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3 Editorial

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5 **Fukushima, Mental Health and Suicide**

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34 On March 11 in 2011, a huge tsunami struck the Tohoku area in Japan. The extensive
35 damage to Fukushima Prefecture was further compounded by the severe accident of the
36 Fukushima Daiichi Nuclear Power Plant (FDNPP). Specifically, the cooling system of
37 the FDNPP was destroyed by the tsunami, leading to several explosions in the reactor
38 buildings and subsequent massive diffusion of radioactive substances. The Japanese
39 government decided to evacuate approximately 488,000 residents living within a 30-km
40 radius of the FDNPP in the first 5 days after the accident. In spite of the gradual lifting
41 of living restrictions within the evacuation zone, opinion surveys conducted by local
42 governments showed that numerous former residents hesitated to return to their
43 hometowns owing to fear of exposure to radioactivity, the delayed reconstruction and
44 decontamination processes, and unclear future of their hometown. For example, in
45 Naraha, a municipality where the entire territory was placed under evacuation orders
46 since 2011, the government recently lifted the living restriction. However, an opinion
47 survey of evacuees conducted by the Naraha government office about the question of
48 return revealed that only 8 per cent wished to return as soon as possible.[1] To date,
49 over 100,000 people have not returned to their homes in Fukushima Prefecture.
50 Moreover, three types of discordance arose in Fukushima [2], each of which has led to
51 dissonance within both families and the community: family members having different

52 opinions on the physical risk induced by radioactive exposure, interfamilial conflicts
53 caused by differences in residential restrictions or compensations, frustrations between
54 evacuees and people living in areas nearby about returning (e.g. Iwaki City). [2]

55 Fukushima Medical University (FMU) conducted a population-based survey of
56 approximately 210,000 original residents living in the evacuation zone using self-
57 administered questionnaires one year after the disaster.[3] The survey found that 65.7 %
58 of the respondents had relocated more than three times since the disaster and 39.2 % of
59 families had been separated.[3] Furthermore, 21.6% had possible post-traumatic stress
60 disorder (PTSD) and 14.6% had probable depression.[3] These prevalence rates were
61 considerably higher than those of the general population of Japan even 4 years after the
62 disaster.[4] Compared with other prefectures affected mainly by the tsunami, such as
63 Iwate or Miyagi Prefecture, the mental health problems in Fukushima evacuees seemed
64 to be more complex and included not only PTSD and depression, but also chronic
65 anxiety and guilt, a global sense of loss, separation of families and communities as
66 described above, and both public and self-stigma.[2]

67 Suicide is another public health issue of growing concern in Fukushima. The rate
68 of suicide in Fukushima Prefecture exceeded the average rate for Japan even before the
69 Great East Japan Earthquake and Tsunami. After the 2011 disaster, the standardized

70 suicide mortality ratio decreased initially (108 in 2010, 107 in 2011, 94 in 2012, and 96
71 in 2013) but then rose to 126 in 2014, thus exceeding the pre-disaster level.[5] In
72 addition, despite the occurrence of less damage from the tsunami in Fukushima, the
73 number of disaster-related suicides is much higher than rates in other prefectures
74 sustaining greater damage from the tsunami (Japanese Cabinet Office, 2015). We note
75 that the determination of “disaster-related” is made by a very rigorous process at the
76 local governmental level (e.g. verification of evidences such as a last note or a statement
77 of the bereaved), as it is necessary for approval of monetary compensation.

78 The patterns and mechanisms explaining the associations between natural or
79 manmade disasters, and suicide and suicide-related behavior (thoughts, plans) are
80 complex. Kölves et al. reviewed 42 empirical studies and found that the pattern was not
81 consistent across disasters.[6] In some instances, the rate of suicide and non-fatal
82 suicide behavior initially declined, as occurred in Fukushima (an effect thought to occur
83 during the post-disaster “honeymoon phase”), and then was followed by a delayed
84 increase.[6] Matsubayashi et al., examining the relationship between the severity of
85 natural disasters in Japan and the suicide rates using prefecture-level panel data between
86 1982 and 2010, further found that a decrease in suicide was only found after less
87 destructive disasters, while massive disasters tended to be associated with an increased

88 rate.[7] They attributed this difference to a weakening connectedness of social ties
89 among community members. In contrast, little is known about suicide behaviors
90 following manmade disasters. To the best of our knowledge, the only studies to date
91 reported an excess in suicide 3 years and 7+ years after Chernobyl among clean-up
92 workers from Estonia.[8, 9]

93 With regard to relationship between disasters and suicide behaviors, Kölves et al.
94 advocated for long-term monitoring of mental health after these events.[6] FMU and
95 other local programs have embraced this aspect of health programming and have
96 provided multiple, pro-active mental health programs (e.g., phone and visit services, or
97 educational and self-help group meetings) to the population. The initial decrease in
98 suicide in Fukushima may reflect the activities of these programs, though the lagged
99 increase suggests that more needs to be done.[5] There are many difficulties that the
100 Fukushima people are facing: delays in and lack of clarity regarding benefits; ongoing
101 rumors and public stigma about radiation; distrust in government, management, and
102 even medical authorities; and friction among community members stemming from
103 different risk perceptions of radiation. These psychosocial factors, which serve to reduce
104 pre-disaster community bonds and resilience, contributed to PTSD and depression,
105 which are critical risk factors for suicide.

106 To prevent suicide or other self-destructive behaviors such as excessive drinking,
107 we are trying to establish new facilities and care networks providing targeted psychiatric
108 interventions as well as to enhance existing resources. For example, the FMU mental
109 health survey department has a team providing telephone intervention for survey
110 responders at risk of PTSD, depression and anxiety disorders.[10] Furthermore, a new
111 facility (the Fukushima Center for Disaster Mental Health) with 40 staff consisting of
112 psychologists, social workers and district nurses has been actively working in the
113 disaster area since 2012. It is providing outreach services, including psychological
114 assessment and psychoeducation, and is becoming a core organization in the care
115 network system in Fukushima. The long-term goals of these new programs are to
116 improve mental health and prevent suicide in Fukushima.

117 There are four important challenges that remain. The first is the need to clarify the
118 risk factors for suicide in Fukushima so that targeted prevention programs can be
119 designed. Case-control studies built on psychological autopsy methodology would help
120 fill this gap. The second is insufficient number of staff working with the affected
121 population of Fukushima, and a situation that has resulted in staff burn-out.[2] The third
122 is to provide intensive care focusing on people vulnerable to suicide, especially middle-
123 aged male unemployed. The sudden increase of the suicide rate in Japan from 1998

124 occurred mainly in middle aged males and was conceivably related to a major change in
125 the employment system. [11] Finally, we should point out that people's stigma against
126 psychiatric disorders is still strong in Japan.[12] Thus, Fukushima people often hesitate
127 to receive psychiatric treatment, even if urgently needed. In order to provide effective
128 interventions for people at risk of suicide, further efforts to dispel the stigma is needed.
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131 **References**

- 132 1. Naraha Town, Fukushima Prefecture, Reconstruction Agency: Resident Opinion
133 Survey Result, 28 February 2014. Available from
134 [www.reconstruction.go.jp/topics/main-cat1/sub-cat1-](http://www.reconstruction.go.jp/topics/main-cat1/sub-cat1-4/ikoucyousa/20140228_02_ikouchousa_sokuhounaraha.pdf)
135 [4/ikoucyousa/20140228_02_ikouchousa_sokuhounaraha.pdf](http://www.reconstruction.go.jp/topics/main-cat1/sub-cat1-4/ikoucyousa/20140228_02_ikouchousa_sokuhounaraha.pdf) (accessed 15 Feb
136 2016).
- 137 2. Maeda M, Oe M. The Great East Earthquake: Tsunami and Nuclear Disaster. In:
138 Cherry KE, ed. Traumatic Stress and Long-Term Recovery: Coping with Disasters
139 and Other Negative Life Events. New York: Springer 2015:71-90.
- 140 3. Yabe H, Suzuki Y, Mashiko H, et al. Psychological distress after the Great East
141 Japan Earthquake and Fukushima Daiichi Nuclear Power Plant accident: results of
142 a mental health and lifestyle survey through the Fukushima Health Management
143 Survey in FY2011 and FY012. *Fukushima J Med Sci* 2014;60:57-67.
- 144 4. Maeda M, Yabe H, Yasumura S, et al. What about the mental health of adults? *J*
145 *Fukushima Med Sci* 2014;60:209-210.
- 146 5. Ohto H, Maeda M, Yabe H, et al. Suicide rates in the aftermath of the 2011 earthquake
147 in Japan. *Lancet* 2015;38:1727.
- 148 6. Kõlves K, Kõlves KE, De Leo D. Natural disasters and suicidal behaviours: a

- 149 systematic literature review. *J Affect Disord* 2013;146:1-14.
- 150 7. Matsubayashi T, Sawada Y, Ueda M. Natural disasters and suicide: evidence from
151 Japan. *Soc Sci Med* 2013;82:126-33.
- 152 8. Rahu K, Rahu M, Tekkel M, et al. Suicide risk among Chernobyl cleanup workers in
153 Estonia still increased: an updated cohort study. *Ann Epidemiol* 2006;16:917-919.
- 154 9. Rahu K, Auvinen A, Hakulinen T, et al. Chernobyl cleanup workers from Estonia:
155 follow-up for cancer incidence and mortality. *J Radiol Prot* 2013;33:395-411.
- 156 10. Yasumura S, Hosoya M, Yamashita S, et al. Study protocol for the Fukushima
157 Health Management Survey. *J Epidemiol* 2012;22:375-383.
- 158 11. Kondo N, Oh J. Suicide and karoshi (death from overwork) during the recent
159 economic crises in Japan: the impacts, mechanisms and political responses. *J*
160 *Epidemiol Community Health* 2010;64:649-650.
- 161 12. Kim Y. Great East Japan earthquake and early mental-health-care response.
162 *Psychiatry Clin Neurosci* 2011;65:539-548.
163