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Volunteer Participation and Loneliness in the Elderly: An Empirical Study Based on CHARLS 2018

Yiren Zhang[1,a,*], Hui Zhu[1,b]

[1]*School of Sociology, Nankai University, Tianjin, China*
a. yirenzhang@mail.nankai.edu.cn, b. zhuhuinku@nankai.edu.cn
**corresponding author*

Abstract: Based on the empirical research data collected from the China Health and Retirement Longitudinal Survey (CHARLS) in 2018, this study examines the specific impacts of two types of volunteering on loneliness among elderly individuals in China. Additionally, it investigates various demographic, socioeconomic, physical health, and family intergenerational support factors that may influence the relationship between these variables. The findings of this investigation demonstrate that both group-driven volunteer service and individual active volunteer service significantly contribute to reducing loneliness among older adults. However, there exist four distinct demographic disparities: variations in age, differences in empty nest situations, disparities based on gender, and discrepancies in economic status. Consequently, to address the issue of elderly loneliness effectively, this study primarily proposes four key approaches: guiding the elderly towards embracing social participation as a concept; emphasizing the development of community social capital; enhancing volunteer service design; and increasing investment in volunteer services for the elderly. These measures aim to foster an inclusive environment that encourages active engagement among older adults while providing them with convenient avenues to participate in volunteer activities. This study empirically investigates the evolution of social engagement among elderly individuals in China, offering novel research perspectives on public involvement in addressing the challenges associated with elderly care services.

Keywords: volunteer services, the elderly in China, mental health, loneliness

1. Introduction

China, as a populous country with a significant global population base, has witnessed an increasing proportion of elderly individuals since the beginning of this century, leading to a deepening degree of aging [1]. As we all know, in the context of elderly individuals, the assessment of their academic standard encompasses not only an external evaluation of their physical condition but also an internal self-assessment. Especially considering the understanding that an unhealthy mental state can easily lead to inappropriate behaviors and harm both the individual and those around them, including society [2], there has been a growing focus on researching the mental health of elderly individuals. This area has emerged as a pivotal direction within the field of geriatric research.

Among them, loneliness is an important criterion for measuring the mental health of the elderly. Chinese scholar G Wang took the elderly in rural Anhui Province as the research object and found that nearly 80% of the elderly have a relatively severe sense of loneliness [3]. However, due to

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different sample selection, different results will appear, such as Yongce Liu and Mingxian Lin took the urban elderly in a certain place as the research object and found that 80% of the elderly did not have loneliness [4]. Junqi He studied the relationship between loneliness and suicide among the elderly in rural areas, and believed that in addition to depression, the loneliness feeling is an important factor for the elderly to have suicidal thoughts [5]. Considering the influence of the middle-class family, Lee Kyuho focused on the important role of family structure factors, and the results showed that the mental health of the elderly will be closely related to various factors in their social life, such as gender, living habits, and children's intergenerational relationships, especially with various interactions in life [6]. Based on this consideration of family intergenerational support, Di Gessa Giorgio conducted a further supplementary study on other social activities involved in the intergenerational parenting process that occur in the community setting, and the results show that older adults who regularly participate in social activities experience significantly less loneliness than those who do not participate regularly [7]. In addition to the interaction caused by family roles, Shpigelman Carmit Noaadvocated that the mediating factor is the income level of the elderly and carried out relevant data analysis and verification and found that the low-income elderly were more seriously affected by loneliness, which further explained that the elderly were deeply affected by structural environmental factors [8]. The community is the main place where most of the elderly live, so the health discussion of loneliness among the elderly is closely related to the social activities in the community field. Based on the research results on loneliness caused by social activities in the community, the relationship between volunteering and loneliness in the elderly has attracted the attention of researchers with the rise of community volunteer service for the elderly. With the advent of the global aging era, social pension volunteer service has become a hot spot for many people, and its research focus is mostly focused on three types of research paths, such as volunteer subject preference research, volunteer service mode selection research, and volunteer service effect evaluation research, and presents three major research trajectories.

First, the focus on volunteer subjects has gradually transitioned from macro large team problems to micro small member categories, and such studies have gradually diversified the sources of participants in volunteer service, which has certain theoretical incentives for encouraging the whole society to participate in volunteer service. Among such studies, Wei Xu and Huanxia Qian analyzed the difficulties and causes of community volunteer construction [9]. On this basis, Valerie A. Canady further explored how volunteers, especially young college students, participate in community elderly care services, and studied the feasibility and willingness of millennials to participate in community elderly care services [10]. At the same time, with the recognition of human resources for the elderly, Davis Janet H analyzed the characteristic elements of the elderly's demand for volunteers from the perspective of competency characteristics and proposed a competency characteristic model of community elderly volunteers [11]. The categories of volunteer service team members are supplemented, and some theoretical support is provided for the elderly to participate in volunteer service. In the same way, compared with foreign research methods that emphasize the feasibility of individual entry based on the division of participants' life cycles, the classification of this type of research in China pays more attention to the social identity of actors and emphasizes the linkage between multiple subjects. With the process of the times, the form of volunteer service organization of a single community grassroots government (street office) has exposed various practical difficulties, so many scholars have made suggestions on how to introduce other forces, Wu Cangping, believe that the construction of a socialized pension system is inseparable from the government, enterprises, social organizations, communities, volunteers, and families to bear the corresponding responsibilities [12].Ma Chunbo believes that the community pension service should achieve a model of combining paid services with free services, and it is necessary to combine private non-enterprises [13], Scholar Li Lijun proposed that when faced with the practical problem of the lack of specialization of

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community volunteer service organizations for the elderly, the grassroots government should actively liaise with vocational colleges and colleges to realize the complementarity of resources with real practice places and professional knowledge and skills [14]. In addition to the focus on cooperation in the public sphere such as social organizations and education, there is also a certain discussion on how to introduce the power of the private sector in the community. ZHAO Di conducted a study on the action strategy of how to link community residents to participate in volunteer service activities in the linkage of the three societies, and concluded that the mobilization effect of residents participating in volunteer service that meets the needs of the community is better, especially in urban communities, the type of volunteer service that helps the poor and the weak is more preferred by participation, which provides a certain research basis for the specific implementation mode and content selection of multi-agent cooperation [15].

Second, in the continuous exploration, countries have gradually explored their own community pension volunteer service model and formed systematic empirical research on the volunteer service model. For example, the United Kingdom advocates the concept of service time, and deposits the service time of volunteers in the time bank, and according to the length of time, they can enjoy the same length of volunteer service for the elderly in the future [16].

Thirdly, the specific development of volunteer services for the elderly and the actual service quality have also been discussed in the academic circles, and such research paths are highly related to the health problems of the elderly, especially the mental health of the elderly. Haski-Leventhal study found that the lower the level of volunteer service for the elderly, the stronger the loneliness, which explains this phenomenon as the physical condition and life ability of the elderly are declining with age, so the elderly need more daily care and medical services, and higher volunteer service will provide more material and emotional help for the elderly, increase their subjective well-being, and reduce loneliness [17]. At the same time, some scholars believe that the reason for the impact of volunteering on loneliness among the elderly lies in whether the elderly have received the supporting role of the environment, which is divided into two categories according to the specific environment: the family environment and the social environment, and Carla Houkamau provides favorable support for the mediating role of the intergenerational support role of the family environment in volunteering and the mental health of the elderly through quantitative data on the Maori ethnic group [18]. In view of the larger social environment, Wang Gang selected the elderly in urban areas of China as the research object to explore the inhibitory effect of cognitive capital on geriatric depression among the elderly and introduced socioeconomic status factors into the study of volunteering and loneliness among the elderly [19]. Wang Ruimei found this phenomenon through research [20] and scholar Zeng Ke further demonstrated and supported by data, using the Cornell Medical Index M-R scale and the volunteer service questionnaire to survey 229 elderly people aged 60 and above in the community in Guangzhou, acknowledging the important position of volunteerism in affecting the mental health of the elderly, as well as the existence of socioeconomic factors in the specific impact process, community support factors, and family intergenerational factors expand the discussion of the obstacles in the specific implementation of volunteer service to promote the mental health of the elderly [21].

2. Methodology

2.1. Data and Variables

2.1.1.Data Setting

The data used in this study are based on the results reported by the China Health and Retirement Longitudinal Study (CHARLS) in 2018. This is a high-quality micro-survey project conducted

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nationwide on families and individuals aged 45 and above in China, conducted by the National School of Development of Peking University. The sample and data of this study have certain stability, focus and authority, and are recognized as empirical data with high reliability in China. Among them, the data survey population is mainly based on the middle-aged and elderly people over 45 years old, covering 150 county-level units across the country, there are 450 village-level units, about 17,000 people in 10,000 households. The data obtained are the average median after excluding the difference between high and low, which is used for more reasonable data analysis.

In view of the lack of some response samples, the cases of serious lack of variables were eliminated without affecting the validity of the inference, and a total of 19,816 elderly people were finally interviewed.

2.1.2.Variable Def1inition

2.1.2.1.Explanatory Variables

The dependent variable in this study was the loneliness in elderly.

In this questionnaire, the mental health-related questions of the elderly are set in the "cognition and depression" part of DC009~DC018, a total of 10 questions related to the "depression scale", and the answer options include: little or no (< 1 day), not too much (1-2 days), sometimes or half the time (3-4 days), most of the time (5-7 days), do not know, and refuse to answer. In this study, the sample that answered the first 4 options was selected for option score assignment, except for the two questions of DC013 and DC016, the options were inversely assigned ["Option 1: little or no (< 1 day)" = 4, "Option 2: Not too much (1-2 days)" = 3, "Option 3: sometimes or half the time (3-). 4 days)" = 2, "Option 4: Most of the time (5-7 days)" = 1], and the remaining 8 questions are all positively assigned ["Option 1: Little or no (< 1 day)" = 1, "Option 2: Not too much (1-2 days)" = 2, "Option 3: Sometimes or half the time (3-4 days)" = 3, "Option 4: Most of the time (5-7 days)" = 4], and the sum-score of the 10 questions in DC009~DC018 is set to "Loneliness of the elderly".

And then, according to the sum-score of the options, the "29< sum-score <40"=1 was classified as the elderly in the high sense of loneliness group, the "21< sum-score <28"=2 was classified as the elderly in the low & medium sense of loneliness group, and the "0< sum-score <20"=3,The elderly were classified into the no-loneliness group, and a tricategory variable of loneliness among the elderly was formed.

2.1.2.2.Explanatory Variables

Personal active volunteer service usually refers to the dedication behavior of an individual to help others spontaneously out of his or her own charity and mutual assistance.

Group-driven volunteer service refers to the non-profit assistance behavior that is organized and carried out by the group together and has a clear service development plan. Combined with data availability, in this study, two types of volunteer service activities, "participation in community organization activities" and "participation in volunteer activities or charity activities" in the questionnaire about the participation of the interviewed elderly in social activities, were selected and the sample of "participating in volunteer activities" = 0, indicating the group that was no such volunteer service participation; "for at least one of the participants" = 1, indicating the group that the crowd-driven volunteering.

Personal active volunteer service usually refers to the dedication behavior of an individual to help others spontaneously out of his or her own charity and mutual assistance. Combined with data availability, in this study, two types of charity and mutual aid behaviors were selected in the questionnaire to ask the interviewed elderly about their participation in social activities: "providing help to relatives, friends or neighbors who are together" and "caring for sick or disabled people who

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do not live with you", "all reported non-participation" =0, indicating the group that not participate in such voluntary services; "Participation in at least one of these activities" =1, indicates the group with the personal-active volunteering.

2.1.2.3.Control Variables

According to the literature review of previous studies, other control factors that may affect the "volunteering-loneliness" of the elderly in this study are divided into four aspects, namely, demographics, socioeconomic factors, physical health and family intergenerational support factors, as shown in Table 1.

2.2. Method

In this study, the dependent variable is an ordered tri-categorical variable, but the proportional characteristic test data tested by the Proportional Odd Model do not satisfy the habitual proportional dominance hypothesis, so the Stereotype Ordered Regression Model is used for analysis, and the specific model is as follows:

$$\log\left(\frac{P[Y_i = k|x_i]}{P[Y_i = 1|x_i]}\right) = a_k + \phi_k\beta'_{x_i}, \ldots \ldots i = 1, \ldots, n, \ldots \ldots k = 2, \ldots, q,$$

Over here, Y_i is the answer to an ordinal variable with the category q for observation the object i, and i=1, ⋯, n. Included in the formula of the monotonic non-decreasing assumptions about 0=Φ1≤Φ2≤⋯≤Φq=1. x_i is a set of explanatory variables (can be categorical or continuous) to the observation object i. The parameter β's p×1 direction is meaning to the effect from the logarithmic advantage of x_i to the category k. The parameter $\{a_2 \ldots a_k\}$ is meaning to the intercept $\{\Phi 1, \Phi 2, \ldots \Phi q\}$ as the parameters for Fraction to the explanatory variables category Y_i.

3. Result

Table 1: Statistical results of variables.[1]

Variable	n	%
Explanatory Variable		
Loneliness		
High Sense of Loneliness	2,414	13.30
Low & Medium Sense of Loneliness	4,265	23.50
No-loneliness	11,473	63.21
Explanatory Variable		
Volunteer Participation		
the Crowd-driven Volunteering		
Yes (=1)	700	3.54
No (=0)	19,052	96.46
the Personal-active Volunteering		
Yes (=1)	3,027	15.33
No (=0)	16,725	84.67
Control Variables		

1 n=number of cases

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Table 1: (continued).

Demographic Factors		
Sex		
Male (=1)	9,340	47.13
Female (=0)	10,476	52.87
Age		
Lower Aged Elderly (=0)	3,340	17.13
Middle Aged Elderly (=1)	5,363	27.51
High Aged Elderly (=2)	10,791	55.36
Socio-economic Factors		
Education Horizontal		
Educated (=1)	8,623	43.52
Uneducated (=0)	11,193	56.48
Economic Conditions		
Poverty (=1)	16,489	83.47
Non-poverty (=0)	3,266	16.53
Physical health		
Healthy (=1)	13,515	68.42
Unhealthy (=0)	6,237	31.58
Family intergenerational support factors		
Empty nest dwelling		
Non-empty nester (=1)	11,561	58.34
Empty nester (=0)	8255	41.66
Financial support from children		
Yes (=1)	8,593	74.28
No (=0)	2,975	25.72

Table 2: The regression results of volunteering among the elderly in China to suppress loneliness.[2]

	1	2	3	4	5	6
Core-explanatory Variables						
the Crowd-Driven Volunteering (No=0)	-0.849***	-0.666**	-0.546**	-0.821***	-0.912***	-0.475***
	(0.141)	(0.133)	(0.147)	(0.143)	(0.148)	(0.158)
the Personal-active Volunteering (No=0)	-0.319*	-0.222*	-0.121*	-0.268*	0.363	-0.132*
	(0.066)	(0.066)	(0.071)	(0.072)	(0.071)	(0.079)
Demographic factors						

2 Note:(1)The data in the table are variable coefficients, and the corresponding standard errors are in parentheses below each coefficient;(2)In the first column, the reference group is in parentheses;(3)The sample size in different models is slightly different due to a small number of missing variables, which is treated as systematic error and does not affect statistical inference.(4)$^{*}p<0.05$;$^{**}p<0.01$;$^{***}p<0.001$.

DOI: 10.54254/2753-7048/47/20240891

Table 2: (continued).

Middle aged elderly		0.125**				0.016
		(0.075)				(0.075)
High aged elderly		0.783**				0.100
		(0.069)				(0.069)
Male		0.385***				0.382***
		(0.052)				(0.052)
Socio-economic factors						
Uneducated			-0.665***			-0.398***
			(0.081)			(0.081)
Poverty			-0.390***			-0.681***
			(0.052)			(0.052)
Physical health factors						
Good health				1.395***		1.399***
				(0.053)		(0.054)
Intergenerational support factors						
Empty nester					-0.151**	-0.065**
					(0.876)	(0.901)
Financial support from children					0.006	0.003
					(0.058)	(0.058)

Table 3: The results of independent sample tests for two types of volunteering to inhibit loneliness in elderly.[3]

	Lower Aged Elderly	Empty nester	Male	Poverty
the crowd-driven volunteering	0.546**	0.215**	0.757**	0.311*
	(0.075)	(0.945)	(0.053)	(0.058)
the personal-active volunteering	0.022*	0.129*	0.253	0.584***
	(0.900)	(1.565)	(0.069)	(0.026)
	High Aged Elderly	Non-empty Nester	Female	Non-poverty
the crowd-driven volunteering	0.097	0.151**	0.385*	0.390**
	(0.069)	(0.876)	(0.052)	(0.051)
the personal-active volunteering	0.016*	0.065*	0.382*	0.398
	(0.075)	(0.901)	(0.052)	(0.081)

3 Note:(1) The data in the table are variable coefficients, and the corresponding standard errors are in parentheses below each coefficient; (2) $^{*}p<0.05;^{**}p<0.01;^{***}p<0.001$.

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3.1. Descriptive Statistics

A total of 19,816 elderly Chinese subjects were included in this study, and the majority (55.36%) were elderly, including 10,476 females (52.87%) and 9,340 males (47.). 13%), the overall physical condition is relatively healthy (68.42%), and the situation of high loneliness is less (13.3%), but nearly forty percent of the elderly in China have loneliness problems. In terms of socio-economic factors, 43.52% of the Chinese elderly are educated, and only 16.53% are not in difficulty, and the intergenerational connection between the Chinese elderly and their families is relatively strong, and 58.34% are not empty nesters, and the intergenerational economic support from their children is more obvious (74.28). The total number of Chinese elderly people participating in volunteer service was 3,727, of which 18.78 were the crowd-driven volunteering and 81.22% the personal-active volunteering (Table 1).

3.2. Regression Analysis Results: Volunteering Participation of the Elderly in China Inhibits Loneliness

Table 2 shows an independent model comparing the two types of volunteering participation with four major control variables (demographic factors, socioeconomic factors, physical health factors, and family intergenerational support factors) and a full model of all variables included in the statistics.

Specifically, the variable coefficients of the two types of volunteer service were negative, and they were significant at the level of $P<0.05$, indicating that the participation behavior of both group that the crowd-driven volunteering and the personal-active volunteering could have a positive impact on reducing the loneliness of the elderly. From the specific value of the variable coefficient, when the elderly choose to participate in crowd-driven volunteering, the probability of reduced loneliness will increase [exp (0.849)-1] =1.337 times. Meanwhile, the probability of loneliness reduction in the elderly with the experience of personal active volunteer service increased [exp (0.319)-1] =0.376 times.

In addition, significant associations after the inclusion of different control variables are also shown in Table 2. When incorporating demographic factors, there was a significant positive correlation between the role of volunteer service experience in inhibiting loneliness with middle-aged elderly ($r=0.13$, $P<0.01$), high-aged elderly ($r=0.78$, $P<0.01$) and male ($r=0.39$, $P<0.001$). When socioeconomic factors were included, there was a significant negative correlation between volunteering experience and uneducated ($r=-0.67$, $p<0.001$) and poverty ($r=-0.39$, $p<0.001$). When physical health factors were included, there was a significant positive correlation between volunteering experience and good health ($r=1.40$, $p<0.001$). When family intergenerational support factors were included, there was a significant negative correlation between volunteer service experience and empty nest living ($r=-0.15$, $p<0.01$), but no significant relationship with financial support from children ($r=0.01$, $p>0.05$).

What's more, taking into account all control variables, there was a significant negative correlation between volunteering experience and uneducated ($r=-0.40$, $p<0.001$), poverty ($r=-0.68$, $p<0.001$) and empty nester ($r=-0.07$, $p<0.01$), and had a significant positive correlation with males ($r=0.38$, $p<0.001$) and good health ($r=1.40$, $p<0.001$), but no significant relationship with middle-aged elderly ($r=0.02$, $P>0.05$), high-aged elderly ($r=0.10$, $p>0.05$) and financial support from children ($r=0.00$, $p>0.05$).

3.3. Sub-sample Testing Model : Two Types of Volunteering Behaviors and Loneliness among the Elderly in China

Table 3 shows the results of the specific effect differences that continue to be set up by independent samples for age, empty nest status, gender, and economic status.

Firstly, in terms of age differences, the impact of the crowd-driven volunteering on loneliness

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among elderly people mainly affects lower aged elderly (r=0.55, p<0.01), while its impact on high aged elderly (r=0.10, p>0.05) is not significant; and the personal-active volunteering has a significant inhibitory effect on loneliness in both lower and high aged elderly individuals (r=0.02, p<0.05). Meanwhile, the crowd-driven volunteering has a stronger effect on reducing loneliness among lower aged elderly people.

Secondly, the crowd-driven volunteering had a significant weakening effect on empty nesters (r=0.22, P<0.01) and non-empty nesters (r=0.15, P<0.01), while the personal-active volunteering also had a significant attenuating effect on empty nesters (r=0.13, p<0.05).and non-empty nesters (r=0.07, p<0.05). There is no clear difference in the impact of the two types of voluntary participation.

Thirdly, the crowd-driven volunteering had a significant inhibitory effect on loneliness in both males (r=0.76, P<0.01) and females (r=0.39, P<0.05), while the personal-active volunteering only had a significant reduction in loneliness in women (r=0.38, P<0.05) and is non-significant effect on men (r=0.25, P>0.05).

Finally, the elderly population with better economic conditions are only significantly affected by the inhibitory effect of the crowd-driven volunteering (r=0.39, P<0.01) on loneliness, and the elderly population with poor economic conditions showed a significant impact on the reduction of loneliness in both types of volunteer participation. Among them, for the elderly population with poor economic conditions, the intervention effect of the crowd-driven volunteering (r=0.31, P<0.05) on loneliness was relatively lower than that of the personal-active volunteering (r=0.58, P<0.001).

4. Discussion

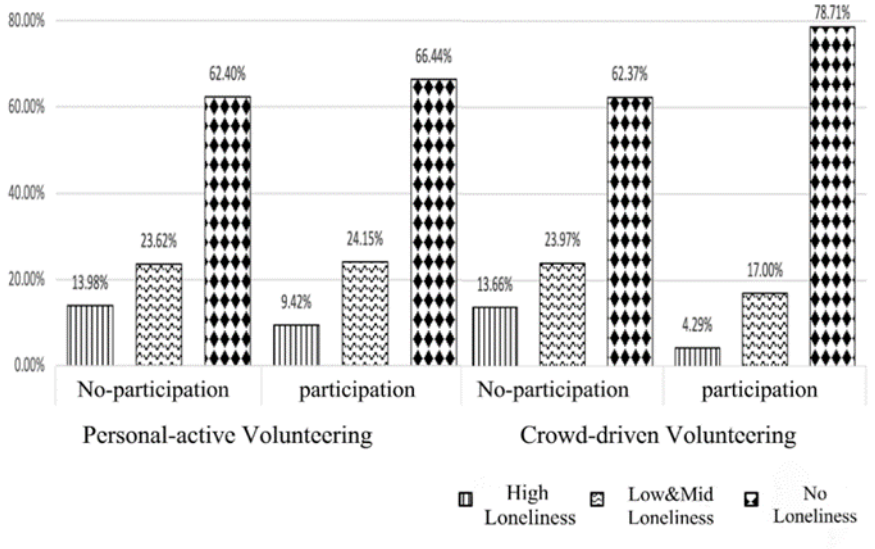

Figure 1: The comparison of loneliness among older adults grouped by two types of voluntary participation.

The sample size in this study is relatively large, and the gender ratio is basically the same. The number of female elderly people in the sample is slightly higher (52.87%), with more high-aged elderly in the age group, accounting for more than half (55.36), which is more conform to the current situation of advanced aging in China. Moreover, from the perspective of socio-economic status, most elderly face the dilemma of overall low education level and living in poverty. However, nearly 70% of elderly people are in good physical condition and have some ability to take care of themselves in daily life.

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Although 41.66% of elderly people live empty nesters, about 70% of them can receive economic support from their children. This to some extent indicates that under the influence of East Asian filial piety culture, the intergenerational relationship among Chinese elderly people is relatively close.

Meanwhile, although the overall level of participation of elderly people in volunteer services in China is not high, the participation rate of elderly individuals who participate spontaneously is almost five times that of the crowd-driven volunteer services. Moreover, according to the research model results, both the crowd-driven volunteering and the personal-active volunteering have a significant positive impact on reducing loneliness among the elderly (Figure 1), but the result from Table 3 also exhibit significant population differences in four categories: age differences, empty nest differences, gender differences, and economic status differences.

Specifically, as shown in the results of the impact of the crowd-driven and personal-active volunteering teams on loneliness among elderly people in Model 1 of Table 2, when both types of volunteer service participation can have a positive impact on reducing loneliness among elderly people, the probability of loneliness reduction will increase [exp (0.849) -1]=1.337 times when elderly people choose to participate in group driven volunteer service behavior.

This indicates that elderly people who choose crowd-driven volunteering can receive positive psychological feedback and have the potential for self-improvement and withdrawal from loneliness and anxiety. At the same time, the coefficient results of personal-active volunteering also indicate that elderly people who participate in this type of volunteer service will also be able to experience a reduction in loneliness. Compared with elderly people who do not participate in such volunteer activities at all, the probability of reduced loneliness among elderly people who have experienced personal-active volunteering increases by [exp (0.319) -1] =0.376 times. This indicates that, under the influence of personal willingness to help others, although they cannot obtain other material rewards or subsidies from the informal support system, their psychological self-efficacy and satisfaction can be positively affected, and to a certain extent, it effectively compensates for the negative psychological health effects caused by the lack of formal elderly volunteer service projects [22].

From the coefficient changes from Model 1 to Model 5 in Table 2, after introducing several types of control variables in sequence, the two types of volunteer participation still maintain a stable and significant positive impact. Especially in the results of Model 2 incorporating demographic factors and Model 3 incorporating socio-economic factors, it can be observed that the coefficients of both types of volunteer participation variables have decreased to varying degrees, indicating that the sociodemographic characteristics of the elderly are relatively important control variables that affect their sense of loneliness. Among them, the fluctuation range of the variable coefficient of the personal-active volunteering is greater than that of the crowd- driven volunteering. This may be because the personal-active volunteering is more driven by their own charity and mutual aid psychology and willingness and is therefore more influenced by the personal situation of the elderly who implement the behavior, and more susceptible to the influence of life cycle factors such as their age, gender, and socio-economic status. Finally, in the results of Model 6, which included all control variables, both types of volunteer participation also showed a significant reduction in loneliness among the elderly.

At the same time, the specific differences among the four groups of population diversity are also worth further exploration. For example, in terms of age differences, the group type only has a significant impact on lower aged elderly, while the impact of individual type is on all ages. This situation is related to the unique psychological strength and physical health of the elderly in their life cycle. As they grow older, they need to gradually accept the natural aging of their body organs and the weakening of their health. From a physical spatial perspective, the range they can reach is also reduced. Therefore, the form of social participation of the elderly develops from an outward oriented

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to an inward oriented form. On this basis, elderly people with the crowd-driven volunteering trajectories will receive higher quality close peer social interaction [23], which has a positive effect on maintaining their perceived state of healthy living to a certain extent. Meanwhile, it should be noted that with the introduction of all control variables in Model 6 of Table 2, the significance level of age completely disappears, and only female gender shows a significant level among genders. This indicates that the influence of age factors on the actual volunteer service behavior of elderly people in China is not stable, and they may be influenced by other factors in the "Volunteer Service - Loneliness" framework [24].

Furthermore, in terms of the difference in empty nester participation, there is no significant difference in the impact of the two types of volunteer service participation on loneliness among elderly people, regardless of whether they are empty nest elderly people or not. However, by comparing the variable coefficients of the two types of volunteer service participation between the empty nester and the non-empty nester elderly people, the variable value of empty nester elderly is larger. This means that the protective effect of the "Volunteer Service - Loneliness" framework has a better effect on elderly people in non-intergenerational living conditions, and the impact of personal-active volunteering is stronger. This indicates that intergenerational support, as one of the influencing mechanisms of volunteer service and loneliness among the elderly, plays an important role in connecting family relationships and maintaining stable family structures. However, it should be noted that with the continuous increase in the proportion of empty nester among elderly people in China and the predictability of a generally "empty nester" future, the impact of intergenerational support on the good psychological health status of the elderly is insufficient [25].

Thirdly, there are significant differences in the impact of participation in two types of volunteer services on loneliness among elderly people of different genders. Among them, male loneliness is only weakened by the crowd-driven volunteering, while female loneliness can be reduced to some extent by both types of volunteer services. However, from the specific role of the crowd-driven volunteering, their impact on female is not as significant as that on male. Moreover, the probability of female experiencing a higher degree of loneliness is 1.47 times higher than that of male's exp (0.385). This gender difference comes from the expectations and constraints of social roles faced by different genders. Traditional social cognition prefers male to participate in volunteer services, and there is less adverse selection towards female [26]. It may also be related to biological factors [27], resulting from female's stronger self-awareness of personal emotional experiences [28].

Fourthly, elderly people with lower socio-economic status showed a significant impact on their participation in both types of volunteer services. Elderly people with poor economic conditions were 1.48 times more likely to have a higher level of loneliness than those without financial difficulties, while those without educational experience were 1.944 times more likely to have a higher level of loneliness than those with educational experience. Especially compared with the results of Model 6 in Table 2, the impact of socio-economic factors is stable and significant. This indicates that educational background and economic ability not only affect the material prosperity of the elderly, but also have a certain impact on their mental health. Moreover, lower levels of education and poorer material living conditions will increase their recognition of negative perceptions such as loneliness [29]. The reason for this situation may also be related to the significant impact of maintaining intergenerational living status on suppressing loneliness in the elderly in Model 5 of Table 2. From Model 5, it can be found that elderly people living in the empty nester have a 1.16-fold increased risk of experiencing higher levels of loneliness compared to those living in the non-empty nester, and families create a substantial protective environment for the elderly [30].However, it is also worth noting that the factor of whether intergenerational economic support can be obtained from the children has not had a significant impact on the loneliness of Chinese elderly people. This may be because for most elderly people, the intergenerational structure within the family is not only the

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formation of blood relationships, but also the satisfaction of multiple factors including economy, society, etc. Pure financial assistance cannot be considered as psychological comfort provided by families in the eyes of elderly people, therefore intergenerational economic support does not have a significant reducing effect on their sense of loneliness [31]. Therefore, for elderly people with lower socio-economic status, participating in the crowd-driven volunteering and the personal-active volunteering can to some extent help them avoid mental health risks when their material living conditions are insufficient to support them in obtaining intergenerational support from their personal family and other social participation projects [32].

Finally, while exploring the influencing factors of mental health, physical health cannot be ignored. As shown in the comparison of variable coefficients between Model 4 and Model 6 in Table 2, elderly individuals experience a significant impact on their self-evaluation of their own health status due to loneliness, and this impact is stable. This aging cognitive attitude indicates that the elderly population with good physical health have a more stable ability to control their emotions and mental health, and to some extent, they are more able to establish a resilient and resilient mentality [33]. This also reminds us to pay more attention to the daily physical health of the elderly and promote the prevention of physical diseases in an actively aging society [34].

5. Conclusion: Future Challenges

Combined with the above discussion of the results of the empirical analysis of the CHARLS2018, we have three findings.

Firstly, in view of the intergenerational structure within the family, the most critical first need of the elderly is the care and warmth of the family, so the care of the family of origin and the intergenerational family has an indispensable supporting role for the mental health of the elderly. Secondly, the society's investment and attention to the cause of the elderly and public welfare undertakings require guidance and support from the higher level. Secondly, the care and daily participation of life at the community level should allow residents to be self-governing, sensual and participate in social life, and form a sense of belonging. The last one is the introduction of industry funds.

In addition, there are some shortcomings in this study and there is room for further discussion. First, the research on the relationship between loneliness and volunteering among the elderly is limited by using only one survey project data in the field of social sciences, which cannot be compared and covered in multiple fields. Second, in terms of data use and citation, since the questionnaire questions that need to be answered involve personal privacy, some unanswered data are missing, and the author has modified and replaced this part of the unreasonable data on its own, so there may be deviations in the final research results. Third, the data comes from 2018, which has not been affected by the new crown epidemic, so the data of the new round of surveys to be carried out in 2022 may reveal the changes in the mental health of the elderly in China under the influence of infectious diseases.

In any case, for the mental health of the elderly, how to maintain the mental health of the elderly, the biggest point to eliminate their loneliness is to expand the living space of the elderly, strengthen their interpersonal communication, and participate in volunteer service is an important channel for the elderly to participate in social activities, is to strengthen the interpersonal communication of the elderly, maintain the mental health of the elderly is a very effective way.

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