Depression among Middle Aged and Elderly People in China —Evidence from CHARLS

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1. INTRODUCTION

Concerning ageing, China is considered one of the most important developing countries in the world. China's population, the largest in the world, is ageing rapidly due to dramatic decreases in fertility and increases in life expectancy. The changes have produced and will continue to produce large proportions of elderly people in China. By 2000, China's population ages 65 and older had reached almost 90 million, and the number could reach over 300 million by 2050(Population Reference Bureau, 2010).

In the past decades, China has focused more on matters of population control than population ageing. In the early 1970s, the Chinese government attempted to establish a nationwide fertility control program that encouraged later marriages, more space between birth, and fewer children. Because of the large number of children born during the early 1960s (Chinese "Baby Boom"), Chinese leaders in the mid- to late 1970s became increasingly worried about demographic momentum and concomitant growth potential of this extraordinarily large cohort. Therefore, in 1979 they launched the *One-Child Policy*, requiring most families (except minorities) to have no more than one child, especially those living in urban areas (Yi, Poston, Vlosky, & Gu, 2008). China's fertility rate has experienced a drastic decline from levels of greater than six children per women in the early 1950s to under two in the late 1990s to 1.7 in the year 2015 (Population Reference Bureau, 2015). Along with the increasing levels of socioeconomic development, the proportion of the elderly population has become more prominent.One of the problems resulting from the increasing elderly population is the inadequate number of producers. An aged dependency ratio (ADR) is defined as the number of persons age 65+ divided by the number of persons age 15-64. According to previous research, China's ADR is projected to increase from 10 aged dependents per 100 producers in 2000 to 37 aged dependents per 100 producers in 2050, one of the oldest countries in the world(Yi, Poston, Vlosky, & Gu, 2008).

One of the implications of these findings is that the provision of eldercare will be a major concern in China.Traditionally, the parents lived with the oldest son, who is either with or nearby the other sons. On the one hand, the sons are responsible for providing the parents with economic support. On the other hand, the sons' sisters or wives assist them in providing their parents with emotional support (Yi, Poston, Vlosky, & Gu, 2008).The provision of support to the elderly has seldom been a major burden with modestly high levels of fertility. However, given the high speed of fertility transition, China has little time to evolve a non-familial old age support system for elderly care to replace the traditional family support. Unlike past decades in which several married sons, along with their sisters are available to look after the elderly parents, the situation in the next three to four decades will be very different: there will be many more elderly, including parents and aunts and uncles, requiring care but not enough children(Yi, Poston, Vlosky, & Gu, 2008). Furthermore, the backbone of China's industry, "migrant labor," consists of the "only-child"generation from rural or less developed urban areas. The migrant trendhas exacerbated the elderly care problem: more than 54% of urban elderly and more than 45% of rural elderly live alone with limited accessibility of care;dubbed as "Empty-Nesters," this group of elderly people will grow to more than 0.2 billion by 2030 in China(Wei, 2013). Moreover, the Sixth National Population Census of the People's Republic of China found that the proportion of elderly people in rural areas is 1.69 times that in urban areas, and the rural elderly are three times more likely than the elderly from urban areas to live under the poverty line (Haiwai wang, 2015).

Apart from physical dysfunctions, the elderly, especially those in rural areas, are also likely to suffer from mental health problems due to lack of access to family and social support. In this study, we aimed to extend current literature by examining the factors that influence the depression level among middle aged (45) to elderly (65+) individuals.

2. LITERATURE REVIEW ON DEPRESSION

According to WHO disease estimates, mental illness has been acknowledged as the most important cause of disability among other top health challenges, particularly in low and middle income countries (WHO, 2005). Depression is a significant mental health problem that is seen among middle aged and elderly people. Depression is usually underdiagnosed and undertreated in primary care but may lead to important loss of abilities and problems with daily activities in later life(WHO, 2015). In sociology, most widely studied outcomes of depression are major/clinical depression and depressive symptoms. Major depression is defined as a pervasive and persistent low mood characterized by low self-esteem and a loss of interest or pleasure in daily activities (Wikipedia, 2015). Depressive symptoms, on the other hand, are usually measured in survey research as the current sum of indicators of depressed mood(Ferraro & Wilkinson, 2013). In this study, we mainly focus on depressive symptoms.

Previous studies about contributors to depression among middle aged and elderly individuals focused on negative and positive factors. For negative factors, many sociological research provided evidence of the relationship between age and depressive symptoms. It is either a j- or a u-shaped relationship in that depressive symptoms are high during young adulthood, lowest in middle age, and highest in old age (Kessler, Foster, Webster, & House, 1992; Ross & Mirowsky,2008; Schieman, Van Gundy, &Taylor, 2001). Researchers speculate that life transactions in different social roles at different ages resulting in higher level of depressive symptoms (Ross&Mirowsky,2008). Researchers in Australia studied the association between working status and psychological distress. Their results show an association of working status (being fully retired or unemployed) and high levels of psychological distress for men and women aged 45 to 64 and for men aged 65 to 74; other factors like ill health, being made redundant or caring duty were associated with the high level of psychological distress among retirees(Vo, et al., 2015).

Gender is another factor that contributes disparities in levels of depression. On average, women have higher lifetime prevalence of depressive symptoms than men, even though the level differences shrink over time (Yang & Lee, 2009).Demura and Sato (2003) stated, "Depression increases in the old-old elderly rather than in the young-old elderly and is highest in old-old females." Kockler and Heun (2002) also pointed out that "women in general population suffered from more depressive symptoms than men." Furthermore, they found that elderly depressed women had more appetite disturbances whereas elderly depressed men had more agitation.

Marital status has long attracted sociologists due to its association with family. Married people with spouses are generally in better mental health than non-married people or people with no partners (Ferraro & Wilkinson, 2013). In Japan, researchers found out that among married elderly who have children, social support from a spouse has a stronger correlation with their mental health than support from their children or friends; among those without a spouse, social support from their children is then strongly associated with their mental health(Okabayashia, Liangb, Krausec, Akiyamad, & Sugisawae, 2004).

Education is one of the indicators of socio-economic status (SES) but its association with level of depression symptoms is uncertain. Lorant et al.(2003) indicated that low SES individuals had higher odds of being depressed but results may vary according to the way psychiatric disorder is measured, the definition and measurement of SES, and the context (e.g. time and location). Similarly, when Cole et al. (2003) used meta-analysis to test risk factors for depression among elderly community subjects, the results indicated that a lower education level does not appear to increase the risk of depression.

Depression may vary from place to place. Philip et al (2009) pointed out that it is important to specify the association between the specific health outcomes among the particular type of persons residing in particular placessuch as urban and rural.In China, neighborhoods can be defined by *hukou*, a record in household registration system that is required by law. The *hukou*system is seen as inner country "green card" system in that it denies rural population the access to better resources of education, employment, health care, and pension in urban areas (Liu, 2004). Recent study on the effects of family, community, and public policy on depressive symptoms among elderly Chinese, indicated that those who lived in rural *hukou* areas had greater level of depressive symptoms compared to those who lived in urban *hukou* areas (Zurlo, Hu, & Huang, 2014). Research in other countries likeJapan and the United States either find no significant difference or a rural advantage in the pattern of rural-urban difference(Li, Liu, Xu, & Zhang, 2015).

Self-rated health has a positive association with depression, especially among the elderly. Alpass and Neville (2003) investigated the associations among loneliness, health, and depression in males in New Zealand, indicating that "a diagnosis of illness or disability was unrelated to depression, however self-reported health was associated with depression, with those reporting poorer health experiencing greater depression." Other research on African American women as well as on middle aged and elderly population in Western Sweden also confirm the positive associations

between depression and self-rated health (Schulz, Gravlee, Williams, Israel, Mentz, & Rowe, 2006; Molarius & Janson, 2002).

3. SAMPLING METHODS AND DATA RESOURCES

I use data from the China Health and Retirement Longitudinal Study (CHARLS) for secondary data analyses. CHARLS is a nationally representative longitudinal survey of people in China 45 years of age or older and spouses, including comprehensive study of social, economic, and health circumstances of community-residents. A pilot survey for CHARLS was conducted in Zhejiang and Gansu provinces in 2008, on 2,685 individuals representing both rural and urban settings (CHARLS). By examining health and economic adjustments to rapid ageing of the population in China, the national baseline survey (wave 1) was conducted between June 2011 and March 2012 involving 10,000 households and 17,500 individuals in 150 counties/districts and 450 villages/resident committees (CHARLS). All samples were drawn in four stages: county-level sampling, neighborhood-level sampling, house-hold level sampling, and respondent-level sampling. In the first stage, 150 county-level units were randomly selected with a probability-proportional-to-size (PPS) sampling technique from all county-level units except Tibet. The sample was stratified by region and within region by urban or rural districts and per capita statistics on gross domestic product (GDP). The final sample of 150 counties fell within 28 provinces. At neighborhood level, administrative villages (cun) in rural areas and shequ in urban areas are primary sample units (PSUs). Three PSUs were selected within each county. At household level, in each PSU, a sample of dwellings was selected from our frame which was constructed based on maps prepared by mappers/listers with the support of local informants. In order to get an accurate sample frame of households in each village or community, a mapping/listing software named CHARLS-GIS was developed. In terms of respondents, a researcher randomly selected one of the household members who met their age eligibility or residence criterion to conduct an interview. A proxy respondent would be identified if an age-eligible person was too frail to answer questions. The respondents are followed every 2 years with a face-to-face computer-assisted personal interview. Modules of CHARLS questionnaire includes: demographics, family structure/transfer, health status and functioning, biomarkers, health care and insurance, work, retirement and pension, income and consumption, assets (individual and household), and community level information. Two waves of data were released so far. In this paper, I work on wave 1 data set.

4. MEASUREMENT AND VARIABLES

Dependent Variables

My research is aimed at understanding the depression level among people aged 45 and older. The survey used short form of the Center for Epidemiologic Studies Depression Scale (CES-D), a self-report measure of depression severity, to measure the depression level. There are ten questions in the scale list. The respondents were directly interviewed about the frequency of experiencing the following ten symptoms during the last week: (1) “was bothered by things,” (2) “had trouble keeping mind on what was doing,” (3) “felt depressed,” (4) “felt everything he/she did was an effort,” (5) “felt hopefulabout future,” (6)“felt fearful,” (7) “sleep was restless,”(8) “felt happy,”(9) “felt lonely,” and (10)”could not ‘get going’.”This shortened 10-item CES-D scale is commonly used for general populations and the validity, reliability, and cultural equivalence of its Chinese version have been established. Score is the sum of the points for all 10 items. If more than 2 items are missing, there would be no score. A score of 10 or greater is considered depressed. This study used the continuous score to indicate mental health rather than adopting a cut-off point to dichotomously distinguish “good” versus “poor” mental health with the following considerations: First, the current literature varies from each other on the optimal threshold-point to categorize “good” versus “poor” mental health from the self-reported responses (Cole & Tembo, 2011). It warrants caution when attaching pathological labels to self-reported symptoms.

Independent Variables

Independent variables include age, gender, education level, marital status,*hukou* type,and their self-rated health.

The five socio-demographic indicators are labeled as the following: 1) age (1= “45-54”,2= “55-64”,3= “65+”); 2)gender (1= “Male”, 2= “Female”); 3)education level (1= “less than primary”, 2= “completed primary”, 3= “completed middle school and above”); 4)marital status (1= “married but not living with spouse” “separated” “divorced” “widowed” “never married”,2= “married with spouse”); 5) *hukou* type (1= “agricultural”, 2= “non-agricultural” and “unified”). Self-rated health is operationalized into five groups: 1= “very poor”, 2= “poor”, 3= “fair”, 4= “good”, 5= “excellent”.

5. RESULTS

There are 14907 subjects havingcomplete data for all variables in the analyses model. The following description of the characteristics of the study population focuses on data from the individual questionnaire of wave1 in 2011.

The study population has an average age of 59, ranging from 45 to 101. The percentage of male (48.04%) is slightly lower than that of female (51.92%). Most of the subjects were married with a spouse present (83.11%). The median education of the study population was primary school completed, while 44.19% of them did not finish their primary school. More than 77% of the study population is agricultural *hukou* and the rest of them are either non-agricultural or unified[1] . In terms of self-rated health, about 15% of them considered their health as good or excellent. Most of the study population rated their health as poor or fair.

Table 2 displays Pearson correlations between variables. Depressive symptoms appear to have moderate negative correlation with self-rated health. The higher the self-rated health, the less likely the subjects suffer from depressive symptoms. The depressive symptoms have weak but positive relations with age in that older people are more likely to suffer from depressive symptoms, especially among females. Those with higher education are less likely to have depressive symptoms compared with those who have lower education. Similarly, married people with a spouse are less likely to have depressive symptoms than those without a partner. The weak negative relation between hukou type and depression scores indicates that people living in rural *hukou* areas have higher rate of depression than those who live in urban or unified *hukou* areas.

Table 3 represents the results of multilevel linear regression. Model 1 is the linear regression model with only self-rated health as independent variable. It shows that compared with people who rated their health as "very poor," on average, the scores of depressive symptoms among those "poor" raters is 3.83 lower, 5.93 lower among "fair" raters, 7.66 lower for "good" raters, and 8.55 lower for "excellent" raters. Self-rated health has a significantly negative relationship with depressive symptoms. Model 1 suggests that the 14% of the variance in depressive symptoms can be explained by self-rated health.

Model 2 involves age, gender, marital status, education level, and *hukou.* All the demographic variables are significantly correlated with depressive symptoms in the expected direction: those who are younger, male, with more education, and who live with married spouse in urban areas had fewer depressive symptoms.

Model 3 includes all the variables to predict the depression scores. Compared with model 2, the coefficient of age reduced 48% ((.62-.32)/.62=.48)and 55% ((1-.45)/1), indicating that depressive symptoms are largely accounted for by self-rated health, coefficient of which remained almost unchanged compared to model 1. The proportion of variance accounted for in the depressive symptoms based on the predictive power of the independent variables in the model improved to 0.2 (i.e. R square).

6. CONCLUSION AND DISCUSSION

In an attempt to explore middle aged and elder people's depressive symptoms in China, this research found out that , as people grow older, they are more likely to experience depressive symptoms. However, the relationship is moderated by controlling self-rated health. By linking the depression process and life course theories, we can conclude that the demands of multiple transitions in later life expose those with limited resources to challenging environments that cause depression(Ferraro & Wilkinson, 2013). As physical health problems increased by age, people's satisfactions to life decreased accompanied by growing mental health problem, thus the self-rated health decreased accordingly. These effects typically occurred after 80 years of age due to the loss of others, lack of financial support, and maybe new care giving responsibilities(Ferraro & Wilkinson, 2013).

[1] Unified *hukou*:rural and urban residents are registered in the same way so that they can enjoy equal opportunities in employment, education, health care, pension etc.

Consistent with previous studies, females are more likely to suffer from depressive symptoms compared with males. Education, on the other hand, demonstrates a negative relation with depressive symptoms. Well-educated people attain a greater sense of control, which in turn facilitates their adaptive strategies for coping with adversity. However, due to the ten-years of "Cultural Revolution", the average education level among middle aged and elder Chinese are not high. Therefore, the differences of depressive symptom scores are not prominent. Our research shows that those who live with a partner tend to be less depressed compared with those who do not live with a spouse. Prior studies pointed out that being unmarried or isolated increase risks of depression ((KB, S, & EA, 2004). By adjusting for age, gender, education, and marital status, depression levels were significantly higher among rural middle aged and elderly persons than their peers with urban or unified *hukou*. As mentioned in literature review, relevant research reported either no difference between rural and urban older adults or a "rural advantage" in the study of depressive symptoms (Li, Liu, Xu, & Zhang, 2015). It is mainly because that those studies were conducted in developed countries where urban life is more stressful than rural living (K, A, & T, 2013).Moreover, people's relationships in communities in urban areas are weaker than people's social ties in rural areas. Whereas in China, people with agricultural *hukou* are confined by limited resources compared to those with non-agricultural or unified *hukou*, especially social networks. Each of the demographic variables is related to depressive symptoms in an expected direction. Together with the variable self-rated health, all variables explained 20% of variances in depressive symptom scores, to be statistically significant.

Limitations should be addressed for this study. First, the selection of factors that influence depressive symptoms are based on general western sociological theories, which may miss some typical Chinese elements such as Traditional Chinese Medicine. Second, the methods of this study simplify the complex relationships between different variables even though the outcomes are all statistically significant. More studies are needed to understand how socio-demographic factors as well as self-rated health at the individual, household, and community levels, separately and as a whole, is related to mental health of older persons in the context of China. In addition, more factors that may influence Chinese middle aged and elder people's mental health should be examined with various methodologies to provide advice for government policies.

Even with these limitations in mind, this study contributes to growing efforts to identify the indicators that influence mental health among older adults in China. Meanwhile, the study extends the literature of depression for other developing countries where populations are aging and depression is emerging as a public health issue. Practically, we think that policies and programs that aim to increase the education level, reduce disparities between rural and urban areas, enhance the infrastructure and social networkat community level should do many goods in preventing depression among older adults in China.

Table 1 Descriptive Statistics

N=14907	**Percentage**
Age	
45-54	35.25
55-64	37.77
65+	26.98
Gender	
Male	48.08
Female	51.92
Marital Status	
Married with spouse	83.11
Without spouse/partners	16.89
Education	
Less than primary	44.19
Completed primary	21.85
Completed middle school and above	33.96
Hukou	
Agricultural	77.03
Non-agricultural/Unified	22.97
Self-rated Health	
Very poor	16.03
Poor	36.12
Fair	32.18
Good	12.39
Excellent	3.29

*P<0.05; **p<0.01; ***p<0.001

Table 2 Pearson Correlation

	1	2	3	4	5	6
1.Age						
2.Gender	-0.05***					
3.Education	-0.30***	-0.25***				
4.Marital Status	-0.17***	-0.11***	0.15***			
5.*Hukou*	0.05***	-0.03***	0.35***	0.03***		
6.Self-rated Health	-0.12***	-0.08***	0.14***	0.04***	0.07***	
7.Depression Score	0.08***	0.13***	-0.20***	-0.11***	-0.14***	-0.31***

Table 3 Multilevel linear Regression

	Model 1: Self-rated Health only	Model 2: Demographic Variables only	Model 3: all covariates
Age(45-54)			
55-64		.62(.12)***	.32(.11)***
65+		1.00(.14)***	.45(.13)***
Gender(male)			
Female		1.37(.11)***	1.12(.10)***
Education (less than primary)			
Completed primary		-1.02(.13)***	-.80(.13)***
Completed middle school and above		-2.02(.14)***	-1.59(.13)***
Marital Status(without partners)			
Married with spouse		-1.38(.14)***	-1.38(.13)***
Hukou(agricultural)			
Non-agricultual/unified		-1.71(.13)***	-1.44(.12)***
Self-rated Health(very poor)			
Poor	-3.83 (.14)***		-3.45(.14)***
Fair	-5.93 (.15)***		-5.32(.14)***
Good	-7.66 (.18)***		-6.95(.18)***
Excellent	-8.55 (.29)***		-7.67(.28)***
Constant	12.94	9.64	13.86
R^2	0.14	0.09	0.20

Notes: N=14907 *P<0.05; **p<0.01; ***p<0.001

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