

# The association between psychological distress and social relationships among younger adult survivors: cross-sectional survey four years after the 2016 Kumamoto Earthquake in Japan

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## Introduction

The psychological effects due to disasters can be long-lasting. During the recovery period, disaster survivors might suffer psychological distress due to **relocation and the related social changes**. Furthermore, younger adults' mental health has been a concern.

## Aim

The purpose of this study is to clarify the mental health status and related factors of the younger adult Kumamoto earthquake survivors, and to consider support measures.

## Methods

Data on 3,880 people (1,687 men and 2,193 women, mean age = 47.3 ± 12.7), collected by a 2020 survey were analyzed. We considered community participation and having confidants were buffering factors. For the comparison of categorical variable distributions across different groups, the chi-square test was initially applied. A multivariate logistic regression analysis using **Firth's penalized logistic regression** was conducted to explore the determinants of psychological distress. The results with a two-sided p < 0.05 were considered statistically significant. The analysis software used was R version 4.4.1. This study was approved by the Institutional Review Board of Kumamoto University.

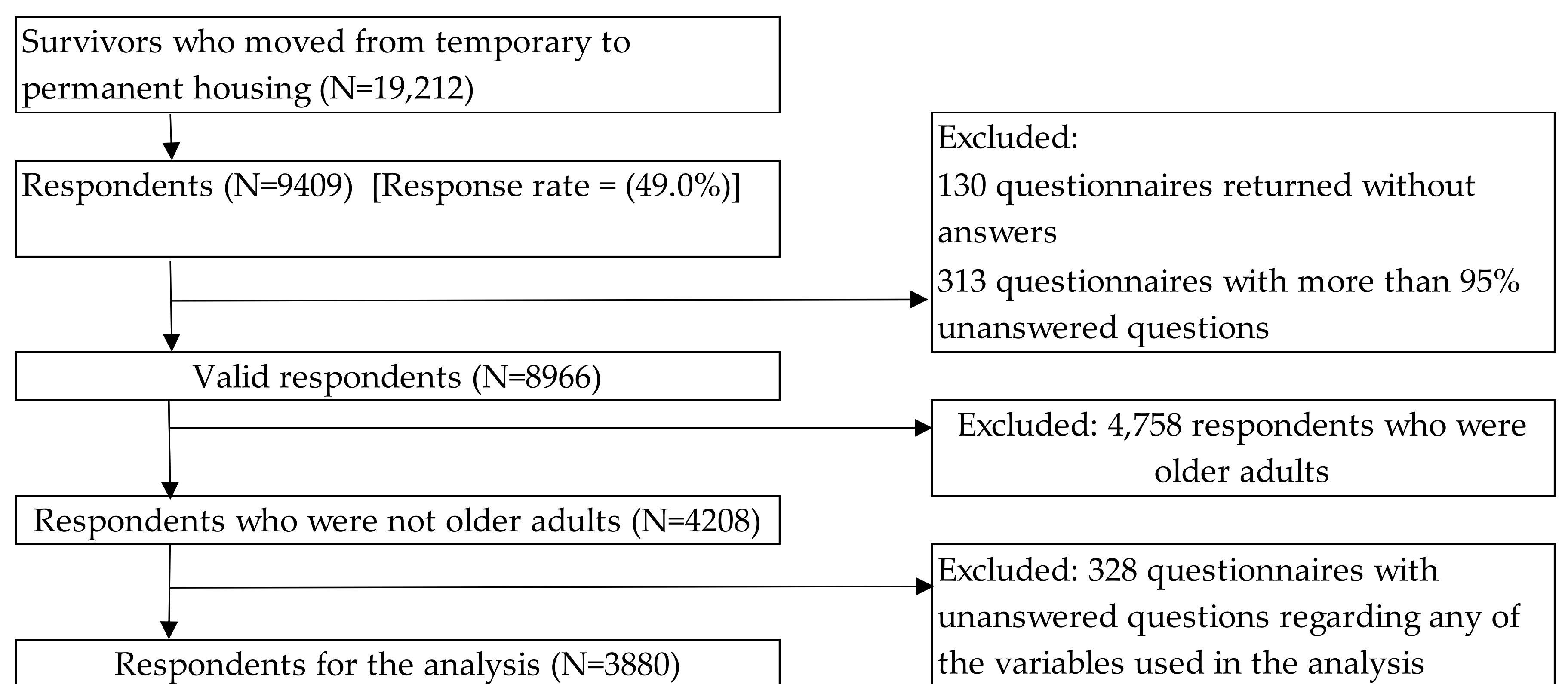


Figure 1. The extraction process of the analysed respondents

## Results

Overall, **11.8%** of respondents reported experiencing psychological distress, with young adults (**25-44 years, 12.5%**) accounting for a higher proportion than adolescents (18-24 years, 7.9%) or the middle-aged (45-64 years, 8.7%). Firth's penalized logistic regression analysis showed that psychological distress was positively correlated with being female, living in public housing, having low self-rated health, experiencing social isolation, lack of community participation, and reduced activity opportunities owing to COVID-19 pandemic. Conversely, older age and having a confidant (family or friend) were associated with lower distress. For **adolescents**, living in public housing and social isolation were risk factors, while having close friends was associated with reduced distress (OR = 0.25). Among **young adults**, being female, having low self-rated health, experiencing social isolation, and reduced community involvement were positively correlated, while social support from friends and family was protective (OR = 0.46 and 0.45, respectively). Among the **middle-aged**, being female, living in public housing, having low self-rated health, lacking community participation (OR = 1.69), and reduced activities owing to COVID-19 were associated with increased distress, while age and family support (OR = 0.39) were found to reduce distress.

## Conclusion

Table 3. Factors associated with psychological (K6 ≥ 10) across all participants and by group, analyzed using Firth's penalized logistic regression analysis.

	All (N=3880)			Adolescents (N=252)			Young adults (N=1220)			Middle-aged adults (N=2408)		
	AOR	95%CI	p	AOR	95%CI	p	AOR	95%CI	p	AOR	95%CI	p
Sex (ref: male)												
Female	1.76	1.36–2.28	<0.001	3.48	0.95–16.02	0.060	1.93	1.22–3.11	0.005	1.54	1.12–2.14	0.008
Age	0.98	0.97–0.99	<0.001	1.21	0.93–1.61	0.156	1.02	0.98–1.06	0.411	0.94	0.92–0.97	0.000
Temporary housing (ref: Deemed temporary housing in the public sector)												
Prefabricated housing	0.87	0.40–1.83	0.714	0.27	0.01–5.33	0.381	0.55	0.11–2.52	0.449	1.30	0.52–3.16	0.570
Deemed temporary housing in the private sector	1.05	0.63–1.76	0.863	0.93	0.09–12.47	0.953	0.74	0.27–2.17	0.576	1.21	0.67–2.26	0.536
Current residence (ref: owned house)												
Houses for rent	1.28	0.96–1.70	0.088	2.01	0.53–7.97	0.301	1.35	0.82–2.22	0.239	1.19	0.83–1.72	0.341
Public housing	1.80	1.19–2.70	0.005	15.48	2.15–111.55	0.008	1.07	0.46–2.42	0.875	2.00	1.22–3.26	0.006
Public housing for disaster	1.39	0.31–5.02	0.646	97.76	0.49–4695.39	0.077	1.38	0.12–10.45	0.766	1.39	0.23–6.58	0.709
Hospitals and facilities	1.47	0.58–3.43	0.401	8.15	0.05–150.46	0.303	1.29	0.25–4.88	0.735	2.13	0.65–6.31	0.205
Cohabitant (ref: yes)												
None	1.12	0.81–1.56	0.490	1.09	0.09–7.55	0.937	1.18	0.60–2.27	0.635	1.10	0.74–1.62	0.644
Self-rated health (ref: healthy)												
Not healthy	6.76	5.19–8.83	<0.001	0.57	0.03–8.35	0.695	6.72	4.04–11.26	<0.001	6.81	4.95–9.40	<0.001
Community participation (ref: yes)												
None	1.63	1.06–2.59	0.026	1.11	0.06–189.18	0.953	1.48	0.67–3.66	0.353	1.69	1.03–2.92	0.039
No information of such events	1.33	0.80–2.24	0.277	1.67	0.09–294.04	0.770	1.09	0.44–2.95	0.850	1.46	0.78–2.79	0.233
Subjective social isolation (ref: none)												
Yes	6.52	5.10–8.37	<0.001	9.55	3.19–31.33	<0.001	8.88	5.68–14.08	<0.001	5.42	3.96–7.45	<0.001
A family member as someone to consult with (ref: none)												
Yes	0.41	0.31–0.53	<0.001	0.46	0.13–1.75	0.241	0.45	0.28–0.73	0.001	0.39	0.28–0.54	<0.001
A friend as someone to consult with (ref: none)												
Yes	0.58	0.45–0.75	<0.001	0.25	0.07–0.81	0.021	0.46	0.29–0.73	0.001	0.75	0.54–1.04	0.085
Decrease in activity opportunities owing to COVID-19 pandemic (ref: none)												
Yes	1.59	1.24–2.04	<0.001	2.86	0.89–10.60	0.079	1.73	1.10–2.73	0.017	1.50	1.09–2.06	0.012
Decrease in income owing to COVID-19 pandemic (ref: none)												
Yes	1.00	0.78–1.28	0.994	0.70	0.19–2.38	0.575	0.73	0.46–1.14	0.168	1.13	0.83–1.54	0.438

The findings highlight the need for age-appropriate interventions to reduce prolonged psychological distress among young adults affected by the Kumamoto Earthquake, underscoring the crucial role of social support and community participation. Given the limitations of reaching young adults through local government channels, promoting awareness and offering support for psychological distress via occupational health and **primary care providers** was deemed effective.

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