Role of social support in cognitive function among elders in central China.

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Abstract:

Aims and objectives. To examine cognitive function and its relationships to demographic characteristics and social support among elders in central China.

Background. Cognitive decline is prevalent among elders. Few studies have explored the relationship between social support and cognitive function among elders.

Design. A cross-sectional, descriptive correlational study.

Methods. A quasi-random, point of reference sample of 120 elders residing in central China was recruited for study. Instruments used included a: Socio-demographic Questionnaire, the Multidimensional Scale on Perceived Social Support and the Mini-Mental State Examination. Hierarchical multiple regression was performed to examine the relationships among demographic variables, social support and cognitive function.

Results. Age, education and social support accounted for 45·2% of the variance in cognitive function. Family support was the strongest predictor of cognitive function. Elders who had higher educational levels and more family support had better cognitive function.

Relevance to clinical practice. Community healthcare providers should consolidate social support among elders in China and use family support interventions to reduce or delay cognitive decline, especially among those of increased age who are illiterate.

Conclusion. Elders who had higher educational level and more family support had better cognitive function levels. Interventions that include family support are needed to improve cognitive function among elders in China.

Keywords: China | Chinese elders | cognitive function | social support

Article:

Introduction

Fundamental, social, economic and nutritional changes have resulted in the cognitive decline among the elders of Chinese population. According to the Population Division of the Department of Economic and Social Affairs of United Nation (2009), the Chinese population above 60 years of age will be expected to increase from 12% in 2009 to 31% in 2050. Correspondingly, the prevalence of cognitive disorder or dementia is expected to increase. At present, approximately 26·6 million people globally have dementia, and the number is predicted to reach 106·2 million worldwide by 2050 (Brookmeyer et al. 2007). Furthermore, the prevalence of dementia also increases with advancing age. Among individuals living in the Western countries, the percentage affected by dementia rises sharply from 1% at age 60–64 years to approximately 25–35% among those aged 85 years and older (Breteler et al. 1992). In comparison, 3·5% of the population in China is estimated to have dementia, and the percentages by increasing age appear to mirror the trends in the West (Zhang et al. 2005). Dementia is a clinical syndrome characterised by a decline in cognitive and memory abilities. Overtime, the condition often progresses to the point that it may interfere with a person's daily functioning and quality of life (Scanlan et al. 2007), and also place a great financial burden on family and society (Ernst & Hay 1994, Maslow 2004). Currently, there is no cure; therapeutic interventions can only help control symptoms or slow the disease's progression. Thus, identifying protective factors or effective prevention strategies to promote optimal cognitive function as the population ages is becoming more and more important. Most studies exploring the factors affecting cognitive function have been based on data collected in Western countries, and these findings may not be applicable to Chinese elders, because of social, cultural and lifestyle differences. Accordingly, further research of factors influencing cognitive function among Chinese elders is merited. This is especially important for Chinese elders who were denied education in their early life and now experience social, financial and cultural constraints and hence, they are more likely to have cognitive impairment (Kalaria et al. 2008).

Background

Demographic characteristics and cognitive function

Education is an influential factor in the maintenance of cognitive function (Carret et al. 2003, Hao et al. 2006, Tyas et al. 2007, Taboonpong et al. 2008, Wilson et al. 2009). Elders with a low level of education have been found to be at increased risk of Alzheimer's disease and other types of dementia (Hao et al. 2006), while higher education has been associated with higher levels of cognitive performance in later life (Wilson et al. 2009). Gender has also been linked to risk for cognitive decline, with higher incidence and prevalence rates observed among women than men (Yen et al. 2004, Zhou et al. 2006, Anderson et al. 2007).

Elders with lower levels of income have been found to have a higher prevalence of cognitive impairment (Ramirez et al. 2007). Additionally, various chronic diseases are risk factors for

impaired cognitive function in late life (Gregg & Brown 2003). Clearly, because health tends to deteriorate with advancing age, the risk of cognitive impairment also increases with age (Breteler et al. 1992). Furthermore, elders living in urban areas are more likely to adopt lifestyles associated with cardiovascular disease and other risk factors (Zhai & McGarvey 1992, Zimmer & Kwong 2004).

Perceived social support and cognitive function

Social support has been shown as an important protective factor in maintaining cognitive function of elders. Several studies have found social support to be associated with lower risk of cognitive decline (Kawachi & Berkman 2001, Seeman et al. 2001, Ficker et al. 2002, Zunzunegui et al. 2003, Green et al. 2008). The effects of social support on cognitive function among elders have not been consistent in the literature. For example, a previous research study reported that elders in good health who have received more instrumental supports were negatively associated with cognitive function ($p < 0{\cdot}05$) (Seeman et al. 1996).

Social support usually refers to the provision of psychological and material resources for the individual by significant others such as family members or friends (Barrera 1986). Elders with established social network resources may have a better chance of receiving help and tend to live longer (Avlund et al. 2004). Elders reporting greater numbers of social ties with others and more social support have also shown better mental and physical health outcomes (He 2002). One longitudinal study showed that married couples were at less risk for cognitive decline than those who were widowed, divorced or separated (Fratiglioni et al. 2000). Individuals who lived alone were at higher risk for dementia than those who lived with others (e.g. spouse, children, caretaker) (Sibley et al. 2002). In Western countries, many studies suggest that social support plays an important role in maintaining elders' cognitive function (Kawachi & Berkman 2001, Seeman et al. 2001, Ficker et al. 2002, Zunzunegui et al. 2003, Green et al. 2008). For example, a low level of perceived social support has been found to be associated with cognitive impairment in community-dwelling elders (Ficker et al. 2002). Elders with little social support also have been found to have poorer cognitive ability and a 60% greater chance of suffering from dementia (Zunzunegui et al. 2003). Similarly, previous research has shown that supportive interactions with friends and family have beneficial effects on elders' cognitive function (Kawachi & Berkman 2001). Studies indicated that elders' social support from informal community networks encompassed close family, friends, neighbours and the church 'family'.

In China, studies have found that intergenerational support (especially financial support from children) may improve the cognitive function of elders in rural areas (Wang & Li 2008, Deng et

al. 2010). But rapid economic development and social change have reduced opportunities for elders to co-reside with their children, particularly with married sons (Zimmer & Kwong 2003), and has weakened daily care and emotional support for elders (Knodel & Ofstedal 2002, Zhang & Li 2005, Gleis & Mu 2007). This shift is not simply a demographic problem, but is also a social one, as existing governmental support structures may be unable to meet elders' health and social support needs. Therefore, this study examined the relationships of demographic characteristics and social support to cognitive function among elders in central China.

Methods

Design, setting and sample

The study used a cross-sectional, descriptive and correlation design. A sample was recruited from the elder populations of three communities in Shiyan city of Hubei province in China. Hubei province is located in central China and has a long history of agricultural production. Approximately, 60 million people live in Hubei province, of which 52% are men (National Bureau of Statistics of China 2000). The mean annual per capita income is <5525 Renminbi (RMB) or US$690·5 in cities and 2269 Renminbi (RMB) or US$283·6 in the countryside (Provincial Statistics Bureau of Hubei 2000). Shiyan City is in a primarily agricultural district located in the north-west of Hubei province, with a population of approximately 3·4 million inhabitants. The mean annual per capita income is 4657 Renminbi (RMB) or US$582·1 in the urban areas and 1487 Renminbi (RMB) or US$185·9 in rural areas (Municipal Statistics Bureau of Shiyan 2000).

A quasi-random, point of reference sample of 120 elders living in the community was recruited. Participants were aged 60 or over; able to speak and read Chinese; living at home; and without a known history of mental illness. The study was approved prior to data collection by the University and community health centres. The first author contacted the administrators of three community health centres in Shiyan City and obtained permission for data collection. Information about the study was then distributed in these community health centres. The first author visited potential participants for recruitment and explained the study to them. Once informed consent was obtained, the questionnaires were administered at participants' homes. Health-related medical history and other information provided by participants were verified by reviewing their health file, with participants' permission. It took about 20–30 minutes for each participant to complete the questionnaires. The study was conducted from July–August 2009.

Measures

Demographic questionnaire. A socio-demographic questionnaire included age (recorded in years, 0 = 60–69; 1 = 70–79; 2 = 80 and over), gender, education (0 = illiteracy; 1 = primary school; 2 = middle school and above), marital status (0 = married; 1 = widowed; 2 = divorced/separated; 3 = single), chronic diseases (0 = no disease; 1 = one kind of disease; 2 = more than one kind of disease), income (0 = <500; 1 = 500∼999; 2 = 1000∼1499; 3 = ≥1500) and residential arrangement (0 = living alone; 1 = living with caregiver; 2 = living with spouse; 3 = living with spouse and children).

Social support was assessed using the 12-question Multidimensional Scale of Perceived Social Support (MSPSS) developed by Zimet et al. (1988). Each question is answered on a 7-point scale, from 7 = very strongly agree to 1 = very strongly disagree. Three areas of perceived social support are included: support from family; support from friends; support from a significant other. Each subscale is summed and divided by 4, and all item scores are summed and divided by 12. Scores can range from 12–84, and higher scores indicate greater perceived social support. Reliability and validity of the Chinese version of this scale have been demonstrated in a number of studies (Chen & Silverstein 2000, Wong et al. 2005). In this study, alpha coefficients for the scale and subscales were 0·81, 0·70, 0·72 and 0·76, respectively.

Cognitive function was measured by the Mini-Mental State Examination (MMSE) (Folstein et al. 1975). This scale consists of 30 questions that test cognitive orientation, attention, recall and language. Scores range from 0 (worst) to 30 (best), and individuals are considered cognitively impaired if they score below 24. The Chinese version of the MMSE which was used in this study has been shown to be reliable and valid with Chinese elders (Hao et al. 2006, Wang & Li 2008, Yao et al. 2009). The alpha coefficient for the scale was 0·72 in this study.

Analytic strategy

Descriptive statistics analyses were used to describe the characteristics of the study sample. Hierarchical multiple regression analyses were used to address the relationships among demographic characteristics, social support and cognitive function.

Results

Characteristics of the participants

The sample consisted of 120 participants. Demographic characteristics are presented in Table 1. The average age of participants was 71·42 years (SD 7·18 years), with a range of 60–86 years.

Participants were mainly men. The majority were married (78·3%) and lived with their spouses (50%) or with spouse and children (40%); only 7% lived alone. Most had completed primary school or above (80·9%). The majority (51·7%) reported having no chronic diseases; 69·2% reported having an individual pension <1000 Yuan per month.

Table 1. Demographic characteristics data (*n* = 120)

Variables	Frequency	%	Mean	SD
1. Total PSSS, total social support; family PSSS, family support; friends PSSS, friends support; other PSSS, significant other support.				
Gender				
Male	75	62·5		
Female	45	37·5		
Age (years)				
60–69	52	43·3		
70–79	49	40·9		
80 and over	19	15·8		
Marital status				
Married	94	78·3		
Widowed	20	16·7		
Divorced/separated	4	3·3		
Single	2	1·7		
Residential arrangement				
Living alone	8	7·0		
Living with caregivers	4	3·0		

Variables	Frequency	%	Mean	SD
Living with spouse	60	50·0		
Living with spouse and children	48	40·0		
Education				
Illiteracy	24	20·1		
Primary school	28	23·3		
Middle school and above	68	57·6		
Income				
<500	48	40·0		
500~999	35	29·2		
1000~1499	22	18·3		
≥1500	15	12·5		
Chronic disease				
NO	62	51·7		
One kind of disease	43	35·8		
More than one kind of disease	15	12·5		
Total PSSS			4·67	0·510
Family PSSS			3·81	0·866
Friend PSSS			6·31	0·589
Other PSSS			3·90	0·915

The mean MMSE score was 24·23 (SD 4·06), and a range from 12–30. The mean MSPSS score was 4·67 (SD 0·510) on a seven-point scale (Table 1). The mean score on friend support was 6·31, which was highest among the three sources of social support; the mean score on family support was lowest (3·81).

Correlational analyses

Pearson's correlation matrices of cognitive function were examined using subjects' demographic characteristics (gender, age, education, chronic disease, marital status, residential arrangement and income) and social support. Education ($r = 0{\cdot}40$; $p < 0{\cdot}05$), income ($r = 0{\cdot}23$; $p < 0{\cdot}05$), total social support ($r = 0{\cdot}21$; $p < 0{\cdot}05$) and family support ($r = 0{\cdot}26$, $p < 0{\cdot}01$) were significantly associated with cognitive function. As expected, age was negatively associated with cognitive function ($r = -0{\cdot}30$, $p < 0{\cdot}001$).

Multiple regression analysis

Multiple hierarchical regression analyses were conducted to determine whether demographic characteristics and social support predicted cognitive function (Table 2). Demographic characteristics (gender, age, education, chronic disease, marital status, residential arrangement and income) were entered first into the equation as a block, followed by total social support, family support, friend support and other support. Standardised regression coefficients (Beta) were reported from the end of block entry, with all variables in the equation. Demographic characteristics and social support together explained 45·2% of the variance in cognitive function. The F-test for the overall model was statistically significant ($p < 0{\cdot}01$). Among the demographic characteristics, age and education were significant predictors of cognitive function. Family support also was a significant predictor.

Table 2. Multiple regression analysis of variables on cognitive function (*n*=120)

Variables	***β***	***B***	**SE**	R^2	**Adjusted** R^2	***F***	***F* change**
Step 1				0·290	0·245	6·568**	7·856***

1. Total PSSS, total social support; family PSSS, family support; friends PSSS, friends support; other PSSS, significant other support.
2. *$p < 0{\cdot}05$; **$p < 0{\cdot}01$ and ***$p < 0{\cdot}001$.

Variables	*β*	*B*	SE	R^2	Adjusted R^2	*F*	*F* change
Gender	0·203	1·760	0·932				
Age	−0·247**	−0·145	0·051				
Education	0·429**	2·260	0·537				
Chronic disease	0·261	1·025	0·445				
Marital status	−0·200	−1·504	0·713				
Residential manner	−0·046	−0·274	0·662				
Income	−0·034	−0·127	0·385				
Step 2				0·498	0·452	10·803**	2·051*
Gender	0·179	1·546	0·811				
Age	−0·215**	−0·126	0·068				
Education	0·418**	2·200	0·466				
Chronic disease	0·132	0·866	0·694				
Marital status	0·006	0·043	1·685				
Residential manner	0·010	0·059	0·739				
Income	0·094	0·053	0·335				
Total PSSS	0·020	0·109	0·065				
Family PSSS	0·212**	0·225	0·096				
Friends PSSS	0·027	0·036	0·071				
Other PSSS	−0·013	−0·015	0·084				

Discussion

This study examined the relationships of demographic characteristics and social support to cognitive function among a sample of elders living in central China. The MMSE scores indicated that the cognitive functioning of the elders was within the normal range. This may be explained by two findings. First, the participants in this study were mainly married (78·3%), and previous research has shown that married couples are at less risk for cognitive decline than those who are widowed, divorced or separated (Fratiglioni et al. 2000). Second, >80·9% of the elders in this study had completed primary school education and thus were more likely to engage in outdoor physical, social and cultural activities and reading, all of which may have helped to maintain better cognitive function, than their less-educated counterparts (Glei et al. 2005).

Age was negatively associated with cognitive function, which is consistent with previous findings (Hao et al. 2006, Motta et al. 2008, Yao et al. 2009) that cognitive function tends to decline with increasing age. The negative relationship between age and cognition presumably is attributable to the brain's ageing and atrophy (Elwan et al. 2003). Additionally, an important factor compared with the young age is the high prevalence of geriatric frailty, which is associated with increased dependence in activities of daily living and increased risk of cognitive decline in elders (Topinková 2008).

Also, consistent with prior studies (Carret et al. 2003, Hao et al. 2006, Tyas et al. 2007, Taboonpong et al. 2008, Wilson et al. 2009), education was positively correlated with cognitive function, suggesting that education is a major protective factor against cognitive impairment (Tze-Pin et al. 2007). It may be that education provides regular and persistent stimuli for the development of higher cognitive abilities, mental activities during later life and thus can maintain one's cognitive reserves (Andel et al. 2006). However, Evans et al. (1993) did not find that education was correlated with cognitive function in later life.

Chronic disease was not significantly associated with cognitive function. However, in this sample, more than half of the participants did not suffer from any disease. Also, most (90%) were living with their spouse or with their spouse and children, and they may have received considerable emotional support to help maintain cognitive function (Seeman et al. 2001).

Income had a significant effect on cognitive function, which is similar to the findings of Ramirez et al. (2007) that cognitively impaired individuals reported lower incomes. Also Lynch et al. (1997) found that people experiencing sustained economic hardship were more likely to have

poor physical, psychological and cognitive function. Conceivably, elders with high incomes are more likely to use healthcare services that help them maintain better cognitive function.

This study found a significant relationship between social support and cognitive function, consistent with previous findings that elders with more social support had better cognitive function (Kawachi & Berkman 2001, Seeman et al. 2001, Ficker et al. 2002, Zunzunegui et al. 2003, Green et al. 2008). Just as He (2002) found significant protective effects of social ties and social support on both mental and physical health, and this study suggests protective effects of social support on cognitive function.

This study also found that family support in particular had a significant positive effect on cognitive function. However, neither friend support nor significant other support was significantly correlated with cognitive function in this study. A study of African Americans found that elders who had social support provided by their friends rather than their family maintained better cognitive function (Brown et al. 2009), but this difference may be owing to cultural differences between Western and Chinese societies. In Chinese culture, children's responsibility for their parents' well-being not only is socially recognised, but is part of the national legal code (Zeng 1991). Thus, most of the elders in this study expected their family members to be their primary providers of support. Also, because of the lack of formal support systems, such as community health services, many Chinese elders have little choice but to rely on their children or spouse for financial, instrumental and emotional support. Other studies have reported that intergenerational support (especially financial support from children) may improve the cognitive function of elders in China (Wang & Li 2008, Deng et al. 2010). Additionally, studies also have shown that psychological support from family members is especially beneficial for the maintenance of cognitive abilities (Siu & Phillips 2002). This may explain why the effect of family support was greater than that of other types of support.

Many elders in China, in spite of changes in population structure, still maintain their traditional culture by keeping in close contact with neighbours and friends, throughout their life. Therefore, they have continuous mental stimulation to help them maintain cognitive function (Yeh & Liu 2003). Holtzman et al. (2004) found that more frequent contact with larger social networks was associated with less cognitive decline over 12 years. Further study of the relationship between friend support and cognitive function and between significant other support and cognitive function is needed.

Limitations

There were some limitations that should be considered when interpreting the results of this study. A quasi-random sample was used, which may influence the generalisability of study findings. Because of the cross-sectional study design, it is not possible to establish causality, for example, between social support and cognitive function. Participants were younger than the general population, and many female participants were excluded from the study owing to low levels of literacy. Thus, study results might not represent populations at greatest risk of cognitive decline. Furthermore, information bias may have occurred owing to the cognitive status of some participants. While the current study is exploratory in nature and potentially prone to the aforementioned bias, it nonetheless provides useful insights into future studies of social support and cognitive function among elders in China.

Relevance to clinical practice

The results of this survey are consistent with prior findings that have demonstrated a relationship between social support and cognitive function, and thus suggest that family support is a significant predictor of cognitive function. Family support may help Chinese elders maintain better cognitive function; however, the Chinese ‘4-2-1’ family structure (four grandparents, two parents and one child in a family) might pose a definitive challenge for family support. Therefore, it is important to enhance the type of social support and improve the quality of life for elders. The study findings may be of use to local community programme planners in designing systems to complement social support for the ageing population in China. The study suggests that community healthcare providers should consolidate social support among elders in China and use family support interventions to reduce or delay cognitive decline, especially among those of increased age who are illiterate.

Conclusion

This exploratory study examined the relationship among demographic characteristics (age, gender, education, chronic disease, marital status, residential manner and income), social support and cognitive function. The findings suggest that elders who had higher educational level and more family support had better cognitive function levels. Further investigations of this vulnerable population are needed, especially randomised efforts aimed at improving cognitive function through better family support and education.

Contributions

Study design: SZ, JH; data collection and analysis: SZ, JH, JTE and manuscript preparation: SZ, JH, JTE.

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