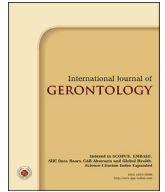


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Original Article

Association between social capital and physical activity among community-dwelling elderly in Wuhan, China

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SUMMARY

Background: Social capital is important for people's health. Few studies have examined the influence of social capital on physical activity among elderly. This study aimed to explore the association between social capital and physical activity among Chinese community-dwelling elderly.**Methods:** A cross-sectional survey was conducted for data collection in 2014. A total of 1210 participants entered the study. Participants were categorized as active or inactive according to self-reported physical activity. Personal Social Capital Scale-16 was used to measure social capital. Logistic regression models were used to examine the association between social capital and physical activity.**Results:** The results showed that participants who were physically active had higher social capital scores (45.6 ± 8.2) than those who were physically inactive (38.8 ± 7.9) ($P < .001$). Participants with midlevel and high level bonding social capital were associated with increased odds of physical activity (0.54, 95% CI: 0.37–0.79 and 0.39, 95%CI: 0.21–0.65, respectively), compared to those with low bonding social capital. The data also showed that participants with midlevel and high level bridging social capital were associated with increased odds of physical activity (0.40, 95%CI:0.22–0.76 and 0.27, 95%CI:0.15–0.49, respectively), compared to those with low level bridging social capital.**Conclusion:** Both bonding and bridging social capital were associated with physical activity among Chinese elderly. It is suggested that health promotion programs targeting elderly adults' physical activity should consider bonding/bridging social capital factors.Copyright © 2017, Taiwan Society of Geriatric Emergency & Critical Care Medicine. Published by Elsevier Taiwan LLC. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Physical activity is considered as a healthy lifestyle and can help the elderly individuals to alleviate their psychological stress from both family and society. The evidence has showed that physical activity has strong effects on reducing the risk of premature death and chronic diseases.^{1,2} But, in China, many people still do not realize the importance of regular physical activity for health.³ By the end of 2015, China's total population had reached 1.37 billion, and those 65 years old and above accounted for 10.5%.⁴ With the increasing aging population, poorer health status in elderly has

become a serious social issue. The increasing expensive medical care is a heavy burden for the elderly in China. Physical activity is easy to implement and is considered as a cheap way to keep one's health. Thus, we should pay more attention to advocate physical activity in Chinese elderly to improve their health and reduce the exorbitant medical expenses in this age group. Hence, in order to formulate health care policies and interventions to enhance physical activity level and to improve the health of the elderly, it is important to investigate the influencing factors of physical activity among elderly. Previous studies have shown that physical activity is associated with socio-demographic, socio-economic status and psychosocial factors, etc.^{5,6}

In the last two decades, the concept of social capital has received much attention in the research field of public health.⁷ The term of social capital has often been used to express the disparities in individuals' health.⁸ Social capital usually emphasizes the role of

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groups or networks,⁹ and views as individual stock of social resources.¹⁰ The definition and measurements of social capital remain controversial. However, an emerging update of consensus has defined two dimensions of social capital, bonding and bridging social capital.¹¹ Bonding social capital refers to links between community residents whose social identities are similar (homogeneous social networks), regardless of their social class, race/ethnicity, and other characteristics; Bridging social capital means connections between community residents whose status and power are different from each other (heterogeneous social networks).¹² Although there is no uniform concept, the core elements of social capital which include social network, social participation, trust, reciprocity and sharing have gradually been accepted by most researchers.¹³ Studies have shown that social capital has effects on a wide range of health issues, such as mortality¹⁴, self-rated health status¹⁵ and even violent crime¹⁶.

To date, only few studies have explored the association between social capital and physical activity. Mummery found that physical inactivity is related to low social capital among adults in Australia.¹⁷ Lindström found that social capital has positive associations with spare-time physical activity in Swedish adults after multiple adjustments.¹⁸ However, there is an obvious absence of research on the relationship between social capital and physical activity focusing on the elderly. Due to the difference of social and cultural backgrounds, the Chinese elderly place large value on possession and expenditure of social resources,¹⁹ which suggests that social capital may have effects on physical activity. Besides, there is no study to distinguish between bonding social capital and bridging social capital while investigating the association between social capital and physical activity.^{20,21} Thus, we hypothesized that social capital would be associated with physical activity among community-dwelling elderly in China. In this study, we aimed to investigate the association between two components of social capital (i.e. bonding and bridging social capital) and physical activity among Chinese community-dwelling elderly.

2. Materials and methods

2.1. Ethics statement

The protocol of the study was approved by the Ethics Committee of School of Health Sciences, Wuhan University. The purpose of the survey is fully explained to the participants, and all participants gave written, informed consent before participating in the study.

2.2. Design and participants

This is a cross-sectional community-based study conducted in July 2014 in Wuhan city. Wuhan, the capital of Hubei province, is located in Central China, with a geographic area of 8494.41 km². Its total population reached 10.33 million by the end of 2014. Population of 65 years old and above accounted for 15.10%. The target population of the present study is elderly residents living in urban communities. Inclusion criteria were as the following: participants should (a) age ≥ 65 years; (b) residents who have been living in Wuhan for more than six months; and (c) agreed to join in the study. Potential participants were excluded while they (a) suffered from severe dementia, schizophrenia, or severe mental disorders in their medical records; (b) had severe vision, hearing, or speaking difficulties; or (c) had severe movement disability and were unable to perform normal social interaction. Based on estimated physical inactivity prevalence rates ranging from 40% to 80%,²² and considering the cluster sampling and possible loss rate of 20%, the required sample size was calculated to be 1080. Stratified cluster sampling was used in this study. First, two districts were selected

randomly out of 13 districts in Wuhan city. Second, one subdistrict was randomly selected from each district. Third, three neighborhood committees were randomly selected from each subdistrict. A total of 1799 potential respondents were identified using a government-maintained residents list. Among them, 450 could not be reached (removed, passed away, traveling and hospitalization), 79 refused to participate, 60 were not able to answer the questionnaire (suffered from dementia, schizophrenia, deafness, vision disorder and dumbness). Finally, 1210 residents were enrolled in the study. This study used face to face questionnaire method. The investigators of this study were the graduate students from School of Health Sciences, Wuhan University, and they had been well trained before the investigation conducted.

2.3. Assessment of social capital

The Chinese Version of Personal Social Capital Scale (PSCS-16) was selected as the assessment tool for social capital because of its suitability for quantitative survey about health behavior and social capital.²³ The acceptable reliability and validity of PSCS-16 were established in China.²³ The PSCS-16 consists of 16 items covering two key social capital domains, bonding social capital and bridging social capital. Bonding social capital focuses on (a) the perceived network size, (b) the number of network members who are perceived as trustful, (c) the number of network members possessing resources, such as professional job and social influence, and (d) the number of network members who are reciprocal. Bridging social capital focuses on (a) the perceived group size, (b) whether the groups represent personal rights and interests, (c) the resources possessed by these groups, and (d) the likelihood to receive assistance from the groups on request. These four dimensions were assessed using a 5-point Likert scale, with an overall range of 8–40 points (higher score indicates possession of more social capital). According to quartiles of the total scores, each type of social capital score was categorized as follows: 8 to 16 points, 17 to 24 points, 25 to 32 points, and ≥ 33 points. In this study, because the number of participants in the lowest quartile of bonding social capital and the highest quartile of bridging social capital is so small (less than 2%), we merged it into the second quartile of bonding social capital and highest quartile of bridging social capital, respectively. Therefore, according to the data distribution, bonding social capital score was categorized as low (8–24 points), mid (25–32 points) and high level (≥ 33 points); bridging social capital score was categorized as low (8–16 points), mid (17–24 points) and high level (≥ 25 points).

2.4. Assessment of physical activity

In our study, physical activity levels were determined by individual self-report on weekly frequency, intensity and time engaged in the following activities: walking, jogging or running, square dance, playing Tai Chi, swimming and so on.²⁴ According to Health Guideline for the Chinese Elderly,²⁵ participants who do physical exercises at least three times a week and each exercise lasts at least 30 min (leading to sweating or exhausted) were defined as physical activity, while the others whose physical exercises did not meet the above standards were defined as physical inactivity.

2.5. Independent variables

General information of participants was obtained from a standardized face to face questionnaire interview, including age, gender, marital status (married or single), dwelling condition (whether living alone or not), educational level, personal income and activities of daily living (ADL). Educational level was categorized as follows: no formal, primary, junior, and college education. Personal income was

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