

Using m-health technologies to increase access and benefits of hearing-related education interventions for hearing aid users

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Background

Research Question

Do video tutorials supplement advice and information provided by audiologists resulting in enhanced benefit and use for first-time hearing aid users?

Aims

- I. To develop a series of interactive multimedia video tutorials, or reusable learning objects (RLOs), that provide a broad range of auditory rehabilitation advice for first-time hearing aid users
- II. Assess the benefits and cost-effectiveness of RLOs.

Phase I: Development of RLOs

RLO content was defined by

- a) a delphi review of 33 hearing experts
- b) focus groups and workshops: hearing aid users (n=35) and audiologists (n=11).



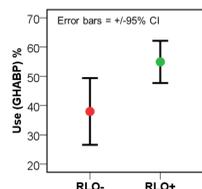
RLOs (total duration ~1h) included learning objectives, a range of visual imagery (illustrations, video clips, animations, photos, testimonials), and an interactive multiple-choice quiz with feedback. All were subtitled.

Phase II: Clinically registered randomised control trial^{1,2}

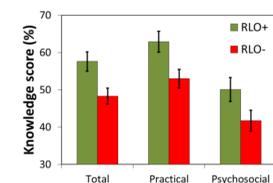
- N=203 first-time hearing aid users recruited at fitting appointment
- Arms: (i) received RLOs (RLO+, n=103) (ii) waitlist control group (RLO-, n=100)
- Delivery: DVD for TV (51.9%), PC (15.2%), and internet (32.9%)
- Evaluation: 6 weeks post-fitting
- Participants: Age = 67.9 years; BEA_{0.5-4kHz} = 32.9 dB HL; females=37.7%.

Hearing aid use

- No group difference in overall GHABP use ($p=.48$)
- In suboptimal users (use <70%), significantly higher use in the RLO+ group, large effect ($d=.88$).



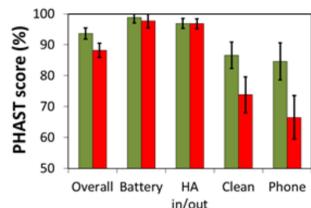
Knowledge of hearing aids and psychosocial issues



- In the RLO+ group, significantly better knowledge overall ($p<.001$), as well as for practical and psychosocial issues ($p<.001$)
- Large effects (overall, $d=.95$; practical, $d=.88$; psychosocial $d=.65$).

Practical hearing aid skills

- RLO+ group had significantly better practical hearing aid skills ($p<.001$)
- Telephone use and cleaning earmould were significantly better in the RLO+ group ($p<.01$)
- Significant effect of age ($p=.04$), but not gender or hearing threshold
- Greater internet competency predicted greater practical hearing aid knowledge and handling skills³
- Greater hearing aid handling skills were associated with greater hearing aid satisfaction (IOI-HA) and patient activation (PAM) ($p<.05$). However, practical hearing aid knowledge mediated this relationship
 - no association between skills and outcomes controlling for practical hearing aid knowledge ($p\geq.095$)⁴.



Current developments

From bench to bed: clinical use

Following patient feedback, the RLOs were improved further and developed for clinical and personal use.

- The C2Hear DVD was launched in November 2014 at the British Academy of Audiology annual conference, Bournemouth UK.
- C2Hear was Implemented into Nottingham Audiology Services via local health commission for all first-time hearing aid users. Clinical audit ongoing to assess impact on return to repair appointments.

To maximise accessibility, C2Hear Online was launched in November 2015 and is freely available through the internet and mobile technologies via YouTube.

- Received over 10,000 unique views
- UK (62.%)
- North America (20%).

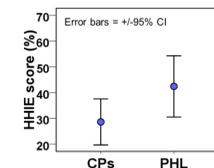


Communication partners

Focus groups suggested that communication partners would value information relevant to them.

"I sat my husband down. I said, "I would like you to watch this. "Well, "What do I need to watch this for? I am not deaf," but I said, "It will help you to understand me." So he did.... yes, I did find it very, very useful for that"

Increasing research shows that communication partners are an important factor in aural rehabilitation⁵.

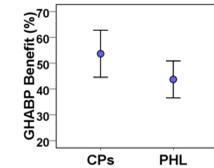


Hearing Handicap Inventory for the Elderly (HHIE)

- Communication partners significantly underestimated the difficulties associated with hearing loss (28.7%), compared with people with hearing loss (42.5%), $t(20)=2.92, p<.01$.

Glasgow Hearing Aid Benefit Profile (GHABP)

- Communication partners significantly overestimated the benefit gained from wearing hearing aids (53.7%), compared with people with hearing loss (43.8%), $t(21) = 2.92, p<.05$.



Given the rapid year-on-year increase in the use of smartphones⁶, we are now taking an m-health approach to ongoing RLO developments.

Developing a web-based app suitable for delivery on multiple mobile platforms aimed at communication partners/public, that will enable greater interactivity.

Three RLOs will be evaluated using semi-structured interviews with people with hearing loss and their communication partners:

1. Communication tactics in different environments
2. Psychosocial consequences of hearing loss
3. Understanding the technical aspects of hearing loss.



Future research

An NIHR research grant will fund research planned to start early 2017.

Aims

- I. To develop a theoretically-driven user-centred personalised intervention that goes beyond the 'one size fits all' approach of C2Hear
- II. Establish feasibility of the intervention by evaluating delivery, accessibility, usability, acceptability, and adherence in first-time hearing aid users.

Methods

Further development and refinement of C2Hear to produce mobile-enabled RLOs (m-RLOs) for use with mobile technologies (e.g. smartphones) and the internet.

The low-level of interactivity and personalise the existing C2Hear RLOs will be extended.



We will use the COM-B⁷ health behaviour change model to:

- a) develop a user-centred intervention that aims to increase hearing aid use in first-time hearing aid users
- b) enable a personalised approach to knowledge acquisition and exchange that meets the needs of the individual
- c) introduce self-evaluation of an individual's progress based on their specific needs.

Phase I: Repurpose C2Hear RLOs

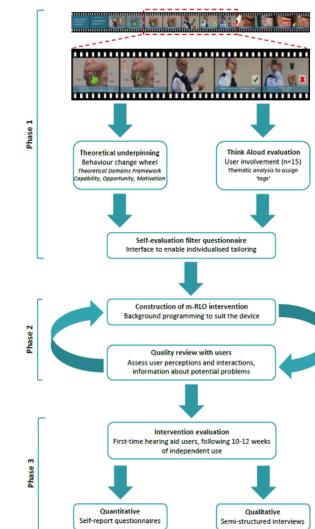
- Identify the individualised components of the m-RLOs using:
 - (i) a theoretical approach based on the COM-B model
 - (ii) an ecological approach using a Think Aloud analysis involving existing hearing aid users.

Phase II: Development of m-RLOs

- Following a user-centred design, a panel of hearing aid users will review and advise on aspects of usability, to ensure the m-RLOs are aligned to the end-users needs.

Phase III: Feasibility

- Assessment of the intervention in first-time hearing aid users using a mixed-methods approach to evaluate delivery, accessibility, usability, acceptability, and adherence.



References

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This is a summary of independent research funded by the National Institute for Health Research at its Nottingham Hearing Biomedical Research Unit. The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health.