

Global Stakeholder Perspectives on Barriers and Facilitators to Community-Based Physical Activity in Adults Living with Disabilities: A Systematic Review Protocol

Rachel Esparza¹, Catherine Stratton², James Joseph³, Joseph K. Balikuddembe⁴, Mark Peterson⁵, Abderrazak Hajjioui^{6,7}, Rory Cooper³, Bo-Young Hong⁸, Uma Pandiyan⁹, Laura Paulina Muñoz-Velasco¹⁰, Andrei Krassioukov^{11,12,13}, Deo Rishi Tripathi¹⁴, Kate Nyhan¹⁵, Yetsa A. Tuakli-Wosornu^{2,16}

¹Yale School of Medicine, New Haven, Connecticut, USA, ²Department of Chronic Disease and Epidemiology, Yale School of Public Health, New Haven, Connecticut, USA, ³US Department of Veteran Affairs, School of Health and Rehabilitation Sciences, Human Engineering Research Laboratories, University of Pittsburgh, Pittsburgh, Pennsylvania, USA, ⁴Department of Disaster Health Sciences, Institute for Disaster Management and Reconstruction, Sichuan University and Hong Kong Polytechnic University, Chengdu, Sichuan, China, ⁵Department of Physical Medicine and Rehabilitation, Michigan Medicine Neuroscience Graduate Program, University of Michigan, Ann Arbor, Michigan, USA, ⁶Department of Physical and Rehabilitation Medicine, Hassan II University Hospital, Fez, Morocco, ⁷Department of Physical Medicine and Rehabilitation, University Sidi Mohammed Ben Abdellah, Fes, Morocco, ⁸Department of Rehabilitation Medicine, St. Vincent's Hospital, College of Medicine, The Catholic University of Korea, Seoul, Korea, ⁹Department of Physical Medicine and Rehabilitation, Qatar Rehabilitation Institute, Hamad Medical Corporation, Doha, Qatar, ¹⁰Department of Amputee Rehabilitation, National Institute of Rehabilitation, Mexico City, Mexico, ¹¹International Collaboration on Repair Discoveries, Faculty of Medicine, University of British Columbia, Vancouver, Canada, ¹²Department of Medicine, Division of Physical Medicine and Rehabilitation, University of British Columbia, Vancouver, Canada, ¹³G.F. Strong Rehabilitation Centre, Vancouver, Canada, ¹⁴Department of Physical Medicine and Rehabilitation, Dr. Ram Manohar Lohia Hospital and Post Graduate Institute of Medical Education and Research, New Delhi, India, ¹⁵Harvey Cushing/John Hay Whitney Medical Library, Yale University, New Haven, Connecticut, USA, ¹⁶Department of Physical Medicine and Rehabilitation, University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania, USA

Abstract

The benefits of physical activity (PA) for health have been extensively studied; however, people with disabilities (PWDs) are more likely to be inactive compared to the general population. The topic of barriers and facilitators to PA for PWDs has been studied, but most reviews have focused on specific impairments, institution-based exercise programs, and/or persons who reside in high-income countries. A comprehensive review describing the barriers and facilitators to PA for community-dwelling PWDs (including developmental, intellectual, sensory, physical, and mental disabilities) from a global perspective has not been published. The aim of this paper is to describe the protocol used to conduct a systematic review concerning the socioenvironmental factors that encourage and discourage PA in PWDs around the world, by investigating the current knowledge, identifying gaps in the literature, and providing guidance for future research and guidelines. MEDLINE All, PsycINFO, and Web of Science Core Collection were searched. Gray literature sources included were extracted from the three main databases used for the literature search. A total of 6434 records were identified for the initial title/abstract screen. The following data were extracted from the final full-text articles: author, title, publication information (journal, year), study design, methodology, data collection instruments employed, language, country or countries where the study was conducted, subject characteristics, disabilities reported, disability characteristics, subjects' mobility level, a relation of stakeholder(s) to PWDs (self, family), PA mode, barriers, and facilitators.

Keywords: Barriers, facilitators, people with disabilities, physical activity, systematic review protocol

INTRODUCTION

Background

The cumulative evidence regarding the benefits of regular physical activity (PA) for health, wellness, and preventing chronic diseases, such as cancer and type 2 diabetes mellitus, is well established.^[1,2] For example, PA has been shown to reduce blood glucose levels and body weight, which directly reduces individual risk for type 2 diabetes. The benefits of

Address for correspondence: Dr. Yetsa A. Tuakli-Wosornu, Department of Chronic Disease and Epidemiology, Yale School of Public Health, 60 College Street, New Haven, Connecticut 06510, USA. E-mail: yetsa.tuakli-wosornu@yale.edu

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Esparza R, Stratton C, Joseph J, Balikuddembe JK, Peterson M, Hajjioui A, *et al.* Global stakeholder perspectives on barriers and facilitators to community-based physical activity in adults living with disabilities: A systematic review protocol. *J Int Soc Phys Rehabil Med* 0;0:0.

Submitted: 31-Aug-2020; **Revised:** 06-Nov-2020; **Accepted:** 23-Aug-2021; **Published:** 30-Oct-2021

Access this article online

Quick Response Code:



Website:
www.jisprm.org

DOI:
10.4103/JISPRM-000109

PA for people with disabilities (PWDs) have been researched extensively,^[3,4] and include improved quality of life,^[5] as well as reduced risk of non-communicable disease.^[3,5-8] For example, patients with spinal cord injury (SCI) who participated in sports or physical recreation reported higher satisfaction with life in general compared to nonparticipants.^[9] Moreover, PA is critical in the context of regaining and maintaining health and function after an acquired impairment. It is necessary to maintain a PA regimen at home in order to maximize functional progress in inpatient and/or outpatient rehabilitation settings.^[10]

Despite this, PWDs are more likely to be inactive compared to the general adult population,^[11] and low levels of PA participation after rehabilitation discharge have been reported.^[12,13] PWDs are at risk for poor conditioning and early deconditioning, either from birth due to congenital disabilities or due to higher rates of physical inactivity from acquired disability, muscle disuse and atrophy, and overall diminished health and functional capacity.^[14] The combination of these factors leads to an increased risk of declining ability to perform activities of daily living (ADL) overall, with accentuated effects as PWDs age.^[15-17] Given the elevated sedentary profiles of most PWDs, there is strong rationale for investigating barriers and facilitators of PA in PWDs.

The current state of the literature dedicated to this topic focuses primarily on patients with SCI or amputation.^[18-21] Further, the majority of research is centered around institution-based rehabilitative and therapeutic exercise and focuses on the physical limitations that a specific clinical diagnosis represents. Barriers and facilitators to adaptive sports participation have also been described.^[22] There remains a need to review the topic more comprehensively by including persons with a broader set of disabilities beyond SCI and amputation in free living PA. According to the World Health Organization's International Classification of Functioning, Disability, and Health (ICF),^[23] "Disability serves as an umbrella term for impairments, activity limitations or participation restrictions. Impairments are problems in body function or structure. Activity limitations are difficulties an individual may have in executing activities. Participation restrictions are problems an individual may have in executing involvement in life situations." The ICF defines disability by combining the medical and social conceptual models of disability into a biopsychosocial approach. In this approach, disability is the outcome or result of an interaction between an individual's health condition and personal or environmental factors.^[23] Based on this definition of disability and the importance of environmental factors in the interaction, there is an urgent need to identify the existing research related to PA for PWDs in different community settings.

A large body of literature related to this subject has been conducted in developed countries. For example, Rimmer *et al.*'s study of adults with disabilities living in the United States identified multifactorial barriers and facilitators to participation in fitness programs/facilities.^[24] The study findings included barriers related to the environment, economic hardship, psychological and emotional barriers, and equipment.

A second study identified similar barriers and facilitators for individuals with SCI living in the United States.^[20]

As a result, there is a narrow perspective on the barriers and facilitators to PA affecting PWDs worldwide due to the limited representation of developing countries in the existing literature. Differences in barriers and facilitators of sports participation experienced by athletes with impairment in different countries have been documented.^[25,26] Because barriers and facilitators vary depending on environment,^[23] it is likely that barriers and facilitators experienced by individuals with a given health condition in developed countries are different than those experienced by individuals with the same health condition in developing countries.

As such, there are likely differences in barriers and facilitators of PA in general in PWDs. For example, in an ideal situation, an individual who uses a wheelchair in the United States may encounter mostly paved sidewalks/roads, curb ramps, accessible pedestrian crosswalk signals or pushbuttons, and automatic doors to enter buildings. However, the same individual in a developing country may find that sidewalks are seldom paved, the terrain is not smooth, the limited paved sidewalks may lack curb ramps, there are no pedestrian crosswalks or signals, and doors must be manually pulled/pushed to enter a building. The individual in the developing country scenario may therefore be less inclined to travel to locations by wheelchair due to more perceived barriers and less facilitators, thus participating in less transportation-related PA than the individual from the developed country. There is a need to objectively determine what patterns in barriers and facilitators to PA exist for individuals across the world.

It is important to determine why PWDs may or may not engage in PA in order to make informed decisions about appropriate interventions to increase their PA for health, wellness and to help to prevent any diseases that might affect them.^[2] Specifically, this information could be used to personalize PA programs, to identify and remove barriers toward PA faced by PWDs and also to take advantage of facilitators for increasing PA.

Objectives

This paper describes a protocol for conducting a systematic review that is aimed to identify the barriers and facilitators of PA for PWDs around the world, to summarize current knowledge, and to identify gaps in the literature to help to inform future research, PA guidelines, and policy development. This protocol was developed by members of the International Society for Physical and Rehabilitation Medicine (ISPRM) Task Force on Physical Activity for Persons with Disabilities.

METHODS

Protocol development

The protocol for this systematic review was developed *a priori* using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA)^[27] and the Joanna Briggs Institute's Systematic Review guidelines.^[28]

Eligibility criteria

Inclusion criteria

This review only included studies published between January 2009 and December 2019, when the literature search was run, to ensure that this systematic review would reflect the most up-to-date data and guidance on barriers and facilitators to PA for PWDs. To meet inclusion criteria, the disability must include an impairment leading to an activity limitation or participation restriction due to personal or environmental factors. Clinical guidelines, barriers, and statistics regarding community-based PA accessibility can change over time. Therefore, a persistent challenge of systematic reviews is that they will not reflect the most recent, up-to-date data. Investigators can address this challenge by limiting the review to the most recent articles published within the past 10 years (including the year of the review's commencement).

To be included, a studied was required to meet all of the following criteria: (1) focused on adult (age 18 or older) subjects of any gender with a documented disability (related to a cognitive, developmental, sensory, or physical impairment) as defined above; (2) focused on PA in the following domains: leisure, occupational, transport, or household; (3) investigated the barriers and/or facilitators of any of the aforementioned categories of PA; (4) must have reported findings from stakeholders (i.e., PWD, caregiver, family member, health professional, and medical provider); (5) must have focused on individuals in the community or those receiving home care services; and (6) must have been an empirical, peer-reviewed study published in a scholarly journal (including randomized control trials, cohort studies, case-control studies, cross-sectional studies, case studies, surveys, interviews, and questionnaires or gray literature). Examples of the included gray literature were conference proceedings, dissertations or theses, anecdotal articles, commentaries, technical reports, or opinion articles not published in a scholarly journal or a scholarly monograph. The included PA categories were based on the Sleep, Leisure, Occupation, Transport, and Home (SLOTH) model of PA. This model was designed to guide interventions for increasing PA and to better understand PA by categorizing all 24-h of the day into 5 domains: SLOTH. We decided to exclude sleep because this is the only domain in which individuals may not choose between PA or inactivity.^[29] No languages were excluded *a priori*.

Exclusion criteria and justification

Studies focusing on the pediatric population, people without disability or on people with temporary impairments (e.g., loss of functional ability for a period <6 months, impairments related to a transient illness or period of inactivity, such as a fracture) or aging-related disabilities (e.g., losses of ADLs associated with muscle weakness/frailty) were excluded, because the focus of the review was on people with permanent disabilities as defined previously. People with temporary disabilities or PWDs admitted to an inpatient unit may have acute medical conditions and were excluded. Studies focusing

on disability due to chronic degenerative musculoskeletal disease (e.g., osteoarthritis) or neurodegenerative disease (e.g., Alzheimer's disease) were also excluded. The rationale for this was that a large proportion of people reaching old age will develop these degenerative diseases over time, and a result making this group of diseases different from the conditions included in our search. Studies focusing on diseases with intrinsic neurological or musculoskeletal defects (i.e., myocyte structure) were also excluded. The rationale for this was that these diseases lead to the inability to regain physical function, and PA loses its power as an intervention. Duplicate studies and those which were published before and after the period considered for review (2009-2019) were excluded.

Information sources

Relevant documents were sought in bibliographic databases. The bibliographic databases searched were MEDLINE All, PsycINFO, and Web of Science Core Collection. The first two databases are considered as core databases for disability literature based on Walsh *et al.*'s guide on searching for disability in electronic databases of published literature.^[29] On the other hand, the latter database is considered important because in our preliminary searching, we identified potentially relevant articles in journals that are indexed in it (such as *Disability and Rehabilitation* and *Adapted PA Quarterly*). These three databases were also used to search for gray literature. Although AMED and CINAHL are more allied health focused, these databases were not included in order to make this already broad review more feasible.

Citation analysis approach

To overcome any gaps in the database searches, references cited in the included full-text articles were screened for potential inclusion based on the inclusion and exclusion criteria of this review ("citation chaining"). Articles citing the included full-text articles were also screened for inclusion. Only citations meeting the inclusion and exclusion criteria established in the *a priori* protocol were included in this review.

Search strategy

The search strategy was developed iteratively and tested against reference/validation articles previously known to the researchers. The initial development of the search happened in MEDLINE and is detailed in Appendix 1. The search strategy was then tailored for the other two databases [Appendices 2 and 3], in consideration of available operations, indexes and subject indexing. In each case, the search included four concepts: PWDs, PA, stakeholder perspectives, and community setting. Each concept was addressed with the text words and controlled vocabulary (in the databases where controlled vocabulary is available). The concept of PWDs was operationalized at broad and narrow levels as recommended by Ioerger *et al.*^[29]

Selection of sources of information

The search results from all the bibliographic databases were downloaded and deduplicated in EndNote by the Cushing/

Whitney Medical Library Cross-Departmental Team. The deduplicated citations were uploaded to an online systematic review management software - Covidence, for screening. Following the removal of duplicate articles, 6,434 articles were included.

Citations were screened in two stages: title-abstract screening and full-text screening. In both stages, each citation was evaluated by two independent reviewers (CS and JJ). When a citation was excluded in full text screening, reviewers selected from a ranked list of exclusion with reasons in Covidence to rationalize their decisions to exclude the citation. The list of exclusion and reasons was extrapolated from the study's exclusion criteria. When conflicts arose, the two reviewers and senior author met and reached a consensus regarding inclusion or exclusion to resolve the disagreement. Intercoder reliability was not reported because Covidence does not offer that feature.

Prior to commencement of the screening process, the principal investigator (YTM) and leading reviewer (CS) held a training session with the review team. During this session, the review team was oriented and provided some background information on Thereview's topic. Further, the session leaders went through the inclusion and exclusion criteria in detail and familiarized the review team with Covidence. After 1 month of screening, the review team met again to discuss any recurring conflicts or seek clarification on any inclusion and exclusion criteria. This gave the reviewers the opportunity to see how conflicts would be addressed and to resolve any inconsistencies between their application of the inclusion and exclusion criteria. This step ensured that the reviewers were operationalizing the inclusion and exclusion criteria in the same manner. A similar training process was used for the full-text screening stage.

Reviewers handled citations of articles in languages other than English as follows: if the article has an English-language abstract, the reviewers will make title-abstract screening decisions based on that. If the article does not have an English-language abstract, the reviewers will use machine translation (Google Translate) if there is no one in the author group who can read the language in question fluently. It should be noted that the review team was multilingual with language capabilities including, English, Spanish, French, German, Arabic, and Urdu. The summary of the screening and search process based on a PRISMA flowchart shall be presented in the results section of our review's final manuscript. This will include a section listing the number of articles identified in non-English languages. It will also indicate how many non-English articles were translated and included or excluded. There will be an appendix in the final manuscript listing those articles excluded from our review due to limited language capabilities but otherwise meeting screening criteria. These will be valuable papers that our review missed but highlighted to be included in similar reviews and other studies in the future.

Non-English-language titles and abstracts within the language capabilities of the group were directed to the reviewer(s) who are fluent in reading the said language. For languages where

two independent reviewers were not present on the study team, the team utilized machine translation (Google Translate) to transcribe the title and abstract to English for screening by a second reviewer. After translation into English, the reviewer fluent in the language checked the transcribed version for accuracy of transcription and meaning. If deemed an accurate translation by the reviewer, the transcribed English version of the title/abstract was sent to a second reviewer on the team (not fluent in the original language) for screening.

Data extraction process, data items, and synthesis of results

The data from the selected full-text articles were recorded in a Microsoft Excel spreadsheet specifically designed for this review paper using an iterative process. Data extraction will be done independently by two reviewers after the eligible full-text articles were determined. Prior to data extraction, the two independent reviewers met to ensure any conflicts from the full-text screening stage were resolved. Further, these two independent reviewers, the principal investigator, and another senior investigator met to develop and come to a consensus on how to proceed with data extraction. The two independent reviewers completed data extraction on 10% of the articles together to ensure that a consistent approach to data extraction was employed. The remaining 90% of eligible full-text articles only had data extracted by one reviewer. Authors of the included articles were not contacted for any additional data that was not available or needed clarity. This applied to the included gray literature as well.

All eligible non-English full-text articles were clustered and assigned to reviewers who were able to read them. In cases where two reviewers with reading fluency in the said language were in the group, the same ten percent overlap principle described above was applied. If two reviewers with reading fluency in said language were not part of the screening team, the data were extracted by a single reviewer with reading fluency in the article's language.

The following data were charted in a spreadsheet from the full text of eligible articles: author, title, publication information (i.e., journal, year), study design, methodology (qualitative, quantitative or mixed methods), data collection instruments employed by study (questionnaire, interview), country or countries where the study was conducted, subject characteristics (age and gender), disabilities reported, disability characteristics, mobility level of subjects, the relation of stakeholder(s) to the person with a disability (i.e. self, family, etc.), PA focused on, barriers listed, and facilitators listed. Barriers and facilitators were also categorized as follows: personal, environmental, social, financial/economic.

The following values were calculated based on the retrieved data: Mean age and age range of study participants (overall and for each study), gender distribution (percent, overall and for each study), and percent breakdown of disabilities represented (overall and for applicable studies). As per the aforementioned Joanna Briggs Institute guidelines 28, data

extraction is meant to be an iterative process. Therefore, the procedure detailed above is only a rough approximation of the steps to be undertaken. Per the guidelines, the data extraction process should evolve as the included full-text articles are reviewed.

Critical appraisal of sources of information and data

The final eligible articles will be critically appraised using the Newcastle–Ottawa Scale^[30] for qualitative studies and a series of checklists developed by the Joanna Briggs Institute for quantitative studies.^[31] Both tools are among the most commonly used tools for critically appraising studies in systematic reviews.^[32] The Newcastle–Ottawa Scale for qualitative studies is a systematic review tool that assesses nonrandomized studies through eight items categorized into three dimensions: study group selection, study group comparability, and the ascertainment of the exposure (case–control studies) or outcome (cohort studies).^[32] The tool’s authors state that its content validity and inter rater reliability have been established,^[30] although multiple studies have raised concerns about its validity and reliability.^[33,34] The Joanna Briggs Institute tools are a series of checklists that assess the quality of included studies through a series of questions tailored by study type. There are different checklists for various study designs including cohort studies, randomized controlled trials, prevalence studies, case control studies, and others. Crucial considerations assessed by the JBI tools include protocol design, sample selection, confounders, inclusion/exclusion criteria, “Was the likelihood of publication bias assessed?” and other items depending on the study design.^[31] These checklists have been validated and continue to undergo further validation.^[33,34] The steps involved in the systematic review is shown in Appendix 4.^[35]

DISCUSSION

The protocol search output suggests a successful protocol design. In addition to a rich volume of literature on the topic (6434 articles), the search was deliberately designed to include the broadest number of regions, disabilities, forms of PA, and barriers and facilitators possible to maximize the possible articles for review.

CONCLUSION

This protocol has demonstrated a there is a great volume of literature on the social–environmental barriers and facilitators to PA for PWDs. Analysis of the screened literature will occur as the next stage and trends will be drawn from the literature to summarize trends of barriers and facilitators and inform suggestions to alleviating barriers. This protocol has set forward a way to synthesize the facilitators and barriers to PA for PWDs in global settings.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- McTiernan A, Friedenreich CM, Katzmarzyk PT, Powell KE, Macko R, Buchner D, *et al.* Physical activity in cancer prevention and survival: A systematic review. *Med Sci Sports Exerc* 2019;51:1252-61.
- Tian D, Meng J. Exercise for prevention and relief of cardiovascular disease: Prognoses, mechanisms, and approaches. *Oxid Med Cell Longev* 2019;2019:3756750.
- Rimmer JH, Chen MD, Hsieh K. A conceptual model for identifying, preventing, and managing secondary conditions in people with disabilities. *Phys Ther* 2011;91:1728-39.
- Lord E, Patterson I. The benefits of physically active leisure for people with disabilities: An Australian perspective. *Ann Leis Res* 2008;11:123-44.
- Knittle KP, De Gucht V, Hurkmans EJ, Vlieland TP, Peeters AJ, Ronday HK, *et al.* Effect of self-efficacy and physical activity goal achievement on arthritis pain and quality of life in patients with rheumatoid arthritis. *Arthritis Care Res (Hoboken)* 2011;63:1613-9.
- Carroll DD, Courtney-Long EA, Stevens AC, Sloan ML, Lullo C, Visser SN, *et al.* Vital signs: Disability and physical activity - United States, 2009-2012. *MMWR Morb Mortal Wkly Rep* 2014;63:407-13.
- US Department of Health and Human Services. Healthy People 2010: Understanding and Improving Health. Washington, DC: National Center for Health Statistics. Healthy People 2010 Final Review. Hyattsville, MD. 2012; 2010. https://www.cdc.gov/nchs/healthy_people/hp2010/hp2010_final_review.htm
- Heath GW, Fentem PH. Physical activity among persons with disabilities – A public health perspective. *Exerc Sport Sci Rev* 1997;25:195-234.
- Tasiemski T, Kennedy P, Gardner BP, Taylor N. The association of sports and physical recreation with life satisfaction in a community sample of people with spinal cord injuries. *NeuroRehabilitation* 2005;20:253-65.
- Askim T, Bernhardt J, Churilov L, Fredriksen KR, Indredavik B. Changes in physical activity and related functional and disability levels in the first six months after stroke: A longitudinal follow-up study. *J Rehabil Med* 2013;45:423-8.
- Centers for Disease Control and Prevention (CDC). Physical activity among adults with a disability - United States, 2005. *MMWR Morb Mortal Wkly Rep* 2007;56:1021-4.
- van den Berg-Emons RJ, Bussmann JB, Haisma JA, Sluis TA, van der Woude LH, Bergen MP, *et al.* A prospective study on physical activity levels after spinal cord injury during inpatient rehabilitation and the year after discharge. *Arch Phys Med Rehabil* 2008;89:2094-101.
- Forkan R, Pumper B, Smyth N, Wirkkala H, Ciol MA, Shumway-Cook A. Exercise adherence following physical therapy intervention in older adults with impaired balance. *Phys Ther* 2006;86:401-10.
- Rimmer JH, Lai BW. Physical activity for people with disabilities. In: DeLisa’s Physical Medicine & Rehabilitation: Principles and Practice. 6th ed., Ch. 43., Vol. 6. Philadelphia: Wolters Kluwer; 2020. p. 982-1000.
- Rimmer JH. Exercise and physical activity in persons aging with a physical disability. *Phys Med Rehabil Clin N Am* 2005;16:41-56.
- Ginis KA, Hicks AL. Considerations for the development of a physical activity guide for Canadians with physical disabilities. *Can J Public Health* 2007;98 Suppl 2:S135-47.
- Corr S, Bayer A. Poor functional status of stroke patients after hospital discharge: Scope for intervention. *Br J Occup Ther* 1992;55:383-5.
- Wu SK, Williams T. Factors influencing sport participation among athletes with spinal cord injury. *Med Sci Sports Exerc* 2001;33:177-82.
- Kars C, Hofman M, Geertzen JH, Pepping GJ, Dekker R. Participation in sports by lower limb amputees in the Province of Drenthe, The Netherlands. *Prosthet Orthot Int* 2009;33:356-67.
- Kehn M, Kroll T. Staying physically active after spinal cord injury: A qualitative exploration of barriers and facilitators to exercise participation. *BMC Public Health* 2009;9:168.
- Pepper M, Willick S. Maximizing physical activity in athletes with amputations. *Curr Sports Med Rep* 2009;8:339-44.
- Jaarsma EA, Dijkstra PU, Geertzen JH, Dekker R. Barriers to and facilitators of sports participation for people with physical disabilities: A systematic review. *Scand J Med Sci Sports* 2014;24:871-81.
- The International Classification of Functioning. Disability and Health. Geneva: World Health Organization; 2001. Available from: <https://apps>.

- who.int/iris/bitstream/handle/10665/42407/9241545429.pdf. [Accessed on 2021 Feb 21]
24. Rimmer JH, Riley B, Wang E, Rauworth A, Jurkowski J. Physical activity participation among persons with disabilities: Barriers and facilitators. *Am J Prev Med* 2004;26:419-25.
 25. Fung L. Participation motives in competitive sports: A cross-cultural comparison. *Adapt Phys Activ Q* 1992;9:114-22.
 26. Dijkers MP, Yavuzer G, Ergin S, Weitzenkamp D, Whiteneck GG. A tale of two countries: Environmental impacts on social participation after spinal cord injury. *Spinal Cord* 2002;40:351-62.
 27. Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, *et al.* Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: Elaboration and explanation. *BMJ* 2015;350:g7647.
 28. Aromataris E, Munn Z, editors. *JBIM Manual for Evidence Synthesis*. JBI; 2020. Available from: <https://synthesismanual.jbi.global>. [doi: 10.46658/JBIMES-20-01]. [Accessed on 2021 Feb 21]
 29. Pratt M, Macera CA, Sallis JF, O'Donnell M, Frank LD. Economic interventions to promote physical activity: Application of the SLOTH model. *Am J Prev Med* 2004;27:136-45.
 30. Wells GA, Shea B, O'Connell D, Peterson J, Welch V, Losos M, *et al.* The Newcastle Ottawa Scale (NOS) for Assessing the Quality of Nonrandomized Studies in Meta Analyses; 2000. Available from: http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp. [Accessed on 2021 Feb 21].
 31. Moola S, Munn Z, Tufanaru C, Aromataris E, Sears K, Sfetcu R, *et al.* Systematic reviews of etiology and risk. In: Aromataris E, Munn Z, editors. *Joanna Briggs Institute Manual for Evidence Synthesis*. Ch. 7. Published Online: The Joanna Briggs Institute; 2020. Available from: <https://synthesismanual.jbi.global> or <https://joannabriggs.org/critical-appraisal-tools>. [Accessed on 2021 Feb 21]
 32. Ma LL, Wang YY, Yang ZH, Huang D, Weng H, Zeng XT. Methodological quality (risk of bias) assessment tools for primary and secondary medical studies: What are they and which is better? *Mil Med Res* 2020;7:7.
 33. Stang A. Critical evaluation of the Newcastle-Ottawa scale for the assessment of the quality of nonrandomized studies in meta-analyses. *Eur J Epidemiol* 2010;25:603-5.
 34. Munn Z, Barker TH, Moola S, Tufanaru C, Stern C, McArthur A, Stephenson M, Aromataris E. Methodological quality of case series studies: an introduction to the JBI critical appraisal tool. *JBIM Evid Synth*. 2020 Oct;18(10):2127-2133.
 35. Porritt K, Gomersall J, Lockwood C. JBI's systematic reviews: Study selection and critical appraisal. *Am J Nurs* 2014;114:47-52.

Appendix 1: MEDLINE search results

Searches	Results
[search for MEDLINE]	0
[concept one: population]	0
exp brain injuries, traumatic/ or (trauma* adj2 brain injur*).mp.	42,970
exp stroke/ or stroke*.mp.	311,185
exp amputation/ or amputation stumps/ or amputation, traumatic/ or artificial limbs/ or bone-anchored prosthesis/ or amputees/ or (amputat* or amputee*).mp.	55,518
exp spinal cord injuries/or spinal cord injur*.mp.	59,460
multiple sclerosis.mp. or exp multiple sclerosis/	81,106
cerebral palsy/or cerebral pals*.mp.	27,006
developmental disabilities/	19,691
exp Intellectual Disability/	94,755
exp Disabled Persons/	64,133
((people or person* or adolescent* or athlete* or player* or child* or men or women or individual* or boys or girls or adult or adults) adj2 (disabled or disabilit*).mp.	62,393
((developmental* or cognitive* or intellectual* or physical*) adj2 (disabled or disabilit* or delay* or impair*).mp.	177,633
((people or person* or adolescent* or athlete* or player* or child* or men or women or individual* or user* or adult or adults) adj2 (wheelchair* or power chair*).mp.	1951
handicap*.mp.	24,375
3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15	835,165
[concept two: physical activity]	0
exp exercise/or dancing/or gardening/or exp sports/or exp recreation/	302,043
exp resistance training/	8,210
(physical* activ* or sport or sports or exercis* or dancing or gardening).mp.	507,139
physical* fit*.mp.	31,560
(physical* adj1 (unfit* or inactiv*).mp.	8,879
(fitness adj2 (class* or regime* or program* or cardiorespiratory or cardiovascular).mp.	7,822
“Physical Education and Training”/or Fitness Centers/	13,898
(walk* or running or jogging or pilates or yoga or bicycl* or bike* or biking or swim* or strength training or resistance training).mp.	286,208
(weight* adj1 lift*).mp.	5,497
(camp* or household activit* or transport activit* or active transport* or tai chi or martial arts or table tennis or ping pong or tennis or bocce or bocce or bowling or dragon boating or goal balling or curling).mp.	242,683
((recreation or recreational) not recreational therap*).mp. or recreation therapy/	28,846
or/18-28	1,011,060
Sports for Persons with Disabilities/	177
30 or (16 and 29)	62,635
[concept three: stakeholder perspective]	0
(barrier* or facilitat* or motivat* or hindrance* or hinder* or (individual adj2 factor*) or perspective* or attitude* or belie* or perception* or perceive*).mp.	2,233,141
(obstacle* or disadvantage* or advantage* or hurdle* or challeng* or benefit* or incentiv*).mp.	1,934,322
(motive* or voice* or opinion*).mp.	171,549
psychology.fs.	1,035,778
attitude to health/or health knowledge, attitudes, practice/or attitude/or attitude of health personnel/	328,657
(participatory research or stakeholder*).mp.	43,151
((consumer* or patient* or community) adj2 (participat* or engag* or involv*).mp.	118,377
or/33-39	4,618,549
31 and 40	19,808
(animals not humans).sh.	4,640,055
41 not 42	18,882
limit 43 to yr="2009 -Current"	13,183
(communit* or independen* or home or homes or free-living or outpatient* or out-patient*).mp. or outpatients/or independent living/	2,084,210
44 and 45	3,899

Appendix 2: PsychINFO search results	
Searches	Results
[search for PsycINFO]	0
[concept one: population]	0
traumatic brain injury/	17,898
(trauma* adj2 brain injur*).mp.	21,498
exp cerebrovascular accidents/	20,530
stroke*.mp.	35,946
exp amputation/	1,470
prostheses/	881
(amputat* or amputee*).mp.	2,274
exp spinal cord injuries/	5,824
spinal cord injur*.mp.	7,276
multiple sclerosis/	12,626
multiple sclerosis.mp.	16,095
cerebral palsy/	5,367
cerebral pals*.mp.	8,211
developmental disabilities/	12,209
exp intellectual development disorder/	44,278
exp disabilities/	53,801
((people or person* or adolescent* or athlete* or player* or child* or men or women or individual* or boys or girls or adult or adults) adj2 (disabled or disabilit*)).mp.	35,230
((developmental* or cognitive* or intellectual* or physical*) adj2 (disabled or disabilit* or delay* or impair*)).mp.	101,383
((people or person* or adolescent* or athlete* or player* or child* or men or women or individual* or user* or adult or adults) adj2 (wheelchair* or power chair*)).mp.	629
handicap*.mp.	23,331
or/3-22	285,597
[concept two: physical activity]	0
physical activity/or exp exercise/or active living/or physical fitness/	42,587
exp recreation/	64,006
horticulture therapy/or recreation therapy/	876
dance therapy/	1,107
exp sports/or athletic participation/	33,734
exp Weightlifting/or exp Athletic Training/	1,899
(physical* activ* or sport or sports or exercis* or dancing or gardening).mp.	134,530
physical* fit*.mp.	7,547
(physical* adj1 (unfit* or inactiv*)).mp.	2,313
(fitness adj2 (class* or regime* or program* or cardiorespiratory or cardiovascular)).mp.	1,869
physical education/	4,455
(walk* or running or jogging or pilates or yoga or bicycl* or bike* or biking or swim* or strength training or resistance training).mp.	62,947
(weight* adj1 lift*).mp.	643
(camp* or household activit* or transport activit* or active transport* or tai chi or martial arts or table tennis or ping pong or tennis or boccea or bocce or bowling or dragon boating or goal balling or curling).mp.	54,033
((recreation or recreational) not recreational therap*).mp. or recreation therapy/	18,037
or/25-39	276,748
23 and 40	19,210
[concept three: stakeholder perspective]	0
(barrier* or facilitat* or motivat* or hindrance* or hinder* or (individual adj2 factor*) or perspective* or attitude* or belie* or perception* or perceive*).mp.	15,43,120
(obstacle* or disadvantage* or advantage* or hurdle* or challeng* or benefit* or incentiv*).mp.	522,912
(motive* or voice* or opinion*).mp.	118,732
attitudes/or attitude change/or exp attitude formation/or exp client attitudes/or community attitudes/or exp consumer attitudes/or counselor attitudes/or exp “disabled (attitudes toward)”/or health attitudes/or exp health personnel attitudes/or exp “physical illness (attitudes toward)”/or “sports (attitudes toward)”/	122,418
(participatory research or stakeholder*).mp.	26,794
((consumer* or patient* or community) adj2 (participat* or engag* or involv*)).mp.	29,304
exp Stakeholder/	3,692

Contd...

Appendix 2: Contd...

Searches	Results
or/43-49	19,22,624
23 and 40 and 50	7,825
(communit* or independen* or home or homes or free-living).mp.	610,108
outpatients/or exp outpatient treatment/	13,033
(outpatient* or out-patient*).mp.	59,618
52 or 53 or 54	657,703
23 and 40 and 50 and 55	2,340
limit 56 to yr="2009 -Current"	1,551

Appendix 3. Web of Science search results

Searches	Results
[search for Web of Science]	0
TS=((trauma* NEAR/2 brain-injur*) OR stroke* OR amputat* OR amputee* OR spinal-cord-injur* OR "multiple sclerosis" OR cebrebral-pals* OR ((people or person* or adolescent* or athlete* or player* or child* or men or women or individual* or boys or girls or adult or adults) NEAR/2 (disabled or disabilit*)) OR ((developmental* or cognitive* or intellectual* or physical*) NEAR/2 (disabled or disabilit* or delay* or impair*)) OR ((people or person* or adolescent* or athlete* or player* or child* or men or women or individual* or user* or adult or adults) NEAR/2 (wheelchair* or power-chair*)) OR handicap*)	815,485
TS=((physical* NEAR/1 activ*) OR sport or sports or exercis* or dancing or gardening OR physical* NEAR/1 (fit* or unfit* or inactiv*) OR (fitness NEAR/2 (class* or regime* or program* or cardiorespiratory or cardiovascular)) OR walk* or running or jogging or pilates or yoga or bicycl* or bike* or biking or swim* or "strength training" or "resistance training" OR (weight* NEAR/1 lift*) OR camp* or household-actiit* or transport-activit* or active-transport* or "tai chi" or "martial arts" or "table tennis" or "ping pong" or tennis or boccia or bocce or bowling or "dragon boating" or "goal balling" or curling OR ((recreation or recreational) not recreational-therap*))	2,041,536
TS=(disabled-sport*).	67
#2 AND #1	62,22
#4 OR#3	62,246
TS=(barrier* or facilitat* or motivat* or hindrance* or hinder* or (individual NEAR/2 factor*) or perspective* or attitude* or belie* or perception* or perceive* OR obstacle* or disadvantage* or advantage* or hurdle* or challeng* or benefit* or incentiv* OR motive* or voice* or opinion* OR participatory research OR stakeholder* OR ((consumer* or patient* or community) NEAR/2 (participat* or engag* or involv*))	7,546,674
#6 AND #5	18,089
TS=(communit* or independen* or home or homes or free-living or outpatient* or out-patient*)	3,344,953
#8 AND #7	4,991
#8 AND #7	4,078

Appendix 4: Systematic review steps involved

