Background

Hearing impairment negatively affects speech perception and may increase listening effort, especially under adverse conditions such as in the presence of background noise. Previous research showed that hearing-aid amplification improves speech perception performance. However, it is still not clear how hearing-impairment and hearing-aid amplification affect effort during speech perception. This systematic review addressed the following research questions:

Q1: Is speech comprehension more effortful for hearing-impaired than for normal-hearing listeners?

Q2: Can hearing aid amplification reduce listening effort during speech comprehension?

Method

Inclusion criteria and search:

The Population, Intervention, Control, Outcomes and Study design (PICOS) strategy was used to create inclusion criteria for relevance. To be included in the review, studies had to meet the following selection criteria of:

- experimental work on hearing impairment OR
- hearing aid technologies AND
- listening effort OR
- fatigue during speech perception
- published in peer reviewed journals in English language

The methods applied in those articles were categorized into subjective, behavioral and physiological assessment of listening effort. For each study, the statistical analysis addressing research question Q1 and/or Q2 was extracted.

Results of the search

Our search revealed 41 relevant articles, published from inception to August 2014. The most common reasons for exclusion were:

- direct measures of listening effort were not applied
- studies focused on other research questions

The quality of evidence rating for outcomes Q1 and Q2 was low or very low, according to the GRADE Working Group guidelines. Studies of high quality are highly needed in the future to provide consistent and reliable findings.

Conclusion

Q1: Evidence relating to Q1 was provided by 21 studies that reported 41 relevant findings. Our interpretation of the scientific evidence within this review is, that only physiological measurement methods showed significantly more listening effort during speech comprehension due to hearing impairment.

Q2: In 27 studies, evidence relating to Q2 was provided by 56 findings. There was no significant finding suggesting that hearing-aid amplification can help to decrease listening effort during speech comprehension.

The quality of evidence on both research questions (Q1 and Q2) was low or very low, according to the GRADE Working Group guidelines. Studies of high quality are highly needed in the future to provide consistent and reliable findings.

The results of this review underline the need for a conceptual framework for listening effort, to specify which stages of cognitive processing are addressed by which type of assessment method.

References:

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Contact

Barbara Ohlenforst
baoh@eriksholm.com

Affiliation: "Section Ear & Hearing, Dept of Otolaryngology-Head and Neck Surgery, VU University Medical Center and EBISQ Institute for Health Care Research, Amsterdam, The Netherlands; Department of Behavioral Sciences and Learning, Linköping University, Linköping, Sweden; University College London, The Swedish Institute for Quality Research, Linköping and Örebro Universities, Sweden; MRC/CSO Institute of Hearing Research, Scottish Section, Glasgow, United Kingdom; Institute of Physiology and Pathology of Hearing, International Centre of Hearing and Speech, Warsaw, Poland.

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