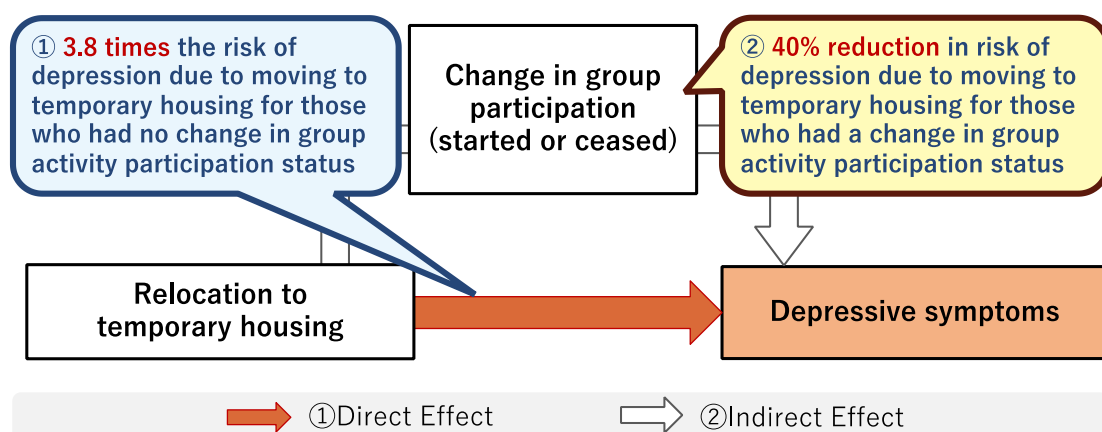


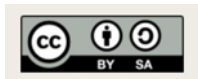
## 3.8 times the risk of depression when moving to temporary housing; however, those who changed their participation in group activities upon moving had a 40% reduction in the risk

Post-disaster relocation is a risk factor for worsening mental health, but the mechanism has not been elucidated. Therefore, we analyzed the effect of relocation on mental health by housing type and what factors explain this effect. We included 828 older adults aged 65 years or older who participated in the 2013 survey before the earthquake and seven months later in the 2016 survey in Mifune Town, Kumamoto Prefecture, which was affected by the April 2016 Kumamoto earthquake. Focusing on participation in group activities, the risk of depression due to relocation to temporary housing was 3.8 times higher for those who had no change before and after the earthquake, but this risk was reduced by 40% for those who had a change in group participation. After the 2016 Kumamoto earthquake, temporary housing facilities were relocated based on lessons learned from past earthquakes and tsunami disasters, including group relocation policies, the establishment of meeting places in proximity, and visitation activities by support centers. There, residents were able to change their involvement in group activities and optimize their connections, which may have led to a reduction in relocation stress.

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(N=828)



## ■ Introduction

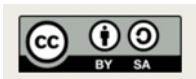
Forced relocation due to natural disasters or other unavoidable circumstances is considered a risk factor for mental health deterioration. However, it has not been clarified through what specific mechanism relocation becomes a risk factor. Relocation is accompanied by various changes in the living environment, not only in the physical environment, such as the type of residence but also in the social ties that have existed up to that point. In this study, we focused on the possibility of changes in participation in group activities after relocation and examined the possibility that these changes may explain part of the association between relocation and worsening mental health.

## ■ Subjects and methods

We included 828 older adults aged 65 years or older who participated in the Japan Gerontological Evaluation Study (JAGES) in the 2013 survey before the earthquake and 7 months later in the 2016 survey in Mifune Town, Kumamoto Prefecture, an area affected by the 2016 Kumamoto earthquake in April 2016. Based on their responses regarding their post-earthquake relocation status, we categorized the respondents into three groups: “moved to temporary housing,” “moved to other housing,” and “did not move.” Depressive symptoms and post-traumatic stress disorder (PTSD) symptoms seven months after the disaster were also measured by questionnaire. As a mediator, we compared the results of the 2013 and 2016 surveys to determine whether there was a change in group participation status before and after the earthquake. Those who participated in group activities before the earthquake and stopped after the earthquake and those who did not participate before the earthquake and started after the earthquake were considered to have a change in group participation. (※group participation: participation in any one of volunteer groups, sports groups or clubs, hobby activity groups, senior citizen clubs, community associations, study or cultural groups, nursing care prevention activities, or activities that taught skills or passed experiences to others)

Pre-disaster	Post-disaster	Change in group participation	
Not Participated	Participated	Started	} <u>Changed</u>
Participated	Not Participated	Ceased	
Participated	Participated	Not Changed	} <u>Not Changed</u> <u>[reference]</u>
Not Participated	Not Participated	Not Changed	

After controlling for the effect of individual attributes, regional characteristics, and earthquake damage, we analyzed the possibility that some of the effects of relocation on the development of depressive and PTSD symptoms could be explained by the presence or absence of changes in group participation. We distinguished between types of relocation, i.e., to temporary housing or to other housing.



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## ■ Results

For those who had no change in group activity participation status before and after the disaster, the risk of depressive symptoms due to moving to temporary housing was 3.8 times greater. There was no clear association with PTSD symptoms, and there was no clear association with either depressive symptoms or PTSD symptoms for those who moved to other housing (other than temporary housing).

## ■ Discussion

After the Kumamoto earthquake, temporary housing in the affected areas had developed group relocation policies, set up nearby meeting places, and visiting activities by support centers as measures to prevent social isolation based on lessons learned from past disasters such as the Great East Japan Earthquake. In such a temporary housing environment, residents were able to optimize their existing social connections (i.e., residents who wanted to join groups were able to find new opportunities and start, and those who did not want to join groups were able to stop without worrying about losing their connections), which may have resulted in a reduction in relocation stress.

## ■ Significance

Utilizing globally rare pre- and post-disaster follow-up data, this study clarified part of the mechanism explaining the association between moving to temporary housing and the risk of depression and revealed for the first time in the world that changes in group activity participation were an important factor that can reduce the stress of moving to temporary housing.

## ■ Published paper

Matsuoka Y, Haseda M, Kanamori M, Sato K, Amemiya A, Ojima T, Takagi D, Hanazato M, Kondo N: Does disaster-related relocation impact mental health via changes in group participation among older adults? Causal mediation analysis of a pre-post disaster study of the 2016 Kumamoto earthquake. BMC Public Health 2023, 23(1):1982.

## ■ Acknowledgments

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