ORIGINAL RESEARCH

Interpersonal Trust and Ability of Elderly Victims to Perform Activities of Daily Living in the Ya'an Earthquake Reconstruction Area, China

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ABSTRACT

Objective: The present study aimed to investigate the effect of the socioeconomic status and interpersonal trust of elderly victims of the Ya'an earthquake on their ability to perform activities of daily living (ADLs).

Methods: Random sampling was done in the 8 counties of Ya'an in Sichuan, China ($N = 691$). A multistage random sampling method was used. Samples were selected from counties, towns, and villages, respectively. The Faith in People Scale was used to measure interpersonal trust, and the Barthel ADL Index was used to measure ADLs. Both scales have strong reliability.

Results: A total of 37.34% of elderly earthquake victims relied on others moderately to live, and their self-rating of interpersonal trust was relatively unfavorable. Factors such as being female, being widowed, having a low educational level, and income negatively affected ADLs, among which education had the greatest influence. Interpersonal trust was vital in enhancing the level of ADLs of elderly victims.

Conclusions: A high level of interpersonal trust can significantly improve the ADLs of elderly persons. However, this may be achieved by weakening the negative effect of deteriorating social structure of victims. Attention should be focused on elderly victims whose social network worsens to improve their ADLs. (*Disaster Med Public Health Preparedness*. 2016;10:739-745)

Key Words: health impact assessment, earthquakes, natural disasters, public health, resilience, psychological

Research on how social psychology variables can provide instructions in terms of health preparedness before disasters is a hot topic. Interpersonal trust is one of the most common variables that can enhance the efficiency of disaster preparation or post-disaster reconstruction. The native effect of natural disasters on the health of elderly persons is self-evident; promoting their ability to perform activities of daily living (ADLs) is an urgent need. This research aimed to study the effect of interpersonal trust on the ADLs of elderly victims of an earthquake.

Trust refers to people being willing to rely on another party or to "take action in circumstances where such action makes one vulnerable to the other party."[1] Those who believe in justice for themselves and for others have higher levels of interpersonal trust, that is, they are more inclined to think that the person is sincere, reliable, and unselfish.[2] Interpersonal trust and political trust have a weak positive relationship,[3] which therefore can enhance tolerance and support for government policy and specific behavior as well as encourage people to participate in additional civic activities.[4]

Trust as social capital can contribute to risk communication in a natural disaster, thus enhancing support from people for preventive measures.[5] Furthermore, trust plays a positive role in post-disaster reconstruction.[6] In addition, trust influences individuals' attitudes and behavior in disaster preparedness.[7] Therefore, improving trust to promote the reconstruction of social order in post-earthquake areas and to improve the efficiency of disaster preparedness are worthy of further research.

ADLs are an important index by which to measure the health status of elderly persons. ADLs evaluate the ability of independent living of older people via measurement of their level of reliance on others in activities of daily life. ADLs can be used as a quantitative index of nursing effort when caring for elderly persons.[8] ADLs have been used to measure the physical disability of earthquake victims.[9] Serious natural calamities make older people more vulnerable, and earthquakes can negatively affect the ADLs of elderly disaster survivors.[10] Elderly victims with lower physical capacity will confront more problems and have a lower quality of life (QOL).[11] Therefore,

paying attention to the ADLs of elderly earthquake victims is an urgent practical need.

Previous research has shown that a high level of trust is related to improved self-rating of health and higher life satisfaction.[12] Interpersonal trust can promote QOL.[13] The importance of trust in public health management lies in driving analysis on public policy. Trust-based health systems can help to establish values in society.[14] During reconstruction of the community, people with higher social capital can effectively address the allocation and use of all types of resources.[15] To the best of our knowledge, no special studies have focused on the interpersonal trust of elderly earthquake victims and the effects of this trust on health. Few previous studies have investigated the effects of different roles of social capital on various health outcomes.[15]

This study aimed to fill the gaps of the above research and focus attention on the ADLs of elderly victims. We used the sampling survey in Ya'an City, Sichuan, as an example. On April 20, 2013, a devastating earthquake measuring 7.0 on the Richter scale struck this city, affecting more than 1 million people. We studied the influence of interpersonal trust on ADLs among the elderly victims and explored the relationship between them. The aims of this study were (1) to understand the relation of interpersonal trust and ADLs of elderly victims and measures of improvement, (2) to discuss the relationship between interpersonal trust and ADLs and to understand how social capital affects ADLs, and (3) to offer advice on how to enhance health recovery in disaster construction.

METHODS

Sampling and Respondents

The investigation was conducted from June to August. A multi-stage random sampling method was used that was based on the administrative plan of China's cities. Among the 8 districts (counties) in Ya'an, we randomly selected a town in each county. In each town, a random sample of 2 rural communities or villages was selected. After obtaining the list of elderly persons aged above 60 years in each community or village, we randomly selected 50 respondents. Questionnaires were distributed and filled out in the household by trained investigators on the basis of the respondents' oral answers. We sent a total of 800 questionnaires, and 691 valid questionnaires were received, an efficiency of 86.4%.

Questionnaire

Basic questionnaire information comprised socioeconomic status (SES), including age, education, marital status, sex, and monthly income. In the survey sample, 363 were men (52.5%) and 328 were women (47.5%). In terms of age, 61.5% of the respondents were 60 to 79 years old and 23.8% were 80 to 89 years old. The data showed that 20.5% of the respondents were illiterate and 55.2% received primary school or junior middle school education. In terms of marital status, 35.3% were married, 47.0% were widowed, and 17.7% were divorced. In addition, 31.8% of the participants' monthly income was less than CNY 1000, 58.0% earned CNY 1000 to 4000, and only 10.1% earned above CNY 4000.

Interpersonal Trust

This study used the Faith in People Scale (FIPS).[16] Many scales are used to measure interpersonal trust, but the FIPS is one of the most common, especially in various large-scale surveys such as the American General Social Survey.[17] Furthermore, the scale is characterized by strong reliability.[18]

The FIPS includes 5 items, represented by Trust1, Trust2, Trust3, Trust4, and Trust5, respectively. Each entry includes 2 options: agree and disagree. Among them, Trust1, Trust3, and Trust4 are reverse entries; Trust2 and Trust5 are positive entries. The disagree option in positive entries and the agree option in reverse entries are recorded as 1 point. The cumulative scores of each item above 1 make up the total score; thus, the total score is between 1 and 5. Higher scores indicate a lower degree of reliance on others.

In this study, the Cronbach's alpha of the FIPS was 0.659. The Cronbach's alpha of each item and the correlation coefficient among the items are listed in Table 1. The deleted Cronbach's alpha coefficients of all items were greater than 0.500, which indicates that the internal consistency of the questionnaire was acceptable. Their coefficients were less than the total coefficient, suggesting that excluding any item was of no significance. Besides, the correlation coefficient was significant ($P < 0.001$), and the correlation coefficient was between 0.20 and 0.34. Therefore, the reliability and validity of the FIPS for the elderly earthquake victims were acceptable.

TABLE 1

Cronbach's Alpha and Spielman Correlation Coefficients of the FIPS[a]

Items	Deleted Cronbach's Alpha of Items	Trust1	Trust2	Trust3	Trust4	Trust5
Trust1	0.589	1				
Trust2	0.621	0.339[b]	1			
Trust3	0.585	0.340[b]	0.299[b]	1		
Trust4	0.607	0.292[b]	0.201[b]	0.321[b]	1	
Trust5	0.630	0.232[b]	0.202[b]	0.260[b]	0.299[b]	1

[a]Abbreviation: FIPS, Faith in People Scale. The 5 items of the FIPS are as follows: Trust1 = Most people cannot be trusted; you can't be too careful about your dealings with people. Trust2 = Most people are more inclined to help others than to look out for themselves. Trust3 = If you don't watch yourself, people will take advantage of you. Trust4 = Most people don't really care what happens to the next person. Trust5 = Human nature is fundamentally cooperative.

[b]Correlation was significant at the 0.001 level (2-tailed).

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Activities of Daily Living

The Barthel ADL Index is valid and reliable[19] and can be used to conduct standardized measurement.[20] The Chinese version of the Modified Barthel Index has been proven to be feasible.[21] The Barthel Index comprises 10 items, including asking about feeding, bathing, grooming, dressing, control of bowels and bladder, use of the toilet, transfer, walking, and using stairs. Each entry has 4 options based on whether help is needed and the degree of demand: independence, independence partly or in need of little help, in need of great help, and total dependence.

However, options in each entry are not completely consistent, which leads to assignments being not entirely consistent. The highest score is 100 points, indicating that elderly persons can live completely independently (independent). Ranges from 75 to 95 points and 50 to 70 points indicate that elderly persons require minimal help with ADLs (supervised) or are partially dependent (assisted or helped) on others, respectively. A range of 25 to 45 points indicates that elderly persons are in severe need of help to live (very dependent). Finally, a score of less than 20 means that elderly persons are completely incapable of self-care (totally dependent). Thus, a higher score indicates a more powerful ability to live independently.

The Cronbach's alpha of each item and correlation coefficients among the items of ADLs are listed in Table 2. The deleted Cronbach's alpha coefficients of the items were more than 0.7 and less than the total Cronbach's coefficient (0.861), suggesting that the measurement had good internal consistency and it was insignificant to exclude any items. Besides, the correlation coefficient was significant ($P < 0.05$), and the values were between 0.10 and 0.40. Therefore, measurement of ADLs was reliable and valid for the elderly earthquake victims in China.

RESULTS

Descriptive Data

The descriptive data are shown in Table 3. The respondents' average age was 76 years, and the greatest percentage of respondents were aged 60 years. The mode of education was 2 (primary school), and more respondents had a primary school education. The mode of monthly income was 1 (CNY < 1000), that is, more respondents had a monthly income < CNY 1000. The average ADL score was 67.07, indicating that many elderly respondents were moderately dependent on others to live. In terms of FIPS, the average value was 3.5, more than the midpoint of the scale (3), but many respondents had a score of 3.

Effect of Socioeconomic Status on Activities of Daily Living

The chi-square test showed that the Pearson chi-square statistics of cross-analysis of SES and ADLs were 135.72, 166.99, 826.69, and 456.13, respectively. In addition, the corresponding P values were 0.000 (<0.001). Thus, the relationship between SES and ADLs was significant.

As shown in Table 4, for women, the proportion of partially dependent respondents was the highest (47.56%), followed by very dependent respondents. For men, however, the proportion of slight dependence was the highest, accounting for more than 36.64%, and the proportion of independent respondents was 21.21%. Thus, the reported independence of males was higher than that of females. The elderly respondents who were married tended to be slightly dependent or independent, whereas those who were widowed or divorced tended to be very or partially dependent.

The majority of the totally independent groups had education levels at the high school level and above. The education degree of the totally dependent as well as the very dependent and partially dependent groups was distributed in primary school and below, and junior middle school and below, respectively. The income of the elderly who were independent was primarily more than CNY 3000 monthly. Meanwhile, the income of totally dependent, very

TABLE 2

Cronbach's Alpha and Spielman Correlation Coefficients of the Barthel Activities of Daily Living Index[a]

Items	Deleted Cronbach's Alpha of Items	Feeding	Bathing	Grooming	Dressing	Bowels	Bladder	Toilet Use	Transfer	Mobility	Stairs
Feeding	0.737	1									
Bathing	0.736	0.307[a]	1								
Grooming	0.738	0.225[a]	0.360[a]	1							
Dressing	0.729	0.245[a]	0.361[a]	0.358[a]	1						
Bowels	0.735	0.230[a]	0.246[a]	0.232[a]	0.299[a]	1					
Bladder	0.744	0.191[a]	0.202[a]	0.234[a]	0.214[a]	0.222[a]	1				
Toilet use	0.736	0.253[a]	0.293[a]	0.276[a]	0.261[a]	0.253[a]	0.179[a]	1			
Transfer	0.722	0.258[a]	0.267[a]	0.307[a]	0.313[a]	0.302[a]	0.327[a]	0.325[a]	1		
Mobility	0.748	0.275[a]	0.216[a]	0.203[a]	0.234[a]	0.216[a]	0.151[a]	0.204[a]	0.283[a]	1	
Stairs	0.739	0.193[a]	0.282[a]	0.251[a]	0.242[a]	0.248[a]	0.193[a]	0.201[a]	0.274[a]	0.234[a]	1

[a]Correlation was significant at the 0.05 level (2-tailed).

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TABLE 3

Descriptive Statistics of the Variables[a]

	Mean	Mode	Variance	Skewness	Kurtosis	Minimum	Maximum
Gender	1.47	1	0.25	0.1	−2.00	1	2
Age	75.99	60	118.22	0.16	−1.17	60	98
Education degree	2.67	2	1.59	0.38	−0.81	1	5
Marital status	1.82	2	0.50	0.26	−0.98	1	3
Income	2.47	1	1.77	0.47	−0.95	1	5
ADLs	67.07	100	498.17	0.03	−1.12	5	100
Degree of trust	3.50	3	0.94	0.05	0.05	1	6

[a]Abbreviation: ADLs, activities of daily living.

TABLE 4

Cross-Analysis of SES on ADLs[a]

	Totally Dependent (0-20)	Very Dependent (25-45)	Partially Dependent (50-70)	Needs Minimal Help with ADLs (75-95)	Independent (100)	Total
Gender						
Female	3	104	156	56	9	328
Male	5	46	102	133	77	363
Marital status						
Married	2	31	58	87	66	244
Widowed	5	87	141	77	15	325
Divorced or other	1	32	59	25	5	122
Education degree						
Illiterate	5	79	57	1	0	142
Primary school	3	58	118	17	0	196
Junior middle school	0	13	83	85	4	185
Senior high school	0	0	0	57	30	87
College and above	0	0	0	29	52	81
Income						
<1000	6	82	114	19	0	221
¥1000–2000	2	44	75	29	6	156
¥2000–3000	0	20	60	55	15	150
¥3000–4000	0	4	9	47	35	95
¥>4000	0	0	0	39	30	69

[a]Abbreviations: ADLs, activities of daily living; SES, socioeconomic status.

dependent, and partially dependent elderly was primarily CNY 1000 monthly.

Regression Analysis

In order to conduct the regression analysis, we use 691 samples and quantified the ADL variable as the dependent variable and quantified the degree of trust as the independent variable. Among the control variables, the variable of education was counted as a real number according to the translating method proposed by other scholars.[22] Education degree was counted as follows: illiterate = 6, primary school = 9, junior high school = 12, high school = 14, junior college and above = 16. The level of monthly income used the median of the interval as follows: less than CNY 1000 = 500, CNY 1000 to 2000 = 1500, CNY 2000 to 3000 = 2500, CNY 3000 to 4000 = 4500, over CNY 4000 = 6500. Sex and marital status were set as dummy variables. The methods were as follows:

$$\text{Sex: } Ds = \begin{cases} 1, \textit{male} \\ 0, \textit{female} \end{cases}; \text{ Marital status: } Dm1 = \begin{cases} 1, \textit{notwidowed} \\ 0, \textit{others} \end{cases}$$

$$Dm2 = \begin{cases} 1, \textit{widowed} \\ 0, \textit{others} \end{cases}$$

Where Ds is Dummy Sex variable, Dm1 is Dummy Marital variable 1, and Dm2 is Dummy Marital variable 2. To exclude the heteroscedasticity effect on the model, this article used weighted regression. As shown in Table 5, we used weighted regression with control variables to improve the coefficient of determination from 0.6964 to 0.9972. We then used the Akaike information criterion and Schwarz criterion to evaluate the model fitting. After adding the independent variable of trust to the weighted regression, the coefficient of determination was further improved. The Akaike information criterion

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TABLE 5

Regression Analysis of Interpersonal Trust on ADLs[a]

	Mode 1				Mode 2			
	Coefficient	SE	t-Statistic	P	Coefficient	SE	t-Statistic	P
Constant	–2.3773	0.8159	–2.9138	0.0037	–3.8963	1.0658	–3.6557	0.0003
Gender	0.2679	0.1303	2.0556	0.0402	0.3631	0.1169	3.1049	0.0020
Age	0.1138	0.0084	13.6178	0.0000	0.1179	0.0100	11.7834	0.0000
Education	5.0752	0.0241	210.5877	0.0000	5.0855	0.0265	191.8727	0.0000
Dm1	2.0592	0.2020	10.1953	0.0000	2.0087	0.2091	9.6068	0.0000
Dm2	1.9217	0.1885	10.1936	0.0000	1.8153	0.1828	9.9291	0.0000
Income	0.0024	0.0001	42.0936	0.0000	0.0024	0.0000	49.7631	0.0000
Trust					0.2962	0.0784	3.7758	0.0002
Before weighting	N	691	AIC	7.877	N	691	AIC	7.8794
	R^2	0.6964	SC	7.9231	R^2	0.6965	SC	7.9321
	F	260.71			F	223.31		
After weighting	N	691	AIC	7.7425	N	691	AIC	5.3878
	R^2	0.9972	SC	7.7886	R^2	0.9995	SC	5.4404
	F	39864.08			F	212782.7		

[a]Abbreviations: ADLs, activities of daily living; AIC, Akaike information criterion; SC, Schwarz criterion; SE, standard error.

and Schwarz criterion were greatly reduced from 7.7425 and 7.7886 to 5.3878 and 5.4404, respectively, suggesting that the variable of trust was sufficient to explain the ADL.

Following the regression coefficient shown in Table 5, we can make conclusions in terms of the factors that influenced independent ability: the influence of sex, age, education level, marital status, income, and the degree of trust on ADL was significant. Furthermore, the education level was the greatest effective factor based on the coefficient. Higher education typically resulted in higher independence.

Under other circumstances, divorce as well as female sex negatively influenced independence. Factors of male sex, not being widowed, and being widowed positively affected independent ability, as did age and level of income. According to the regression coefficient, the degree of trust positively affected ADL. Such a result indicates that a lower degree of trust resulted in worse ADLs.

DISCUSSION

This study measured the interpersonal trust and ADLs of elderly Chinese earthquake victims and explored the effects of SES and interpersonal trust on ADLs. By using cross-analysis and regression analysis, the main findings of this research were as follows. (1) A total of 37.34% of elderly Chinese victims were moderately dependent on others to live, and their self-rating of interpersonal trust was relatively unfavorable. (2) The factors of being female, being widowed, having a low education, and having low income negatively affected the ADLs of elderly victims. Low education was the predominant factor. (3) Higher interpersonal trust played a positive role in promoting ADLs of elderly victims.

The physical functioning and ability of the elderly decline with age. In this study, 39.22% of the respondents were over 80 years old. At such an age, they are in need of help from other people and are at high risk during earthquakes. In addition, their self-rating score on the FIPS is not ideal, and the interpersonal trust of many elderly people is below average. Furthermore, if they are highly dependent on others to live, the QOL of elderly victims will decline.[11]

In the present study, the effect of SES on ADLs was similar to that shown in previous research.[23] Female earthquake victims have unique psychological characteristics; they are more inclined to degrade their self-rated health.[24] Widowed status means the loss of mutual help and comfort from the deceased spouse. Furthermore, this severely affects the mental health of the remaining spouse, which may affect physical functioning. Low income not only increases the prevalence of disability in the elderly,[25] it also reduces their ADLs. The present study has emphasized that the education of elderly victims has an important and significant effect on ADLs. Higher education may mean that older people have a clear sense of self, so that they will pay more attention to their own health and are in better control of their ADLs.

Most importantly, the results suggest that interpersonal trust has positive effects on the ADLs of elderly earthquake victims. Previous research has revealed in a broader dimension that a person's social network will affect their health. Solid social capital is closely related to the health of elderly people.[26] Trust, especially, is a particularly important factor for our subjective health. As for victims suffering from a natural disaster, a change in social network will reduce their QOL,[27] and socially isolated individuals will present with more depressive symptoms.[28]

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After adding interpersonal trust variables to model 2 in this study, the coefficient of sex became larger, but the coefficient of marital status became smaller. This may be explained by the fact that the influence of interpersonal trust on ADLs is the dilution of the explanatory extent of the marriage variables. Compared to those widowed, the interpersonal trust of married elderly is much higher, as is their ADL score. Interpersonal trust can mediate the negative effects of unfavorable marital status on the ADL score of the elderly. In fact, scholars believe that the influence of social capital variables such as trust on the subjective well-being of the elderly can mediate the negative effect of poverty and marital status,[29] among others. Interpersonal trust can improve the QOL of disadvantaged groups.[13] Therefore, the impact of high interpersonal trust on the ADLs of elderly victims may be achieved by mediating the negative effect of deteriorating social structure (eg, loss of spouse) of elderly victims.

This study provides interpersonal trust, which can improve the health of elderly victims, with empirical data. Therefore, we can afford certain recommendations for the healthy preparation of the elderly during earthquakes. For example, when using a community map to locate the homes of elderly people,[30] we can focus on those whose social network has been worsening (such as through the loss of relatives or friends).[31] Improving the ADLs of the elderly requires the help of trusted family members and friends and analysis of the interpersonal trust of elderly people will be a more effective method.

Limitations

This study had 2 main limitations. First, the reliability of the FIPS of the respondents was not ideal. Finding or developing a better scale for future research is recommended. Second, we did not use practical evidence to prove that the social network of the elderly earthquake victims was worsening. We did not involve control groups, namely, measuring the interpersonal trust or ADLs of elderly victims before and after the disaster to study the trend of change.

CONCLUSIONS

The observation and study of trust can provide victims with enlightenment in terms of health recovery or preparation for disaster. It plays a helpful role not only in enhancing cognitive psychology but also in fulfilling the proposition and implementation of public policy. This article explored the influence of interpersonal trust on the ADLs of elderly earthquake victims in Ya'an, Sichuan. The study found that the factors of being female, being widowed, having low education, and income had negative effects on the ADLs of elderly earthquake victims. However, a high level of interpersonal trust can significantly improve the ADLs of elderly victims, which is likely to be achieved by mediating the negative effect of deteriorating social structure (eg, loss of spouse) of elderly victims. Therefore, we propose to focus on elderly whose social networks have been worsening (such as by the loss of a family member or friend) to improve their ADLs.

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