Understanding the psychosocial impact of assistive technologies for blind and partially sighted people: a scoping review protocol

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Abstract

Background: There has been a rapid growth in the literature on the design and evaluation of assistive technologies for blind and partially sighted people, yet there is a lack of a comprehensive analysis of the existing literature on the classification of immediate-, short-, medium-, and long-term psychosocial impact of assistive technologies on the quality of life of blind and partially sighted people.

Objective: This scoping review aims to identify and synthesise the existing literature on the psychosocial impact of assistive technologies on the quality of life of blind and partially sighted people.

Methods: Searches will be conducted across seven electronic research databases - CINAHL (EBSCO), PsycINFO (EBSCO), ACM Digital Library, IEEE Xplore, Scopus, Web of Science, and Google Scholar (first 100 records). Data will be extracted for author(s), year of publication, country of origin, purpose, population, methodology, concepts of interest, outcomes, and key findings relating to the scoping review objectives. The findings will present a descriptive synthesis of the search results.

Results: The database search was conducted in July 2024. The database search identified a total of 1,145 records. It is anticipated that the study findings will be submitted for publication in a peer-reviewed journal by the end of September 2024.

Conclusions: This study will provide a synthesis of the recent body of work on the psychosocial impact of assistive technologies for blind and partially sighted people and recommendations for researchers and designers interested in this research area. Clinical Trial: https://osf.io/sk7n8/?view_only=d95ccaf7b674418db27ac9935a23a0bd

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Original Manuscript

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Keywords: Assistive technology; psychosocial impact; quality of life;` visual impairment; blind and partially sighted people.

Introduction

Globally, visual impairment affects approximately 1 billion people (World Health Organization, 2019). Visual impairment significantly impacts people's quality of life, affecting activities of daily living, education, employment, and social interactions (Bandukda et al., 2020; Khorrami-Nejad et al., 2016; Nyman et al., 2010). The most prominent effects of vision loss are loss of independence and social isolation, leading to anxiety, depression, and other mental health conditions (Nyman et al., 2010). Due to this, many blind and partially sighted (BPS) people experience low self-esteem and self-efficacy in their mobility and social interaction (Bandukda et al., 2021). Furthermore, the participation of BPS people in leisure activities is low. Where they do, BPS people participate in passive leisure activities (e.g., watching TV, listening to the radio) rather than actively participating in physical activities, social interaction, and sports in outdoor places (Vučinić et al., 2020). Research shows that BPS have low mental health outcomes and overall quality of life compared to sighted people (Bonsaksen et al., 2023; Nyman et al., 2010; van der Aa et al., 2015).

The World Health Organization (2022) defines assistive technology (AT) as an umbrella term for assistive products, systems and services designed to maintain and/or improve one’s functioning related to cognition, communication, hearing, mobility, self-care, and vision, therefore promoting health, well-being, inclusion, and participation. The European Parliament research report on AT for people with disabilities (2018) distinguishes between 5 types of ATs for blindness and visual impairment: 1) haptic aids (e.g., the white cane, the traditional Braille system, embossed pictures, advanced Braille applications, advanced canes, haptic aids for computer usage, matrices of point stimuli), 2) travelling aids (e.g., low-tech haptic aids, obstacle and object location detectors, electronic travel devices, assistive applications in mobile phone technology, embedded technologies, mixed-systems), 3) AT for accessible information and communication, 4) AT for daily living (e.g., labelling systems, talking readers, tactile and vibrating clocks and alarms, talking kitchen tools, talking wallets and purses, etc.), and 5) phone and table applications (e.g., magnification apps, colour detection apps, money identification apps, object identification apps, scan and read apps, screen reading apps, voice recognition apps, location and GPS apps, Braille apps, etc.).

Mashiata and colleagues (2022) classified ATs for visual impairment into 4 categories: 1) based on portability (e.g., non-wearable devices such as smart canes and assistant robots and wearable travel aids such as head-mounted, ear aids, belt mounted, blind shoes, glasses, and gloves), 2) based on navigation (e.g., audio-tactile maps, indoor, indoor-outdoor, and outdoor such as smart city/urban navigation, vehicle detection, airport accessibility, shopping guide, and pedestrian navigation), 3) based on detection (e.g., object recognition and obstacle detection, including vehicle detection, pedestrian detection, staircase, and daily life objects), and 4) based on smartphone assistance (e.g., virtual assistants and apps, including voice maps, voice search, interactive games, and blind carts).

Over recent decades, disability has stopped being viewed solely in functional terms. Frameworks such as the International Classification of Functioning, Disability and Health (ICF) and the World Health Organization Quality of Life (WHOQOL)(World Health Organization, 2012) now emphasise the importance of psychological and social dimensions in understanding and enhancing the quality of life for disabled individuals. However, much of the existing research on the impact of ATs has primarily focused on the functional outcomes associated with their use and attributed the poor uptake of these technologies to functional issues (Jutai & Day, 2002; Traversoni et al., 2018). Two key points should be raised in relation to this. Firstly, ATs continue to be designed from a biomedical, deficiency-oriented rather than a psychosocial, person-centred approach, failing to effectively fulfil users' needs (Ortiz-Escobar et al., 2023). Secondly, researchers have overlooked the role of psychosocial factors in the perception and use of ATs, which may better explain their acceptance and uptake, prompting the development of instruments such as the Psychosocial Impact of Assistive Devices Scale (Jutai & Day, 2002) to address this gap.

As with other disabilities, prior research has mainly focused on the functional outcomes of AT and rehabilitation interventions for BPS people (Borgnis et al., 2023; Horowitz et al., 2006; Pundlik et al., 2023), yet there is a lack of a comprehensive review of the literature to understand the psychological and social impact of AT for this population.

This review aims, therefore, to comprehensively examine the research investigating the short-, medium-, and long-term psychosocial impact of AT for BPS people.

Review question(s)

This scoping review aims to answer the following questions:

- What psychological and social outcomes are associated with the use of ATs among blind and partially sighted people?
- What methods and instruments are used to measure the psychosocial impact and outcomes of ATs for blind and partially sighted people?
- What are the key trends in the literature in relation to the population characteristics, countries of study, settings, type of ATs examined, impact period, and research methodologies used to assess the psychosocial impact of ATs for blind and partially sighted people?

Inclusion criteria

Participants

This review will consider literature that includes blind and partially sighted people, including children and adults, irrespective of the diagnosis and inclusion criteria used by individual studies.

Concept

Studies will be included if they 1) refer to the use of AT by BPS people and 2) focus on the psychosocial impact or outcomes associated with the use of ATs. Guided by the World Health Organization (WHO) Quality of Life (WHOQOL) framework (World Health Organization, 2012) and Schalock & Alonso's Quality of Life model (2002), the psychological outcomes refer to the impact of ATs on the mental and emotional state of the individual, including positive feelings (happiness, life satisfaction), negative feelings (anxiety, depression, stress), self-esteem, etc. Social outcomes refer to the impact of ATs on the individual's social interactions, support, and participation in community and societal activities.

Context

For the purpose of this review, studies conducted in any country or setting, including healthcare, community, education, work, etc., and across all age groups will be considered.

Type of evidence sources

Primary research,–including quantitative, qualitative, and mixed-method studies reported in peer-reviewed journal articles or conference proceedings, will be included in this review. Conference abstracts only will be excluded. Secondary research (e.g., literature reviews, meta-analyses) and non-empirical works (e.g., theoretical papers, conceptual frameworks, opinion pieces, editorials) may be consulted during the review process but will not be included. The review will only include research that includes the design and/or evaluation of an AT intervention with a focus on impact.

Methods

This scoping review follows the guidance provided in the Joanna Briggs Institute (JBI) Manual for Evidence Synthesis (Peters et al., 2020) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) Checklist (Tricco et al., 2018).

Search strategy

An initial limited search of CINAHL (EBSCO) and PsycINFO (EBSCO) was conducted to inform the development and refinement of the search strategy. A university librarian was also consulted at this stage to help identify the databases and refine the search strategy. The search included variations and combinations of the following key concepts:

Assistive technology (“assistive technol*” OR “adaptive technol*” OR “assistive aid*” OR “assistive equipment*” OR “assistive device*” OR “assistive product*” OR “assistive service*” OR “assistive interv*” OR “sensory aid*”)

Visual impairment (“visual impair*” OR “vision impair*” OR “impaired vision” OR “sight impairment” OR “visual loss” OR “vision loss” OR “vision defect” OR “visual handicap” OR “blind” OR “blindness” OR “low vision” OR “partial* sight*” OR “partial vision” OR “visual* disorder*” OR “vision disord*” OR “visual* disab*” OR “vision disab*” OR “eye disord*”).

Next, a full literature search of peer-reviewed journal articles and conference proceedings was conducted across seven electronic databases, including CINAHL (EBSCO) and PsycINFO (EBSCO), as well as ACM Digital Library, IEEE Xplore, Scopus, Web of Science, and Google Scholar (first 100 records).

In order to focus on the most up-to-date literature and to capture the latest developments in the field of ATs for visual impairments, the search was limited to studies published in the past five years (2019-2024). Furthermore, the search was limited to studies written in English only.

A full literature search was conducted in July 2024 which produced in 1,145 results.

Source of evidence selection

Following the literature search, all retrieved studies will be collated and uploaded into an online literature review tool (Rayyan), where duplicates will be removed. A random sample of 25 articles from the overall dataset will be first reviewed for pilot testing of the source selector criteria. Following this, the reviewers will meet to discuss discrepancies and adapt the criteria based on the insights from the pilot test. Independently, two reviewers will then conduct a screening of titles and abstracts to determine their potential eligibility for inclusion. The full texts of potentially eligible studies will be then retrieved and reviewed in detail for final inclusion. Reasons for excluding sources of evidence at the full-text stage that do not meet the eligibility criteria will be documented and reported in the scoping review. Any discrepancies between reviewers at each stage of the study selection process will be resolved through consensus or by consulting a third reviewer. The search results and the study inclusion process will be reported in full in the final scoping review and presented in a PRISMA-ScR flow diagram (Figure 1).

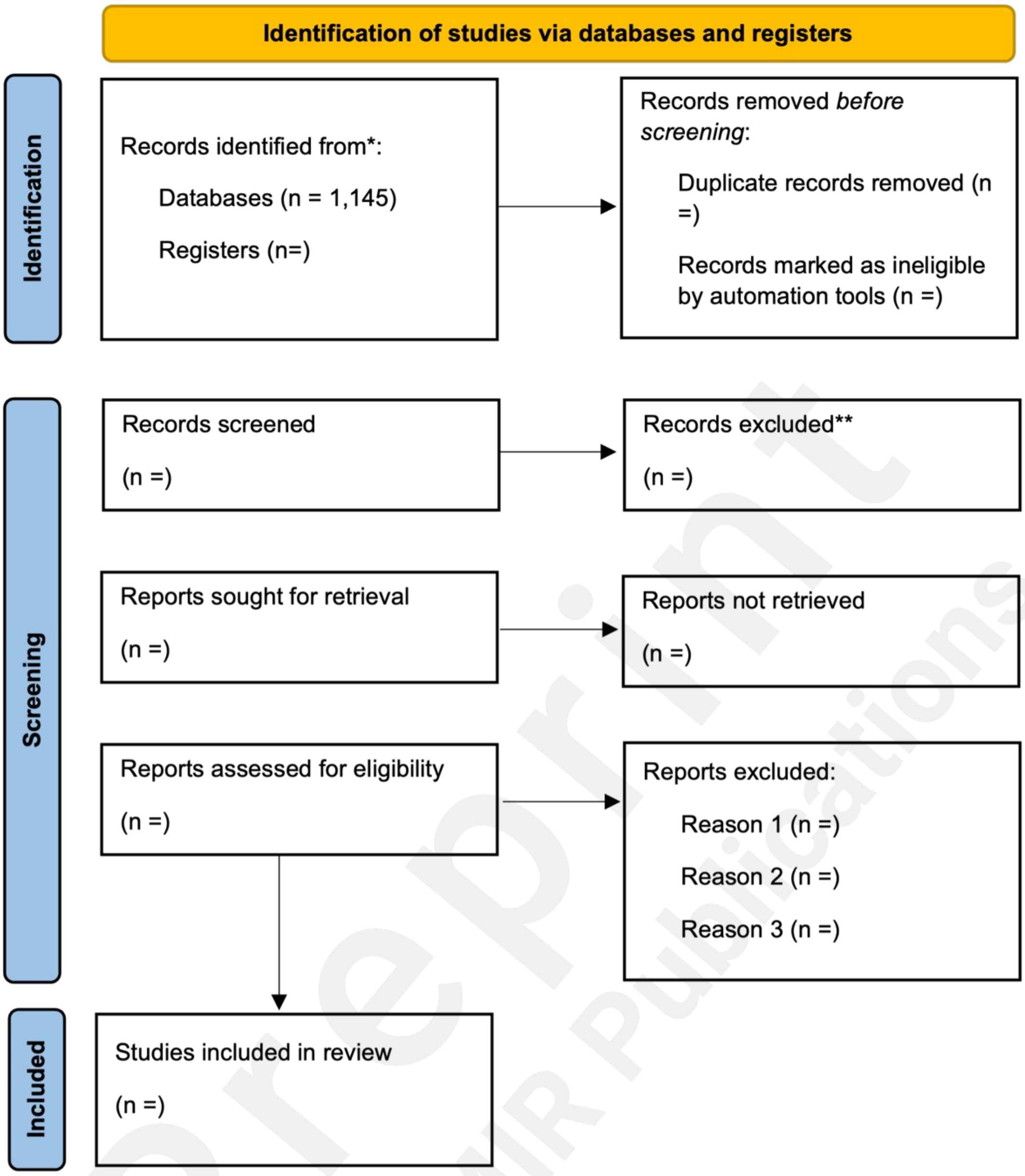

Figure 1: PRISMA-Scr Flow Diagram for this scoping review.

Data extraction

A standardised data extraction table will be used to systematically capture all relevant information. The data extraction table will be piloted on a subset of the included and will be revised as necessary. Any details will be provided in the scoping review.

The information to be extracted from each study includes the author(s), year of publication, title, source of publication, type of publication, country of study, aim of the study, population and sample characteristics, research design, type of AT or intervention, setting, outcomes, instruments or impact measures, key findings, and the impact period categorised as immediate (less than one month), short-term (one to six months), medium-term (six to twelve months), and long-term (more than twelve months). To ensure the accuracy of the process, a second reviewer will cross-check the data extracted from at least 25% of all included studies. Any discrepancies between reviewers will be resolved through consensus or consultation with a third reviewer.

Data presentation

Descriptive statistics will be employed to summarise the overall characteristics of the included studies. These will cover the number of studies, the distribution of studies by publication year, population characteristics, country of origin, study setting, type of ATs examined, impact period, and research methodologies used. Charts and diagrams will also be used to support data presentation. Tables will be constructed to synthesise the psychosocial outcomes reported in the included studies. Tables will detail the methods and instruments used to measure the psychosocial impacts of ATs, including information on specific tools or questionnaires, their reliability and validity, and the context of their application. Additionally, tables will summarise the main findings of the included studies. Furthermore, a narrative summary will accompany the tabular and/or charted results, providing a description of the literature on the psychosocial impact of ATs for BPS people including key themes and trends observed. It will also identify gaps in the current body of knowledge while recommendations for future research will be made based on the identified gaps or inconsistencies.

Dissemination strategy

This protocol has been pre-registered in the Open Science Framework (OSF) (https://osf.io/sk7n8/?view_only=d95ccaf7b674418db27ac9935a23a0bd) and submitted for publication in a relevant journal. The completed scoping review will be submitted to a journal relevant to ATs and disability studies. The findings are expected to inform the development of a global evidence database mapping the impact of AT for blind and partially sighted people, with a view to extending it to other disabilities and long-term conditions, including other sensory impairments, mental health conditions, neurodevelopmental conditions, intellectual disabilities, physical disabilities, etc. The database is also expected to serve as a resource for researchers, clinicians, AT developers, policymakers, and other stakeholders, providing accessible and up-to-date evidence on the impact of AT. It is intended to facilitate evidence-based decision-making, support the development of guidelines, interventions, and policies, as well as identify gaps in the current research landscape. Findings will be presented at relevant conferences and shared with stakeholders (e.g., disability and healthcare organisations, AT developers, and policymakers).

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