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HTA 267

PATIENT-CENTERED HEARING TECHNOLOGY ASSESSMENT: INTEGRATING ICF INTO MULTICRITERIA DECISION-MAKING

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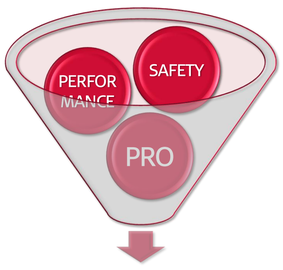
BACKGROUND



MCDA

Sound comparative evidence is essential to demonstrate the value of health technologies but is often limited. Generic measures of benefit such as quality-adjusted life years (QALYs) allow for an assessment of opportunity costs but fall short in adequately capturing all relevant dimensions of the benefit a specific technology offers. Multicriteria Decision Analysis (MCDA) is a structured decision-making approach that evaluates and compares alternatives based on multiple criteria to identify the most suitable option.

OBJECTIVE

Health Technology Assessment (HTA) in hearing rehabilitation increasingly demands comprehensive, patient-centered evaluation frameworks that go beyond traditional cost-effectiveness metrics. Our aim was to enable a simplified comparison of hearing interventions.

METHODS

The presented study was conducted using a novel approach by integrating the International Classification of Functioning, Disability and Health (ICF) into MCDA.

RESULTS

1. Defining the decision problem

Following ISPOR guidelines for applying MCDA in healthcare decision-making, the initial phase of the stepwise approach involves defining the decision problem. This case study focuses on choosing among different interventions for hearing rehabilitation.

2. Selecting Criteria

The ICF is a framework developed by the WHO to describe and measure health and disability. From the ICF core set for hearing loss[1] and the resulting outcome assessment protocol for cochlear implant users[2] three categories were selected (Fig.1).

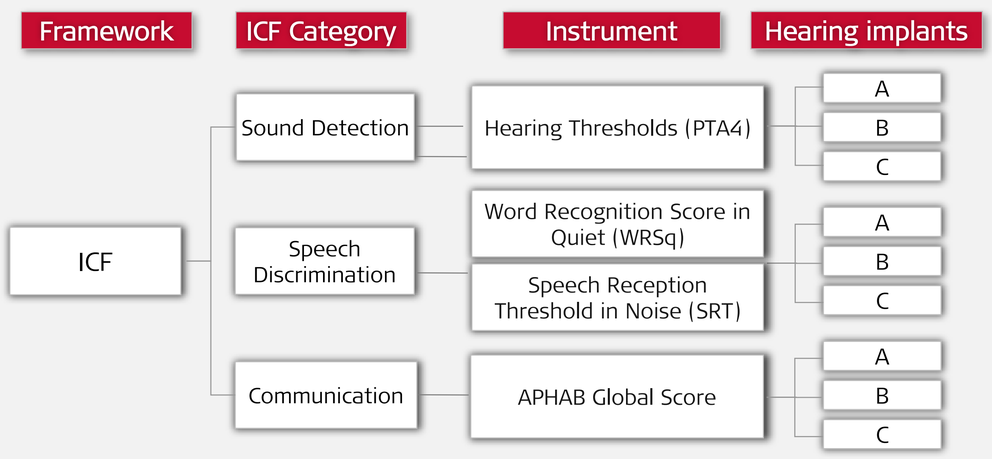


Fig.1: ICF categories and measurement instruments selected for the evaluation of three treatment alternatives

3. Performance Measures and Scoring

A matched cohort approach is employed to compare performance outcomes from published data between three hearing implant alternatives for mixed and conductive hearing loss[3,4]. A linear scoring function is used to translate outcome measures onto a common scale (Tab.1).

Implant	WRSq	APHAB
A	70	22.7
B	89	15.3
C	79	23.3

rescaling

Implant	WRSq	APHAB
A	25	24
B	73	49
C	49	22

Tab.1: Effect of rescaling on ICF categories for speech discrimination and communication onto a common scale from 0 to 100

1. Danermark, B. et al. (2013). The creation of a comprehensive and a brief core set for hearing loss using the international classification of functioning, disability and health. Am. J. Audiol. 22, 323–328.
2. Andries, E. et al. (2023). Implementation of the international classification of functioning, disability and health model in cochlear implant recipients: a multi-center prospective follow-up cohort study. Frontiers in Audiology and Otology, 1, 1257504.
3. Gerdes, T., et al. (2016). Comparison of Audiological Results Between a Transcutaneous and a Percutaneous Bone Conduction Instrument in Conductive Hearing Loss. Otol Neurotol 37, 685–91.
4. Rauch, A. K., et al. (2022). Long-term data of the new transcutaneous partially implantable bone conduction hearing system Osia(R). Eur Arch Otorhinolaryngol 279, 4279–4288.

4. Weighting and Aggregation

Weights obtained from a survey of professionals in the field of hearing rehabilitation are applied to the respective categories. An overall score for each treatment alternative is calculated by additive combination of weighted outcomes (Fig.2).

Overall, intervention B receives the highest score of 64, while intervention A and C score 41 and 45.

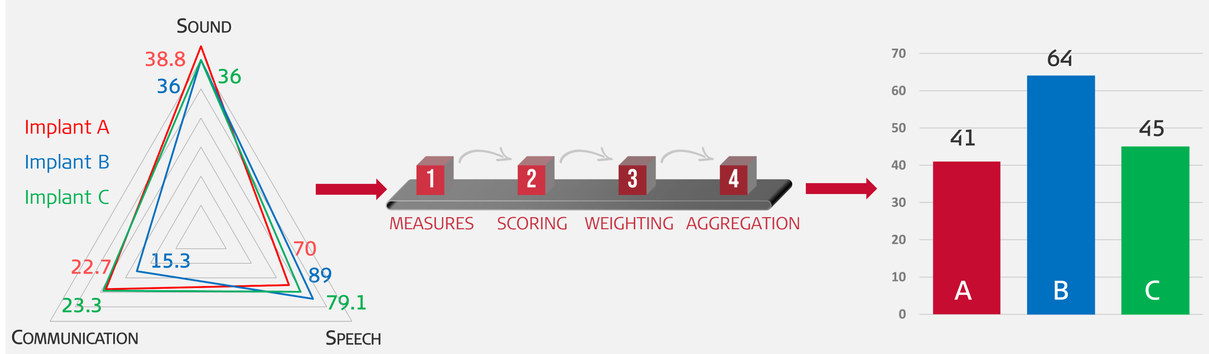


Fig.2: Combination of outcome measures by weighted aggregation results in overall score for each treatment alternative

5. Robustness of the results

The choice of weighting and the number of combined outcome measures do not have considerable effects on overall results. Adding safety (not in the ICF core set) as an outcome measure does not change the rankings of the compared interventions.

Incorporating stakeholder preferences into the weighting of outcome measures represents an important advancement in MCDA. However, the application of equal weights to all investigated ICF categories demonstrates scores being robust to variation in the value measurement model (Tab.2).

ICF Category	SOUND	SPEECH		COMMUNICATION	SAFETY		Overall SCORE	Overall SCORE
	PTA	WRS	SRT	APHAB	minor	major	No weights, no safety	No weights, incl. safety
A	56	25	64	24	31	35	42	39
B	70	73	69	49	82	83	63	68
C	70	49	NA	22	48	72	47	50

Tab.2: Effect of weighting and additional outcome measures on the overall score

CONCLUSION

Results demonstrate that our integrated approach supports more equitable and context-sensitive evaluations. Furthermore, it addresses key methodological challenges in MCDA, such as criteria selection, weighting, and stakeholder diversity. Further research is needed to assess the benefits of MCDA over other composite indicator methods for future HTA.