to understand the reasons for hearing aid use, so they internalized this knowledge and decided for themselves to wear their hearing aids:

A: It's about telling them what to do. You just want to tell them why they might want to use it and how it might improve things, and let them make the decision if they must use it or not. (Research audiologist with 10 years experience)

B: Yeah. Try to lead them so that they can come to that conclusion themselves. (Public audiologist with 22 years experience)

Clients found the reception of information and advice from their audiologist to be central. Unfortunately, most views clients expressed focused on either not having received information and advice or wanting to have received more. Clients identified that poor information retention and misunderstandings were potentially detrimental to optimal hearing aid use. To circumvent this problem, audiologists who repeated information, who provided written information, and who gave access to an ongoing stream of information (e.g., newsletters or other forms of information follow-up) were particularly appreciated.

Relationship with Me as a Client / Relationship with my Client • Audiologists described their relationship with their clients in great detail. They put a lot of emphasis on the power of the audiologist-client relationship in attaining optimal hearing aid use and expressed two somewhat contrasting messages: delivering client-oriented service and taking on the role of the expert.

1 In terms of delivering client-oriented service, audiologists described how the fitting
2 appointment was carried out as influencing hearing aid use. Audiologists believed that good
3 communication between client and audiologist, rather than the hearing aid itself, was essential for
4 optimal hearing aid use:

5 *We surely can't avoid it, no matter how good a hearing aid is, it also requires a good fitter or at*
6 *least good communication with the user.* (Research audiologist with 24 years experience)

7 Audiologists also reported that experience taught audiologists to gauge their clients to
8 deliver the correct services in a manner appropriate to the individual client. Good interaction and
9 dialogue with clients were seen as essential. The more audiologists knew about a client, the better
10 they could individualize their approach:

11 *The longer [time] you can spend and engage with that patient, the more success you'll eventually*
12 *have because you're addressing the problems, all the things which are important to them.* (Public
13 audiologist with 2 years experience)

14 Audiologists believed that good clinicians needed to be competent listeners. As
15 clients' needs for hearing rehabilitation were individual, the audiologist's ability to help clients relied
16 on information obtained from the client (lifestyle, financial situation, hearing problems, reason for
17 not wearing hearing aids, etc.). Some even added that the skilled audiologist should be able to
18 notice topics which clients left unsaid.

19 In a somewhat contradictory fashion, audiologists nuanced their emphasis on client-
20 centered service by adding that audiologists were professionals who had expertise which justified
21 an audiologist-led, prescriptive approach:

22 *Even though they think they've got optimal, you've got a wealth of understanding and knowledge to*
23 *be able to maybe even improve it that step further. So although it's predominantly patient based, it*
24 *is also your experience.* (Private audiologist with 6 years experience)

25 Some audiologists attempted to limit their clients' access to technical information
26 pertaining to their clinical activities:

27 *You have to be careful that they don't sit and focus on the [hearing aid fitting software displayed on*

1 *the computer] screen. Because then they focus only on it and think: "Why are you doing this?".*
 2 *They have no insight in what we are doing. They can't relate to the various algorithms, [to] what we*
 3 *do. They can't do that.* (Public audiologist with 3 years experience)

4 Clients described the clinical relationship in less detail than audiologists. Still, they
 5 valued audiologists who involved them in decisions (e.g., by trialling different hearing aids) and
 6 who took into account their individual needs and preferences.

8 **Hearing Aid Determinants**

9 **Benefits and Limitations** • Clients reported widely on the benefits and limitations of their hearing
 10 aids and how this influenced their perspectives on optimal hearing aid use. Relative hearing aid
 11 satisfaction was also discussed in terms of situations where hearing aids were perceived as
 12 effective versus ineffective. Points of view often diverged, for example occlusion was sometimes a
 13 problem, but clearly not for all clients:

14 *When I sing, one sings occasionally, I like to hear my own voice. It does help me. If you are doing*
 15 *karaoke, you can hear what's going on. I find [the hearing aid] an advantage from a singing point of*
 16 *view.* (Client had hearing aid for 2 years, reported using it all day)

17 In some other situations, there was a better agreement between clients' experiences
 18 of benefits and limitations of hearing aids, for example limited benefit in background noise:

19 *It seems to be a general feeling that in hubbub situations, aids are not really useful.* (Client had
 20 hearing aid for 2 years, reported using it occasionally)

21 Compared to the clients, audiologists only discussed hearing aid benefits and
 22 limitations briefly. They felt that as wearing hearing aids generally improves hearing, regular and
 23 consistent hearing aid use was likely to be more optimal than not wearing hearing aids.

24
 25 **Features, Accessories, and Hearing Assistive Technology** • Hearing aids themselves were
 26 central to the conceptualization of optimal hearing aid use for clients. Hearing aid features,
 27 accessories, and hearing assistive technology were all discussed at length and in detail. For

example, hearing aid controls such as program change or volume control were compared, appreciated, or desired:

It would be nice to be able to turn it up and turn it down sometimes. (Client had hearing aid for 2 years, reported using it all day)

Clients viewed hearing assistive technology very positively. They described how it complimented their hearing aid use and, often, how much it had improved their hearing abilities:

A: The teleloop is one of the best. (Client had hearing aids for 16 years, reported using them all day)

B: I wouldn't miss it for anything in life! Oh my God! (Client had hearing aids for 15 years, reported using them all day)

Audiologists found that clients appreciated hearing aids with options for connectivity and teleloop and that client awareness of available hearing assistive technology represented a positive influence on hearing aid use. Some believed hearing aid type (relative to client needs) could be a determinant of optimal hearing aid use. Audiologists also pointed out that not using hearing aids can be optimal when other assistive technology (for example, wireless headphones for the television) better sustain functioning than hearing aids.

DISCUSSION

This focus group study of 17 clients and 13 audiologists provided insights into the meaning and determinants of optimal hearing aid use. Focus groups were a successful data collection technique for the purposes of this study, both with clients and audiologists. Rather than a structured exchange dominated by the facilitator, all four focus groups were conducted as a free-flowing exchange between participants. This resulted in rich and complimentary data, including interactions between the participants which became an integral part of the data. This reduces the threat of social desirability bias in the data. As censorship or conformity has been said to influence data collected with focus groups, the facilitators purposefully highlighted at the outset that no consensus was expected or required. They welcomed diverging opinions. As a result, different views

were voiced in the focus groups as participants were explicitly informed that consensus was not expected and that expression of different opinions was encouraged. This study and previous experiences with qualitative methods in audiology suggests that an individual interview is a suitable data collection technique to obtain an in-depth and personal description of a phenomenon (for example, perspectives on help-seeking and rehabilitation in Laplante-Lévesque et al. 2012). On the other hand, a focus group is a suitable data collection technique to contrast participants' descriptions of a phenomenon. In the present study, the 30 participants generated enough data to reach saturation (Morse 1995). In qualitative research, adequate sample size varies according to the complexity of the research question and the heterogeneity of the sample (Guba 1981; Graneheim & Lundman 2004). Qualitative research results which were obtained with participants chosen with maximum variation sampling and which have reached saturation are more transferable (Guba 1981). In other words, maximum variation sampling and saturation make the results likely to be applicable to other clients and audiologists.

This study also benefited from gathering the perspectives of both clients and audiologists and contrasting them. Overall, both clients and audiologists described optimal hearing aid use as being frequent and regular, but even more importantly as being driven by the individual needs of the clients. Both clients and audiologists highlighted how circumstances specific to each client overruled the general principle that frequent hearing aid use is optimal. The participants' views are in line with a holistic view of disability and health where individual influences are paramount (Gagné et al. 2009). They also corroborate the results of a previous study of clients' views (Lockey et al. 2010) and show that optimal hearing aid use does not equate frequent hearing aid use for all hearing aid clients and audiologists.

The focus group topic guide covered definitions and determinants of optimal hearing aid use. However, participants discussed the latter more. Both clients and audiologists highlighted the importance of client access to information. Audiologists were very aware of the need to provide the right type and amount of information to clients and in the right tone. They saw information as having the potential to empower and enable the client in becoming an optimal hearing aid user, but

1 they were also wary of overwhelming clients with too much information. They discussed how that
2 information needed to become knowledge clients could use as required. Their observations and
3 efforts expanded on this topic were very much in line with the principles of andragogy or adult
4 learning (Knowles et al. 2005) and health education (Glanz et al. 2008). For example, participants
5 described the importance of relevance (for example, learning things which clients see as important
6 for their hearing aid use) and experience (for example, learning by doing), important aspects of
7 andragogy. Similarly, participants raised topics central to health education such as social networks
8 and support or stress and coping. Clients also found the reception of information and advice from
9 their audiologist to be central. Most views clients expressed focused on either not having received
10 information and advice or wanting to have received more. Researchers and program developers
11 must continue to address the problem of poor information retention and misunderstandings during
12 audiologic appointments. Written information, information repetition, and ongoing streams of
13 information (e.g., newsletters or other forms of information follow-up) must be better integrated into
14 practice. Information technology can provide opportunities to improve access to information for
15 people with hearing impairment (e.g., Laplante-Lévesque et al. 2006; Thorén et al. 2011).

16 There was a close match between clients and audiologists on the positive and
17 negative attributes of the client-audiologist relationship. For example, both clients and audiologists
18 generally valued client involvement in terms of participation in aspects of the hearing aid fitting
19 process. Both clients and audiologists also raised interesting contrasts between client-centered
20 services and audiologist-led services. Overall, their views followed a biopsychosocial approach,
21 where all spheres of the client's life are taken into account when considering the consequences of
22 a disability and their remediation (Gagné et al. 2009). Such approaches require a good
23 understanding and tactful merging of various types of information when making clinical decisions.
24 Shared decision making is an example of a clinical approach which combines the client's needs
25 with the clinician's expertise and which has shown promise in audiology (Laplante-Lévesque et al.
26 2010). Further research should be done to understand how best to balance client-centered and
27 audiologist-led services.

Both clients and audiologists perceived the client's significant others as influential toward optimal hearing aid use. However, they described their influence differently. Clients mentioned significant others motivating them to seek help for their hearing and to take up hearing aids. However, their role did not extend past the initial steps of audiologic rehabilitation. On the other hand, audiologists described clients' significant others as providing a more holistic and long-lasting support for the client's optimal hearing aid use.

Clients emphasized how important the hearing aid was in achieving optimal hearing aid use. From a client perspective, hearing aids which performed well and which had relevant features were most central. Hearing aid benefits and limitations, features, accessories, and hearing assistive technology were all discussed in detail. Clients saw hearing aids as static objects and as not easily altered. Therefore, it was crucial for optimal hearing aid use that the hearing aids themselves were optimal. Many did not seem to understand that hearing aids could be modified, both physically (e.g., to address management issues) and in terms of signal processing (e.g., to improve sound quality). If hearing aids were not optimal, clients looked toward accessories and hearing assistive technology which could address the shortcomings. In contrast, audiologists emphasized the role of a good client-audiologist relationship in achieving optimal hearing aid use. From the audiologist's perspective, it was important to understand the needs of the clients and to instruct clients appropriately were most central. They put little emphasis on the hearing aids and their benefits and limitations or features, which they saw as malleable as long as they were aware of the needs, preferences and expectations of the client. Previous literature describes how audiologists can address client expectations (Saunders et al. 2009). It is commendable that audiologists acknowledge their own role in optimal hearing aid use and the importance of the client-audiologist relationship, but given clients' focus on hearing aids, audiologists might wish to describe more explicitly to their clients how their intervention can extend beyond provision of the optimal hearing aid. For example, audiologists may wish to emphasize to their clients that they can make alterations to the hearing aids. The clients' focus on the hearing aids rather than on a more holistic approach to hearing rehabilitation probably stems from a lack of knowledge rather than

1 from an actual preference. Many clients are simply unaware of what an audiologist can do beyond
2 hearing aid dispensing. Audiologists should keep on offering holistic hearing rehabilitation to their
3 clients with a full range of interventions and explaining the benefits of such an approach (e.g.,
4 Hickson et al. 2007; Kramer et al. 2005; Thorén et al. 2011). The results of the present study
5 reinforce that the concept of optimal hearing aid use might be a better dimension of hearing aid
6 success than the absolute amount of hearing aid use.

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SHORT SUMMARY (PRÉCIS)

This study explored the meaning and determinants of optimal hearing aid use from the perspectives of hearing aid clients and audiologists and contrasted them. Focus groups were conducted with 17 clients and 13 audiologists in Denmark and in the United Kingdom. Both clients and audiologists described optimal hearing aid use as being frequent and regular and driven by the individual needs of the clients. Clients emphasized the hearing aid, whilst audiologists emphasized a good client-audiologist relationship as determinants of optimal hearing aid use.

TABLE 1. Summary of sample characteristics (n=30)

Hearing aid clients (n=17)		Audiologists (n=13)	
Site		Site	
Denmark	41.2%	Denmark	46.2%
United Kingdom	58.8%	United Kingdom	53.8%
Age		Age	
Median [Range]	67 [23-90]	Median [Range]	36 [24-52]
Gender		Gender	
Female	35.3%	Female	61.5%
Male	64.7%	Male	38.5%
Years of hearing aid experience		Years of experience as audiologist	
Median [Range]	5 [2-23]	Median [Range]	6 [2-24]
Setting in which current hearing aids were obtained*		Primary current setting*	
Public	64.7%	Public	46.1%
Private	11.8%	Private	38.5%
Research	23.5%	Research	15.4%
Self-reported hearing aid use pattern		Level of education	
Daily	70.6%	No university education	30.8%
Not daily	29.4%	Undergraduate university education	23.1%
		Postgraduate university education	46.1%
Hearing impairment in better ear (average hearing thresholds at 0.5, 1, 2, & 4 kHz)			
Median [Range]	42.5 [10-87.5]		
Self-reported hearing disability without hearing aids, from 1 (no hearing problems) to 5 (very serious hearing problems)**			
1 out of 5	0.0%		
2 or 3 out of 5	58.8%		
4 or 5 out of 5	41.2%		
Occupational status			
Employment or study (full or part time)	35.3%		
Retirement or unemployment	64.7%		
Living arrangement			
Alone	35.3%		
With other(s)	64.7%		

* Public= Publicly funded provider, where the client does not contribute to the cost of the hearing aids and related services; Private= Privately funded provider, where the client contributes to the cost of the hearing aids and related services; Research= Research provider, such as university setting or hearing aid manufacturer research clinic, where the client does not contribute to the cost of the hearing aids and related services.

** The question was: "How do you describe your hearing problems without your hearing aids, where 1 is no hearing problems and 5 is very serious problems?"

TABLE 2. Focus group procedure

Introduction (approximately 10 minutes)
The facilitator and note-taker introduce themselves. The facilitator invites the focus group participants to introduce themselves.
Rules (approximately 10 minutes)
The facilitator discusses the roles of the facilitator and of the note-taker. The facilitator stresses that participants' own perspectives, rather than second-hand perspectives or general statements, are sought. Simple focus group rules are discussed. For example, the facilitator describes how consensus is not expected and that respectful comparisons of opinions between participants are welcome. Take turning is highlighted to facilitate communication. Confidentiality is emphasized. Clear rules encourage self-regulation within a group.
Focus group discussion (approximately 40 minutes)
The audio-recording starts here. The facilitator uses a focus group topic guide to introduce topics for discussion (see Table 3 for topic guide excerpt). As required, the facilitator encourages more quiet participants to voice their opinions and less quiet participants to let others voice their opinions. If needed, the facilitator gently reminds participants of the rules (e.g., take turning when talking). Each focus group uses a semi-structured format, with the facilitator following the group's train of thoughts whilst still ensuring all topic guide items are being discussed.
Break (approximately 20 minutes)
Participants are offered a break. Refreshments are provided.
Focus group exercises (approximately 30 minutes)
The facilitator introduces exercises for the participants to complete together. Exercises include reflecting on fictitious quotes and case studies relating to optimal hearing aid use. Exercises elucidate new and complementary perspectives to those provided earlier in the focus groups.
Focus group summary (approximately 10 minutes)
The note-taker summarizes the content of the focus group. The note-taker chooses one or two topics the focus group raised which warrant further discussion or clarification. This ensures all topic guide items are successfully addressed.
Focus group debriefing (approximately 10 minutes)
The facilitator asks participants to share their experiences of the focus group. The audio-recording stops here.
Questionnaire (approximately 10 minutes)
The facilitator asks participants to complete a short demographic questionnaire.
Thank you (approximately 10 minutes)
The facilitator and the note-taker thank the participants for their participation.
Hearing screening (approximately 10 minutes)
Clients who could not provide recent hearing test results (less than 12 months old) complete a hearing screening. Participants are offered a copy of their hearing screening results.

TABLE 3. Focus group topic guide excerpts

For hearing aid clients	For audiologists
When and where do you use your hearing aids? When and where do you not use your hearing aids?	When and where do clients use their hearing aids? When and where do clients not use their hearing aids?
When and where should you use your hearing aids? When and where should you not use your hearing aids?	When and where should clients use their hearing aids? When and where should clients not use their hearing aids?
How should audiologists counsel you regarding hearing aid use? How should audiologists not counsel you regarding hearing aid use?	How should audiologists counsel hearing aid end clients regarding hearing aid use? How should audiologists not counsel hearing aid end clients regarding hearing aid use?
What is optimal hearing aid use? What is suboptimal hearing aid use?	What is optimal hearing aid use? What is suboptimal hearing aid use?

TABLE 4. Optimal hearing aid use: Perspectives of hearing aid clients and audiologists. Dense categories are in bold and are described in the text.

Perspectives of hearing aid clients (n=17)	Perspectives of audiologists (n=13)
<p>Client determinants</p> <ul style="list-style-type: none"> • Adjustment over time • Dependence on hearing aids • Knowledge and personal factors • Modes of hearing aid use • Relationship with my audiologist <p>Audiologist determinants</p> <ul style="list-style-type: none"> • Audiologic practice • System in which I obtain hearing aids • Reception of information and advice • Relationship with me as a client <p>Hearing aid determinants</p> <ul style="list-style-type: none"> • Benefits and limitations • Features, accessories, and hearing assistive technology • Physical object • Settings and adjustments 	<p>Client determinants</p> <ul style="list-style-type: none"> • Adjustment over time • Expectations and level of experience • Lifestyle and personal factors • Modes of hearing aid use • Relationship with me as a audiologist <p>Audiologist determinants</p> <ul style="list-style-type: none"> • Audiologic practice and profession • System in which I provide hearing aids • Giving of information and advice • Relationship with my client <p>Hearing aid determinants</p> <ul style="list-style-type: none"> • Benefits and limitations • Features, accessories, and hearing assistive technology • Physical object • Settings and adjustments