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Emergency volunteering willingness and participation: a cross-sectional survey of residents in northern China

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Complete List of Authors:	Shi, Mengli; Department of Social Medicine Gao, Lijun; Harbin Medical University, Social Medicine Xu, Wei; Harbin Medical University, Social Medicine Kang, Zheng; Harbin Medical University, Health policy Ning, Ning Liu, Chaojie; La Trobe University, Public Health Liang, Chao; Department of Social Medicine Sun, Hong; School of Health Management, Harbin Medical University, Jiao, Mingli; Harbin Medical University, Health policy Liang, Libo; School of Health Management, Harbin Medical University, Li, Ye; School of Health Management, Harbin Medical University, Cui, Yu; Harbin Medical University, School of Public Health Fei, Jie; Department of Social Medicine Wei, Qiuyu; Department of Social Medicine Yi, Ming; Department of Social Medicine Wu, Qunhong; Harbin Medical University, Social Medicine Hao, Yanhua; Harbin Medical University, Social Medicine
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Emergency volunteering willingness and participation: a cross-sectional survey of residents in northern China

Mengli Shi,¹ Lijun Gao,^{1,2} Wei Xu,¹ Zheng Kang,^{1,2} Ning Ning,^{1,2} Chaojie Liu,³ Chao Liang,¹ Hong Sun,^{1,2} Mingli Jiao,^{1,2} Libo Liang,^{1,2} Ye Li,^{1,2} Yu Cui,^{1,2} Jie Fei,¹ Qiuyu Wei,¹ Ming Yi,¹ Qunhong Wu,^{*1,2} Yanhua Hao.^{*1,2}

ABSTRACT

Objectives: Volunteers have become an important part of the national response system. Little is known about willingness and participation of Chinese people to volunteering in emergencies. This study aimed to identify factors that influence people's willingness and participation of emergency volunteering in northern China.

Design/Setting: A mixed method was adopted in this study. A cross-sectional questionnaire survey was conducted in Heilongjiang province. Respondents were selected using a stratified cluster sampling strategy. In-depth review was carried out with residents, related organization managers and officials.

Participants: 2686 respondents participated in the survey and 19 key informants were interviewed in September 2014.

Primary and secondary outcome measures: Primary outcome (willingness to respond to emergencies as a volunteer) were measured with a 5-point Likert scale. Secondary outcome (participation in emergency volunteering) was measured with respondents' self-reported past experience.

Results: 65.7% of respondents were willing to volunteer in emergencies. 24.3% of respondents had participated in emergency action. Willingness and participation were commonly associated with residency (OR=1.308(1.064, 1.608) and OR=1.518(1.208, 1.908) for rural residency, respectively), stronger community attachment (OR=1.720(1.429, 2.069) and OR=1.547(1.266, 1.890), respectively), higher recognition of responsibility (OR=1.981(1.498, 2.619) and OR=1.517(1.177, 1.955), respectively), preparedness behavior (OR=1.714(1.424, 2.064) and OR=1.391(1.151, 1.681), respectively) and injury insurance coverage (OR=1.335(1.102, 1.619) and OR=1.822, (1.500, 2.214), respectively). The In-depth interviews revealed that inappropriate policy environment and volunteer organizational management were major barriers for converting willingness into actions.

Conclusion: A relatively high level of willingness to volunteer in emergencies in northern China is associated with a range of individual, community and institutional factors. Efforts should be made to translate the willingness into effective contributions to the emergency response system. This

*Corresponding authors: Yanhua Hao and Qunhong Wu contributed equally to this paper.

Correspondence to

Professor Yanhua Hao; hyhyjw@126.com

Professor Qunhong Wu; wuqunhong@163.com

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3 can be done through improving policies, regulations, coordination mechanisms, and volunteer
4 training and support.
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6 **Strengths and limitations**

7
8 This study adopted a mixed methods approach, involving a questionnaire survey and in-depth
9 interviews. Findings from the two methods complement and support each other.
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11
12 Factors associated with willingness and participation of emergency volunteering were explored
13 from the individual, community and institutional perspectives.
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15
16 The concept of “emergency events” adopted in this study was general and covered a broad range
17 of events including natural disaster, human-made accidents, public health emergencies and social
18 arrest. This may lead to vague or uncertain answers from some respondents. Self-reported
19 willingness to volunteer may vary with different scenarios. Scenario-based studies should be
20 considered in the future for better understanding of the findings.
21

22
23 This study was conducted in Heilongjiang, which may not be representative of the entire country
24 of China. Cautions need to be taken when generalizing the findings. The cross-sectional design of
25 this study does not allow causal conclusions to be drawn.
26

27 **INTRODUCTION**

28
29 Emergency volunteering emerged and developed in a time of crisis. Since the second half of the
30 20th century, the world has encountered high incidence of disastrous events: 1986 Chernobyl
31 disaster in Ukraine, "9.11" terrorist attack in 2001 in the US, 2003 SARS crisis, 2008 Wenchuan
32 earthquake in China, just to name a few. Some of the disastrous events are natural disasters, others
33 are manmade. It is undeniable that governments play a leading role in emergency responses.
34 However, in many cases the emergency response needs exceed the capacity of government
35 agencies and professional rescue bodies. Volunteers often play a critical role across the entire
36 spectrum of rescue efforts.¹ For example, immediately following the blast of the 1995 Oklahoma
37 city bombing, voluntary organizations and civilian volunteers participated in the search and rescue
38 efforts and a Compassion Centre was established by volunteers within seven hours.² In the 1976
39 Tangshan earthquake, survivors formed rescue teams immediately to save people buried in the
40 debris.³ Indeed, without the efforts of spontaneous volunteers, immediate response and recovery
41 would not have a high success rate.⁴
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47 The best definition of volunteers was probably given during the International Year of Volunteers
48 (2001): “A volunteer is a person, who, having carried out the duties of every citizen, places her/his
49 own capacity at the disposal of others, for the community or for all humanity. She/he operates in a
50 free and gratuitous manner promoting creative and effective responses to the needs of
51 beneficiaries of her/his own action and contributing to the realization of common goods”.⁵ There
52 are three types of volunteers in emergency responses according to the Hong Kong Red Cross:
53 community-based volunteer is someone who comes from the community and is willing to help
54 others; functional volunteer is someone who is equipped with specific emergency skills, such as
55 first aid and psychological support; professional volunteer is someone who has a professional
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3 qualification, such as doctor and nurse.⁶ Emergency volunteering requires not only a will to help
4 others, but also professional knowledge and skills.⁶
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7 Some countries have attached great importance to improving the public capability of emergency
8 response. For example, in the US, the Community Emergency Response Team (CERT) program
9 offers a consistent and nationwide approach to volunteer training, which has enhanced the public
10 capability to respond to and recover from disasters.⁷ The Japanese government has integrated
11 emergency education into school education and community activities, and established multiple
12 "disaster prevention days" to carry out emergency training and exercises.⁸ Such regular emergency
13 training ensures that the people with qualified skills can be effectively deployed to emergency
14 volunteer services during disasters. However, China has not yet established a regular
15 community-based emergency training program, and lacks volunteers with specific knowledge and
16 skills to respond to emergencies.⁹ Those shortfalls were conspicuously exposed in the Wenchuan
17 earthquake, even resulting in a "new victims" phenomenon.⁹
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21 The development of an emergency volunteer system in China is still in its infant stage. During the
22 2003 SARS outbreak, only a small number of social organizations and individuals provided
23 volunteer services. The demand for large numbers of rescue workers in the 2008 Wenchuan
24 earthquake accelerated the development of emergency volunteering. According to the statistics,
25 more than 4 million volunteers were involved in disaster relief activities during the Wenchuan
26 earthquake, which remained to be the largest emergency volunteering effort in China up to now.¹⁰
27 However, most of those volunteers were spontaneous and in an unorganized state, which even
28 added some obstacles to the emergency rescue work.⁹
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31 It is noteworthy that integrating volunteer organizations into the formal emergency response
32 system has become a world trend.¹¹ Many developed countries have established institutionalized
33 mechanisms to attract, train and retain volunteers.¹² In Japan, a volunteer center was established,
34 serving as a volunteer recruitment platform.¹³ In the US, the Medical Reserve Corps (MRC) is a
35 national network of volunteers, which maintains a recruitment and registration system for
36 emergency volunteering.¹⁴ Formal volunteer organizations were also established in Germany, the
37 UK, and Australia.^{11,15} In the case of emergencies, these organized volunteers can be mobilized
38 and deployed rapidly. Such systems also offer appropriate protections on the health of the
39 volunteers through training, support and insurance coverage.^{14,16-18}
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43 In countries with a well-established volunteer system, participation in volunteering is high. In the
44 US, for example, 40% of the total population is involved in volunteer services.¹⁹ Germany has
45 only about 82 million population, but 23 million have participated in volunteer activities and 1.8
46 million have provided emergency volunteering services.¹⁵ It is not clear how many people in
47 China are willing to volunteer and have actually provided emergency volunteer services. Due to
48 the lack of a well-organized system in China, only 1% of the total population has registered for
49 volunteering services.¹⁹
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53 Extensive studies have been undertaken in the western countries with regard to the motivation and
54 benefits of volunteering.²⁰⁻²¹ Willingness to volunteer often depends on specific circumstances,²²
55 and is subject to the impacts of regulations and training.²³⁻²⁵ However, there is a dearth of
56 literature in China probing into the willingness to emergency volunteer and the participation in
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3 emergency volunteering. This study aimed to fill the literature gap, which can provide evidence
4 for policy development in relation to emergency volunteering.
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6 **METHODS**

7 **Questionnaire survey**

8 **● Study population**

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11 A cross-sectional questionnaire survey was conducted in Heilongjiang province in September
12 2014. Heilongjiang is located in the northeast of China, with a population over 38 million. The
13 gross domestic product per capita in Heilongjiang reached ¥39,352 (US \$5,700) in 2015, lower
14 than the national average of ¥49,730 (US \$7,957).²⁶
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18 A multi-stage stratified cluster sampling strategy was adopted to ensure demographic and
19 social-economic diversities of study participants. Five (out of 13) municipalities in Heilongjiang
20 were selected: Harbin (capital city), Qiqihar, Mudanjiang, Jiamusi and Daqing. In each
21 municipality, one urban district and one rural county were randomly selected. Two
22 communities/villages were then randomly selected from each district/county. All of the households
23 in the selected communities/villages were eligible to participate in the survey. Each household was
24 asked to nominate one adult member to complete the questionnaire. A total of 2800 questionnaires
25 were returned, in which 2686 (95.9%) were valid for data analyses.
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29 The questionnaire survey was administered through face-to-face interviews. Each interview took
30 about 20 minutes. The interviewers were recruited from the postgraduate students in the school of
31 public health of Harbin Medical University. They had attended a training workshop prior to
32 embark in the fieldwork. One experienced researcher was allocated to each community/village to
33 supervise the data collection activities.
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36 **● Dependent variable**

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38 Willingness to emergency volunteer: respondents were asked to rate on a 5-point Likert scale
39 (ranging from 1 “no, not at all” to 5 “yes, very much”) in relation to the question: “Are you
40 willing to respond to emergencies as a volunteer?”
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43 Participation in emergency volunteering: respondents were asked whether they had ever
44 participated in emergencies as a volunteer (yes or no).
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47 **● Independent variable**

48 Independent variables tested in this study included socio-demographic characteristics, awareness
49 and attitudes toward emergency risks, community attachment, recognition of responsibility, and
50 self-efficacy in emergency response. These variables were selected based on the existing literature.
51 Rosychuk and colleagues suggest the application of the knowledge-attitudes-behavior model in
52 emergency volunteering studies,²⁴ based on the theory of rational action.²⁷ Enders recommends
53 addition of past experience and self-efficacy into the knowledge-attitudes-behavior model.²⁸ The
54 self-efficacy theory posits that confidence and ability contribute to the individual’s capacity to
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control their behaviors.²⁹ In recent years, the social capital theory has started to attract increasing attention. Catts and Chamings proposed that social capital based on trust is critical to effective functioning of volunteering.³⁰

The *socio-demographic characteristics* of respondents were measured by gender, age (years), residency (urban vs rural), educational attainment (no more than junior high school, senior high school, university) and household income (¥0-1999/ \$0-300, ¥2000-4999/ \$300-750, ¥5000+/ \$750+).

Knowledge: 18 statements (involving earthquake, fire, infectious disease and food poisoning) were designed to test the knowledge of respondents in regard to emergencies, including two about first aid (chest compression and limb artery ligation). Respondents chose one of the answers for each statement: agree, disagree, don't know. A correct answer attracted a score of 1, otherwise 0.

Risk perception: respondents were asked to rate the risk of emergencies (4 items) in relation to natural disaster (earthquake, flood), accidents (fire, road accident), public health (infectious disease, food poisoning) and social arrest (violence, terrorism), respectively, on a five-point Likert scale (ranging from 1-“highly unlikely” to 5-“highly likely”). The level of risk awareness was also indicated by an additional item measuring the coverage (yes or no) of accident injury insurance.

Attitudes (4 items): respondents were asked to rate their attitudes and beliefs towards emergency preparedness on a 5-point Likert scale (ranging from 1-“strongly disagree” to 5-“strongly agree”). Example questions include: “Luck is more important than preparedness in emergencies” and “I am very interested in information about emergencies”.

Community attachment (5 items): respondents were asked to rate how closely they were attached to their community on a 5-point Likert scale (ranging from 1-“strongly disagree” to 5-“strongly agree”). Example statements include: “I like my community” and “I'm willing to help my neighbor when they have troubles”.

Recognition of responsibility (1 item): respondents were asked to judge whether volunteers should have some responsibility (yes or no) to respond to emergencies.

Self-efficacy (2 items): respondents were asked to rate their capability to engage in emergency response (“I am confident that I can cope with emergencies effectively”) and mitigate risks (“I can always keep calm when I encounter emergencies”) on a 5-point Likert scale (ranging from 1-“totally disagree” to 5-“totally agree”).

Past experience of emergencies: respondents were asked whether they had ever experienced emergencies in the past (yes or no).

Exposure to awareness campaigns over the past year: respondents were asked whether they received any emergency-related training in the past year (yes or no).

Behavior in emergency preparedness (4 items): respondents were asked to report their behaviors in relation to emergency preparedness on a 5-point Likert scale (ranging from 1-“totally disagree” to 5-“totally agree”). Example questions include: “I always pay special attention to all kinds of

risk warning messages” and “I always take the initiative to participate in emergency training”.

● Quantitative analysis

The two dependent variables (willingness to volunteer and participation in volunteering) were collapsed into two categories respectively, with 0 indicating “unwilling” (score 1, 2, or 3) or “no” and 1 indicating “willing” (score 4 or 5) or “yes”.

The independent variables were transformed into categorical measurements for the purpose of statistical analyses due to a lack of evidence to support the assumptions of linear correlations. For the scales measuring *knowledge*, *risk perception*, *attitudes*, *community attachment*, *self-efficacy*, and *behavior*, a summed score was calculated before it was recoded into 1 “above average” and 0 “on/below average”.

χ^2 tests were performed to determine the differences of the two dependent variables across different categories of the independent variables. The independent variables that showed statistical significance ($p < 0.05$) were entered into a multivariate logistic regression model. The regression model was established to determine the effect size of each independent variable, adjusting for the influence of others. All statistical analyses were conducted using SPSS 19.0. A p-value (two-sided) less than 0.05 was considered to be statistically significant.

In-depth interview

The interviewees were purposively selected based on their roles and experience in emergency volunteering. Ten residents and nine organization managers and officials completed the interviews. The managers and officials were asked to answer questions in relation to the status and barriers of the emergency volunteering organizations, such as related policies, volunteer recruitment, selection, training and registration, equity protection, incentive mechanisms, and linkages with the community. The volunteers were asked to answer when, where and why they participated in emergency as a volunteer, as well as the protections and rewards they received during and after emergency volunteer services.

The interviews were digitally recorded, transcribed and thematically coded. The final sample size was determined by saturation of information when no new themes emerged.

● Qualitative analysis

The interview data were analyzed thematically. The coding framework was developed inductively from the data. The initial coding used open coding (codes derived directly from the data) and theoretical coding. The initial codes were then refined to produce a smaller set of themes. The coding framework was subject to continuing iterative revision during the course of analysis.

Ethics approval

The study was approved by the Medical Research Ethics Committee of Harbin Medical University.

RESULTS

Characteristics of respondents

The respondents had an average age of 41.9 (SD=14.6); 56.2% were women; 58.0% resided in rural areas; 29.1% obtained a university qualification. More than 52% of respondents had a monthly household income between ¥2000 (\$300) and ¥4999 (\$750) (Table 1).

Willingness to volunteer and participation in volunteering

About 65.7% of respondents were willing to volunteer in emergency events, including 28.3% who expressed strong willingness. Only 7.7% of respondents were not willing to volunteer: 1.2% strongly unwilling. About 24.3% of respondents had participated in emergencies as a volunteer.

Factors associated with willingness to volunteer and participation in volunteering

Willingness to volunteer varied by age, residency, educational attainment, knowledge about emergencies, risk perception, attitudes toward emergency preparedness, community attachment, recognition of responsibility, self-efficacy, preparedness behavior, past experiences, and injury insurance coverage. However, no significant differences in willingness to volunteer were found across gender, income, and exposure to emergency awareness campaigns ($p>0.05$, Table 1).

Participation in volunteering varied by gender, age, residency, educational attainment, knowledge about emergencies, community attachment, recognition of responsibility, preparedness behavior, past experiences, injury insurance coverage and exposure to emergency awareness campaigns. However, income, risk perception, attitudes toward emergency preparedness and self-efficacy were not found to be associated with participation in volunteering ($p>0.05$, Table 1).

Table 1 Characteristics of respondents and their willingness to volunteer and participation in volunteering (n=2686)

Characteristics	Respondents [n (%)]	Willingness [n (%)]	χ^2	p	Participation [n (%)]	χ^2	p
Gender			3.374	0.066		18.403	0.000
Male	1177 (43.8)	751 (63.8)			333(28.3)		
Female	1509 (56.2)	1014 (67.2)			319(21.1)		
Age (years)			19.168	0.000		11.328	0.003
<35	910 (22.9)	550 (60.4)			250(27.5%)		
35-55	1265 (47.1)	852 (67.4)			302(23.9%)		
55+	511 (19.0)	363 (71.0)			100(19.6%)		
Residency			12.292	0.000		3.869	0.049
Rural	1559 (58.0)	1067 (68.4)			400(25.7)		
Urban	1127 (42.0)	698 (61.9)			252(22.4)		
Educational attainment			6.254	0.044		19.647	0.000
≤Junior high school	1260 (46.9)	830 (65.9)			262(20.8)		
Senior high school	644 (24.0)	400 (62.1)			160(24.8)		
University	782 (29.1)	535 (68.4)			230(29.4)		
Household monthly income (¥/\$)			1.189	0.552		1.603	0.449
0-1999/0-300	853 (31.8)	573 (67.2)			217(25.4)		
2000-4999/300-750	1409 (52.4)	916 (65.0)			328(23.3)		
5000+/750+	424 (15.8)	276 (65.1)			107(25.2)		
Knowledge about emergencies			53.966	0.000		35.438	0.000

On /below average	1083 (40.3)	623 (57.5)			242(19.0)		
Above average	1603 (59.7)	1142 (71.2)			410(28.9)		
Risk perception			10.137	0.001		2.725	0.099
On /below average	1420 (52.9)	894 (63.0)			363(25.6)		
Above average	1266 (47.1)	871 (68.8)			289(22.8)		
Attitudes toward emergency preparedness			56.259	0.000		0.903	0.342
On /below average	1370 (51.0)	808 (59.0)			322(23.5)		
Above average	1316 (49.0)	957 (72.7)			330(25.1)		
Community attachment			74.360	0.000		31.146	0.000
On /below average	1522 (56.7)	895 (58.8)			308(20.2)		
Above average	1164 (43.3)	870 (74.7)			344(29.6)		
Recognition of responsibility			36.808	0.000		13.025	0.000
Yes	372 (13.8)	296 (79.6)			118(31.72)		
No	2314 (86.2)	1469 (63.5)			534(23.08)		
Self-efficacy			54.824	0.000		0.888	0.346
On /below average	1456 (54.2)	866 (59.5)			343(23.56)		
Above average	1230 (45.8)	899 (73.1)			309(25.12)		
Preparedness behavior			91.289	0.000		29.143	0.000
On /below average	1530 (57.0)	889 (58.1)			312(20.39)		
Above average	1156 (43.0)	876 (75.8)			340(29.41)		
Past experience of emergencies			32.690	0.000		5.901	0.015
Yes	580 (21.6)	439 (75.7)			163(28.10)		
No	2106 (78.4)	1326 (63.0)			489(23.22)		
Exposure to awareness campaigns over the past year			2.988	0.084		95.869	0.000
Yes	657 (24.5)	450 (68.5)			253(38.51)		
No	2029 (75.5)	1315 (64.8)			399(19.66)		
Injury insurance coverage			11.830	0.001		51.285	0.000
Yes	789 (29.4)	557 (70.6)			264(33.46)		
No	1897 (70.6)	1208 (63.7)			388(20.45)		

Two multivariate logistic regression models confirmed the results of χ^2 tests. The respondents who were older, resided in rural areas, and had a university qualification were more likely to be willing to volunteer in emergencies. Willingness to volunteer was also positively associated with better knowledge about emergencies, higher risk perception, more positive attitudes toward emergency preparedness, past experience of emergencies, stronger community attachment, higher recognition of responsibility, higher self-efficacy, preparedness behavior, and injury insurance coverage (Table 2).

The respondents who were males, resided in rural areas, and had a senior high school or university qualification were more likely to participate in emergency volunteering. Participation in volunteering was also positively associated with stronger community attachment, higher recognition of responsibility, preparedness behavior, injury insurance coverage and exposure to awareness campaigns (Table 2).

Table 2 Factors associated with willingness to volunteer and participation in volunteering – findings from multivariate logistic regression analysis

Variables	Willingness			Participation		
	p	OR	95%CI	p	OR	95%CI
Gender						
Male	—	—	—	0.000	1.481	1.230~1.783
Female (reference)						

Age							
<35 (reference)							
35-55	0.027	1.243	1.026~1.507	0.161	0.861	0.698~1.061	
55+	0.006	1.433	1.106~1.857	0.060	0.756	0.565~1.012	
Residency							
Rural	0.011	1.308	1.064~1.608	0.000	1.518	1.208~1.908	
Urban (reference)							
Educational attainment							
≤Junior high school (reference)							
Senior high school	0.656	0.949	0.755~1.194	0.005	1.436	1.115~1.850	
University	0.005	1.426	1.114~1.825	0.000	1.747	1.343~2.272	
Knowledge about emergencies							
On /below average (reference)							
Above average	0.000	1.627	1.363~1.943	0.391	1.091	0.894~1.331	
Risk perception							
On /below average (reference)							
Above average	0.031	1.209	1.018~1.436	—	—	—	
Attitudes toward emergency preparedness							
On /below average (reference)							
Above average	0.000	1.567	1.318~1.862	—	—	—	
Community attachment							
On /below average (reference)							
Above average	0.000	1.720	1.429~2.069	0.000	1.547	1.266~1.890	
Recognition of responsibility							
Yes	0.000	1.981	1.498~2.619	0.001	1.517	1.177~1.955	
No (reference)							
Self-efficacy							
On /below average (reference)							
Above average	0.001	1.360	1.133~1.631	—	—	—	
Preparedness behavior							
On /below average (reference)							
Above average	0.000	1.714	1.424~2.064	0.001	1.391	1.151~1.681	
Past experience of emergency events							
Yes	0.000	1.540	1.234~1.921	0.178	1.163	0.934~1.449	
No (reference)							
Injury insurance coverage							
Yes	0.003	1.335	1.102~1.619	0.000	1.822	1.500~2.214	
No (reference)							
Exposure to awareness campaigns over the past year							
Yes	—	—	—	0.000	2.191	1.784~2.691	
No (reference)							
Constants							
	0.000	0.317		0.000	0.072		

Gap between willingness to volunteer and participation in volunteering

The interviews revealed that inappropriate policy environment and volunteer organizational management were major barriers for converting willingness into actions.

Policy environment refers to the related policies, laws, regulations, and coordination mechanisms. The interviewees agreed that there was a shortage of unified national laws and regulations in relation to volunteer services. Local regulations were inconsistent across regions. In addition, no reliable government funding was allocated to support the organization of emergency volunteering.

The national emergency response system failed to integrate volunteer organizations and spontaneous volunteers into rescue and recovery efforts.

Inappropriate management of volunteers, including volunteer recruitment, training, protection and incentive mechanisms, contributed to the limited willingness of the public to volunteer and participation in emergency volunteering. The interviewees reported a lack of intermediary recruitment platform for volunteer organizations and communities. The public was not well-informed of the channels to participate in volunteering activities. The incentive mechanisms (such as reward system) and protection mechanisms (such as insurance coverage) fell behind the needs of volunteers, restricting their participation in emergency volunteering. In addition, emergency volunteering had not become a culture commonly shared by the society.

In summary, the public willingness to volunteer and participation in emergency volunteering were shaped by factors from the individual, community and institutional perspective (Figure 1).

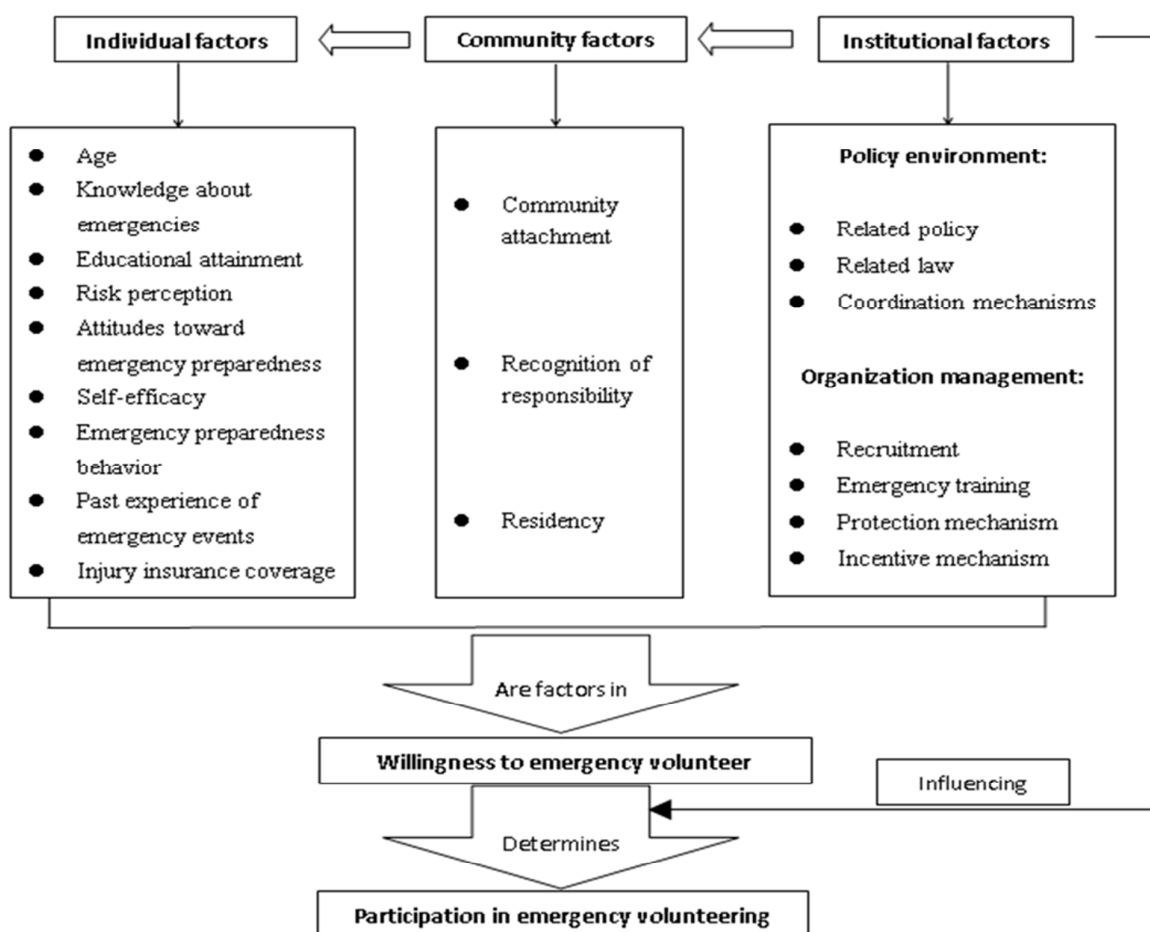


Figure 1. Factors associated with willingness to volunteer and participation in volunteering

DISCUSSION

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3 Non-professional rescue workers and volunteers play a vital role in an emergency response
4 system.³¹ Successful rescue operations in emergencies depend on coordinated efforts by a wide
5 range of responders.³² In this study, we found a relatively high level of willingness to volunteer:
6 more than 65% of respondents were willing to volunteer in emergencies. However, a small
7 percentage (24.3%) of respondents had participated in emergency volunteering. Willingness to
8 volunteer and participation in volunteering are determined by many factors, including those at the
9 individual level, community level as well as those at the institutional level. The findings of this
10 study support the theory of rational action, which believes that individual behaviors are influenced
11 by their cognitions and attitudes based on the comprehensive consideration of various
12 information.²⁷
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16 **Individual factor**

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18 People with a better knowledge on emergencies are more likely to be willing to volunteer. Indeed,
19 knowledge and skills are deemed as a key factor in influencing human behaviors in several
20 behavioral investigations.³³
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23 Training and education is perhaps the most commonly used strategy for improving knowledge and
24 awareness. Education helps shape people's consciousness, cognition and behavior.³⁴ Evidence
25 shows that education is the most consistent and strongest determinant of volunteering
26 participation,³⁵ which is consistent with our findings. Exposure to emergency awareness
27 campaigns appeared to be a significant factor influencing volunteering participation. But only 24.5%
28 of respondents were exposed to emergency awareness campaigns over the past year. This level is
29 very low compared with Japan where an "education for all" system exists, integrating emergency
30 education (for disaster prevention and mitigation) into school education and community
31 activities.⁹ Unlike in many developed countries, volunteer training has not been integrated into the
32 national emergency rescue system in China.²⁵ In the US, for example, the Community Emergency
33 Response Team (CERT) program was established in 1985, recognizing the fact that disaster
34 survivors are likely to be on their own at the early stage of a disaster and they need to be prepared
35 to help themselves.¹⁶ Germany, Australia and some other countries have also established an
36 emergency training system focusing on emergency volunteering services.^{2,15,36}
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41 Better knowledge can improve risk perception and self-efficacy, which can strengthen willingness
42 to volunteer.³⁷⁻³⁸ In this study, we found that increased risk perception, more positive attitudes
43 toward emergency preparedness, and injury insurance coverage are significant predictors of
44 willingness to volunteer. Injury insurance coverage is also a strong predictor of volunteering
45 participation. Risk perception and injury insurance coverage are an indication of risk awareness.
46 We found that the respondents covered by injury insurance have a higher ratio of participation in
47 emergency volunteering than those without insurance. In Japan and Germany, emergency
48 volunteering services are encouraged through of a sound volunteer risk management system, such
49 as volunteer insurance programs.^{15,17-18} In German, the government has the statutory responsibility
50 to purchase insurance for volunteers.¹⁵
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54 Respondents who report high levels of confidence and perceived ability to response are more
55 likely to participate in volunteering. We found that self-efficacy is a significant predictor of
56 willingness to volunteer, and emergency preparedness behaviors influence both willingness to
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3 volunteer and participation in volunteering. These findings are consistent with previous studies.
4 Wang and colleagues found that self-efficacy has a strong impact on behaviors and behavior
5 intentions in challenging environments.³⁹ Emergency preparedness training can result in
6 knowledge gains and shift attitudes toward volunteering.⁴⁰ Alice and colleagues found that nurses
7 have higher willingness and participation in emergency volunteering services, partly because
8 nurses are professionally trained and adequately prepared.⁴¹
9

10
11 We found that past experience of emergencies is associated with higher willingness to volunteer.
12 This is perhaps because they have developed a better understanding on the needs for volunteering
13 services. Meanwhile, emergency experience may prompt people to become more proactive in
14 learning knowledge and skills associated with emergency response,⁴² boosting their confidence to
15 participate in volunteering services.
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18 In this study, older age was found to be associated with higher willingness to volunteer in
19 emergency events. Previous studies have identified 35-55 years as the most active age for
20 volunteering.³⁵ Smith argues that this may be due to the rising socioeconomic status of the
21 middle-aged people.³⁵ Lee and colleagues point out that social and family commitment may be a
22 factor shaping people's decision for volunteering.³⁴ Older people may be more experienced and
23 confident to participate in volunteering. The results of this study showed that participation in
24 emergency volunteering is higher in men, which is consistent with findings of previous study.³⁵
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27 28 **Community factor**

29
30 Social capital can foster trust and enforce reciprocal behaviors in a group.^{12,30} Indeed, we found
31 that community attachment is a significant predictor of volunteering willingness and participation.
32 Previous studies conducted in some western countries showed that the people who have a strong
33 consciousness of neighborhood and a sense of belonging to community are most likely to
34 participate in community volunteering activities.⁴³⁻⁴⁴ The social relations based on trust and
35 solidarity can encourage emergency volunteering.^{30,43}
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38 We found that rural residents are more likely to be willing to volunteer and participate in
39 volunteering than their urban counterparts. It has been widely accepted that rural residents have a
40 stronger bond and sense of community than their urban counterparts.^{43,45-46} There is no exception
41 in China. Studies have found that strong local concentration of network ties is more common in
42 people with lower social status (e.g. people with lower levels of income and education). Naturally,
43 rural residents in China have a stronger sense of community and are more inclined to help each
44 other.⁴⁷ The urban overload hypothesis speculates that urban residents are often exposed to many
45 events; so they are inclined to be immune to a mass of information.⁴⁸
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48
49 In this study, we found that recognition of responsibility is a significant predictor of willingness to
50 volunteer and participation in volunteering. Recognition of responsibility refers to the individual
51 understanding, emotion and belief of social responsibility, as well as the self-conscious attitude for
52 assuming obligation and responsibility, which can help volunteering to become normalized
53 activities.⁴⁹ However, a low level of recognition of responsibility (13.8%) was demonstrated
54 among the study participants. In the UK, most emergency volunteers engage in volunteering
55 activities "just to give something back to the community".⁴³ Some western countries even use
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3 legislation tools to mandate community responsibilities. In Norway, for example, the “Fire and
4 Explosion Prevention Act” stipulates that the public has the duty and obligation to assist in the fire
5 and rescue services when required by the on-scene commander.²⁵
6

7 **Institutional factor**

8
9 Previous studies suggest that the model of volunteer management consists of four components:
10 leadership, integration processes, resources commitment and relative autonomy of volunteers.³⁶
11

12
13 Participants of this study believed that policy environment is critical for promoting emergency
14 volunteering. Indeed, government-supported volunteer activities are more effective.⁵⁰ In the US,
15 the encouragement of volunteering has long been a public policy. The Serve America Act of 2009
16 presented the most dramatic expansion of the size and scope of policies supporting volunteering.
17 The act, on the one hand, has increased the quantity of volunteers nationwide by providing
18 inducements (such as education award, income); on the other hand, it has strengthened the
19 development of volunteering organizations through the provision of funds.²³ Analogously,
20 Australia and New Zealand provide strong financial support to their emergency volunteering.³⁶
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24 Volunteering organizational management was considered by our interviewees as another
25 institutional factor influencing participation in emergency volunteering. The contributions of
26 volunteers, especially those from the unorganized volunteers, are not always positive in
27 emergency events. Their desire to help may not align well with the planned strategy of rescue
28 efforts.²⁵ Drill exercises may offer a platform for better coordination of unorganized
29 volunteers.^{25,36} There is also a need to develop a transparent certification and rewarding system,
30 attracting and recognizing volunteer efforts.⁵¹
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33 **Strengths and limitations**

34
35 This study adopted a mixed methods approach, involving a questionnaire survey and in-depth
36 interviews. Findings from the two methods complement and support each other. Factors associated
37 with willingness and participation of emergency volunteering were explored from the individual,
38 community and institutional perspectives.
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41
42 The concept of “emergency events” adopted in this study was general and covered a broad range
43 of events including natural disaster, human-made accidents, public health emergencies and social
44 arrest. This may lead to vague or uncertain answers from some respondents. Self-reported
45 willingness to volunteer may vary with different scenarios.²² Scenario-based studies should be
46 considered in the future for better understanding of the findings. This study was conducted in
47 Heilongjiang, which may not be representative of the entire country of China. Cautions need to be
48 taken when generalizing the findings. The cross-sectional design of this study does not allow
49 causal conclusions to be drawn.
50

51 **CONCLUSION**

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54 A relatively high level of willingness to volunteer in emergency events is evident in northern
55 China, which is associated with a range of individual, community and institutional factors.
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3 However, the willingness has not effectively translated into volunteering actions. Low levels of
4 recognition of responsibility and community attachment, poor knowledge and emergency
5 preparedness behaviors, as well as inappropriate institutional environments may impose serious
6 barriers, jeopardizing the willingness of people to volunteer and their contributions of
7 volunteering services. Future efforts should be made to convert the volunteering willingness into
8 effective contributions to the emergency response system. This can be done through improving
9 policies, regulations, coordination mechanisms, and volunteer training and support.
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14 **Author affiliations**

- 15 1. School of Health Management, Harbin Medical University, Harbin, Heilongjiang, China.
- 16 2. Collaborative Innovation Center of Social Risks Governance in Health, China.
- 17 3. School of Psychology and Public Health, La Trobe University, Melbourne, Victoria, Australia.

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25 **Contributor**

26 MS participated in the design of the research, conducted the survey and data analyses, and drafted
27 the manuscript. YH and QW took overall responsibility for the study design, coordination of the
28 survey, development of the analysis framework, and writing of the manuscript. LG, WX, ZK, NN,
29 CL, HS, LL, MJ, YL and YC participated in the design of the research, organized and conducted
30 the survey. CJL supervised data analyses, interpreted the results and revised the manuscript. JF,
31 QW and MY participated in the literature review and data collection.
32
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34

35 MS, LG and WX contributed equally.
36
37

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40

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42
43

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45

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47
48

49 **RIFERENCES**

- 50 1 Bachner G, Seebauer S, Pfurtscheller C, et al. Assessing the benefits of organized voluntary
51 emergency services: Concepts and evidence from flood protection in Austria. *Disaster*
52 *Prevention and Management* 2016;25(3):1-17.
- 53 2 Oklahoma Department of Civil Emergency Management After Action Report: Alfred P.
54 Murrah Federal Building Bombing.
55 <https://www.ok.gov/OEM/documents/Bombing%20After%20Action%20Report.pdf>(accessed
56
57
58
59
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- 20 August 2017)
- 3 Whittaker J, Mclennan B, Handmer J. A review of informal volunteerism in emergencies and disasters: Definition, opportunities and challenges. *International Journal of Disaster Risk Reduction* 2015;13:358-368.
 - 4 Orloff L. *Managing Spontaneous Community Volunteers in Disasters: A Field Manual*. Crc Press 2011.
 - 5 Voluntary Action Italy: Facts and Figures. <http://www.kansalaisareena.fi/Voluntary%20Action%20Italy.pdf>(accessed 28 September 2017)
 - 6 The Role of Volunteers in Disaster Response. <http://www.volunteerlink.net/datafiles/D061.pdf>(accessed 25 September 2017)
 - 7 Community Emergency Response Team. <https://www.ready.gov/community-emergency-response-team>(accessed 28 September 2017)
 - 8 Zhang ZR. Summarize lessons from disaster—Japanese training. *China Emergency Management* 2010(2):52-54.
 - 9 Yuan Y, Zhu W, Chen G. Volunteer's Organization and Management in Wenchuan Earthquake: Problems and Countermeasures. *China Nonprofit Review* 2008(2):276-282.
 - 10 The state council information office of the People's Republic of China. "China's Actions for Disaster Prevention and Reduction". <http://www.scio.gov.cn/zfbps/ndhf/2009/Document/847130/847130.html>.(accessed 25 Jan 2017)
 - 11 Cowlshaw S, Birch A, Mclennan J, et al. Antecedents and Outcomes of Volunteer Work—Family Conflict and Facilitation in Australia. *Applied Psychology* 2014;63(1):168–189.
 - 12 Pfuerscheller C, Brucker A, Seebauer S. Prepared for the future? Evaluating the costs and benefits of voluntary work for natural disaster management under a changing climate - data on recent flood events, stakeholder needs and policy applications. *European Geosciences Union General Assembly* 2014.
 - 13 Song YC. Reflections on Japan 's emergency volunteer service mechanism. *Chin Legal System and Society* 2014;27.
 - 14 About the Medical Reserve Corps. <https://mrc.hhs.gov/pageviewfldr/About>(accessed 25 August 2017)
 - 15 Lin XW. Characteristics and enlightenment of volunteer system in German emergency rescue. *Chin Journal of Liaoning Administration College* 2010;12(5):9-10.
 - 16 FEMA. Community emergency response team: basic training participant manual. https://www.fema.gov/media-library-data/1448917365279-3a7949605bd9e03633af2473a5741aa9/Section_0_PM_Combined.pdf(accessed 16 March 2017)
 - 17 The Xinhua News Agency. "volunteer first year" of Japan since the Hanshin earthquake http://news.xinhuanet.com/mrdx/2008-06/04/content_8312305.html(accessed 5 Feb 2017)
 - 18 How does Japan organize volunteers in an orderly manner to relief a disaster? <http://world.people.com.cn/GB/14549/7334918.html>(accessed 9 Feb 2017)
 - 19 Guan RH. The role of volunteer in disaster early warning management system. *Chin Safety* 2010;31(2):1-4.
 - 20 Finkelstein M A, Penner L A, Brannick M T. Motive, role identity, and prosocial personality as

- 1
2
3 predictors of volunteer activity. *Social Behavior & Personality An International Journal*
4 2004;33(4):403-418.
- 5 21 Blau G, Chapman S, Gibson G, et al. Exploring the importance of different items as reasons
6 for leaving emergency medical services between fully compensated, partially compensated,
7 and non-compensated/volunteer samples. *Journal of Allied Health* 2011;40(3):e33-7.
- 8 22 Barnett D J, Thompson C B, Errett N A, et al. Determinants of emergency response willingness
9 in the local public health workforce by jurisdictional and scenario patterns: a cross-sectional
10 survey. *Bmc Public Health* 2012;12(1):164.
- 11 23 Nesbit R, Brudney J L. Projections and Policies for Volunteer Programs: The Implications of
12 the Serve America Act for Volunteer Diversity and Management. *Nonprofit Management and*
13 *Leadership* 2013;24(1):3–21.
- 14 24 Rosychuk R J, Bailey T, Haines C, et al. Willingness to volunteer during an influenza pandemic:
15 perspectives from students and staff at a large Canadian university. *Influenza Other Respir*
16 *Viruses* 2008;2(2):71–79.
- 17 25 Skar M, Sydnes M, Sydnes A K. Integrating unorganized volunteers in emergency response
18 management. *International Journal of Emergency Services* 2016;5(1):52-65.
- 19 26 Heilongjiang municipal GDP and per capita GDP ranking 2015.
20 <http://www.phbang.cn/finance/data/152416.html>(accessed 19 Oct 2016)
- 21 27 Duang YT, Jiang GR. Review of theory of rational action. *Adv Psychol Sci* 2008;16:315–20.
- 22 28 Enders J. Measuring community awareness and preparedness for emergencies. *Australian*
23 *Journal of Emergency Management* 2001;16(3):52-58.
- 24 29 Zhang AQ. Self-efficacy and organization networking. *Organizational Behavior. Beijing, BJ:*
25 *China Machine Press* 2013:126.
- 26 30 Catts R, Chamings D. Recognising current competencies of volunteers in emergency service
27 organizations. *Journal of Workplace Learning* 2006;18(7/8):451-463.
- 28 31 Anonymous. CISCO: Cisco and the Red Cross Launch Global Volunteer Initiative; Just in Time
29 for National Volunteer Week, Collaboration Creates Largest Corporate Disaster Response
30 Volunteer Program in Red Cross History. *M2 Presswire* 2010.
- 31 32 Liu C, Robinson P. Better organization of volunteers, in disaster settings is needed; lessons
32 for all from China. *Australian and New Zealand Journal of Public Health* 2013;37(6):595.
- 33 33 Vaughan E, Tinker T. Effective Health Risk Communication About Pandemic Influenza for
34 Vulnerable Populations. *American Journal of Public Health* 2011;99(2):S324-32.
- 35 34 Lee S, Saito T, Takahashi M, et al. Volunteer participation among older adults in Japan: an
36 analysis of the determinants of participation and reasons for non-participation. *Archives of*
37 *Gerontology & Geriatrics* 2007;47(2):173-187.
- 38 35 Smith D H. Determinants of Voluntary Association Participation and Volunteering: A
39 Literature Review. *Nonprofit and Voluntary Sector Quarterly* 1994;23(3):243-264.
- 40 36 O'Meara P, Tourle V, Rae J. Factors influencing the successful integration of ambulance
41 volunteers and first responders into ambulance services. *Health & Social Care in the*
42 *Community* 2012;20(5):488–496.
- 43 37 Bandura A. Self-efficacy; The exercise of control. *Journal of Cognitive Psychotherapy*
44 1997;604(2):158-166.
- 45 38 Knuth D, Kehl D, Hulse L, et al. Risk perception, experience, and objective risk: a
46 cross-national study with European emergency survivors. *Risk Analysis*

- 2014;34(7):1286-1298.
- 39 Wang J W, Wei C N, Harada K, et al. Applying the social cognitive perspective to volunteer intention in China: the mediating roles of self-efficacy and motivation. *Health Promotion International* 2011;26(2):177.
- 40 Qureshi K A, Gershon R R, Merrill J A, et al. Effectiveness of an emergency preparedness training program for public health nurses in New York City. *Family & Community Health* 2004;27(3):242.
- 41 Fothergill A, Palumbo M V, Rambur B, et al. The volunteer potential of inactive nurses for disaster preparedness. *Public Health Nursing* 2005;22(5):414–421.
- 42 Xu W, Hao Y, Wu Q, et al. Community preparedness for emergency: a cross-sectional survey of residents in Heilongjiang of China. *Bmj Open* 2015;5(11):e008479-e008479.
- 43 Roberts A, Nimegeer A, Farmer J, et al. The experience of community first responders in co-producing rural health care: in the liminal gap between citizen and professional. *BMC Health Services Research* 2014;14(1):460.
- 44 Taniguchi H, Marshall G A. The effects of social trust and institutional trust on formal volunteering and charitable giving in Japan. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations* 2014;25(1):150-175.
- 45 Sønderskov K M. Does generalized social trust lead to associational membership? Unraveling a bowl of well-tossed spaghetti. *European Sociological Review* 2011;27(4):419-434.
- 46 Hofferth S L, Iceland J. Social capital in rural and urban communities. *Rural Sociology* 1998;63(4):574–598.
- 47 Beggs J J, Hurlbert J S, Haines V A. Community Attachment in a Rural Setting: A Refinement and Empirical Test of the Systemic Model. *Rural Sociology* 1996;61(3):407-426.
- 48 Elliot A, Hou YB. Social psychology (5th Edition) . *China Light Industry Press* 2005:332-384.
- 49 Schlenker B R, Britt T W, Pennington J, et al. The triangle model of responsibility. *Psychological Review* 1994;101(4):632-652.
- 50 Perlstadt H, Kozak L J. Emergency medical services in small communities. *Journal of Community Health* 1977;2(3):178-188.
- 51 Palaz S, Boz S. Factors Influencing College Graduate Adults to Provide Volunteer Service in Different Organizations. *Balikesir Üniversitesi Sosyal Bilimler Dergisi* 2008;11(19):95-106.

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Emergency volunteering willingness and participation: a cross-sectional survey of residents in northern China

Mengli Shi,¹ Lijun Gao,^{1,2} Wei Xu,¹ Zheng Kang,^{1,2} Ning Ning,^{1,2} Chaojie Liu,³ Chao Liang,¹ Hong Sun,^{1,2} Mingli Jiao,^{1,2} Libo Liang,^{1,2} Ye Li,^{1,2} Yu Cui,^{1,2} Xiaowen Zhao,¹ Jie Fei,¹ Qiuyu Wei,¹ Ming Yi,¹ Qunhong Wu,^{*1,2} Yanhua Hao.^{*1,2}

Correspondence to

Professor Yanhua Hao; School of Public Health, Harbin Medical University, 157 Baojian Road, Nangang District, Harbin, Heilongjiang, China; hyhyjw@126.com; 87502860.

Professor Qunhong Wu; School of Public Health, Harbin Medical University, 157 Baojian Road, Nangang District, Harbin, Heilongjiang, China; wuqunhong@163.com; 87502851.

Author affiliations

1. School of Health Management, Harbin Medical University, Harbin, Heilongjiang, China.
2. Collaborative Innovation Center of Social Risks Governance in Health, China.
3. School of Psychology and Public Health, La Trobe University, Melbourne, Victoria, Australia.

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ABSTRACT

Objectives: Volunteers have become an important part of a national emergency response system. Little is known about how and why Chinese people volunteer in emergencies. This study aimed to identify factors that influence people's willingness to volunteer and participation in emergency volunteering in northern China.

Design/Setting: This study was conducted in Heilongjiang province in September 2014 using a mixed methods approach, which included a cross-sectional questionnaire survey on community residents and in-depth interviews with community residents and relevant organizational managers and governmental officials in relation to an emergency response. A stratified cluster sampling strategy was employed to select questionnaire respondents.

Participants: 2686 respondents completed the questionnaire survey; 19 key informants were interviewed.

Primary and secondary outcome measures: Willingness to volunteer was the major concern of this study. Self-reported past experience of the participants in emergency volunteering served as a secondary outcome.

*Corresponding authors: Yanhua Hao and Qunhong Wu contributed equally to this paper.

Results: 65.7% of respondents were willing to volunteer in emergencies. 24.3% of respondents had participated in emergency actions. Higher levels of willingness to volunteer and participation in volunteering were found in those who resided in rural areas (OR=1.308 (1.064, 1.608) for willingness; OR=1.518 (1.208, 1.908) for participation), had stronger community attachment (OR=1.720 (1.429, 2.069) for willingness; OR=1.547 (1.266, 1.890) for participation), had higher recognition of responsibility (OR=1.981 (1.498, 2.619) for willingness; OR=1.517 (1.177, 1.955) for participation), demonstrated preparedness behavior (OR=1.714 (1.424, 2.064) for willingness; OR=1.391 (1.151, 1.681) for participation), and were covered by injury insurance (OR=1.335 (1.102, 1.619) for willingness; OR=1.822 (1.500, 2.214) for participation). The in-depth interviews revealed that an inappropriate policy environment and poor volunteer organizational management were major barriers for converting willingness into actions.

Conclusion: A relatively high level of willingness to volunteer in emergencies in northern China is associated with a range of individual, community and institutional factors. Efforts should be made to translate willingness into effective contributions to the emergency response system. This can be done through improving policies, regulations, coordination mechanisms, and volunteer training and support.

Strengths and limitations

- This study adopted a mixed methods approach, involving a questionnaire survey and in-depth interviews.
- The sample size is large, enabling us to explore determinants of emergency volunteering from individual, community and institutional perspectives.
- The concept of “emergency events” adopted in this study was general and covered a broad range of events, which may lead to vague or uncertain answers from some respondents.
- Self-reported willingness to volunteer may vary with different scenarios.
- This study was conducted in Heilongjiang, which may not be representative of the entire country of China.

INTRODUCTION

Emergency volunteering emerged and developed in a time of crisis. Since the second half of the 20th century, the world has encountered a high incidence of disastrous events: 1986 Chernobyl disaster in Ukraine, "9.11" terrorist attack in 2001 in the US, 2003 SARS crisis, 2008 Wenchuan earthquake in China, just to name a few. Some of the disastrous events are natural disasters, others are manmade. It is undeniable that governments play a leading role in emergency responses. However, in many cases, the emergency response needs exceed the capacity of government agencies and professional rescue bodies. Volunteers often play a critical role across the entire spectrum of rescue efforts.¹ For example, immediately following the 1995 Oklahoma city bombing, voluntary organizations and civilian volunteers participated in the search and rescue

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3 efforts and a Compassion Centre was established by volunteers within seven hours.² After the
4 1976 Tangshan earthquake, survivors formed rescue teams immediately to save people buried in
5 the debris.³ Indeed, without the efforts of spontaneous volunteers, immediate response and
6 recovery would not have a high success rate.⁴
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9 The best definition of volunteers was probably given during the International Year of Volunteers
10 (2001): "A volunteer is a person, who, having carried out the duties of every citizen, places her/his
11 own capacity at the disposal of others, for the community or for all humanity. She/he operates in a
12 free and gratuitous manner promoting creative and effective responses to the needs of
13 beneficiaries of her/his own action and contributing to the realization of common goods".⁵ There
14 are three types of volunteers in emergency responses according to the Hong Kong Red Cross: a
15 community-based volunteer is someone who comes from the community and is willing to help
16 others; a functional volunteer is someone who is equipped with specific emergency skills, such as
17 first aid and psychological support; a professional volunteer is someone who has a professional
18 qualification, such as a doctor or nurse.⁶ Emergency volunteering requires not only a will to help
19 others, but also professional knowledge and skills.⁶
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23 Some countries have attached great importance to improving the public capability of an
24 emergency response. For example, in the US, the Community Emergency Response Team (CERT)
25 program offers a consistent and nationwide approach to volunteer training, which has enhanced
26 the public capability to respond to and recover from disasters.⁷ The Japanese government has
27 integrated emergency education into school education and community activities, and established
28 multiple "disaster prevention days" to carry out emergency training and exercises.⁸ Such regular
29 emergency training ensures that people with qualified skills can be effectively deployed to
30 emergency volunteer services during disasters. However, China has not yet established a regular
31 community-based emergency training program, and lacks volunteers with specific knowledge and
32 skills to respond to emergencies.⁹ These shortfalls were conspicuously exposed in the Wenchuan
33 earthquake, even resulting in a "new victims" phenomenon: many volunteers had no capacity to
34 provide rescue services and instead put themselves in a dangerous situation requiring support from
35 others.⁹
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40 The development of an organized emergency volunteer system in China is still in its infant stage.
41 During the 2003 SARS outbreak, only a small number of social organizations and individuals
42 provided volunteer services. The demand for large numbers of rescue workers in the 2008
43 Wenchuan earthquake accelerated the development of organized emergency volunteering.
44 According to the statistics, more than 4 million volunteers (including both spontaneous and
45 organized volunteers) were involved in disaster relief activities during the Wenchuan earthquake,
46 which remained the largest emergency volunteering effort in China up to now.¹⁰ However, most of
47 those volunteers were spontaneous and operated in an unorganized state, which even added some
48 obstacles to the emergency rescue work (such as unintended interference with professional
49 activities and the aforementioned "new victims" phenomenon).⁹
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53 There have been increasing calls to integrate volunteer organizations into the formal emergency
54 response system.¹¹ Many developed countries have established institutionalized mechanisms to
55 attract, train and retain volunteers.¹² In Japan, a volunteer center was established, serving as a
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3 volunteer recruitment platform.¹³ In the US, the Medical Reserve Corps (MRC) is a national
4 network of volunteers which maintains a recruitment and registration system for emergency
5 volunteering.¹⁴ Formal volunteer organizations were also established in Germany, the UK, and
6 Australia.^{11,15} In the case of emergencies, these organized volunteers can be mobilized and
7 deployed rapidly. Such systems also offer appropriate protections on the health of the volunteers
8 through training, support and insurance coverage.^{14,16-18}
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11 In countries with a well-established volunteer system (comprising relevant laws, policies,
12 organizations, advocacy mechanisms, and training and deployment mechanisms), participation in
13 volunteering is high. In the US, for example, 40% of the total population is involved in volunteer
14 services.¹⁹ Germany only has a population of about 82 million, but 23 million have participated in
15 volunteer activities and 1.8 million have provided emergency volunteering services.¹⁵ It is not
16 clear how many people in China are willing to volunteer and have actually provided emergency
17 volunteer services. Due to the lack of a well-organized volunteer management system in China,
18 only 1% of the total population has registered for volunteering services.¹⁹
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20
21 The theory of rational action states that individual behaviors are influenced by their cognitions and
22 attitudes based on the comprehensive consideration of various information.²⁰ Extensive studies
23 have been undertaken in western countries with regard to the motivation and benefits of
24 volunteering. Willingness to volunteer often depends on specific circumstances,²¹ and is also
25 subject to the impacts of regulations and training.²²⁻²⁴ Finkelstein et al. categorized the motivation
26 of volunteers into selfless and altruistic motives; self-interest (eg. career-related benefits); and
27 social objectives (such as pro-social behaviors).²⁵ Blau et al. investigated the influence of
28 incentive mechanisms on emergency volunteering, and found that the desire for advancement
29 opportunity and better pay is a strong reason for providing emergency volunteer services.²⁶
30 However, there is a dearth of literature in China probing willingness to emergency volunteer and
31 participation in emergency volunteering. This study aimed to fill the literature gap and provide
32 evidence for policy development in relation to emergency volunteering (including both
33 spontaneous and organized volunteering).
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38 **METHODS**

39 **Questionnaire survey**

40 **● Study population**

41
42 A cross-sectional questionnaire survey was conducted in Heilongjiang province in September
43 2014. Heilongjiang is located in the northeast of China, with a population over 38 million. The
44 gross domestic product per capita in Heilongjiang reached ¥39,352 (US \$5,700) in 2015, lower
45 than the national average of ¥49,730 (US \$7,957).²⁷ Over the past few decades, this region
46 experienced forest fires, floods, SARS and other disastrous events.
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52 A multi-stage stratified cluster sampling strategy was adopted to ensure the demographic and
53 social-economic diversity of the study participants. Five (out of 13) municipalities in Heilongjiang
54 were selected: Harbin (capital city), Qiqihar, Mudanjiang, Jiamusi and Daqing. In each
55 municipality, one urban district and one rural county were randomly selected. Two
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3 communities/villages were then randomly selected from each district/county. All of the households
4 in the selected communities/villages were eligible to participate in the survey. Trained
5 interviewers visited the selected households and explained the purpose of the survey to the person
6 they met first, and then asked this person to nominate one adult member to complete the
7 questionnaire. A total of 2800 questionnaires were returned, of which 2686 (95.9%) were valid for
8 data analyses.
9

10
11 The questionnaire survey was administered through face-to-face interviews. Each interview took
12 about 20 minutes. The interviewers were recruited from the postgraduate students in the School of
13 Public Health at Harbin Medical University. They had attended a training workshop prior to
14 embarking on the fieldwork. One experienced researcher was allocated to each community/village
15 to supervise the data collection activities.
16
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18 ● **Dependent variable**
19

20 Willingness to emergency volunteer: respondents were asked to rate on a 5-point Likert scale
21 (ranging from 1 “no, not at all” to 5 “yes, very much”) in relation to the question: “Are you
22 willing to respond to emergencies as a volunteer?”
23

24 Participation in emergency volunteering: respondents were asked whether they had ever
25 participated in emergencies as a volunteer (yes or no).
26
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28 ● **Independent variable**
29

30 Independent variables tested in this study included socio-demographic characteristics, awareness
31 and attitudes toward emergency risks, community attachment, recognition of responsibility, and
32 self-efficacy in emergency response. These variables were selected based on the existing literature.
33 Rosychuk and colleagues suggest the application of the knowledge-attitudes-behavior model in
34 emergency volunteering studies,²³ based on the theory of rational action.²⁰ Enders recommends the
35 addition of past experience and self-efficacy into the knowledge-attitudes-behavior model.²⁸ The
36 self-efficacy theory posits that confidence and ability contribute to the individual’s capacity to
37 control their behaviors.²⁹ In recent years, the social capital theory has started to attract increasing
38 attention. Catts and Chamings proposed that social capital based on trust is critical to the effective
39 functioning of volunteering.³⁰
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43 The *socio-demographic characteristics* of the respondents were measured by gender, age,
44 residency, educational attainment and household income.
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47 *Knowledge*: 18 statements (involving earthquake, fire, infectious disease, food poisoning and first
48 aid) were designed to test the knowledge of the respondents in regard to emergencies.
49 Respondents chose one of the answers for each statement: agree, disagree, don’t know. A correct
50 answer attracted a score of 1, otherwise 0.
51
52

53 *Risk perception*: respondents were asked to rate the risk of emergencies (4 items) in relation to
54 natural disaster (earthquake, flood), accidents (fire, road accident), public health (infectious
55 disease, food poisoning) and social unrest (violence, terrorism), respectively, on a five-point Likert
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scale (ranging from 1-“highly unlikely” to 5-“highly likely”). The level of risk awareness was also indicated by an additional item measuring the coverage (yes or no) of accident injury insurance.

Attitudes (4 items): respondents were asked to rate their attitudes and beliefs toward emergency preparedness on a 5-point Likert scale (ranging from 1-“strongly disagree” to 5-“strongly agree”). Example questions: “Luck is more important than preparedness in emergencies”.

Community attachment (5 items): respondents were asked to rate how closely they were attached to their community on a 5-point Likert scale (ranging from 1-“strongly disagree” to 5-“strongly agree”). Example statements: “I’m willing to help my neighbor when they have troubles”.

Recognition of responsibility (1 item): respondents were asked to judge whether volunteers should have some responsibility (yes or no) to respond to emergencies.

Self-efficacy (2 items): respondents were asked to rate their capability to engage in an emergency response (“I am confident that I can cope with emergencies effectively”) and mitigate risks (“I can always keep calm when I encounter emergencies”) on a 5-point Likert scale (ranging from 1-“totally disagree” to 5-“totally agree”).

Past experience of emergencies: respondents were asked whether they had ever experienced emergencies in the past (yes or no).

Exposure to awareness campaigns over the past year: respondents were asked whether they had received any emergency-related training in the past year (yes or no).

Behavior in emergency preparedness (4 items): respondents were asked to report their behaviors in relation to emergency preparedness on a 5-point Likert scale (ranging from 1-“totally disagree” to 5-“totally agree”). Example questions: “I always take the initiative to participate in emergency training”.

● Quantitative analysis

The two dependent variables (willingness to volunteer and participation in volunteering) were collapsed into two categories respectively, with 0 indicating “unwilling” (score 1, 2, or 3) or “no” and 1 indicating “willing” (score 4 or 5) or “yes”.

The independent variables were transformed into categorical measurements for the purpose of statistical analyses due to a lack of evidence to support the assumptions of linear correlations. For the scales measuring *knowledge*, *risk perception*, *attitudes*, *community attachment*, *self-efficacy*, and *behavior*, a summed score was calculated before it was recoded into 1 “above average” and 0 “on/below average”.

χ^2 tests were performed to determine the differences of the two dependent variables across different categories of the independent variables. The independent variables that showed statistical significance ($p < 0.05$) were entered into a multivariate logistic regression model. The regression model was established to determine the effect size of each independent variable, adjusting for the influence of others. All statistical analyses were conducted using SPSS 19.0. A p -value (two-

sided) less than 0.05 was considered to be statistically significant.

In-depth interview

The interviewees were purposively selected based on their roles and experience in emergency volunteering. Ten residents and nine organization managers and officials completed the interviews. The managers and officials were asked to answer questions in relation to the status and barriers of the emergency volunteering organizations, such as related policies, volunteer recruitment, selection, training and registration, equity protection, incentive mechanisms, and linkages with the community. The volunteers were asked to answer when, where and why they had participated in an emergency as a volunteer, as well as the protections and rewards they received during and after participating in emergency volunteer services.

The interviews were digitally recorded, transcribed and thematically coded. The final sample size was determined by saturation of information when no new themes emerged.

● **Qualitative analysis**

The interview data were analyzed thematically. The coding framework was developed inductively from the data. The initial coding used open coding (codes derived directly from the data) and theoretical coding. The initial codes were then refined to produce a smaller set of themes. The coding framework was subject to continuing iterative revision during the course of analysis.

Ethics approval

The study was approved by the Medical Research Ethics Committee of Harbin Medical University. Participation in this study was completely voluntary. Written informed consent was obtained from each participant.

RESULTS

Characteristics of respondents

The respondents had an average age of 41.9 (SD=14.6) years; 56.2% were women; 58.0% resided in rural areas; and 29.1% had obtained a university qualification. More than 52% of respondents had a monthly household income between ¥2000 (\$300) and ¥4999 (\$750) (Table 1).

Willingness to volunteer and participation in volunteering

About 65.7% of respondents were willing to volunteer in emergency events, including 28.3% who expressed strong willingness. Only 7.7% of respondents were not willing to volunteer and 1.2% were strongly unwilling. About 24.3% of respondents had participated in emergencies as a volunteer.

Factors associated with willingness to volunteer and participation in volunteering

Willingness to volunteer varied by age, residency, educational attainment, knowledge about emergencies, risk perception, attitudes toward emergency preparedness, community attachment,

recognition of responsibility, self-efficacy, preparedness behavior, past experiences, and injury insurance coverage. However, no significant differences in willingness to volunteer were found across gender, income, and exposure to emergency awareness campaigns ($p>0.05$, Table 1).

Participation in volunteering varied by gender, age, residency, educational attainment, knowledge about emergencies, community attachment, recognition of responsibility, preparedness behavior, past experiences, injury insurance coverage and exposure to emergency awareness campaigns. However, income, risk perception, attitudes toward emergency preparedness and self-efficacy were not found to be associated with participation in volunteering ($p>0.05$, Table 1).

Table 1 Characteristics of respondents and their willingness to volunteer and participation in volunteering (n=2686)

Characteristics	Respondents [n (%)]	Willingness [n (%)]	χ^2	<i>p</i>	Participation [n (%)]	χ^2	<i>p</i>
Gender			3.374	0.066		18.403	0.000
Male	1177 (43.8)	751 (63.8)			333(28.3)		
Female	1509 (56.2)	1014 (67.2)			319(21.1)		
Age (years)			19.168	0.000		11.328	0.003
<35	910 (22.9)	550 (60.4)			250(27.5%)		
35-55	1265 (47.1)	852 (67.4)			302(23.9%)		
55+	511 (19.0)	363 (71.0)			100(19.6%)		
Residency			12.292	0.000		3.869	0.049
Rural	1559 (58.0)	1067 (68.4)			400(25.7)		
Urban	1127 (42.0)	698 (61.9)			252(22.4)		
Educational attainment			6.254	0.044		19.647	0.000
≤Junior high school	1260 (46.9)	830 (65.9)			262(20.8)		
Senior high school	644 (24.0)	400 (62.1)			160(24.8)		
University	782 (29.1)	535 (68.4)			230(29.4)		
Household monthly income (¥/\$)			1.189	0.552		1.603	0.449
0-1999/0-300	853 (31.8)	573 (67.2)			217(25.4)		
2000-4999/300-750	1409 (52.4)	916 (65.0)			328(23.3)		
5000+/750+	424 (15.8)	276 (65.1)			107(25.2)		
Knowledge about emergencies			53.966	0.000		35.438	0.000
On /below average	1083 (40.3)	623 (57.5)			242(19.0)		
Above average	1603 (59.7)	1142 (71.2)			410(28.9)		
Risk perception			10.137	0.001		2.725	0.099
On /below average	1420 (52.9)	894 (63.0)			363(25.6)		
Above average	1266 (47.1)	871 (68.8)			289(22.8)		
Attitudes toward emergency preparedness			56.259	0.000		0.903	0.342
On /below average	1370 (51.0)	808 (59.0)			322(23.5)		
Above average	1316 (49.0)	957 (72.7)			330(25.1)		
Community attachment			74.360	0.000		31.146	0.000
On /below average	1522 (56.7)	895 (58.8)			308(20.2)		
Above average	1164 (43.3)	870 (74.7)			344(29.6)		
Recognition of responsibility			36.808	0.000		13.025	0.000
Yes	372 (13.8)	296 (79.6)			118(31.72)		
No	2314 (86.2)	1469 (63.5)			534(23.08)		
Self-efficacy			54.824	0.000		0.888	0.346
On /below average	1456 (54.2)	866 (59.5)			343(23.56)		
Above average	1230 (45.8)	899 (73.1)			309(25.12)		
Preparedness behavior			91.289	0.000		29.143	0.000
On /below average	1530 (57.0)	889 (58.1)			312(20.39)		
Above average	1156 (43.0)	876 (75.8)			340(29.41)		
Past experience of emergencies			32.690	0.000		5.901	0.015
Yes	580 (21.6)	439 (75.7)			163(28.10)		

No	2106 (78.4)	1326 (63.0)			489(23.22)		
Exposure to awareness campaigns over the past year			2.988	0.084		95.869	0.000
Yes	657 (24.5)	450 (68.5)			253(38.51)		
No	2029 (75.5)	1315 (64.8)			399(19.66)		
Injury insurance coverage			11.830	0.001		51.285	0.000
Yes	789 (29.4)	557 (70.6)			264(33.46)		
No	1897 (70.6)	1208 (63.7)			388(20.45)		

Two multivariate logistic regression models confirmed the results of χ^2 tests. The respondents who were older, resided in rural areas, and had a university qualification were more likely to be willing to volunteer in emergencies. Willingness to volunteer was also positively associated with better knowledge about emergencies, higher risk perception, more positive attitudes toward emergency preparedness, past experience of emergencies, stronger community attachment, higher recognition of responsibility, higher self-efficacy, preparedness behavior, and injury insurance coverage (Table 2).

The respondents who were males, resided in rural areas, and had a senior high school or university qualification were more likely to participate in emergency volunteering. Participation in volunteering was also positively associated with stronger community attachment, higher recognition of responsibility, preparedness behavior, injury insurance coverage and exposure to awareness campaigns (Table 2).

Table 2 Factors associated with willingness to volunteer and participation in volunteering – findings from multivariate logistic regression analysis

Variables	Willingness			Participation		
	p	OR	95%CI	p	OR	95%CI
Gender						
Male	—	—	—	0.000	1.481	1.230~1.783
Female (reference)						
Age						
<35 (reference)						
35-55	0.027	1.243	1.026~1.507	0.161	0.861	0.698~1.061
55+	0.006	1.433	1.106~1.857	0.060	0.756	0.565~1.012
Residency						
Rural	0.011	1.308	1.064~1.608	0.000	1.518	1.208~1.908
Urban (reference)						
Educational attainment						
≤Junior high school (reference)						
Senior high school	0.656	0.949	0.755~1.194	0.005	1.436	1.115~1.850
University	0.005	1.426	1.114~1.825	0.000	1.747	1.343~2.272
Knowledge about emergencies						
On /below average (reference)						
Above average	0.000	1.627	1.363~1.943	0.391	1.091	0.894~1.331
Risk perception						
On /below average (reference)						
Above average	0.031	1.209	1.018~1.436	—	—	—
Attitudes toward emergency preparedness						
On /below average (reference)						
Above average	0.000	1.567	1.318~1.862	—	—	—
Community attachment						

On /below average (reference)						
Above average	0.000	1.720	1.429~2.069	0.000	1.547	1.266~1.890
Recognition of responsibility						
Yes	0.000	1.981	1.498~2.619	0.001	1.517	1.177~1.955
No (reference)						
Self-efficacy						
On /below average (reference)						
Above average	0.001	1.360	1.133~1.631	—	—	—
Preparedness behavior						
On /below average (reference)						
Above average	0.000	1.714	1.424~2.064	0.001	1.391	1.151~1.681
Past experience of emergency events						
Yes	0.000	1.540	1.234~1.921	0.178	1.163	0.934~1.449
No (reference)						
Injury insurance coverage						
Yes	0.003	1.335	1.102~1.619	0.000	1.822	1.500~2.214
No (reference)						
Exposure to awareness campaigns over the past year						
Yes	—	—	—	0.000	2.191	1.784~2.691
No (reference)						
Constants	0.000	0.317		0.000	0.072	

Gap between willingness to volunteer and participation in volunteering

The interviews revealed that an inappropriate policy environment and poor volunteer organizational management were major barriers for converting willingness into actions.

Policy environment refers to the related policies, laws, regulations, and coordination mechanisms. The interviewees agreed that “*there was a shortage of unified national laws and regulations in relation to volunteer services*”. Local regulations were inconsistent across regions. In addition, no reliable government funding was allocated to support the organization of emergency volunteering. The Wenchuan earthquake demonstrated the failure of the national emergency response system to integrate volunteer organizations and spontaneous volunteers into rescue and recovery efforts.

Inappropriate management of volunteers, including volunteer recruitment, training, protection and incentive mechanisms, contributed to the limited willingness of the public to volunteer and participation in emergency volunteering. The interviewees reported a lack of an intermediary recruitment platform for volunteer organizations and communities. “*The public was not well-informed of the channels by which to participate in volunteering activities*”. The incentive mechanisms (such as reward systems) and protection mechanisms (such as insurance coverage) fell behind the needs of volunteers, restricting their participation in emergency volunteering. In addition, emergency volunteering had not become a culture commonly shared by the society.

In summary, the public willingness to volunteer and participation in emergency volunteering were shaped by factors from the individual, community and institutional perspective (Figure 1).

DISCUSSION

Non-professional rescue workers and volunteers play a vital role in an emergency response

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3 system.³¹ Successful rescue operations in emergencies depend on coordinated efforts by a wide
4 range of responders.³² In this study, we found a relatively high level of willingness to volunteer:
5 more than 65% of respondents were willing to volunteer in emergencies. However, a small
6 percentage (24.3%) of respondents had participated in emergency volunteering. Willingness to
7 volunteer and participation in volunteering are determined by many factors, including those at the
8 individual level, community level as well as those at the institutional level. The findings of this
9 study support the theory of rational action.²⁰

10 11 12 **Individual factor**

13
14 In this study, we found that people with a better knowledge of emergencies are more likely to be
15 willing to volunteer. Indeed, knowledge and skills are deemed as key factors in influencing human
16 behaviors in several behavioral investigations.³³

17
18 Training and education is perhaps the most commonly used strategy for improving knowledge and
19 awareness. Education helps shape people's consciousness, cognition and behavior.³⁴ Evidence
20 shows that education is the most consistent and strongest determinant of volunteering
21 participation,³⁵ which is consistent with our findings. Exposure to emergency awareness
22 campaigns appeared to be a significant factor influencing volunteering participation. But only
23 24.5% of respondents had been exposed to emergency awareness campaigns over the past year.
24 This level is very low compared with Japan where an "education for all" system exists, integrating
25 emergency education (for disaster prevention and mitigation) into school education and
26 community activities.⁹ Unlike in many developed countries, volunteer training has not been
27 integrated into the national emergency rescue system in China.²⁴ In the US, for example, the
28 Community Emergency Response Team (CERT) program was established in 1985, recognizing
29 the fact that disaster survivors are likely to be on their own at the early stage of a disaster and they
30 need to be prepared to help themselves.¹⁶ Germany, Australia and some other countries have also
31 established an emergency training system focusing on emergency volunteering services.^{2,15,36}

32
33 Better knowledge can improve risk perception and self-efficacy, which can strengthen willingness
34 to volunteer.³⁷⁻³⁸ In this study, we found that increased risk perception, more positive attitudes
35 toward emergency preparedness, and injury insurance coverage are significant predictors of
36 willingness to volunteer. Injury insurance coverage is also a strong predictor of volunteering
37 participation. Risk perception and injury insurance coverage are an indication of risk awareness.
38 We found that the respondents covered by injury insurance have a higher ratio of participation in
39 emergency volunteering than those without insurance. In Japan and Germany, emergency
40 volunteering services are encouraged through a sound volunteer risk management system, such as
41 volunteer insurance programs.^{15,17-18} In Germany, the government has a statutory responsibility to
42 purchase insurance for volunteers.¹⁵

43
44 Respondents who report high levels of confidence and a perceived ability to respond are more
45 likely to participate in volunteering. We found that self-efficacy is a significant predictor of
46 willingness to volunteer, and emergency preparedness behaviors influence both willingness to
47 volunteer and participation in volunteering. These findings are consistent with previous studies.
48 Wang and colleagues found that self-efficacy has a strong impact on behaviors and behavior
49 intentions in challenging environments.³⁹ Emergency preparedness training can result in

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3 knowledge gains and shift attitudes toward volunteering.⁴⁰ Fothergill and colleagues found that
4 nurses have higher willingness and participation in emergency volunteering services, partly
5 because nurses are professionally trained and adequately prepared.⁴¹
6

7 We found that past experience of emergencies is associated with higher willingness to volunteer.
8 This is perhaps because these people have developed a better understanding of the need for
9 volunteering services. Meanwhile, emergency experience may prompt people to become more
10 proactive in acquiring the knowledge and skills associated with an emergency response,⁴² boosting
11 their confidence to participate in volunteering services.
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14 In this study, older age was found to be associated with higher willingness to volunteer in
15 emergency events. Previous studies identified 35-55 years as the most active age for
16 volunteering.³⁵ Smith argues that this may be due to the rising socioeconomic status of middle-
17 aged people.³⁵ Lee and colleagues point out that social and family commitment may be a factor
18 shaping people's decision to volunteer.³⁴ Older people may be more experienced and confident to
19 participate in volunteering. The results of this study showed that participation in emergency
20 volunteering is higher in men, which is consistent with the findings of a previous study.³⁵
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24 **Community factor**

25
26 Social capital can foster trust and enforce reciprocal behaviors in a group.^{12,30} Indeed, we found
27 that community attachment is a significant predictor of volunteering willingness and participation.
28 Previous studies conducted in several western countries showed that people who have a strong
29 consciousness of neighborhood and a sense of belonging to community are most likely to
30 participate in community volunteering activities.⁴³⁻⁴⁴ Social relations based on trust and solidarity
31 can encourage emergency volunteering.^{30,43}
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34 We found that rural residents are more likely to be willing to volunteer and participate in
35 volunteering than their urban counterparts. It has been widely accepted that rural residents have a
36 stronger bond and sense of community than their urban counterparts.^{43,45-46} This is no exception in
37 China. Studies have found that a strong local concentration of network ties is more common in
38 people with lower social status (e.g. people with lower levels of income and education). Naturally,
39 rural residents in China have a stronger sense of community and are more inclined to help each
40 other.⁴⁷ The urban overload hypothesis speculates that urban residents are often exposed to many
41 events; so they are inclined to be immune to a mass of information.⁴⁸
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44

45 In this study, we found that recognition of responsibility is a significant predictor of willingness to
46 volunteer and participation in volunteering. Recognition of responsibility refers to the individual's
47 understanding, emotion and belief of social responsibility, as well as their sub-conscious attitude
48 to assume obligation and responsibility, which can help volunteering to become a normalized
49 activity.⁴⁹ However, a low level of recognition of responsibility (13.8%) was demonstrated among
50 the study participants. In the UK, most emergency volunteers engage in volunteering activities
51 "just to give something back to the community".⁴³ Some western countries even use legislation
52 tools to mandate community responsibilities. In Norway, for example, the "Fire and Explosion
53 Prevention Act" stipulates that the public has the duty and obligation to assist in fire and rescue
54 services when required by the on-scene commander.²⁴
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Institutional factor

Previous studies suggest that the model of volunteer management consists of four components: leadership, integration processes, resources commitment and relative autonomy of volunteers.³⁶

The participants of this study believed that the policy environment is critical for promoting emergency volunteering and that government-supported volunteer activities are more effective.⁵⁰ In the US, the encouragement of volunteering has long been public policy. The Serve America Act of 2009 presented the most dramatic expansion of the size and scope of policies supporting volunteering. The act, on the one hand, has increased the quantity of volunteers nationwide by providing inducements (such as an education award or income); on the other hand, it has strengthened the development of volunteering organizations through the provision of funds.²² Analogously, Australia and New Zealand provide strong financial support to their emergency volunteering.³⁶

Volunteering organizational management was considered by our interviewees as another institutional factor influencing participation in emergency volunteering. The contributions of volunteers, especially those from unorganized volunteers, are not always positive in emergency events. Their desire to help may not align well with the planned strategy of rescue efforts.²⁴ Drill exercises may offer a platform for the better coordination of unorganized volunteers.^{24,36} There is also a need to develop a transparent certification and reward system, attracting and recognizing volunteer efforts.⁵¹

Strengths and limitations

This study adopted a mixed methods approach, involving a questionnaire survey and in-depth interviews. Findings from the two methods complement and support each other. Factors associated with willingness to volunteer and participation in emergency volunteering were explored from the individual, community and institutional perspectives.

The questionnaires were administered through face-to-face interviews. Such an approach has the potential to result in response bias. However, the risk is minimal when the questions are deemed non-sensitive by the respondents and the interviewers are strangers to the respondents. We also trained the interviewers to avoid suggestive questioning.

The concept of “emergency events” adopted in this study was general and covered a broad range of events including natural disaster, human-made accidents, public health emergencies and social unrest. This may lead to vague or uncertain answers from some respondents. Self-reported willingness to volunteer may vary in different scenarios.²² Scenario-based studies should be considered in the future for a better understanding of the findings. This study was conducted in Heilongjiang, which may not be representative of the entire country of China. Caution need to be taken when generalizing the findings. The cross-sectional design of this study does not allow causal conclusions to be drawn.

CONCLUSION

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3 A relatively high level of willingness to volunteer in emergency events is evident in northern
4 China. But willingness has not effectively translated into volunteering actions. People with a
5 better knowledge of emergencies are more likely to be willing to volunteer because they have
6 better risk perceptions and are more confident to participate in volunteering. However, low levels
7 of recognition of responsibility and community attachment may demotivate people to participate
8 in emergency volunteering. Inappropriate institutional environments may also impose serious
9 barriers, jeopardizing the willingness of people to volunteer and their contribution to volunteering
10 services. Future efforts should be made to convert volunteering willingness into effective
11 contributions to the emergency response system. This can be done through improving the
12 organized efforts of volunteers by implementing policies, regulations, coordination mechanisms,
13 and volunteer training and support.
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22

23 **Contributor**

24 MS participated in the design of the research, conducted the survey and data analyses, and drafted
25 the manuscript. YH and QHW took overall responsibility for the study design, coordination of the
26 survey, development of the analysis framework, and writing of the manuscript. LG, WX, ZK, NN,
27 CL, HS, MJ, LL, YL, YC and XZ participated in the design of the research, organized and
28 conducted the survey. CJL supervised the data analyses, interpreted the results and revised the
29 manuscript. JF, QW and MY participated in the literature review and data collection.
30
31
32

33 MS, LG and WX contributed equally.
34

35
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38

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40

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42
43

44 **Data sharing statement:** No additional data are available
45
46

47 **REFERENCES**

- 48 1 Bachner G, Seebauer S, Pfuertscheller C, et al. Assessing the benefits of organized voluntary
49 emergency services: Concepts and evidence from flood protection in Austria. *Disaster*
50 *Prevention and Management* 2016;25(3):1-17.
- 51 2 Oklahoma Department of Civil Emergency Management After Action Report: Alfred P.
52 Murrah Federal Building Bombing.
53 <https://www.ok.gov/OEM/documents/Bombing%20After%20Action%20Report.pdf>(accessed
54 20 August 2017)
- 55 3 Whittaker J, Mclennan B, Handmer J. A review of informal volunteerism in emergencies and
56
57

- disasters: Definition, opportunities and challenges. *International Journal of Disaster Risk Reduction* 2015;13:358-368.
- 4 Orloff L. Managing Spontaneous Community Volunteers in Disasters: A Field Manual. *Crc Press* 2011.
 - 5 Voluntary Action Italy: Facts and Figures. <http://www.kansalaisareena.fi/Voluntary%20Action%20Italy.pdf>(accessed 28 September 2017)
 - 6 The Role of Volunteers in Disaster Response. <http://www.volunteerlink.net/datafiles/D061.pdf>(accessed 25 September 2017)
 - 7 Community Emergency Response Team. <https://www.ready.gov/community-emergency-response-team>(accessed 28 September 2017)
 - 8 Zhang ZR. Summarize lessons from disaster—Japanese training. *China Emergency Management* 2010(2):52-54.
 - 9 Yuan Y, Zhu W, Chen G. Volunteer's Organization and Management in Wenchuan Earthquake: Problems and Countermeasures. *China Nonprofit Review* 2008(2):276-282.
 - 10 The state council information office of the People's Republic of China. "China's Actions for Disaster Prevention and Reduction". <http://www.scio.gov.cn/zfbps/ndhf/2009/Document/847130/847130.html>.(accessed 25 Jan 2017)
 - 11 Cowlshaw S, Birch A, McLennan J, et al. Antecedents and Outcomes of Volunteer Work—Family Conflict and Facilitation in Australia. *Applied Psychology* 2014;63(1):168–189.
 - 12 Pfurtscheller C, Brucker A, Seebauer S. Prepared for the future? Evaluating the costs and benefits of voluntary work for natural disaster management under a changing climate - data on recent flood events, stakeholder needs and policy applications. *European Geosciences Union General Assembly* 2014.
 - 13 Song YC. Reflections on Japan 's emergency volunteer service mechanism. *Chin Legal System and Society* 2014;27.
 - 14 About the Medical Reserve Corps. <https://mrc.hhs.gov/pageviewfldr/About>(accessed 25 August 2017)
 - 15 Lin XW. Characteristics and enlightenment of volunteer system in German emergency rescue. *Chin Journal of Liaoning Administration College* 2010;12(5):9-10.
 - 16 FEMA. Community emergency response team: basic training participant manual. https://www.fema.gov/media-library-data/1448917365279-3a7949605bd9e03633af2473a5741aa9/Section_0_PM_Combined.pdf(accessed 16 March 2017)
 - 17 The Xinhua News Agency. "volunteer first year" of Japan since the Hanshin earthquake http://news.xinhuanet.com/mrdx/2008-06/04/content_8312305.html(accessed 5 Feb 2017)
 - 18 How does Japan organize volunteers in an orderly manner to relieve a disaster? <http://world.people.com.cn/GB/14549/7334918.html> (accessed 9 Feb 2017)
 - 19 Guan RH. The role of volunteers in a disaster early warning management system. *China Safety* 2010;31(2):1-4.
 - 20 Duang YT, Jiang GR. Review of theory of rational action. *Adv Psychol Sci* 2008;16:315–20.
 - 21 Finkelstein M A, Penner L A, Brannick M T. Motive, role identity, and prosocial personality as predictors of volunteer activity. *Social Behavior & Personality An International Journal*

- 2004;33(4):403-418.
- 22 Blau G, Chapman S, Gibson G, et al. Exploring the importance of different items as reasons for leaving emergency medical services between fully compensated, partially compensated, and non-compensated/volunteer samples. *Journal of Allied Health* 2011;40(3):e33-7.
- 23 Barnett D J, Thompson C B, Errett N A, et al. Determinants of emergency response willingness in the local public health workforce by jurisdictional and scenario patterns: a cross-sectional survey. *Bmc Public Health* 2012;12(1):164.
- 24 Nesbit R, Brudney J L. Projections and Policies for Volunteer Programs: The Implications of the Serve America Act for Volunteer Diversity and Management. *Nonprofit Management and Leadership* 2013;24(1):3–21.
- 25 Rosychuk R J, Bailey T, Haines C, et al. Willingness to volunteer during an influenza pandemic: perspectives from students and staff at a large Canadian university. *Influenza Other Respir Viruses* 2008;2(2):71–79.
- 26 Skar M, Sydnes M, Sydnes A K. Integrating unorganized volunteers in emergency response management. *International Journal of Emergency Services* 2016;5(1):52-65.
- 27 Heilongjiang municipal GDP and per capita GDP ranking 2015. <http://www.phbang.cn/finance/data/152416.html>(accessed 19 Oct 2016)
- 28 Enders J. Measuring community awareness and preparedness for emergencies. *Australian Journal of Emergency Management* 2001;16(3):52-58.
- 29 Zhang AQ. Self-efficacy and organization networking. *Organizational Behavior. Beijing, BJ: China Machine Press* 2013:126.
- 30 Catts R, Chamings D. Recognising current competencies of volunteers in emergency service organizations. *Journal of Workplace Learning* 2006;18(7/8):451-463.
- 31 Anonymous. CISCO: Cisco and the Red Cross Launch Global Volunteer Initiative; Just in Time for National Volunteer Week, Collaboration Creates Largest Corporate Disaster Response Volunteer Program in Red Cross History. *M2 Presswire* 2010.
- 32 Liu C, Robinson P. Better organization of volunteers in disaster settings is needed: lessons for all from China. *Australian and New Zealand Journal of Public Health* 2013;37(6):595.
- 33 Vaughan E, Tinker T. Effective Health Risk Communication About Pandemic Influenza for Vulnerable Populations. *American Journal of Public Health* 2011;99(2):S324-32.
- 34 Lee S, Saito T, Takahashi M, et al. Volunteer participation among older adults in Japan: an analysis of the determinants of participation and reasons for non-participation. *Archives of Gerontology & Geriatrics* 2007;47(2):173-187.
- 35 Smith D H. Determinants of Voluntary Association Participation and Volunteering: A Literature Review. *Nonprofit and Voluntary Sector Quarterly* 1994;23(3):243-264.
- 36 O'Meara P, Tourle V, Rae J. Factors influencing the successful integration of ambulance volunteers and first responders into ambulance services. *Health & Social Care in the Community* 2012;20(5):488–496.
- 37 Bandura A. Self-efficacy: The exercise of control. *Journal of Cognitive Psychotherapy* 1997;604(2):158-166.
- 38 Knuth D, Kehl D, Hulse L, et al. Risk perception, experience, and objective risk: a cross-national study with European emergency survivors. *Risk Analysis* 2014;34(7):1286-1298.
- 39 Wang J W, Wei C N, Harada K, et al. Applying the social cognitive perspective to volunteer intention in China: the mediating roles of self-efficacy and motivation. *Health Promotion*

- 1
2
3 *International* 2011;26(2):177.
- 4 40 Qureshi K A, Gershon R R, Merrill J A, et al. Effectiveness of an emergency preparedness
5 training program for public health nurses in New York City. *Family & Community Health*
6 2004;27(3):242.
- 7
8 41 Fothergill A, Palumbo M V, Rambur B, et al. The volunteer potential of inactive nurses for
9 disaster preparedness. *Public Health Nursing* 2005;22(5):414–421.
- 10 42 Xu W, Hao Y, Wu Q, et al. Community preparedness for emergency: a cross-sectional survey
11 of residents in Heilongjiang of China. *Bmj Open* 2015;5(11):e008479–e008479.
- 12
13 43 Roberts A, Nimegeer A, Farmer J, et al. The experience of community first responders in co-
14 producing rural health care: in the liminal gap between citizen and professional. *BMC Health*
15 *Services Research* 2014;14(1):460.
- 16 44 Taniguchi H, Marshall G A. The effects of social trust and institutional trust on formal
17 volunteering and charitable giving in Japan. *VOLUNTAS: International Journal of Voluntary*
18 *and Nonprofit Organizations* 2014;25(1):150-175.
- 19
20 45 Sønderskov K M. Does generalized social trust lead to associational membership? Unraveling
21 a bowl of well-tossed spaghetti. *European Sociological Review* 2011;27(4):419-434.
- 22 46 Hofferth S L, Iceland J. Social capital in rural and urban communities. *Rural Sociology*
23 1998;63(4):574–598.
- 24
25 47 Beggs J J, Hurlbert J S, Haines V A. Community Attachment in a Rural Setting: A Refinement
26 and Empirical Test of the Systemic Model. *Rural Sociology* 1996;61(3):407-426.
- 27 48 Elliot A, Hou YB. Social psychology (5th Edition) . *China Light Industry Press* 2005:332-384.
- 28 49 Schlenker B R, Britt T W, Pennington J, et al. The triangle model of responsibility.
29 *Psychological Review* 1994;101(4):632-652.
- 30
31 50 Perlstadt H, Kozak L J. Emergency medical services in small communities. *Journal of*
32 *Community Health* 1977;2(3):178-188.
- 33
34 51 Palaz S, Boz S. Factors Influencing College Graduate Adults to Provide Volunteer Service in
35 Different Organizations. *Balikesir Üniversitesi Sosyal Bilimler Dergisi* 2008;11(19):95-106.

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Figuer1 (Factors associated with willingness to volunteer and participation in volunteering) shows that willingness to volunteer and participation in volunteering are determined by many factors, including those at the individual level (age, knowledge about emergencies, educational attainment and so on), community level (community attachment, recognition of responsibility and residency) and institutional level (policy environment and organization management). Willingness to emergency volunteer determines the participation in emergency volunteering; also, institutional factors influence the participation in emergency volunteering directly.

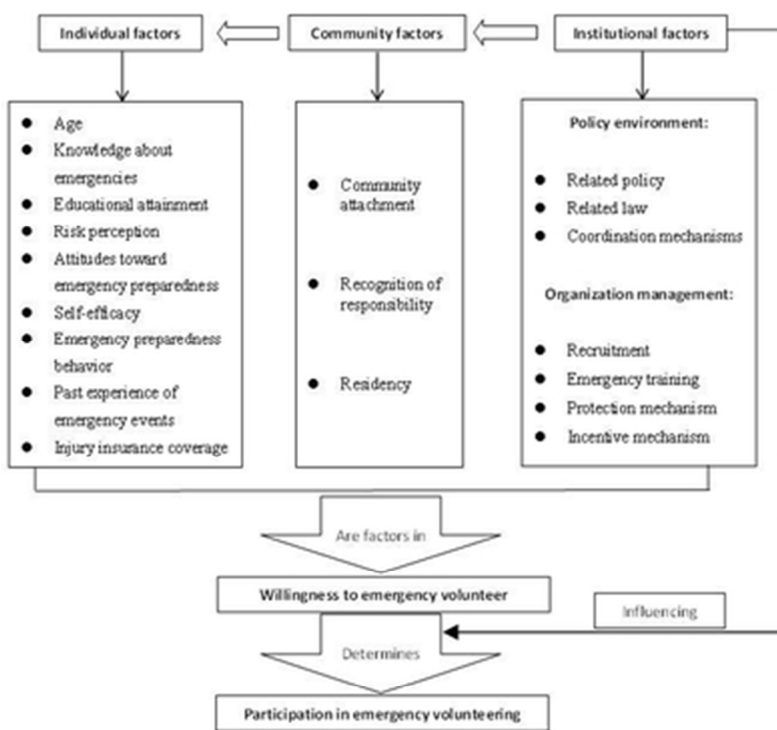


Figure 1 Factors associated with willingness to volunteer and participation in volunteering

34x34mm (300 x 300 DPI)

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Emergency volunteering willingness and participation: a cross-sectional survey of residents in northern China

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Emergency volunteering willingness and participation: a cross-sectional survey of residents in northern China

Mengli Shi,¹ Wei Xu,¹ Lijun Gao,^{1,2} Zheng Kang,^{1,2} Ning Ning,^{1,2} Chaojie Liu,³ Chao Liang,¹ Hong Sun,^{1,2} Mingli Jiao,^{1,2} Libo Liang,^{1,2} Ye Li,^{1,2} Yu Cui,^{1,2} Xiaowen Zhao,¹ Jie Fei,¹ Qiuyu Wei,¹ Ming Yi,¹ Qunhong Wu,^{*1,2} Yanhua Hao.^{*1,2}

Correspondence to

Professor Yanhua Hao; School of Public Health, Harbin Medical University, 157 Baojian Road, Nangang District, Harbin, Heilongjiang, China; hyhyjw@126.com; 87502860.

Professor Qunhong Wu; School of Public Health, Harbin Medical University, 157 Baojian Road, Nangang District, Harbin, Heilongjiang, China; wuqunhong@163.com; 87502851.

Author affiliations

1. School of Health Management, Harbin Medical University, Harbin, Heilongjiang, China.
2. Collaborative Innovation Center of Social Risks Governance in Health, China.
3. School of Psychology and Public Health, La Trobe University, Melbourne, Victoria, Australia.

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ABSTRACT

Objectives: This study aimed to identify factors that influence people's willingness to volunteer and participation in emergency volunteering in northern China.

Design/Setting: This study was conducted in Heilongjiang province in September and October 2014 using a mixed methods approach, which included a cross-sectional questionnaire survey on community residents and in-depth interviews with community residents and relevant organizational managers and officials in relation to emergency response. A stratified cluster sampling strategy was employed to select questionnaire respondents.

Participants: 2686 respondents completed the questionnaire survey; 19 key informants were interviewed.

Primary and secondary outcome measures: Willingness to volunteer was the major concern of this study. Self-reported past experience of the participants in emergency volunteering served as a secondary outcome.

Results: 65.7% of respondents were willing to volunteer in emergencies. 24.3% of respondents had participated in emergency actions. Higher levels of willingness to volunteer and participation

*Corresponding authors: Yanhua Hao and Qunhong Wu contributed equally to this paper.

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3 in volunteering were found in those who resided in rural areas (OR=1.308 (1.064, 1.608) for
4 willingness; OR=1.518 (1.208, 1.908) for participation), had stronger community attachment
5 (OR=1.720 (1.429, 2.069) for willingness; OR=1.547 (1.266, 1.890) for participation), had higher
6 recognition of responsibility (OR=1.981 (1.498, 2.619) for willingness; OR=1.517 (1.177, 1.955) for
7 participation), demonstrated preparedness behavior (OR=1.714 (1.424, 2.064) for willingness;
8 OR=1.391 (1.151, 1.681) for participation), and were covered by injury insurance (OR=1.335
9 (1.102, 1.619) for willingness; OR=1.822 (1.500, 2.214) for participation). The in-depth interviews
10 revealed that an inappropriate policy environment and poor volunteer organizational
11 management were major barriers for converting willingness into actions.
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15 **Conclusion:** A relatively high level of willingness to volunteer in emergencies in northern China is
16 associated with a range of individual, community and institutional factors. Efforts should be made
17 to translate willingness into effective contributions to the emergency response system. This can
18 be done through improving policies, regulations, coordination mechanisms, and volunteer
19 training and support.
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22 **Strengths and limitations**

- 23 • This study adopted a mixed methods approach, involving a questionnaire survey and in-
24 depth interviews.
- 25 • The sample size is large, enabling us to explore determinants of emergency volunteering
26 from individual, community and institutional perspectives.
- 27 • The concept of “emergency events” adopted in this study was general and covered a
28 broad range of events, which may lead to vague or uncertain answers from some
29 respondents.
- 30 • Self-reported willingness to volunteer may vary with different scenarios.
- 31 • This study was conducted in Heilongjiang, which may not be representative of the entire
32 country of China.
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41 **INTRODUCTION**

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43 Emergency volunteering emerged and developed in a time of crisis. Since the second half of the
44 20th century, the world has encountered a high incidence of disastrous events: 1986 Chernobyl
45 disaster in Ukraine, "9.11" terrorist attack in 2001 in the US, 2003 SARS crisis, 2008 Wenchuan
46 earthquake in China, just to name a few. Some of the disastrous events are natural disasters, others
47 are manmade. It is undeniable that governments play a leading role in emergency responses.
48 However, in many cases, the emergency response needs exceed the capacity of government
49 agencies and professional rescue bodies. Volunteers often play a critical role across the entire
50 spectrum of rescue efforts.¹ For example, immediately following the 1995 Oklahoma city
51 bombing, voluntary organizations and civilian volunteers participated in the search and rescue
52 efforts and a Compassion Centre was established by volunteers within seven hours.² After the
53 1976 Tangshan earthquake, survivors formed rescue teams immediately to save people buried in
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3 the debris.³ Indeed, without the efforts of spontaneous volunteers, immediate response and
4 recovery would not have a high success rate.⁴
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7 The best definition of volunteers was probably given during the International Year of Volunteers
8 (2001): "A volunteer is a person, who, having carried out the duties of every citizen, places her/his
9 own capacity at the disposal of others, for the community or for all humanity. She/he operates in a
10 free and gratuitous manner promoting creative and effective responses to the needs of
11 beneficiaries of her/his own action and contributing to the realization of common goods".⁵ There
12 are three types of volunteers in emergency responses according to the Hong Kong Red Cross: a
13 community-based volunteer is someone who comes from the community and is willing to help
14 others; a functional volunteer is someone who is equipped with specific emergency skills, such as
15 first aid and psychological support; a professional volunteer is someone who has a professional
16 qualification, such as a doctor or nurse.⁶ Emergency volunteering requires not only a will to help
17 others, but also professional knowledge and skills.⁶
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21 Some countries have attached great importance to improving the public capability of an
22 emergency response. For example, in the US, the Community Emergency Response Team (CERT)
23 program offers a consistent and nationwide approach to volunteer training, which has enhanced
24 the public capability to respond to and recover from disasters.⁷ The Japanese government has
25 integrated emergency education into school education and community activities, and established
26 multiple "disaster prevention days" to carry out emergency training and exercises.⁸ Such regular
27 emergency training ensures that people with qualified skills can be effectively deployed to
28 emergency volunteer services during disasters. However, China has not yet established a regular
29 community-based emergency training program, and lacks volunteers with specific knowledge and
30 skills to respond to emergencies.⁹ These shortfalls were conspicuously exposed in the Wenchuan
31 earthquake, even resulting in a "new victims" phenomenon: many volunteers had no capacity to
32 provide rescue services and instead put themselves in a dangerous situation requiring support from
33 others.⁹
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38 The development of an organized emergency volunteer system in China is still in its infant stage.
39 During the 2003 SARS outbreak, only a small number of social organizations and individuals
40 provided volunteer services. The demand for large numbers of rescue workers in the 2008
41 Wenchuan earthquake accelerated the development of organized emergency volunteering.
42 According to the statistics, more than 4 million volunteers (including both spontaneous and
43 organized volunteers) were involved in disaster relief activities during the Wenchuan earthquake,
44 which remained the largest emergency volunteering effort in China up to now.¹⁰ However, most of
45 those volunteers were spontaneous and operated in an unorganized state, which even added some
46 obstacles to the emergency rescue work (such as unintended interference with professional
47 activities and the aforementioned "new victims" phenomenon).⁹
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51 There have been increasing calls to integrate volunteer organizations into the formal emergency
52 response system.¹¹ Many developed countries have established institutionalized mechanisms to
53 attract, train and retain volunteers.¹² In Japan, a volunteer center was established, serving as a
54 volunteer recruitment platform.¹³ In the US, the Medical Reserve Corps (MRC) is a national
55 network of volunteers which maintains a recruitment and registration system for emergency
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3 volunteering.¹⁴ Formal volunteer organizations were also established in Germany, the UK, and
4 Australia.^{11,15} In the case of emergencies, these organized volunteers can be mobilized and
5 deployed rapidly. Such systems also offer appropriate protections on the health of the volunteers
6 through training, support and insurance coverage.^{14,16-18}
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9 In countries with a well-established volunteer system (comprising relevant laws, policies,
10 organizations, advocacy mechanisms, and training and deployment mechanisms), participation in
11 volunteering is high. In the US, for example, 40% of the total population is involved in volunteer
12 services.¹⁹ Germany only has a population of about 82 million, but 23 million have participated in
13 volunteer activities and 1.8 million have provided emergency volunteering services.¹⁵ It is not
14 clear how many people in China are willing to volunteer and have actually provided emergency
15 volunteer services. Due to the lack of a well-organized volunteer management system in China,
16 only 1% of the total population has registered for volunteering services.¹⁹
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20 The theory of rational action states that individual behaviors are influenced by their cognitions and
21 attitudes based on the comprehensive consideration of various information.²⁰ Extensive studies
22 have been undertaken in western countries with regard to the motivation and benefits of
23 volunteering. Willingness to volunteer often depends on specific circumstances,²¹ and is also
24 subject to the impacts of regulations and training.²²⁻²⁴ Finkelstein et al. categorized the motivation
25 of volunteers into selfless and altruistic motives; self-interest (e.g. career-related benefits); and
26 social objectives (such as pro-social behaviors).²⁵ Blau et al. investigated the influence of
27 incentive mechanisms on emergency volunteering, and found that the desire for advancement
28 opportunity and better pay is a strong reason for providing emergency volunteer services.²⁶
29 However, there is a dearth of literature in China probing willingness to emergency volunteer and
30 participation in emergency volunteering. This study aimed to fill the literature gap and provide
31 evidence for policy development in relation to emergency volunteering (including both
32 spontaneous and organized volunteering).
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36 **METHODS**

37 **Questionnaire survey**

38 **● Study population**

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41 A cross-sectional questionnaire survey was conducted in Heilongjiang province in September
42 2014. Heilongjiang is located in the northeast of China, with a population over 38 million. The
43 gross domestic product per capita in Heilongjiang reached ¥39,352 (US \$5,700) in 2015, lower
44 than the national average of ¥49,730 (US \$7,957).²⁷ Over the past few decades, this region
45 experienced forest fires, floods, SARS and other disastrous events.
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50 A multi-stage stratified cluster sampling strategy was adopted to ensure the demographic and
51 social-economic diversity of the study participants. Five (out of 13) municipalities in Heilongjiang
52 were selected: Harbin (capital city), Qiqihar, Mudanjiang, Jiamusi and Daqing. In each
53 municipality, one urban district and one rural county were randomly selected. Two
54 communities/villages were then randomly selected from each district/county. All of the households
55 in the selected communities/villages were eligible to participate in the survey. Trained
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interviewers visited the selected households and explained the purpose of the survey to the person they met first, and then asked this person to nominate one adult member to complete the questionnaire. A total of 2800 questionnaires were returned, of which 2686 (95.9%) were valid for data analyses.

The questionnaire survey was administered through face-to-face interviews. Each interview took about 20 minutes. The interviewers were recruited from the postgraduate students in the School of Public Health at Harbin Medical University. They had attended a training workshop prior to embarking on the fieldwork. One experienced researcher was allocated to each community/village to supervise the data collection activities.

● **Dependent variable**

Willingness to emergency volunteer: respondents were asked to rate on a 5-point Likert scale (ranging from 1 “no, not at all” to 5 “yes, very much”) in relation to the question: “Are you willing to respond to emergencies as a volunteer?”

Participation in emergency volunteering: respondents were asked whether they had ever participated in emergencies as a volunteer (yes or no).

● **Independent variable**

Independent variables tested in this study included socio-demographic characteristics, awareness and attitudes toward emergency risks, community attachment, recognition of responsibility, and self-efficacy in emergency response. These variables were selected based on the existing literature. Rosychuk and colleagues suggest the application of the knowledge-attitudes-behavior model in emergency volunteering studies,²³ based on the theory of rational action.²⁰ Enders recommends the addition of past experience and self-efficacy into the knowledge-attitudes-behavior model.²⁸ The self-efficacy theory posits that confidence and ability contribute to the individual’s capacity to control their behaviors.²⁹ In recent years, the social capital theory has started to attract increasing attention. Catts and Chamings proposed that social capital based on trust is critical to the effective functioning of volunteering.³⁰

The *socio-demographic characteristics* of the respondents were measured by gender, age, residency, educational attainment and household income.

Knowledge: 18 statements (involving earthquake, fire, infectious disease, food poisoning and first aid) were designed to test the knowledge of the respondents in regard to emergencies. Respondents chose one of the answers for each statement: agree, disagree, don’t know. A correct answer attracted a score of 1, otherwise 0.

Risk perception: respondents were asked to rate the risk of emergencies (4 items) in relation to natural disaster (earthquake, flood), accidents (fire, road accident), public health (infectious disease, food poisoning) and social unrest (violence, terrorism), respectively, on a five-point Likert scale (ranging from 1-“highly unlikely” to 5-“highly likely”). The level of risk awareness was also indicated by an additional item measuring the coverage (yes or no) of accident injury insurance.

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3 *Attitudes* (4 items): respondents were asked to rate their attitudes and beliefs toward emergency
4 preparedness on a 5-point Likert scale (ranging from 1-“strongly disagree” to 5-“strongly agree”).
5 Example questions: “Luck is more important than preparedness in emergencies”.
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8 *Community attachment* (5 items): respondents were asked to rate how closely they were attached
9 to their community on a 5-point Likert scale (ranging from 1-“strongly disagree” to 5-“strongly
10 agree”). Example statements: “I’m willing to help my neighbor when they have troubles”.
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12 *Recognition of responsibility* (1 item): respondents were asked to judge whether volunteers should
13 have some responsibility (yes or no) to respond to emergencies.
14

15 *Self-efficacy* (2 items): respondents were asked to rate their capability to engage in an emergency
16 response (“I am confident that I can cope with emergencies effectively”) and mitigate risks (“I can
17 always keep calm when I encounter emergencies”) on a 5-point Likert scale (ranging from 1-
18 “totally disagree” to 5-“totally agree”).
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21 *Past experience of emergencies*: respondents were asked whether they had ever experienced
22 emergencies in the past (yes or no).
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25 *Exposure to awareness campaigns over the past year*: respondents were asked whether they had
26 received any emergency-related training in the past year (yes or no).
27

28 *Behavior in emergency preparedness* (4 items): respondents were asked to report their behaviors
29 in relation to emergency preparedness on a 5-point Likert scale (ranging from 1-“totally disagree”
30 to 5-“totally agree”). Example questions: “I always take the initiative to participate in emergency
31 training”.
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33 34 ● Quantitative analysis

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36 The two dependent variables (willingness to volunteer and participation in volunteering) were
37 collapsed into two categories respectively, with 0 indicating “unwilling” (score 1, 2, or 3) or “no”
38 and 1 indicating “willing” (score 4 or 5) or “yes”.
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41 The independent variables were transformed into categorical measurements for the purpose of
42 statistical analyses due to a lack of evidence to support the assumptions of linear correlations. For
43 the scales measuring *knowledge*, *risk perception*, *attitudes*, *community attachment*, *self-efficacy*,
44 and *behavior*, a summed score was calculated before it was recoded into 1 “above average” and 0
45 “on/below average”.
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48 χ^2 tests were performed to determine the differences of the two dependent variables across
49 different categories of the independent variables. The independent variables that showed statistical
50 significance ($p < 0.05$) were entered into a multivariate logistic regression model. The regression
51 model was established to determine the effect size of each independent variable, adjusting for the
52 influence of others. All statistical analyses were conducted using SPSS 19.0. A p -value (two-
53 sided) less than 0.05 was considered to be statistically significant.
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55 56 In-depth interview

● **Materials**

Two semi-structured interview guides were developed by the study team based on the study objectives. One semi-structured interview guide was for volunteer organization managers and officials, included questions regarding the emergency system construction, the operation of the emergency volunteering organizations, the status and barriers of emergency volunteering. The other is for residents, included questions related to the status and experience of residents' participation in emergency volunteering, as well as the reasons for not participating.

● **Sampling strategy and data collection**

The interview was conducted in Heilongjiang province in October 2014. Ten residents and nine volunteer organization managers and officials completed the interviews. The ten residents were community members, they were selected from those who had finished our questionnaire survey, and we contacted them through community councils. Each interview was administered by face-to-face. The nine managers and officials were from volunteer organizations, interviews were conducted by telephone. Each interview took about 20 to 30 minutes.

The interviews were digitally recorded, transcribed and thematically coded. The final sample size was determined by saturation of information when no new themes emerged.

● **Qualitative analysis**

The interview data were analyzed thematically. The coding framework was developed inductively from the data. The initial coding used open coding (codes derived directly from the data) and theoretical coding. The initial codes were then refined to produce a smaller set of themes. The coding framework was subject to continuing iterative revision during the course of analysis.³¹ Findings were discussed and approved by the study team.

● **Data integration**

The categories emerging inductively from the interviews were compared with the findings of the questionnaire survey. Analysis conclusion were based on the combination the findings of the two methods from different perspectives and expand the strength of each type of data to better explain the phenomenon.

Ethics approval

The study was approved by the Medical Research Ethics Committee of Harbin Medical University. Participation in this study was completely voluntary. Written informed consent was obtained from each participant.

Patient and Public Involvement

Participation in this study was completely voluntary. We have informed every participant of the interviewers' phone number when we conducted this survey. Participants can contact us for findings of this study at any moment.

RESULTS

Characteristics of respondents

The respondents had an average age of 41.9 (SD=14.6) years; 56.2% were women; 58.0% resided in rural areas; and 29.1% had obtained a university qualification. More than 52% of respondents had a monthly household income between ¥2000 (\$300) and ¥4999 (\$750) (Table 1).

Willingness to volunteer and participation in volunteering

About 65.7% of respondents were willing to volunteer in emergency events, including 28.3% who expressed strong willingness. Only 7.7% of respondents were not willing to volunteer and 1.2% were strongly unwilling. About 24.3% of respondents had participated in emergencies as a volunteer.

Factors associated with willingness to volunteer and participation in volunteering

Willingness to volunteer varied by age, residency, educational attainment, knowledge about emergencies, risk perception, attitudes toward emergency preparedness, community attachment, recognition of responsibility, self-efficacy, preparedness behavior, past experiences, and injury insurance coverage. However, no significant differences in willingness to volunteer were found across gender, income, and exposure to emergency awareness campaigns ($p>0.05$, Table 1).

Participation in volunteering varied by gender, age, residency, educational attainment, knowledge about emergencies, community attachment, recognition of responsibility, preparedness behavior, past experiences, injury insurance coverage and exposure to emergency awareness campaigns. However, income, risk perception, attitudes toward emergency preparedness and self-efficacy were not found to be associated with participation in volunteering ($p>0.05$, Table 1).

Table 1 Characteristics of respondents and their willingness to volunteer and participation in volunteering (n=2686)

Characteristics	Respondents [n (%)]	Willingness [n (%)]	Participation	
			χ^2	p
Gender			3.374	0.066
Male	1177 (43.8)	751 (63.8)		
Female	1509 (56.2)	1014 (67.2)		
Age (years)			19.168	0.000
<35	910 (22.9)	550 (60.4)		
35-55	1265 (47.1)	852 (67.4)		
55+	511 (19.0)	363 (71.0)		
Residency			12.292	0.000
Rural	1559 (58.0)	1067 (68.4)		
Urban	1127 (42.0)	698 (61.9)		
Educational attainment			6.254	0.044
≤Junior high school	1260 (46.9)	830 (65.9)		
Senior high school	644 (24.0)	400 (62.1)		
University	782 (29.1)	535 (68.4)		
Household monthly income (¥/\$)			1.189	0.552
0-1999/0-300	853 (31.8)	573 (67.2)		
2000-4999/300-750	1409 (52.4)	916 (65.0)		
5000+/750+	424 (15.8)	276 (65.1)		

Knowledge about emergencies			53.966	0.000		35.438	0.000
On /below average	1083 (40.3)	623 (57.5)			242(19.0)		
Above average	1603 (59.7)	1142 (71.2)			410(28.9)		
Risk perception			10.137	0.001		2.725	0.099
On /below average	1420 (52.9)	894 (63.0)			363(25.6)		
Above average	1266 (47.1)	871 (68.8)			289(22.8)		
Attitudes toward emergency preparedness			56.259	0.000		0.903	0.342
On /below average	1370 (51.0)	808 (59.0)			322(23.5)		
Above average	1316 (49.0)	957 (72.7)			330(25.1)		
Community attachment			74.360	0.000		31.146	0.000
On /below average	1522 (56.7)	895 (58.8)			308(20.2)		
Above average	1164 (43.3)	870 (74.7)			344(29.6)		
Recognition of responsibility			36.808	0.000		13.025	0.000
Yes	372 (13.8)	296 (79.6)			118(31.72)		
No	2314 (86.2)	1469 (63.5)			534(23.08)		
Self-efficacy			54.824	0.000		0.888	0.346
On /below average	1456 (54.2)	866 (59.5)			343(23.56)		
Above average	1230 (45.8)	899 (73.1)			309(25.12)		
Preparedness behavior			91.289	0.000		29.143	0.000
On /below average	1530 (57.0)	889 (58.1)			312(20.39)		
Above average	1156 (43.0)	876 (75.8)			340(29.41)		
Past experience of emergencies			32.690	0.000		5.901	0.015
Yes	580 (21.6)	439 (75.7)			163(28.10)		
No	2106 (78.4)	1326 (63.0)			489(23.22)		
Exposure to awareness campaigns over the past year			2.988	0.084		95.869	0.000
Yes	657 (24.5)	450 (68.5)			253(38.51)		
No	2029 (75.5)	1315 (64.8)			399(19.66)		
Injury insurance coverage			11.830	0.001		51.285	0.000
Yes	789 (29.4)	557 (70.6)			264(33.46)		
No	1897 (70.6)	1208 (63.7)			388(20.45)		

Two multivariate logistic regression models confirmed the results of χ^2 tests. The respondents who were older, resided in rural areas, and had a university qualification were more likely to be willing to volunteer in emergencies. Willingness to volunteer was also positively associated with better knowledge about emergencies, higher risk perception, more positive attitudes toward emergency preparedness, past experience of emergencies, stronger community attachment, higher recognition of responsibility, higher self-efficacy, preparedness behavior, and injury insurance coverage (Table 2).

The respondents who were males, resided in rural areas, and had a senior high school or university qualification were more likely to participate in emergency volunteering. Participation in volunteering was also positively associated with stronger community attachment, higher recognition of responsibility, preparedness behavior, injury insurance coverage and exposure to awareness campaigns (Table 2).

Table 2 Factors associated with willingness to volunteer and participation in volunteering – findings from multivariate logistic regression analysis

Variables	Willingness			Participation		
	p	OR	95%CI	p	OR	95%CI
Gender						
Male	—	—	—	0.000	1.481	1.230~1.783

Female (reference)							
Age							
<35 (reference)							
35-55	0.027	1.243	1.026~1.507	0.161	0.861	0.698~1.061	
55+	0.006	1.433	1.106~1.857	0.060	0.756	0.565~1.012	
Residency							
Rural	0.011	1.308	1.064~1.608	0.000	1.518	1.208~1.908	
Urban (reference)							
Educational attainment							
≤Junior high school (reference)							
Senior high school	0.656	0.949	0.755~1.194	0.005	1.436	1.115~1.850	
University	0.005	1.426	1.114~1.825	0.000	1.747	1.343~2.272	
Knowledge about emergencies							
On /below average (reference)							
Above average	0.000	1.627	1.363~1.943	0.391	1.091	0.894~1.331	
Risk perception							
On /below average (reference)							
Above average	0.031	1.209	1.018~1.436	—	—	—	
Attitudes toward emergency preparedness							
On /below average (reference)							
Above average	0.000	1.567	1.318~1.862	—	—	—	
Community attachment							
On /below average (reference)							
Above average	0.000	1.720	1.429~2.069	0.000	1.547	1.266~1.890	
Recognition of responsibility							
Yes	0.000	1.981	1.498~2.619	0.001	1.517	1.177~1.955	
No (reference)							
Self-efficacy							
On /below average (reference)							
Above average	0.001	1.360	1.133~1.631	—	—	—	
Preparedness behavior							
On /below average (reference)							
Above average	0.000	1.714	1.424~2.064	0.001	1.391	1.151~1.681	
Past experience of emergency events							
Yes	0.000	1.540	1.234~1.921	0.178	1.163	0.934~1.449	
No (reference)							
Injury insurance coverage							
Yes	0.003	1.335	1.102~1.619	0.000	1.822	1.500~2.214	
No (reference)							
Exposure to awareness campaigns over the past year							
Yes	—	—	—	0.000	2.191	1.784~2.691	
No (reference)							
Constants	0.000	0.317		0.000	0.072		

Gap between willingness to volunteer and participation in volunteering

Two main themes were identified from the qualitative analysis process: “policy environment” and “organizational management”. The interviews revealed that an inappropriate policy environment and incomplete volunteer organizational management were major barriers for converting willingness into actions. Key concepts and representative quotes emerged from the interviews are outlined in table 3.

Policy environment refers to the related policies, laws, regulations, and coordination mechanisms. The interviewees agreed that there was a shortage of unified national laws and regulations in relation to volunteer services. Local regulations were inconsistent across regions. In addition, no reliable government funding was allocated to support the organization of emergency volunteering. The Wenchuan earthquake demonstrated the failure of the national emergency response system to integrate volunteer organizations and spontaneous volunteers into rescue and recovery efforts.

Inappropriate management of volunteers, including volunteer recruitment, training, protection and incentive mechanisms, contributed to the limited willingness of the public to volunteer and participation in emergency volunteering. The interviewees reported a lack of an intermediary recruitment platform for volunteer organizations and communities. The public was not well-informed of the channels by which to participate in volunteering activities. The incentive mechanisms (such as reward systems) and protection mechanisms (such as insurance coverage) fell behind the needs of volunteers, restricting their participation in emergency volunteering. In addition, emergency volunteering had not become a culture commonly shared by the society.

Table 3 Overarching categories and key concepts emerging from qualitative analysis of interviews

category	concept	Representative quote(s)
Policy environment	Related policies	“Honestly speaking, it is very hard to maintain the normal operation of volunteer organizations with only a small amount of funds given by the government.” (volunteer organization manager)
	Related Law	“As far as I know, there are no unified laws and regulations of volunteer service throughout the country, and the laws and systems set up by local governments are different.” (official)
	Coordination mechanisms	“Because of lacking effective coordination, both spontaneous volunteers and organized volunteers failed to play their due roles in many emergency rescues and instead caused chaos.” (official)
Organizational management	Volunteer recruitment	“I have lived in the area for years, but have never heard of recruiting volunteers, I don’t know what channels to volunteer.” (resident)
	Emergency training	I haven’t any first aid skill and do not know where to get the training. As for our communities, it seems that there has never been any organization that has provided emergency education and training. So I do not think I have the ability to be an emergency volunteer.” (resident)
	Protection mechanisms	“Emergency rescue is risky, while I did not buy any insurance. If I go to volunteer, I’m not sure if there are organizations or agencies that provide me with risk-reduction

	protection.” (resident)
Incentive mechanism	“In our country, volunteers generally gain a few spiritual rewards, such as certificates and honorary titles, lack of incentives related to their benefits. Also, there is a lack of a voluntary culture in society.” (volunteer organization manager)

In summary, based on integration findings of the questionnaire survey and the in-depth interviews, the public willingness to volunteer and participation in emergency volunteering were shaped by factors from the individual, community and institutional perspectives (Figure 1).

DISCUSSION

Non-professional rescue workers and volunteers play a vital role in an emergency response system.³² Successful rescue operations in emergencies depend on coordinated efforts by a wide range of responders.³³ In this study, we found a relatively high level of willingness to volunteer: more than 65% of respondents were willing to volunteer in emergencies. However, a small percentage (24.3%) of respondents had participated in emergency volunteering. Willingness to volunteer and participation in volunteering are determined by many factors, including those at the individual level, community level as well as those at the institutional level. The findings of this study support the theory of rational action.²⁰

Individual factor

In this study, we found that people with a better knowledge of emergencies are more likely to be willing to volunteer. Indeed, knowledge and skills are deemed as key factors in influencing human behaviors in several behavioral investigations.³⁴

Training and education is perhaps the most commonly used strategy for improving knowledge and awareness. Education helps shape people’s consciousness, cognition and behavior.³⁵ Evidence shows that education is the most consistent and strongest determinant of volunteering participation,³⁶ which is consistent with our findings. Exposure to emergency awareness campaigns appeared to be a significant factor influencing volunteering participation. But only 24.5% of respondents had been exposed to emergency awareness campaigns over the past year. This level is very low compared with Japan where an "education for all" system exists, integrating emergency education (for disaster prevention and mitigation) into school education and community activities.⁹ Unlike in many developed countries, volunteer training has not been integrated into the national emergency rescue system in China.²⁴ In the US, for example, the Community Emergency Response Team (CERT) program was established in 1985, recognizing the fact that disaster survivors are likely to be on their own at the early stage of a disaster and they need to be prepared to help themselves.¹⁶ Germany, Australia and some other countries have also established an emergency training system focusing on emergency volunteering services.^{2,15,37}

Better knowledge can improve risk perception and self-efficacy, which can strengthen willingness to volunteer.³⁸⁻³⁹ In this study, we found that increased risk perception, more positive attitudes toward emergency preparedness, and injury insurance coverage are significant predictors of

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3 willingness to volunteer. Injury insurance coverage is also a strong predictor of volunteering
4 participation. Risk perception and injury insurance coverage are an indication of risk awareness.
5 We found that the respondents covered by injury insurance have a higher ratio of participation in
6 emergency volunteering than those without insurance. In Japan and Germany, emergency
7 volunteering services are encouraged through a sound volunteer risk management system, such as
8 volunteer insurance programs.^{15,17-18} In Germany, the government has a statutory responsibility to
9 purchase insurance for volunteers.¹⁵
10
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12 Respondents who report high levels of confidence and a perceived ability to respond are more
13 likely to participate in volunteering. We found that self-efficacy is a significant predictor of
14 willingness to volunteer, and emergency preparedness behaviors influence both willingness to
15 volunteer and participation in volunteering. These findings are consistent with previous studies.
16 Wang and colleagues found that self-efficacy has a strong impact on behaviors and behavior
17 intentions in challenging environments.⁴⁰ Emergency preparedness training can result in
18 knowledge gains and shift attitudes toward volunteering.⁴¹ Fothergill and colleagues found that
19 nurses have higher willingness and participation in emergency volunteering services, partly
20 because nurses are professionally trained and adequately prepared.⁴²
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24 We found that past experience of emergencies is associated with higher willingness to volunteer.
25 This is perhaps because these people have developed a better understanding of the need for
26 volunteering services. Meanwhile, emergency experience may prompt people to become more
27 proactive in acquiring the knowledge and skills associated with an emergency response,⁴³ boosting
28 their confidence to participate in volunteering services.
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31 In this study, older age was found to be associated with higher willingness to volunteer in
32 emergency events. Previous studies identified 35-55 years as the most active age for
33 volunteering.³⁶ Smith argues that this may be due to the rising socioeconomic status of middle-
34 aged people.³⁶ Lee and colleagues point out that social and family commitment may be a factor
35 shaping people's decision to volunteer.³⁵ Older people may be more experienced and confident to
36 participate in volunteering. The results of this study showed that participation in emergency
37 volunteering is higher in men, which is consistent with the findings of a previous study.³⁶
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41 **Community factor**

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43 Social capital can foster trust and enforce reciprocal behaviors in a group.^{12,30} Indeed, we found
44 that community attachment is a significant predictor of volunteering willingness and participation.
45 Previous studies conducted in several western countries showed that people who have a strong
46 consciousness of neighborhood and a sense of belonging to community are most likely to
47 participate in community volunteering activities.⁴⁴⁻⁴⁵ Social relations based on trust and solidarity
48 can encourage emergency volunteering.^{30,44}
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51 We found that rural residents are more likely to be willing to volunteer and participate in
52 volunteering than their urban counterparts. It has been widely accepted that rural residents have a
53 stronger bond and sense of community than their urban counterparts.^{44,46-47} This is no exception in
54 China. Studies have found that a strong local concentration of network ties is more common in
55 people with lower social status (e.g. people with lower levels of income and education). Naturally,
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3 rural residents in China have a stronger sense of community and are more inclined to help each
4 other.⁴⁸ The urban overload hypothesis speculates that urban residents are often exposed to many
5 events; so they are inclined to be immune to a mass of information.⁴⁹
6

7
8 In this study, we found that recognition of responsibility is a significant predictor of willingness to
9 volunteer and participation in volunteering. Recognition of responsibility refers to the individual's
10 understanding, emotion and belief of social responsibility, as well as their sub-conscious attitude
11 to assume obligation and responsibility, which can help volunteering to become a normalized
12 activity.⁵⁰ However, a low level of recognition of responsibility (13.8%) was demonstrated among
13 the study participants. In the UK, most emergency volunteers engage in volunteering activities
14 "just to give something back to the community".⁴⁴ Some western countries even use legislation
15 tools to mandate community responsibilities. In Norway, for example, the "Fire and Explosion
16 Prevention Act" stipulates that the public has the duty and obligation to assist in fire and rescue
17 services when required by the on-scene commander.²⁴
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20 21 **Institutional factor**

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23 Previous studies suggest that the model of volunteer management consists of four components:
24 leadership, integration processes, resources commitment and relative autonomy of volunteers.³⁷
25

26 The participants of this study believed that the policy environment is critical for promoting
27 emergency volunteering and that government-supported volunteer activities are more effective.⁵¹
28 In the US, the encouragement of volunteering has long been public policy. The Serve America Act
29 of 2009 presented the most dramatic expansion of the size and scope of policies supporting
30 volunteering. The act, on the one hand, has increased the quantity of volunteers nationwide by
31 providing inducements (such as an education award or income); on the other hand, it has
32 strengthened the development of volunteering organizations through the provision of funds.²²
33 Analogously, Australia and New Zealand provide strong financial support to their emergency
34 volunteering.³⁷
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38 Volunteering organizational management was considered by our interviewees as another
39 institutional factor influencing participation in emergency volunteering. The contributions of
40 volunteers, especially those from unorganized volunteers, are not always positive in emergency
41 events. Their desire to help may not align well with the planned strategy of rescue efforts.²⁴ Drill
42 exercises may offer a platform for the better coordination of unorganized volunteers.^{24,37} There is
43 also a need to develop a transparent certification and reward system, attracting and recognizing
44 volunteer efforts.⁵²
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47 48 **Strengths and limitations**

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50 This study adopted a mixed methods approach, involving a questionnaire survey and in-depth
51 interviews. Findings from the two methods complement and support each other. Factors associated
52 with willingness to volunteer and participation in emergency volunteering were explored from the
53 individual, community and institutional perspectives.
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56 The questionnaires were administered through face-to-face interviews. Such an approach has the
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potential to result in response bias. However, the risk is minimal when the questions are deemed non-sensitive by the respondents and the interviewers are strangers to the respondents. We also trained the interviewers to avoid suggestive questioning.

The concept of “emergency events” adopted in this study was general and covered a broad range of events including natural disaster, human-made accidents, public health emergencies and social unrest. This may lead to vague or uncertain answers from some respondents. Self-reported willingness to volunteer may vary in different scenarios.²² Scenario-based studies should be considered in the future for a better understanding of the findings. This study was conducted in Heilongjiang, which may not be representative of the entire country of China. Caution need to be taken when generalizing the findings. The cross-sectional design of this study does not allow causal conclusions to be drawn.

CONCLUSION

A relatively high level of willingness to volunteer in emergency events is evident in northern China. But willingness has not effectively translated into volunteering actions. People with a better knowledge of emergencies are more likely to be willing to volunteer because they have better risk perceptions and are more confident to participate in volunteering. However, low levels of recognition of responsibility and community attachment may demotivate people to participate in emergency volunteering. Inappropriate institutional environments may also impose serious barriers, jeopardizing the willingness of people to volunteer and their contribution to volunteering services. Future efforts should be made to convert volunteering willingness into effective contributions to the emergency response system. This can be done through improving the organized efforts of volunteers by implementing policies, regulations, coordination mechanisms, and volunteer training and support.

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Contributor

MS participated in the design of the research, conducted the survey and data analyses, and drafted the manuscript. YH and QHW took overall responsibility for the study design, coordination of the survey, development of the analysis framework, and writing of the manuscript. WX, LG, ZK, NN, CL, HS, MJ, LL, YL, YC and XZ participated in the design of the research, organized and conducted the survey. CJL supervised the data analyses, interpreted the results and revised the manuscript. JF, QW and MY participated in the literature review and data collection.

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REFERENCES

- 1 Bachner G, Seebauer S, Pfurtscheller C, et al. Assessing the benefits of organized voluntary emergency services: Concepts and evidence from flood protection in Austria. *Disaster Prevention and Management* 2016;25(3):1-17.
- 2 Oklahoma Department of Civil Emergency Management After Action Report: Alfred P. Murrah Federal Building Bombing. <https://www.ok.gov/OEM/documents/Bombing%20After%20Action%20Report.pdf>(accessed 20 August 2017)
- 3 Whittaker J, McLennan B, Handmer J. A review of informal volunteerism in emergencies and disasters: Definition, opportunities and challenges. *International Journal of Disaster Risk Reduction* 2015;13:358-368.
- 4 Orloff L. Managing Spontaneous Community Volunteers in Disasters: A Field Manual. *Crc Press* 2011.
- 5 Voluntary Action Italy: Facts and Figures. <http://www.kansalaisareena.fi/Voluntary%20Action%20Italy.pdf>(accessed 28 September 2017)
- 6 The Role of Volunteers in Disaster Response. <http://www.volunteerlink.net/datafiles/D061.pdf>(accessed 25 September 2017)
- 7 Community Emergency Response Team. <https://www.ready.gov/community-emergency-response-team>(accessed 28 September 2017)
- 8 Zhang ZR. Summarize lessons from disaster—Japanese training. *China Emergency Management* 2010(2):52-54.
- 9 Yuan Y, Zhu W, Chen G. Volunteer's Organization and Management in Wenchuan Earthquake: Problems and Countermeasures. *China Nonprofit Review* 2008(2):276-282.
- 10 The state council information office of the People's Republic of China. "China's Actions for Disaster Prevention and Reduction". <http://www.scio.gov.cn/zfbps/ndhf/2009/Document/847130/847130.html>.(accessed 25 Jan 2017)
- 11 Cowlshaw S, Birch A, McLennan J, et al. Antecedents and Outcomes of Volunteer Work—Family Conflict and Facilitation in Australia. *Applied Psychology* 2014;63(1):168–189.
- 12 Pfurtscheller C, Brucker A, Seebauer S. Prepared for the future? Evaluating the costs and benefits of voluntary work for natural disaster management under a changing climate - data on recent flood events, stakeholder needs and policy applications. *European Geosciences Union General Assembly* 2014.
- 13 Song YC. Reflections on Japan 's emergency volunteer service mechanism. *Chin Legal System and Society* 2014;27.
- 14 About the Medical Reserve Corps. <https://mrc.hhs.gov/pageviewfldr/About>(accessed 25

- August 2017)
- 15 Lin XW. Characteristics and enlightenment of volunteer system in German emergency rescue. *Chin Journal of Liaoning Administration College* 2010;12(5):9-10.
 - 16 FEMA. Community emergency response team: basic training participant manual. https://www.fema.gov/media-library-data/1448917365279-3a7949605bd9e03633af2473a5741aa9/Section_0_PM_Combined.pdf(accessed 16 March 2017)
 - 17 The Xinhua News Agency. "volunteer first year" of Japan since the Hanshin earthquake http://news.xinhuanet.com/mrdx/2008-06/04/content_8312305.html(accessed 5 Feb 2017)
 - 18 How does Japan organize volunteers in an orderly manner to relieve a disaster? <http://world.people.com.cn/GB/14549/7334918.html> (accessed 9 Feb 2017)
 - 19 Guan RH. The role of volunteers in a disaster early warning management system. *China Safety* 2010;31(2):1-4.
 - 20 Duang YT, Jiang GR. Review of theory of rational action. *Adv Psychol Sci* 2008;16:315–20.
 - 21 Finkelstein M A, Penner L A, Brannick M T. Motive, role identity, and prosocial personality as predictors of volunteer activity. *Social Behavior & Personality An International Journal* 2004;33(4):403-418.
 - 22 Blau G, Chapman S, Gibson G, et al. Exploring the importance of different items as reasons for leaving emergency medical services between fully compensated, partially compensated, and non-compensated/volunteer samples. *Journal of Allied Health* 2011;40(3):e33-7.
 - 23 Barnett D J, Thompson C B, Errett N A, et al. Determinants of emergency response willingness in the local public health workforce by jurisdictional and scenario patterns: a cross-sectional survey. *Bmc Public Health* 2012;12(1):164.
 - 24 Nesbit R, Brudney J L. Projections and Policies for Volunteer Programs: The Implications of the Serve America Act for Volunteer Diversity and Management. *Nonprofit Management and Leadership* 2013;24(1):3–21.
 - 25 Rosychuk R J, Bailey T, Haines C, et al. Willingness to volunteer during an influenza pandemic: perspectives from students and staff at a large Canadian university. *Influenza Other Respir Viruses* 2008;2(2):71–79.
 - 26 Skar M, Sydnes M, Sydnes A K. Integrating unorganized volunteers in emergency response management. *International Journal of Emergency Services* 2016;5(1):52-65.
 - 27 Heilongjiang municipal GDP and per capita GDP ranking 2015. <http://www.phbang.cn/finance/data/152416.html>(accessed 19 Oct 2016)
 - 28 Enders J. Measuring community awareness and preparedness for emergencies. *Australian Journal of Emergency Management* 2001;16(3):52-58.
 - 29 Zhang AQ. Self-efficacy and organization networking. *Organizational Behavior. Beijing, BJ: China Machine Press* 2013:126.
 - 30 Catts R, Chamings D. Recognising current competencies of volunteers in emergency service organizations. *Journal of Workplace Learning* 2006;18(7/8):451-463.
 - 31 Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology* 2008;3(2):77-101.
 - 32 Anonymous. CISCO: Cisco and the Red Cross Launch Global Volunteer Initiative; Just in Time for National Volunteer Week, Collaboration Creates Largest Corporate Disaster Response Volunteer Program in Red Cross History. *M2 Presswire* 2010.

- 1
2
3 33 Liu C, Robinson P. Better organization of volunteers in disaster settings is needed: lessons for
4 all from China. *Australian and New Zealand Journal of Public Health* 2013;37(6):595.
5
6 34 Vaughan E, Tinker T. Effective Health Risk Communication About Pandemic Influenza for
7 Vulnerable Populations. *American Journal of Public Health* 2011;99(2):S324-32.
8
9 35 Lee S, Saito T, Takahashi M, et al. Volunteer participation among older adults in Japan: an
10 analysis of the determinants of participation and reasons for non-participation. *Archives of*
11 *Gerontology & Geriatrics* 2007;47(2):173-187.
12
13 36 Smith D H. Determinants of Voluntary Association Participation and Volunteering: A
14 Literature Review. *Nonprofit and Voluntary Sector Quarterly* 1994;23(3):243-264.
15
16 37 O'Meara P, Tourle V, Rae J. Factors influencing the successful integration of ambulance
17 volunteers and first responders into ambulance services. *Health & Social Care in the*
18 *Community* 2012;20(5):488-496.
19
20 38 Bandura A. Self-efficacy: The exercise of control. *Journal of Cognitive Psychotherapy*
21 1997;604(2):158-166.
22
23 39 Knuth D, Kehl D, Hulse L, et al. Risk perception, experience, and objective risk: a cross-
24 national study with European emergency survivors. *Risk Analysis* 2014;34(7):1286-1298.
25
26 40 Wang J W, Wei C N, Harada K, et al. Applying the social cognitive perspective to volunteer
27 intention in China: the mediating roles of self-efficacy and motivation. *Health Promotion*
28 *International* 2011;26(2):177.
29
30 41 Qureshi K A, Gershon R R, Merrill J A, et al. Effectiveness of an emergency preparedness
31 training program for public health nurses in New York City. *Family & Community Health*
32 2004;27(3):242.
33
34 42 Fothergill A, Palumbo M V, Rambur B, et al. The volunteer potential of inactive nurses for
35 disaster preparedness. *Public Health Nursing* 2005;22(5):414-421.
36
37 43 Xu W, Hao Y, Wu Q, et al. Community preparedness for emergency: a cross-sectional survey
38 of residents in Heilongjiang of China. *Bmj Open* 2015;5(11):e008479-e008479.
39
40 44 Roberts A, Nimegeer A, Farmer J, et al. The experience of community first responders in co-
41 producing rural health care: in the liminal gap between citizen and professional. *BMC Health*
42 *Services Research* 2014;14(1):460.
43
44 45 Taniguchi H, Marshall G A. The effects of social trust and institutional trust on formal
45 volunteering and charitable giving in Japan. *VOLUNTAS: International Journal of Voluntary*
46 *and Nonprofit Organizations* 2014;25(1):150-175.
47
48 46 Sønderskov K M. Does generalized social trust lead to associational membership? Unraveling
49 a bowl of well-tossed spaghetti. *European Sociological Review* 2011;27(4):419-434.
50
51 47 Hofferth S L, Iceland J. Social capital in rural and urban communities. *Rural Sociology*
52 1998;63(4):574-598.
53
54 48 Beggs J J, Hurlbert J S, Haines V A. Community Attachment in a Rural Setting: A Refinement
55 and Empirical Test of the Systemic Model. *Rural Sociology* 1996;61(3):407-426.
56
57 49 Elliot A, Hou YB. Social psychology (5th Edition) . *China Light Industry Press* 2005:332-384.
58
59 50 Schlenker B R, Britt T W, Pennington J, et al. The triangle model of responsibility.
60 *Psychological Review* 1994;101(4):632-652.
51
52 51 Perlstadt H, Kozak L J. Emergency medical services in small communities. *Journal of*
53 *Community Health* 1977;2(3):178-188.
54
55 52 Palaz S, Boz S. Factors Influencing College Graduate Adults to Provide Volunteer Service in

1
2
3 Different Organizations. *Balikesir Üniversitesi Sosyal Bilimler Dergisi* 2008;11(19):95-106.
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6 Figuer1 (Factors associated with willingness to volunteer and participation in volunteering) shows
7 that willingness to volunteer and participation in volunteering are determined by many factors,
8 including those at the individual level (age, knowledge about emergencies, educational attainment
9 and so on), community level (community attachment, recognition of responsibility and residency)
10 and institutional level (policy environment and organization management). Willingness to
11 emergency volunteer determines the participation in emergency volunteering; also, institutional
12 factors influence the participation in emergency volunteering directly.
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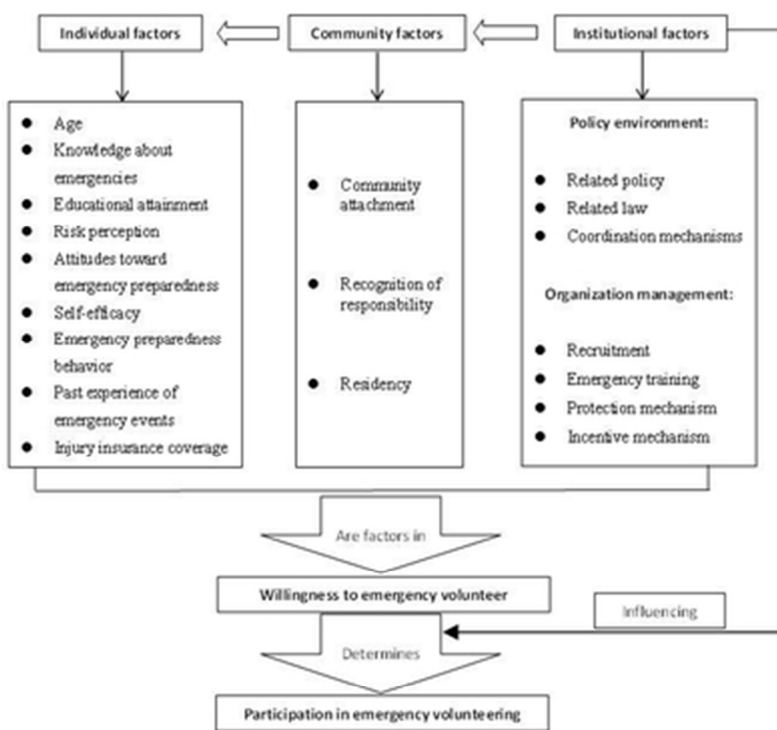


Figure 1 Factors associated with willingness to volunteer and participation in volunteering

34x34mm (300 x 300 DPI)

Standards for Reporting Qualitative Research (SRQR)

No.	Topic	Item
1	Title and abstract	Title Abstract
2	Introduction	Problem formulation Purpose or research question
3	Methods	Qualitative approach and research paradigm Researcher characteristics and reflexivity Context Sampling strategy Ethical issues pertaining to human subjects Data collection methods Data collection instruments and technologies Units of study Data processing Data analysis Techniques to enhance trustworthiness
4	Results/findings	Synthesis and interpretation Links to empirical data
5	Discussion	Integration with prior work, implications, transferability, and contribution(s) to the field Limitations
6	Other	Conflicts of interest Funding

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Emergency volunteering willingness and participation: a cross-sectional survey of residents in northern China

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Emergency volunteering willingness and participation: a cross-sectional survey of residents in northern China

Mengli Shi,¹ Wei Xu,¹ Lijun Gao,^{1,2} Zheng Kang,^{1,2} Ning Ning,^{1,2} Chaojie Liu,³ Chao Liang,¹ Hong Sun,^{1,2} Mingli Jiao,^{1,2} Libo Liang,^{1,2} Ye Li,^{1,2} Yu Cui,^{1,2} Xiaowen Zhao,¹ Jie Fei,¹ Qiuyu Wei,¹ Ming Yi,¹ Qunhong Wu,^{*1,2} Yanhua Hao.^{*1,2}

Correspondence to

Professor Yanhua Hao; School of Public Health, Harbin Medical University, 157 Baojian Road, Nangang District, Harbin, Heilongjiang, China; hyhyjw@126.com; 87502860.

Professor Qunhong Wu; School of Public Health, Harbin Medical University, 157 Baojian Road, Nangang District, Harbin, Heilongjiang, China; wuqunhong@163.com; 87502851.

Author affiliations

1. School of Health Management, Harbin Medical University, Harbin, Heilongjiang, China.
2. Collaborative Innovation Center of Social Risks Governance in Health, China.
3. School of Psychology and Public Health, La Trobe University, Melbourne, Victoria, Australia.

Keywords: emergency; volunteer; willingness; participation.

Word count: 4526

ABSTRACT

Objectives: This study aimed to identify factors that influence people's willingness to volunteer and participation in emergency volunteering in northern China.

Design/Setting: This study was conducted in Heilongjiang province in September and October 2014 using a mixed methods approach, which included a cross-sectional questionnaire survey on community residents and in-depth interviews with community residents and relevant organizational managers and officials in relation to emergency responses. A stratified cluster sampling strategy was employed to select questionnaire respondents.

Participants: 2686 respondents completed the questionnaire survey; 19 key informants were interviewed.

Primary and secondary outcome measures: Willingness to volunteer was the major concern of this study. Self-reported past experience of the participants in emergency volunteering served as a secondary outcome.

Results: 65.7% of respondents were willing to volunteer in emergencies. 24.3% of respondents had participated in emergency actions. Higher levels of willingness to volunteer and participation

*Corresponding authors: Yanhua Hao and Qunhong Wu contributed equally to this paper.

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3 in volunteering were found in those who resided in rural areas (OR=1.308 (1.064, 1.608) for
4 willingness; OR=1.518 (1.208, 1.908) for participation), had stronger community attachment
5 (OR=1.720 (1.429, 2.069) for willingness; OR=1.547 (1.266, 1.890) for participation), had higher
6 recognition of responsibility (OR=1.981 (1.498, 2.619) for willingness; OR=1.517 (1.177, 1.955) for
7 participation), demonstrated preparedness behavior (OR=1.714 (1.424, 2.064) for willingness;
8 OR=1.391 (1.151, 1.681) for participation), and were covered by injury insurance (OR=1.335
9 (1.102, 1.619) for willingness; OR=1.822 (1.500, 2.214) for participation). The in-depth interviews
10 revealed that an inappropriate policy environment and poor volunteer organizational
11 management were major barriers for converting willingness into actions.
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15 **Conclusion:** A relatively high level of willingness to volunteer in emergencies in northern China is
16 associated with a range of individual, community and institutional factors. Efforts should be made
17 to translate willingness into effective contributions to the emergency response system. This can
18 be done through improving policies, regulations, coordination mechanisms, and volunteer
19 training and support.
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22 **Strengths and limitations**

- 23
24 • This study adopted a mixed methods approach, involving a questionnaire survey and in-
25 depth interviews.
- 26
27 • The sample size is large, enabling us to explore determinants of emergency volunteering
28 from individual, community and institutional perspectives.
- 29
30 • The concept of “emergency events” adopted in this study was general and covered a
31 broad range of events, which may lead to vague or uncertain answers from some
32 respondents.
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34 • Self-reported willingness to volunteer varied with different scenarios.
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36 • This study was conducted in Heilongjiang, which may not be representative of the entire
37 country of China.
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40 **INTRODUCTION**

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43 Emergency volunteering emerged and developed in a time of crisis. Since the second half of the
44 20th century, the world has encountered a high incidence of disastrous events: 1986 Chernobyl
45 disaster in Ukraine, "9.11" terrorist attack in 2001 in the US, 2003 SARS crisis, 2008 Wenchuan
46 earthquake in China, just to name a few. Some of the disastrous events are natural disasters, others
47 are manmade. It is undeniable that governments play a leading role in emergency responses.
48 However, in many cases, the emergency response needs exceed the capacity of government
49 agencies and professional rescue bodies. Volunteers often play a critical role across the entire
50 spectrum of rescue efforts.¹ For example, immediately following the 1995 Oklahoma city
51 bombing, voluntary organizations and civilian volunteers participated in the search and rescue
52 efforts and a Compassion Centre was established by volunteers within seven hours.² After the
53 1976 Tangshan earthquake, survivors formed rescue teams immediately to save people buried in
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3 the debris.³ Indeed, without the efforts of spontaneous volunteers, immediate response and
4 recovery would not have a high success rate.⁴
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7 The best definition of volunteers was probably given during the International Year of Volunteers
8 (2001): "A volunteer is a person, who, having carried out the duties of every citizen, places her/his
9 own capacity at the disposal of others, for the community or for all humanity. She/he operates in a
10 free and gratuitous manner promoting creative and effective responses to the needs of
11 beneficiaries of her/his own action and contributing to the realization of common goods".⁵ There
12 are three types of volunteers in emergency responses according to the Hong Kong Red Cross: a
13 community-based volunteer is someone who comes from the community and is willing to help
14 others; a functional volunteer is someone who is equipped with specific emergency skills, such as
15 first aid and psychological support; a professional volunteer is someone who has a professional
16 qualification, such as a doctor or nurse.⁶ Emergency volunteering requires not only a will to help
17 others, but also professional knowledge and skills.⁶
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21 Some countries have attached great importance to improving the public capability of an
22 emergency response. For example, in the US, the Community Emergency Response Team (CERT)
23 program offers a consistent and nationwide approach to volunteer training, which has enhanced
24 the public capability to respond to and recover from disasters.⁷ The Japanese government has
25 integrated emergency education into school education and community activities, and established
26 multiple "disaster prevention days" to carry out emergency training and exercises.⁸ Such regular
27 emergency training ensures that people with qualified skills can be effectively deployed to
28 emergency volunteer services during disasters. However, China has not yet established a regular
29 community-based emergency training program, and lacks volunteers with specific knowledge and
30 skills to respond to emergencies.⁹ These shortfalls were conspicuously exposed after the
31 Wenchuan earthquake, even resulting in a "new victims" phenomenon: many volunteers had no
32 capacity to provide rescue services and instead put themselves in a dangerous situation requiring
33 support from others.⁹
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38 The development of an organized emergency volunteer system in China is still in its infant stage.
39 During the 2003 SARS outbreak, only a small number of social organizations and individuals
40 provided volunteer services. The demand for large numbers of rescue workers in the 2008
41 Wenchuan earthquake accelerated the development of organized emergency volunteering.
42 According to the statistics, more than 4 million volunteers (including both spontaneous and
43 organized volunteers) were involved in disaster relief activities during the Wenchuan earthquake,
44 which remained the largest emergency volunteering effort in China up to now.¹⁰ However, most of
45 those volunteers were spontaneous and operated in an unorganized state, which even added some
46 obstacles to the emergency rescue work (such as unintended interference with professional
47 activities and the aforementioned "new victims" phenomenon).⁹
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51 There have been increasing calls to integrate volunteer organizations into the formal emergency
52 response system.¹¹ Many developed countries have established institutionalized mechanisms to
53 attract, train and retain volunteers.¹² In Japan, a volunteer center was established, serving as a
54 volunteer recruitment platform.¹³ In the US, the Medical Reserve Corps (MRC) is a national
55 network of volunteers which maintains a recruitment and registration system for emergency
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3 volunteering.¹⁴ Formal volunteer organizations were also established in Germany, the UK, and
4 Australia.^{11,15} In the case of emergencies, these organized volunteers can be mobilized and
5 deployed rapidly. Such systems also offer appropriate protections on the health of the volunteers
6 through training, support and insurance coverage.^{14,16-18}
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9 In countries with a well-established volunteer system (comprising relevant laws, policies,
10 organizations, advocacy mechanisms, and training and deployment mechanisms), participation in
11 volunteering is high. In the US, for example, 40% of the total population is involved in volunteer
12 services.¹⁹ Germany only has a population of about 82 million, but 23 million have participated in
13 volunteer activities and 1.8 million have provided emergency volunteering services.¹⁵ It is not
14 clear how many people in China are willing to volunteer and have actually provided emergency
15 volunteer services. Due to the lack of a well-organized volunteer management system in China,
16 only 1% of the total population has registered for volunteering services.¹⁹
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20 The theory of rational action states that individual behaviors are influenced by their cognitions and
21 attitudes based on the comprehensive consideration of various information.²⁰ Extensive studies
22 have been undertaken in western countries with regard to the motivation and benefits of
23 volunteering. Willingness to volunteer often depends on specific circumstances,²¹ and is also
24 subject to the impacts of regulations and training.²²⁻²⁴ Finkelstein et al. categorized the motivation
25 of volunteers into selfless and altruistic motives; self-interest (e.g. career-related benefits); and
26 social objectives (such as pro-social behaviors).²⁵ Blau et al. investigated the influence of
27 incentive mechanisms on emergency volunteering, and found that the desire for advancement
28 opportunity and better pay is a strong reason for providing emergency volunteer services.²⁶
29 However, there is a dearth of literature in China probing willingness to emergency volunteer and
30 participation in emergency volunteering. This study aimed to fill the literature gap and provide
31 evidence for policy development in relation to emergency volunteering (including both
32 spontaneous and organized volunteering).
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36 **METHODS**

37 **Questionnaire survey**

38 **● Study population**

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41 A cross-sectional questionnaire survey was conducted in Heilongjiang province in September and
42 October 2014. Heilongjiang is located in the northeast of China, with a population over 38 million.
43 The gross domestic product per capita in Heilongjiang reached ¥39,352 (US \$5,700) in 2015,
44 lower than the national average of ¥49,730 (US \$7,957).²⁷ Over the past few decades, this region
45 experienced forest fires, floods, SARS and other disastrous events.
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50 A multi-stage stratified cluster sampling strategy was adopted to ensure the demographic and
51 social-economic diversity of the study participants. Five (out of 13) municipalities in Heilongjiang
52 were selected: Harbin (capital city), Qiqihar, Mudanjiang, Jiamusi and Daqing. In each
53 municipality, one urban district and one rural county were randomly selected. Two
54 communities/villages were then randomly selected from each district/county. All of the households
55 in the selected communities/villages were eligible to participate in the survey. Trained
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interviewers visited the selected households and explained the purpose of the survey to the person they met first, and then asked this person to nominate one adult member to complete the questionnaire. A total of 2800 questionnaires were returned, of which 2686 (95.9%) were valid for data analyses.

The questionnaire survey was administered through face-to-face interviews. Each interview took about 20 minutes. The interviewers were recruited from the postgraduate students in the School of Public Health at Harbin Medical University. They had attended a training workshop prior to embarking on the fieldwork. One experienced researcher was allocated to each community/village to supervise the data collection activities.

● **Dependent variable**

Willingness to emergency volunteer: respondents were asked to rate on a 5-point Likert scale (ranging from 1 “no, not at all” to 5 “yes, very much”) in relation to the question: “Are you willing to respond to emergencies as a volunteer?”

Participation in emergency volunteering: respondents were asked whether they had ever participated in emergencies as a volunteer (yes or no).

● **Independent variable**

The independent variables tested in this study included socio-demographic characteristics, awareness and attitudes toward emergency risks, community attachment, recognition of responsibility, and self-efficacy in an emergency response. These variables were selected based on the existing literature. Rosychuk and colleagues suggest the application of the knowledge-attitudes-behavior model in emergency volunteering studies,²³ based on the theory of rational action.²⁰ Enders recommends the addition of past experience and self-efficacy into the knowledge-attitudes-behavior model.²⁸ The self-efficacy theory posits that confidence and ability contribute to the individual’s capacity to control their behaviors.²⁹ In recent years, the social capital theory has started to attract increasing attention. Catts and Chamings proposed that social capital based on trust is critical to the effective functioning of volunteering.³⁰

The *socio-demographic characteristics* of the respondents were measured by gender, age, residency, educational attainment and household income.

Knowledge: 18 statements (involving earthquake, fire, infectious disease, food poisoning and first aid) were designed to test the knowledge of the respondents in regard to emergencies. Respondents chose one of the answers for each statement: agree, disagree, don’t know. A correct answer attracted a score of 1, otherwise 0.

Risk perception: respondents were asked to rate the risk of emergencies (4 items) in relation to natural disaster (earthquake, flood), accidents (fire, road accident), public health (infectious disease, food poisoning) and social unrest (violence, terrorism), respectively, on a five-point Likert scale (ranging from 1-“highly unlikely” to 5-“highly likely”). The level of risk awareness was also indicated by an additional item measuring the coverage (yes or no) of accident injury insurance.

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3 *Attitudes* (4 items): respondents were asked to rate their attitudes and beliefs toward emergency
4 preparedness on a 5-point Likert scale (ranging from 1-“strongly disagree” to 5-“strongly agree”).
5 Example questions: “Luck is more important than preparedness in emergencies”.
6

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8 *Community attachment* (5 items): respondents were asked to rate how closely they were attached
9 to their community on a 5-point Likert scale (ranging from 1-“strongly disagree” to 5-“strongly
10 agree”). Example statements: “I’m willing to help my neighbor when they have troubles”.
11

12 *Recognition of responsibility* (1 item): respondents were asked to judge whether volunteers should
13 have some responsibility (yes or no) to respond to emergencies.
14

15 *Self-efficacy* (2 items): respondents were asked to rate their capability to engage in an emergency
16 response (“I am confident that I can cope with emergencies effectively”) and mitigate risks (“I can
17 always keep calm when I encounter emergencies”) on a 5-point Likert scale (ranging from 1-
18 “totally disagree” to 5-“totally agree”).
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21 *Past experience of emergencies*: respondents were asked whether they had ever experienced
22 emergencies in the past (yes or no).
23

24 *Exposure to awareness campaigns over the past year*: respondents were asked whether they had
25 received any emergency-related training in the past year (yes or no).
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28 *Behavior in emergency preparedness* (4 items): respondents were asked to report their behaviors
29 in relation to emergency preparedness on a 5-point Likert scale (ranging from 1-“totally disagree”
30 to 5-“totally agree”). Example questions: “I always take the initiative to participate in emergency
31 training”.
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33 ● Quantitative analysis

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36 The two dependent variables (willingness to volunteer and participation in volunteering) were
37 collapsed into two categories respectively, with 0 indicating “unwilling” (score 1, 2, or 3) or “no”
38 and 1 indicating “willing” (score 4 or 5) or “yes”.
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41 The independent variables were transformed into categorical measurements for the purpose of
42 statistical analyses due to a lack of evidence to support the assumptions of linear correlations. For
43 the scales measuring *knowledge*, *risk perception*, *attitudes*, *community attachment*, *self-efficacy*,
44 and *behavior*, a summed score was calculated before it was recoded into 1 “above average” and 0
45 “on/below average”.
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48 χ^2 tests were performed to determine the differences of the two dependent variables across
49 different categories of the independent variables. The independent variables that showed statistical
50 significance ($p < 0.05$) were entered into a multivariate logistic regression model. The regression
51 model was established to determine the effect size of each independent variable, adjusted for the
52 influence of others. All statistical analyses were conducted using SPSS 19.0. A p -value (two-
53 sided) less than 0.05 was considered to be statistically significant.
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55 In-depth interview

● **Materials**

Two semi-structured interview guides were developed by the study team based on the study objectives. One semi-structured interview guide was for volunteer organization managers and officials, and included questions regarding the emergency system construction, the operation of the emergency volunteering organizations, the status of and barriers to emergency volunteering. The other was for residents, and included questions relating to the status and experience of residents' participation in emergency volunteering, as well as the reasons for not participating.

● **Sampling strategy and data collection**

The interviews were conducted in Heilongjiang province in October 2014. Ten residents and nine volunteer organization managers and officials completed the interviews. Each interview took about 20 to 30 minutes. The ten residents were community members, who were selected from those who had finished our questionnaire survey. We contacted them through the community councils. Their interviews were administered face-to-face. The nine managers and officials were from volunteer organizations. Their interviews were conducted by telephone.

All interviews were digitally recorded, transcribed and thematically coded. The final sample size was determined by saturation of information when no new themes emerged.

● **Qualitative analysis**

The interview data were analyzed thematically. The coding framework was developed inductively from the data. The initial coding used open coding (codes derived directly from the data) and theoretical coding. The initial codes were then refined to produce a smaller set of themes. The coding framework was subject to continuing iterative revision during the course of analysis.³¹ Findings were discussed and approved by the study team.

● **Data integration**

The categories emerging inductively from the interviews were compared with the findings of the questionnaire survey. Conclusions were made based on the consolidated results, which expanded the strength of each type of data to offer more robust evidence.

Ethics approval

The study was approved by the Medical Research Ethics Committee of Harbin Medical University. Participation in this study was completely voluntary. Written informed consent was obtained from each participant.

Patient and Public Involvement

Patients and members of the public were not involved in the design and conceptualization of this study.

RESULTS

Characteristics of respondents

The respondents had an average age of 41.9 (SD=14.6) years; 56.2% were women; 58.0% resided in rural areas; and 29.1% had obtained a university qualification. More than 52% of respondents had a monthly household income between ¥2000 (\$300) and ¥4999 (\$750) (Table 1).

Willingness to volunteer and participation in volunteering

About 65.7% of respondents were willing to volunteer in emergency events, including 28.3% who expressed strong willingness. Only 7.7% of respondents were not willing to volunteer and 1.2% were strongly unwilling. About 24.3% of respondents had participated in emergencies as a volunteer.

Factors associated with willingness to volunteer and participation in volunteering

Willingness to volunteer varied by age, residency, educational attainment, knowledge about emergencies, risk perception, attitudes toward emergency preparedness, community attachment, recognition of responsibility, self-efficacy, preparedness behavior, past experiences, and injury insurance coverage. However, no significant differences in willingness to volunteer were found across gender, income, and exposure to emergency awareness campaigns ($p>0.05$, Table 1).

Participation in volunteering varied by gender, age, residency, educational attainment, knowledge about emergencies, community attachment, recognition of responsibility, preparedness behavior, past experiences, injury insurance coverage and exposure to emergency awareness campaigns. However, income, risk perception, attitudes toward emergency preparedness and self-efficacy were not found to be associated with participation in volunteering ($p>0.05$, Table 1).

Table 1 Characteristics of respondents and their willingness to volunteer and participation in volunteering (n=2686)

Characteristics	Respondents [n (%)]	Willingness [n (%)]	χ^2	<i>p</i>	Participation [n (%)]	χ^2	<i>p</i>
Gender			3.374	0.066		18.403	0.000
Male	1177 (43.8)	751 (63.8)			333(28.3)		
Female	1509 (56.2)	1014 (67.2)			319(21.1)		
Age (years)			19.168	0.000		11.328	0.003
<35	910 (33.9)	550 (60.4)			250(27.5%)		
35-55	1265 (47.1)	852 (67.4)			302(23.9%)		
55+	511 (19.0)	363 (71.0)			100(19.6%)		
Residency			12.292	0.000		3.869	0.049
Rural	1559 (58.0)	1067 (68.4)			400(25.7)		
Urban	1127 (42.0)	698 (61.9)			252(22.4)		
Educational attainment			6.254	0.044		19.647	0.000
≤Junior high school	1260 (46.9)	830 (65.9)			262(20.8)		
Senior high school	644 (24.0)	400 (62.1)			160(24.8)		
University	782 (29.1)	535 (68.4)			230(29.4)		
Household monthly income (¥/\$)			1.189	0.552		1.603	0.449
0-1999/0-300	853 (31.8)	573 (67.2)			217(25.4)		
2000-4999/300-750	1409 (52.4)	916 (65.0)			328(23.3)		
5000+/750+	424 (15.8)	276 (65.1)			107(25.2)		
Knowledge about emergencies			53.966	0.000		35.438	0.000
On /below average	1083 (40.3)	623 (57.5)			242(19.0)		

Above average	1603 (59.7)	1142 (71.2)			410(28.9)		
Risk perception			10.137	0.001		2.725	0.099
On /below average	1420 (52.9)	894 (63.0)			363(25.6)		
Above average	1266 (47.1)	871 (68.8)			289(22.8)		
Attitudes toward emergency preparedness			56.259	0.000		0.903	0.342
On /below average	1370 (51.0)	808 (59.0)			322(23.5)		
Above average	1316 (49.0)	957 (72.7)			330(25.1)		
Community attachment			74.360	0.000		31.146	0.000
On /below average	1522 (56.7)	895 (58.8)			308(20.2)		
Above average	1164 (43.3)	870 (74.7)			344(29.6)		
Recognition of responsibility			36.808	0.000		13.025	0.000
Yes	372 (13.8)	296 (79.6)			118(31.72)		
No	2314 (86.2)	1469 (63.5)			534(23.08)		
Self-efficacy			54.824	0.000		0.888	0.346
On /below average	1456 (54.2)	866 (59.5)			343(23.56)		
Above average	1230 (45.8)	899 (73.1)			309(25.12)		
Preparedness behavior			91.289	0.000		29.143	0.000
On /below average	1530 (57.0)	889 (58.1)			312(20.39)		
Above average	1156 (43.0)	876 (75.8)			340(29.41)		
Past experience of emergencies			32.690	0.000		5.901	0.015
Yes	580 (21.6)	439 (75.7)			163(28.10)		
No	2106 (78.4)	1326 (63.0)			489(23.22)		
Exposure to awareness campaigns over the past year			2.988	0.084		95.869	0.000
Yes	657 (24.5)	450 (68.5)			253(38.51)		
No	2029 (75.5)	1315 (64.8)			399(19.66)		
Injury insurance coverage			11.830	0.001		51.285	0.000
Yes	789 (29.4)	557 (70.6)			264(33.46)		
No	1897 (70.6)	1208 (63.7)			388(20.45)		

The two multivariate logistic regression models confirmed the results of the χ^2 tests. The respondents who were older, resided in rural areas, and had a university qualification were more likely to be willing to volunteer in emergencies. Willingness to volunteer was also positively associated with better knowledge about emergencies, higher risk perception, more positive attitudes toward emergency preparedness, past experience of emergencies, stronger community attachment, higher recognition of responsibility, higher self-efficacy, preparedness behavior, and injury insurance coverage (Table 2).

The respondents who were male, resided in rural areas, and had a senior high school or university qualification were more likely to participate in emergency volunteering. Participation in volunteering was also positively associated with stronger community attachment, higher recognition of responsibility, preparedness behavior, injury insurance coverage and exposure to awareness campaigns (Table 2).

Table 2 Factors associated with willingness to volunteer and participation in volunteering – findings from multivariate logistic regression analysis

Variables	Willingness			Participation		
	<i>p</i>	<i>OR</i>	<i>95%CI</i>	<i>p</i>	<i>OR</i>	<i>95%CI</i>
Gender						
Male	—	—	—	0.000	1.481	1.230~1.783
Female (reference)						
Age						

<35 (reference)							
35-55	0.027	1.243	1.026~1.507	0.161	0.861	0.698~1.061	
55+	0.006	1.433	1.106~1.857	0.060	0.756	0.565~1.012	
Residency							
Rural	0.011	1.308	1.064~1.608	0.000	1.518	1.208~1.908	
Urban (reference)							
Educational attainment							
≤Junior high school (reference)							
Senior high school	0.656	0.949	0.755~1.194	0.005	1.436	1.115~1.850	
University	0.005	1.426	1.114~1.825	0.000	1.747	1.343~2.272	
Knowledge about emergencies							
On /below average (reference)							
Above average	0.000	1.627	1.363~1.943	0.391	1.091	0.894~1.331	
Risk perception							
On /below average (reference)							
Above average	0.031	1.209	1.018~1.436	—	—	—	
Attitudes toward emergency preparedness							
On /below average (reference)							
Above average	0.000	1.567	1.318~1.862	—	—	—	
Community attachment							
On /below average (reference)							
Above average	0.000	1.720	1.429~2.069	0.000	1.547	1.266~1.890	
Recognition of responsibility							
Yes	0.000	1.981	1.498~2.619	0.001	1.517	1.177~1.955	
No (reference)							
Self-efficacy							
On /below average (reference)							
Above average	0.001	1.360	1.133~1.631	—	—	—	
Preparedness behavior							
On /below average (reference)							
Above average	0.000	1.714	1.424~2.064	0.001	1.391	1.151~1.681	
Past experience of emergency events							
Yes	0.000	1.540	1.234~1.921	0.178	1.163	0.934~1.449	
No (reference)							
Injury insurance coverage							
Yes	0.003	1.335	1.102~1.619	0.000	1.822	1.500~2.214	
No (reference)							
Exposure to awareness campaigns over the past year							
Yes	—	—	—	0.000	2.191	1.784~2.691	
No (reference)							
Constants	0.000	0.317		0.000	0.072		

Gap between willingness to volunteer and participation in volunteering

Two main themes were identified from the qualitative analysis process: “policy environment” and “organizational management”. The interviews revealed that an inappropriate policy environment and incomplete volunteer organizational management were major barriers for converting willingness into actions. Table 3 illustrate the key concepts emerging from the interviews.

Policy environment refers to the related policies, laws, regulations, and coordination mechanisms on emergency responses. The interviewees agreed that there was a shortage of unified national laws and regulations in relation to volunteer services. Local regulations were inconsistent across

regions. In addition, no reliable government funding was allocated to support the organization of emergency volunteering. The Wenchuan earthquake demonstrated the failure of the national emergency response system to integrate volunteer organizations and spontaneous volunteers into rescue and recovery efforts.

Inappropriate management of volunteers, including volunteer recruitment, training, protection and incentive mechanisms, contributed to the limited willingness of the public to volunteer and participation in emergency volunteering. The interviewees reported a lack of an intermediary recruitment platform for volunteer organizations and communities. The public was not well-informed of the channels by which to participate in volunteering activities. The incentive mechanisms (such as reward systems) and protection mechanisms (such as insurance coverage) fell behind the needs of volunteers, restricting their participation in emergency volunteering. In addition, emergency volunteering had not become a culture commonly shared by society.

Table 3 Overarching categories and key concepts emerging from qualitative analyses of the interviews

Category	Concept	Representative quote(s)
Policy environment	Related policies	"Honestly speaking, it is very hard to maintain normal operations of volunteer organizations with only a small amount of funds being given by the government." (volunteer organization manager)
	Related Law	"As far as I know, there are no unified laws and regulations for volunteer services throughout the country, and the laws and systems set up by the local governments vary." (official)
	Coordination mechanisms	"Because of a lack of effective coordination, both spontaneous volunteers and organized volunteers failed to play their role in many emergency rescue efforts and they instead caused chaos." (official)
Organizational management	Volunteer recruitment	"I have lived in the area for years, but have never heard about volunteer recruitment, I don't know where to go to volunteer." (resident)
	Emergency training	I don't have any first aid skills and do not know where to get the training. As for our communities, it seems that there has never been any organization which provides emergency education and training. So I do not think I have the ability to be an emergency volunteer." (resident)
	Protection mechanisms	"Emergency rescue is risky, and I don't have insurance. If I volunteer, I'm not sure if there are organizations or agencies that would provide me with risk-reduction protection."

(resident)

Incentive mechanism

“In our country, volunteers generally are given a few honorable rewards, such as certificates and honorary titles. There is a lack of incentives related to their benefits. Also, there is a lack of a volunteering culture in this society.” (volunteer organization manager)

In summary, based on the findings from the questionnaire survey and the in-depth interviews, public willingness to volunteer and participation in emergency volunteering are shaped by factors from the individual, community and institutional perspectives (Figure 1).

DISCUSSION

Non-professional rescue workers and volunteers play a vital role in an emergency response system.³² Successful rescue operations in emergencies depend on coordinated efforts by a wide range of responders.³³ In this study, we found a relatively high level of willingness to volunteer: more than 65% of respondents were willing to volunteer in emergencies. However, only a small percentage (24.3%) of respondents had participated in emergency volunteering. Willingness to volunteer and participation in volunteering are determined by many factors, including those at the individual level, community level as well as those at the institutional level. The findings of this study support the theory of rational action.²⁰

Individual factors

In this study, we found that people with a better knowledge of emergencies are more likely to be willing to volunteer. Indeed, knowledge and skills are deemed as key factors in influencing human behaviors in several behavioral investigations.³⁴

Training and education is perhaps the most commonly used strategy for improving knowledge and awareness. Education helps shape people’s consciousness, cognition and behavior.³⁵ Evidence shows that education is the most consistent and strongest determinant of volunteering participation,³⁶ which is consistent with our findings. Exposure to emergency awareness campaigns appeared to be a significant factor influencing volunteering participation. But only 24.5% of respondents had been exposed to emergency awareness campaigns over the past year. This level is very low compared with Japan where an "education for all" system exists, integrating emergency education (for disaster prevention and mitigation) into school education and community activities.⁹ Unlike in many developed countries, volunteer training has not been integrated into the national emergency rescue system in China.²⁴ In the US, for example, the Community Emergency Response Team (CERT) program was established in 1985, recognizing the fact that disaster survivors are likely to be on their own at the early stage of a disaster and they need to be prepared to help themselves.¹⁶ Germany, Australia and some other countries have also established an emergency training system focusing on emergency volunteering services.^{2,15,37}

Better knowledge can improve risk perception and self-efficacy, which can strengthen willingness to volunteer.³⁸⁻³⁹ In this study, we found that increased risk perception, more positive attitudes

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3 toward emergency preparedness, and injury insurance coverage are significant predictors of
4 willingness to volunteer. Injury insurance coverage is also a strong predictor of volunteering
5 participation. Risk perception and injury insurance coverage are an indication of risk awareness.
6 We found that the respondents covered by injury insurance have a higher ratio of participation in
7 emergency volunteering than those without insurance. In Japan and Germany, emergency
8 volunteering services are encouraged through a sound volunteer risk management system, such as
9 volunteer insurance programs.^{15,17-18} In Germany, the government has a statutory responsibility to
10 purchase insurance for volunteers.¹⁵

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13 Respondents who report high levels of confidence and a perceived ability to respond are more
14 likely to participate in volunteering. We found that self-efficacy is a significant predictor of
15 willingness to volunteer, and emergency preparedness behaviors influence both willingness to
16 volunteer and participation in volunteering. These findings are consistent with previous studies.
17 Wang and colleagues found that self-efficacy has a strong impact on behaviors and behavior
18 intentions in challenging environments.⁴⁰ Emergency preparedness training can result in
19 knowledge gains and shifts attitudes toward volunteering.⁴¹ Fothergill and colleagues found that
20 nurses have higher willingness and participation in emergency volunteering services, partly
21 because nurses are professionally trained and adequately prepared.⁴²

22
23 We found that past experience of emergencies is associated with higher willingness to volunteer.
24 This is perhaps because these people have developed a better understanding of the need for
25 volunteering services. Emergency experience may prompt people to become more proactive in
26 acquiring the knowledge and skills associated with an emergency response,⁴³ boosting their
27 confidence to participate in volunteering services.

28
29 In this study, older age was found to be associated with higher willingness to volunteer in
30 emergency events. Previous studies identified 35-55 years as the most active age for
31 volunteering.³⁶ Smith argues that this may be due to the rising socioeconomic status of middle-
32 aged people.³⁶ Lee and colleagues point out that social and family commitment may be a factor
33 shaping people's decision to volunteer.³⁵ Older people may be more experienced and confident to
34 participate in volunteering. The results of this study showed that participation in emergency
35 volunteering is higher for men, which is consistent with the findings of a previous study.³⁶

36 37 38 39 40 41 42 **Community factors**

43
44 Social capital can foster trust and enforce reciprocal behaviors in a group.^{12,30} We found that
45 community attachment is a significant predictor of volunteering willingness and participation.
46 Previous studies conducted in several western countries showed that people who have a strong
47 consciousness of neighborhood and a sense of belonging to community are most likely to
48 participate in community volunteering activities.⁴⁴⁻⁴⁵ Social relations based on trust and solidarity
49 can encourage emergency volunteering.^{30,44}

50
51
52 We found that rural residents are more likely to be willing to volunteer and participate in
53 volunteering than their urban counterparts. It has been widely accepted that rural residents have a
54 stronger bond and sense of community than their urban counterparts.^{44,46-47} This is no exception in
55 China. Studies have found that a strong local concentration of network ties is more common in
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2
3 people with lower social status (e.g. people with lower levels of income and education). Naturally,
4 rural residents in China have a stronger sense of community and are more inclined to help each
5 other.⁴⁸ The urban overload hypothesis speculates that urban residents are often exposed to many
6 events; so they are inclined to be immune to a mass of information.⁴⁹
7

8
9 In this study, we found that recognition of responsibility is a significant predictor of willingness to
10 volunteer and participation in volunteering. Recognition of responsibility refers to the individual's
11 understanding, emotion and belief of social responsibility, as well as their sub-conscious attitude
12 to assume obligation and responsibility, which can help volunteering to become a normalized
13 activity.⁵⁰ However, a low level of recognition of responsibility (13.8%) was demonstrated among
14 the study participants. In the UK, most emergency volunteers engage in volunteering activities
15 "just to give something back to the community".⁴⁴ Some western countries even use legislation
16 tools to mandate community responsibilities. In Norway, for example, the "Fire and Explosion
17 Prevention Act" stipulates that the public has a duty and obligation to assist in fire and rescue
18 services when required by the on-scene commander.²⁴
19
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21 22 **Institutional factors**

23
24 Previous studies suggest that the model of volunteer management consists of four components:
25 leadership, integration processes, resources commitment and relative autonomy of volunteers.³⁷
26

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28 The participants of this study believed that the policy environment is critical for promoting
29 emergency volunteering and that government-supported volunteer activities are more effective.⁵¹
30 In the US, the encouragement of volunteering has long been public policy. The Serve America Act
31 of 2009 presented the most dramatic expansion of the size and scope of policies supporting
32 volunteering. The act, on the one hand, has increased the quantity of volunteers nationwide by
33 providing inducements (such as an education award or income); on the other hand, it has
34 strengthened the development of volunteering organizations through the provision of funds.²²
35 Analogously, Australia and New Zealand provide strong financial support to their emergency
36 volunteering.³⁷
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39
40 Volunteering organizational management was considered by our interviewees to be another
41 institutional factor influencing participation in emergency volunteering. The contributions of
42 volunteers, especially those from unorganized volunteers, are not always positive in emergency
43 events. Their desire to help may not align well with the planned strategy of rescue efforts.²⁴ Drill
44 exercises may offer a platform for the better coordination of unorganized volunteers.^{24,37} There is
45 also a need to develop a transparent certification and reward system, attracting and recognizing
46 volunteer efforts.⁵²
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49 **Strengths and limitations**

50
51 This study adopted a mixed methods approach, involving a questionnaire survey and in-depth
52 interviews. The findings from the two methods complement and support each other. Factors
53 associated with willingness to volunteer and participation in emergency volunteering were
54 explored from individual, community and institutional perspectives.
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3 The questionnaires were administered through face-to-face interviews. Such an approach has the
4 potential to result in response bias. However, the risk is minimal when the questions are deemed
5 non-sensitive by the respondents and the interviewers are strangers to the respondents. We also
6 trained the interviewers to avoid suggestive questioning.
7

8
9 The concept of “emergency events” adopted in this study was general and covered a broad range
10 of events including natural disaster, human-made accidents, public health emergencies and social
11 unrest. This may lead to vague or uncertain answers from some respondents. Self-reported
12 willingness to volunteer may vary in different scenarios.²² Scenario-based studies should be
13 considered in the future for a better understanding of the findings. This study was conducted in
14 Heilongjiang, which may not be representative of the entire country of China. Caution need to be
15 taken when generalizing the findings. The cross-sectional design of this study does not allow
16 causal conclusions to be drawn.
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18

19 **CONCLUSION**

20
21 A relatively high level of willingness to volunteer in emergency events is evident in northern
22 China. But willingness has not effectively translated into volunteering actions. People with a
23 better knowledge of emergencies are more likely to be willing to volunteer because they have
24 better risk perceptions and are more confident to participate in volunteering. However, low levels
25 of recognition of responsibility and community attachment may demotivate people to participate
26 in emergency volunteering. Inappropriate institutional environments may also impose serious
27 barriers, jeopardizing the willingness of people to volunteer and their contribution to volunteering
28 services. Future efforts should be made to convert volunteering willingness into effective
29 contributions to the emergency response system. This can be done through improving the
30 organized efforts of volunteers by implementing policies, regulations, coordination mechanisms,
31 and volunteer training and support.
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42

43 **Contributor**

44 MS participated in the design of the research, conducted the survey and data analyses, and drafted
45 the manuscript. YH and QHW took overall responsibility for the study design, coordination of the
46 survey, development of the analysis framework, and writing of the manuscript. WX, LG, ZK, NN,
47 CL, HS, MJ, LL, YL, YC and XZ participated in the design of the research, organized and
48 conducted the survey. CJL supervised the data analyses, interpreted the results and revised the
49 manuscript. JF, QW and MY participated in the literature review and data collection.
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53 MS, WX and LG contributed equally.
54

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57

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REFERENCES

- 1 Bachner G, Seebauer S, Pfurtscheller C, et al. Assessing the benefits of organized voluntary emergency services: Concepts and evidence from flood protection in Austria. *Disaster Prevention and Management* 2016;25(3):1-17.
- 2 Oklahoma Department of Civil Emergency Management After Action Report: Alfred P. Murrah Federal Building Bombing. <https://www.ok.gov/OEM/documents/Bombing%20After%20Action%20Report.pdf>(accessed 20 August 2017)
- 3 Whittaker J, Mclennan B, Handmer J. A review of informal volunteerism in emergencies and disasters: Definition, opportunities and challenges. *International Journal of Disaster Risk Reduction* 2015;13:358-368.
- 4 Orloff L. Managing Spontaneous Community Volunteers in Disasters: A Field Manual. Crc Press 2011.
- 5 Voluntary Action Italy: Facts and Figures. <http://www.kansalaisareena.fi/Voluntary%20Action%20Italy.pdf>(accessed 28 September 2017)
- 6 The Role of Volunteers in Disaster Response. <http://www.volunteerlink.net/datafiles/D061.pdf>(accessed 25 September 2017)
- 7 Community Emergency Response Team. <https://www.ready.gov/community-emergency-response-team>(accessed 28 September 2017)
- 8 Zhang ZR. Summarize lessons from disaster—Japanese training. *China Emergency Management* 2010(2):52-54.
- 9 Yuan Y, Zhu W, Chen G. Volunteer's Organization and Management in Wenchuan Earthquake: Problems and Countermeasures. *China Nonprofit Review* 2008(2):276-282.
- 10 The state council information office of the People's Republic of China. "China's Actions for Disaster Prevention and Reduction". <http://www.scio.gov.cn/zfbps/ndhf/2009/Document/847130/847130.html>.(accessed 25 Jan 2017)
- 11 Cowlshaw S, Birch A, Mclennan J, et al. Antecedents and Outcomes of Volunteer Work—Family Conflict and Facilitation in Australia. *Applied Psychology* 2014;63(1):168–189.
- 12 Pfurtscheller C, Brucker A, Seebauer S. Prepared for the future? Evaluating the costs and benefits of voluntary work for natural disaster management under a changing climate - data on recent flood events, stakeholder needs and policy applications. *European Geosciences Union General Assembly* 2014.
- 13 Song YC. Reflections on Japan 's emergency volunteer service mechanism. *Chin Legal System and Society* 2014;27.

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- 14 About the Medical Reserve Corps. <https://mrc.hhs.gov/pageviewfldr/About>(accessed 25 August 2017)
- 15 Lin XW. Characteristics and enlightenment of volunteer system in German emergency rescue. *Chin Journal of Liaoning Administration College* 2010;12(5):9-10.
- 16 FEMA. Community emergency response team: basic training participant manual. https://www.fema.gov/media-library-data/1448917365279-3a7949605bd9e03633af2473a5741aa9/Section_0_PM_Combined.pdf(accessed 16 March 2017)
- 17 The Xinhua News Agency. "volunteer first year" of Japan since the Hanshin earthquake http://news.xinhuanet.com/mrdx/2008-06/04/content_8312305.html(accessed 5 Feb 2017)
- 18 How does Japan organize volunteers in an orderly manner to relieve a disaster? <http://world.people.com.cn/GB/14549/7334918.html> (accessed 9 Feb 2017)
- 19 Guan RH. The role of volunteers in a disaster early warning management system. *China Safety* 2010;31(2):1-4.
- 20 Duang YT, Jiang GR. Review of theory of rational action. *Adv Psychol Sci* 2008;16:315–20.
- 21 Finkelstein M A, Penner L A, Brannick M T. Motive, role identity, and prosocial personality as predictors of volunteer activity. *Social Behavior & Personality An International Journal* 2004;33(4):403-418.
- 22 Blau G, Chapman S, Gibson G, et al. Exploring the importance of different items as reasons for leaving emergency medical services between fully compensated, partially compensated, and non-compensated/volunteer samples. *Journal of Allied Health* 2011;40(3):e33-7.
- 23 Barnett D J, Thompson C B, Errett N A, et al. Determinants of emergency response willingness in the local public health workforce by jurisdictional and scenario patterns: a cross-sectional survey. *Bmc Public Health* 2012;12(1):164.
- 24 Nesbit R, Brudney J L. Projections and Policies for Volunteer Programs: The Implications of the Serve America Act for Volunteer Diversity and Management. *Nonprofit Management and Leadership* 2013;24(1):3–21.
- 25 Rosychuk R J, Bailey T, Haines C, et al. Willingness to volunteer during an influenza pandemic: perspectives from students and staff at a large Canadian university. *Influenza Other Respir Viruses* 2008;2(2):71–79.
- 26 Skar M, Sydnnes M, Sydnnes A K. Integrating unorganized volunteers in emergency response management. *International Journal of Emergency Services* 2016;5(1):52-65.
- 27 Heilongjiang municipal GDP and per capita GDP ranking 2015. <http://www.phbang.cn/finance/data/152416.html>(accessed 19 Oct 2016)
- 28 Enders J. Measuring community awareness and preparedness for emergencies. *Australian Journal of Emergency Management* 2001;16(3):52-58.
- 29 Zhang AQ. Self-efficacy and organization networking. *Organizational Behavior. Beijing, BJ: China Machine Press* 2013:126.
- 30 Catts R, Chamings D. Recognising current competencies of volunteers in emergency service organizations. *Journal of Workplace Learning* 2006;18(7/8):451-463.
- 31 Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology* 2008;3(2):77-101.
- 32 Anonymous. CISCO: Cisco and the Red Cross Launch Global Volunteer Initiative; Just in Time for National Volunteer Week, Collaboration Creates Largest Corporate Disaster Response

- Volunteer Program in Red Cross History. *M2 Presswire* 2010.
- 33 Liu C, Robinson P. Better organization of volunteers in disaster settings is needed: lessons for all from China. *Australian and New Zealand Journal of Public Health* 2013;37(6):595.
- 34 Vaughan E, Tinker T. Effective Health Risk Communication About Pandemic Influenza for Vulnerable Populations. *American Journal of Public Health* 2011;99(2):S324-32.
- 35 Lee S, Saito T, Takahashi M, et al. Volunteer participation among older adults in Japan: an analysis of the determinants of participation and reasons for non-participation. *Archives of Gerontology & Geriatrics* 2007;47(2):173-187.
- 36 Smith D H. Determinants of Voluntary Association Participation and Volunteering: A Literature Review. *Nonprofit and Voluntary Sector Quarterly* 1994;23(3):243-264.
- 37 O'Meara P, Tourle V, Rae J. Factors influencing the successful integration of ambulance volunteers and first responders into ambulance services. *Health & Social Care in the Community* 2012;20(5):488-496.
- 38 Bandura A. Self-efficacy: The exercise of control. *Journal of Cognitive Psychotherapy* 1997;604(2):158-166.
- 39 Knuth D, Kehl D, Hulse L, et al. Risk perception, experience, and objective risk: a cross-national study with European emergency survivors. *Risk Analysis* 2014;34(7):1286-1298.
- 40 Wang J W, Wei C N, Harada K, et al. Applying the social cognitive perspective to volunteer intention in China: the mediating roles of self-efficacy and motivation. *Health Promotion International* 2011;26(2):177.
- 41 Qureshi K A, Gershon R R, Merrill J A, et al. Effectiveness of an emergency preparedness training program for public health nurses in New York City. *Family & Community Health* 2004;27(3):242.
- 42 Fothergill A, Palumbo M V, Rambur B, et al. The volunteer potential of inactive nurses for disaster preparedness. *Public Health Nursing* 2005;22(5):414-421.
- 43 Xu W, Hao Y, Wu Q, et al. Community preparedness for emergency: a cross-sectional survey of residents in Heilongjiang of China. *Bmj Open* 2015;5(11):e008479-e008479.
- 44 Roberts A, Nimegeer A, Farmer J, et al. The experience of community first responders in co-producing rural health care: in the liminal gap between citizen and professional. *BMC Health Services Research* 2014;14(1):460.
- 45 Taniguchi H, Marshall G A. The effects of social trust and institutional trust on formal volunteering and charitable giving in Japan. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations* 2014;25(1):150-175.
- 46 Sønderskov K M. Does generalized social trust lead to associational membership? Unraveling a bowl of well-tossed spaghetti. *European Sociological Review* 2011;27(4):419-434.
- 47 Hofferth S L, Iceland J. Social capital in rural and urban communities. *Rural Sociology* 1998;63(4):574-598.
- 48 Beggs J J, Hurlbert J S, Haines V A. Community Attachment in a Rural Setting: A Refinement and Empirical Test of the Systemic Model. *Rural Sociology* 1996;61(3):407-426.
- 49 Elliot A, Hou YB. Social psychology (5th Edition) . *China Light Industry Press* 2005:332-384.
- 50 Schlenker B R, Britt T W, Pennington J, et al. The triangle model of responsibility. *Psychological Review* 1994;101(4):632-652.
- 51 Perlstadt H, Kozak L J. Emergency medical services in small communities. *Journal of Community Health* 1977;2(3):178-188.

1
2
3 52 Palaz S, Boz S. Factors Influencing College Graduate Adults to Provide Volunteer Service in
4 Different Organizations. *Balıkesir Üniversitesi Sosyal Bilimler Dergisi* 2008;11(19):95-106.
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7 Figure 1 (Factors associated with willingness to volunteer and participation in volunteering) shows
8 that willingness to volunteer and participation in volunteering are determined by many factors,
9 including those at the individual level (age, knowledge about emergencies, educational attainment
10 and so on), community level (community attachment, recognition of responsibility and residency)
11 and institutional level (policy environment and organization management). Willingness to
12 emergency volunteer determines participation in emergency volunteering; also, institutional
13 factors influence participation in emergency volunteering directly.
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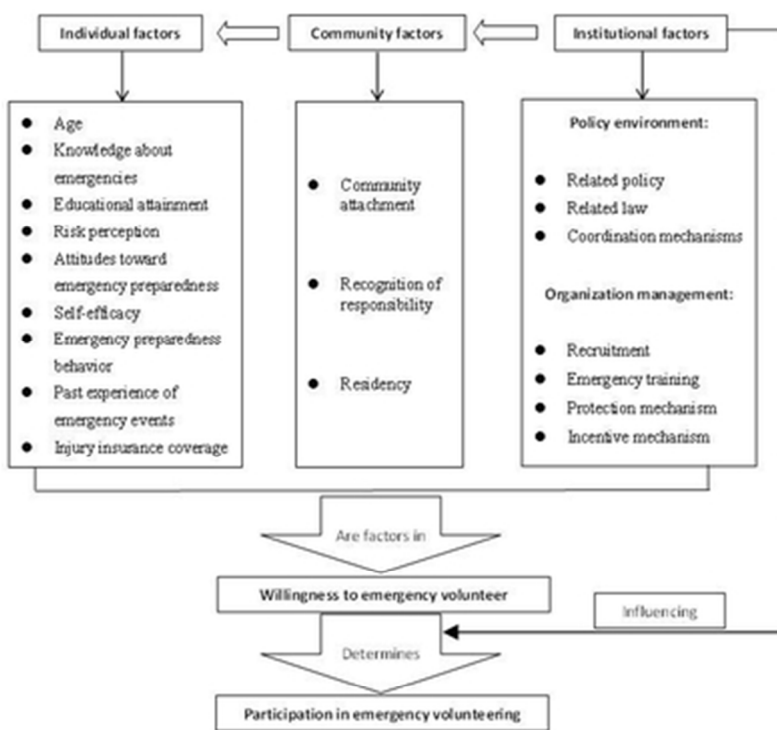


Figure 1 Factors associated with willingness to volunteer and participation in volunteering

34x34mm (300 x 300 DPI)

Standards for Reporting Qualitative Research (SRQR)

No.	Topic	Item	page numbers
1	Title and abstract	Title	1
		Abstract	1
2	Introduction	Problem formulation	2-4
		Purpose or research question	4
3	Methods	Qualitative approach and research paradigm	7
		Researcher characteristics and reflexivity	5
		Context	7
		Sampling strategy	7
		Ethical issues pertaining to human subjects	7
		Data collection methods	7
		Data collection instruments and technologies	7
		Units of study	7
		Data processing	7
		Data analysis	7
4	Results/findings	Synthesis and interpretation	10-12
		Links to empirical data	11-12
5	Discussion	Integration with prior work, implications, transferability, and contribution(s) to the field	14
		Limitations	14-15
6	Other	Conflicts of interest	16
		Funding	15