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Declining Willingness to Work Under Radiation Exposure: An 8-Year Follow-up Study of Healthcare Workers Near a Nuclear Power Plant

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Genro Ochi MD, PhD



Presenter Profile

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One of his key areas of interest is nuclear disaster preparedness, particularly shelter-in-place and evacuation strategies for medical institutions located near nuclear power plants. In this field, he has been conducting research and surveys as a Visiting Professor at the Department of Radiation Disaster Medicine, Research Institute for Radiation Biology and Medicine, Hiroshima University. Additionally, he serves on the Advisory Board of the Society of Water Rescue and Survival Research, an organization established in 2011, through which he continues to engage in research and public education to prevent water-related accidents. A summary of his activities is available in Japanese at the following website.

<https://plaza.umin.ac.jp/~GHDNet/sennyu/home.html>

Introduction

Background: Healthcare facilities near nuclear power plants face potential staffing challenges during nuclear accidents due to radiation exposure risks. Four years after the Great East Japan Earthquake, in 2015, we surveyed hospital staff working 11km

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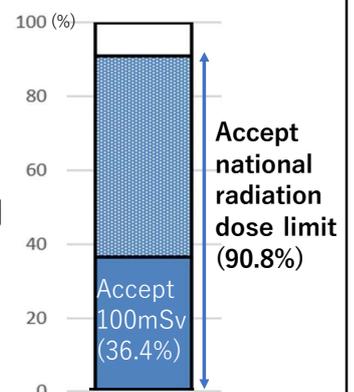
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Background



Healthcare facilities near nuclear power plants may face staffing challenges during nuclear incidents due to risks from radiation exposure. In 2015, four years after the Great East Japan Earthquake, we surveyed staff at a hospital located 11 km from **the Ikata nuclear power plant** in Japan, finding that 90.8% of respondents were willing to work within national radiation dose limits, while 36.4% were willing to work under conditions of cumulative exposure up to 100 mSv. In 2024, we conducted a follow-up survey at the same hospital to examine changes over time.





Methods

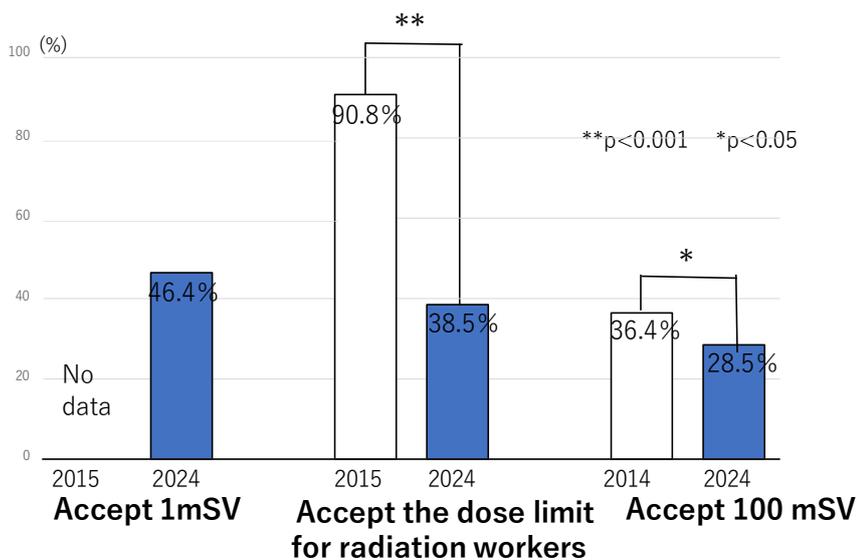


- 1) In January 2024, we surveyed staff at a hospital near a nuclear plant regarding their willingness to work under three cumulative radiation exposure levels: 1 mSv, the standard dose limit for radiation workers in Japan, and 100 mSv. Respondents indicated whether they were **willing**, **unwilling**, or **uncertain** about working under each exposure level.

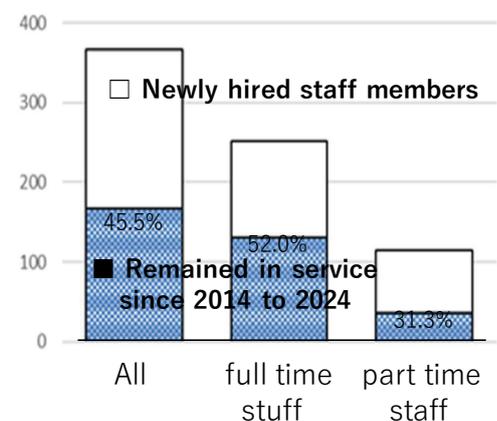
The national standard annual dose limit for male radiation workers is 50 mSv, while it is 5 mSv per three months for female workers.

- 2) Percentages of the hospital staff members remained in service since 2014 to 2024 were analyzed.

Results 1. Proportion of staff who accepted exposure at each level



Results 2. Percentages of hospital staff remained in service since 2014 to 2024





Discussion-1



Hospital staff near nuclear power plants are essential for patient care and evacuation during nuclear incidents.

However, many staff members expressed reluctance to work, even at low exposure levels (1 mSv). Enhancing staff preparedness requires improved risk communication and training sessions held annually.

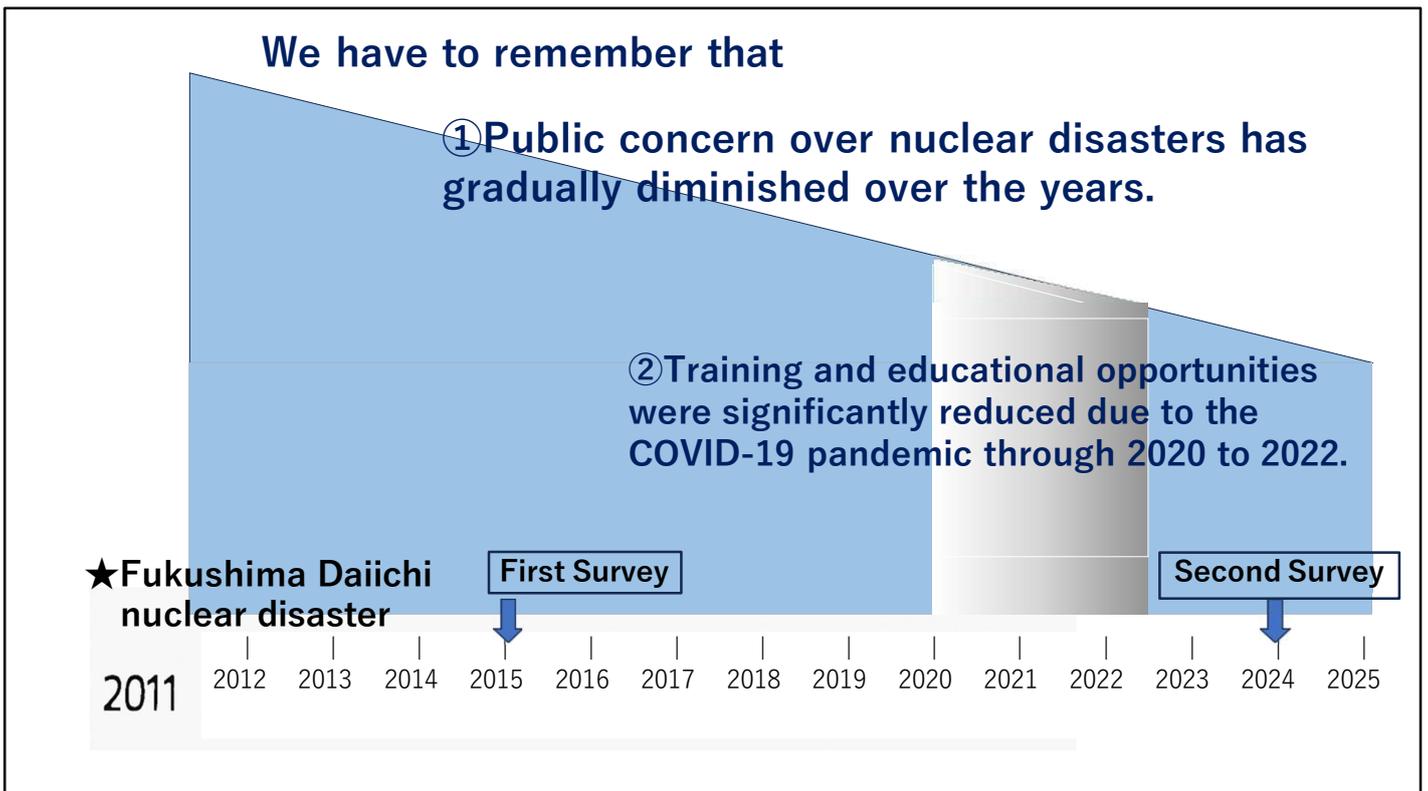


Discussion-1



Risk communication aimed at conveying that even after a cumulative exposure of 100 mSv, the incidence of cancer remains low is needed.

Enhancing staff preparedness requires improved risk communication and training sessions held annually.






Discussion-2

We need organizational measures to ensure effective response in future nuclear disaster scenarios. The work building need to be equipped with filtered ventilation systems, and staying overnight at the workplace should be possible. When approaching the dose limit, staff members from other headquarters should take over duties based on mutual support agreements.



Conclusion

In Japan, many healthcare workers at medical institutions located near nuclear power plants may be reluctant to work during a nuclear disaster. Enhancing staff preparedness requires improved risk communication and organizational measures to protect staff from radiation exposure, ensuring effective response in future nuclear disaster scenarios.

Declining Willingness to Work Under Radiation Exposure: An 8-Year Follow-up Study of Healthcare Workers Near a Nuclear Power Plant (Abstract)

Background: Healthcare facilities near nuclear power plants may face staffing challenges during nuclear incidents due to risks from radiation exposure. In 2015, four years after the Great East Japan Earthquake, we surveyed staff at a hospital located 11 km from a nuclear power plant, finding that 90.8% of respondents were willing to work within national radiation dose limits, while 36.4% were willing to work under conditions of cumulative exposure up to 100 mSv. In 2024, we conducted a follow-up survey at the same hospital to examine changes over time.

Methods: In January 2024, we surveyed staff at a hospital near a nuclear plant regarding their willingness to work under three cumulative radiation exposure levels: 1 mSv, the standard dose limit for radiation workers in Japan, and 100 mSv. The standard annual dose limit for male radiation workers is 50 mSv, while it is 5 mSv per three months for female workers. Respondents indicated whether they were willing, unwilling, or uncertain about working under each exposure level.

Results: The survey had a response rate of 90.2% (358 out of 397). Among respondents, 46.4% (n=166) were willing to work under 1 mSv exposure, 38.5% (n=138) under 50 mSv, and 28.5% (n=102) under 100 mSv. Compared to 2015, Chi-square tests indicated significantly lower acceptance rates across all exposure levels ($\chi^2=187.4$, $p<0.001$).

Discussion and Conclusion: Hospital staff near nuclear power plants are essential for patient care and evacuation during nuclear incidents. However, many staff members expressed reluctance to work, even at low exposure levels (1 mSv). Enhancing staff preparedness requires improved risk communication and organizational measures to protect staff from radiation exposure, ensuring effective response in future nuclear disaster scenarios.

Hypothetical Question and Answer

Question: You investigated the attitudes of staff working at medical institutions near nuclear power plants regarding their willingness to work during a nuclear disaster. As a result, compared to similar survey results from 2015, in 2024, only a small number of staff members were willing to work during a nuclear disaster. One reason cited was that only half of the staff from 2015 were still working at the facility in 2024. Why are the newly joined staff members reluctant to work during a nuclear disaster?

Answer: At our hospital, we held annual seminars on disaster medicine for new staff members until 2019, which included topics related to duties during a nuclear disaster. In addition, we organized annual disaster lectures for all staff, and every other year, we invited external speakers to give talks specifically focused on nuclear disaster preparedness. However, due to the COVID-19 pandemic, opportunities for such training were significantly reduced over the three years starting in 2020. As a result, we believe that we were unable to adequately convey the importance of radiation-related knowledge and the roles of staff during a nuclear disaster.