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< Review >

Social capital in disaster-affected areas

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Abstract

Natural disasters have increased in recent years. Although a physical infrastructure is important to reduce disaster damage, it has its limits. It has been pointed out that attention should be paid to the social infrastructure. In this paper, we focus on social capital, which is attracting attention as a social infrastructure that is one of the social determinants of health, and give an overview of its impact on disaster-affected areas. Various studies have shown that a region with rich social capital recovers its social and physical environment, including local infrastructure, community and individual health, faster. Social support, social participation, and informal social controls provided by social capital also improve disaster preparedness and resilience of individuals and the community before a disaster occurs. However, social capital also has a negative side. While paying attention to the negative aspects, the creation of social capital during normal times will contribute to disaster mitigation.

keywords: Social capital, social determinants of health, natural disaster

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I. Introduction

1. Social determinants of health in disaster-affected areas

Health is determined by socioeconomic factors including the environment as well as individual habits and inheritance (Figure 1), and its mechanism is gradually being elucidated. WHO issued a report entitled, "Social determinants of health." That report indicated the solid fact of the impact of socio-economic factors on health, and the need to change socio-economic factors [1]. This social determinant has also been shown to affect the health of survivors in disaster-affected areas [2].

Due to the increasing trend of natural disasters in recent years, many people die every year, which puts a heavy burden on survivors [3,4]. Under these circumstances, the physical infrastructure, including buildings, seismic standards and breakwaters, is important to reduce disaster damage. However, it has been found that there are also limits. In fact, the tsunami destroyed the breakwater during the Great East Japan Earthquake, and it was clear that strengthening of the physical infrastructure alone was not sufficient. In recent years, it has been pointed out that attention should also be paid to social infrastructures [5-7]. We believe that exploring of social determinants of health will help to establish effective measures based on evidence in disaster-affected areas.

The usefulness of social capital has been pointed out for regional and individual preparation for disasters, relief activities immediately after disasters, and medium- to longterm recovery [6-10]. In this paper, we focus on social capital, which is attracting attention as a social infrastructure that is one of the social determinants of health, and gives an overview of its impact on disaster-affected areas. We report on the role of each phase before and after an earthquake, the usefulness of social capital for disaster recovery, and the negative aspects of social capital as well.

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Figure 1 The main determinants of health

(Created by the author in reference to, "The main determinants of health," Policies and strategies to promote social equity in health, 1991)

2. What is "social capital"?

There are some definitions of social capital. Carpiano has conceptualized the theoretical model of social capital as existing in the neighborhood [2,11] (Figure 2). Here, we adopt "resources that are accessed by individuals as a result of their membership of a network or a group" as defined by two social epidemiologists, Kawachi and Berkman [12].

There are three categories of social capital: bonding, bridging, and linking [13]. Bonding social capital refers to

resources that are accessed within social groups whose members are alike ("homophilous") in terms of their social identity, such as class or race. Bridging social capital refers to resources accessed by individuals and groups through connections that cross class, race/ethnicity, and other boundaries of social identity. It can incorporate a subset of linking social capital that usually refers to links with external sources of power such as local government and other controlling forces. Linking social capital refers to relations



Figure 2 Conceptual model of neighborhood social capital processes affecting individual health outcomes (Created by the author in reference to "Conceptual model of neighborhood social capital processes on individual health outcomes" Social Capital and Health, 2008)

between individuals and groups in different social strata in a hierarchy where power, social status and wealth are accessed by different groups [14,15].

II. Influence of social capital in disaster-affected areas

Social support, social participation, and informal social controls provided by social capital improve disaster preparedness and resilience of individuals and communities before a disaster occurs [16,17]. Public support is not always available immediately at and after a disaster. Channels that bring people together and obtain various kinds of information during relief and subsequent evacuation activities are considered to be better in areas with rich social capital. Various studies have shown that the social and physical environment, including local infrastructure, community and individual health, recovers faster in a region with rich social capital [6,18-20]. This is because various types of social capital are involved in unity among local residents and cooperation with external Nonprofit Organizations (NPOs) and the government. In this way, social capital is believed to contribute to protect people against and recover from disasters involving various situations before and after the disaster. For this reason, social capital has the potential to improve post-disaster health.

Hobfoll et al. identified five empirically supported interventional principles that should be used to guide, and provide information on, interventional and preventive efforts during the early to mid-term phases following disasters and mass violence [21]. These are promoting 1) a sense of safety, 2) calming, 3) a sense of self- and community efficacy, 4) connectedness, and 5) hope. Among these, social capital especially has the role of enriching and strengthening connectedness among people. Regardless of the kind of natural disaster, social capital is also considered to improve mental health by reducing stress [22]. In addition to these psychological pathways, social capital is believed to help rebuild communities affected by disasters, which in turn reduces the long-term health effects of disasters and improves mental and physical health. In fact, it was reported that social capital is acting in a protective manner against post-traumatic stress disorder (PTSD) [23-26], anxiety [25], and depression [25,27] after a disaster, which was also confirmed by systematic review [28]. Social capital also plays a role to promote healthy dietary intake in disaster-affected areas [29]. However, it has been shown that high social capital increases the possibility of drinking after a disaster [30]. Aldrich notes that there are regional differences in disaster recovery and shows that these regional differences can be explained by social capital [8].

In a survey of older people who had not been certified to receive long-term care in Iwanuma City, Miyagi Prefecture, which suffered enormous damage due to the Great East Japan Earthquake, the social determinants of health were investigated using natural experimental data. The study did not only show the impact on mental health caused by the disaster [31,32], but also the impact on organic diseases, such as obesity [33], cognitive decline [34], circulatory metabolic diseases [35], and instrumental activities of daily living (IADL) decline [36].

In addition, it clarified the reduction in depression by group exercise [37], the reduction in insomnia through instrumental support [38], alleviation of dementia progression due to social ties [39], and the relationship between the strength of social ties in the region and mitigation of the progression of dementia, even if individual ties are weak [40].

III. Three phases of social capital functioning in disaster-affected areas

A growing body of literature supports the integral role of social capital in all phases of disaster management i.e., 1. preparedness, 2. mitigation, response, and 3. recovery [2].

Though traditional disaster management emphasizes the value of physical, economic, and human capital, increasing research supports the notion that such dimensions as social cohesion and social networks particularly apply to preparedness work [2,41,42].

1. Pre-disaster: preparedness

It has been reported that accumulation of experience at the meeting place of local women's disaster prevention clubs was useful during the period until public support was provided after the Great East Japan Earthquake [43]. The higher the social capital between residents before a disaster occurs, the more disaster prevention measures and disaster drills are organized by residents' associations and community organizations. This is thought to reduce disaster damage. In addition, local governments, companies, hospitals, etc. often have their own disaster prevention plans. Efficient disaster prevention measures are considered to function when the government, residents, hospitals, healthcare organizations, companies and NPOs work together to formulate plans.

2. When a disaster occurs/immediately after a disaster: mitigation/response

At the time of and immediately after a disaster, public rescue such as the police, fire fighter, and the Self-Defense Forces may not be able to enter all sites immediately. During the 1995 Great Hanshin-Awaji Earthquake, rescue from a collapsed house by a neighbor was reported [6]. During the 2004 Indonesian tsunami, it is known that the presence of male family members who helped contributed to improved survival [44].

After a disaster has occurred, residents will be involved in the operation of shelters if they live there for the medium term. If it is a relationship where people usually know each other and cooperate, the operation will proceed more smoothly than in other regions. In addition, evacuation supplies and necessary support are often managed by the government, and the accessibility to such support reflects the richness of linking social capital that allows direct contact with the government [45].

3. Post-disaster: recovery

People from various organizations and departments are involved in disaster recovery, and many residents are also involved for their livelihood such as reconstruction of housing, roads, railway networks etc. Therefore, there are cases where consensus building is difficult. Cooperation at various levels, such as between residents, residents and administration, and administration and the private sector, is thought to affect the speed of reconstruction [42].

IV. Utilization of social capital for disaster recovery and its dark-side

Here are some examples of social capital related to disaster recovery. One is the method of relocation when migrating to prefabricated temporary housing due to the tsunami damage caused by the Great East Japan Earthquake. The second is about people's interactions and social participation in prefabricated temporary housing. Finally, the negative aspects that should be noted when considering how to use social capital are introduced.

1. Group relocation and social support

There are mainly two methods of moving to prefabricated temporary housing after home has been destroyed by a disaster. The first is group relocation whereby people who originally lived in the same district move as a group. The second is a method whereby tenants are randomly selected by lottery for each temporary housing unit (in this case, lottery transfer). As a lesson at the time of the Hanshin-Awaji Earthquake, it was said that it was important for residents to live nearby when they moved into temporary housing to maintain their connections. Therefore, this lesson was used in some areas during the Great East Japan Earthquake. However, there are difficulties with the implementation of group relocation. Basically, people will move into a prefabricated temporary housing area that can accommodate dozens of households. However, if the number of households in the original area exceeds the occupancy, not everyone can move in immediately. Considering the number of households in the original area and the construction status of prefabricated temporary buildings, it is necessary to divide the area into an area into which occupants move first and an area into which occupants move later. The victims basically want to move from shelters to temporary housing as soon as possible. Therefore, it is necessary to make adjustments while waiting. This coordinating work cannot always be done by a government that is busy with a sudden disaster response. In addition, because the government prefers "fairness" like a lottery, the convenience of the community may have to be sacrificed for fairness. The area where group relocation has been implemented seems to be a relatively small community or a limited number of communities. Even if group relocation is basically adopted, if a resident comes from another area or the occupancy time deviates from other people for some reason, the result may be the same situation as lottery relocation.

In a study conducted in a prefabricated temporary housing area in Iwanuma city, these differences in the status of relocation and the connections between people were investigated [46]. The results showed that the proportion of people who received or provided social support was significantly higher among those who moved in as a group than those who moved by lottery: people who received social support were 92% of those who answered that they were moving as a group, while it was 70% of those who moved by lottery, and those who provided social support were 80% of people who moved as a group, and 66.7% of those who moved by lottery. The risk of depression also tended to be higher without social support in the same study [46].

This suggests that when moving into evacuation shelters and temporary housing, it is important to actively adopt group relocation, which can maintain the original community as far as possible as allowed by the situation. This requires a lot of negotiation and coordination. For these to work well, it may be important to have social capital from before the disaster, that is, the relationship and connection between the district head, the government, and the community people, from before the disaster.

2. Effect of social participation and exchange in temporary housing areas

The temporary housing area after the Great East Japan Earthquake played a role as a community. According to the analysis results of the survey data of Miyagi Prefecture in 2012 and 2013, it became clear that there was a difference in people's mental health between the temporary housing

communities [47]. Individuals who lived in temporary housing with many people whom they could consult about their worries, and those who were actively participating in community events had good mental health after one year. After the Great East Japan Earthquake, the government and volunteers encouraged the survivors to go out and participate in society through events in many prefabricated temporary housing areas, and to deepen exchanges. This study shows the possibility of reducing the mental stress of the survivors through such efforts to increase social connections. The study also suggests that if survivors live in a well-linking community, regardless of the individual situation, they are healthy. The situation of the prefabricated housing area may have been improved by the social capital that makes it easy to obtain various kinds of information and support through communication among the survivors.

3. Negative side of social capital

It has been pointed out that social capital also has a negative side: a dark side [48,49]. It is the negative aspect that too strong cohesion may reject outsiders or not be able to stop bad culture and norms. Interviews have shown that women have been told that they should get up at 5:00 am and start cooking at shelters after the Great East Japan Earthquake [43]. The women said that they would not be in the shelter if they had objected. This community connection seems to have worked in the wrong direction for the women. Although gender issues can affect many aspects of society, these issues must be reduced by including female staff as administrative staff working in evacuation shelters and temporary housing, or by including women in disaster-recovery meetings.

V. Summary

Among social determinants of health in disaster-affected areas, this paper focused on social capital. Although social capital is invisible, it may play a major role in disaster mitigation and recovery after a natural disaster. It was suggested that not only strengthening of the physical infrastructure, but also the creation of a community that fosters social capital is necessary to prepare for natural disasters. There is a need for ongoing research, such as how to create social capital during normal times more effectively, and whether social capital had a major impact on survivors' health over the long term.

References

[1] Organization WH. Social determinants of health: the solid facts: World Health Organization. Copenhagen: Re-

gional Office for Europe; 2003.

- [2] Kawachi I, Subramanian SV, Kim D. Social capital and health. In: Social capital and health. New York; Springer; 2008. p.1-26.
- [3] Ritchie HR, Max. Natural disasters: Empirical view. https://ourworldindata.org/natural-disasters (accessed 2019-11-27)
- [4] Ryan B, Franklin RC, Burkle FM, Jr., Aitken P, Smith E, Watt K, et al. Identifying and describing the impact of cyclone, Storm and flood related disasters on treatment management, care and exacerbations of non-communicable diseases and the implications for public health. PLoS Curr. 2015;7. doi: 10.1371/currents.dis.62e9286d-152de04799644dcca47d9288.
- [5] Rasid H, Shuncai S, Xiubo Y, Chen Z. Structural vs non-structural flood-alleviation measures in the Yangtze Delta: a pilot survey of floodplain residents' preferences. Disasters. 1996;20(2):93-110.
- [6] Aldrich DP. The power of people: social capital's role in recovery from the 1995 Kobe earthquake. Natural Hazards. 2011;56(3):595-611.
- [7] Aldrich DP, Kyota E. Creating community resilience through elder-led physical and social infrastructure. Disaster Med Public Health Prep. 2017;11(1):120-126.
- [8] Aldrich DP, Meyer MA. Social capital and community resilience. American behavioral scientist. 2015;59(2):254-269.
- [9] Wulff K, Donato D, Lurie N. What is health resilience and how can we build it? Annual review of public health. 2015;36:361-374.
- [10] Akbar MSP, Aldrich DP. Social capital's role in recovery: evidence from communities affected by the 2010 Pakistan floods. Disasters. 2018;42(3):475-497.
- [11] Carpiano RM. Toward a neighborhood resource-based theory of social capital for health: can Bourdieu and sociology help? Soc Sci Med. 2006;62(1):165-175.
- [12] Berkman LF, Kawachi I, Glymour MM. Social epidemiology. New York; Oxford University Press; 2014.
- [13] Szreter S, Woolcock M. Health by association? Social capital, social theory, and the political economy of public health. International journal of epidemiology. 2004;33(4):650-667.
- [14] Woolcock M. Microenterprise and social capital: A framework for theory, research, and policy. The Journal of Socio-Economics. 2001;30(2):193-198.
- [15] Claridge T. Functions of social capital bonding, bridging, linking. Social Capital Research. 2018:1-7.
- [16] Brockie L, Miller E. Understanding older adults' resilience during the Brisbane fFloods: Social capital, life experience, and optimism. Disaster Med Public Health Prep. 2017;11(1):72-79.

- [17] van Kessel G, Gibbs L, MacDougall C. Strategies to enhance resilience post-natural disaster: a qualitative study of experiences with Australian floods and fires. Journal of public health (Oxford, England). 2015;37(2):328-336.
- [18] Hikichi H, Sawada Y, Tsuboya T, Aida J, Kondo K, Koyama S, et al. Residential relocation and change in social capital: A natural experiment from the 2011 Great East Japan Earthquake and Tsunami. Science advances. 2017;3(7):e1700426.
- [19] Sobelson RK, Wigington CJ, Harp V, Bronson BB. A whole community approach to emergency management: Strategies and best practices of seven community programs. Journal of emergency management (Weston, Mass). 2015;13(4):349-357.
- [20] Aldrich DP. Building resilience: Social capital in post-disaster recovery. Chicago: University of Chicago Press; 2012.
- [21] Hobfoll SE, Watson P, Bell CC, Bryant RA, Brymer MJ, Friedman MJ, et al. Five essential elements of immediate and mid-term mass trauma intervention: empirical evidence. Psychiatry. 2007;70(4):283-315; discussion 6-69.
- [22] Kawachi I, Berkman L. Social cohesion, social capital, and health. In: Social epidemiology. New York: Oxford University Press; 2000. p.174-190.
- [23] Ali M, Farooq N, Bhatti MA, Kuroiwa C. Assessment of prevalence and determinants of posttraumatic stress disorder in survivors of earthquake in Pakistan using Davidson Trauma Scale. Journal of affective disorders. 2012;136(3):238-243.
- [24] Beiser M, Wiwa O, Adebajo S. Human-initiated disaster, social disorganization and post-traumatic stress disorder above Nigeria's oil basins. Social Science & Medicine. 2010;71(2):221-227.
- [25] R. Wind T, Fordham M, H. Komproe I. Social capital and post-disaster mental health. Global health action. 2011;4(1):6351.
- [26] Wind TR, Komproe IH. The mechanisms that associate community social capital with post-disaster mental health: A multilevel model. Social science & medicine. 2012;75(9):1715-1720.
- [27] Beaudoin CE. News, social capital and health in the context of Katrina. Journal of Health Care for the Poor and Underserved. 2007;18(2):418-430.
- [28] Noel P, Cork C, White RG. Social capital and mental health in post-disaster / conflict contexts: A systematic review. Disaster Med Public Health Prep. 2018;12(6):791-802.
- [29] Goryoda S, Nishi N, Shimoda H, Yonekura Y, Sakata K, Kobayashi S, et al. Social capital and dietary intakes following the 2011 Great East Japan Earthquake and

Tsunami. J Epidemiol. 2019;29(3):92-96.

- [30] Beaudoin CE. Hurricane Katrina: addictive behavior trends and predictors. Public health reports. 2011;126(3):400-409.
- [31] Sasaki Y, Aida J, Tsuji T, Miyaguni Y, Tani Y, Koyama S, et al. Does the type of residential housing matter for depressive symptoms in the aftermath of a disaster? Insights from the Great East Japan Earthquake and Tsunami. Am J Epidemiol. 2018;187(3):455-464.
- [32] Tsuboya T, Aida J, Hikichi H, Subramanian SV, Kondo K, Osaka K, et al. Predictors of depressive symptoms following the Great East Japan earthquake: A prospective study. Soc Sci Med. 2016;161:47-54.
- [33] Hikichi H, Aida J, Kondo K, Tsuboya T, Kawachi I. Residential relocation and obesity after a natural disaster: A natural experiment from the 2011 Japan Earthquake and Tsunami. Scientific reports. 2019;9(1):374.
- [34] Hikichi H, Kondo K, Takeda T, Kawachi I. Social interaction and cognitive decline: Results of a 7-year community intervention. Alzheimer's & Dementia: Translational Research & Clinical Interventions. 2017;3(1):23-32.
- [35] Shiba K, Hikichi H, Aida J, Kondo K, Kawachi I. Longterm associations between disaster experiences and cardiometabolic risk: A natural experiment from the 2011 Great East Japan Earthquake and Tsunami. Am J Epidemiol. 2019;188(6):1109-1119.
- [36] Tsuboya T, Aida J, Hikichi H, Subramanian SV, Kondo K, Osaka K, et al. Predictors of decline in IADL functioning among older survivors following the Great East Japan earthquake: A prospective study. Soc Sci Med. 2017;176:34-41.
- [37] Tsuji T, Sasaki Y, Matsuyama Y, Sato Y, Aida J, Kondo K, et al. Reducing depressive symptoms after the Great East Japan Earthquake in older survivors through group exercise participation and regular walking: a prospective observational study. BMJ Open. 2017;7(3):e013706.
- [38] Li X, Buxton OM, Hikichi H, Haneuse S, Aida J, Kondo K, et al. Predictors of persistent sleep problems among older disaster survivors: a natural experiment from the 2011 Great East Japan earthquake and tsunami. Sleep. 2018;41(7). doi: 10.1093/sleep/zsy084.
- [39] Hikichi H, Tsuboya T, Aida J, Matsuyama Y, Kondo K, Subramanian SV, et al. Social capital and cognitive decline in the aftermath of a natural disaster: a natural experiment from the 2011 Great East Japan Earthquake and Tsunami. The Lancet Planetary health. 2017;1(3):e105-e113.
- [40] Hikichi H, Aida J, Matsuyama Y, Tsuboya T, Kondo K, Kawachi I. Community-level social capital and cognitive decline after a natural disaster: A natural experiment from the 2011 Great East Japan Earth-

quake and Tsunami. Soc Sci Med. 2018. doi: 10.1016/ j.socscimed.2018.09.057.

- [41] Dynes R. Social capital: Dealing with community emergencies. Homeland Security Affairs. 2006;2(2).
- [42] Aida J. Social capital: Utilization of social capital for disaster prevention. J Seizon and Life Sci. 2016;26(2):37-41.
- [43] Hikichi H, Kondo K, Aida J. Social capital in disaster medicine: Group interviews with public nurses working in areas stricken by the Tohoku earthquake. Japanese journal of disaster medicine. 2015;20(1):51-56.
- [44] Frankenberg E, Gillespie T, Preston S, Sikoki B, Thomas D. Mortality, the family and the Indian Ocean tsunami. The Economic Journal. 2011;121(554):F162-F182.
- [45] Nakagawa Y, Shaw R. Social capital: A missing link to disaster recovery. International Journal of Mass Emergencies and Disasters. 2004;22(1):5-34.
- [46] Koyama S, Aida J, Kawachi I, Kondo N, Subramanian

SV, Ito K, et al. Social support improves mental health among the victims relocated to temporary housing following the Great East Japan Earthquake and Tsunami. Tohoku J Exp Med. 2014;234(3):241-247.

- [47] Matsuyama Y, Aida J, Hase A, Sato Y, Koyama S, Tsuboya T, et al. Do community- and individual-level social relationships contribute to the mental health of disaster survivors?: A multilevel prospective study after the Great East Japan Earthquake. Soc Sci Med. 2016;151:187-195.
- [48] Campos-Matos I, Subramanian SV, Kawachi I. The 'dark side' of social capital: trust and self-rated health in European countries. European journal of public health. 2016;26(1):90-95.
- [49] Villalonga-Olives E, Kawachi I. The dark side of social capital: A systematic review of the negative health effects of social capital. Soc Sci Med. 2017;194:105-127.

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被災地におけるソーシャル・キャピタルの役割

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抄録

近年,自然災害は増加傾向である.建築物,耐震基準や防波堤などのハード面の対策が,災害の被 害を減少させるために重要であるが,それだけでは限界がある.そのような中,ソフト面の対策にも 注目すべきことが指摘されている.本稿では,健康の社会的決定要因の1つとして注目されているソー シャル・キャピタルに焦点を当て,被災地での影響を概観することを目的とした.災害からの回復の 過程である復興期の社会的・物理的環境への適応や健康の回復,地域のインフラとコミュニティの回 復スピードは,ソーシャル・キャピタルが豊かな地域ほど早いことが示されてきている.更に,ソー シャル・キャピタルと,そこからもたらされる社会的サポート,組織参加,インフォーマルな社会統 制は,災害が起こる前の平時からの個人およびコミュニティの災害への備えと回復力(レジリエンス) を向上させることも示されている.一方,ソーシャル・キャピタルには負の側面もある.負の側面に 注意を払いながら,平時からソーシャル・キャピタルの醸成を促す地域づくりが震災の備えに必要で ある.

キーワード:ソーシャル・キャピタル、健康の社会的決定要因、自然災害