

Brief Report

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Questionnaire Survey on Stockpiling Medicines for Disasters in Pharmacies in Gifu City in Anticipation of Nankai Trough Earthquake

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Abstract

Objectives: In recent years, Japan has experienced a series of earthquakes and torrential rain disasters in various regions, and in Gifu City, there is concern about the possibility of Nankai Trough earthquakes in the near future. However, pharmacists' awareness of disaster preparedness and status of drug stockpiles in pharmacies are not clearly outlined.

Methods: A survey on disaster prevention and stockpiling was conducted in 286 pharmacies in Gifu City. Data were collected from August to the end of October 2022. A simple aggregate was used in the study.

Results: The response rate was 66.8% (191 pharmacies). Among them, 9.9% (19 pharmacies) had stockpiles of medicines for disasters, in which 33.3% of the medicines needed in the early stages of a disaster were above the average overall stockpiling rate. In addition, 2.1% (4 pharmacies) selected medicines according to national or prefectural manuals, and 96.3% (184 pharmacies) preferred to have the “national or local government” bear the cost of stockpiling.

Conclusions: This study allowed us to understand the stockpiling situation of pharmacies in Gifu City in event of a disaster such as the Nankai Trough earthquake, which is likely to occur in the future. Based on these results, it is necessary to consider measures for disaster stockpiling.

During the Great East Japan Earthquake on March 11, 2011, disaster medical teams, including the Disaster Medical Assistance Team (DMAT), pharmaceutical companies and wholesalers, and local governments, provided relief supplies for medicines and other goods.¹ However, there was a shortage of medicines for chronic diseases in the affected areas owing to the high demand for medical care for people with minor illnesses and the prolonged evacuation period.²

A major pharmaceutical wholesaler handling ethical pharmaceuticals began taking orders and making deliveries from client medical institutions a few days after the earthquake.³ However, immediately after the earthquake, communication with medical institutions was restricted due to the lack of communication lines, the warehouses of pharmaceutical wholesalers were damaged, road networks were cut off, and gasoline was in short supply. These factors made it difficult to transport pharmaceuticals out of the area, and it was reported that sufficient delivery frequency could not be ensured.²

In recent years, Japan has been hit by a series of disasters, along with the looming threat of the Nankai Trough earthquake. To ensure a smooth and stable supply of pharmaceuticals during disasters, it is crucial to prepare them beforehand. With the separation of prescription and dispensing progressing and the out-of-hospital prescription rate at nearly 79.1%,⁴ pharmacies play a vital role in ensuring a stable supply of medicines in the event of a disaster. However, there is still much to learn about pharmacists' awareness of disaster countermeasures, drug stockpiling status, and stockpiling in pharmacies. In particular, the current status of stockpiling medicines for disasters at pharmacies in Gifu City is still being determined despite the imminent threat of a huge earthquake, with the Nankai Trough as its epicenter. This study aimed to investigate the stockpiling of medicines for disasters in pharmacies in Gifu City and the availability of medicines for disasters.

Method

Data Collection

The survey covered 286 pharmacies listed in the “List of Medical Institutions by Code Content (Pharmacies in Gifu Prefecture) (as of May 1, 2022)” on the website of the Tokai-Hokuriku

Regional Bureau of Health and Welfare and located in Gifu City. Google Forms was used to conduct the survey. Data were collected from August 2022 to the end of October 2022.

Questionnaire Items

The questionnaire used in this study is shown in Figure 1. Referring to previous studies,⁵ we used the following eight questions in the questionnaire: “1. Which type of workplace do you work in?,” “2. If a disaster were to occur, what damage do you think your workplace or surrounding area would suffer (multiple choice are allowed)?,” “3. Does your pharmacy have stockpiles of medicines for disasters?,” “4. How many days of stockpiles of medicines for disasters do you have in stock?,” “5. What medicines are stockpiled for disasters? (multiple choices are allowed),” “6. How do you select the stockpiles of medicines for disasters to be stockpiled?,” “7. Does the prefecture or municipality in which your pharmacy is located stockpile medicines as relief supplies for disasters?,” and “8. Who should pay for the cost of stockpiling medicines for disasters?”

Data Analysis

This study is a simple aggregate.

Ethical Considerations

In the request letter, we explained that participation in this survey was voluntary and that there would be no disadvantages if the participants did not participate. This study complied with the “Ethical Guidelines for Medical Research Involving Human Subjects” and was approved by the Ethics Committee of Gifu Pharmaceutical University (approval number: 4-8).

Result

1. Which type of workplace do you work in?

Of the 298 pharmacies surveyed, 191 pharmacies (66.8%) responded, of which 55 (28.8%) were independent insurance dispensing pharmacies, 96 (50.3%) were chain insurance dispensing pharmacies, 35 (18.3%) were chain drug stores, and 5 (2.6%) were “other.”

2. If a disaster were to occur, what damage do you think your workplace or surrounding area would suffer (multiple choice are allowed)?

“Potential damage to your workplace and surrounding area in the event of a disaster” was the multiple response question. The top responses were “Collapse of buildings” 79.1% (151 pharmacies), “Fire” 74.9% (143 pharmacies), “Disruption of lifelines” 69.1% (132 pharmacies), “Liquefaction” 31.9% (61 pharmacies), “Landslides including cracks” 29.8% (57 pharmacies), and “Tsunami” 2.6% (5 pharmacies). In contrast, 1.6% (3 pharmacies) answered that there was no risk of secondary disasters.

3. Does your pharmacy have stockpiles of medicines for disasters?

A total of 128 pharmacies (67.0%) did not stockpile medicines for disasters in the workplace, and more than 19 pharmacies (9.9%) did. However, some pharmacies were unable to ascertain whether they had stockpiles.

4. How many days of stockpiles of medicines for disasters do you have in stock?

Of the 19 pharmacies that had stockpiled, 26.3% (5 pharmacies) had 1-3 days' worth, 3-7 days' worth, and more than 7 days' worth, while 21.1% (4 pharmacies) were unsure.

5. What medicines are stockpiled for disasters? (multiple choices are allowed)

Table 1 shows the results for the types of medicines used for disasters. The average stockpiling rate was 58.4%. Antipyretic analgesics and anti-inflammatory drugs had a stockpile rate of 89.5% and were stocked in many pharmacies. The next 4 drugs with the highest stockpiling rates (78.9%) were antihistamines, antibiotics, anxiolytics, and cold remedies.

The types of medicines needed during a disaster differ according to the respective phases of the disaster: the first 3 days after the occurrence of the disaster, the third day or later when outside help is expected, and the chronic phase when people live in evacuation centers for an extended period.⁶ In this survey, regarding the medicines that were considered necessary for the first 3 days after the disaster, 5 medicines were stockpiled at more than 60% of the pharmacies: hygiene materials, external skin care products, antipyretic analgesics, antibiotic preparations, and disinfectant preparations. Most pharmacies stocked ten of the medicines that would be needed after the third day of the earthquake: gargle, stomachic, stomachic digestive, anti-anxiety, peptic ulcer, bowel preparation, general cold remedy, cough medicine, laxatives, and eye drops.

6. How do you select the stockpiles of medicines for disasters to be stockpiled?

In total, 73.7% (14 pharmacies) responded “pharmacies and drugstores had selected their own products.” In contrast, 21.1% (4 pharmacies) answered that they “selected according to national or prefectural manuals.”

7. Does the prefecture or municipality in which your pharmacy is located stockpile medicines as relief supplies for disasters?

Most respondents 50.8% (97 pharmacies) answered, “I don't know.”

8. Who should pay for the cost of stockpiling medicines for disasters?

The cost of stockpiling medicines for disasters was borne by the national government at 44.5% (85 pharmacies) and local governments at 51.8% (99 pharmacies).

Discussion

We conducted a questionnaire survey of insurance pharmacies in Gifu City to ascertain whether they have a system to ensure a smooth supply of medicines to patients, even during disasters. Regarding potential damage to pharmacies in the event of a disaster, many pharmacists indicated the possibility of building collapse, fire, and disruption of lifelines (79.1%, 74.9%, and 69.1%, respectively). These findings indicate that many pharmacies are likely to experience operational disruptions during disasters. The current rate of out-of-hospital prescriptions is very high, with

Questionnaire survey on stockpiling of medicines for disasters in pharmacies

In recent years, Japan has been inextricably linked to disasters, with a series of earthquakes and torrential rain disasters in various parts of the country, and there are concerns that the Nankai Trough earthquake may occur in the near future. To ensure a stable supply of pharmaceuticals even in times of disaster, it is important to be prepared during normal times. In this survey, pharmacies in Gifu City will be surveyed to determine their stockpile of pharmaceuticals in the event of a disaster.

* The questionnaire will be kept in strict confidence and used as a valuable resource. The results of the survey may be published in academic conferences or journals, but pharmacies will not be identified from the survey results. Participation in the survey is voluntary, and you will not be disadvantaged in any way if you do not participate.

Gifu Pharmaceutical University
Prof. Hitomi Teramachi
Dr. Yoshihiro Noguchi

Please checkmark the applicable items in the following questions.

1. Which type of workplace do you work in?

- Independent insurance dispensary Chain insurance dispensary
 Independent drugstore Chain drugstore
 Other:

2. If a disaster were to occur, what damage do you think your workplace or surrounding area would suffer (multiple choice are allowed)?

- Fire Tsunami Liquefaction
 Landslide such as cracks or landslides Disruption of lifelines
 Collapse of buildings No risk of secondary disasters
 Other:

3. Does your pharmacy have stockpiles of medicines for disasters?

- Yes No I don't know

4. How many days of stockpiles of medicines for disasters do you have in stock?

- For 1–3 days For 3–7 days For more than 7 days I don't know

5. What medicines are stockpiled for disasters? (multiple choices are allowed)

- | | |
|--------------------------------------------------------------------------------|--------------------------------------------------------|
| <input type="checkbox"/> Anti-allergic agents | <input type="checkbox"/> Eye drops |
| <input type="checkbox"/> Anti-influenza virus agents | <input type="checkbox"/> Gargles |
| <input type="checkbox"/> Antiasthmatics | <input type="checkbox"/> Gastrointestinal agents |
| <input type="checkbox"/> Antibiotics | <input type="checkbox"/> Hemostatics |
| <input type="checkbox"/> Antidiabetic agents | <input type="checkbox"/> Hygiene materials |
| <input type="checkbox"/> Antidiarrheals | <input type="checkbox"/> Isotonic solutions |
| <input type="checkbox"/> Antiflatulents | <input type="checkbox"/> Laxatives |
| <input type="checkbox"/> Antihistamines | <input type="checkbox"/> Local anesthetics |
| <input type="checkbox"/> Antihypertensives | <input type="checkbox"/> Maintenance solutions |
| <input type="checkbox"/> Antipyretics and analgesics, anti-inflammatory agents | <input type="checkbox"/> Parasitic skin disease agents |
| <input type="checkbox"/> Antithrombotic agents | <input type="checkbox"/> Patches |
| <input type="checkbox"/> Anxiolytics | <input type="checkbox"/> Peptic ulcer agents |
| <input type="checkbox"/> Blood derivative products | <input type="checkbox"/> Public sanitation agents |
| <input type="checkbox"/> Blood substitutes | <input type="checkbox"/> Sedative hypnotics |
| <input type="checkbox"/> Cardiac preparations | <input type="checkbox"/> Sterile disinfectants |
| <input type="checkbox"/> Cardiotonics | <input type="checkbox"/> Stomachics and digestives |
| <input type="checkbox"/> Cold remedies | <input type="checkbox"/> Stomatological preparations |
| <input type="checkbox"/> Cough suppressants | <input type="checkbox"/> Topical agents |
| <input type="checkbox"/> Decongestants | <input type="checkbox"/> Vasopressors |
| <input type="checkbox"/> Disinfectants | <input type="checkbox"/> Vitamin B preparations |
| <input type="checkbox"/> Expectorants | |

6. How do you select the stockpiles of medicines for disasters to be stockpiled?

- Selected according to national or prefectural manuals Selected their own products
 Other:

7. Does the prefecture or municipality in which your pharmacy is located stockpile medicines as relief supplies for disasters?

- Yes No I don't know

8. Who should pay for the cost of stockpiling medicines for disasters?

- National government Local government Company Store
 Other:

*This is the end of the survey.
Thank you for your cooperation.*

Figure 1. Questionnaire form on stockpiling disaster medicines.

Table 1. Types of disaster medicines stockpiled

	Number of facilities	%		Number of facilities	%
Antipyretic analgesics and anti-inflammatory drugs	17	89.5	Stomachics and digestives	12	63.2
Antihistamines	15	78.9	Topical agents	12	63.2
Antibiotics	15	78.9	Anti-influenza virus agents	11	57.9
Anxiolytics	15	78.9	Antidiarrheals	11	57.9
Cold remedies	15	78.9	Antithrombotic agents	11	57.9
Anti-allergic agents	14	73.7	Cardiotonics	11	57.9
Antiflatulents	14	73.7	Hemostatics	11	57.9
Antiasthmatics	13	68.4	Patches	11	57.9
Antidiabetic agents	13	68.4	Sedative hypnotics	11	57.9
Antihypertensives	13	68.4	Vitamin B preparations	11	57.9
Cardiac preparations	13	68.4	Stomatological preparations	10	52.6
Cough suppressants	13	68.4	Vasopressors	9	47.4
Decongestants	13	68.4	Local anesthetics	8	42.1
Disinfectants	13	68.4	Public sanitation agents	8	42.1
Expectorants	13	68.4	Sterile disinfectants	8	42.1
Gargles	13	68.4	Maintenance solutions	7	36.8
Gastrointestinal agents	13	68.4	Blood derivative products	5	26.3
Peptic ulcer agents	13	68.4	Parasitic skin disease agents	4	21.1
Eye drops	12	63.2	Isotonic solutions	4	21.1
Hygiene materials	12	63.2	Blood substitutes	2	10.5
Laxatives	12	63.2			

many patients receiving medication at pharmacies rather than hospitals. Therefore, if a disaster occurs and an external supply is not expected, it will be difficult to serve patients with only pharmaceuticals stockpiled in the hospital, and a stable supply of pharmaceuticals will likely be affected if pharmacies cease operations.

According to the report by the Japan Pharmaceutical Association, “Concerning the normal delivery system from pharmaceutical wholesalers to medical institutions and pharmacies in the affected areas after the Great East Japan Earthquake, except for the hardest-hit centers of the disaster, more than 70% of functions were restored on the third day after the earthquake, and more than 90% within one week, almost the same delivery system as normal to medical institutions was restored.”⁷ Therefore, “the Disaster Preparedness Manual for Pharmacists,” published by the Japan Pharmaceutical Association⁶, stipulates that pharmacies should stockpile at least a 3-day supply of pharmaceuticals in preparation for disasters. However, less than 10% of the pharmacies in Gifu City were stockpiled for disaster management. Furthermore, approximately 40% of the pharmacies with stockpiles did not even have 3 days’ worth of medicines.

More than 60% of the pharmacies stockpiled the following medicines needed during the chronic phase: allergy medicines, gastrointestinal medicines, antihypertensive medicines, antihistamines, cardiac agents, intestinal agents, asthma remedies, diabetes remedies, and rhinitis medicines. Previous studies have reported that the frequency of prescriptions for antihypertensive agents,

antitussives/expectorants, antipyretic analgesics, and laxatives is higher in times of disaster.⁸ These drugs were assumed to have been stockpiled in this survey.

Gifu City has a relatively large elderly population (29.3%),⁹ therefore, it is important to stockpile medicines for chronic diseases, such as diabetes and hypertension. The survey found that stockpiles of medicines for chronic diseases such as hypertension, heart disease, and diabetes are sufficient, but the amount of each medicine stockpiled was not surveyed. Therefore, future research is needed to determine if there is enough medicine stockpiled to cover the expected number of patients in the event of a disaster.

The average stockpiling rate of medicines during disasters was 78.0% for privately owned dispensing pharmacies, 38.8% for chain-dispensing pharmacies, and 75.6% for chain drugstores. Furthermore, private pharmacies had the highest percentage of pharmacists who indicated that they had a stockpile of at least a 3-day supply of medicines for disasters. This suggests that privately owned pharmacies are more willing to stockpile than chain pharmacies. Regarding the selection method of medicines for disasters, many pharmacies and drugstores independently selected the types of medicines to be stockpiled. More than half of the pharmacists did not accurately understand official stockpiles, suggesting that cooperation and information disclosure between local governments and pharmacies may be inadequate.

However, a significant number of pharmacists responded that they would prefer the national or local government to bear the costs

of stockpiling pharmaceuticals. Because stockpiling pharmaceuticals is a major burden for pharmacies, many pharmacists would like national and local governments to take the lead in disaster preparation. Unless the issue of the costs of stockpiling pharmaceuticals is resolved, it will be difficult to obtain more pharmacies to stockpile for disasters.

In Nerima Ward, the Nerima Ward Pharmaceutical Association stockpiles and manages medicines for disasters and has adopted a “running stock system” in which stockpiled medicines are replaced with new ones every six months, and the old ones are used at pharmacies belonging to the Nerima Ward Pharmaceutical Association.¹⁰ In this system, the stockpiling of pharmaceuticals should not be increased by one pharmacy alone, but rather by the entire community as a whole, with the national and local governments as well as the pharmaceutical associations taking the lead in promoting cooperation among the pharmacies.

Conclusion

Disasters can occur in any community. Countermeasures should be tailored for each region. This study allowed us to understand the stockpiling situation of pharmacies in Gifu City in the event of a disaster such as the Nankai Trough earthquake, which is likely to occur in the future. Based on lessons learned from the Great East Japan Earthquake, a certain level of stockpiling has been established; however, few pharmacies have stockpiles in place, confirming the need for support from public institutions. Based on the results of this study, it would be effective to consider how disaster stockpiling should be conducted so that stockpiles of pharmaceuticals are not increased by one pharmacy alone, but rather by the entire community, with public institutions

taking the lead in increasing stockpiles through collaboration between public institutions and pharmacies, and between pharmacies.

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