

## Risk of radiation exposure from genbaku and genpatsu: The 1945 atomic bombings and the 2007 Kashiwazaki nuclear power plant leak

Chushi Kuroiwa\*

*The Department of Health Policy and Planning, School of International Health, Graduate School of Medicine, The University of Tokyo, Tokyo, Japan.*

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The Japanese word for atomic bomb is “genbaku” while that for nuclear power plant is “genpatsu”. The two words only differ by one character, but both refer to the same radioactive substances - uranium and plutonium - and both have the potential to bring about catastrophe for innocent people (1). Terrorists could make atomic bombs, or genbaku, by stealing uranium and plutonium from nuclear plants, or genpatsu.

This year, Hiroshima and Nagasaki marked the 62nd anniversary of the world’s first atomic bombings; the attack by the American B-29 bomber Enola Gay on August 6 of 1945 killed 140,000 in Hiroshima instantly or within a few months (2), and another B-29-dropped plutonium bomb on August 9 killed approximately 74,000 people in Nagasaki (3).

As in past decades, the approach of the anniversaries of the bombings has been marked by media sources throughout Japan reporting hidden stories behind the bombings. One such report drew my interest as a Japanese pediatrician. Mainichi newspaper reported on August 4 that at Omura Naval Hospital, located 19 kilometers away from the hypocenter in Nagasaki, medical personnel who treated patients suffering from the August 9 atomic bomb were found to develop higher rates of radiation diseases such as cancer, liver ailments, or cataracts (4). Thousands of atomic bomb survivors were transferred to the hospital by relief train or truck, and some 860 medical staff members worked to save the victims. A questionnaire survey was conducted from November 2005 to November 2006 by lawyers representing some 267 atomic bomb survivors who have not yet been recognized as radiation disease sufferers. Under the current law, those who did not live within 2 kilometers of the hypocenter on the date of the bombing are not classified as radiation disease sufferers. The lawyers pressed the government to recognize the victims as radiation disease sufferers, making them eligible for special medical allowances. Of the 73 medical personnel working at Omura Naval Hospital on the day the bomb was dropped in 1945, 25 (34.2%) developed cancer, a figure significantly higher than the

9.7% observed in the control group. Prof. Shoji Sawada of Nagoya University, one of the survey members, said that the hospital workers could have inhaled radiation particles attached to the clothing or hair of the atomic bomb survivors, causing continuous radiation exposure from within their bodies (4).

“I am not exaggerating, but even without using a stethoscope, you could hear the glass shards jangling against each other every time they took a breath. There were many patients like that. ....So many people came at once that we didn’t use a stethoscope for every one of them, we just put our ears to their chests and listened to determine if their hearts were still beating. .... At first, we didn’t understand radiation sickness, and we didn’t start to notice anything unusual until three or four days later. For example, when we gave a patient an injection, the skin in the area of the injection would gradually decay, and leukemia would eventually set in. When the girls in the volunteer corps borrowed combs from the nurses and used them, their hair would fall out from the roots. We thought this was strange. There was the shock and sadness of young women who suddenly lost all their hair,” said Dr. Masao Shiotsuki (1920-1978), who treated the victims of the atomic bombing at Omura Naval Hospital in 1945 (5). One can easily imagine how medical staff might have come into close contact with the victims and how powerful the tiny radiation particles must have been.

Japanese people are all too familiar with the issue of radiation exposure; the government of Japan, however, has given priority to the general construction business, which includes the construction of nuclear power plants and may expose the residents near the plants to radiation. As the BBC frankly reported, “It seems odd, then, that it is so addicted to nuclear energy, operating more reactors than any other country after the United State and France” (6). This report came after a strong earthquake hit northwestern Japan on July 16 of this year, causing a fire and damaging the world’s largest nuclear power plant in Kashiwazaki, Niigata Prefecture. The plant was ordered to close indefinitely on July 18

amid growing public anger over revelations that damage was much worse than initially announced. The damage included the spilling of radioactive water and waste into the sea and atmosphere (7). Concerns about nuclear safety have echoed across Japan, which depends on 55 reactors for about 30 percent of its electricity needs.

Although officials repeatedly announced that the extent of the radiation leaks was extremely small and not at a level that would pose health hazards, hotels and inns in Kashiwazaki have received roughly 30,000 cancellations of room reservations as of August 4. This indicates that majority of Japanese citizens may have doubts about the government's announcements proclaiming safe levels of radiation leaks, and residents throughout the prefecture have pressured the governor into persuading the central government to allow an inspection team of the International Atomic Energy Agency (IAEA) access to the facility. The government, initially reluctant to let the IAEA inspect, relented and the IAEA team started investigating the damaged plant on August 6 (8). The residents hope an announcement by the IAEA will be sufficient to convince people across Japan of the lack of danger associated with the extent of the leaks and encourage them to come to the resorts for summer vacation, as in previous years.

A peaceful population living under a pacifist constitution (9), the Japanese have finally grasped that the government's top priority is the interests of its own groups rather than the lives of we, its citizens. It consistently attempts to hide realities behind vague remarks. The then Prime Minister Shinzo Abe has not answered recent questions concerning issues such as a series of scandals involving various Ministers, including one culminating in the suicide of the agriculture minister and another relating to false pension records kept by the Social Insurance Agency. This attitude on the part of the government has not changed for more than 60 years. Dr Shiotsuki recalled the date in 1945 when he treated the victims sent from Ground Zero of the atomic bombing: "When the first truck arrived-and I still can't forget this-but I thought, well, now the War is over. Once they understood the real situation, the Japanese military, no matter how single-mindedly they wanted to continue fighting, would stop once they knew the facts. Anyone in the military who still wanted to continue fighting against a weapon that had caused this much harm to people had to be crazy. I thought once any normal person had seen this, they would realize they should end the war" (5).

Mr. Kyuma was forced to step down as defense minister in early July after commenting in a speech, "I understood the bombing brought the war to its end. I think it was something that couldn't be helped." The remarks outraged atomic bomb survivors and others who interpreted them as a suggestion that the atomic bombings were justified (10). However, the situation seems as if the government has evaded its responsibility

in the war by simply sacking the naive defense minister. From the theoretical point of view of the civilians, his remarks may indicate that the rightwing Japanese government of that time could have saved more than 200,000 innocent civilians if Japan had only surrendered earlier. The Japanese population was also a victim of the government at the time, although the atomic bombs can certainly not be justified and there must have been some other way to end the war.

The accident at the Chernobyl nuclear power plant in 1986 was the most severe in the history of the nuclear power industry, causing a massive release of radiation over large areas of Belarus, Ukraine, and the Russian Federation. The Chernobyl Forum held an international conference entitled "Chernobyl - Looking Back to Go Forward" in Vienna from the 6th to the 7th of September, 2005 (11). In the report, 28 persons were reported to have died in 1986 due to causes directly attributable to acute radiation syndrome. Although the reliability of cancer mortality cannot be accurately assessed, the international group of experts also predicted that, among the 600,000 persons receiving more extensive exposure, the possible increase in cancer mortality due to this radiation might be as much as a few percentage points. Finally, more than 4,000 children were reported to have developed thyroid cancer (12). In addition, elevated frequency of chromosome aberrations in most residents tested was reported (13), and the frequency of congenital malformation in newborns and human embryos has increased in heavily contaminated areas of Belarus following the accident (14,15). Yuri E. Dubrova *et al.* reported in 1996 that the frequency of germline mutations was found to be two times higher in the exposed families than in the control group (16), and a 2002 report by the team suggested that the elevated minisatellite mutation rate can be attributed to post-Chernobyl radioactive exposure (17).

The Liberal Democratic Party of Japan (LDP), the ruling party of Japan, was devastatingly defeated in the Upper House elections on July 29 of this year, and the massive defeat will greatly hinder efforts by the LDP to pass bills in the Diet. For the first time, Japanese voters clearly expressed their dissatisfaction with the current regime (18). This is a chance for the public to discuss, free of pressure from a government held captive by scores of vested interests, the potential for an eco-friendly society in Japan, whether to stop the operation of all nuclear plants, and the introduction of new transport and urban planning measures concerning the environment. Even foreigners are sure to question why nuclear plants are located near resort areas, as in the case of the Kashiwazaki plant, and why the Hamaoka nuclear plant is situated in the Tokai area, where a magnitude-8-class earthquake of incredibly massive proportions is predicted. The situation simply does not make sense.

Japan has started preparations for the G8 summit in

Hokkaido next year, and the main item on the agenda is the Environment (19). Without solving these serious domestic problems associated with the existence of nuclear plants in Japan, what sort of paramount message can Japan convey to the world?

(\*e-mail: ckuroiw@m.u-tokyo.ac.jp)

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