



Article

Effects of selected leisure activities on preventing loneliness among older Chinese

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ABSTRACT

This study examined three types of leisure activities (playing cards/mahjong, watching TV/listening to the radio, and participation in social activities) among the older segment of the Chinese population, and the effects of these activities in preventing the feelings of loneliness. Data came from the Chinese Longitudinal Healthy Longevity Survey (CLHLS), conducted in 2005, 2008, and 2011. The males, those who were educated, the young-old (aged between 65 and 74 years), urban dwellers, and living in institutions were more likely to participate in all three activities frequently. Frequent or occasional participation in these three activities was negatively associated with feelings of loneliness. The longitudinal study from 2005 to 2011 showed that respondents who frequently played cards/mahjong at baseline were less likely to feel persistent loneliness at the end of the 2011 wave. Instead, frequently watching TV/listening to the radio in 2008 was associated with lower odds in feeling persistent loneliness at the end of 2011. Hence, active participation in playing cards/mahjong and TV/radio entertainment can be effective treatment intervention against persistent loneliness among older Chinese. For the Chinese, a leisure activity steeped in a nation's culture and heritage, such as playing mahjong, may be used as an intervention strategy to prevent and alleviate chronic loneliness among older adults.

Introduction

Loneliness is a pressing issue among older persons (De Jong Gierveld & Van Tilburg, 2006; Koropecjy-Cox, 1998; VanderWeele, Hawkey, & Cacioppo, 2012). Chronic loneliness is detrimental to one's well-being and quality of life, and it can have deleterious effects on the mental and physical health of older persons. Loneliness has been linked to poorer cognitive function (Holmén, Ericsson, Andersson, & Winblad, 1992; Shankar, Hamer, McMunn, & Steptoe, 2013), and increased risk of dementia (Wilson et al., 2007; Zhou, Wang, & Fang, 2018). Loneliness is also associated with higher risks of depression (Alpass & Neville, 2003; Cacioppo, Hughes, Waite, Hawkey, & Thisted, 2006) and suicidal ideation (Beutel et al., 2017). Moreover, studies have shown that loneliness is associated with functional decline, increased risk of developing coronary heart disease and stroke, as well as increased risk of mortality (Luo, Hawkey, Waite, & Cacioppo, 2012; Perissinotto, Cenzer, & Covinsky, 2012; Valtorta, Kanaan, Gilbody, Ronzi, & Hanratty, 2016).

Past research have shown that several factors can influence loneliness among older persons (Aartsen & Jylhä, 2011; Pinquart & Sorensen, 2001; K.; Yang & Victor, 2008). Loneliness tends to increase with age

(Fees, Martin, & Poon, 1999, pp. P231–P239; F.; Yang, Zhang, & Wang, 2018), and it is more prevalent among those living alone or not living with a spouse (Holmén et al., 1992; Russell, 2009). Older women are more likely than older men to suffer from loneliness, as women have the greater risk of being widowed (Aartsen & Jylhä, 2011; Xie, Matthews, Jagger, Bond, & Brayne, 2008). Low socioeconomic status, such as lower educational attainment and low income are also associated with higher prevalence of loneliness (Creecy, Berg, & Wright, 1985; Hawkey et al., 2008; Pinquart & Sorensen, 2001).

Leisure activities have often been used as an intervention strategy to prevent and alleviate loneliness among older adults (Cattan, White, Bond, & Learmouth, 2005; Pettigrew, 2007; Toepoel, 2013). Participation in leisure activities represents a significant part of older persons' social contacts and social connectedness. Voluntary work, cultural activities, and shopping are among the leisure activities which reflect the social connectedness among older persons (Toepoel, 2013). Participation in passive leisure activities such as hobbies, and social leisure activities such as regular contacts with friends, have been known to prevent and alleviate loneliness and lead to greater well-being among older adults regardless of age, gender and marital status (Dupuis &

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Smale, 1995; Pettigrew, 2007). Higher frequencies of participation build social relationships and thus lead to greater well-being (Brajša-Žganec, Merkaš, & Šverko, 2011; Rodríguez, Látková, & Sun, 2008).

There is a sizable literature on the benefits of leisure activities within the Western context. In the past, there was a dearth of research on leisure activities among the Chinese people. In a subsistence economy in China, loneliness was not a concern (Lu & Hu, 2005). However, things have changed in this post-industrial society where many have the means to pursue a wider variety of leisure activities (Liang & Walker, 2011). There has been an increase in research on leisure in the Chinese culture and how it leads to happiness or better quality of life (Lu & Argyle, 1994; Lu & Hu, 2005; Wei, Huang, Stodolska, & Yu, 2015). More leisure time leads to more happiness, and passive leisure activities such as watching TV contributes to happiness and improved well-being among Chinese of different ages (Ross & Zhang, 2008; Wei et al., 2015). Participation in activities such as playing mahjong has also been associated with better psychological well-being among the oldest-old Chinese (Ross & Zhang, 2008). Mahjong, a fast-paced tile game originating in ancient China, presents an opportunity for socialization and a popular pastime among Chinese (Paul, 2007).

A study on how leisure activities can help to prevent loneliness in China is relevant because its population is aging rapidly. This nation has the largest number of older adults (United Nations, 2014), and a recent study has shown that loneliness is prevalent among older Chinese (Luo & Waite, 2014). Social support is an important factor related to loneliness, and the family is the main provider of support (Y. Chen, Hicks, & While, 2014). Comparatively, these older people receive little support from their neighbours, government, or social institutions. Dominant Chinese national policies on aging emphasize the duty of adult children in taking care of older family members (Shea, 2018). However, the 'empty-nest elderly family' landscape is becoming increasingly common in China (Zeng & Wang, 2003; Q. F.; Zhang, 2004). Older persons living alone or whose children have left home are more vulnerable to feelings of loneliness (Liu & Guo, 2007).

The Activity Theory of Aging (Bengtson & Putney, 2009; Schulz, 2006) postulates that older adults who stay active and maintain social interactions are aging more successfully than those who do not. It further hypothesizes that the aging process is delayed and the quality of life is enhanced when older adults remain socially active. The ability to adapt through the life course and active engagement in various new roles indicate successful adaptation to aging (DeLiema & Bengtson, 2017). Past research have shown that greater activity level is positively associated with greater happiness and well-being (Menec, 2003; Winstead, Yost, Cotten, Berkowsky, & Anderson, 2014). Besides well-being, activity level can also predict the cognitive status (Bourassa, Memel, Woolverton, & Sbarra, 2017) and incidence of dementia (Akbaraly et al., 2009; Wilson et al., 2002).

The Activity Theory provides a conceptual framework for examining the effects of selected leisure activities on the feelings of loneliness. This present study aims to examine the different levels of participation in selected leisure activities among older persons in China according to various socio-demographic factors, and the association of these activities with the prevalence of persistent loneliness, using data from a panel sample. It is likely that older persons who stay active are less lonely than their counterparts (Luo & Waite, 2014; Toepoel, 2013). Hence, it may be hypothesized that active participation in these selected leisure activities prevents the feelings of persistent loneliness among older persons. Finally, this study intends to add to the literature on the relationship between loneliness and participation in leisure activities among older persons, with empirical evidence from China.

Methods

Data sources

This study utilized data from 2005, 2008, and 2011 Chinese

Longitudinal Healthy Longevity Surveys (CLHLS). The CLHLS is a national survey of older adults in China, covering 22 of 31 provinces in the country. The CLHLS questionnaire was designed following international standards and was adapted to the Chinese cultural and social context. The survey was conducted through face-to-face home-based interviews and included responses from proxies to avoid non-response among frail and older respondents. The overall interview refusal rate was 3% in the 2005 wave (Zeng, 2012). A detailed description of the CLHLS with regards to sampling design and data quality has been reported elsewhere (Zeng, 2008, 2012; 2002). Various assessments of the CLHLS waves have concluded that the data quality is generally good, in aspects of age reporting, mortality rate, sample attrition, reliability, validity, and consistency of the various measures (Gu, 2008).

A total of 15,613 older adults aged 65 and above from all the 22 provinces in China were first interviewed in the 2005 baseline survey. Follow-up interviews were conducted in 2008 and 2011. In the 2008 survey, a total of 7452 (47.7%) of the respondents from the 2005 round were re-interviewed, 5227 (33.5%) had died and 2934 (18.8%) were lost to follow-up. In the 2011 survey, 4177 (26.8%) were re-interviewed, 2253 (14.4%) had died before the survey, and 1021 (6.5%) were lost to follow-up.

Ethical approval

The CLHLS was conducted using the guidelines laid down in the Declaration of Helsinki, and all procedures involving human subjects/patients were approved by the Biomedical Ethics Committee of Peking University. Duke University gave permission to use data for this paper. Since we used secondary data with no identifiable information, no formal approval from an institutional review board was required for this study.

Measures

Leisure activities

Three types of activities were examined in this study: 1) play cards/mahjong, 2) watch TV or listen to the radio, and 3) take part in some social activities. Respondents were asked if they were presently engaged in each of the activities. Response options included 'almost every day,' 'not daily, but once in a week,' 'not weekly, but at least once in a month,' 'not monthly, but sometimes,' and 'never.' Responses for each activity were recoded into a 3-category variable for the 2005, 2008 and 2011 waves [1 = Frequent (to represent 'almost everyday' and 'not daily, but once in a week'), 2 = Occasional (to represent 'not weekly, but at least once in a month' and 'not monthly, but sometimes'), 3 = Never]. The classification of these activities into categories of 'frequent,' 'occasional' and 'never,' resembles that used in a study by Fernandez-Mayoralas et al. (2015), which categorised participation in leisure activities as 'active,' 'moderately active' and 'inactive.' This categorisation has drawn out more differences between the three categories, as opposed to categorising participation into a two-category variable ('active' and 'inactive').

Loneliness

Respondents were asked, "do you feel lonely and isolated?". Responses included 'always,' 'often,' 'sometimes,' 'seldom,' 'never'. Responses for loneliness were recoded into a dichotomous variable to reflect the prevalence in feeling persistent loneliness [0 = Not persistently lonely (respondents who reported 'sometimes,' 'seldom,' or 'never' lonely), 1 = Persistently lonely (respondent who reported 'always' or 'often' lonely)].

Other variables

Socio-demographic variables in the analysis include gender ('male','female'), age group ('65-74','75-84','85+'), ethnicity ('Han','others'), place of residence ('city or town','rural'), marital status

(‘married’, ‘not married’ (*widowed, divorced, separated, never married*)), living arrangement (‘with household members’, ‘alone’, ‘in an institution’) and education (‘no schooling’, ‘at least 1 year of schooling’). Self-rated health was also included in the analysis (‘very good’, ‘good’, ‘so’, ‘bad’ and ‘very bad’).

Statistical analysis

This sub-section begins with a description of the socio-demographic characteristics, self-rated health, the prevalence of loneliness, and leisure activities of the total sample ($n = 15,613$) at the baseline. Cross-tabulations were run to examine the bivariate associations for loneliness and each activity, respectively, with baseline socio-demographic characteristics and health. Then, cross-tabulations were run to examine loneliness stratified by each leisure activity among those who were re-interviewed for each corresponding wave (2005, $n = 15,613$; 2008, $n = 7452$; 2011, $n = 4177$).

In the multivariate analysis, the sample was filtered for respondents according to 2 criteria ($n = 3841$):

1. Those who were NOT persistently lonely at baseline 2005.
2. Those who survived were re-interviewed in the 2011 wave.

Out of the total respondents who reported not persistently lonely in 2005, around 7% reported feeling persistently lonely in 2011. Logistic regression was used to assess the effects of each activity on persistent loneliness in 2011, controlling for socio-demographic variables at baseline and in 2008. As the multivariate model included age, gender, and place of residence, the sampling weight based on the distribution of age-gender-urban/rural residence, provided with the CLHLS data was not utilized ([Winship & Radbill, 1994](#)).

Results

Of the 15,613 respondents at the baseline ([Table 1](#)), close to three-fifths were females, and 60% were aged 85 years and over. Slightly more than half were living in rural areas. Around 30% were still married and living with their spouse, and 66% were widowed. The majority (84%) were living with household members, and around 3% were living in an institution. In this sample, 61% had no formal schooling. Of the respondents, 8% always or often felt lonely, while 37.5% never felt lonely. Close to 15% and 2% reported having bad and very bad self-rated health respectively. Only a rather small proportion had ever played cards/mahjong (17%) or participated in social activities (14%), but a much higher proportion (44%) watched TV or listened to the radio almost every day.

Always or often felt lonely was categorised as persistent loneliness. Females, the oldest-old (85+), those who had no formal schooling, those living in rural areas, those living alone, and those who reported very bad health, were more likely than their counterparts to feel persistent loneliness ([Table 2](#)). Widows and widowers were more likely than those currently married to feel persistently lonely.

[Table 3](#) shows that males were more likely than females to play cards/mahjong, watch TV or listen to the radio and participate in social activities. Participation in these three activities decreased with the advancement in age. For instance, the proportion who never took part in playing cards/mahjong increased from 71.4% among those aged 65–74 to 89.2% among those aged 85+. The oldest-old (aged 85+) were also much less likely than the young-old (aged 65–74) to be frequently engaged in the passive leisure activities such as watching TV or listening to the radio. The majority ethnic Han, city and urban dwellers, those who were currently married, and those who had some schooling were more active in these activities than their counterparts who were non-Han, living in rural areas, widowed and who had never been to school. Older adults who were living in institutions were more likely than those living with family members or living alone to participate in all the three activities. More active participation in these activities was

Table 1
Sociodemographic characteristics, loneliness, self-rated health and leisure activities of respondents at baseline, 2005 (%).

Characteristics		All ($n = 15,613$)
Gender	Male	42.8
	Female	57.2
Age Group	65–74	21.2
	75–84	19.1
	85+	59.6
Ethnicity	Han	93.8
	Others	6.2
Residence	City	24.8
	Town	19.8
	Rural	55.4
Marital status	Currently married and living with spouse	30.5
	Separated	1.9
	Divorced	0.4
	Widowed	66.3
	Never Married	0.9
Living arrangement	With household member(s)	83.8
	Alone	13.4
	In an institution	2.7
Education	No formal schooling	61.2
	At least 1 year of schooling	38.8
Lonely and isolated	Always	2.2
	Often	5.8
	Sometimes	24.0
	Seldom	30.5
	Never	37.5
Self-rated Health	Very good	11.0
	Good	38.7
	So	33.9
	Bad	14.8
	Very bad	1.6
Play cards/mahjong	Almost everyday	5.8
	Not daily, but once for a week	5.0
	Not weekly, but at least once for a month	2.4
	Not monthly, but sometimes	3.8
	Never	83.0
Watch TV or listen to radio	Almost everyday	43.7
	Not daily, but once for a week	11.5
	Not weekly, but at least once for a month	5.0
	Not monthly, but sometimes	6.6
	Never	33.2
Participated in social activities	Almost everyday	2.9
	Not daily, but once for a week	2.3
	Not weekly, but at least once for a month	2.6
	Not monthly, but sometimes	6.7
	Never	85.6

also associated with better health.

There were significant associations between loneliness with leisure activities ([Table 4](#)). It can be seen that across all the three waves, those who played cards/mahjong frequently or occasionally and those who watched TV or listened to the radio frequently were much less likely to feel persistently lonely, as compared to those who did not. In the first two waves, those who participated in social activities frequently or occasionally were also less likely to feel persistent loneliness than those who did not participate in social activities. However, there was no significant association between loneliness and social activities among those interviewed in 2011.

[Table 5](#) shows the effects of leisure activities on the prevalence of persistent loneliness in the multivariate context. In the crude model, of

Table 2
Persistent loneliness by socio-demographic variables at baseline, 2005 (%).

	Loneliness		Significance
	Not Persistent	Persistent	
Gender			
Male	93.6	6.4	<i>p</i> < 0.01
Female	90.7	9.3	
Age Group			
65-74	94.0	6.0	<i>p</i> < 0.01
75-84	92.1	7.9	
85+	91.1	8.9	
Ethnicity			
Han	91.9	8.1	<i>p</i> > 0.05
Others	92.8	7.2	
Residence			
Rural	91.2	8.8	<i>p</i> < 0.01
City & Towns	93.0	7.0	
Marital Status			
Not married	89.8	10.2	<i>p</i> < 0.01
Married	96.4	3.6	
Living Arrangement			
Household	93.9	6.1	<i>p</i> < 0.01
Alone	81.0	19.0	
Institution	88.8	11.2	
Education			
No schooling	90.7	9.3	<i>p</i> < 0.01
>1 year	93.9	6.1	
Self-rated Health			
Very good	96.4	3.6	<i>p</i> < 0.01
Good	95.4	4.6	
So	92.2	7.8	
Bad	81.2	18.8	
Very bad	73.7	26.3	

those interviewed in 2005, the odds of persistent loneliness in 2011 were lower among those who frequently played cards/mahjong (OR = 0.44, 95% CI: 0.28–0.69), frequently and occasionally watched TV or listened to radio (OR = 0.65, 95% CI: 0.48–0.90; OR = 0.60, 95% CI: 0.36–1.01),

Table 3
Types of activities by socio-demographic variables at baseline, 2005 (%).

	Cards/Mahjong			TV/Radio			Social Activities		
	Freq.	Occ.	Nev.	Freq.	Occ.	Nev.	Freq.	Occ.	Nev.
Gender	<i>p</i> < 0.01			<i>p</i> < 0.01			<i>p</i> < 0.01		
Male	14.7	8.7	76.6	66.0	11.2	22.7	7.4	12.7	79.9
Female	7.9	4.4	87.8	47.1	11.9	41.0	3.4	6.7	89.9
Age Group	<i>p</i> < 0.01			<i>p</i> < 0.01			<i>p</i> < 0.01		
65-74	18.3	10.4	71.4	80.7	8.6	10.7	9.3	16.1	74.7
75-84	15.5	8.1	76.5	68.1	10.4	21.5	6.8	13.3	79.9
85+	6.7	4.1	89.2	42.0	13.1	44.9	3.1	5.6	91.3
Ethnicity	<i>p</i> < 0.01			<i>p</i> < 0.01			<i>p</i> < 0.01		
Han	11.2	6.4	82.4	55.8	11.8	32.4	5.2	9.5	85.2
Others	5.6	2.9	91.5	46.1	8.8	45.1	3.6	5.5	90.9
Residence	<i>p</i> < 0.01			<i>p</i> < 0.01			<i>p</i> < 0.01		
Rural	9.2	5.6	85.2	48.6	12.2	39.2	3.1	6.7	90.3
City & Towns	12.9	6.9	80.2	63.5	10.8	25.7	7.7	12.5	79.8
Marital Status	<i>p</i> < 0.01			<i>p</i> < 0.01			<i>p</i> < 0.01		
Not married	8.5	4.8	86.7	46.9	12.8	40.3	3.7	6.9	89.4
Married	16.1	9.5	74.5	74.2	8.9	16.9	8.4	14.7	76.9
Living Arrangement	<i>p</i> < 0.01			<i>p</i> < 0.01			<i>p</i> < 0.01		
Household	10.6	6.2	83.2	56.5	11.7	31.8	4.9	9.1	85.9
Alone	10.8	6.3	82.8	46.8	11.0	42.2	5.0	8.3	86.6
Institution	17.1	5.2	77.7	59.0	10.9	30.1	11.1	18.5	70.4
Education	<i>p</i> < 0.01			<i>p</i> < 0.01			<i>p</i> < 0.01		
No schooling	7.1	4.2	88.7	44.5	12.6	42.9	2.7	5.2	92.1
>1 year	16.7	9.5	73.8	72.3	10.1	17.6	9.0	15.7	75.3
Self-rated Health	<i>p</i> < 0.01			<i>p</i> < 0.01			<i>p</i> < 0.01		
Very good	18.5	8.1	73.4	73.2	8.3	18.4	11.7	14.6	73.7
Good	13.4	7.6	79.0	62.6	11.4	26.0	6.3	11.3	82.4
So	9.7	6.8	83.5	55.4	13.5	31.1	4.3	9.5	86.2
Bad	6.7	3.3	89.9	45.6	12.2	42.2	2.1	5.5	92.4
Very bad	3.0	3.4	93.6	27.5	11.4	61.0	1.3	3.0	95.8

Note: Freq. – Frequent; Occ. – Occasional; Nev. – Never.

and occasionally participated in social activities (OR = 0.63, 95% CI: 0.41–0.97) as compared to those who never engaged in these leisure activities. Among those interviewed in the 2008 survey and re-interviewed in 2011, only those who frequently and occasionally watched TV or listened to the radio in 2008 had lower odds of feeling persistently lonely (OR = 0.51, 95% CI: 0.37–0.68; OR = 0.53, 95% CI: 0.33–0.87) three years later.

Logistic regression diagnostics for Model B show that the model is an excellent fit to the data. The adjusted odds ratios show that those who frequently played cards/mahjong in 2005, were 57% less likely to feel persistent loneliness when they were re-interviewed in 2011 (OR = 0.43, 95% CI: 0.26–0.72) as compared to their counterparts who did not play cards/mahjong. Those who frequently and occasionally watched TV or listened to radio at 2008, were respectively 32% and 39% less likely to feel persistent loneliness in 2011 (OR = 0.68, 95% CI: 0.48–0.95; OR = 0.61, 95% CI: 0.37–1.00), as compared to those who had never done so. Participation in social activities did not have a significant effect on loneliness.

Discussion

Consequent upon demographic and social changes in China, more and more older Chinese are experiencing loneliness, which may lead to distress and depression. Consistent with findings from many past studies (Y. Chen et al., 2014; Wang et al., 2011; K. Yang & Victor, 2008), data from the Chinese Longitudinal and Healthy Longevity Survey provide empirical evidence of wide variation in the feelings of loneliness across socio-economic sub-groups of the population.

The results from this analysis show that those in rural areas are more likely to feel persistent loneliness, corroborating with past studies in China (Wang et al., 2011; K.; Yang & Victor, 2008). Many adult children have left their aging parents in the countryside, while some older adults also choose not to move to the city with their children (Zeng & Wang, 2003; Q. F.; Zhang, 2004). Continuous isolation from family members

Table 4
Persistent loneliness by leisure activities in 2005, 2008 and 2011 (%).

Loneliness	Cards/Mahjong			TV/Radio			Social Activities		
	Freq.	Occ.	Nev.	Freq.	Occ.	Nev.	Freq.	Occ.	Nev.
2005 (n = 15,613)	<i>p</i> < 0.01			<i>p</i> < 0.01			<i>p</i> < 0.01		
Not persistent	95.8	95.2	91.2	94.6	90.9	87.2	95.4	95.0	91.4
Persistent	4.2	4.8	8.8	5.4	9.1	12.8	4.6	5.0	8.6
2008 (n = 7452)	<i>p</i> < 0.01			<i>p</i> < 0.01			<i>p</i> < 0.01		
Not persistent	94.4	94.3	90.8	93.6	89.2	86.6	93.7	94.7	90.9
Persistent	5.6	5.7	9.2	6.4	10.8	13.4	6.3	5.3	9.1
2011(n = 4177)	<i>p</i> < 0.01			<i>p</i> < 0.01			<i>p</i> > 0.05		
Not persistent	95.6	94.9	91.5	93.9	91.5	87.0	94.3	92.9	91.9
Persistent	4.4	5.1	8.5	6.1	8.5	13.0	5.7	7.1	8.1

Note: Freq. – Frequent; Occ. – Occasional; Nev. – Never.

Table 5
Logistic regression analysis for effects of leisure activities on persistent loneliness at 2011.

	Model A		Model B	
	Odds Ratio	95% CI	Odds Ratio	95% CI
2005				
Cards/Mahjong (ref: Never)				
Frequent	0.44**	(0.28, 0.69)	0.43*	(0.26, 0.72)
Occasional	0.68	(0.41, 1.13)	0.79	(0.47, 1.36)
TV/Radio (ref: Never)				
Frequent	0.65*	(0.48, 0.90)	1.07	(0.75, 1.54)
Occasional	0.60 ⁺	(0.36, 1.01)	0.76	(0.44, 1.31)
Social Activities (ref: Never)				
Frequent	0.75	(0.44, 1.29)	1.05	(0.60, 1.86)
Occasional	0.63*	(0.41, 0.97)	0.85	(0.54, 1.34)
2008				
Cards/Mahjong (ref: Never)				
Frequent	0.81	(0.55, 1.19)	1.41	(0.91, 2.20)
Occasional	0.67	(0.38, 1.20)	1.04	(0.57, 1.89)
TV/Radio (ref: Never)				
Frequent	0.51**	(0.37, 0.68)	0.68*	(0.48, 0.95)
Occasional	0.53*	(0.33, 0.87)	0.61 ⁺	(0.37, 1.00)
Social Activities (ref: Never)				
Frequent	0.51	(0.25, 1.04)	0.72	(0.34, 1.52)
Occasional	0.84	(0.54, 1.30)	1.10	(0.69, 1.74)

Note: ***p* < 0.001; **p* < 0.05; ⁺*p* < 0.06.

Model A: Crude model, no adjustment.

Model B: Adjusted for gender, age, ethnicity, education, residence, marital status, living arrangements, and self-rated health at baseline. Omnibus Test: $\chi^2(22) = 75.968, p < 0.001$; Hosmer-Lemeshow: $\chi^2(8) = 12.276, p = 0.139$.

and lack of family support are associated with higher levels of loneliness among older Chinese (Wang et al., 2011). Besides that, findings from this study also indicate that loneliness is more prevalent among other sub-groups such as older women, the oldest-old, those living alone, and those with poorer perceived health, consistent with those of K. Yang and Victor (2008). Older women tend to be more lonely than older men, as the former face the greater risk of being widowed (Aartsen & Jylhä, 2011; Xie et al., 2008). In China especially, marital status is a strong indicator of loneliness among older persons (K. Yang & Victor, 2008). The oldest-old are most vulnerable to feelings of loneliness, as many are likely widowed, suffer from health problems and disabilities (Xie et al., 2008), and have dwindling circle of friends (Asiamah, 2017). Educational attainment appears to have a negative association with feelings of loneliness. As lower educational attainment indicates lower socioeconomic status, it has likely led to fewer opportunities for social participation, which then led to higher prevalence of loneliness (Hawkey et al., 2008; Pinquart & Sorensen, 2001).

Those living alone did not differ much as compared to those living with family members, in terms of participation in playing cards/mahjong and social activities. But the prevalence of loneliness is much greater than those living with their family. Correspondingly, institutionalized older Chinese are more likely to actively participate in all

three activities, but they still appear to be more persistently lonely as compared to those living with their family. Given the collectivistic nature in Chinese culture, it seems likely that living with family members prevents loneliness more than the active participation in activities. As indicated in past research, factors such as family support, emotional support from adult children, and satisfaction with family relationships strongly protects against loneliness among older persons in China (Wang et al., 2011; F.; Yang et al., 2018; K.; Yang & Victor, 2008).

By contrast, relatively few older adults are participating in social activities, especially among females, the rural dwellers, those with no formal schooling, and the oldest-old. A previous sociodemographic profile of the oldest-old in China showed that women were far more disadvantaged than men, and most had none or very little schooling (Zeng, Vaupel, Xiao, Zhang, & Liu, 2002). Those living in rural areas were worse-off than their urban counterparts, as the former were significantly less educated and more likely to be widowed. Thus, these inequalities in health and economics pose a challenge for aging persons to remain socially engaged and active (Arslantas, Adana, Abacigil Ergin, Kayar, & Acar, 2015; Asiamah, 2017). It is also likely that majority who are at an advanced age would have withdrawn and disengaged from social and leisure activities, as life expectancy will influence whether frequent social engagement can be maintained (Asiamah, 2017).

Consistent with the Activity Theory, bivariate analysis shows that frequent participation in three simple leisure activities are associated with lower prevalence in persistent loneliness among older adults. Older Chinese who play cards/mahjong, watch TV or listen to the radio, and participate in social activities frequently are less lonely compared to those who do not. As social beings, people have a basic need to belong. Activities that involve social interaction such as playing mahjong and participation in social activities are especially beneficial for emotional fulfillment (Baumeister & Leary, 1995; Hughes, Waite, Hawkey, & Cacioppo, 2004). Maintaining social engagement and frequent social participation not only prevents loneliness, but also improves one's well-being in later age (VanderWeele et al., 2012).

Findings from multivariate analysis suggest that the frequent playing of cards/mahjong can likely prevent persistent loneliness among the young-old, but not among the oldest-old. Conversely, frequent TV/radio entertainment may be especially beneficial in preventing persistent loneliness among the oldest-old. This situation is supported by F. Yang et al. (2018) who showed that correlates of loneliness in older adults depend on age, and varies between the young-old and the oldest-old. The basis for this is that there are two stages in later life (Baltes & Smith, 2003), where the young-old are more socially engaged, have better cognitive functions and health. Whereas the oldest-old often face increased limitations in their mobility, suffer from multimorbidity, and cognitive decline. There is support for the Activity Theory nonetheless, although age-differential patterns reveal that effects of activity are specific to different stages in later life. These differentials may also indicate that older persons in China are successfully adapting to aging (DeLiema & Bengtson, 2017).

Playing mahjong has an added benefit of cognitive stimulation, and

it was found to have the therapeutic effects of preserving functioning or delaying decline in specific cognitive domains, even in those with significant cognitive impairment (Cheng et al., 2014). Cognitive stimulating activities can indirectly improve one's psychological well-being (Ross & Zhang, 2008). It can also protect against the worsening of mental health, and thus decrease the likelihood of becoming lonely (Aartsen & Jylhä, 2011). Playing mahjong has also been found to be a viable treatment option for dementia (Cheng, Chan, & Yu, 2006). Participating in the activity can maintain cognitive abilities or delay cognitive decline in older persons suffering from dementia (Cheng & Chow, 2011; Cheng et al., 2014). Furthermore, regular mahjong activities can have long-term cognitive benefits, which can even be seen among those with significant cognitive impairments living in nursing homes. Hence, playing mahjong is a suitable activity in preventing loneliness as well as maintaining cognitive abilities, which can be adopted into the routine for older adults.

It appears that older males are more likely than females to play cards/mahjong, and this corroborates with findings for older Chinese living in Chinese communities in Chicago and Sydney (R. Chen et al., 2015; Zheng, Walker, & Blaszczynski, 2010). Playing mahjong often involves money, with the amount pre-determined among the players (Greene, 2015; Paul, 2007). The cost involved may explain why the game is more popular among the young-old, the urban dwellers, and those with some education who tend to have more financial resources for the game, as compared to their counterparts who are older, living in rural areas and with no education. Coincidentally, financial resources have been found to be positively associated with happiness among Chinese people (Wei et al., 2015). Winning the card/mahjong game may not be an important motivation to play the game for some people and most people played for token sums (Greene, 2015). Although, there is a tendency for players to gamble on mahjong, especially among males (Zheng, Walker, & Blaszczynski, 2011).

Although watching TV or listening to the radio are passive activities, which are not associated with social connectedness (Toepoel, 2013), these activities are effective in preventing persistent loneliness. Past studies have indicated that watching TV brings happiness and is associated with improved psychological well-being among older Chinese (Ross & Zhang, 2008; Wei et al., 2015). TV and radio provide entertainment and is a form of escapism for older persons (Henning & Vorderer, 2001), who are often susceptible to declines in health and functional abilities, typically associated with the aging process. However, some studies in the United States found contradictory results, where more hours of TV viewership is associated with more unhappiness with their lives, especially among the elderly (Morgan, 1984; Sirgy et al., 1998). In China, watching TV may be a form of socialization where older persons do not usually watch alone but with other members in a household, providing opportunities for a lively discussion about the shows they see on TV (Ross & Zhang, 2008). Older Chinese with few other sources of information may find TV programmes, such as history programmes and dramas, intellectually engaging. Since the 1990s, there has been a high rate of TV penetration in Chinese households (S. H. Lu, 2000). TV dramas are immensely popular in China and historical series have dominated on primetime TV since the mid-1990s (Zhu, 2005). Interestingly, Chinese people who frequently watch TV dramas tend to be happier than others (Lu & Argyle, 1993). As watching TV appears to be socially engaging for older Chinese, this activity will likely lead to less feelings of loneliness among them (W. Zhang, Liu, Tang, & Dong, 2018).

There is a need for innovative intervention strategies to engage more older people in these three leisure activities. As the older population is not homogenous in terms of health and social characteristics, it is more effective to tailor age-specific intervention programmes. For example, community center programmes may host frequent weekly mahjong sessions for the young-old at minimal or no cost at all, or organize public viewing of TV programmes for all older persons. Both activities can also easily be integrated into the daily routine of those staying in institutions or nursing homes for the aged (Fernandez-Mayoralas et al., 2015).

Considering the comparatively lower participation in social activities, perhaps more varied social activities are needed. Activities may include socio-cultural activities, senior day care programmes, visiting friends and relatives, and involvement in community activities. Besides that, national policies should encourage participation in community volunteer programs based on functional ability and not on age (Shea, 2018). Older adults may even be active contributors to community eldercare, which in turn, may lead to more social engagement and enhanced quality of life. Gender-specific intervention programmes may also be effective to encourage more active participation among older women, who tend to have higher risk of loneliness.

There are limitations to this study. Due to limited questions on leisure activities in the CLHLS, only three types of leisure activities were examined, as against the six categories of leisure activities as suggested by Ragheb (Beard & Ragheb, 1980). Nevertheless, playing mahjong and watching TV are the preferred activities among older Chinese (Wei et al., 2015), as shown in the findings. Since this paper focuses on the effects of leisure activities, the effect of leisure-time physical activity on loneliness was not examined. However, although regular physical activity has been shown to have many health benefits, older people are unlikely to be physically active, either due to lack of interest or reasons related to old age such as shortness of breath and joint pains (Crombie et al., 2004).

In this analysis, loneliness is a subjective measure based on self-assessment and response to a single question by the respondents. The reliability of such measures has often been questioned, considering that loneliness is a multi-dimensional concept. Hence a composite measure of loneliness, rather than a single response, may have been more reliable (De Jong Gierveld & Van Tilburg, 2006). However, it is important to take into consideration the difficulties of understanding the concept of loneliness, due to differences in the cultural and social environment (Luo & Waite, 2014; Victor, Grenade, & Boldy, 2005). Therefore, a single question may be adequate in this case. Although forcing the loneliness variable into a dichotomous variable to indicate persistent levels of loneliness may lead to considerable loss of information, it is to be noted that persistently feeling lonely is the focus of this study as it is a matter of grave concern (Alpass & Neville, 2003; Fees et al., 1999; Hauge & Kirkevold, 2012; Jaremka et al., 2013; Koropecyk-Cox, 1998; Park, Jang, Lee, Haley, & Chiriboga, 2012; Peplau & Perlman, 1982; Pitkala, Routasalo, Kautiainen, & Tilvis, 2009; VanderWeele et al., 2012).

Conclusion

This study uses longitudinal data that allows an analysis of the effects of leisure activities in preventing loneliness among aging persons in China. The findings contribute to the knowledge of the relationship between the feelings of loneliness and participation in three leisure activities. The frequent playing of mahjong, a leisure activity steeped in a nation's culture and heritage, may be used as one of the intervention strategies to delay cognitive decline and alleviate loneliness among older people. This study is important because China has a large number of older adults, and there are Chinese populations around the world that also play cards/mahjong. Moreover, if more studies are to be carried out to establish the benefits of the mahjong game, it may be introduced to people of other cultures as well. Activities such as watching TV or listening to the radio, as well as participation in social activities, are also useful in preventing loneliness. However, relatively few older people are engaged in playing cards/mahjong and social activities. Because of the high prevalence of loneliness among older persons in China, all stakeholders including the relevant authorities, the community, and the family should seriously consider the promotion of leisure activities among older persons, especially among the females, the rural dwellers, and those with no schooling. Future research could be done to ascertain other types of leisure activities that are effective in preventing and alleviating loneliness among older people for the introduction of intervention strategies.

Conflicts of interest

The authors declare no conflict of interest.

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Ethical approval

The CLHLS was conducted using the guidelines laid down in the Declaration of Helsinki, and all procedures involving human subjects/patients were approved by Biomedical Ethics Committee of Peking University. Permission to use data for this paper was given by Duke University. Since we used secondary data with no identifiable information, no formal approval from an institutional review board was required for this study.

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