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Title: Barriers and facilitators to delivery of group audiological rehabilitation programs: a survey based on the COM-B model

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ABSTRACT

Objective: To canvas the views of Australia-based hearing healthcare clinicians regarding group audiological rehabilitation practices.

Design: A national cross-sectional self-report survey. Data was analysed using descriptive statistics and content analysis.

Study sample: Sixty-two Australia-based hearing healthcare clinicians, with experience working in an adult rehabilitation setting.

Results: Clinicians appeared to positively view the provision of group audiological rehabilitation services, yet were limited in their ability to deliver these services due to organisational barriers. Although some organisational barriers were non-modifiable by the clinician (such as group AR services not prioritised within their workplace, a lack of support from colleagues/managers, lack of resources, and a lack of funding for delivery of group AR services), others were within the clinicians' ability to change (such as habit formation for recommending these services during clinical appointments). Participants expressed desire for resources to assist them in delivering group AR, including downloadable lesson plans and information sheets for clients, clinician training videos and client educational videos. Clinicians called for increased diversity in program offerings, specifically relating to the emotional, relational and social impacts of hearing loss.

Conclusions: These results provide a framework for the development of interventional studies to increase the utilisation of group audiological rehabilitation services.

INTRODUCTION

Hearing rehabilitation services predominantly follow an acute illness model of care (i.e. offering a single solution of hearing devices), rather than a chronic disease model of care which considers an individual's lived experience of the disability (Hogan et al, 2020), despite hearing loss being a chronic condition. It is widely recognized that hearing aids improve listening ability, and hearing- and health-related quality of life (Ferguson et al, 2017). However, they do not fully address the communication, social and emotional impacts of hearing loss (Hickson et al, 2007; Lawrence et al, 2020; Poissant et al, 2008; Weinstein, Sirow & Moser, 2016), nor do they address the third party disability often experienced by communication partners (e.g. spouses, family members) of people with hearing loss (Barker, Leighton & Ferguson, 2017; Scarinci, Worrall & Hickson, 2012; Wallhagen et al, 2004).

In an attempt to decrease the negative communication, social and emotional impacts of hearing loss, hearing aid acquisition is sometimes supplemented with audiological rehabilitation (AR) services. These service-based programs aim to improve a variety of skills for the person with hearing loss (and sometimes their communication partners), and can be conducted in an individual or group format. Both individual and group delivered AR programmes have been shown to improve communication and the ability to manage one's listening environment (such as identifying and reducing background noise) (Hickson et al, 2007; Hickson et al, 2019; Kramer et al, 2005), and reduce the burden of hearing loss on the individual and their communication partners (Getty & Héту, 1991; Hickson, Worrall & Scarinci, 2007; Hickson et al, 2019; Preminger & Meeks, 2010; Preminger & Yoo, 2010). Additional benefits of AR include hearing aid retention and use when compared to non-attendees (Hawkins, 2005; Northern & Beyer, 1999). Provision of AR programmes in conjunction with hearing aids are more cost effective at improving the burden of disease for hearing loss than provision of hearing aids alone (Abrams, Chisolm & McArdle, 2002; Hogan et al, 2020).

Despite the evidence of improved outcomes when supplementing hearing device fittings with AR services, use of these services in clinical practice is low (Montano et al, 2013). In Australia, the Government funds devices and audiological services, including individual and

group AR, for adults with hearing loss who fit certain socio-economic selection criteria. Yet, for the financial year 2018–2019, only 0.6% of eligible clients received a funded AR service (Australian Government Department of Health, 2020). Low rates of group AR services are also noted in the USA (Kochkin et al, 2010). To date, there are no comprehensive reports exploring the barriers to provision of AR from the perspectives of hearing healthcare clinicians.

Group AR programmes have some advantages over individual AR sessions because the group setting facilitates an atmosphere of peer support in which the participants learn with and from each other (Hickson et al, 2007; Preminger & Yoo, 2010). Group members take an active approach to the education process, share ideas and strategies for alleviation of the effects of hearing loss, and actively problem solve in collaboration with the audiologist and other members of the group to find solutions to their hearing-related problems. Additionally, the group itself becomes a venue for practicing communication skills (Hickson et al, 2007). Group AR can also provide a space for people to share and learn from one another's psychosocial experiences of hearing loss (such as embarrassment and loneliness) (Hawkins, 2005). Furthermore, group AR programs are more financially feasible for clinics to deliver than individual programs based on the time and cost of services delivery, and thus group AR is subsequently more affordable for the client to attend (Thibodeau & Alford, 2011). On the other hand, the logistics of organising group sessions can be difficult, attendance can be unreliable due to distance and travel needs, and anecdotally hearing healthcare clinicians have indicated that they lack confidence in their skills to facilitate group interactions during the group sessions.

Provision of group AR services has been encouraged through development of structured guides (Hickson et al, 2007; Montano et al, 2013), supplemental digital educational resources (Ferguson et al, 2016) and online platforms for delivery of virtual sessions (Thorén et al, 2014). Digital resources have taken on expanded importance since physical distancing rules due to the COVID-19 pandemic discourage in-person provision of care, making it even more challenging to provide group AR services. Digital resources and online programs demonstrate promise in improving client skills and knowledge (Ferguson et al, 2019;

Maidment et al, 2020a; Ratanjee-Vanmali et al, 2020). However, research has elucidated a number of challenges relating to participant's difficulty in navigating digital training and support programs (Thorén et al, 2014; Thorén, Pedersen & Jørnæs, 2016; Vlaescu et al, 2015). Several research groups have involved adults with hearing loss in participatory research projects co-designing futuristic eHealth solutions aimed to improve hearing healthcare services (Ferguson et al., 2018; Maidment et al, 2020b; Nielsen et al, 2018). These participatory projects highlight the need for future eHealth solutions to offer rehabilitation strategies that incorporate easy access to personalized information, communication, and learning milieus, and that they consider the needs of people with a range of hearing impairments and technical "know-how" when they are designed. Hearing healthcare clinicians appear willing to use digital technologies for delivery of audiological support (Bennett et al, 2020; Saunders & Roughley, 2020), yet, further research is needed to understand the barriers to utilisation of existing resources and preferences for future resource development.

In general, little is known regarding why AR services are not more frequently provided in the clinical setting, nor whether existing barriers might be mitigated through the use of digital technologies. The purpose of this research was thus to identify barriers to delivery of group AR in the clinical setting, so that future interventional studies may target these to ultimately increase the use of group AR services either in-person or virtually.

Changing clinical behaviours is difficult, and often requires context-specific interventions that address multiple barriers at once (Grol & Grimshaw, 2003). To guide intervention development, behavioural scientists developed the Behaviour Change Wheel (Michie, Atkins & West, 2014), a comprehensive theoretical framework that guides the development of health interventions through systematically identifying appropriate behaviour change techniques to address the context specific barriers and facilitators to health behaviour. The Behaviour Change Wheel process has been successfully used in the development of behaviour change interventions in health sciences, including audiology (Barker, de Lusignan & Cooke, 2016; Ekberg et al, 2020). The Behaviour Change Wheel follows a three-step process. The first phase aims to identify the targeted behaviour for change, and define the

problem in behavioural terms, in this case delivering group AR services. The second phase aims to understand the contextual barriers and facilitators to clinicians' behaviour change, using the COM-B model (Michie et al, 2014) (as was performed in the current study). The final phase aims to identify intervention functions, guiding development of an intervention programme that is both acceptable to users and effective in achieving their aims. At its core, the COM-B model is a framework of behaviour change that identifies factors relating to Capability, Opportunity and Motivation that need to be present for any Behaviour to occur. This exploratory study used the COM-B framework to canvas the views of hearing healthcare clinicians regarding barriers and facilitators to the delivery of group AR, and to explore interest in potentially using digital technologies to address these barriers.

METHODS

This cross-sectional study used a self-report survey to explore the views of Australia-based hearing healthcare clinicians with a view to understanding the barriers and facilitators to delivery of group AR. The design of the survey was informed by the COM-B framework (Michie et al, 2014), enabling a systematic approach to future development of an intervention program to increase utilization of group AR services. This study was conducted in July 2020, at a point in time when the first wave of the COVID-19 pandemic had subsided in Australia and COVID-19 infection rates were low; thus hearing services were unrestricted, and services were only mildly impacted. Therefore participant responses to this survey were likely unaffected by the COVID-19 pandemic.

Ethical approval for this study was granted by the Human Research Ethics Office of The University of Western Australia, and The University of Queensland's Human Research Ethics Committee.

The Australian Context

In Australia, adult hearing rehabilitation services, both group and individual, are either funded by the Government (pension card holders and war veterans) or funded privately (where the client pays in full for their devices and services) and all service providers are

required to inform their clients about these services. Prior to April 2020, government funding for AR was restricted to face-to-face services, however, virtual delivery of group and individual AR services is now included. Not only do clinicians receive government reimbursement for providing these services, they also receive support through training (included in the syllabus for all six Australian university programs over the past 10-15 years) and clinical guidelines (e.g. the Audiology Australia *Professional Practice Standards*; Audiology Australia, 2013).

Materials

The online survey requested information covering four broad topics: (1) past and current clinical practices recommending and delivering both individual and group AR services; (2) wants and needs relating to the delivery of group AR programs; (3) perceived barriers and facilitators to recommending and delivering group AR services based on the COM-B model; and (4) demographic questions (age, gender, areas of clinical speciality, and years of clinical experience). The survey responses were provided either by selecting one or more items off a list, a 5-point Likert scale, a 0-100 rating scale, or by open-ended text. The survey was administered via Qualtrics (<https://www.qualtrics.com>), and took approximately 15 minutes to complete (Appendix 1).

A preliminary version of the survey was reviewed by five clinicians to ensure the appropriateness of the items and the ecological validity of the behaviours described in the survey. No amendments to the survey were suggested during piloting.

Participants

Australia-based hearing healthcare clinicians who had experience providing adult rehabilitation services at any stage of their career were eligible to participate in the study. They were invited through the two leading professional bodies for Australia-based hearing healthcare professionals: Audiology Australia via an advertisement in the fortnightly electronic magazine emailed to the membership of approximately 2,800 clinicians, Australian College of Audiology via direct email to all members (approximately 700

clinicians); and via direct email through the research teams' professional networks (approximately 20 clinicians).

Sixty-two clinicians responded, ranging in age from 23 to 67 (M 42.6; SD 11.8) years; 69.4% (n=43) identified as female and 20.1% (n=13) as male, and 10.5% (n=6) did not indicate gender. Participants reported having between one and 40 (M 15.6; SD 11.7) years of clinical experience. Respondents indicated experience working in a range of different areas of audiological clinical practice including: Diagnostic audiology, Adult audiological rehabilitation, Paediatric audiological rehabilitation, Implantable devices, Tinnitus, Balance and vestibular, Workcover (workers compensation cases), Manufacturer sales/training, and Clinic/people management. Respondents indicated working in six of the eight Australian states and territories: Western Australia (n=24), South Australia (n=2), Queensland (n=9), Tasmania (n=1), New South Wales (n=11), and Victoria (n=9).

Procedure

The recruitment email included a URL to the survey. The survey was open for the month of July 2020. All returned surveys were included in the analyses.

Data analysis

Data were exported from Qualtrics. Closed response questions were analysed using descriptive statistics (i.e. counts, means and SDs), and open text responses were analysed using content analysis (Braun & Clarke, 2012).

RESULTS

The majority of participants (87.1%, n=54) reported firsthand experience with delivering individualized AR at some point during their career, yet far fewer (30.6%, n=19) reported firsthand experience delivering group AR.

The majority (82.3%) of participants indicated that their current workplace offered AR services, with 64.5% (n=40) offering only individualized AR services, and 17.8% (n=11) offering both individual and group AR services. Eight participants (12.9%) worked for organizations that did not offer either service, and three participants (4.8%) were unsure whether their workplace offered these services or not.

Participants indicated that they recommend AR services to approximately 26.4% of all clients regardless of the funding source (Median 20%; Mean 26.4%; SD 24.8; range 0 to 100%). When participants were asked to think specifically about clients who are eligible for government subsidized funding for this service, they indicated that they were more inclined to offer AR services to these clients (Median 50%; Mean 50.4%; SD 37.3; range 0 to 100%).

Participants were asked to indicate, from a list of 11 set options, all of the factors that influence their decision to recommend AR services to their clients. Participants were required to select at least one item (including an option to provide free text to describe "other"), and were able to select multiple items. The three most commonly reported items were "their own clinical opinion", "client case history", and "client preferences" (Figure 1; n=50). Additional items reported by participants included "Habit, I provide this service as part of my fitting procedure to all clients", "It is mandated by the Hearing Service Provider Guidelines", "Family support/observes poor communication strategies", and "Time constraints".

Group audiological rehabilitation

Less than one third of participants had prior experience delivering group AR (29%; n=18). An additional 21% (n=13) indicated that they recommended group AR services within their workplace, although they did not deliver them. The remaining 50% (n=31) had never recommended nor delivered group AR services. Eleven respondents described their current workplace as delivering face-to-face group AR services, with three of these also offering online sessions via video-conferencing software.

Respondents whose work-place offered group AR programs covered a range of topics, most often including communication skills and strategies, emotional impacts of hearing loss, and hearing device management skills (Figure 2). These clinicians (n=11) called for increased diversity in program offerings, specifically inclusion of content relating to the emotional, relational and social impacts of hearing loss (Figure 2).

All participants (n=62) were asked to indicate the types of topics that they would like included in future resources designed to assist them in delivering AR programs (Table 1). Topics relating to aural rehabilitation (also described as auditory training), communication, and the social and emotional impacts of hearing loss were most commonly requested. Although an “other” option was provided, no additional topics were put forward by participants. Of note, comparison of the rank order of the topics that participants would like to see included in future resources designed to help delivery of audiological rehabilitation were similar when compared to the rank order generated by the sample of 11 versus the whole sample (n=62).

Participants were presented with a list of resources that may assist a clinician in delivering AR services, and asked to identify those that they thought would be of benefit to them (Figure 3; n=56). Most suggestions were perceived as beneficial; the most highly desired resources were “Downloadable lesson plans to help me deliver group AR program(s)”, “Website with resources”, “Training videos to help me improve my skills/knowledge”, “Downloadable information sheets for clients”, and “Educational videos designed for clients”. More than half of the participants also selected the “other” option and added free text that further described their needs and desires regarding delivery of group AR services. Two participants requested a detailed protocol for how to set up and deliver group AR services within the clinic, including funding sources and claim items, and internal workplace protocols for how to book clients in, run sessions, document the sessions within the case notes, and process financial reimbursements for group sessions within the individual workplace settings. Several participants also reiterated their desire for the client educational videos to assist with explaining common issues that clients experience, and downloadable client workbooks, as provided as suggestions in the question. The majority of these entries however described current barriers to the delivery of group audiological services; most

common were workplaces not encouraging delivery of group services, insufficient time to deliver group services, insufficient funding to cover the time-cost for preparing and delivering group services, and lack of managerial support.

Barriers to recommending and delivering group audiological rehabilitation

Although only 30.6% (n=19) of participants had ever offered group AR, and 17.8% (n=11) worked at a clinic that offered group AR, all participants (n=62) were presented with questions exploring the barriers and facilitators to delivering group AR. Responses from participants not currently providing group AR are important for understanding why there are so few clinicians and clinics that currently offer these services. This study aims to provide insight into those perceived barriers that likely prevent Australian clinicians from delivering group AR.

Self-reported barriers to the recommendation and delivery of group AR services were described within the three domains of the COM-B framework (Michie et al, 2014): Capability (knowledge or skills), Opportunity (physical resources or societal influences), and Motivation (emotion or beliefs and intentions).

Capability. Participants described possessing the skills to deliver group AR, but lacking the experience to deliver it; specifically participants indicated a lack of a clear plan for how to deliver group AR, training and practice in how to provide group AR, and awareness of how GAR is accessed and funded within their workplace (Figure 4; n=56).

Opportunity. Items within the opportunity domain were largely identified as barriers to group AR. Physical opportunity describes those opportunities afforded by the environment,

such as time, resources, locations, and cues/prompts. Barriers relating to physical opportunity identified by participants included availability of services, with group AR not being available at the majority of workplaces; lack of easily accessible pathways for booking clients into group AR services; and lack of time and resources (Figure 5; n=56). Social opportunity describes the opportunities afforded by interpersonal interactions, social cues and cultural norm. In this instance, clinicians indicated social opportunities that pose as a barrier to delivery of group AR services, as well as a lack of priority and support for delivering group AR in their workplace, and to a lesser extent clients' lack of desire to attend group AR services.

Motivation. Participants indicated that they believed that group AR had benefits such as the potential for improved client outcomes and public health, and that there was a research evidence-base for this (Figure 6; n=56). Participants described a sense of responsibility to provide group AR services and a confidence in their skills to provide group AR services. Barriers to delivery of group AR included not being in the habit of recommending group AR to clients, and the perception that delivery of group AR services are not financially worthwhile.

DISCUSSION

Supplementing hearing device acquisition with group AR can improve clinical outcomes for both the individual with hearing loss and their communication partners (Hickson et al, 2007; Hickson et al, 2019; Preminger & Yoo, 2010). However, group AR services are rarely delivered in either Australia (Australian Government Department of Health, 2020) or the USA (Kochkin et al, 2010). The present study is the first to explore perceived barriers and facilitators to the provision of group AR services based on the COM-B model. Results show that, barriers to recommendation and delivery of group AR span all three COM-B domains; Capability, Opportunity and Motivation. In general, hearing healthcare clinicians appear to view positively the provision of group AR services. Clinicians indicated a feeling of

responsibility to provide group AR services to their clients, yet felt unable to do so due to a wide range of clinician and organisational barriers. Clinician barriers included lack of habits relating to recommending group AR services, lack of prioritisation of group AR within their workflow, and lack of a clear plan for how to deliver group AR. Organisational barriers that may have been somewhat out of the control of the clinicians included issues such as group AR services not being available within their workplace, a lack of support from colleagues/managers, lack of resources, and a lack of funding for delivery of group AR services. Barriers to clinician uptake of evidence-based practices are not unique to the audiology landscape (Williams, Perillo & Brown, 2015), and behaviour change research has shown the value in addressing these barriers through implementation of complex interventions such as targeting staff attitudes, enhancing leadership, organizational restructure, developing internal processes or specific resources, implementing policies and/or incentives, and setting up support networks and linkages (Aarons et al, 2015; Mendel et al, 2008; Moodie et al, 2011).

Applying the Behaviour Change Wheel COM-B framework to systematically investigate the barriers to delivery of group AR services provides valuable insights for the future development of interventions to increase utility of group AR services. With regards to *Capability*, many participants self-reported having sufficient skills and knowledge for delivering group AR, but a lack of training, practice and a clear plan for how they deliver group AR. This suggests that future interventions should incorporate clinician training that includes behavioural practice/rehearsal and feedback on the behaviour within the clinical setting (Michie et al, 2014). *Motivational* barriers were related to not being in the habit of recommending these services within the timeframe of the appointments, and the perception that delivery of group AR services are not financially worthwhile. These could be addressed through environmental restructuring (such as adding prompts or cues within the workflow), and education (such as providing information on the funding pathways available) (Michie et al, 2014). The majority of barriers identified related to *Opportunity*, with participants specifically highlighting a lack of processes, support, time and resources. These barriers might be overcome through the use of environmental restructuring, modelling or

enablement (such as setting up social and practical support, goal setting, problem solving and action planning, self-monitoring behaviours) (Michie et al, 2014).

Clinicians described their decision-making process for recommending AR services to be influenced by clinical knowledge, opinion, client preference, and practice guidelines. These are in-line with previous reports describing factors that influence clinical decision-making processes in audiology (Boisvert et al, 2017). It is encouraging to see clinical practice guidelines listed within the top four influencing factors on clinical decision making (also reported in Boisvert et al, 2017), as guidelines help to minimize practice variability and error rates, as well as to ensure clinical services align with current principles of evidence-based practice (Moodie et al, 2011). However, development of clinical practice guidelines does not guarantee their uptake nor a change in clinical practice behaviours (Moodie et al, 2011). Current audiology practice guidelines highlight the need to offer AR services in conjunction with hearing aids (American Speech-Language and Hearing Association, 2020; Audiology Australia, 2013; British Society of Audiology, 2016). Furthermore, the majority of participants were contractually required to offer AR services to eligible Australian Government funded clients (Australian Government Department of Health, 2019). Yet less than one third reported doing so, indicating that guidelines have not prompted many clinicians to recommend group AR services. Furthermore, government records show that less than 0.06% of clients are receiving these services (Australian Government Department of Health, 2020), suggesting that recommendations from clinicians have not been an effective method of encouraging client uptake of group AR services.

Research groups have developed protocols and resources for delivering group AR services (Hickson et al, 2007; Montano et al, 2013; Preminger & Nesbitt, 2014). They provide background information on why group AR is important, guidance on how to develop a group AR program, and clinical resources to assist with delivering group AR services (for example see <https://shrs.uq.edu.au/active-communication-education-ace>). Nevertheless, participants reported a lack of protocols and resources, suggesting that they are either unaware of the aforementioned resources or desire alternative resources. Results suggest

that these gaps may be related to content and/or resources for delivery. Where current group AR programs appear to focus primarily on communication, the emotional impacts of hearing loss and hearing device management skills, participants called for increased diversity in program offerings, specifically inclusion of content relating to the emotional, relational and social impacts of hearing loss. These findings align with the desires of adults with hearing loss and co-morbid mental health conditions, who call for hearing healthcare clinicians to pay greater attention to the client as a whole, and to how their hearing loss impacts upon their lives beyond communication, including psychological well-being and experience of co-morbid conditions (Laird et al, 2020).

In general, we have seen an increased willingness for people to engage in online communications and tele-health practices during the pandemic (Australia Communications and Media Authority, 2020). Although only three participants in this present study indicated delivering group AR services via online mediums currently, it is possible that the COVID-19 pandemic may facilitate widespread adoption of online options for delivery of group AR services. Many audiology clinics have increased their use of tele-audiology services to enable them to maintain service delivery (Bennett et al, 2020; Ferguson et al, 2020; Saunders & Roughley, 2020). In the UK there was a 57% increase in take-up of freely available online educational videos 6 months post-pandemic onset for the YouTube version, and a four-fold increase for the standalone C2HearOnline.com version (Ferguson et al, 2020). Further, preliminary findings for the Australia-based sample (n=74) of an ongoing study (Bennett et al, 2020) indicate that tele-audiology practices have increased from 58% of clinics pre- COVID-19 pandemic to 76% of clinics during the pandemic. Although few hearing healthcare practitioners said they had used tele-audiology services for the purpose of delivering group AR services (9%), almost one third (30%) said they intended to start delivering group AR services via tele-audiology in the near future. Participants in the current study indicated a desire for digital resources related to downloadable lesson plans, a designated website with additional resources, training videos, downloadable information sheets for clients, and educational videos designed for clients. There is a clear need for

development of modern resources, with diverse content, to assist clinicians with the delivery of AR services or to disseminate those already available more widely.

Limitations

There are a number of limitations to consider. The first limitation is associated with the sample. Participants self-selected for the study, thus we do not know the extent to which they represent a diverse workforce. Second, participants all worked in Australia, with the sample size representing approximately only 1.8% of all Australia-based clinicians. Nonetheless, the study has value because barriers and needs have been identified that can be used to assist in the design of future larger scale studies. Third, the survey was conducted in July 2020, at a point in time in Australia, when the first COVID-19 wave had subsided. At that time Australian hearing services were unrestricted, and clinics generally indicated only being mildly affected; however, clinicians were looking towards tele-audiology as a means to support their clients and this may have influenced how they responded to the survey items. Nonetheless, this explorative study provides preliminary insight into the barriers and facilitators to delivery of individual and group AR, with findings supporting the development of digital resources for delivering group AR. Finally, when devising the survey we made the assumption that all participants would have had knowledge of group AR. If an individual did not have this experience, some survey questions would have been problematic to answer because there was no 'not applicable' response option. In this case, respondents did have the option to simply skip a question.

CONCLUSION

Hearing healthcare clinicians viewed the provision of group AR services positively and indicated a sense of duty about providing such services, yet appear hindered by organisational and personal barriers. Although some organisational barriers are outside the control of the clinician, others can be modified by the clinician. The COM-B framework has elucidated core barriers that should be addressed in future interventional studies. These

include lack of skill, experience and a clear plan for group AR recommendation and delivery (Capability), lack of processes, support, time and resources as well as the need for prioritisation within the workflow (Opportunity), and lack of habit (Motivation). There is a clear need for development of modern resources to assist clinicians with the delivery of AR services. Participants desire digital resources relating to downloadable lesson plans, information sheets, client-facing educational videos, and clinician training programs.

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References

- Aarons, G. A., Ehrhart, M. G., Farahtak, L. R., & Hurlburt, M. S. (2015). Leadership and organizational change for implementation (LOCI): a randomized mixed method pilot study of a leadership and organization development intervention for evidence-based practice implementation. *Implementation Science, 10*(1), 11.
- Abrams, H., Chisolm, T. H., & McArdle, R. (2002). A cost-utility analysis of adult group audiologic rehabilitation: Are the benefits worth the cost? *Journal of Rehabilitation Research and Development, 39*(5), 549-558.
- American Speech-Language and Hearing Association (2020). 2020 Standards and Implementation Procedures for the Certificate of Clinical Competence in Audiology. Retrieved 17/11/2020 from <https://www.asha.org/certification/2020-audiology-certification-standards/>
- Audiology Australia. (2013). Audiology Australia Professional Practice Standards - Part B Clinical Standards. Retrieved 17/11/2020 from <http://www.audiology.asn.au/standards-downloads/Clinical%20Standards%20-%20whole%20document%20July13%201.pdf>
- Australia Communications and Media Authority (2020). *Trends in Online Behaviour: ACMA consumer survey 2020*. Retrieved 17/11/2020 from <https://www.acma.gov.au/sites/default/files/2020-09/Trends-in-online-behaviour0-and-technology-usage-ACMA-consumer-survey-2020.pdf>
- Australian Government Department of Health (2019). *Hearing Rehabilitation Outcomes for Voucher-Holders* Retrieved 17/11/2020 from Canberra, Australia: http://www.hearingservices.gov.au/wps/wcm/connect/hso/d2f17955-17ad-44e6-8153-a10fa116f7a3/Hearing+Rehabilitation+Outcomes+-+1019.pdf?MOD=AJPERES&CONVERT_TO=url&CACHEID=d2f17955-17ad-44e6-8153-a10fa116f7a3
- Australian Government Department of Health (2020). *Annual Program Statistics 2019-2020*. Retrieved 17/11/2020 from http://www.hearingservices.gov.au/wps/portal/hso/site/about/program_stats/annual-program-stats/!ut/p/a1/rVJNT4NAEP0reuhxs1NgWziSfiDU0hirAheyLJ9adikspv33LqYXE0WbOLd5mXnzZt7gCAC44vS9KqisBKeHIY9m8eaBzKYuaBvzebcG2_af7r21ocEO8AuOcMS4bGSJw7ITN0xwmXE5gaZPDhWbQCnqbAI0Ef0AtqJoaR13kspOoZz39IAuKPPeB8KGVSkO89QiLJszRGaUIInkFFIALaTnCdNjxliqJ0phqBTCD2HDnxYYKQFyKRgZESoN81gzl_adZUzd3cpdgb1w9p5jupqzJPjxyqXGCfdwNaH32xnUGbV2u9gWipbKEIU8Fzj4YhcOvrVLdVavx2Nkqz8YvD9JHPzPlzR1bepn9Jb7PqKJeT6R8PYD2Pyf_A!!/dI5/d5/L2dBISEvZ0FBIS9nQSEh/
- Bennett, R. J., Swanepoel, D.W., Manchaiah, V., & Eikelboom, R. H. (2020). Tele-audiology services in australia: a shift in clinical practices. *AudiologyNOW, 81*, 11-13.
- Barker, A. B., Leighton, P., & Ferguson, M. A. (2017). Coping together with hearing loss: A qualitative meta-synthesis of the psychosocial experiences of people with hearing loss and their communication partners. *International Journal of Audiology, 56*(5), 297-305.
- Barker, F., de Lusignan, S., & Cooke, D. (2016). Improving Collaborative Behaviour Planning in Adult Auditory Rehabilitation: Development of the I-PLAN Intervention Using the Behaviour Change Wheel. *Annals of Behavioral Medicine, 1*-12.
- Boisvert, I., Clemesha, J., Lundmark, E., Crome, E., Barr, C., & McMahon, C. M. (2017). Decision-Making in Audiology: Balancing Evidence-Based Practice and Patient-Centered Care. *Trends in Hearing, 21*, 2331216517706397.
- Braun, V., Clarke, V., & Terry, G. (2012). Thematic analysis. APA handbook of research methods in psychology. Ed. Harris Cooper, 55-71.
- British Society of Audiology (2016). *Common Principles of Rehabilitation for Adults in Audiology services*. Retrieved 17/11/2020 from <http://www.thebsa.org.uk/wp->

content/uploads/2016/10/Practice-Guidance-Common-Principles-of-Rehabilitation-for-Adults-in-Audiology-Services-2016-3.pdf.

- Ekberg, K., Timmer, B., Schuetz, S., & Hickson, L. (2020). Use of the Behaviour Change Wheel to design an intervention to improve the implementation of family-centred care in adult audiology services. *International Journal of Audiology*, 1-10.
- Ferguson, M. A., Brandreth, M., Brassington, W., Leighton, P., & Wharrad, H. (2016). A randomized controlled trial to evaluate the benefits of a multimedia educational program for first-time hearing aid users. *Ear and Hearing*, 37(2), 123.
- Ferguson, M. A., Kitterick, P. T., Chong, L. Y., Edmondson-Jones, M., Barker, F., & Hoare, D. J. (2017). Hearing aids for mild to moderate hearing loss in adults. *Cochrane Database of Systematic Reviews*(9).
- Ferguson, M., Leighton, P., Brandreth, M., & Wharrad, H. (2018). Development of a multimedia educational programme for first-time hearing aid users: A participatory design. *International Journal of Audiology*, 57(8), 600-609.
- Ferguson, M. A., Maidment, D. W., Gomez, R., Coulson, N., & Wharrad, H. (2020). The feasibility of an m-health educational programme (m2Hear) to improve outcomes in first-time hearing aid users. *International Journal of Audiology*, 1-12.
- Ferguson, M. A., Maidment, D., Henshaw, H., & Heffernan, E. (2019). Evidence-Based Interventions for Adult Aural Rehabilitation: That Was Then, This Is Now. *Seminars in Hearing*, 40(1).
- Getty, L., & Héту, R. (1991). Development of a Rehabilitation Program for People Affected with Occupational Hearing Loss 2. Results from Group Intervention with 48 Workers and Their Spouses. *Audiology*, 30(6), 317-329.
- Grol, R., & Grimshaw, J. (2003). From best evidence to best practice: effective implementation of change in patients' care. *The Lancet*, 362(9391), 1225-1230.
doi:[https://doi.org/10.1016/S0140-6736\(03\)14546-1](https://doi.org/10.1016/S0140-6736(03)14546-1)
- Hawkins, D. B. (2005). Effectiveness of counseling-based adult group aural rehabilitation programs: A systematic review of the evidence. *Journal of the American Academy of Audiology*, 16(7), 485-493.
- Hickson, L., Worrall, L., & Scarinci, N. (2007). *Active Communication Education (ACE): A program for older people with hearing impairment*: Speechmark. Brackley, U.K., 1-94.
- Hickson, L., Worrall, L., & Scarinci, N. (2007). A randomized controlled trial evaluating the active communication education program for older people with hearing impairment. *Ear and Hearing*, 28(2), 212-230.
- Hickson, L., Worrall, L., Scarinci, N., & Laplante-Lévesque, A. (2019). Individualised active communication education (I-ACE): another clinical option for adults with hearing impairment with a focus on problem solving and self-management. *International Journal of Audiology*, 58(8), 504-509.
- Hogan, A., Donnelly, D., Ferguson, M., Boisvert, I., & Wu, E. (2020). Is the provision of rehabilitation in adult hearing services warranted? A cost benefit analysis. *Disability and Rehabilitation*, 1-6.
- Kochkin, Beck, Christensen, Compton-Conley, Fligor, Kricos, & Turner. (2010). MarkeTrak VIII: The impact of the hearing healthcare professional on hearing aid user success. *Hearing Review*, 17(4), 12-34.
- Kramer, S. E., Allessie, G. H., Dondorp, A. W., Zekveld, A. A., & Kapteyn, T. S. (2005). A home education program for older adults with hearing impairment and their significant others: a randomized trial evaluating short- and long-term effects. *International Journal of Audiology*, 44(5), 255-264.

- Laird, E. C., Bennett, R. J., Barr, C. M., & Bryant, C. A. (2020). Experiences of Hearing Impairment and Audiological Rehabilitation for Older Adults with Comorbid Psychological Symptoms. *American Journal of Audiology*, 1-16.
- Lawrence, B. J., Jayakody, D. M., Bennett, R. J., Eikelboom, R. H., Gasson, N., & Friedland, P. L. (2020). Hearing loss and depression in older adults: a systematic review and meta-analysis. *The Gerontologist*, 60(3), e137-154.
- Maidment, D. W., Coulson, N. S., Wharrad, H., Taylor, M., & Ferguson, M. A. (2020a). The development of an mHealth educational intervention for first-time hearing aid users: combining theoretical and ecologically valid approaches. *International Journal of Audiology*, 1-9.
- Maidment, D. W., Heyes, R., Gomez, R., Coulson, N. S., Wharrad, H., & Ferguson, M. A. (2020b). Evaluating a theoretically informed and cocreated mobile health educational intervention for first-time hearing aid users: qualitative interview study. *JMIR Mhealth And Uhealth*, 8(8), e17193.
- Mendel, P., Meredith, L. S., Schoenbaum, M., Sherbourne, C. D., & Wells, K. B. (2008). Interventions in organizational and community context: a framework for building evidence on dissemination and implementation in health services research. *Administration and Policy in Mental Health and Mental Health Services Research*, 35(1-2), 21-37.
- Michie, S., Atkins, L., & West, r. (2014). *The behaviour change wheel: A guide to designing interventions*. London: Silverback.
- Montano, J. J., Preminger, J. E., Hickson, L., & Gregory, M. (2013). A new web-based tool for group audiologic rehabilitation. *American Journal of Audiology*, 22(2), 332-334.
- Moodie, S. T., Kothari, A., Bagatto, M. P., Seewald, R., Miller, L. T., & Scollie, S. D. (2011). Knowledge translation in audiology: promoting the clinical application of best evidence. *Trends in Amplification*, 15(1), 5-22.
- Nielsen, A. C., Rotger-Griful, S., Kanstrup, A. M., & Laplante-Lévesque, A. (2018). User-innovated eHealth solutions for service delivery to older persons with hearing impairment. *American Journal of Audiology*, 27(3S), 403-416.
- Northern, J. L., & Beyer, C. M. (1999). Hearing aid returns analyzed in search for patient and fitting patterns. *The Hearing Journal*, 52(7), 46-48.
- Poissant, S. F., Beaudoin, F., Huang, J., Brodsky, J., & Lee, D. J. (2008). Impact of cochlear implantation on speech understanding, depression, and loneliness in the elderly. *Journal of Otolaryngology--Head & Neck Surgery*, 37(4).
- Preminger, J., & Nesbitt, L. (2014). Group audiologic rehabilitation for adults: Justification and implementation. In J. J. Montano & J. B. Spitzer (Eds.), *Adult audiologic rehabilitation* (p. 307–328). Plural Publishing Inc.
- Preminger, J. E., & Meeks, S. (2010). Evaluation of an audiological rehabilitation program for spouses of people with hearing loss. *Journal of the American Academy of Audiology*, 21(5), 315-328.
- Preminger, J. E., & Yoo, J. K. (2010). Do group audiologic rehabilitation activities influence psychosocial outcomes? *American Journal of Audiology*, 19(2), 109-125.
- Ratanjee-Vanmali, H., Swanepoel, D. W., & Laplante-Lévesque, A. (2020). Patient Uptake, Experience, and Satisfaction Using Web-Based and Face-to-Face Hearing Health Services: Process Evaluation Study. *Journal of Medical Internet Research*, 22(3), e15875.
- Saunders, G. H., & Roughley, A. (2020). Audiology in the time of COVID-19: practices and opinions of audiologists in the UK. *International Journal of Audiology*, 1-8.
- Scarinci, N., Worrall, L., & Hickson, L. (2012). Factors associated with third-party disability in spouses of older people with hearing impairment. *Ear and Hearing*, 33(6), 698-708.
- Thibodeau, L. M., & Alford, J. A. (2011). Group Audiologic Rehabilitation for Adults: Ten Reasons to Add This Service to Private Practice. *The ASHA Leader*, 16(14), 5-6.

- Thorén, E. S., Oberg, M., Wanstrom, G., Andersson, G., & Lunner, T. (2014). A randomized controlled trial evaluating the effects of online rehabilitative intervention for adult hearing-aid users. *International Journal of Audiology, 53*(7), 452-461. doi:10.3109/14992027.2014.892643
- Thorén, E. S., Pedersen, J. H., & Jørnæs, N. O. (2016). Usability and online audiological rehabilitation. *American Journal of Audiology, 25*(3S), 284-287.
- Vlaescu, G., Carlbring, P., Lunner, T., & Andersson, G. (2015). An e-platform for rehabilitation of persons with hearing problems. *American Journal of Audiology, 24*(3), 271-275.
- Wallhagen, M. I., Strawbridge, W. J., Shema, S. J., & Kaplan, G. A. (2004). Impact of self-assessed hearing loss on a spouse: A longitudinal analysis of couples. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 59*(3), S190-S196.
- Weinstein, B. E., Sirow, L. W., & Moser, S. (2016). Relating hearing aid use to social and emotional loneliness in older adults. *American Journal of Audiology, 25*(1), 54-61.
- Williams, B., Perillo, S., & Brown, T. (2015). What are the factors of organisational culture in health care settings that act as barriers to the implementation of evidence-based practice? A scoping review. *Nurse Education Today, 35*(2), e34-e41.

Table 1. Topics that participants would like to see included in future resources designed to help delivery of group audiological rehabilitation (n=62).

Topics that participants would like to see included in future resources designed to help delivery of audiological rehabilitation	% of respondents
Aural rehabilitation, such as ability to hear speech in noise	95
Communication skills and strategies	93
Psychosocial impacts of hearing loss, such as loneliness	86
Emotional impacts of hearing loss, such as embarrassment, frustration, or worry	86
Improving relationships impacted by hearing loss	84
Cognitive impacts of hearing loss and options for cognitive training	82
Hearing device management skills	80
Psychological impacts of hearing loss, such as anxiety or depression	79
Facilitating peer support	77
Social skills, social engagement, and overcoming social isolation	73
Lip reading skills	68
Managing severe to profound hearing loss	63
Tinnitus management	59
Management of specific conditions, such as Menieres or acoustic shock	41

Figure 1. Factors influencing clinicians' decisions to recommend audiological rehabilitation services to their clients (n=50)

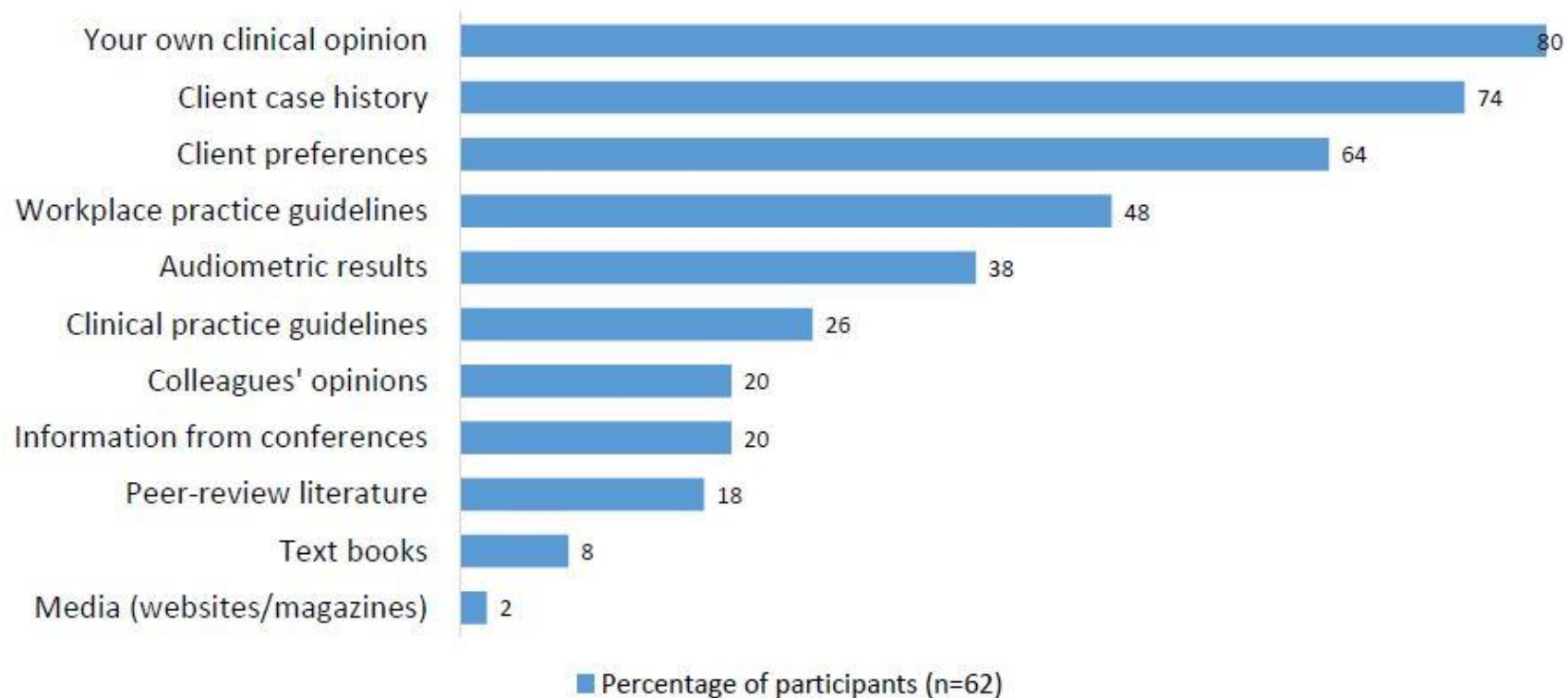


Figure 2. Topics currently covered in group audiological rehabilitation session, and topics that participants would like to see included in future resources designed to help delivery of audiological rehabilitation (n=11)

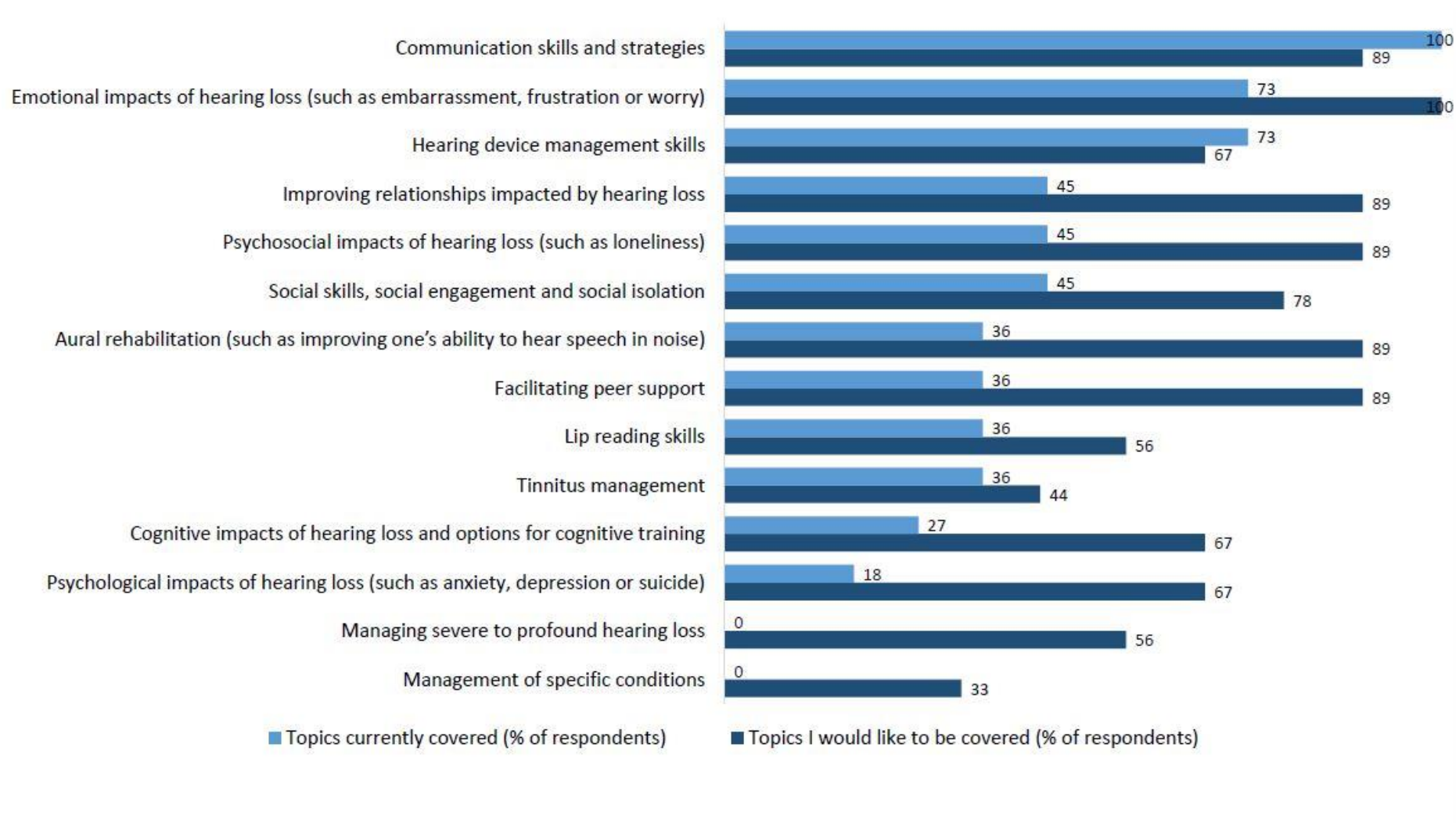


Figure 3. The reported resources that would assist clinicians to deliver group audiological rehabilitation services (n=56)



Figure 4. Barriers and facilitators to recommending and delivering group audiological rehabilitation relating to *Capability* (n=62)

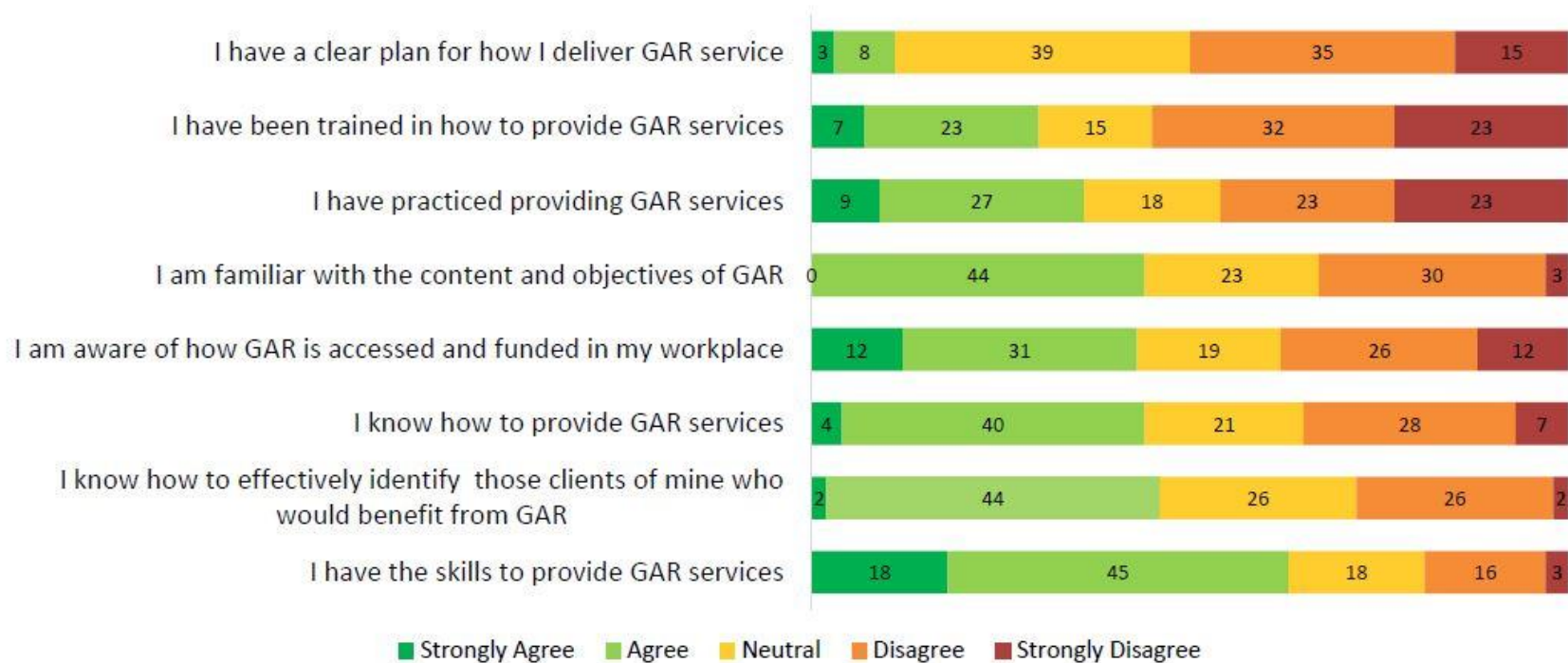


Figure 5. Barriers and facilitators to recommending and delivering group audiological rehabilitation relating to *Opportunity* (n=62)

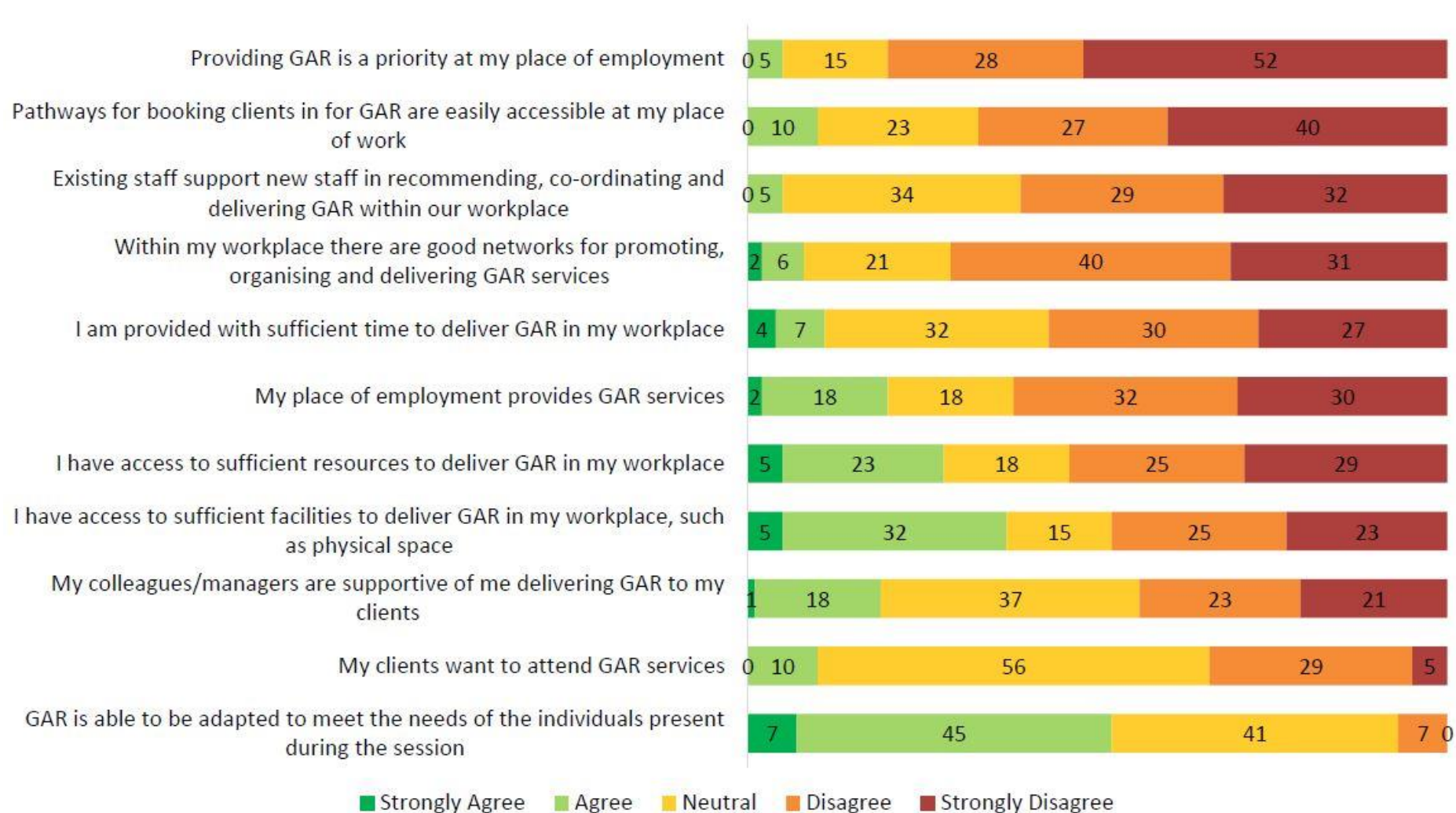


Figure 6. Barriers and facilitators to recommending and delivering group audiological rehabilitation relating to *Motivation* (n=62)

