Research Article

Psychological Distress and Health-related Quality of Life in Relocated and Nonrelocated Older Survivors after the 2008 Sichuan Earthquake

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Summary

Purpose: The purposes of the study were to examine psychological distress and health-related quality of life (HRQoL) in relocated and nonrelocated survivors aged 60 years and older, and to analyze predictors for psychological distress and HRQoL in older survivors 5 years after the 2008 Sichuan earthquake.

Methods: This was a cross-sectional descriptive study with 112 relocated older survivors and 156 non-relocated older survivors. Our study used a multistage sampling method. The measurements used in the study included self-reporting questionnaire-20, medical outcomes study 36-item short form health survey, and an instrument measuring demographic and disaster-related characteristics. Descriptive and multiple linear regression analysis were performed to determine factors that contributed to psychological distress and HRQoL.

Results: The prevalence of psychological distress in relocated group (20.5%) was significantly higher compared to those in nonrelocated group (4.8%). Scores for HRQoL in relocated older survivors was significantly lower than those in nonrelocated older survivors. Relocation from preearthquake residence was the most significant predictor for psychological distress and HRQoL in the total sample. Other predictors were advanced age, lower educational level, the loss of family members during the earthquake, and the presence of chronic illnesses as well as the death of a spouse after the earthquake.

Conclusions: Strategies can be designed in postdisaster recovery program, particularly for older survivors at high risk for psychological distress and poor HRQoL.

Introduction

Natural disasters such as hurricanes, floods and earthquakes can occur rapidly and unpredictably leading to the loss of human lives and damage to personal properties, and disaster survivors may suffer from long-term psychiatric disorders and reduced health-related quality of life (HRQoL) [1,2]. For instance, it was reported that the rates of major depression, post-traumatic stress disorder (PTSD) and prolonged grief disorder in bereaved Norwegians 2 years after a tsunami ranged from 5.2% to 34.4% [3]. The prevalence of depression and PTSD in adult survivors 4 years after the Turkey earthquake was 11.0% and 25.0%, respectively [4]. Approximately 7.5% of survivors living in the rural areas 8 years after the Italy earthquake experienced psychological disorders [5]. Poor HRQoL has also been reported in many disaster-affected populations. For example, the survivors who were directly exposed to the Turkey earthquake reported significantly lower scores in psychological and environmental HRQoL than did those not exposed [6]. More than half of the survivors 2 years after Hurricane Katrina experienced poor mental health summary scores in the 36-item short form health survey (SF-36) [7].

Due to decreased physical and psychosocial functioning, older people are the most vulnerable to physical injury during disasters, which may affect their resilience to acute traumatic events [8,9]. Natural disasters have long-term negative impacts on older survivors’ mental health and HRQoL. For instance, 3 years after the Japan earthquake, the rate of psychological distress in older survivors was 24.0% [10]. The findings of the Wu et al study [11] indicated that the prevalence of PTSD, major depression and other psychiatric diseases (such as panic disorder, bipolar disorder, alcohol or drug

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abuse) in survivors aged 65 years and older were significantly higher than those younger than 65 years 3 years after the Chi-Chi earthquake in Taiwan [11]. Similarly, it was reported that older age was significantly related to poorer HRQoL [12].

Relocation or migration after mass traumatic events has been identified as a significant predictor for psychological disorders and poor HRQoL among disaster survivors in many previous studies. The majority of these studies have focused on the effects of relocation on children and adult populations. For example, Abramson et al [7] reported that psychological distress was common in children and adult survivors who experienced long-term relocation 2 years after Hurricane Katrina and Hurricane Rita [7]. In a sample of survivors 8 weeks after the Hurricane Tsunami, Van Griensven et al [13] reported that the prevalence of anxiety, depression and PTSD in relocated group was significantly higher than those in non-relocated group [13]. Similarly, another study indicated that displacement from one's predisaster residence was strongly related to PTSD in adult survivors 6 months after Hurricane Katrina [14]. It is known that older populations are frailer to physical injury during disasters and tend to experience more psychological distress and poorer HRQoL after disasters [15,16]. Relocation from one's familiar residence may result in less visiting frequency with friends and/or neighbors, and disrupting one's social network. Relocation is regarded as a significant risk factor for psychological disorders [7]. However, to our knowledge, studies that aimed to explore the long-term effects of relocation after disasters on psychological disorder and HRQoL in older survivors are few.

On May 12, 2008, an earthquake with a magnitude of 8.0 occurred in northwest Sichuan province, China. As one of the most severe natural disasters in the history of China, this earthquake has resulted in 69,227 deaths, 374,643 individuals injured and 17,824 individuals missing [17]. Many disaster survivors had to move to a new place to live in after the earthquake due to total damage to their houses, concerns about seeking help from relatives or friends and finding a new job. Relocation may be a risk factor for psychological distress such as anxiety, depression and PTSD through the destruction of social networks [4]. Nevertheless, to date, whether differences exist in psychological distress and HRQoL between the relocated and nonrelocated older survivors 5 years after the 2008 Sichuan earthquake has not been explored.

Therefore, the aims of this study were to examine psychological distress and HRQoL in relocated and nonrelocated older persons 5 years after the 2008 Sichuan earthquake, and to analyze predictors for psychological distress and HRQoL in the total sample.

Methods

Study design

This was a cross-sectional descriptive study using the Self-Reporting Questionnaire-20 (SRQ-20) [18] and medical outcomes study SF-36 [19] to investigate 112 relocated older survivors and 156 nonrelocated older survivors 5 years following the 2008 Sichuan earthquake.

Setting and sample

Ten cities are identified as the hardest-hit areas in which hundreds of thousands of houses completely collapsed during the disaster. After the earthquake, a large number of severely damaged villages in these hardest-affected cities have been rebuilt, and many disaster survivors from other disaster-exposed districts have relocated to these newly-built villages to live a new life because of total damage to their houses [20].

A multistage sampling method was used to recruit the participants for our study. First, one city (Dujiangyan City) was randomly selected from the 10 hardest-affected cities in the 2008 Sichuan earthquake [20]. Second, one newly-rebuilt village (Juyuan Village) was randomly chosen from the selected city. Third, 2 of the 11 communities (Longquan Community and Yangojiao Community) in the village were randomly selected. The randomization procedure was accomplished via a random number generator according to the names of cities, villages and communities that were arranged in alphabetical order, respectively. Finally, all the disaster survivors aged 60 and older in the two selected communities who met the following inclusion criteria were recruited for the study.

The inclusion criteria were as follows: (a) aged 60 years and older; (b) personally experienced the 2008 Sichuan earthquake. Older disaster survivors who refused to participate in the study or had cognitive impairment were excluded. In our study, the Chinese Mini-Mental State Examination (MMSE) [21] was performed to assess cognitive impairment of the participants. According to the results of the Chinese MMSE, three different cut-off scores were used depending on the participant’s educational level with a score > 17 (illiterate), > 20 (primary school) and > 24 (junior high school or above), suggesting no cognitive impairment [22]. As a result, a total of 14 older survivors (6 relocated survivors and 8 nonrelocated survivors) were excluded based on their MMSE scores, and 8 older survivors (5 relocated survivors and 3 nonrelocated survivors) refused to participate in our study. In conclusion, 268 older people (112 relocated older survivors and 156 nonrelocated older survivors) successfully completed the survey with a response rate of 91.1% and 93.4%, respectively (Figure 1).

Ethical consideration

Ethical consideration was obtained from the Human Subjects Ethics Subcommittee of Sichuan University. Participants were told the purpose and importance of this study before the survey. Written informed consent was obtained from each participant who was literate. As for each illiterate participant, oral informed consent was received. They were assured of anonymity, confidentiality and their rights to withdraw from the study at any time.

Measurements

SRQ-20 is a common tool for evaluating general psychological distress. It includes 20 items assessing anxiety, depression and psychosomatic complaints with score 0 indicating “no” (symptom absent) and score 1 indicating “yes” (symptom present). The total scores range from 0 to 20 with higher scores suggesting higher levels of general psychological distress. This measure has been translated into various versions, and the optimal cut-off scores are significantly different in different cultures, languages and settings [23,24]. The SRQ-20 has been validated in Chinese people with good reliability (Cronbach α = .91, test-retest r = .94). According to the optimal cut-off point (6/7), respondents with scores greater than 7 were identified as experiencing psychological distress [25]. Cronbach α was .81 in the present study.

SF-36 is a widely used instrument measuring HRQoL for the general population. This scale includes eight subscales which are defined as physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, mental health, and their summarized physical component summary (PCS) and mental component summary (MCS) dimensions. The responses are based on a Likert scale of 3, 5, or 6 points. The PCS dimension assesses physical functioning, role physical, bodily pain and general health. The MCS dimension measures vitality, social functioning, role-emotional and mental health. Cronbach α of the eight subscales
ranged from .73 to .96, test-retest reliability ranged from .69 to .81 [26]. The SF-36 has been validated in Chinese people with Cronbach \( \alpha \) of the eight subscales ranging from .66 to .88 [27]. In the present study, Cronbach \( \alpha \) of all the subscales ranged from .83 to .93.

In addition, demographic variables included gender, age, marital status and educational level. Disaster-related variables included damage to houses, being injured, and the loss of family members during the earthquake, as well as postearthquake chronic diseases, the death of a spouse and relocation after the earthquake.

Data collection

Prior to this study, two study assistants each with a master’s degree in nursing science participated in two training conferences so that the measurements can be administered efficiently. To avoid evoking emotional trauma to the participants during the survey when referring to the horrible disaster-related experiences again, an experienced psychologist and a professional gerontologist were invited to train the two study assistants the necessary communication skills with older people. A pilot study was conducted on 25 older survivors in Dujiangyan city under the guidance of the psychologist and gerontologist 2 weeks after training conferences. The findings indicated that the two study assistants can make smooth and effective communication with older survivors, and the content of the measurements can be easily understood.

This survey was carried out from May 13, 2013 to June 11, 2013. First, with the help of the local government and the community service organization, the addresses and telephone numbers of the relocated and nonrelocated older people living in the two selected communities were provided. Second, a face-to-face interview was conducted, and the purposes and importance of the study were explained to the participants by the two research assistants. Third, the participants were informed that participation was voluntary and anonymous, and informed consent was obtained from each participant. Finally, participants were required to fill in the questionnaires independently according to their actual feelings. With regard to the participants who cannot fill in the questionnaires by themselves due to physical illnesses, the study assistants recorded their responses. As for the participants who were illiterate, the study assistants read the questions to the participants, and their
responses were recorded. The questionnaires were collected immediately after completion and checked for incomplete items.

Data analysis

The statistical analysis software package used in the study was SPSS 16.0 (SPSS Inc., Chicago, IL, USA). Chi-square statistical analysis was used to examine differences in categorical variables. Two independent sample t tests (or Mann-Whitney U tests) were performed to evaluate differences in continuous variables. Multiple linear regression analysis (stepwise) was used to examine predictors for general psychological distress and HRQoL. The independent variables in regression analysis included demographic variables such as gender, age, marital status and educational level, and disaster-related variables such as damage to houses, being injured, and the loss of family members during the earthquake, as well as postearthquake chronic diseases, the death of a spouse and relocation after the earthquake. A p value less than .05 was considered statistically significant.

Results

Study participants

Of the 268 respondents in the study, the percentage of relocated and nonrelocated older survivors was 58.2% and 41.8%, respectively. Of these, 132 respondents (49.3%) were older men and 136 respondents (50.7%) were older women. The average age of the sample was 71.99 years (SD = 7.94), ranging from 60 years to 93 years. Approximately half of the respondents were illiterate (42.9%). In addition, over half of the respondents were injured (74.6%), and 38 respondents (14.2%) lost family members during the earthquake. The majority of the respondents suffered from chronic illnesses after the earthquake (71.3%), and 6.7% of the respondents lost a spouse after the earthquake. No statistically significant differences were found in age, marital status, educational level, house collapsed, being injured and the loss of family members during the earthquake, as well as chronic illnesses and the death of a spouse after the earthquake between the relocated and nonrelocated older survivors except gender (Table 1).

Psychological distress and HRQoL between relocated and nonrelocated older survivors

As presented in Table 1, the prevalence of psychological distress in the total sample was 13.8%. The rate of psychological distress in relocated group (20.5%) was significantly higher than those in nonrelocated group (4.8%) (p < .001). Relocated older survivors reported significantly higher SRQ-20 scores as compared to nonrelocated older survivors.

The scores on physical functioning, role-physical, general health, vitality, role-emotional and mental health subscales, and their summarized PCS and MCS dimensions of SF-36 in relocated group were significantly lower than those in nonrelocated group, but the bodily pain scores in relocated group were significantly higher. No significant differences were found in social functioning subscale between the two groups (Table 2).

Predictors for psychological distress and HRQoL in older survivors

Multiple linear regression analysis (stepwise) was performed to examine the factors contributing to psychological distress and HRQoL in the total sample (relocated and nonrelocated older survivors). As shown in Table 3, predictors for psychological distress included five variables, relocation from preearthquake residence, the loss of family members in the earthquake, lower educational level and postearthquake chronic illnesses, which explained 31.3% of the total variances after the earthquake, postearthquake chronic illnesses, which explained 31.3% of the total variances.

<table>
<thead>
<tr>
<th>Variables</th>
<th>N (%) of the participants</th>
<th>χ² (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>132 (49.3)</td>
<td>73 (65.2)</td>
</tr>
<tr>
<td>Female</td>
<td>136 (50.7)</td>
<td>39 (34.8)</td>
</tr>
<tr>
<td>Age (yr)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>69–74</td>
<td>164 (61.2)</td>
<td>65 (58.0)</td>
</tr>
<tr>
<td>≥ 75</td>
<td>104 (38.8)</td>
<td>47 (42.0)</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single/divorced/widowed</td>
<td>78 (29.1)</td>
<td>33 (29.5)</td>
</tr>
<tr>
<td>Married</td>
<td>190 (70.9)</td>
<td>79 (70.5)</td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>115 (42.9)</td>
<td>40 (35.7)</td>
</tr>
<tr>
<td>Primary school</td>
<td>102 (38.1)</td>
<td>47 (42.0)</td>
</tr>
<tr>
<td>Junior high school or above</td>
<td>51 (19.0)</td>
<td>25 (22.3)</td>
</tr>
<tr>
<td>Postearthquake chronic diseases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>77 (28.7)</td>
<td>31 (27.7)</td>
</tr>
<tr>
<td>Yes</td>
<td>191 (71.3)</td>
<td>81 (72.3)</td>
</tr>
<tr>
<td>House collapsed during the earthquake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>88 (32.8)</td>
<td>38 (33.9)</td>
</tr>
<tr>
<td>Yes</td>
<td>180 (67.2)</td>
<td>74 (66.1)</td>
</tr>
<tr>
<td>Injured during the earthquake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>68 (25.4)</td>
<td>28 (25.0)</td>
</tr>
<tr>
<td>Yes</td>
<td>200 (74.6)</td>
<td>84 (75.0)</td>
</tr>
<tr>
<td>Loss of family members during the earthquake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>230 (85.8)</td>
<td>93 (83.0)</td>
</tr>
<tr>
<td>Yes</td>
<td>38 (14.2)</td>
<td>17 (17.0)</td>
</tr>
<tr>
<td>Psychological distress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>231 (86.2)</td>
<td>107 (95.5)</td>
</tr>
<tr>
<td>Yes</td>
<td>77 (13.8)</td>
<td>5 (4.8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total (n = 268)</th>
<th>Nonrelocated (n = 112)</th>
<th>Relocated (n = 156)</th>
<th>t or Z (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M ± SD</td>
<td>M ± SD</td>
<td>M ± SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychological distress</td>
<td>2.38 ± 2.21</td>
<td>3.92 ± 3.19</td>
<td>-4.09 (&lt;.001)</td>
<td></td>
</tr>
<tr>
<td>Physical functioning</td>
<td>79.51 ± 22.67</td>
<td>74.19 ± 23.39</td>
<td>1.86 (.044)</td>
<td></td>
</tr>
<tr>
<td>Role-physical</td>
<td>75.45 ± 40.27</td>
<td>59.09 ± 46.40</td>
<td>-2.96 (&lt;.003)</td>
<td></td>
</tr>
<tr>
<td>Bodily pain</td>
<td>76.51 ± 26.88</td>
<td>87.38 ± 22.15</td>
<td>-3.49 (&lt;.001)</td>
<td></td>
</tr>
<tr>
<td>General health</td>
<td>68.66 ± 17.09</td>
<td>60.17 ± 17.50</td>
<td>3.95 (&lt;.001)</td>
<td></td>
</tr>
<tr>
<td>Vitality</td>
<td>76.04 ± 15.96</td>
<td>66.29 ± 19.94</td>
<td>-3.96 (&lt;.001)</td>
<td></td>
</tr>
<tr>
<td>Social functioning</td>
<td>92.14 ± 18.37</td>
<td>92.49 ± 14.83</td>
<td>-0.17 (.865)</td>
<td></td>
</tr>
<tr>
<td>Role-emotional</td>
<td>89.29 ± 20.07</td>
<td>77.89 ± 38.85</td>
<td>-2.76 (&lt;.001)</td>
<td></td>
</tr>
<tr>
<td>Mental health</td>
<td>82.11 ± 13.17</td>
<td>75.38 ± 16.19</td>
<td>3.62 (&lt;.001)</td>
<td></td>
</tr>
<tr>
<td>Physical component summary</td>
<td>51.92 ± 8.53</td>
<td>47.80 ± 8.62</td>
<td>3.87 (&lt;.001)</td>
<td></td>
</tr>
<tr>
<td>Mental component summary</td>
<td>55.36 ± 7.18</td>
<td>51.93 ± 8.96</td>
<td>-3.33 (&lt;.001)</td>
<td></td>
</tr>
</tbody>
</table>
earthquake, lower educational level, the loss of family members during the earthquake and postearthquake chronic illnesses, accounting for 37.3% of the total variances (adjusted $R^2 = .373$, $p < .001$). Relocation from preearthquake residence was the strongest predictor for psychological distress and poor MCS scores ($\beta = 0.27$, $p < .001$, $\beta = -0.21$, $p < .001$), and it was the second strongest predictor for poor PCS scores ($\beta = -0.25$, $p < .001$) after older age ($\beta = -0.31$, $p < .001$).

**Discussion**

Although substantial studies have focused on specific psychological disorders such as anxiety, depression and PTSD in older survivors, little is known about general psychiatric distress and its predictors, especially relocation in the aftermath of disasters. The present study compared general psychological distress and HRQoL in relocated group with those of the nonrelocated group, and examined predictors for general psychiatric distress and HRQoL in a sample of older survivors affected by the 2008 Sichuan earthquake. Our study has identified six variables contributing to psychological distress and poor HRQoL: displacement from one’s preearthquake residence, the death of a spouse after the earthquake, the loss of family members during the earthquake, older age, lower educational level and postearthquake chronic diseases. These results are important for health care providers to identify the high-risk older people after mass traumatic events and to develop effective strategies aimed at reducing psychological distress and improving HRQoL in this population.

It was found that, the older survivors in our study displayed a high prevalence of general psychiatric distress (13.8%) 5 years after the 2008 Sichuan earthquake. An epidemiological study conducted by Suzuki et al [28] indicated that the rate of general psychological distress in older survivors after the Niigata-Chuetsu earthquake in Japan was 14.5%, which is consistent with our findings [28]. These two studies are similar in demographic characteristics of the samples, the impacts of disasters, and the method of sampling. The high prevalence of general psychiatric distress found in our study confirms the long-term effects of mass traumatic events on older survivors’ mental disorders.

The relationships between relocation and the symptoms of anxiety, depression and PTSD have been widely explored in previous studies [13,14]. In the present study, it was found that displacement from one’s preearthquake residence after the 2008 Sichuan earthquake was the strongest predictor for general psychological distress and poor HRQoL, which is in parallel to the results of the Abramson et al [7] study suggesting that 2 years after the Hurricane Katrina and Hurricane Rita, psychological distress was pervasive in relocated survivors [7]. Disruption of social network resulting from relocation may be an explanation for more psychiatric morbidity and poorer HRQoL in survivors after natural disasters. It is known that, in the Chinese society, older people usually do not cohabit with their children, and they are no longer working since they have retired. Frequent communication with acquainted neighbors and friends is an indispensable pattern for emotional interaction and stress management. Support from others can provide people with positive affection, a sense of belonging, social contact, approval and security [29]. Moreover, Chen et al [30] reported that social support is positively related to HRQoL; social support can be helpful for survivors in obtaining more emotional help from others and express their feelings in stressful conditions [30]. Therefore, relocation to a new and unfamiliar living environment may result in less visiting frequency with relatives, friends, neighbors and acquaintances, and lead to a series of psychiatric problems and poor quality of life. Also, these results can be explained by the infrequent mental health service utilization in relocated survivors. It has been reported that, after adjusting for demographic characteristics and disaster-related variables, relocation was a contributing factor to decreased mental health services utilization in survivors 18 months after a man-made disaster in the Netherlands [31]. In addition, as survivors with higher psychological distress tended to leave predisaster residences after mass traumatic events, this potential bias may be another explanation for higher psychological morbidity and poorer HRQoL in relocated group although this effect may be insignificant.

In addition to relocation from preearthquake residence, other factors were identified as predictors for general psychiatric distress and HRQoL in our study. One of these factors was educational level. In the present study, we found that the higher the level of education, the lower the prevalence of psychological distress and the higher scores of SF-36, similar to previous findings [32]. Older people with good education tend to use positive cognitive strategies when faced with natural disasters, have reasonable and effective coping strategies for disasters and possess more health self-management knowledge, which are helpful in improving physical and mental health [29]. Moreover, we also found that having chronic illnesses after the earthquake was another significant predicting factor for psychological distress and poor HRQoL, consistent with the results of many previous studies focusing on older adults [33,34]. It was reported that older survivors who suffered from physical illness were more likely to experience psychological distress in comparison to those who did not [16].

The results in the study showed that older age was a significant predictor for poor PCS and MCS scores, similar to the findings of the Jia et al [35] study focusing on older survivors 15 months after the Sichuan earthquake [35]. These results can be explained by the fact that older age is related to increased numbers of chronic diseases, reduced frequency of social activity participation, deterioration of
activity of daily life, and decrease of quality of life. In addition, with regard to disaster-related variables, we found that the loss of family members during the earthquake was a significant predictor for general psychological distress and MCS scores, which indicated that the loss of family members had long-term negative effects on survivors’ psychological health. These findings are in parallel to many previous studies [36,37].

Several limitations are identified in our study. First, both the SRQ-20 and SF-36 are self-evaluation instruments. Thus, a response bias might exist due to social desirability. Second, a response bias might also exist as the respondents in our study might be affected in answering the questionnaires when the study assistant was waiting to check for their incomplete items. Third, our study used a cross-sectional research design, which excludes the possibility of identifying the variations of general psychological distress and HRQoL in various phases. Fourth, only one newly-built village was included, which might result in the non-representativeness of selected samples. Finally, a higher ratio of women found in the relocated group (62.2%) than that in the nonrelocated group (34.8%) might be a confounding factor for the higher prevalence of general psychological distress in relocated group due to the more emotion-focused coping styles women possess during disasters.

Conclusion

In conclusion, the prevalence of general psychological distress in relocated older survivors 5 years after the 2008 Sichuan earthquake was high. Relocation preearthquake residence was the strongest predicting factor for psychological distress and HRQoL in older survivors. Other factors contributing to psychological distress and poor HRQoL were advanced aged (75 years or above), low education, the loss of family members in the earthquake, the presence of chronic diseases and the death of a spouse after the earthquake. The findings in our study are important for health care providers to recognize, that is, the massive effects of relocation after disasters on older survivors’ general psychological distress and HRQoL. In particular, our findings would help health care providers identify the high-risk older people for psychological morbidity, and develop effective strategies aimed at improving mental health and HRQoL in a long-term recovery program after disasters.

Conflicts of interest

The authors declare that they have no competing interests.

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References