

The Outcome of Exercise for Adults and Older Adults with Visual Impairment: A Scoping Review Protocol

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Abstract

Introduction: Exercise programs provide numerous health benefits, including improved physical fitness, psychosocial status, and sense of well-being. Previous research has identified a range of positive outcomes as a result of exercise for most populations; however, the current understanding of the exercise outcomes for adults from 18 to 65 years and older adults over 65 years with visual impairment is limited. **Objective:** The proposed scoping review aims to allow a better understanding of current exercise outcomes for adults (including older adults) with visual impairment. This protocol enhances the research quality and the transparency of the proposed scoping review. It pre-defines the objective and methods of the scoping review, including details of the criteria of inclusion and exclusion for evidence sources and the way the data will be identified, extracted, and presented. **Inclusion criteria:** Articles involving participants with visual impairment aged 18 and over will be the focus of the proposed scoping review. All English-language peer-reviewed studies with a focus on outcomes of exercise programs and interventions for adults with visual impairment, including quantitative, qualitative, and mixed methods study designs, will be considered. In order to make the result more applicable for future research and practice, studies published from 2000 to present will be included, given consideration of the changing concept and format of exercise since 2000. The exercise-related programs and interventions to be included can be delivered via any format in any geographical area. **Methods:** The search strategy will aim to locate all eligible published studies in the following databases: Ovid MEDLINE, Embase, CINAHL Complete, PsycInfo, AMED, and SPORTDiscus. Full text review will be undertaken of articles that meet criteria on initial review of title and abstract. Reference lists and citations of studies selected for full text review will be further reviewed to identify any additional studies that meet inclusion. Data from the selected studies will be extracted and tabulated based on the exercise and the key findings relevant to the research question. Findings from this scoping review will be presented as a summary of the data from the selected studies in a tabular form, which will categorize exercise outcomes and the corresponding exercise along with a narrative summary. **Conclusion:** It is expected that the results of this scoping

review will enable a better understanding of exercise for adults with visual impairments and inform future exercise programs for adults with visual impairment.

Keywords: Blindness; Physical activity; Recreation; Sport; Vision loss

Introduction

This study introduces the protocol of a scoping review on exercise outcomes for adults with visual impairment. Exercise has the potential to enhance the lives and well-being of people with visual impairment, and thus lessen health disparities (Anderson & Durstine, 2019; Ruegsegger & Booth, 2018). Adults with visual impairment are individuals aged 18 years and over with blindness or low vision (World Health Organization [WHO], 2021). Visual impairment is defined as an impairment to an individual's ability to see that impacts their daily life (Sapp, 2010). According to the WHO (2021), the global prevalence of any visual impairment is increasing, with at least 2.2 billion people worldwide reporting some form of a vision-related difficulty—from total blindness to presbyopia. Among this population, it was estimated that 43.3 million people are blind, 295 million have moderate to severe visual impairment, and 258 million people have mild visual impairment (GBD 2019 Blindness and Vision Impairment Collaborators, 2021). By 2050, the number of people with blindness is estimated to increase to 61 million worldwide, with 474 million living with moderate to severe visual impairment and 360 million living with mild visual impairment (GBD 2019 Blindness and Vision Impairment Collaborators, 2021). Aside from the impact on day-to-day living (WHO, 2021), visual impairment has been indicated to result in locomotor dysfunction (Inoue et al., 2018), poor quality of life (Amedo et al., 2016; Khorrami-Nejad et al., 2016), and poor mental health (Demmin & Silverstein, 2020). In addition, obesity and being overweight have also been identified as health issues among people with visual impairment (Capella-McDonnall, 2007; Vági et al., 2012; Wrzesińska et al., 2017). With increasing recognition of the impact on people's lives and the health disparities associated with vision impairment,

previous studies have indicated that education programs and health promotion activities, including exercise, are needed (Capella-McDonnall, 2007; Khorrami-Nejad et al., 2016; Wrzesińska et al., 2017). Therefore, it is important to explore and better understand appropriate exercise programs for people with visual impairments.

The importance of exercise for all people has been recognized broadly. Exercise provides general health benefits to people and prevents disease (Anderson & Durstine, 2019; Ruegsegger & Booth, 2018). It also improves people's physical fitness and their well-being more generally. Previous studies have highlighted that exercise has a positive impact on quality of life and the performance of daily living activities as a result of improved physical outcomes (Campbell et al., 2021; Gerritsen & Vincent, 2016), which is associated with psychosocial status (Karelis et al., 2008; Vardar-Yagli et al., 2015). Exercise participation has further evidenced providing people with a mastery experience that leads to increased self-efficacy and results in enhanced well-being (Netz et al., 2005).

Adults with visual impairment, however, have difficulty participating in exercise. Due to their visual difficulty, barriers such as negotiating traffic and transportation often preclude them from participating in exercise (Jaarsma et al., 2014). Additionally, being afraid of injury and the difficulty of accessing the appropriate exercise facilities have also been identified as barriers by adults with visual impairment (Chu et al., 2020). This results in adults with visual impairment tending to be physically inactive. Previous studies that investigated the physical activity level of adults with visual impairment indicated an insufficient amount of physical activity for adults with visual impairment (Gawlik et al., 2019; Inoue et al., 2018). Further, adults with visual impairment were found to have more sedentary behaviour

compared to those with normal vision (Smith et al., 2020). A sedentary lifestyle has been identified as a significant factor for the increasing health disparities for adults with visual impairment (Crews & Campbell, 2004).

To encourage exercise participation, exercise instructions and guidelines have been specifically published for adults with visual impairment. To improve the physical fitness of adults with visual impairment, static stretching and yoga are recommended in order to improve an individual's flexibility, balance, and muscle strength (Gerritsen & Vincent, 2016; Jeter et al., 2015). During exercise participation, tactile and verbal cues are recommended for inclusion in order to facilitate the performance of adults with visual impairment (Moore, 2016). In addition, environmental factors, such as exercising together with peers, the use of assistive devices, and improving the accessibility of exercise, can also facilitate greater participation in exercise (Chu et al., 2020). Exercise needs to be adjusted for people with visual impairment according to their personal health condition(s) and disease in order to ensure their safety. For example, strenuous activity is suggested to be avoided for individuals who have received recent eye operations or are at risk for intraocular bleeding (McMonnies, 2016). Exercise that causes imbalance needs to be conducted cautiously for adults with visual impairment due to their lack of visual feedback (Malouf, 2013). The positive impact of such guidelines and recommendations has been demonstrated by previous research (Jeter et al., 2012; Khan et al., 2018; Saulynas et al., 2022), and thus has been used to inform the development of exercise interventions for adults with visual impairment.

The influence of exercise interventions for adults with visual impairment has been identified in previous research (Hackney et al., 2015; Jeter et al., 2012; Jeter et al., 2015; Sweeting et al., 2020) and includes any kinds of outcomes for adults with visual impairment after exercise. However, the types of exercise and the outcomes being assessed vary. For example, one randomized control trial pre- and post- design study applied yoga (a common exercise intervention for adults with visual

impairment) with adults with visual impairment from 31 to 59 years of age, to help address issues such as sleep disturbance, balance problems, and negative psychosocial states (e.g., depression; Jeter et al., 2012). Participation in recreational exercise was also found to improve the mental health and quality of life of adults with visual impairment. A pre- and post- follow-up design study applied dancing sessions to demonstrate improvement of vision-related quality of life for adults with visual impairment aged 51 to 95 years (Hackney et al., 2015). Similarly, a case study used karate sessions to demonstrate subsequent increases in self-esteem and self-efficacy of adults with visual impairment aged 19 to 40 years (Qasim et al., 2014). Lastly, older adults with visual impairment (aged 62–91 years) reported increased confidence in performing their daily living activities following involvement in a Falls Management Exercise program (de Jong et al., 2021). All these studies have demonstrated the impact of exercise intervention for adults with visual impairment.

Despite the breadth of research conducted regarding the influence and impact of exercise interventions for adults with visual impairment, existing reviews of this literature are limited. One recent appraisal by Sweeting et al. (2020) systematically reviewed the effectiveness of exercise interventions conducted for adults with visual impairment. Their review included only randomized controlled trials and pre-post studies that provided exercise intervention for adults with visual impairment and reported physical outcomes. However, there have been studies to identify quality of life, mental health, and psychosocial benefits as exercise outcomes for adults with visual impairment (Bao et al., 2021; da Silva et al., 2022; McCarthy et al., 2018). Different research designs have also been conducted to investigate the influence of exercise interventions (de Jong et al., 2021; Hackney et al., 2015). Given the limitations of the current existing review outlined, we believe it is necessary to conduct a novel review assessing the state of current evidence on any outcomes, inclusive of broader research designs.

The aim of the proposed scoping review is to allow a better understanding of the current state of exercise outcomes for adults with visual impairment. The review will be conducted to identify and summarize current research evidence regarding exercise-related programs and interventions for adults with visual impairment and the consequent outcomes. Scoping reviews are recommended for summarizing and disseminating research findings when there is not yet a universal review in a broad topic (Arksey & O'Malley, 2005; Pham et al., 2014). In turn, conducting a scoping review will enable the outcomes of the exercise and the related exercise programs and interventions for adults with visual impairment from current research evidence to be mapped. The “outcomes of the exercise” in this scoping review refers to the impact. The effectiveness and the degree of the influence of the exercise on participants is not going to be discussed in the proposed scoping review. It is expected that the results of this scoping review will enable a better understanding of exercise for individuals with vision impairments and inform the development of exercise programs for adults with visual impairment. To ensure the benefit of the proposed scoping review for future research and practice, we aim to enhance its research quality and transparency through publication of the protocol (Khalil et al., 2022). The use of a protocol for scoping reviews has been indicated to reduce research bias through pre-defining the objective and methods (Peters et al., 2020). It also allows for transparency of the process by reporting the details of criteria for inclusion and exclusion of evidence sources and how the data will be identified, extracted, and presented. Therefore, publishing the protocol of a proposed scoping review is important. This scoping review protocol is developed according to the guidelines developed by the JBI Scoping Review Methodology Group (Peters et al., 2022).

Review Question

What outcomes have been reported for adults with visual impairment participating in exercise?

Inclusion Criteria

Participants

This study will explicitly focus on adult participants aged 18 to 65 years old and older adults aged over 65 years old who have a visual impairment. Studies including adults with multiple conditions, in addition to visual impairment, will be considered. In addition, studies examining participants identifying as any sex or gender will be considered in the current review. Where studies with a broader age range are sampled, those with more than 50% of individuals aged 18 years and over will be included. To guide the proposed review, adults with visual impairment are defined as any adult or older adult aged 18 or over who is blind or has low vision (WHO, 2021), with the visual impairment having been established through clinical assessment or by self-report. Studies with participants who are national-level athletes, such as Paralympic athletes, will not be considered.

Concept

This review will map the outcomes of exercise for adults with visual impairment and the corresponding exercise. Therefore, studies that report on the provision of an exercise program and/or exercise intervention for adults with visual impairment and report on the results will be considered. Exercise in the proposed scoping review refers to physical activities that are planned and arranged to improve or maintain people's health and lives (Caspersen et al., 1985; WHO, 2020). There is no restriction regarding the mode of delivery, exercise duration, or exercise provider background.

Context

The exercise-related programs and interventions to be included in the proposed review can be delivered via any format, such as through a service setting, home-based program, and/or online delivery mode. Furthermore, eligible studies will not be limited to any

geographical area.

Types of Sources

The proposed scoping review will consider for inclusion all English-language peer-reviewed published studies available that have a focus on the exercise outcomes for adults with visual impairment based on the review question, including quantitative, qualitative, and mixed methods study designs. We aim to map out the type of exercise programs and interventions and corresponding outcomes. As such, only experimental studies will be considered. All studies related to exercise programs and interventions for adults with visual impairment that report on quantitative and/or qualitative outcome measures will be reviewed. In addition, we will include articles with any type of research design, such as pre-and post-test, control trial, and case study. Because the concept toward exercise has changed over the years (Andreasson & Johansson, 2014; Speck, 2002), the format of exercise before 2000 is different from present. Therefore, only studies published from 2000 to the present will be considered in order to make the results more applicable for future research and practice. Review papers, text and opinion papers, academic presentations, theses and dissertations, and articles on organizational websites will not be considered for inclusion. However, the citation list of review papers or meta-analyses that are identified will be reviewed to determine if any studies meet criteria for inclusion in this proposed scoping review.

Methods

This scoping review will be guided by the Joanna Briggs Institute (JBI) *Manual for Evidence Synthesis* (Peters et al., 2022). This protocol and the future associated scoping review are reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR; Tricco et al., 2018). Data will be extracted from eligible studies according to the items of the Template for Intervention

Description and Replication (TIDieR) checklist (Hoffmann et al., 2014). Specific details about the participants and the key findings relevant to the research question will also be included in the extracted data.

Search Strategy

The search strategy will aim to locate all eligible published studies. It will include electronic database searching, guided by the Peer Review of Electronic Search Strategies (PRESS) guidelines (McGowan et al., 2016), and manual searching. The PICO (population, intervention, comparison, and outcomes) format has been applied to derive search terms (McGowan et al., 2016). Terms related to visual impairment and exercise will be included as searching terms. The search strategy will be conducted in the following databases: Ovid MEDLINE, Excerpta Medica Database (Embase), Cumulative Index to Nursing and Allied Health Literature Complete (CINAHL Complete), PsycInfo, Allied and Complementary Medicine Database (AMED), and SPORTDiscus. The search strategy will be adapted for each database based on the terms identified relevant to the population (e.g., “vision disorders” or blindness), concepts (e.g., exercise), and other keywords and index terms of interest (McGowan et al., 2016). An example of the search strategy developed for Ovid MEDLINE is presented in Appendix A. Manual searching will be conducted by reviewing the reference lists of articles that are selected for full text review to further identify studies that meet inclusion. All the articles from both electronic database searching and manual searching will be imported into Covidence (www.covidence.org) for review. Duplicate publications will be removed. Full text review will be undertaken on articles that meet criteria for inclusion based on initial review of title and abstract by two or more reviewers. The search strategy of the proposed scoping review has been developed in conjunction with the Medicine Liaison Librarian of the Faculty of Medicine, Nursing and Health Sciences at Monash University Library.

Study Selection

Following identification of potential studies for inclusion by electronic database searching and manual searching, a two-step process for study selection will be conducted in Covidence. All the authors of the proposed scoping review have expertise regarding individuals with visual impairment and knowledge of physical activity interventions and health promotion for individuals with visual impairment, and three authors have previous experience conducting scoping reviews. Initially, two authors will independently review and screen the titles and abstracts of the identified studies in duplicate. One author (C-WC) will screen 100% of the studies, and each of the other three authors (AFL, NT, or M-DC) will screen a third of the identified studies. The decision regarding including or excluding the studies for screening in the second step will be recorded in Covidence. In the second step, the full text of selected studies from the titles and abstracts screening will be further reviewed in more detail by three of the authors who conducted title and abstract screening, with one author (C-WC) reviewing 100% of the selected studies, and two authors (AFL and NT) sharing full text screening to ensure all studies are independently reviewed in duplicate. The eligibility of the studies will be recorded in Covidence. The study selection process will be conducted based on the criteria for inclusion and exclusion. The reasons for excluding studies during the second step of screening will be reported. The authors will meet at the beginning to discuss inclusion and exclusion criteria, at midpoint to discuss challenges, and after each data selection step to discuss uncertainties and refine the strategy if needed. Any disagreements that arise between reviewers during any study selection process will be resolved through discussion or with the involvement of an additional reviewer. The studies that meet the criteria for inclusion will be selected for data extraction to derive the results of the proposed scoping review. In order to ensure all relevant and recent studies meeting the inclusion criteria are identified, and should there be a delay

between study selection and data extraction, additional consultation of the selected electronic databases will be undertaken prior to final analyses.

Data Extraction

The proposed scoping review will identify exercise outcomes and the corresponding exercises from the selected studies. Data from the selected studies will be extracted and tabulated according to the items in the TIDieR checklist (Hoffmann et al., 2014), as well as the demographic information of the participants and the key findings relevant to the research question. Data extraction will be completed by at least two independent reviewers. The data extraction tool will be piloted, with the first five included studies being extracted by two independent reviewers. The extraction tool will be amended based on this piloting prior to data being extracted from remaining studies to ensure the data extraction is consistent with the research purpose (Levac et al., 2010). Modifications to the data extraction table will be recorded and reported in the scoping review. The data extraction table will include elements outlined in Appendix B.

Data Presentation

The results of the proposed scoping review will be presented as a summary of the data from the selected studies in a tabular form, which categorizes exercise outcomes and the corresponding exercise intervention along with a narrative summary. Information about each intervention included will consist of the name/type of the exercise, materials needed, procedure, intervention provider(s), methods/mode of intervention delivery, intervention location, intervention intensity, tailoring required, and modifications needed. Each included intervention's outcomes and outcome measures along with the results/findings will be reported. In addition, the authors, publication date, journal, and participants' demographic information will be presented. The number of selected studies and

the study inclusion process will be presented in a PRISMA-ScR flow diagram (Tricco et al., 2018). With the expectation that the proposed scoping review will contribute to a better understanding on the current state of exercise outcomes and exercise programs or interventions for adults with visual impairment, the results will be critically analyzed and discussed.

Conclusion

The proposed scoping review will summarize the current research evidence regarding exercise-related programs and interventions for adults with visual impairment and the consequent outcomes. This protocol is published to pre-define the objective and method, and to report the details of criteria for inclusion of evidence sources and how the data will be identified, extracted, and presented. Publication of this protocol of the proposed scoping review will enhance the research quality and transparency of the scoping review. After identifying the research question and related studies, selecting studies, and extracting data, we will tabulate and summarize the results based on the exercises and the key findings relevant to the review question. Ethics approval is not required as the scoping review will collect and review data from publicly available studies. The results of this scoping review will be disseminated through a peer-reviewed journal publication, so that it can have the potential to inform future research (methods and intervention) and practice in the area of exercise for adults with visual impairment. It is expected to allow researchers to ensure future exercise-related programs and interventions are evidence-based and suitable for adults with visual impairment, thus promoting the development of an exercise program for adults with visual impairment and to encourage their exercise participation.

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Author Contributions

All authors contributed to the study design for the protocol. The primary author (C-WC) drafted the initial proposed scoping review protocol. AFL, NT, and M-DC contributed to critical revision of the initial protocol draft. All authors reviewed and approved the final version for publication.

Availability of Data

Not applicable.

Conflicts of Interest

The authors declare no conflict of interest in this project.

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Appendix A

Search Strategy for Ovid MEDLINE

Visual Impairment-Related Terms
1. "Vision disorders"/ or blindness/ or blindness, cortical/ or vision, low/ 2. "Visually Impaired Persons"/ 3. exp Visual Acuity/ 4. ((Vision* or visual* or eye* or sight) adj3 (impair* or loss or disorder* or disease* or disab* or blind*)).tw. 5. 1 or 2 or 3 or 4
Exercise-Related Terms
6. exp exercise/ 7. Yoga/ or Tai Ji/ 8. exp Sports/ 9. recreation/ or dancing/ 10. (Physical* adj (activ* or exercise or fitness)).mp. 11. 6 or 7 or 8 or 9
Integrate
12. 5 and 11 13. limit 12 to yr="2000 -Current"

Appendix B
Data Extraction Tool

<p>Authors</p> <p>Publication date</p> <p>Journal</p> <p>Participants' demographic information: sample size, age range, gender and ratio, visual ability</p>
<p>Programs and Interventions</p>
<p>Exercise name/type</p> <p>What?: materials needed in the exercise, procedure</p> <p>Who?: provider(s)</p> <p>How?: method/mode of delivery</p> <p>Where?: location, infrastructure required (if applicable)</p> <p>When and How much?: number of times, period of time, number of sessions, schedule, duration, intensity/dose, tailoring, modification</p> <p>How well?: planned vs. actual</p>
<p>Outcomes</p>
<p>Measure(s): including interview questions, etc.</p> <p>Results/ findings</p>