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Original Article

Social isolation and health-promoting behaviors among older adults living with different health statuses: A cross-sectional study

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ABSTRACT

Objectives: To describe the characteristics and relationships of social isolation and health promoting behaviors of Chinese older adults with different health statuses.

Methods: Totally 485 older adults were recruited. They were divided into three groups based on their health status: healthy group ($n = 72$), group with one disease ($n = 183$) and group with multimorbidity ($n = 230$). Lubben Social Network Scale-6 and Health-Promoting Lifestyle Profile II were used to measure their social isolation and health-promoting behaviors, respectively.

Results: Among the aged with one disease or multimorbidity, 30.6% (56/183) and 31.7% (73/230) were socially isolated, respectively, based on the score of the Lubben Social Network Scale-6. The three groups differed significantly in health-promoting behaviors and scores on several subscales. The group with multimorbidity exhibited more social isolation and fewer health-promoting behaviors than other groups. Social isolation was among the factors adversely affecting health-promoting behaviors in older adults.

Conclusions: Health care providers should help older adults with multimorbidity preserve the remaining abilities to improve health-promoting behaviors. Meanwhile, it is important to support healthy older adults to increase self-responsibility to achieve healthy aging.

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What is known?

- Social isolation among older adults has profound implications for health.
- A number of reasons have been explained for the increase of social isolation among older adults.

What is new?

- It is prevailing for older adults living with multiple diseases to become socially isolated.
- Older adults living with one disease performed better in health-promoting behaviors than those with multiple diseases or healthy people.
- Healthy older adults living alone had higher health-promoting behaviors compared with those living with children or spouses.

1. Introduction

The number of Chinese older adults aged 60 or above reached 18.1% of the total population of the country by the end of 2019 [1]. In recent years, changes in economy and culture in Chinese society, as well as life events in the ageing process, have made the shrinking of social network more pronounced among the elderly. Social isolation, which is one of the important factors related to the health of older adults, has arisen from these phenomena. It is defined as the status of lacking a support system, having minimal contact with others and/or a generally low level of participation in community life [2,3].

Older adults are more vulnerable to social isolation due to life-course transitions such as retirement, widowhood and the migration of younger generations. Previous studies have shown that the proportion of older people who are socially isolated in Western countries is between 10% and 35% [4]. The research conducted by using the China Longitudinal Aging Social Survey (CLASS) 2014 found that 34.9% of older adults – that is, those of 60 years and older – were socially isolated [5]. It has been demonstrated that socially isolated individuals have two to four times greater risk of

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all-cause mortality than those who are more socially integrated [6]. Social isolation has therefore become one of the important public health indicators [7].

Health-promoting behaviors could be one of the potential pathways linking social isolation to health. Previous research has indicated that lower levels of social integration and social contacts can affect older adults' eating habits, including fruit and vegetable consumption, potentially leading to malnutrition [8]. Existing studies have demonstrated that social isolation could diminish participation in recreational physical activity as well as induce anxious-depressive-related behaviors [9]. In addition, older adults who were at risk of social isolation did not seem to make full use of medical services or seek help from others [10]. A vicious circle can be created between social isolation and a low level of health-promoting behaviors, which may finally lead to adverse health outcomes.

Despite the substantial body of scientific literature which emphasizes the role of social isolation in changing and maintaining health-promoting behaviors, there are several gaps in our understanding of these associations. Firstly, health-promoting behaviors could be one of the potential pathways linking social isolation to health; however, very few studies have investigated the association between social isolation and health-promoting behaviors among older adults. Secondly, previous research related to social isolation or health-promoting behaviors tends to focus on the entire elderly population. Few studies have considered the differences in social isolation and health-promoting behaviors among older adults with different health conditions. Chronic diseases have replaced infectious diseases as the dominant health care burden, and almost all chronic diseases are related to aging. More than half of the elderly population have suffered from two or more chronic diseases simultaneously, which is defined as multimorbidity [11]. Previous studies have shown that the prevalence of multimorbidity among Chinese older adults was from 6.4% to 76.5% [12]. Older adults living with multimorbidity experienced a decline in quality of care, functional impairment and high health care costs [13]. Therefore, research regarding multimorbidity in primary care has been put on the international agenda. Given the importance of social isolation and health-promoting behaviors for older adults and primary care, the present study aims to compare social isolation and health-promoting behaviors among older adults with different health status.

2. Methods

2.1. Participants

It is a cross-sectional descriptive study. Participants were adults aged 60 or older from four districts in Beijing, China. People who were diagnosed with a terminal illness, severe cognitive diseases and/or disability by clinicians were excluded. The convenience sample of 485 participants came from our previous survey about social networks and healthy aging [14].

2.2. Measures

The self-designed questionnaire was administrated to collect participants' demographic characteristics, including age, gender, education, personal income, living arrangements and health statuses. Social isolation was assessed using the Lubben Social Network Scale-6 (LSNS-6). This scale is mainly used to evaluate the kinship and non-kinship ties of older adults [15]. It consists of two sets of questions on family and friendship ties, with three items in each set, including the number of relatives/friends see or hear from at least once a month, the number of relatives/friends they feel able

to call for help, and the number of relatives/friends they feel able to talk about private matters. Each item is scored from 0 to 5. The total score is an equally weighted sum of the six items, ranging from 0 to 30. The Cronbach's α coefficient of sub-scales varies from 0.78 to 0.89, while the Cronbach's α coefficient of total scale is 0.89 [16]. Lubben and colleagues identified individuals with a score less than 12 as socially isolated [15]. The scale demonstrated good reliability for this study (Cronbach's α coefficient, 0.82).

Health-promoting behaviors were measured using the Health-Promoting Lifestyle Profile II (HPLP-II). This scale was developed by Susan Noble Walker [17]. Cao and colleagues [18] introduced the scale in China after cultural adaptation and translation. The 40-item summated behavior rating scale employs a four-point response format that measures the frequency of self-reported health-promoting behaviors in the domains of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations and stress management. The overall scores for the 40 items are summed and range from 40 to 160, with higher scores suggesting higher levels of health-promoting behaviors. The scale demonstrated high reliability for this study.

2.3. Ethical considerations

This study was approved by the Institutional Review Board of School of Nursing, Peking Union Medical College (No. 20160902). All participants were given detailed written and oral information about the study and its aims. They gave informed consent and were assured that all data would be treated confidentially. Participants could withdraw from the study at any time without giving a reason.

2.4. Data analysis

All analyses were conducted using SPSS version 23.0. Descriptive information is reported for the entire sample and separately for the healthy, with one disease and multimorbidity groups. Sample characteristics of the three groups were analyzed using a chi-square test and analysis of variance with Bonferroni corrections. Linear regression modeling measured associations between social isolation, health-promoting behaviors and demographic factors. Probability values of less than 0.05 were seen as statistically significant. Reported *P*-values were two-tailed in all calculations.

3. Results

3.1. Sample demographic characteristics and health status

The previous study sample was 500 older adults; among these, 15 individuals (3%) were excluded because of missing data. Therefore, the final sample was 485 older adults with an average age of 70.31 years ($SD = 7.66$); 35.1% were male and 64.9% female. Most (55.3%) of the older adults had finished senior high school or gone onto higher education, and 92.6% had middle or high levels of personal monthly income (the average minimum wage was 2,000 CNY in China in 2017). As shown in Table 1, 14.8% (72/485) were healthy, 37.7% (183/485) had one disease, and 47.4% (230/485) were in a state of multimorbidity. Healthy older adults were the youngest (67.17 ± 6.86 years), followed by older adults with one disease (69.29 ± 7.26 years). There was a higher proportion of females than males in each group. However, in this study, older adults living with a different health status demonstrated no significant differences in proportions of gender, education, personal income and/or living arrangements.

Table 1
Sociodemographic characteristics of older adults with different health conditions (n = 485).

Characteristics	Healthy (n = 72)	With one disease (n = 183)	Multimorbidity (n = 230)	F/ χ^2	P
Age	67.17 ± 6.86	69.29 ± 7.26	72.11 ± 7.76	14.88	<0.001
Gender				5.48	0.064
Male	19 (26.4)	59 (32.2)	92 (40.0)		
Female	53 (73.6)	124 (67.8)	138 (60.0)		
Education				4.70	0.583
Primary school at least	12 (16.7)	23 (12.6)	33 (14.3)		
Junior high school	18 (25.0)	55 (30.1)	76 (33.0)		
Senior high school	28 (38.9)	56 (30.6)	69 (30.0)		
College and above	14 (19.4)	49 (26.8)	52 (22.6)		
Monthly income (CNY)				11.63	0.168
≤500	4 (5.6)	7 (3.8)	8 (3.5)		
501–1,999	4 (5.6)	8 (4.4)	5 (2.2)		
2,000–3,999	37 (51.4)	81 (44.3)	88 (38.3)		
4,000–5,999	23 (31.9)	67 (36.6)	93 (40.4)		
≥6,000	4 (5.6)	20 (10.9)	36 (15.7)		
Living arrangements				5.87	0.438
Living alone	7 (9.7)	26 (14.2)	33 (14.3)		
With children	25 (34.7)	63 (34.4)	82 (35.7)		
With spouse	37 (51.4)	93 (50.8)	112 (48.7)		
Others	3 (4.2)	1 (0.5)	3 (1.3)		

Note: Data are n (%), or Mean ± SD.

3.2. Differences in social isolation and health-promoting behaviors among older adults

Table 2 shows that 19.4% (14/72) of the healthy group were socially isolated. Older adults who had one and more than one disease had higher percentages, 30.6% (56/183) and 31.7% (73/230) respectively. However, no significant difference in social isolation was found between the three groups. In contrast, a significant difference for older adults with different health statuses was found in terms of the total scores for health-promoting behaviors (Table 3). Older adults with one disease had a significantly higher score than older adults with more than one disease (P = 0.012). In terms of the sub-scales of health-promoting behaviors, healthy older adults had a significantly higher score for interpersonal relations than individuals with multimorbidity (P = 0.021). Healthy older adults and those with more than one disease had a significantly lower score for health responsibility than that of the group with one disease (P = 0.014). Older adults with multimorbidity had a significantly lower score for physical activity than that of healthy older people (P < 0.001) or those who only had one disease (P = 0.004). Older adults with one disease had a significantly higher score for spiritual growth than that of older adults living with multimorbidity (P = 0.008).

Linear regression was conducted to measure the cross-sectional association between health-promoting behaviors and social isolation (Table 4). Social isolation was significantly negatively associated with health-promoting behaviors for the whole sample (P < 0.05). Women scored more highly in health-promoting behaviors than men. When compared with a high level of education, a low level of education was a negative factor for health-promoting behaviors. A high level of personal income was also a positive factor, except for older adults' health-promoting who earned 500–1,999 CNY per month and 2,000–3,999 CNY per month. We ran a linear regression for older adults with different health

statuses to consider any differences. Social isolation was significantly negatively associated with health-promoting behaviors for older adults living with multimorbidity (P < 0.05). However, social isolation was not shown to significantly associate with health-promoting behaviors for healthy older adults and those with one disease. Compared with healthy older adults who live with children or spouses, those living alone had a higher score of health-promoting behaviors. Older adults living with one disease who had finished junior high school performed fewer health-promoting behaviors than older adults who had finished college or above. Multimorbidity and being female as well as having high education and income levels were positive factors for health-promoting behaviors.

4. Discussion

This study compared social isolation and health-promoting behaviors among older adults living with different health statuses. In addition, it provided evidence for associations between social isolation, demographic variables and the health-promoting behaviors of older adults. Previous studies have found that 21.4%–34.9% of older adults aged 60 and over were socially isolated in China [5,19], which is somewhat in line with the results of this study (29.5%). Findings showed that more older adults with one or more than one disease were socially isolated than healthy older adults. Healthy older adults were significantly younger than older adults with one or more disease. Previous research has demonstrated that the percentage of social isolation in older people is significantly higher than that of the young elderly [20]. This may be due to the degeneration of physical and psychological functions in the ageing process, as well as the shrinking of social networks following retirement.

Our findings showed that older adults with one disease had greater scores of health-promoting behaviors than older adults

Table 2
The social isolation status of older adults living with different health statuses (n = 485).

Social isolation	Healthy (n = 72)	With one disease (n = 183)	Multimorbidity (n = 230)
Socially isolated	14 (19.4)	56 (30.6)	73 (31.7)
Not socially isolated	58 (80.6)	127 (69.4)	157 (68.3)

Note: Data are n (%). $\chi^2 = 4.16$, P = 0.132.

Table 3The social isolation and health promoting behaviors of older adults living with different health statuses ($n = 485$).

Items	Healthy ($n = 72$)	With one disease ($n = 183$)	Multimorbidity ($n = 230$)	F	P
Health promotion behaviors	102.65 ± 17.35	103.73 ± 17.20	99.59 ± 15.63	3.38	0.035
Interpersonal relations	14.35 ± 2.69	13.91 ± 2.86	13.48 ± 2.71	3.03	0.043
Health responsibility	25.19 ± 5.45	27.05 ± 5.74	26.26 ± 5.11	3.19	0.042
Stress management	12.54 ± 2.55	12.68 ± 2.80	12.50 ± 2.17	0.26	0.774
Nutrition	19.35 ± 2.97	19.67 ± 2.67	19.14 ± 2.72	1.93	0.146
Physical activity	18.47 ± 4.89	17.61 ± 4.85	16.28 ± 4.30	7.95	<0.001
Spiritual growth	12.75 ± 3.32	12.81 ± 3.34	11.92 ± 3.40	4.09	0.017

Note: Data are Mean ± SD.

Table 4Associations between social isolation and health promoting behaviors ($n = 485$).

Variables	Total sample	Healthy	With one disease	Multimorbidity
Social isolation (Not socially isolated as reference)	-0.143*	-0.195	-0.099	-0.167*
Age	-0.067	0.106	-0.130	-0.045
Gender (Male as reference)	0.117*	-0.034	0.120	0.155*
Education (College and above as reference)				
Primary school at least	-0.240*	-0.318	-0.149	-0.258*
Junior high school	-0.184*	-0.209	-0.233*	-0.143
Senior high school	-0.141*	-0.087	-0.158	-0.123
Monthly income (≥6,000 CNY as reference)				
500 CNY or below	-0.108*	0.002	-0.121	-0.163*
501–1,999 CNY	-0.095	0.019	-0.180	-0.058
2,000–3,999 CNY	-0.161	0.035	-0.245	-0.171
4,000–5,999 CNY	-0.192*	-0.190	-0.199	-0.202*
Living arrangements (Living alone as reference)				
With children	-0.127	-0.536*	-0.127	0.001
With spouse	-0.049	-0.448*	-0.024	0.033
Other	-0.003	0.001	-0.111	-0.015
R^2	0.148	0.301	0.168	0.161
P	<0.001	0.046	0.002	<0.001

Note: Data are β values. * $P < 0.05$.

with multiple diseases. Older adults with only one disease appeared to pay more attention to their health. Scores for health responsibility, physical activity and spiritual growth for older adults living with one disease were higher than those for older adults with multiple diseases and even healthy older adults. There could be two reasons for this finding. Firstly, the basic health care system in China has run many proactive programs to endorse health promotion and disease prevention, which may have increased the awareness of health-promoting behaviors for older adults living in the community. Secondly, older adults with one disease, especially a chronic disease, may have fewer barriers to independent living in their daily lives. Therefore, they may experience less psychological pressure when considering their disease and its treatment. In order to prevent disease complications, they may be more active than healthy older adults, as they have a sense of responsibility and engage in health-promoting measures. However, older adults with multiple diseases had lower scores for interpersonal relationships and physical activity in comparison to healthy adults, as well as lower scores for spiritual growth than those of older adults with one disease. Studies have shown that older people living with multimorbidity experience poor prognosis due to the difficulties and complexities of their clinical treatment [12,21]. The consequences of multimorbidity may include functional impairment, which may in turn cause adverse effects on the ability of older adults to put health-promoting behaviors into practice. Our results indicated that health professionals in the community should pay more attention to older adults with multimorbidity during treatment. Older adults living with multiple diseases may need more individualized care to encourage them to engage in appropriate physical activity and improve their social relationships and

psychological well-being.

The three groups of older adults did not demonstrate significant differences in their nutrition and stress management; the scores for these two sub-scales were in the middle level. However, multi-center cross-sectional research with 3,885 older Chinese adults showed that up to 48.4% of those adults were at high risk of malnutrition [22]. Data from the 2015 China Health and Retirement Longitudinal Study (CHARLS) suggested that the prevalence of depression among older adults was 32.7% [23]. The difference may vary due to the sample difference. In this study, the participants recruited were from the capital city. They may enjoy better health and public welfare policies and facilities than those who live in other regions. Besides, with the strengthening of health education and publicity in China, older adults have a certain degree of awareness and knowledge around maintaining proper nutrition and psychological well-being. However, there is still a gap between the self-health-promoting behaviors that the elderly believed they engaged in and the objective results. Therefore, it is necessary for health professionals working in the community to conduct more evidence-based health education in nutrition and stress management for all older adults as well as to promote the effect of these interventions [21].

Social isolation was negatively related to health-promoting behaviors for the older adults in this study. This finding is approximately in accord with findings from previous studies [24]. A body of cross-sectional literature has demonstrated that social isolation is associated with having a poor diet, being physically inactive, heavy consumption of alcohol and smoking [25,26]. Higher levels of educational level and personal income were positive factors for promoting health behaviors. The problem of health inequality may

occur in those who had lower levels of education and personal income due to the limitations in understanding or low levels of financial support. These people may not be active in seeking help from health care centers and may have less access to health professionals [27]. Women were more active than men in terms of health-promoting behaviors. It is a common phenomenon in Chinese culture that women pay more attention to health and actively interact with their social surroundings [28]. Greater social integrity and engagement may increase a sense of obligation to stay well for loved ones and result in rich instrumental or emotional social support to promote healthy behaviors [29]. The health-promoting behaviors of healthy older adults and older adults living with one disease were not affected by social isolation in this study. However, demographic characteristics such as gender, education, and income still influence health-promoting behaviors.

5. Limitations and considerations for future work

Cross-sectional studies such as this have limitations in presenting the relationships of social isolation with health-promoting behaviors over time. These associations may need time to be verified. Therefore, the potentially important mechanisms in this study should be further explored. Another limitation might be that the study was conducted only in Beijing, which means that there might be a risk that the result has captured just local phenomenon. Beijing is the capital city of China, the development of society and economy is better than other cities of China. So, the representativeness of the sample needs to be improved in the future study.

6. Conclusions

Our findings indicated that health-promoting behaviors varied for those living with different health statuses. The findings suggested that it might be meaningful for health care providers to assess the social network of older adults. For older adults with multimorbidity, it expects to create more benefit when providing nursing care to preserve the remaining abilities to promote and extend health-promoting behaviors. Meanwhile, it is essential for health care providers to pay attention to healthy older adults and help them increase the awareness of self-responsibility to achieve healthy aging.

CRedit authorship contribution statement

Fan Wu: Conceptualization, Methodology, Software, Investigation, Data curation, Formal analysis, Visualization, Writing – original draft, Writing – review & editing. **Yu Sheng:** Conceptualization, Methodology, Supervision, Project administration, Writing – review & editing.

Declaration of competing interest

The authors declare no conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijnss.2021.05.007>.

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