

services, and the sensitivity and educational awareness of health personnel [17]. Considering the diverse characteristics of disabilities and the unique challenges presented by individuals with disabilities, existing research on health education interventions for people with disabilities can be inherently complex. This complexity tends to result in individuals with disabilities receiving lower-quality health services compared to those without disabilities, leading to various health-related issues [17].

People with disabilities, such as those with chronic diseases, require ongoing management and complex treatment [1], which can be challenging to achieve through medical services [2]. Murtagh analyzed 22 studies examining how health management systems can enhance chronic disease management among patients with diabetes, obstructive pulmonary disease, and Parkinson's disease. This analysis, employing a scoping literature review approach, suggested avenues for improving health outcomes based on future population needs [18]. Agarwal et al. reviewed 65 studies on mobile health applications supporting chronic disease management using a scoping literature review method. There was no single framework identified that encompasses all dimensions of mobile health apps, but future evaluation methods could benefit from a more specific approach that balanced standardized quality criteria with the specific needs of various types of health apps [19].

The WHO established the ICF to provide a unified framework for understanding and categorizing functioning and disability [

in health education for individuals with visual or hearing impairments?”

Identifying relevant studies

Environmental factors: products, technology, and attitude (Fig. 1). The results are summarized using descriptive statistics, including frequencies and percentages.

Results

Literature search

Figure 2 presents the specific flowchart for selecting the target theses. A total of 3,168 papers were retrieved through the data search. After excluding 42 duplicate papers, the abstracts of 3,126 papers were reviewed. During the abstract review, 3,077 papers that did not meet the selection criteria were excluded, leaving 49 papers for further examination. The remaining papers were scrutinized to determine their adherence to the selection criteria. Subsequently, 11 studies without full-text availability, three that were not intervention studies, and one that did not target person, were excluded. Ultimately, 34 papers, comprising 19 and 15 studies focused on the visually and hearing impaired, respectively, were included in the final analysis. No study found combined visual and hearing impairment, whether or not it was intended.

General characteristics of each study

A total of 34 articles were selected for the final analysis. Table 1 presents the summarized research-related characteristics, while Additional File 3 describes the specific details of individual studies. The selected studies were published between 2001 and 2023. Among the studies, 44.1% (15) had a one-group intervention design, and 55.9% (19) had a control group. Among the studies with a control group, three articles [32–34] randomly allocated groups.

Characteristics of intervention

Table 2 outlines the analysis of various intervention characteristics, including the type of intervention (neuro-motor, sensory, acquisition–developmental, cognitive–psychosocial, visual–perceptual), mode of delivery (face-to-face or non-face-to-face), facilitator’s profession (nurses, clinical personnel, paramedical practitioners, non-healthcare workers), location of intervention (healthcare center, home, educational institution), sample size, total duration of intervention, and dosage (frequency and duration) for both visual and hearing categories.

Body Function	
Mental functions	Cognitive functions such as attention, memory, and problem-solving
Sensory functions and pain	Includes hearing, seeing, and the experience of pain
Neuromusculoskeletal and movement-related functions	Refers to movement, muscle strength, and coordination
Activities and Participation	
Learning and knowledge	Includes cognitive tasks related to education, work, and daily learning
Communication	Involves interacting with others and conveying information
Self-care	Basic tasks such as dressing, eating, and hygiene
Major life areas	Encompasses aspects of work, family, and social life
Environmental Factors	
Products and technology	Tools, devices, and other products that may support or hinder function
Attitudes	The societal or individual perceptions and biases that may affect a person’s participation or abilities.

Fig. 1 Outcome variables according to International Classification of Functioning Disability and Health (ICF) classification criteria. Source: World Health Organization. Towards a common language for functioning, disability, and health: ICF. The international classification of functioning, disability and health. 2002. Available from: <https://cdn.who.int/media/docs/default-source/classification/icf/icfbeginnersguide.pdf>. Accessed 20 May 2024

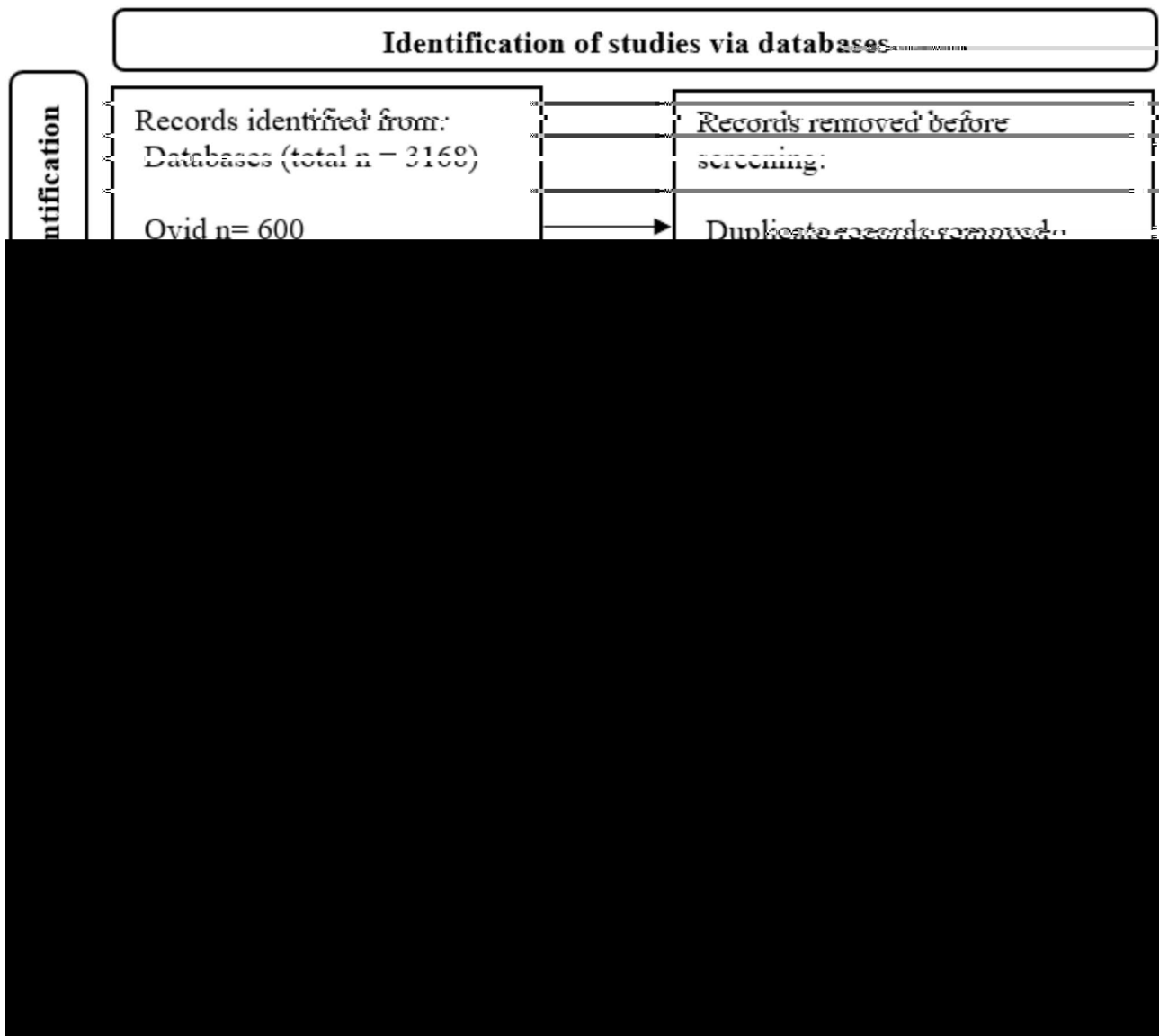


Fig. 2 Flow diagram of study selection

Source: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71. Available from: <https://www.bmj.com/content/bmj/372/bmj.n71.full.pdf>

Table 1 Study characteristics (N= 34)

Characteristics	Reference no.						
		Visual			Hearing		
		n	Reference No:	32 50	n	Reference No:	51 65
Publication year	Before 2009	5	46–50	4	62–65		
	2011–2019	10	36–45	8	54–61		
	2020–2023	4	32–35	3	51–53		
Study design	RCT	2	33, 46	1	53		
	Non-RCT	9	32, 34, 36, 40, 41, 43, 45, 48, 50	7	54, 55, 57, 60, 61, 62, 64		
	One-group	8	35, 37, 38, 39, 42, 44, 47, 49	7	51, 52, 56, 58, 59, 63, 65		

RCT: Randomized controlled trial

Source: Developed by the authors

Interventions for participants who are visually impaired

When categorizing studies conducted on participants who are visually impaired by intervention type, eight out of the 19 studies focused on acquisition and development, followed by cognitive–psychosocial themes in six, neuro-motor aspects in four, and visual–perceptual considerations in one. The majority of the studies (17 articles) involved face-to-face interventions. Non-face-to-face interventions used smartphones [35, 36] and conventional phones [37] as educational media, with study [37] categorized in both face-to-face and phone-based intervention groups. Thirteen studies implemented individual educational interventions, four involved group educational interventions, and two employed an integration of individual and group educational interventions.

More than half of the studies (10 articles) were intervention studies conducted by healthcare providers. The interventionists included four nurses, four paramedic practitioners, two clinical personnel, five non-healthcare workers. Medical institutions or centers (nine articles) were the most common settings for interventions, followed by homes or residential facilities (six articles), and educational institutions (three articles).

Interventions for participants who are hearing impaired

Among the 15 studies of literature on participants who are hearing impaired, acquisition–development was the most common category of intervention, including nine acquisition–development, five cog3

Number of participants

For participants with visually impairment, the number of participants ranged from a minimum of one participant [39] to a maximum of 391 participants [33] (Additional File 3). Conversely, for hearing impaired studies, the number of participants ranged from a minimum of 10 participants [40] to a maximum of 728 participants [41] (Additional File 3). Additionally, the duration of the interventions varied. Among the 34 studies

36. Tan AC, Man R, Wong CW, Lee SY, Lamoureux EL, Ang M. Randomized controlled trial evaluating a novel community eye care programme for elderly individuals with visual impairment. *Clin Exp Ophthalmol*. 2018;46(6):593–9.