

# Volunteer activity and depression among the elderly in China

## A study on rural-urban differences

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### Abstract

Participation in volunteer activity has positive effects on health among elderly. Few studies have investigated the association between volunteer activity and depression among Chinese elderly. This study aimed to examine the association between volunteer activity and depression among the elderly in China regarding rural–urban differences.

Totally 8255 subjects from the 2015 China Health and Retirement Longitudinal Study were selected in this study. Depression was assessed by 10-item Center for Epidemiologic Studies Depression Scale. Types and frequency of volunteer activity were measured in the questionnaire. Multiple linear regression analysis was used to explore the relationship between volunteer activity and depression of elderly.

In our study, the urban elderly had lower depressive scores than rural elderly ( $6.7 \pm 5.8$  vs.  $9.1 \pm 6.7$ ). After adjustment for all covariates, our results revealed that almost daily participation in formal volunteer activities was negatively associated with depression among urban elderly ( $B = -2.69$ ,  $SE = 1.05$ ,  $P = .010$ ); almost daily caring for a sick or disabled adult was positively associated with depression among both urban and rural elderly (urban:  $B = 3.13$ ,  $SE = 1.54$ ,  $P = .043$ ; rural:  $B = 2.56$ ,  $SE = 1.18$ ,  $P = .031$ ).

These findings suggested that there was a negative association between formal volunteer activity and depression among urban elderly, while there was a positive association between caring for a sick or disabled adult and depression among both urban and rural elderly. The government should take effective measures to encourage the elderly to participate in formal volunteer activities to prevent them from depression.

**Abbreviations:** BADL = basic activities of daily living, CES-D = Center for Epidemiologic Studies Depression Scale, CHARLS = China Health and Retirement Longitudinal Study, IADL = instrumental activities of daily living, SPSS = Statistical Package for the Social Sciences, TICS = Telephone Interview for Cognitive Status.

**Keywords:** depression, elderly, rural-urban difference, volunteer activity

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The datasets generated during and/or analyzed during the current study are publicly available.

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## 1. Introduction

Aging is one of the primary social and economic challenges in the world. The World Health Organization (WHO) reported that the number of elderly would increase from 900 million in 2015 to 2 billion in 2050.<sup>[1]</sup> To respond to the challenges of aging, WHO proposed a framework of “active aging”. The word “active” refers to continuing participation in social, economic, cultural, and civic affairs.<sup>[2]</sup> Older people who retire from work and those who are ill or live with disabilities can remain active contributors to their families, colleagues, communities and nations.<sup>[2]</sup>

Volunteering has been promoted as a favored option for active aging by the United Nations, WHO, and a number of international studies.<sup>[3]</sup> Volunteering refers to a form of unpaid labor, which is beneficial to the giver and receiver.<sup>[4]</sup> Volunteering includes a variety of types of activities which can be divided into formal volunteering and informal volunteering. Formal volunteering refers to participating in formal organizations or social group activities with non paying time and energy, while informal volunteering refers to helping others without formal organization.<sup>[5]</sup> Volunteer activities are not only good for social and economic development, but also good for the health of elderly. Previous studies have found that participation in volunteer activities is associated with many healthy outcomes for the elderly, such as their cognitive function,<sup>[6]</sup> well-being,<sup>[7]</sup> and self-rated health.<sup>[8]</sup>

Depression is one of the most common mental diseases and causes serious damage to older adults’ health.<sup>[9]</sup> Previous studies

from Western countries showed that participation in volunteer activities can prevent depression among elderly. Another study revealed that there is a beneficial effect of formal volunteering on depression among the elderly, but not for informal helping.<sup>[10]</sup> From a previous survey, the results indicated that volunteering for religious causes is more beneficial for mental health among elderly.<sup>[4]</sup>

However, few research on the relationship between volunteer activity and depression among Chinese elderly was carried out. China has the largest elderly population in the world. According to the National Bureau of Statistics of China, at the end of 2019, the number of people aged 60 years and older in China was 254 million, accounting for 18.1% of the total population. From 1990 to 2017, the disability-adjusted life years of depression in China have increased by 36.5%,<sup>[11]</sup> which means that Chinese elderly are at high risk for depression. Volunteer activity has developed earlier in Western countries than in China, and the types of volunteer activity may be different from Western countries. In addition, unlike Western culture, most traditional Chinese elderly prefer to spend their time with family and to be less willing to participate in volunteer activity.<sup>[12]</sup> A previous study had found that different frequencies of participation in volunteer activities have different effects on health of the elderly.<sup>[13]</sup> Therefore, to explore volunteer activities (types and frequencies) and depression among elderly may improve the understanding of active aging and healthy aging in China.

It is generally known that there are gaps between urban and rural areas in China. These differences exist in social and economic development status, such as social policy, educational level, social security system, health-care system, and public services.<sup>[14]</sup> These differences could lead to health disparity (including depressive symptom disparity) and different levels of development of volunteer activity. Therefore, the association between volunteer activity and depression may be different among the urban and rural elderly. This study aimed to investigate the relationship between volunteer activity and depression among the elderly in China regarding urban-rural differences.

## 2. Methods

### 2.1. Data and sampling

The data used for this study were obtained from the 2015 China Health and Retirement Longitudinal Study (CHARLS), a national representative survey of Chinese community-dwelling residents. This survey was conducted by National School of Development (China Center for Economic Research) of Peking University. A multistage sampling method was used, and 21,096 individuals from 12,400 households in 450 village-level units and 150 county-level units participated in the survey. Participants aged 60 years and above who could communicate with the investigators were eligible for the study. Elderly adults with serious diseases such as Alzheimer's disease and serious psychiatric disorders other than depression were excluded from our study. After excluding the subjects with no information about participation in volunteer activity and history of depression, 8255 subjects were enrolled into our analysis.

The data are obtained by applying to National School of Development (China Center for Economic Research) of Peking University. All subjects gave their informed consent for inclusion before they participated in the study. The original CHARLS was

approved by the Ethical Review Committee of Peking University. The secondary analysis of data from CHARLS did not require ethics approval.

### 2.2. Assessment of depression

Depression was assessed using the 10-item Center for Epidemiologic Studies Depression Scale (CES-D 10), which has been validated among middle-age and elderly respondents in China.<sup>[15]</sup> The answers of the CES-D 10 include 4 options:

1. rarely;
2. some days (1–2 days);
3. occasionally (3–4 days);
4. most of the time (5–7 days) per week.

The participants' answers were recorded from 0 (rarely) to 3 (most of the time) for negative questions and from 3 (rarely) to 0 (most of the time) for positive questions.<sup>[16]</sup> The score ranges from 1 to 30, with higher scores indicating more depressive symptoms.<sup>[17]</sup>

### 2.3. Assessment of volunteer activity

In the CHARLS questionnaire, volunteer activities included formal volunteer activities and informal ones. Formal volunteer activities refer to participating in formal organizations or social group activities with nonpaying time and energy. The informal volunteer activities include caring for a sick or disabled adult and providing help to family, friends, or neighbors.<sup>[18]</sup> Respondents were asked whether they did any of these volunteer activities in the last month. If the answer was yes, then the respondents were asked to demonstrate the frequency of volunteer activities in the last month. The answers were categorized as not regularly, almost every week, or almost daily.

### 2.4. Other variables

The demographic characteristics included age, marital status (married/cohabitating and divorced/separated/widowed/never married), educational level (no formal education, elementary school, middle school, high school and above), and community type (urban or rural). Lifestyle factors included smoking (current/past, never), alcohol consumption (yes, no). The number of chronic diseases were categorized as zero, one, or two or more. Basic activities of daily living (BADL) include eating, dressing, using the toilet, getting in and out of bed, defecating, and bathing. Instrumental activities of daily living (IADL) included doing daily housework, making a telephone call, cooking, taking medicine, going shopping, and managing finances. There were four possible responses for each task: "can do it by myself", "have some difficulty", "need help" and "cannot do it." Participants who expressed any difficulty with any item were classified as having BADL/IADL functional decline. Health status was assessed through self-rating on a five-point scale (very poor, poor, fair, good, and very good). Self-rated health was categorized as good (including very good and good), fair, or poor (including very poor and poor). The measurement of cognitive function included Telephone Interview for Cognitive Status (TICS-10), figure drawing, and word recall, and all participants were asked questions face-to-face. The overall cognition scores are the sum score of these three dimensions, which ranged from 0 to 21.<sup>[19]</sup> Higher scores indicate better cognitive function.<sup>[13]</sup>

**Table 1****Characteristics of the participants (n = 8255).**

| Variables                         | Total (n = 8255) | Urban (n = 1685) | Rural (n = 6570) | P     |
|-----------------------------------|------------------|------------------|------------------|-------|
| Age, mean $\pm$ SD                | 67.9 $\pm$ 6.4   | 68.2 $\pm$ 6.7   | 67.8 $\pm$ 6.3   | .012  |
| Gender (%)                        |                  |                  |                  | .210  |
| Male                              | 50.4             | 49.0             | 50.7             |       |
| Female                            | 49.6             | 51.0             | 49.3             |       |
| Marital status (%)                |                  |                  |                  | .672  |
| Married/ Cohabiting               | 77.4             | 77.7             | 77.3             |       |
| Never married/divorced/ widowed   | 22.6             | 22.3             | 22.7             |       |
| Education level (%)               |                  |                  |                  | <.001 |
| No normal education               | 54.2             | 27.7             | 60.5             |       |
| Elementary school                 | 23.5             | 22.8             | 23.7             |       |
| Middle school                     | 14.4             | 26.6             | 11.5             |       |
| High school or above              | 7.8              | 22.9             | 4.3              |       |
| Smoking (%)                       |                  |                  |                  | <.001 |
| Current/Past                      | 44.3             | 39.7             | 45.5             |       |
| Never                             | 55.7             | 60.3             | 54.5             |       |
| Alcohol consumption (%)           |                  |                  |                  | .264  |
| Yes                               | 33.3             | 34.4             | 33.0             |       |
| No                                | 66.7             | 65.6             | 67.0             |       |
| Chronic diseases (%)              |                  |                  |                  | .002  |
| 0                                 | 18.2             | 15.2             | 19.0             |       |
| 1                                 | 27.9             | 27.5             | 28.0             |       |
| $\geq 2$                          | 53.9             | 57.3             | 53.1             |       |
| BADL (%)                          |                  |                  |                  | <.001 |
| Completely normal                 | 66.5             | 75.2             | 64.4             |       |
| Functional decline                | 33.5             | 24.8             | 35.6             |       |
| IADL (%)                          |                  |                  |                  | <.001 |
| Completely normal                 | 63.0             | 76.9             | 59.4             |       |
| Functional decline                | 37.0             | 23.1             | 40.6             |       |
| Self-rated health (%)             |                  |                  |                  | <.001 |
| Good                              | 21.5             | 25.9             | 20.3             |       |
| Fair                              | 52.5             | 56.5             | 51.5             |       |
| Poor                              | 26.0             | 17.6             | 28.2             |       |
| Cognitive function, mean $\pm$ SD | 9.5 $\pm$ 4.4    | 11.8 $\pm$ 3.9   | 8.9 $\pm$ 4.3    | <.001 |
| Depression, mean $\pm$ SD         | 8.6 $\pm$ 6.6    | 6.7 $\pm$ 5.8    | 9.1 $\pm$ 6.7    | <.001 |

Percentages may not add up to 100% due to rounding.

BADL = basic activities of daily living, IADL = instrumental activities of daily living, SD = standard deviation.

## 2.5. Statistics analysis

Data were analyzed by using the Statistical Package for the Social Sciences (SPSS) version 20.0 (SPSS Inc., Chicago, IL). Characteristics of the overall respondents were described using means and standard deviations for continuous data and percentages for categorical data. A comparison between groups was carried out by using independent *t*-tests for continuous variables and  $\chi^2$ -tests for categorical variables. Multiple linear regression analysis was used to examine the association between volunteer activity and depression. We carried out multiple imputations using chained equations to address missing data. A *P*-value less than .05 was considered statistically significant.

## 3. Results

### 3.1. Sample characteristics

Table 1 shows the characteristics of participants. A total of 8255 older adults participated in our survey. Of the 8255 participants (mean age = 67.9 years, standard deviation = 6.4 years), 50.4% were men. In total, 79.6% of the participants lived in rural areas, and 77.4% were married/cohabiting. Among the participants, 54.2% had not received a formal education, and 52.5% reported

having a fair health status. More than half of the participants had never smoked or no alcohol consumption (55.7% and 66.7%, respectively). Over 60% of the participants had completely normal basic activities of daily living (BADL) and instrumental activities of daily living (IADL). Of the participants, 81.8% had two or more kinds of chronic diseases. The cognitive function score was 9.5  $\pm$  4.4 and the depression score was 8.6  $\pm$  6.6. There were significant differences in age, education level, smoking, number of chronic diseases, BADL, IADL, self-rated health, cognitive function, and depression between urban and rural groups.

### 3.2. The difference of participating in volunteer activities among the urban and rural elderly

As Table 2 showed, 3.4% of subjects participated in formal voluntary activities, 2.4% cared for a sick or disabled adult, and 12.7% provided some help to family, friends or neighbors. The proportion of urban elderly participating in the three types of volunteer activities was higher than their rural counterparts. There were significant differences in participation in formal voluntary activities and providing help to family, friends, or neighbors between urban and rural groups (*P* < .05).

**Table 2****Type and frequency of volunteer activities among the urban and rural elderly (n = 8255).**

| Type and frequency of volunteer activities(%) | Total (n = 8255) | Urban (n = 1685) | Rural (n = 6570) | P      |
|---|------------------|------------------|------------------|--------|
| Formal voluntary activities                   |                  |                  |                  | < .001 |
| No participation                              | 96.6             | 92.5             | 97.7             |        |
| Not regularly                                 | 2.1              | 4.7              | 1.4              |        |
| Almost every week                             | 0.7              | 1.4              | 0.5              |        |
| Almost daily                                  | 0.5              | 1.4              | 0.3              |        |
| Informal voluntary activities                 |                  |                  |                  | .191   |
| Cared for a sick or disabled adult            |                  |                  |                  |        |
| No participation                              | 97.6             | 96.9             | 97.7             |        |
| Not regularly                                 | 1.7              | 2.1              | 1.6              |        |
| Almost every week                             | 0.3              | 0.4              | 0.3              |        |
| Almost daily                                  | 0.4              | 0.7              | 0.4              | .019   |
| Provided help to family, friends or neighbors |                  |                  |                  |        |
| No participation                              | 87.2             | 85.9             | 87.6             |        |
| Not regularly                                 | 9.8              | 10.3             | 9.7              |        |
| Almost every week                             | 1.8              | 2.1              | 1.8              |        |
| Almost daily                                  | 1.1              | 1.8              | 0.9              |        |

Percentages may not add up to 100% due to rounding.

**3.3. Multiple linear regression analysis**

Table 3 shows the cross-sectional relationship between type and frequency of volunteer activity and depression. After adjusting all covariates, model 3 showed that almost daily participating in formal voluntary activity was negatively associated with

depression among the urban elderly ( $B = -2.69$ ,  $SE = 1.05$ ,  $P < .05$ ). Almost daily caring for a sick or disabled adult was positively associated with depression among both the urban and rural elderly (urban:  $B = 3.13$ ,  $SE = 1.54$ ,  $P < .05$ ; rural:  $B = 2.56$ ,  $SE = 1.18$ ,  $P < .05$ ). No associations between providing help to

**Table 3****Multiple linear regression model testing the association between volunteer activities and depression among urban and rural elderly.**

| Type of volunteer activity |   | Model 1<br>B (SE)         | Model 2<br>B (SE)         | Model 3<br>B (SE)         |
|----------------------------|---|---------------------------|---------------------------|---------------------------|
| Urban                      | Formal voluntary activities (ref. No participation)                   |                           |                           |                           |
|                            | Not regularly   | -1.03 (0.68)              | -0.19 (0.67)              | -0.02 (0.59)              |
|                            | Almost every week   | -2.08 (1.21)              | -1.70 (1.18)              | -0.74 (1.04)              |
|                            | Almost daily  | -4.16 (1.21) <sup>†</sup> | -4.04 (1.19) <sup>†</sup> | -2.69 (1.05) <sup>*</sup> |
|                            | Informal voluntary activities   |                           |                           |                           |
|                            | Cared for a sick or disabled adult (ref. No participation)            |                           |                           |                           |
|                            | Not regularly   | 0.67 (1.02)               | 0.47 (0.99)               | 0.91 (0.87)               |
|                            | Almost every week   | 0.19 (2.43)               | 1.20 (2.38)               | 1.66 (2.10)               |
|                            | Almost daily  | 2.66 (1.78)               | 3.01 (1.75)               | 3.13 (1.54) <sup>*</sup>  |
|                            | Provided help to family, friends or neighbors (ref. No participation) |                           |                           |                           |
|                            | Not regularly   | -0.57 (0.48)              | -0.29 (0.47)              | 0.02 (0.42)               |
|                            | Almost every week   | -1.57 (1.03)              | -0.77 (1.01)              | -0.07 (0.89)              |
| Almost daily               | -0.25 (1.08)  | -0.32 (1.06)              | -0.04 (0.93)              |                           |
| Rural                      | Formal voluntary activities (ref. No participation)                   |                           |                           |                           |
|                            | Not regularly   | -1.77 (0.70) <sup>*</sup> | -0.97 (0.68)              | -0.46 (0.59)              |
|                            | Almost every week   | -2.83 (1.13) <sup>*</sup> | -2.11 (1.09)              | -1.45 (0.96)              |
|                            | Almost daily  | 0.05 (1.54)               | 0.55 (1.49)               | 0.93 (1.31)               |
|                            | Informal voluntary activities   |                           |                           |                           |
|                            | Cared for a sick or disabled adult (ref. No participation)            |                           |                           |                           |
|                            | Not regularly   | 0.19 (0.67)               | 0.11 (0.64)               | 0.01 (0.56)               |
|                            | Almost every week   | 1.60 (1.52)               | 1.39 (1.47)               | -0.18 (1.28)              |
|                            | Almost daily  | 2.83 (1.40) <sup>*</sup>  | 2.70 (1.36) <sup>*</sup>  | 2.56 (1.18) <sup>*</sup>  |
|                            | Provided help to family, friends or neighbors (ref. No participation) |                           |                           |                           |
|                            | Not regularly   | -0.43 (0.28)              | -0.13 (0.28)              | 0.26 (0.24)               |
|                            | Almost every week   | -0.76 (0.64)              | -0.40 (0.62)              | -0.37 (0.54)              |
| Almost daily               | -1.99 (0.86) <sup>*</sup>   | -2.02 (0.83) <sup>*</sup> | -1.10 (0.73)              |                           |

<sup>\*</sup>  $P < .05$ .

<sup>†</sup>  $P < .01$ .

B = coefficient, BADL = basic activities of daily living, IADL = instrumental activities of daily living, SE = standard error.

Model 1: crude model. Model 2: adjusted for age, gender, marital status, education level, smoking and drinking. Model 3: adjusted for age, gender, marital status, education level, smoking, alcohol consumption, self-rated health, chronic diseases, BADL, IADL and cognitive function.

family, friends, or neighbors and depression among both urban and rural elderly were found in this study.

#### 4. Discussion

In our study, we investigated the association between volunteer activity and those with depression among the urban and the rural elderly in China. The results showed that rural elderly had a higher level of depression status than urban elderly, which was consistent with previous studies.<sup>[14,20]</sup> There are two reasons to explain this phenomenon. First, compared with the urban elderly, the rural elderly had less chance to receive education in those days; 60.5% of rural elderly didn't receive any normal education, while 27.7% didn't among urban elderly in our study. Research showed that the difference in education level between the urban and rural elderly contributes 24% to 26% to their disparity in depressive symptom.<sup>[14]</sup> Second, there was a significant difference of health status among rural and urban elderly, and the poor physical health was closely related to high level of depression.<sup>[21]</sup> Our results suggested that cognitive function, BADL and IADL of rural elderly were significantly worse than their urban counterparts and were significantly correlated with the depression scores. Cognitive decline usually coexists with geriatric depression, and depression can be aggravated by cognitive deficit.<sup>[22]</sup> Functional disability is also the risk of depression.<sup>[23]</sup>

Our study found that the rate of participation in volunteer activities among Chinese elderly was much lower than that in developed countries. Huang reported that there were 62% of the elderly who participate in volunteer activity in Japan, Singapore, and South Korea.<sup>[7]</sup> However, in the present study, the rate of participation in formal voluntary work, caring for a sick or disabled adult, and providing help to family, friends or neighbors were only 3.4%, 2.4%, and 12.7%, respectively. These results reflected that elders in China might not have much enthusiasm of participating in volunteer activity. In Chinese traditional perception, when you are old, you don't need to do anything, and it is necessary to be cared by their own children, which is named as filial culture. In addition, there are relatively less volunteer services for the elders in China, such as backward concept of volunteer services, narrow platform of volunteer activity, and lack of management regulations. The bondage of traditional ideas and shortage of volunteer services hinder the enthusiasm of Chinese elderly to participate in volunteer activities.

In our study, we found different types of volunteer activities had different effects on depression, and there was an urban-rural difference in the association between volunteer activity and depression among elderly in China. The results of the present study showed that participation in formal voluntary activity was negatively associated with depression among urban elderly but not among rural elderly. A previous study also found that participating in formal voluntary work is a process of social integration in which the elderly can find useful and helpful social contacts<sup>[5]</sup> and it provides facilitated access to salutary social resources, such as emotional, cognitive or material support, and health-related information.<sup>[24]</sup> Both social contacts and salutary social resources can help the elderly to alleviate depression symptom. However, these beneficial effects of formal volunteering only for urban elderly in our study, which is consistent with a previous study.<sup>[20]</sup> A report revealed that the differences in the enthusiasm of volunteer participation between the urban and rural elderly had a inconsistent effects on the improvement of

depression.<sup>[20]</sup> The urban elderly often have better volunteer activity condition and platform than rural elderly due to the higher degree of development. In addition, there are different causes of depression between urban and rural elderly. Because of weaker community relationships, the urban elderly may face more pressure from social isolation after retirement<sup>[21]</sup> and formal voluntary activities may provide them an opportunity of social integration and help them to ease depressive symptoms. However, for the rural elderly, greater social support is the key to reduce their depressive symptoms, such as through improving the infrastructure and economic condition and establishing more health care facilities<sup>[25]</sup> so the beneficial effect for health from participating in formal voluntary activities were limited.

Our data showed that caring for a sick or disabled adult was positively associated with depression scores among both urban and rural elderly. As for the elderly, caring for a sick or disabled adult is a tough task which requires much energy and time. Moreover, the demands of caring for others are beyond their own ability and may bring them much pressure. Sometimes the elderly even need to play the role of health care professionals, undertaking the tasks of psychological consolation, physical care, and so on.<sup>[26]</sup> Besides, caring for a sick or disabled adult could not expand their social interaction and get salutary social resources like participating in formal volunteer activities.

Our results also suggested that there was no significant correlation between providing help to family, friends, neighbors, and depression among urban and rural elderly. The reason may be that, in traditional Chinese culture, people often pay more attention to the relations of family, friends, and neighbors.<sup>[27]</sup> To provide help to family, friends, and neighbors is a widespread and it could not replace the psychological imbalance caused by the lack of long-term social roles.

Our study found that only almost daily participation in formal volunteer activities and caring for a sick or disabled adult were associated with depression, which indicated that different frequencies of volunteering may have different effects on older adults' health.

The limitations of the present study are as follows. First, this cross-sectional survey study did not investigate the causal relationships between volunteer activity and depression among elderly. Since elderly who were depressed may restrain themselves from participation in volunteer activities, longitudinal studies are needed to examine the effects of volunteer activities on depression. Second, the survey depended on self-report, which is involved in a risk of recall bias due to false or inaccurate responses from the participants. Third, the CHARLS could not assess the quality of interaction in volunteer activity and it should be considered in the future study. Last, the study did not assess the benefits of subjects who received support from volunteer activities. To further examine the useful of volunteer activity and to promote the volunteer activity in elderly, the multidimensional assessment<sup>[28]</sup> should be used in future studies.

#### 5. Conclusion

In our study, rural elderly had higher depression score and a lower rate of participation in volunteer activity than urban elderly, and different types and frequencies of volunteer activities had different effects on depression among urban and rural groups. Compared with non-volunteers, urban elderly who participated in formal voluntary activities almost daily were less likely to be depressed, while the elderly who cared for sick or

disabled adult almost daily were more likely to have depression. We recommend that the government should take effective measures to encourage the elderly to participate in formal volunteer activities so as to alleviate depressive symptoms with consideration of the frequency of volunteer activity. The government should develop the platform of formal voluntary work for the elderly. Benefits of participation in formal volunteer activities need to reinforce publicity. The community officials should pay more attention to the mental health of rural elderly and the elderly who have a heavy tasks to care for a sick or disabled adult.

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