The Health Related Components of Physical Fitness in People with Visual Impairment: A Systematic Review

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Abstract

Visual impairment is becoming progressively more common in America's aging society. Physical inactivity contributes to the development of chronic health conditions. Therefore it is important to understand the relationship between visual impairment and its impact on health related physical activity and fitness. The purpose of this systematic review is to examine the prevalence of physical activity and the five components of physical fitness in the visually impaired population. This review was limited to articles addressing individuals with "visual impairment", as defined by the National Eye Institute. The data abstracted included documentation of visual impairment, physical activity rates, physical fitness measures, gender, age, number of participants, and sample size. Results confirm that persons with visual impairment tend to participate in physical activity significantly less than their sighted counterparts and are often less physically fit, especially in regards to body composition, cardiovascular endurance, and muscular strength. Consensus within the research attributes this decreased physical fitness to the lack of sufficient physical activity within the population. The observed lack of physical activity warrants sustained efforts to decrease the many psychophysiologicla and social barriers preventing visually impaired children and adults from having equal access to opportunities to engage regularly in such activities.

Introduction

The CDC defines physical fitness as "the ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to enjoy leisure-time pursuits and respond to emergencies. Because of this direct link to maintenance of independence in activities of daily living, a person's physical fitness is crucial to his or her physical health and overall well-being. The five measurable health related components of fitness -cardiovascular endurance, muscular strength, muscular endurance, body composition and flexibility - are quantifiable markers for physical fitness and are therefore relevant to public health. The 2018 Physical Activity guidelines for Americans provide recommendations to better health through regular participation in physical activity, yielding benefits that can be seen in all people, including those with disabilities, although to what extent is never clarified. There is a vast spectrum of disabilities -each with its own multi-faceted barriers to regular participation physical activity. As a result, there are many unanswered questions regarding disabled individuals and specific recommendations for health related fitness. Bourne, et al. (2017) reveal that 1.3 billion people worldwide live with some form of visual impairment; due to population growth and aging, this number is projected to continue increasing. In lieu of these findings, this literature review will focus specifically on the health related fitness of individuals with visual impairment.

Methods

This review was limited to articles addressing individuals with visual impairment, which is defined as "the best-corrected visual acuity less than 6/12 (‹20/40) in the better-seeing eye" (National Eye Institute).

Study Design	123 Cross-sectional studies/articles
Databases	PubMed MEDLINE Google Scholar GALE ProQuest
Search Terms	visually impaired/visual impairment, children, adults, health, physical activity, physical fitness
Screening	
Step 1	Title and abstract evaluation
Step 2	Downloading, ordering, and storing full texts
Step 3	Summarizing information and results in an excel spreadsheet
Step 4	Review references from identified articles
Step 5	Excluding studies which do not examine any of the following in visually impaired persons: measurement of physical activity, muscular strength or endurance, flexibility, body composition, cardiovascular endurance, or any other factors relevant to these measurements
Results	**38 relevant studies**

Results

- **Physical Activity**: The literature reaffirms that visually impaired populations stand to gain the same health related benefits from regular participation in physical activity as their sighted counterparts, and should be expected to follow a physical activity regimen which fosters a healthy lifestyle. However, as a result of psychophysiological and social factors which restrict access to health-related fitness activities, the majority of visually impaired youth and adults alike participate significantly less than sighted.
- **Body Composition**: The general visually impaired population does have higher incidence of being overweight or obese. Worse body composition scores were correlated to lower levels of physical activity rather than to the degree of visual acuity. Studies which concluded sighted and visually impaired participants had comparable body composition scores suggesting this was the result of physical education programs specialized for the visually impaired which were sufficient to maintain healthy body composition.
- **Flexibility:** Flexibility measures were comparable between sighted and visually impaired participants.
- **Cardiovascular Endurance:** Only visually impaired participants who regularly engaged in recreational physical activity demonstrated comparable cardiovascular fitness to sighted participants. Cardiovascular endurance scores may or may not be correlated with the degree of visual disability.
- **Muscular Strength:** Unless they were part of a specialized activity program, visually impaired participants had lower muscular strength scores than their sighted peers. This may be a result of decreased lean body mass as a consequence of less physical activity.
- **Muscular Endurance:** Visually impaired participants who were not recreationally active had lower muscular endurance scores than sighted participants.

Discussion

Those who are not part of specialized programs for visually impaired are more likely to participate in health-related physical fitness activities, have decreased physical fitness, motivation to exercise, movement-related self-efficacy, functional movement, and an increasing risk of chronic illness with the progression of age the visual depreciation. The collective research warrants a shift away from the physical capacities of individuals in this population, towards the socioeconomic and cultural systems creating barriers that limit access to the opportunities that would make sighted and visually impaired persons indifferentiable in terms of physical fitness. The key mechanism by which these barriers will be removed at the level of institutions, social groups, and the individual, is education.

Some limitations within this review would include the smaller sample sizes, potentially invalid methods of data collection and tests, and any self-reported data from surveys. Only tests valid both for sighted and visually impaired should be used to compare physical fitness so that scores may be truly comparable and visually impaired persons will be held to the same standards as sighted. It is possible that some of the studies concluding visually impaired participants were less physically fit than sighted were utilizing tests indirectly relying on visual acuity to succeed, skewing the results.

Other Considerations

Balance: Several studies identified either a real or perceived lack of balance as a limiter to engagement in physical fitness activities. Results suggested visual cues were important for balance because of the role they play in maintaining postural control during physical activity, which could be improved if participation is sufficient. This means visually impaired individuals should participate regularly in activities which improve proprioception and locomotor-related balance skills to develop movement competency and self-efficacy.

Quality of Life: Well-being was shown to have a positive correlation to prevalence of physical activity and a negative correlation to degree of impairment. This further warrants the aforementioned changes which would allow more frequent and varied opportunities to participate in fitness activities, thereby increasing chances of preserving quality of life.

Conclusion

The present literature demonstrates a significantly decreased prevalence of physical activity within the visually impaired population in comparison to those who are sighted. This has in turn contributed to poor physical fitness that ultimately puts this population at greater risk for other chronic injuries and illnesses as it continues to age. Because these individuals are at an increased risk for further health consequences, and therefore have a greater need to engage in regular and sufficient physical activities, institutions and individuals alike should be striving to tear down some of the psychological and socioeconomic barriers limiting access to such opportunities. These changes would grant people within the visually impaired population the same access to health-related benefits of physical fitness activities.

Acknowledgements

We would like to thank the following:

•Janet Peterson, Linfield College

- This research was supported by a Student Faculty Collaborative Research Grant

References

Available on request