

The costs of unaddressed hearing loss as basis for cost-effectiveness analyses

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BACKGROUND

Over 1.5 billion people worldwide suffer from hearing loss (HL). The great majority (83 %) remains untreated, leading to learning impairment, reduced productivity, poorer quality of life, and thus a long-term economic burden to individuals and the society (Fig. 1).



Figure 1: People suffering from HL and associated costs worldwide (WHO, 2021)

Bone-conduction devices or active middle ear implants are effective, safe and long-term beneficial solutions for HL-patients. Both have upfront investment costs. Health decision makers usually opt for or against interventions on the basis of cost-effectiveness analyses, which examine costs and health outcomes for interventions to treat HL as well as for unaddressed HL.

* International dollars

OBJECTIVE

The aim of this study was to identify published estimates of the costs of unaddressed HL for different country settings and subgroups.

METHODS

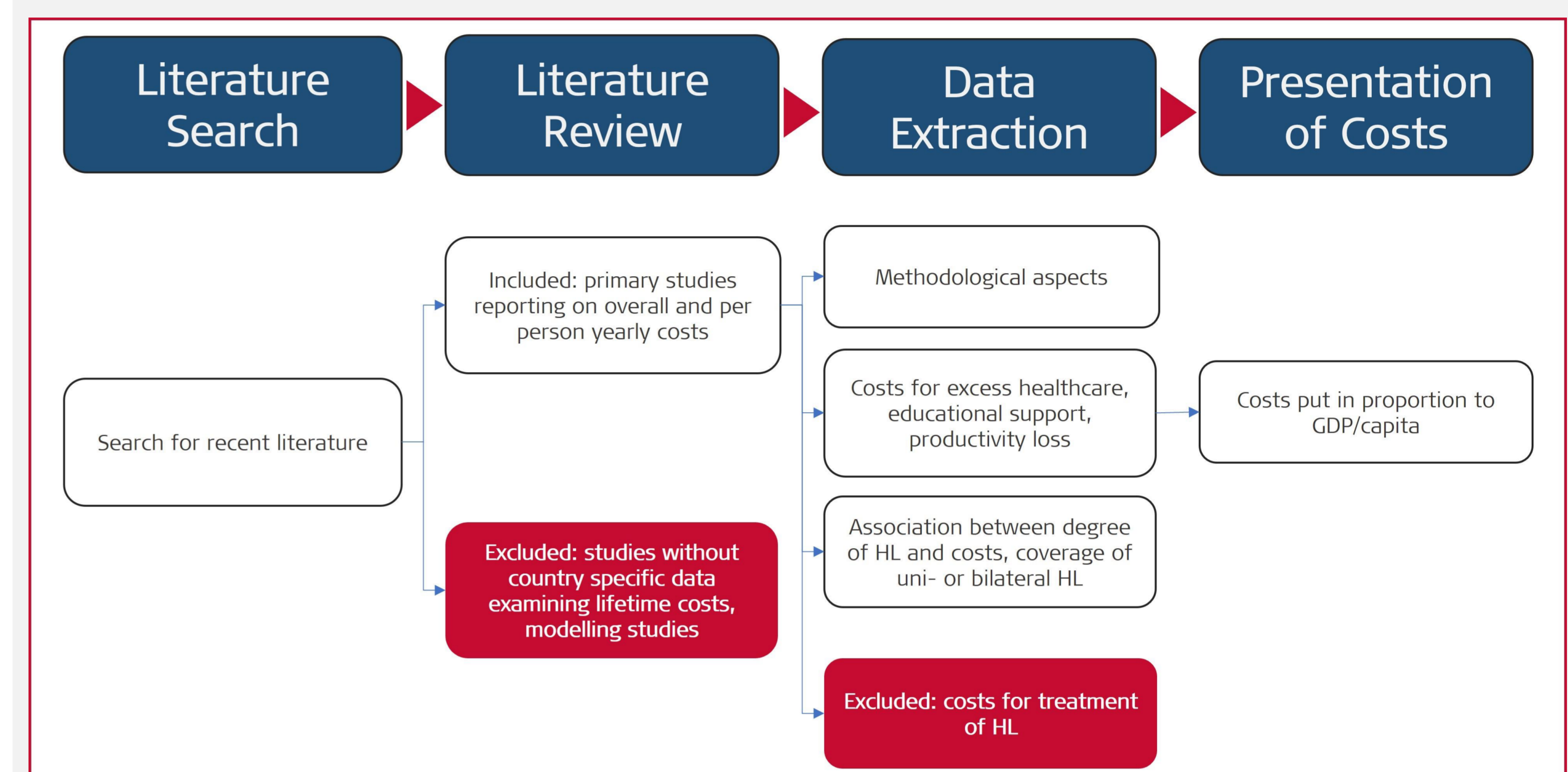


Figure 2: Graphical overview of the applied methodology

RESULTS

Study characteristics: In total 24 studies were included. Although the reviewed publications determine the magnitude of costs in the different categories, they show heterogeneity in terms of methodology (e.g., age group, degree of HL, classification of expenses). Most papers don't include all cost dimensions. A comprehensive estimate is not available for most countries. Studies by McDaid et al. (2021) or the WHO (2017) assess the worldwide amount of costs, while most records focus on high-income settings. Due to methodological differences, a direct comparison of expenditure between countries does not provide meaningful results.

Costs reported: Individuals with unaddressed HL utilize more health care resources (e.g., audiologists, speech therapists) also due to comorbidities (e.g., depression) or physical problems (e.g., due to falls) than the normal hearing population, thus causing a higher financial burden to the health care system. Children with hearing impairment may need pedagogical support or special schooling, which leads to higher educational expenses. Poorer career opportunities and unemployment are the reason for costs due to productivity loss. (McDaid et al., 2021; WHO, 2017; Deloitte Access Economics, 2017)

The major findings can be categorized in the following three sections:

1. Costs relative to GDP/capita are substantial

COSTS HEALTH CARE SECTOR					
STUDY	COUNTRY	AGE	BY DEGREE OF HL	BY UNI/BILATERAL HL	COSTS RELATIVE TO GDP/CAPITA
Schroeder et al. (2006)	UK	7-9 y.	✓	✗	6.1 %
Chorozoglou et al. (2018)	UK	13-20 y.	✓	✗	5.5 %
Nachtegaal et al. (2010)	NL	18-70 y.	✗	✗	1.8 %
Simpson et al. (2018)	US	≥65 y.	✗	✗	4 %

Table 1: Health care sector costs caused by unaddressed HL (excerpt of selected studies)

The calculation (Tab. 1) showed that the yearly excess health care costs of untreated HL per person are substantial and amount up to 6.1 % of GDP per capita (Schroeder et al., 2006). There is a considerable heterogeneity in the estimated expenses of educational assistance for hearing impaired children ranging from 2 % of GDP per capita in Colombia to 134 % of GDP per capita in Nepal (McDaid et al., 2021). The economic impact of reduced productivity sums up to 28 % of GDP per capita (Ruben, 2000).

2. Association of degree of HL and costs remains unaddressed

In all but three studies, the association between the degree of HL and costs was not covered, disregarding the fact that the severity of HL is an important predictor of health and societal costs. Two of those studies reported on children only in the United Kingdom with small populations, the other one looked exclusively at productivity loss in adults in the United States.

(Chorozoglou et al., 2018; Schroeder et al., 2006; Kochkin, 2010)

3. Costs of unaddressed unilateral HL not assessed

None of the reviewed papers included costs of unilateral unaddressed HL, not considering the individual challenges and the financial impact of unilateral HL. Bell et al. (2022) emphasize that children with unaddressed unilateral HL have difficulties succeeding in school, experience limitations in their psychological development and a lower quality of life. Thus, cost estimates can be considered conservative, and expenses might be even higher. To only assess the costs of unaddressed bilateral HL, indicates a lack of evidence.

CONCLUSION & OUTLOOK

The rising prevalence of HL poses a major public health issue, while the associated economic impact of unaddressed HL is an economic burden for society. The beforementioned results indicate that more specific and local evidence regarding costs of unaddressed HL is needed. Future research should focus on longitudinal studies generating long-term evidence on comprehensive costs for uni- and bilateral HL by severity of hearing impairment in children and adults, especially in low- and middle-income countries. This evidence may be used to perform cost-effectiveness analyses of interventions such as bone-conduction devices or active middle ear implants.

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