

Delayed hospital visits in breast cancer patients in Fukushima, Japan: a retrospective comparative analysis before and after the Great East Japan Earthquake and the subsequent nuclear accident

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Introduction

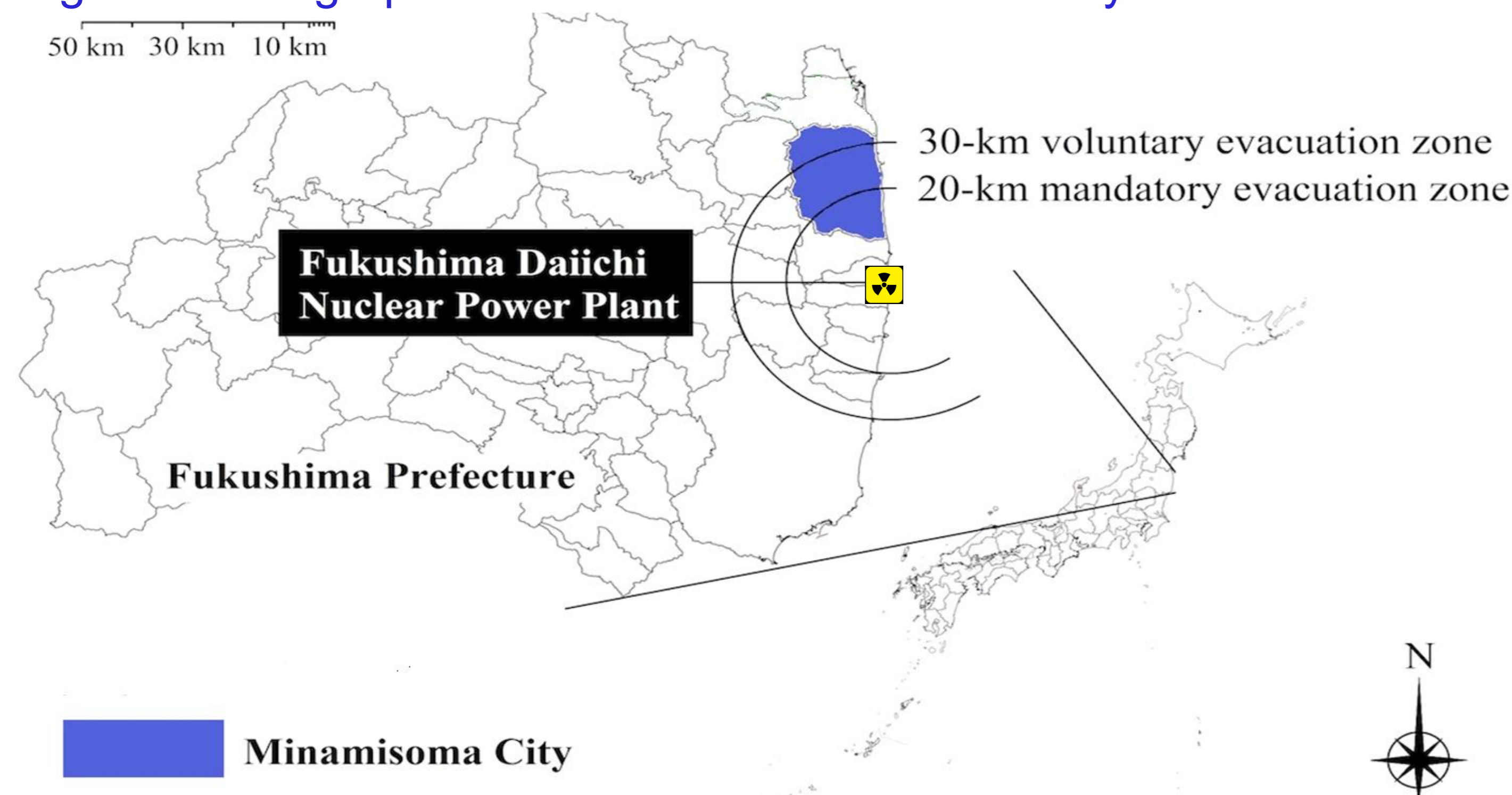
Breast cancer is the most common cancer and cause of cancer death in women worldwide. Early detection is important in the management of breast cancer, and mammography screening is available to the asymptomatic general population. However, the majority of breast cancer cases present with symptoms, such as lumps in the breast, nipple discharge, and breast pain. Yet, 20-30% of symptomatic breast cancer patients delay first hospital visits.

In the breast cancer patients, delay in first presentation may lead to advanced stage at diagnosis, potentially contributing to poor survival. Understanding the influence of mass disasters on delayed hospital visits is imperative to successfully and safely managing cancer patients in the aftermath of disasters; however little has been investigated in this area.

Minamisoma City (Figure 1), located within a 30 kilometers radius from Fukushima Daiichi nuclear power plant, experienced the Great East Japan Earthquake and the subsequent nuclear accident (3.11 triple disaster). These disasters may have impacted the behavioral patterns of cancer patients.

In addition, it has been suggested that social isolation may be associated with delay in first presentation. In Minamisoma City, there has been a mass evacuation of young and middle-aged generations for fear of potential irradiation, possibly leading to social isolation of older generations.

Figure 1: Geographical location of Minamisoma City



Objectives

- ✓ To assess the change of the proportion of the delayed hospital visits in breast cancer patients before and after the 3.11 triple disaster.
- ✓ To determine if there was an association between social isolation and increased proportion of delayed first hospital visits post-disaster.

Methods

Design, Setting, and Participants

The study population comprised of 120 symptomatic breast cancer patients, diagnosed from January 2008 through March 2015 in the two main cancer centers in Minamisoma City. All the patients were citizens of Minamisoma City when the diagnosis was made. Demographic and clinical information was extracted from medical records. Ethics approval was obtained from Minamisoma Municipal General Hospital.

Main Outcome Measures

Short delay and long delay are respectively defined as less than three months, and less than one year, from the first appearance of symptoms to the first hospital visit.

The change of the proportion/odds of delayed hospital visits since the appearance of initial symptoms between pre- and post-disaster using chi-squared analysis and logistic regression.

Results

Baseline characteristics of patients

The proportion of patients with the symptom of lump significantly increased post-disaster compared with pre-disaster. None of the other factors significantly changed before and after the disaster (Table 1).

Table 1: Baseline characteristics of patients pre- and post-disaster (N, %)

Variables	Post-disaster (N=61)	Pre-disaster (N=59)	P-value [†]
Age (median, range)	63 (35-88)	63 (36-88)	0.85
Symptom of lump	58 (95.1)	48 (81.4)	0.02
Diagnosis at stage 3/4	15 (24.6)	13 (22.0)	0.74
Pathological findings			
Invasive cancer	58 (95.1)	53 (89.8)	0.27
ER positive	48 (78.7)	37 (62.7)	0.05
PgR positive	37 (60.7)	34 (57.6)	0.74
HER2 positive ^{††}	12 (20.7)	8 (15.1)	0.44

[†] Age: Mann-Whitney's U test, Other factors: Chi-squared analysis

^{††} Analyzed only among patients with invasive cancer

Delay in first hospital visits pre- and post-disaster

The proportion of patients with ≥ 1 year delay significantly increased after the disaster (Table 2). Among the 9 patients with ≥ 1 year delay, 8 patients presented with cancer in stage 3 or 4.

Table 2: Comparison of the proportion of the delay pre- and post-disaster (N, %)

Variables	Post-disaster (N=61)	Pre-disaster (N=59)	P-value [†]
Delay of hospital visits			
≥ 3 months	15 (24.6)	11 (18.6)	0.42
≥ 1 year	9 (14.8)	2 (3.4)	0.03

[†] Chi-squared analysis

Analysis of the impact of social isolation on delay

Living without a child was associated with increased ratio of ≥ 1 year delay with the odds ratio of 8.64 (95% CI: 1.01-74.09) (Table 3).

Table 3: Influence of social isolation on ≥ 1 year delay (N, %)

Variables	≥ 1 year (N=9)	< 1 year (N=52)	P-value [†]
Social Isolation			
Living without a partner	3 (33.3)	18 (34.6)	0.94
Living without a child	8 (88.9)	25 (48.1)	0.02
Living alone	1 (11.1)	6 (11.5)	0.97

[†] Chi-squared analysis

In the logistic regression, none of the following factors were significant: living without a partner, living alone, age, air radiation dose rate, living within a 30 kilometers radius from the power plant, and socioeconomic status.

Conclusion

The proportion of delayed hospital visits among breast cancer patients increased after the disaster, especially in patients living without children, potentially leading to poor prognosis

A mass disaster may impact behavioral patterns of cancer patients, possibly due to increased psychosocial stress and worsened access to health care. Health care providers should keep in mind that socially isolated patients may be particularly vulnerable after disasters.

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