



BMJ Open Household preparedness for emergency events: a cross-sectional survey on residents in four regions of China

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ABSTRACT

Objective This study aimed to assess household preparedness for emergency events and its determinants in China.

Design A cross-sectional questionnaire survey was conducted on 3541 households in China in 2015.

Participants Households were selected using a stratified cluster sampling strategy, representing central, eastern, western and southern regions of China. The designed questionnaires were administered through face-to-face interviews.

Outcome measures Household emergency preparedness was measured with 14 indicators, tapping into the supply of nine emergency necessities (food and water, extra batteries, battery-powered radio, battery-operated torch, first-aid kit, gas mask, fire extinguisher, escape ropes, whistle), coverage of accident insurance, knowledge of local emergency response systems (emergency numbers, exit routes and shelters) and availability of a household evacuation plan. If an individual acted on 9 of the 14 indicators, they were deemed well prepared. Logistic regression models were established to identify predictors of well preparedness based on 3541 returned questionnaires containing no missing values.

Results Only 9.9% of households were well prepared for emergencies: 53.6% did not know what to do and 31.6% did not want to think about it. A higher level of preparedness was found in the respondents who have attained higher education (adjusted OR=0.826 compared with the higher level), participated in emergency training activities (adjusted OR=2.299), had better emergency knowledge (adjusted OR=2.043), reported less fate-submissiveness (adjusted OR=1.385) and more self-reliance (adjusted OR=1.349), prior exposure to emergency events (adjusted OR=1.280) and held more positive attitudes towards preparedness (adjusted OR=1.286).

Conclusion Household preparedness for emergency events is poor in China. Lack of motivation, negative attitude to preparedness and knowledge shortfall are major but remediable barriers for household preparedness.

INTRODUCTION

No community is immune from the risk of emergencies and disasters in today's increasingly interconnected world. Many emergency events may be difficult to prevent. Inadequate

Strengths and limitations of this study

- This study quantified household preparedness for emergency events for the first time in China and identified factors associated with emergency preparedness.
- The findings of the determinants of poor household preparedness are closely aligned with the Chinese auspicious culture.
- One adult respondent from each household was invited to complete the survey but opinions from the family members might not have always been consistent.
- The 14 emergency items included in this study reflected priorities in emergency responses in China which might not be exhaustive. The importance of the emergency items was not differentiated either.
- We presented the results of both logistic regression and linear regression analyses which were largely consistent.

preparation in response to these events can cause a tremendous loss in terms of human lives and health, property and infrastructure. It was estimated that natural disasters alone cost over US\$ 100 billion annually worldwide.¹ According to the *2016 Humanitarian Response Plan* launched by the WHO, US\$ 2.2 billion was needed to provide life-saving health services to more than 79 million people in more than 30 countries due to protracted emergencies that year.² In the first half of 2016, 68.77 million people in China were affected by floods, hail and geological disasters, resulting in 505 deaths and a direct economic loss of ¥89.04 billion (US\$12.9645 billion).³

Strengthening emergency responses can effectively reduce human casualties and contribute to sustainable postevent development. It is deemed a cost-effective investment in preventing losses and is considered one of the four priority areas in the Sendai Framework for Disaster Risk Reduction 2015–2030 which has been endorsed by the third United

Nations World Conference in Japan.⁴ Over the past few decades, emergency response efforts have evolved from a focus on top-down relief assistance to a more comprehensive strategy with a greater emphasis on community participation and pre-event preparedness for better risk management. This is because emergency victims often face geographical isolation as a result of damage to local infrastructure such as energy, road and communication facilities.⁵ Consequently, the arrival of external rescue support may experience two or more days of delay.⁶ But rescue efforts in the first couple of days in disastrous events are critical.⁷ Community and household preparedness in self-rescue efforts prior to the arrival of external assistance may result in the difference between the chance of survival and death.⁸ Empirical evidence shows that sufficient household preparedness can significantly mitigate the negative consequences of emergency events.⁹

The United Nations International Strategy for Disaster Reduction defined preparedness as the 'knowledge, capacities and actions to effectively respond to the effects of hazard events, whether or not they have occurred'.¹⁰ Preparedness activities can be developed at the individual, household, community and governmental levels. Household preparedness plays a critical role because it is an integral part of any individual and community effort. The concept of household preparedness emphasises household responsibilities and the capability to reduce risks and damage¹¹ which requires stockpiling emergency supplies, planning for emergency events and other actions like buying accident insurance.^{12 13}

Previous studies revealed poor household preparedness for disastrous events across a range of different settings.^{14 15} Despite a rise in the number of publications on household preparedness in developed countries, there is a serious shortage of literature documenting the situation in low-income and middle-income countries. Empirical evidence shows that household preparedness is associated with many factors, including knowledge, risk awareness, prior exposure to disasters, attitudes towards emergency preparedness¹⁶ and trust in the government. Socioeconomic status may also play an important role.^{17 18} Low-income and middle-income countries are facing ever-increasing challenges and costs associated with disastrous events but experiences from developed countries cannot be extrapolated to low-income and middle-income countries without consideration of the local contexts.

China is a disaster-prone country with the largest population and high population density but little is known about the household preparedness of China in response to emergencies. This study aimed to assess the level of household emergency preparedness in China and identify the factors associated with household preparedness. The findings of the study can provide evidence for better planning for the emergency response system.

METHODS

A cross-sectional questionnaire survey was conducted on 3541 households in four regions of China.

Study population

A multistage stratified sampling strategy was adopted to select participating households. In the first stage, we identified four regions purposively considering diversities in geographic location and socioeconomic development: Beijing is the capital of China; Guangdong represents the most developed region in eastern China; Heilongjiang and Sichuan represent the less developed regions in central and western China, respectively. These four regions have a total population of more than 25 million, accounting for over 18% of the entire population in China. Of the four regions, Sichuan is an earthquake-prone area and recently experienced the Jiuzhaigou earthquake in 2017 and the Wenchuan earthquake in 2008. Guangdong is most frequently affected by typhoons. Meanwhile, many infectious diseases erupted in Guangdong, such as Severe Acute Respiratory Syndrome in 2003 and dengue fever in 2014.

The second stage involved a selection of two municipalities in each province (two districts in Beijing) with varied social and economic conditions. We then randomly selected one urban and one rural residential community from each participating municipality/district. A total of 3650 households in these communities were approached and invited to participate in this study: 1000 in Beijing, 850 in Guangdong, 900 in Heilongjiang and 900 in Sichuan.

Data collection

Data were collected from April to September 2015. A research team comprising 10 trained researchers and postgraduate students from Harbin Medical University visited the selected households. One adult member from each household was interviewed. Verbal informed consent was obtained prior to the survey. The questionnaire was administered anonymously which took about 20 min to complete. Of the 3650 invited households, 3580 (98.1%) completed the questionnaire survey. The final data analyses included 3541 (98.9%) questionnaires that contained no missing values.

Dependent variable

Household preparedness was measured by 14 items that were commonly used in previous studies. A list of emergency items was generated through literature review. The selection of the emergency items in this study considered the relevance of the emergency items to the common disastrous events in China. The relevant emergency items were prioritised in accordance with the National Disaster Prevention Manual published by the Ministry of Civil Affairs of China and the CDC Behavioral Risk Factor Surveillance System. These included nine general emergency necessities (3-day supply of non-perishable food and water, battery-powered radio, extra batteries, battery-operated torch, first-aid kit, gas mask, fire extinguisher,

Table 1 Sociodemographic characteristics of respondents

Characteristics	N	%
Gender		
Male	1614	45.6
Female	1927	54.4
Age (years)		
18–24	359	10.1
25–44	1882	53.2
45–64	994	28.1
>64	282	8.6
Education		
Secondary education or below	1325	37.4
High school education	740	20.9
College or above	1476	41.7
Residency		
Urban	2277	64.3
Rural	1264	35.7
Region		
Beijing	988	27.9
Heilongjiang	862	24.3
Guangdong	811	22.9
Sichuan	880	24.9
Monthly household income (¥)		
0–3499	987	27.9
3500+	2554	72.1
Marital status		
Married	2803	79.2
Not married	738	20.8

escape ropes, whistle) as recommended by the national public education ‘ready’ programme in the USA and some preparedness items source from the General Preparedness Module,^{18 19} as well as coverage of accident insurance, knowledge of local emergency response systems (emergency numbers, exit routes and shelters) and availability of an evacuation plan.^{20 21}

Independent variables

The selection of independent variables was guided by two behavioural theories: the KAP (knowledge, attitudes and practice) theory and the theory of reasoned action (TRA). The KAP theory addresses the intertwined effects between knowledge, attitudes and behaviours, whereas, the TRA emphasises the importance of human reasoning as many contextual factors can weigh into human decision on actions.^{22 23}

The independent variables tested in this study included:

Demographic and socioeconomic characteristics: age, region and residency (urban vs rural), educational attainments and monthly household income (estimated in Chinese

yuan). Previous studies showed that socioeconomic factors not only determine the available resources, but also predict the knowledge and attitudes of an individual towards human actions, in particular those for preventive purposes. People with low socioeconomic status are less likely to invest and act on risk prevention and risk management activities.^{24 25}

Knowledge: 16 statements were designed based on the national guidelines for emergency responses in China to test the relevant knowledge of respondents. They were asked to judge whether these statements were correct, incorrect or if they were unsure. A correct answer was given a score of one point. This generated an overall knowledge score for each respondent ranging from 0 to 16.

Risk awareness: respondents were asked to rate their concerns about natural and man-made disasters, social safety events and public health emergencies on a five-point Likert scale (1-5). A summed score was calculated for each respondent (ranging from 4 to 20), with a higher score indicating a higher level of concern.

Attitudes: respondents were asked to rate on a five-point Likert scale (1-5) their interests in gathering information regarding emergency responses, perceived importance of such information and willingness to discuss this topic with others. A summed score was calculated (ranging from 3 to 15), with a higher score indicating a higher level of endorsement with emergency preparedness.

Fate-submissiveness and self-reliance: respondents were asked to rate on a five-point Likert scale (1-5) their inclination of submissiveness to fate or luck, in comparison with the determination of self-rescue in emergency events.

Past experience: prior exposure to emergency events and participation in emergency training activities over the past year were measured in this study. Experiences play a pivotal role in the development of human behaviours.²⁶

Respondents were also asked to choose all the reasons that prevented ‘people from preparing for emergencies’ from the following list: (1) ‘do not know what to do’; (2) ‘do not want to think about it’; (3) ‘nothing can be done’; (4) ‘it takes too much time’; (5) ‘it takes too much money’; (6) ‘do not have the ability to prepare’; (7) ‘professionals will do the rescue job’; (8) ‘do not believe emergency will happen to the family’; (9) ‘do not have enough information from the government and the public media’. The list was developed based on findings of previous studies.^{27 28}

Statistical analysis

We estimated the number and percentage of households acting on each of the 14 indicators for emergency preparedness. These indicators were commonly used for measuring the preparedness of the household. Each positive answer was given one point. A score of actions on over nine out of the 14 points was categorised as well prepared. Differences in actions across households were tested using χ^2 tests.

A multivariate logistic regression model was established to identify independent variables associated with well

Table 2 Number and percentage (%) of households acting on emergency items

Action	Total n=3541	Regions				Residency		
		Beijing n=988	Heilongjiang n=862	Guangdong n=811	Sichuan n=880	P value	Urban n=2266	Rural n=1275
Possession of emergency necessities								
3-day supply of food and water	1101 (31.1)	230 (23.3)	350 (40.6)	264 (32.6)	257 (29.2)	<0.001	684 (30.2)	417 (32.7)*
Extra batteries	1151 (32.5)	261 (26.4)	313 (36.3)	268 (33.0)	309 (35.1)	<0.001	728 (32.1)	423 (33.2)
Battery-powered radio	990 (28.0)	187 (18.9)	338 (39.2)	239 (29.5)	226 (25.7)	<0.001	600 (26.5)	390 (30.6)*
Battery-operated torch	2843 (80.3)	718 (72.7)	704 (81.7)	651 (80.3)	770 (87.5)	<0.001	1760 (77.7)	1083 (84.9)*
First-aid kit	1215 (34.3)	307 (31.1)	237 (27.5)	382 (47.1)	289 (32.8)	<0.001	881 (38.9)*	334 (26.2)
Gas mask	164 (4.6)	36 (3.6)	39 (4.5)	58 (7.2)	31 (3.5)	0.001	113 (5.0)	51 (4.0)
Fire extinguisher	931 (26.3)	174 (17.6)	148 (17.2)	315 (38.8)	294 (33.4)	<0.001	625 (27.6)*	306 (24.0)
Escape rope	403 (11.4)	69 (7.0)	141 (16.4)	94 (11.6)	99 (11.3)	<0.001	233 (10.3)	170 (13.3)*
Whistle	387 (10.9)	95 (9.6)	117 (13.6)	73 (9.0)	102 (11.6)	0.010	264 (11.7)*	123 (9.6)
Coverage of accident insurance	819 (23.1)	291 (29.5)	147 (17.1)	132 (16.3)	249 (28.3)	<0.001	582 (25.7)*	237 (18.6)
Household evacuation plan	1083 (30.6)	151 (15.3)	255 (29.6)	292 (36.0)	385 (43.8)	<0.001	673 (29.7)	446 (35.0)*
Knowledge of local emergency response systems								
Evacuation route	2652 (74.9)	742 (75.1)	599 (69.5)	626 (77.2)	685 (77.8)	0.003	1767 (78.0)*	885 (69.4)
Emergency shelter	2210 (62.4)	584 (59.1)	523 (60.7)	500 (61.7)	603 (68.5)	0.001	1447 (63.9)	763 (59.8)
Emergency phone numbers	3325 (93.9)	915 (92.6)	788 (91.4)	781 (96.3)	841 (95.6)	<0.001	2170 (95.8)*	1155 (90.6)
Actions on ≥9 indicators	352 (9.9)	48 (4.9)	91 (10.6)	92 (11.3)	121 (13.8)	0.001	236 (10.4)	116 (9.1)

*P<0.05 in urban-rural comparisons.
P<0.001 in regions comparisons.

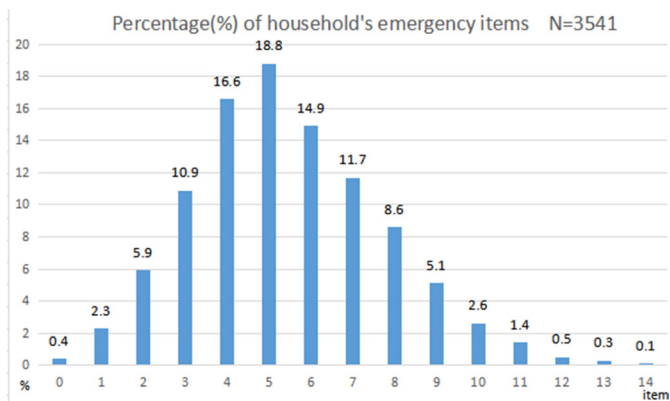


Figure 1 Percentage (%) of households preparedness of 14 emergency items.

preparedness. We also performed a linear regression analysis using the ‘summed points’ as a dependent variable.

In the regression models, independent variables measuring knowledge, risk awareness, attitudes, fate-submissiveness and self-reliance were transformed into a nominal measure: ‘above average score’ versus ‘on/below average score’. The models employed an enter approach based on the maximum likelihood estimation method, with an enter/exit criterion (α) of 0.05/0.01. All statistical analyses were performed using SPSS V.22.0.

RESULTS

Characteristics of respondents

Over half (53.2%) of the respondents were aged between 25 and 44 years; 54.4% were women; 41.7% held a college degree or above; 72.1% had a monthly household income of above ¥3500. Most (64.3%) respondents lived in urban areas. The majority (79.2%) were married at the time of the survey (table 1).

Household emergency preparedness

The respondents had relatively good knowledge of their local emergency response systems, with 93.9% knowing the emergency numbers, 74.9% being aware of the evacuation exit routes and 62.4% being able to locate the emergency shelters but less than half of the households were well prepared in terms of necessities (apart from 80% having a battery-operated torch), having accident insurance coverage and having developed an evacuation plan. Overall, households in Beijing performed worse than those in the other regions. Urban households outperformed their rural counterparts in insurance coverage and knowledge of local emergency response systems but rural households were more likely to have an evacuation plan and stockpile food/water, radio, torch and escape ropes. Only a small number of households (9.9%) were deemed well prepared, acting on nine or more of the emergency indicators (table 2).

About 0.4% of households did not prepare any emergency items at home, compared with 2.3% having one item and 10.9% having three items. The majority of

households owned five emergency items. About 10% owned over nine emergency items (figure 1).

Factors associated with emergency preparedness

The level of well preparedness varied by region, prior exposure to emergency events, emergency training, knowledge and attitudes towards emergency preparedness, education, self-reliance and fate submissiveness ($p < 0.05$ in χ^2 tests, table 3). However, no significant differences in the level of well preparedness were found in respondents of a different gender, age, residency and risk awareness ($p > 0.05$ in χ^2 tests, table 3).

The logistic regression model confirmed that socioeconomic status, knowledge and attitudes towards emergency preparedness were significant predictors of the level of well preparedness after adjustments for variations in other variables. Higher levels of preparedness were associated with higher educational attainments, participation in emergency training activities (AOR=2.299), better emergency knowledge (AOR=2.043), less fate-submissiveness (AOR=1.385) and more self-reliance (AOR=1.349), prior exposure to emergency events (AOR=1.280) and more positive attitudes towards preparedness (AOR=1.286) (table 3).

The perceived barriers reported by the respondents for hindering household preparedness echoed well with the findings of the regression models. More than half (53.6%) of the respondents cited knowledge shortage as a major barrier. This was followed by inertia: 31.6% did not want to think about it; 28.1% believed that emergency professionals would do the rescue job for them; 21.5% did not believe an emergency would happen to the family. In addition, 24.4% of respondents blamed the government and the public media for the limited availability of information. Resource restrictions were not perceived as a major barrier for household emergency preparedness: less than 20% respondents cited the lack of time, money and personal ability as a barrier (figure 2).

DISCUSSION

Low level of household preparedness in China

Overall, the level of household emergency preparedness in China is low, with less than 10% of households acting on nine or more emergency indicators out of a possible 14. This result is consistent with the findings of studies conducted elsewhere in China. Poor household preparedness for emergency events is common in many low-income and middle-income countries, such as Turkey and Iran.²⁹ The performance of developed countries, although better than in low-income and middle-income countries, is also far from satisfactory. In Australia, about one-fifth of households have sufficient supplies of items for emergency events such as a torch, radio, mobile phone, first-aid kit, appropriate batteries and an emergency contact list. A study in the USA revealed that 12.3% of American households possessed a 3-day supply of water and nonperishable food, an evacuation plan, a

**Table 3** Factors associated with emergency preparedness: results of logistic regression models (n=3541)

Independent variable	N	N (%) of well prepared	AOR (95% CI)	P value
Gender				
Male (reference)	1614	169 (10.5)	1.134 (0.949 to 1.356)	0.167
Female	1927	183 (9.5)		
Age (years)				
18–24 (reference)	359	67 (1.9)		
25–44	1882	371 (10.5)	0.773 (0.539 to 1.110)	0.440
45–64	994	161 (4.6)	0.939 (0.666 to 1.322)	0.716
>64	282	51 (1.5)	0.846 (0.553 to 1.829)	0.440
Education*				
Secondary education or below	1325	257 (7.3)	0.757 (0.591 to 0.970)	0.028
High school education	740	123 (3.5)	0.826 (0.677 to 1.007)	0.059
College or above (reference)	1476	275 (7.8)		
Residency				
Urban	2277	236 (10.4)	1.142 (0.940 to 1.382)	0.181
Rural (reference)	1264	116 (9.2)		
Region*				
Beijing (reference)	988	48 (4.9)		
Heilongjiang	862	91 (10.6)	3.409 (2.531 to 4.592)	0.000
Guangdong	811	92 (11.3)	3.890 (2.910 to 5.199)	0.000
Sichuan	880	121 (13.8)	3.450 (2.574 to 4.625)	0.000
Monthly household income (¥)				
0–3499 (reference)	987	191 (5.4)		
3500+	2554	464 (13.1)	1.202 (0.972 to 1.486)	0.089
Prior exposure to emergency events*				
Yes	1332	155 (11.6)	1.280 (1.042 to 1.571)	0.019
No (reference)	2209	197 (8.9)		
Participation in emergency training* last year				
Yes	957	158 (16.5)	2.299 (1.902 to 2.779)	0.000
No (reference)	2584	194 (7.5)		
Emergency knowledge score*				
>Average	3127	333 (10.6)	2.043 (1.460 to 2.859)	0.000
≤Average (reference)	414	19 (4.6)		
Risk awareness score				
>Average	1302	145 (11.1)	1.047 (0.866 to 1.265)	0.638
≤Average (reference)	2239	207 (9.2)		
Attitudes towards emergency preparedness*				
>Average	1947	216 (11.1)	1.286 (1.067 to 1.575)	0.011
≤Average (reference)	1594	136 (8.5)		
Self-reliance*				
>Average	2378	263 (11.1)	1.349 (1.059 to 1.562)	0.018
≤Average (reference)	1163	86 (7.4)		
Fate submissiveness*				
>Average (reference)	431	31 (7.2)		
≤Average	3110	321 (10.3)	1.385 (1.028 to 1.868)	0.033
Constants			0.015	0.000

*P<0.05 in univariate χ^2 tests.

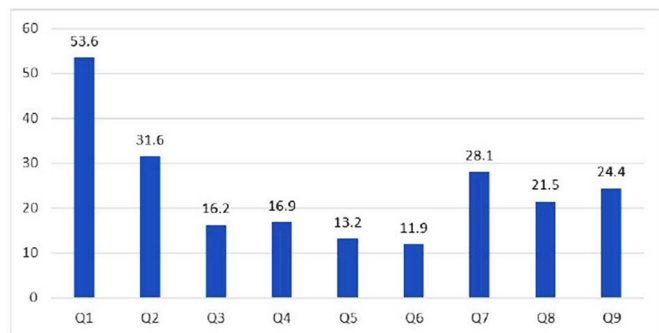


Figure 2 Barriers reported by respondents (%) for not preparing for emergencies. Q1 ‘do not know what to do’; Q2 ‘do not want to think about it’; Q3 ‘nothing can be done’; Q4 ‘it takes too much time’; Q5 ‘it takes too much money’; Q6 ‘do not have the ability to prepare’; Q7 ‘professionals will do the rescue job’; Q8 ‘do not believe emergency will happen to the family’; Q9 ‘do not have enough information from the government and the public media’.

working torch and radio. Similarly, 30% of households in Japan stockpiled food and drinking water for emergency events.¹⁵

Factors contributing to the low level of household preparedness

Findings of the logistic regression model and ranking of perceived barriers reported by the respondents point to the same conclusion: knowledge is a major determinant of household emergency preparedness (figure 3). The odds of well preparedness doubled in the respondents with a higher than average level of knowledge. Training would also double the odds of well preparedness, possibly through filling knowledge gaps. This is echoed by over half of the respondents who reported knowledge shortage

as the major barrier to preparing for emergency events. The association between knowledge and preparedness for emergency events is further supported by the link between education in general and preparedness. Prior exposure to emergency events may also improve the knowledge and attitudes of people, resulting in better preparedness for emergency events. These findings are consistent with previous studies.^{30 31}

Fate-submissiveness and a lack of recognition of self-reliance were identified as a significant predictor of poor-preparedness in the logistic regression model. Similarly, a lack of motivation to act (‘do not want to think about it’ and ‘leave it to professionals’) was reported as the second most significant barrier in household emergency preparedness.

Surprisingly, the most developed region, Beijing, was found to be the worst performer. The underlying reasons warrant further studies. Clearly, the results cannot be fully explained by individual differences.

Similar to the results of this study, gender and age were not found to be associated with disaster preparedness in several previous studies.^{32 33}

Policy implications

Large improvements can be made in relation to emergency preparedness in China. Public knowledge on emergency responses is universally poor in China. Educational campaigns, if designed and implemented properly, can effectively improve public knowledge. However, this has to be done through multiple avenues. Governmental agencies can coordinate the timely provision of adequate information about emergency events. Emergency training can be offered through specifically designed drill exercise,³⁴ or as part of the national essential education

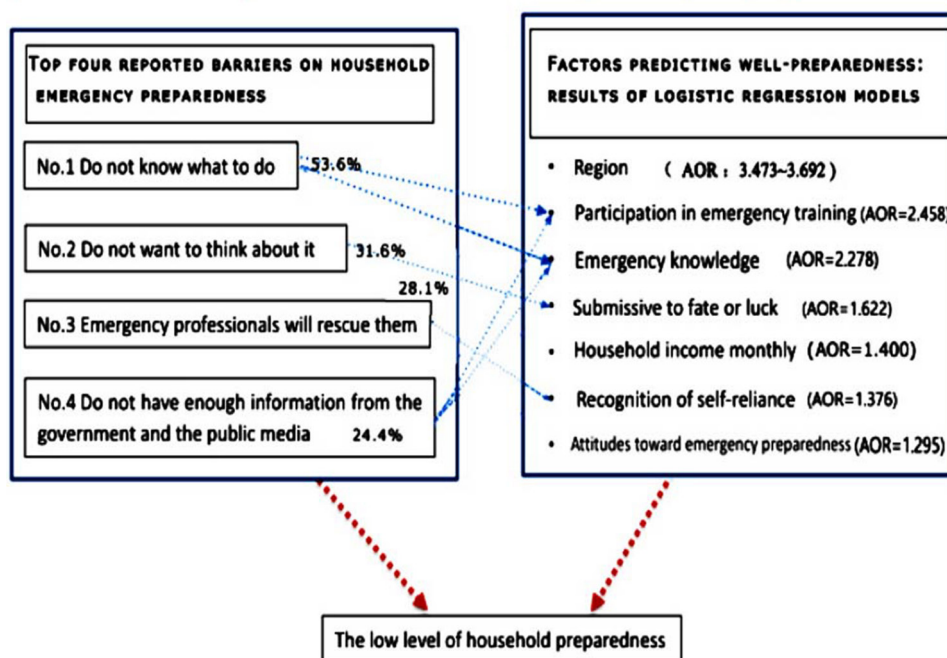


Figure 3 Link between perceived barriers and factors predicting well preparedness.



system. In Japan, a disaster-prone country, for example, disaster mitigation has been integrated into its national school curriculum.³⁵

However, knowledge improvement by itself is not enough. The mentality of inertia in the public needs to be addressed. A positive correlation between the recognition of self-reliance and better household preparedness is evident as confirmed in this study and others.³⁶ But unfortunately, many traditional cultures encourage fate submissiveness. A study in Saudi Arabia found that most (93%) respondents believed that floods, earthquakes and other natural disasters are signs of god.³⁷ Fatalism is an attitude of self-defeatism which may lead individuals into helplessness, undermining their efforts of individual preparedness.^{34 38} The Chinese society also embraces an auspicious culture, encouraging people to pursue luck and avoid ominous things. It is taboo to talk about bad things, such as disaster and death. People prefer to pin their hopes on illusory things, rather than be prepared for real threats.^{39 40}

Lessons learnt from past disaster experiences may help change the mentality of inertia and risk perception. In Australia, for example, bush fires impose a regular risk for many households. The preparedness of individual households can make a difference between life and death. The National Partnership Agreement on Natural Disaster Resilience in Australia therefore emphasises the significance of involving multiple parties including individuals.⁴¹ Emergency response systems are often complex and adaptive. A highly participatory strategy would encourage individuals to take more responsibility, become less dependent on the government and leave more resources for others.⁴² Trust in the government is important given that it is most likely to play a coordinating role in emergency events.⁴³ However, over-reliance on the government and professional workers could dampen household efforts for future disasters.⁴⁴ A study of post-earthquake survivors in China showed that high expectations of the public on the government are associated with high trust in the government, leading to increased complacency in individual efforts in preparedness.¹⁶ In China, governmental response to disasters from the military force has often been extraordinarily rapid and efficient. For example, an earthquake-relief headquarter was established by the army 18 min after the earthquake strike in Ya'an and 5000–6000 rescue workers were deployed on the same day but people need to realise that there is always a gap before the full functioning of external rescue assistance, a gap which needs to be filled by the survivors of disasters.⁷ Poor cooperation from those being rescued can also jeopardise professional efforts.

Limitation

There are several limitations in this study. Although this study drew large samples from four representative regions in China, the participants were not completely randomly selected. One adult respondent was invited to represent each household in this study but opinions from family members might not have always been

consistent. Household preparedness can involve many aspects. The 14 emergency items included in this study may not be exhaustive. Although the 14 items are not equally important, their importance varies with different emergency events. This makes it difficult to attach a fixed weight to each item in terms of their importance. For example, in a fire emergency, 'escape rope' and 'gas mask' are more important than having food and water but this is not necessarily the case in an event when the survivors are isolated from the outside world. Therefore, we did not differentiate the importance of the emergency items. The dichotomisation of the dependent variable is somehow arbitrary. Although it enabled easy interpretation of the results, certain information might get lost in the statistical analyses. However, the linear regression analysis generated consistent results. It is important to note that the study adopted a cross-sectional design, no causal relationships should be assumed.

CONCLUSION

The overall level of household emergency preparedness in China is extremely low. A lack of knowledge presents a great barrier to household preparedness. Although training can be an effective measure for improving knowledge, a more comprehensive strategy needs to be adopted to address issues associated with the lack of motivation. Emergency response systems should emphasise individual responsibilities as well as those from the government and professional workers.

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