

# Studies examine health consequences of meltdown, damage to Fukushima nuclear power plants in Japan

August 14 2012

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The results of two studies in the August 15 issue of *JAMA* report on the psychological status of workers at the Fukushima nuclear power plants in Japan several months after the earthquake and tsunami in March 2011, and the amount of internal radiation exposure among residents of a city north of the power plant that experienced a meltdown.

As reported in a Research Letter, Jun Shigemura, M.D., Ph.D., of the National Defense Medical College, Saitama, Japan, and colleagues examined the psychological status of Fukushima workers 2 to 3 months after the disaster for symptoms of general psychological distress, including posttraumatic [stress response](#) (PTSR). The study included all full-time workers from the Daiichi plant (n = 1,053; plant experienced meltdown) and Daini plant (n = 707; plant experienced damage but remained intact) in May and June 2011. Using a self-report questionnaire, the researchers assessed sociodemographic characteristics and disaster-related experiences, including discrimination/slurs because the electric company that managed these plants was criticized for their [disaster response](#) and the workers have been targets of discrimination. Measures of general psychological distress included feeling nervous, hopeless, restless/fidgety, depressed, and worthless in the last 30 days.

Of 1,760 eligible workers, 1,495 (85 percent) participated (Daiichi: n = 885 [84 percent]; Daini: n = 610 [86 percent]). The authors found that compared with Daini workers, Daiichi workers were more often exposed

to disaster-related [stressors](#). Experiencing discrimination or slurs was not statistically significantly different between groups (14 percent vs. 11 percent). The researchers found that general psychological distress and PTSD were common in nuclear plant workers 2 to 3 months after the disaster. "Daiichi workers had significantly higher rates of psychological distress (47 percent vs. 37 percent) and PTSD (30 percent vs. 19 percent). For both groups, discrimination or slurs were associated with high psychological distress and high PTSD. Other significant associations in both groups included tsunami evacuation and major property loss with [psychological distress](#) and pre-existing illness and major property loss with PTSD."

In another Research Letter, Masaharu Tsubokura, M.D., of the University of Tokyo, and colleagues conducted a study to gauge the level of radiation exposure to residents of the city of Minamisoma, located 14 miles north of the Fukushima Daiichi nuclear plant. "Release of radioactive material into the air, water, and soil raised concern about internal [radiation exposure](#) and the long-term risk of cancer in nearby residents," they write.

Many residents were evacuated after the [meltdown](#), but by August 2011, approximately half had returned. A voluntary screening program for levels of cesium, known to be representative of total [internal radiation](#) exposure, was conducted between September 2011 and March 2012 for all residents ages 6 years or older. Total cesium exposure was converted into committed effective dose (sievert, Sv). Common dose-limit recommendations for the public are 1 mSv or less. A total of 9,498 residents enrolled in the study, 24 percent of the registered population on August 15, 2011. The sample consisted of 1,432 children and 8,066 adults. A total of 3,286 individuals (34.6 percent) had detectable levels of cesium, including 235 children (16.4 percent) and 3,051 adults (37.8 percent). Committed effective doses were less than 1 mSv in all but 1 resident (1.07 mSv).

"To our knowledge, this is the first report on internal exposure to cesium radiation after the Fukushima Daiichi nuclear plant incident. In this sample, exposure levels were low in most adults and children tested and much lower than those reported in studies years after the Chernobyl incident. Even the highest levels of contamination observed are below the thresholds for the administration of Prussian blue [an antidote used in the treatment of cesium poisoning]," the authors write.

The researchers note that because this screening program started 6 months after the nuclear power plant disaster, higher exposure levels might have been detected earlier, and that it is not possible to ascertain whether the low levels of exposure were due to low ongoing exposure or decay from high exposure values. "Because data were collected from volunteers, the results may not be representative of the entire population in contaminated areas. No case of acute health problems has been reported so far; however, assessments of the long-term effect of radiation requires ongoing monitoring of exposure and the health conditions of the affected communities."

**More information:**

JAMA. 2012;308[7]:667-669.

JAMA. 2012;308[7]:669-670.

Provided by JAMA and Archives Journals

Citation: Studies examine health consequences of meltdown, damage to Fukushima nuclear power plants in Japan (2012, August 14) retrieved 26 April 2024 from <https://medicalxpress.com/news/2012-08-health-consequences-meltdown-fukushima-nuclear.html>

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