



A Systematic Review of Physical Activity among People with Disabilities in Mainland China: From 1992 to 2013

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Abstract

Context: Regular physical activity has increasingly been recommended to promote human health and wellbeing. However, information on participation in physical activities by people with disabilities is relatively scarce. The aim of this article is to conduct a systematically review of studies on physical activity among people with disabilities in mainland China from 1992 to 2013.

Evidence acquisition: In 2015, a search of three major Chinese electronic databases (CNKI, WANGFAN DATA, and VIP) was conducted for studies that examined physical activity among people with disabilities. The search included studies dating from January 1992 to December 2013. After applying inclusion criteria, 31 studies, all cross-sectional in design, were included in this review.

Evidence synthesis: The 31 studies included some self-reports of physical activity by people with disabilities (N=5,982). The results from 9 of the 31 studies indicated that 12.7% of the participants in those studies (N=760) had physical activity levels that met the standards recommended by national physical activity guidelines for China. Levels of physical activity among people with disabilities varied by gender, income, and education. Men and people with higher education and income levels were more physically active compared to women and those with lower education and income levels. In addition, people living in urban areas were more active than those living in rural areas.

Conclusions: Relatively low levels of physical activity were found among people with disabilities in mainland China. Further research on this special population is needed. Studies that employ rigorous standards for design and methodologies, including the use of objective physical activity measures, are recommended.

Keywords: Exercise, disabilities, cross-sectional design, physical activity recommendations, healthy lifestyles.

1. INTRODUCTION

The health benefits of participating in regular physical activity have been well documented.¹ Current guidelines for adults call for physical activity of moderate intensity lasting at least 150 minutes per week or of vigorous intensity for at least 75 minutes per week.¹ Despite strong and compelling evidence of health benefits associated with physical activity, globally only 31% of adults aged 15 and over (28% of men and 34% of women) meet these physical activity guidelines². This suggests that a significant proportion of people worldwide remain largely physically inactive. Not surprisingly, approximately 3.2 million deaths occur each year are attributable to the negative health effects of insufficient physical activity.²

Evidence indicates that people with disabilities in particular are less likely than people without disabilities to be physically active.³ This further increases the risk of this special population

developing functional limitations and secondary health conditions (e.g., obesity, depression, or social isolation).⁴ The low level of physical activity among people with disabilities raises serious concerns regarding their health and well-being.⁵ Understanding trends and physical activity in this population thus becomes important because such knowledge can help us development of better health promotion strategies for this population.

In 2006, approximately 83 million individuals in mainland China lived with different types of disabilities, accounting for 6.3% of the national population.⁶ Three decades of economic development, social progress, and improvement in health and medical services have contributed to some notable achievements in disability prevention and rehabilitation in China. However, physical activity studies targeting people with disabilities remain scarce. The first Chinese study that examined physical activity in people with disabilities was published in 1992,⁷ but since then there has been no systematic review of studies reporting on physical activity in this population in China. To close this gap, this paper provides an overview of studies relevant to this topic that conducted between 1992 and 2013.

2. EVIDENCE ACQUISITION

2.1. Selection and Identification of Studies

A systematic search of the research on physical activity in people with disabilities in China was conducted in 2015. “A person with disabilities” was defined as someone with physical, cognitive, mental, sensory, emotional, or developmental impairment(s), or someone with some combination of these impairments.⁸ An adequate level of physical activity was defined using guidelines implemented in China, which call for at least 30 minutes of moderate-intensity physical activity at least 3 times a week.⁹

To identify relevant studies, the authors of the paper performed a systematic search using three major Chinese literature databases (CNKI, WANGFAN DATA, and VIP). Articles published between January 1992 and December 2013 were examined for reports on physical activity among people with disabilities. Primary search terms included “disabled person,” “disabilities,” “disability,” and “underserved group” coupled with “physical activity” “exercise,” “mass sports,” and “leisure time physical activity.” These terms were used to search text and subject headings wherever possible.

2.2. Inclusion Criteria

For this review, studies were considered to be eligible for inclusion if they:

1. Were written in the Chinese language
2. Were published in a peer-reviewed journal
3. Were published from 1992 to 2013
4. Clearly stated that the study of physical activity among people with disabilities was a research objective

Assessed physical activity using either self-reports or objective measures Studies were excluded if they were:

1. Theses; dissertations; conference abstracts, presentations, or proceedings; unpublished articles; or reports
2. Published in non-peer-reviewed publications
3. Rehabilitation studies, discussion articles, or program descriptions
4. Physical fitness assessments¹⁰
5. Studies were included or excluded after consensus was reached by two authors (qs and lzw).

3. DATA EXTRACTION

Data extraction was carried out via a standardized data extraction form completed by two independent reviewers. Information in the form included (a) article title and publication year, (b) study design, measures, and method of data analysis, (c) demographic characteristics of participants, and (d) data statistics on the prevalence of physical activity. When there was disagreement between the two reviewers, a consensus was reached after discussion with a third reviewer.

Because study outcomes and types of analytic methods used varied by study, a meta-analysis was not performed.

4. EVIDENCE SYNTHESIS

Figure 1 provides an overall flow diagram for searching, screening, and identifying studies. The initial search of the databases yielded a total of 571 publications ($n = 248$ from CNKI, $n = 253$ from WANGFAN DATA, $n = 70$ from VIP). After removing duplicates, ineligible studies, and unrelated studies, 29 studies met the criteria for this systematic review. Of these, 6 had research design, data analysis, or duplicate submission problems. After attempting to contact the authors of these studies, no reply was received; hence, these 6 studies were removed from this review. After screening relevant reference lists, a manual search for the full text of articles not identified in the original database search was conducted, and an 8 additional eligible articles were discovered. Thus, a total of 31 studies were eligible and included in the final analysis.

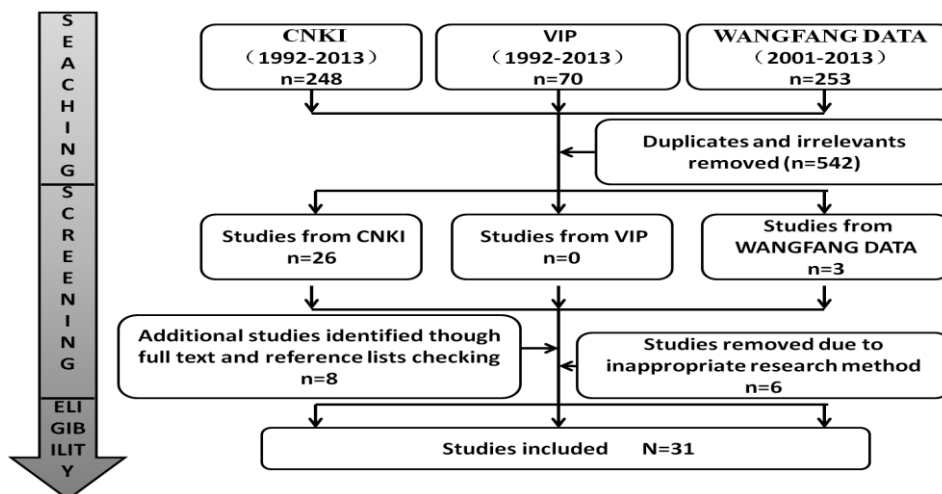


Figure 1 Flow diagram for searching, screening and identifying papers

Figure1. Flow diagram for searching, screening, and identifying papers.

The first study about physical activity of people with disabilities conducted in mainland China were published in 1992.⁷ However, the first eligible study for this review was published in 2003.¹¹ In the 10 years since then, the frequency of publications in this area has been inconsistent (see Figure 2).

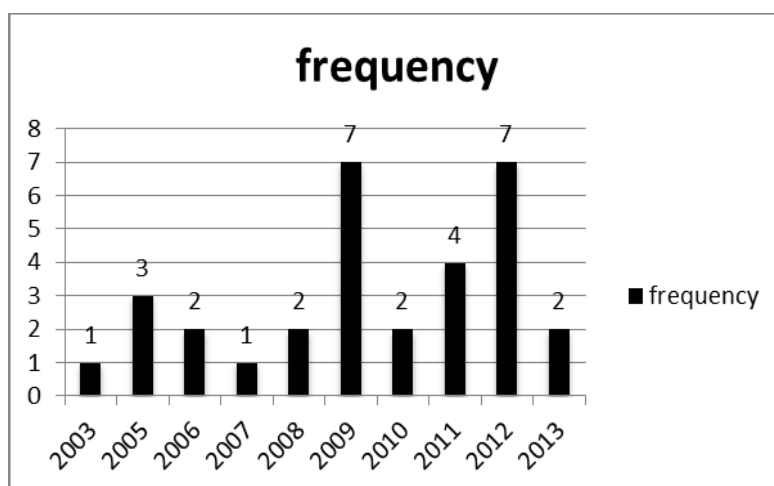


Figure2. Frequency of papers published between 2003 and 2013.

5. RESEARCH DESIGN AND METHODOLOGIES

All 31 studies employed a cross-sectional design (Table 1). Of these, 7 studies (22.58%) used stratified random sampling methodologies, 2 (6.45%) used random sampling, and 22 (70.97%) provided no description on the study sampling. Twenty-eight studies (90.32%) assessed physical activity and psychological or physiological profiles of the study participants using invalidated self-

reports. Three studies (9.68%) used partially empirically supported self-reports (i.e., showed reliability test results). None of the 31 studies used objective measures of physical activity. Of the 31 studies, 28 (90.32%) used descriptive statistics to analyze the physical activity data and 2 (6.45%) reported *t* tests and χ^2 tests. One study (3.23%) used cluster analysis.

Table1. Number of studies by research design, measurement, data analysis, characteristics of participants, and physical activity pattern for people with disabilities

Characteristics	Reference No.
Research design Cross-sectional design (n=31)	11-41
Sampling Stratified random sampling (n=7) Random sampling (n=2) No information about sampling (n=22)	11,14,19, 21,25,36,39 29,30 12,13,15-18,20,22-24,26,27,28,31-35,37,38,40,41
Measurement Invalidated self-reports (n=28) Partial empirically supported self-reports (n=3)	11-20,22,24-27,28-36,38-41 21,23,37
Data analysis Descriptive statistics (n=28) T test or χ^2 test (n=2) Cluster analysis (n=1)	11-16,18-27,28-33,35-39,41 17,34 40
Disability type Hearing disability (n=4) Physical disability (n=1) Hearing, visual, intellectual disabilities (n=1) Minority with disabilities (n=1) Variety of disabilities (n=24)	19,32,34,37 23 13 30 11,12,14-18,20-22,24-27,28-29,31,33,35,36,38-41
Sample size <100 (n=2) <1000 (n=24) ≥1000 (n=5)	24,36 12-20,23,25-27,28-30,32-35,37-38,40,41 11,21,22,31,39
Participants' diversity Undergraduate students (n=4) Children and adolescents (n=2) Citizens (n=25)	19,32,34,37 13,35 11,12,14-18,20-27,28-31,33,36,38-41
Study site Inside a city (n=13) Inside a province (n=10) Different provinces (n=7) No information (n=1)	14,18,20,24,27,32-38,41 12,13,21,26,28-31,39,40 11,15-17,19,23,25 22
Demographic characteristics of participants No information (n=9) One position (i.e., education, gender, urban/rural) (n=11) Two positions (i.e., education, gender, urban/rural, age) (n=2) Three or more positions (i.e., gender, age, education, income, occupation, urban or rural, and income) (n=9)	14,19,24-26,32,37-39 11-13,18,20,21,22,27,34,35,41 29,40 15-17,23,28,30,31,33,36
Education level (n=7, N=3,234) Primary education or under (N=1424, 44.03%) Junior or high school (N=1632, 50.46%) Vocational institute degree or above (N=178, 5.51%)	15,23,27,28,30,33,40
Gender (n=17, N=11,489) Male (N=7,300, 63.54%) Female (N=4,189, 36.46%)	13,15,16,17,18,20,21,22,23,28,29,30,31,34,35,36,41
Ages (n=10, N=5,081)	15,16,17,23,28,29,30,31,33,36
Income (n=4, N=4,042)	15,16,31,40
Urban/Rural (n=3, N=2,159)	12,30,40

Disability (n=14, N=6,866) Hearing disability (N=2,630, 38.31%) Physical disability (N=2,102, 30.61%) Visual disability (N=1,251, 18.22%) Intellectual disability (N=384, 5.59%) Mental disability (N=57, 0.83%) Multiple disabilities (N=442, 6.44%)	11,12,13,15,17,18,23,28,29,32,33,34,37,40,41
Prevalence (n=9, N=5,982) Participants met the national guidelines (N=760, 12.7%)	14,15,16,17,18,26,28,33,39

5.1. Characteristics of Studies

Sample Size. The total sample for the 31 studies was 18,851 ($M = 608$; $SD=539$; range: 90 to 2,605) with most studies ($n = 24$) having between 100 and 999 participants.

Study Site. Thirteen studies (41.93%) sampled study participants from a single city. Of the remaining studies, 10 (32.26%) sampled participants in multiple cities within a province and 7 (22.58%) sampled participants in several cities across multiple provinces. One study (3.23%) failed to identify the geographic location of the study site and provided no information about it.

5.2. Demographic Characteristics of Participants

Education. Seven studies ($n = 3,234$, 22.58%) provided information on the education level of the study participants. Of these participants, 44.03% ($n = 1,424$) had a primary level of education or less and 50.46% ($n = 1,632$) had a junior or high school degree. The remaining participants ($n = 178$, 5.51%) had education at the vocational institution level or above.

Gender. Of the 31 studies, 17 ($n = 11,489$, 54.84%) identified the participants' gender, with 63.54% of participants ($n = 7,300$) being male.

Ages. Ten studies ($n = 5,081$, 32.26%) identified the participants' ages. The majority of participants were between the ages of 16 and 65.

Income. Among the 31 studies, four ($n = 4,042$, 12.90%) identified the participants' monthly income level, with 67.66% of these participants ($n = 2,735$) having a monthly income level lower than 500RMB.

Urban/Rural. Of the 31 studies, three ($n = 2,159$, 9.68%) provided information about the participants' residential location. Of these participants, 56.83% ($n = 1,227$) lived in a rural area.

Disabilities. Fourteen studies ($n = 6,866$, 45.16%) identified disability categories for participants. Of these, 38.31% of the participants ($n = 2,630$) had a hearing and/or speech disability. The percentages and number of participants with other disabilities included the following: physical disability (30.61%, $n = 2,102$), visual disability (18.22%, $n = 1,251$), intellectual disability (5.59%, $n = 384$), mental disability (0.83%, $n = 57$), and multiple disabilities (6.44%, $n = 442$).

5.3. Prevalence of Physical Activity

Across the 31 studies, a total of 760 participants (12.7%) pooled from nine studies ($n = 5,982$) reported having a level of physical activity that met the national guidelines (Table 1).⁹

Physical activity type. Jogging, playing ball games, and walking were cited as the most common forms of physical activity for Chinese people with disabilities. Of these physical activities, jogging and walking were common both for males and females. However, ball games, which included three modalities—basketball, table tennis, and badminton—were most common for males.

Location. Community spaces, homes, and free open spaces were the most common places where Chinese people with disabilities carried out their physical activities.

5.4. Differences in Physical Activity by Demographic and Disabilities

Gender. Male participants were more physically active than their female counterparts.^{14, 21, 31, 41} In terms of activity types, activities such as ball games and resistance training were identified as the most

common modes of physical activity for male participants, whereas for female participants aerobic dance and Tai Chi were the most common modes of physical activity.^{15,18,19,26,30,33,37,40,41}

Age. Compared to other age groups, young adults and middle-age adults (from 16 to 50 years old) were more physically active.^{14,21,31} Physical activity among older adults (age 50 and older) with disabilities showed an inconsistent trend.^{14,31,33} In terms of specific activities, young and middle-age adults with disabilities preferred ball games as a form of physical activity. However, older adults were more likely to choose aerobic dance and traditional Chinese physical activities, such as Tai Chi and Qi-gong.^{15,26}

Education. Higher levels of education were related to physical activity participation.^{14,40}

Incomes. People with higher incomes (including social security insurance) were more likely to participate in physical activities.³⁷

Living settings. People living in urban areas were more physically active than people living in rural areas.^{12,14} In addition, those living in urban areas had more choices for places and spaces to carry out physical activities than did those living in rural areas.^{12,40}

Disabilities. People with a hearing disability were more likely than people with other types of disabilities to be physically active.^{11,14,18,26,33} In addition, people with visual impairment were less likely than people with other types of disabilities to be physically active.^{18,21,26,33} In terms of specific activity types, playing ball games and jogging/walking⁴¹ were reported as the most common modes of physical activity for people with a hearing disability.^{16,21,29} Resistance training was the most common form of physical activity for people with a visual disability.^{16,21,29,41}

6. DISCUSSION

This review examines, for the first time, physical activity of Chinese people with disabilities. Findings indicated that a small percentage (12.7%) of people with disabilities met China's physical activity guideline levels. There were differences in the levels of physical activity by demographics and living settings, with men and those with higher levels of education and incomes tending to be more physically active compared to women and those with low education and income levels; and those living in urban areas were more active than those living in rural areas.

In a national survey conducted in 2013, the General Administration of Sport of China reported that 32.7% of Chinese adults (those between 20 and 69 years old) met the standards recommended by national physical activity guidelines.⁴² Thus, compared to the general population, the overall level of physical activity for people with disabilities was much lower than for people without disabilities.

6.1. Limitations and Future Studies

One limitation of this review is that the search terms and methods used may not have captured all studies related to physical activity among Chinese citizens with disabilities. There were also significant methodological limitations in the studies reviewed. All studies were cross-sectional in design and descriptive in nature. This limitation makes it impossible to infer causality. Prospective and longitudinal studies are needed to better understand trends and patterns in physical activity over time in order to inform public health policy planning and aid in the development of targeting strategies.⁴³ Many of the studies provided incomplete information on the study design and sampling methodologies; these limitations, along with the heterogeneity in the age of participants and the level and type of their disabilities, make it difficult to generalize the results to any one particular population of interest. More importantly, all studies used self-report measures of physical activity, raising questions regarding self-recall bias, and the validity of the study findings. Finally, the lack of a consistent definition of "disability" and "physical activity" makes it a challenge to compare results across studies, thereby limiting generalizability.

In reference to the need for future studies, people with disabilities living in urban areas were shown to be more physically active than people with disabilities living in rural areas. This finding on urban-rural disparities in the prevalence of physical activity is consistent with the results of a 2007 survey of the general Chinese population.⁴⁴ With rapid urbanization in China occurring over the last three decades, this finding suggests that people living in urban areas may have greater access to physical

activity facilities compared to those living in the rural areas. Epidemiological studies have clearly indicated urban-rural disparities in disability prevalence.⁴⁵ These factors call for a more systematic research effort in order to understand patterns of physical activity in rural areas.

7. CONCLUSION

This review indicates that low levels of physical activity exists among people with disabilities in mainland China, and that few people with disabilities meeting established the standards set by physical activity guidelines. In addition, there are differences in physical activity levels by socioeconomic and education status and between urban and rural areas. These findings document the need for additional studies that employ rigorous designs and methodologies, including the use of objective physical activity measures.

8. FUNDING

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9. AUTHORS' CONTRIBUTIONS

QS drafted the manuscript. LZW and HQL conducted literature search. QS and LZW evaluated the study articles and made decisions on inclusion and exclusion of the articles. QS, PDL and BJC performed statistical analyses. All authors (QS, LZW, HQL, PDL and BJC) were involved in the manuscript development and its revision. All authors read and approved the final manuscript.

10. DECLARATION OF CONFLICTING INTERESTS

The author(s) declare that they have no competing interests.

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