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Review

What Japan can learn from Canada's guidelines on food and nutritional support during emergencies: A scoping review

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Abstract: *Background:* Providing meals to an evacuated population is important for sustaining their health during disasters. In the 2023 wildfires in Canada, Emergency Social Services played an important role in disaster management, cooperating with restaurants. In contrast, Japan faced operational problems in disaster management during the 2024 Noto Peninsula Earthquake. *Objective:* We aimed to investigate the national model for food service management and dietary considerations during disasters in Canada to reveal novel insights for Japan. *Methods:* We conducted a scoping review to identify websites, manuals, and guidelines published between 2019 and 2024 using Google. Consequently, a nationwide manual from Canada titled "Emergency food services: Planning for disaster" (EFS manual) was extracted, and eight nationwide guidelines or manuals from Japan were identified that contained items applicable to the EFS manual. *Results:* We found that external professional associations actively participate in emergency food services in Canada, whereas public health dietitians mainly take responsibility for food management in Japan. Volunteer organizations or professional meal provision operators, such as restaurant owners, are members of the Food Service Planning Committee in Canadian emergency food management. In Canada, a Food Service Coordinator conducts surveys on food resources that are prepared and reviews them once a year before

disasters. Canada followed its national food guidelines for normal situations even in emergency cases, whereas Japan's Ministry of Health, Labour and Welfare issued nutritional reference values for evacuation shelters. The Canadian EFS manual highlights the importance of providing adequate support, including meal services, to staff for effective disaster management of evacuees. *Conclusions:* Japan, particularly, should utilize external professional associations from the planning stage and dietary care for staff, as in Canada. Our findings may contribute to the revision of the disaster nutrition manual for Japan to improve nutritional assistance in evacuation shelters during disasters.

Keywords: Canada; disaster management; emergency meal service; Japan; nutrition; public health; scoping review

1. Introduction

Natural disasters such as floods and earthquakes are occurring at an increasing rate worldwide. From 2012 to 2022, 363 events per year were reported globally, which is over six times higher than the rate in the 1960s (56 events per year) [1]. In 2023, 399 catastrophic natural hazards affected 93.1 million individuals, resulting in 86,473 deaths worldwide [2].

Inadequate food availability and subsequent nutritional deficiencies in evacuation shelters contribute to the onset of disaster-related diseases. For example, an imbalanced diet can lead to gastrointestinal diseases [3]. Moreover, increased sodium intake in evacuation shelters is associated with disaster hypertension [4]. In addition to these limitations in meals during an emergency, sufficient dietary care is required for vulnerable categories of evacuees, such as older adults, children, and those with chronic diseases [5].

According to the World Risk Index 2024, Japan faces "very high" exposure to natural hazards [6]. In the most recent large-scale disaster, the 2024 Noto Peninsula Earthquake (a 7.6 magnitude earthquake), with over 50,000 evacuees and 1,500 evacuation shelters [7], food delivery was disrupted due to the road destruction after the earthquake [8]. Even in the welfare evacuation shelter (shelter for vulnerable evacuees such as older individuals and pregnant women), food rations mainly comprised instant noodles, bread, and canned items. Meals served in the shelter were frequently provided cold and deficient in energy and protein to older individuals [9]. It has also been reported that the levels of amino acids and essential fatty acids in meals served in shelters were inadequate [10]. According to a previous study, inadequate nutritional supply in evacuation shelters after large-scale disasters has been an ongoing issue since before the 2024 Noto Peninsula Earthquake [11].

In 2023, Canada suffered from a record-breaking wildfire season with 185,000 internal displacements [12]. Although Canada is as highly exposed to natural hazards as Japan [6], western countries, including Canada, provide adequate nutrition even in emergencies [13]. Canada has a system of Emergency Social Services (ESS) to meet the evacuee's six basic needs: Food, clothing, shelter, registration, inquiries, and personal services [14]. According to the record of one city in Alberta, ESS supported 1,129 evacuees due to the 2023 wildfire and served meals by cooperating with 69 restaurants over a 1-month period [15]. In another city, ESS ensured that basic needs were met in a hotel when 2,699 evacuees reached the city. Evacuees were provided with a per diem for meals at the hotel and restaurants or with vouchers to use at nearby restaurants in business [16].

The Global Food Security Index (GFSI) of 2022 assesses four key aspects of food security:

Affordability (consumers' ability to procure foods and programs for supporting them when shocks occur), availability (agricultural production capabilities), quality and safety (variety and nutritional quality of diets as well as safety), and sustainability and adaptation (resilience to any crisis). In this index, Japan ranks sixth (overall score: 79.5/100) out of 113 countries [17]. Since Japan is highly ranked on this index, certain universal nutritional programs are provided even during non-emergency periods; food banks are promoted by the Ministry of Agriculture, Forestry and Fisheries to support low-income households [18]. During the coronavirus 2019 (COVID-19) pandemic, foods were delivered to home-isolated patients by most local governments with a subsidy from the Ministry of Health, Labour, and Welfare (MHLW) [19]. Food access has been relatively guaranteed in Japan. However, the most recent natural hazards have led to food-procurement problems, with dietary issues, particularly for vulnerable evacuees such as older individuals. Hence, Japan should review its emergency food supply management and learn from measures developed in other countries.

There are research articles on disaster food and nutritional management in the USA [20] and Italy [21], where appropriate meal services are provided during an emergency [13]. To the best of our knowledge, no previous studies have described disaster nutrition management in Canada. In addition, according to the GFSI 2022, Canada is ranked seventh (overall score: 79.1/100) and thus has a similar level of food security as Japan. In light of these considerations, Japan can benefit from adopting actionable insights from Canada to enhance its disaster food management system. Therefore, we aimed to compare the national standard and what is expected in disaster meal services, including management and dietary considerations for those who receive meal provisions, in Japan and Canada, through a scoping review referencing governmental websites, national manuals, and guidelines for experts.

2. Methods and data sources

2.1. Background information about ESS in Canada

The information in this section was collected through Google by searching "Canada" AND "Emergency Social Services". As emergency management plans are developed in each province and territory [22], we also reviewed descriptions regarding the ESS from each province and territory (the second largest administrative unit), by searching "(the name of province or territory)" AND "Emergency Social Services" on Google. The documents (guidelines, manuals, and websites) were limited to those published by the national, provincial, or municipal government, national academic organization, and national professional association; published in English; and published or updated in the last 5 years (2019–2024), a period based on the method of a previous study analyzing disaster food and nutritional management [23]. The Supplementary file lists all the documents that met these criteria.

ESS are part of a community-based emergency response plan [24–25] under the provincial government [26–35]. They are also called "Emergency Support Services" in British Columbia [36] and "Emergency Crisis Support" in Saskatchewan [37]. The Public Health Agency of Canada (PHAC) establishes the national ESS standards and provides manuals of each basic service [38]: Food, clothing, lodging, registration and inquiries (assisting in reuniting families and responding to inquiries about the conditions or whereabouts of missing people [39]), and personal services (offering temporary care for residents from special care facilities, unattended children, or older individuals, and providing emotional support [39]). When disasters occur, ESS carry out the plan with other municipal departments. As seen in some municipal emergency response plans [40–46], ESS are one of the

operational branches, such as the fire, police, and ambulance departments, under the emergency operation center. Although ESS depend on volunteer staff to provide services for evacuees [35], some documents revealed that municipal employees are also involved in ESS [46,47]. The ESS Director is a provincial title given to the person appointed by the local authority who has the responsibility of coordinating the ESS program [48]. ESS basically function for 72 h, which is described in the manuals or guidelines in British Columbia [49], Manitoba [26], and some municipalities in other provinces [38,50]. According to the documents, the support period can be extended when a longer disaster response is required: 3 months in British Columbia [51] and 30 days in Manitoba [26]. The age for volunteer applications differed in each municipality; for instance, in the city of Surrey, British Columbia, the age is 18 years and older [52], whereas in the city of Abbotsford, it is over 19 years [53]. According to the data in British Columbia, special skills or experiences are not necessary to become ESS volunteer members; those who apply can take free training provided by the Justice Institute of British Columbia [51,54]. For instance, in Surrey, British Columbia, volunteers are required to complete a 30-min online lecture with in-house training provided by the city, and 7 h of online courses by the Justice Institute of British Columbia. To maintain an accepted volunteer status, volunteers need to take a minimum of 3 h of training annually [52].

2.2. Research method

In this study, we aimed to provide an overview of disaster food and nutritional assistance in Canada and Japan. Scoping reviews allow the inclusion of gray literature, such as websites [55]. As our research focuses on existing websites, manuals, and guidelines, we conducted a scoping review in accordance with the reporting guidelines by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) [56]. Scoping reviews are usually based on the PCC mnemonic (Population, Concept, and Context), which is described in Table 1. Our research questions aimed to identify the food service management in evacuation shelters and dietary considerations of those who receive meals during emergencies in Canada and Japan. Keyword searches were conducted on January 4, 2025, for Canada and January 5, 2025, for Japan. In this study, we did not prepare a review protocol available online.

Table 1. Population/concept/context mnemonic of the present study.

Component	Details of the present study
Population	(1) Organizations or supporters for meal provision in evacuation shelters after a disaster
	(2) People who receive meals, such as disaster victims or evacuees (no age limit)
Concept	(1) How to organize disaster meal provision
	(2) What dietary considerations are expected to be made
Context	Canada and Japan

2.3. Collection of Canadian disaster nutrition websites, manuals, and guidelines

The field of this study is disaster nutrition. The research subjects were Canadian documents (websites, manuals, and guidelines) related to national disaster nutrition management for experts written in English, and Google was used to collect them. Based on the research field and search method in a previous study [23], the keywords searched were as follows: “Canada” AND “disaster”

OR “disaster prevention” AND “nutrition” OR “diet” OR “food” AND “guideline” OR “guide” OR “manual”. We did not include the name of the place for the disaster food and nutritional services in the keywords because their names differ depending on individuals or organizations (they may be called “evacuation shelter”, “emergency center”, “shelter”, “refuge center”, etc.). In line with a previous study’s search guidelines and manuals of disaster nutrition [23], the publication or update years of the documents were limited to the last 5 years (2019–2024) to ensure collection of the latest information. Therefore, all documents with no publication year and published or updated in 2018 or before were removed. The other inclusion criteria included: Being published by the national government, national academic organization, or national professional association; a title related to disaster management; inclusion of food service management or dietary considerations for those who receive meals; and being published in English (Table 2). Initially, 220 documents were identified. After excluding 12 duplicates, we screened 208 documents. Among them, the number of documents assessed for eligibility was 25. When ensuring eligibility, we checked all documents because a few websites listed some guidelines and manuals. Finally, we included one document (website) [57] updated in 2021 for analysis. Among the eight manuals on this website [57], one of them, “Emergency food services: Planning for disaster” (EFS manual) [58], was chosen for analysis, as it was the only disaster food manual (Figure 1). Although the EFS manual was published in 2007, it still remained the national ESS standard in the last 5 years [35,38].

Table 2. Eligibility criteria for the current study.

	Canada	Japan
Language	English	Japanese
Publication or update date	The last 5 years (2019–2024)	The last 5 years (2019–2024)
Documents	• Websites • Manuals • Guidelines	• Websites • Manuals • Guidelines
Publisher	• National government • National academic organization • National professional association	• National government • National academic organization • National professional association
Context	Documents related to disaster food and nutritional measurement in evacuation shelters for experts, especially the following items: • Food service management • Dietary considerations for those who receive meals	Documents related to disaster food and nutritional measurement in evacuation shelters for experts, particularly the following items: • Food service management • Dietary considerations for those who receive meals • Including corresponding items with “Emergency food services: planning for disaster” (EFS manual) [58] as shown in Table 3.

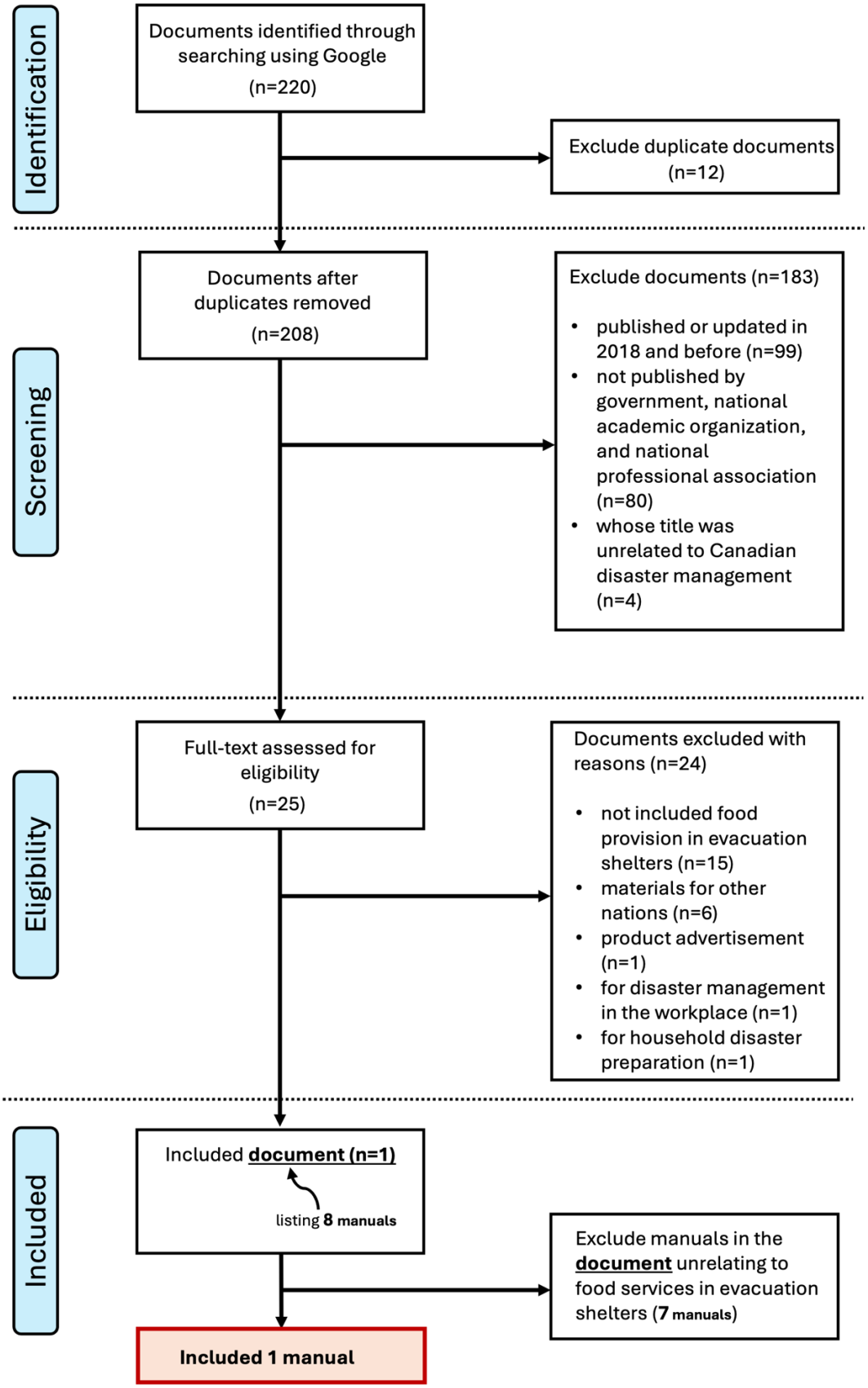

Figure 1. Search flow of documents (websites, guidelines, and manuals) related to food services during disaster management in Canada.

2.4. Disaster nutrition measures

As this study focused on what Japan could learn from disaster nutrition management in Canada, we created categories based on the table of contents in the EFS manual (Table 3). The EFS manual comprised 11 chapters, 17 appendices, and 1 table. This study focused on the national nutritional management in evacuation shelters during an emergency and dietary considerations. Therefore, we decided to exclude the following unrelated chapters: Chapter 1 (the definition and concept of EFS), Chapter 4 (mainly precaution of sanitation) except for "General Operational Guidelines" and "Specific Operational Guidelines", Chapter 8 (food services in hospitals and other institutions), and five headings of Chapter 9 (adverse effect of stress on eating). Appendices K (kitchen hygiene in disaster situations) and Q (improvised refrigeration) were also unrelated to the aim of this study. As Appendix F (Outdoor Feeding Site–Traffic Flow) was the supplement of Chapter 8, we excluded this from the research as well. Mobile Feeding Units, one of the National Emergency Stockpiling Strategy (NESS) managed by PHAC [58], were recycled or disposed several years ago [59] and could not be found in the latest NESS plan [60]; hence, Chapter 11 and Appendix N were also excluded from this study. The excluded items are shown in gray in Table 3. Next, we read the contents and extracted all sentences for categorization. The EFS manual states that ESS are generally provided in reception centers, i.e., one-step service sites. Overnight lodgings may be provided at different locations [58]. Considering this, their function may not be the same as the Japanese evacuation shelters, where people stay and sleep all day. However, both are centralized facilities providing meals to evacuees during emergencies. Therefore, this study uses the reception center as a reference to learn lessons that can be applied to Japanese evacuation shelters. In the EFS manual, Chapters 2 and 5 describe the overall organization of food services in reception centers, where evacuees can get basic services during an emergency. Therefore, we combined them as each subcategory, "Organizational chart" and "Personnel roles". Because "Food service plan" (Chapter 7), "Training" (Chapter 6), and "Emergency food resource survey and directory" (Chapter 3) were associated with Chapters 2 and 5, we decided to combine these subcategories as a main category: "Food service management". Chapter 3 also describes food provision in remote areas. Since some evacuees cannot access the evacuation shelters or reception centers due to geographical or physical reasons, we decided to incorporate a subcategory, known as "Support for non-evacuating people", under this main category. In the EFS manual, recommendations for meal contents were also described, such as nutritional standard (Chapter 2), model menus (Appendixes G and M), specific operations for vulnerable evacuees (Chapters 4 and 10, Appendixes I, M, and P, and Table 1), and feeding workers (Chapters 9 and 10 and Appendixes M). Therefore, we combined them into a main category titled "Dietary consideration". The survey items, main categories, and subcategories are presented in the left two columns of Table 4.

Table 3. Outlines of the Emergency Food Service (EFS) manual and survey items.

Chapter		Survey item*
1	**Emergency Food Service (EFS)**	
1.1	Introduction	
1.2	Meeting Urgent Needs	
1.3	Responsibilities	
2	**Organization of a Food Service (FS)**	
2.1	Planning	(b)
2.2	Structure	(a), (b)
2.3	Personnel Roles and Responsibilities	(b), (g)
2.4	Back-up Staff	(b)
2.5	Recruiting FS Staff	(b)
2.6	Mobile Emergency Food Service Team	(b)
3	**Emergency Food Resource Survey and Directory**	
3.1	Introduction	(e)
3.2	Planning the Survey	(b), (e)
3.3	Conducting the Survey	(e), (f)
3.4	Emergency Equipment and Supplies Survey	(e)
3.5	Kitchen Equipment Survey Form	(e)
3.6	Written Agreements	(e)
3.7	Maps and Boundaries	(e), (f)
3.8	Record Keeping	(e)
3.9	Emergency Food Directory	(e)
4	**Operational Guidelines**	
4.1	Introduction	
4.2	General Operational Guidelines	(i), (j)
4.3	Specific Operational Guidelines	(i)
4.4	Sanitation Guidelines	
4.5	Precautions Against Food Contamination	
4.6	Operational Procedures at Warehouses	
4.7	Improvised Refrigeration	
5	**Emergency Food Service Management—Operational Procedures**	
5.1	Food Service Management	(b)
5.2	Emergency Priorities and Responsibilities	(b)
5.3	Food Supervisor's Responsibilities	(b)
5.4	The Role of the Public Health Inspector in Emergency Health	(b)
6	**Training**	
6.1	Training Responsibility	(b), (d)
6.2	Training Program	(d)
6.3	Basic Training in Civil Emergency Planning	(d)
6.4	Selecting and Training Workers	(b), (d)
7	**Food Service Plan**	
7.1	Planning Responsibilities	(b)
7.2	Characteristics of an FS Plan	(c)
7.3	Plan Content	(c), (d)
7.4	Letter of Agreement	(c)
7.5	Mutual Aid Agreements	(c)
7.6	Testing the FS Plan	(c)
7.7	Distributing the Plan	(c)
8	**Planning the Food Service in Hospitals and Other Institutions**	
8.1	The Role of the Department of Dietetics	
8.2	Immediate Disaster Response	
8.3	Guidelines for Evacuation and Relocation Planning	
8.4	Other Planning Guidelines	
8.5	Supplies and Equipment	

Continued on next page

Chapter		Survey item*
8.6	Meal Service	
8.7	Isolation (Survival)	
9	**Nutrition and Stress**	
9.1	Introduction	
9.2	Eating Habits and Stress	
9.3	Nutritional Needs and Stress	
9.4	The Digestive System and Stress	
9.5	Nutrition and Physiological Stress	
9.6	Food and Stress	(j)
9.7	Feeding Workers	(j)
9.8	Recommendations	(j)
10	**The Food Service in an Emergency Hospital**†	
10.1	Introduction	(i)
10.2	Food Service in Emergency Hospitals	(i)
10.3	The Advanced Treatment Centre (ATC)††	(i), (j)
11	**Mobile Feeding Unit (MFU)**	
11.1	Introduction	
11.2	An Essential Interim Measure	
11.3	Reserve Stock	
11.4	The MFU	
11.5	Soyer Boilers	
11.6	Layout of Soyer Boilers	
11.7	Layout of Emergency Food Area	
Appendixes		
A	Emergency Social Services Organization Chart	(a)
B	Food Service Organization Chart	(a)
C	Food Service Equipment and Supply Needs at Operational Sites, and Food Service Area Required in Square Feet and Square Metres	(c), (e)
D	Food Service Log Sheet, and Accounting Log Sheet	(e)
E	Donation Log Sheet (Food), Food Directory, and Importance of an Adequate Water Supply	(e)
F	Outdoor Feeding Site—Traffic Flow	
G	Food Requisition Guide	(h)
H	Kitchen Resource Survey Form	(e)
I	Infants and Young Children	(i)
J	Food Service Staff Requirements	(b)
K	Kitchen Hygiene in Disaster Situations	
L	Letter of Agreement	(c), (e)
M	Menus for Infants (4 to 12 Months), Young Children (1 to 6 Years), Evacuees, and Emergency Workers	(h), (i), (j)
N	Mobile Feeding Unit Weights, Dimensions, and Content	
O	Community Emergency Plan	(a)
P	Liquid Diet, Soft Diet	(i)
Q	Improvised Refrigeration	
Table		
1	Alternative Solutions	(i)

Parts filled in gray were excluded.

*Note: This letter is in line with Table 4.

†Note: Emergency Hospital: This is one of the National Emergency Stockpiling System (NESS) pre-packaged mobile units that includes 200 beds for patients. During an emergency, it is set up in a building such as a school or community center.

††Note: Advanced Treatment Center (ATC): It is one of the NESS units that takes care of patients requiring surgery. The ATC also supports patients in moving to other community centers.

Table 4. Contents of Japanese manuals and guidelines.

		Japanese manuals and guidelines no.*							
Main categories	Subcategories	1	2†	3	4	5	6	7	8
Food service management	(a) Organizational chart	√ (p. 27)		√ (p. 13)			√ (p. 5)	√ (p. 2–6, 40)	√ (p. 12)
	(b) Personnel roles		√ (p. 51, 57)	√ (p. 10–15, 17, 19, 28–38, 41–45, 53–58, 60–65, 68–77)			√ (p. 13–16, 27–31, 47–48, 50–51, 106–110)	√ (p. 2–6, 8, 10, 19, 21–25, 27–33, 41–42, 44–46, 49–55, 59–64, 67–70, 72–82, 84, 99–102)	√ (p. 13–16, 18–23, 25)
	(c) Food service plan		√ (p. 11, 57)	√ (p. 15, 17, 19, 56–57, 74, 87)			√ (p. 106–110)	√ (p. 61)	
	(d) Staff training		√ (p. 59)	√ (p. 17, 75)				√ (p. 3, 30, 31)	
	(e) Survey and directory		√ (p. 51)	√ (p. 15, 17, 19, 28–29, 34, 37–38, 58, 85–86, 94, 96, 98–99)	√ (p. 61–63)		√ (p. 13–16, 27–31, 47–48, 50–51)	√ (p. 19, 21–22, 25, 29, 45, 54–55, 61, 64–83, 87–96)	√ (p. 14)
	(f) Support for non-evacuating people			√ (p. 30–31, 33–34)	√ (p. 37)		√ (p. 30, 48, 51, 67)	√ (p. 33, 59, 68)	√ (p. 24, 36, 42–45)
Dietary consideration	(g) Nutritional standard			√ (p. 14, 39–40, 66, 69–70)				√ (p. 19, 59, 106)	√ (p. 26)
	(h) Model menus			√ (p. 67)					
	(i) Specific guidelines for vulnerable evacuees	√ (p. 27)	√ (p. 51, 57)	√ (p. 12–14, 17, 19, 21–26, 30–31, 33–35, 37–38, 43, 56, 58, 60–62, 64, 68, 70–71, 73, 88, 96–97)	√ (p. 8, 15, 17, 24, 41–42, 61–63, 68)	√ (p. 2–9)	√ (p. 13–16, 27–31, 47–48, 50–51, 66–71, 87, 99)	√ (p. 4, 7, 19–20, 24–25, 30–31, 33, 47, 62–82, 97–99, 112–115, 120–121)	√ (p. 14, 39, 46–52)
	(j) Feeding workers								

√Note: The contents that are included in manuals and used as references in the current study.

*Note: Manual number and its document can be seen in Table 5.

†Note: The following pages in this manual were ignored because they were duplicates of Manual number 3: p. 32–34, 37–46, and 52–55.

2.5. *Collection of Japanese disaster nutrition manuals or guidelines*

We collected documents about Japanese disaster nutrition by searching terms in Japanese through Google: "*saigai* (disaster)" OR "*bousai* (disaster prevention)" AND "*eiyo* (nutrition)" OR "*shokuji* (diet)" OR "*shoku* (food)" AND "*gaidorain* (guideline)" OR "*gaido* (guide)" OR "*manyuaru* (manual)" OR "*tebiki* (manual)" OR "*shishin* (guideline)". In this search, documents were limited to those written in Japanese. As Japan is the only country where Japanese is the first language, we omitted "Japan" from the keyword searches. Moreover, we included documents that had information corresponding with the EFS manual (Table 4, main categories and subcategories). The other criteria for selecting Japanese documents were the same as those used for the Canadian search (Table 2). Initially, 223 documents were identified through our keyword search, then 50 were added from the previous study analyzing disaster nutrition manuals and guidelines [23,61], and 17 were excluded due to duplication. In the next stage, 256 documents were screened, and 22 were assessed for eligibility. Finally, 8 documents were chosen as they aligned with the survey items (Tables 4 and 5). Among them, one document (website) included two guidelines; therefore, the total number of detected guidelines or manuals was 9. Since one guideline was unrelated to disaster food services in evacuation shelters, it was excluded. Hence, we examined 8 Japanese guidelines and manuals in the present study [62–69] (Tables 4 and 5, Figure 2). In this study, the first author collected Canadian and Japanese documents and screened them for analysis. The data in each document and the food service management and dietary considerations in the results section were validated by the second author, who is a Japan Dietetic Association-Disaster Assistance Team (JDA-DAT) leader and the vice-president of the Japan Disaster Food Society (2024–present). This author has published 87 articles about disaster food and nutrition and contributed to four guidelines (published by the national academic organization or professional association) related to this field since 2005.

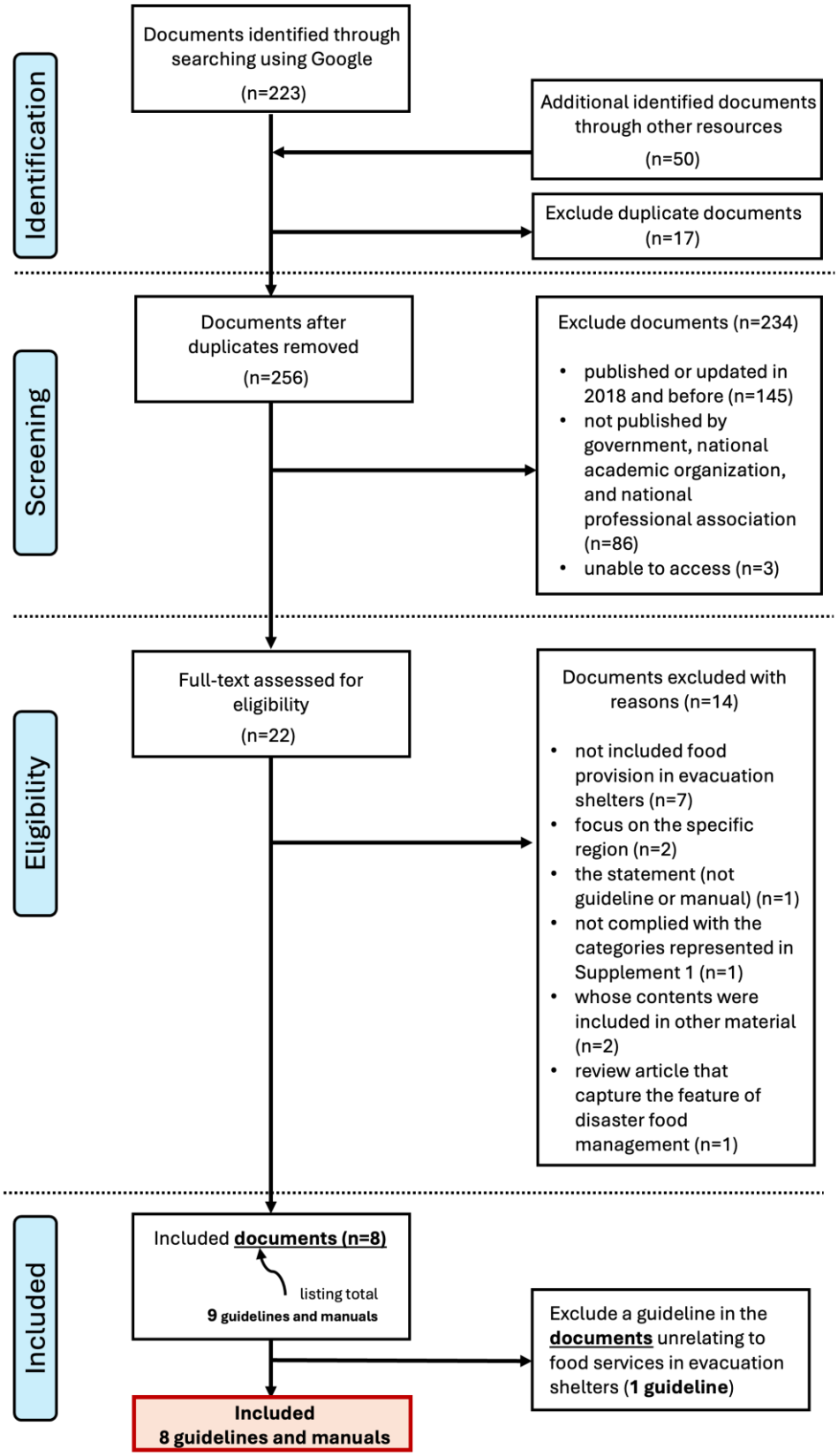

Figure 2. Search flow of documents (websites, guidelines, and manuals) related to food services during disaster management in Japan.

Table 5. Details of Japanese manuals and guidelines.

No.	Name of Japanese manuals or guidelines	Publisher	Publication or update year	Reference No.
1	Guideline of food stockpiling in case of disasters for people with special needs	Ministry of Agriculture, Forestry and Fisheries	2019	[62]
2	Food and nutritional support system in large-scale disasters based on the latest evidence	Ministry of Health, Labour, and Welfare	2019	[63]
3	Guidelines for food and nutritional assistance in large-scale disasters	Japan Public Health Association	2019	[64]
4	The strength of disaster measurement from women's perspective ~Disaster prevention and reconstruction guideline from the gender equality perspective~	Gender Equality Bureau Cabinet Office	2020	[65]
5	Japan protect baby in disaster project ~manual for nutritional assistance for infants and children at the time of disasters~	The Japan Dietetic Association	2020	[66]
6	Manual for mid-to-long-term maternal and child health measures after disasters	National Center for Child Health and Development	2021	[67]
7	Guidelines for food and nutritional assistance in disasters	The Japan Dietetic Association	2022	[68]
8	Manual for food and nutrition assistance at the time of disasters*	Japanese Voluntary Organizations Active in Disaster	2024	[69]

*Note: This manual was published as "Eating support project (*Tabepuro*)" derived from the forum hosted by Japanese Voluntary Organizations Active in Disaster, a non-profit organization. National research centers, universities, and companies were involved in this project.

3. Results

The eight Japanese guidelines or manuals [62–69] included in this study are presented in Table 5. The contents that we used as references in line with the categories are summarized in Table 4. Since "guidelines" and "manuals" almost have the same meaning, we describe these Japanese documents as "Manual number _".

3.1. National model of emergency food services

3.1.1. Structure (organizational chart) and personnel roles in disaster food management for evacuees

Based on the above data, we evaluated what kind of support each organization or personnel was expected to provide in the emergency food management of evacuees.

According to the EFS manual, volunteers and external professional associations are mainly involved in the food supply chain. Table 6 and Figure 3 show the roles of the EFS and organizational chart, respectively. In the EFS, the ESS Director appoints the Food Service Coordinator (FS Coordinator). The FS Coordinator is responsible for developing response measures before, during, and

after catastrophes. In the first stage, the FS Coordinator organizes a committee and appoints a Food Supervisor. The Food Service Planning Committee (FS Planning Committee) assists the FS Coordinator in preparing food service plans. Although public health officials are also recruited, committee members are also represented by local professional human resources, such as staff in restaurants or cafeterias, dietitians, members of volunteer organizations, and retailers. The Food Supervisor at the reception center operates food services during emergencies. This category of professional coordinates food service workers (FS workers) engaged in meal support to evacuees. FS workers are enlisted from active personnel with food service experience, such as the Canadian Red Cross, Salvation Army, and Meals on Wheels. Their roles in the food supply process are divided into those of chefs, cooks, assistant cooks, food servers, dishwashers, and cleaners. The recommended number of workers in each role is presented in Appendix J of the EFS manual by cooking place, such as reception centers, outdoor feeding, and mobile kitchens [58].

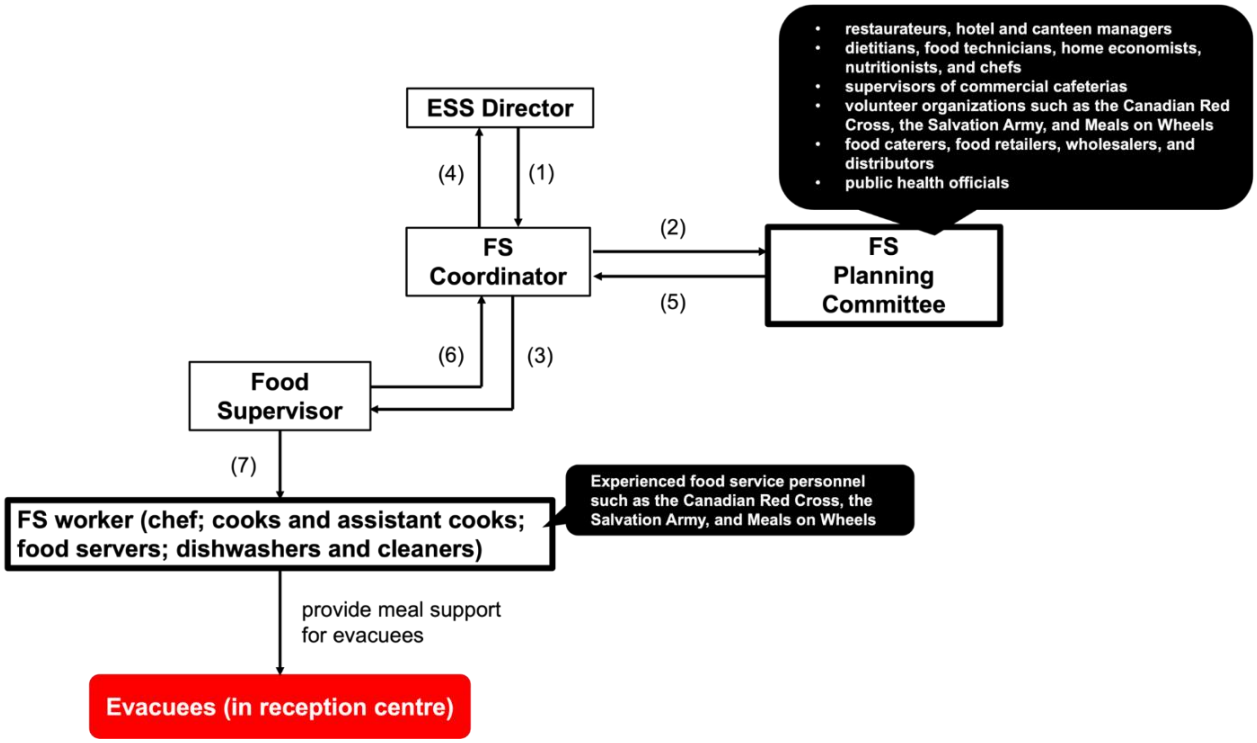

Figure 3. Canada's emergency food service model (based on "Emergency food service: Planning for disasters" [58]).
ESS: Emergency social services; FS: Food service.

[Responsibilities]

(1) Appointing and training
(2) Organizing committee
(3) Selecting each designated reception center in the community
(4) Notifying about buildings relevant for FS
・Ensuring the provision of FS logs and providing regular reports, including operational matters, to the ESS Director
・Submitting a report on FS emergency measures
(5) Assisting

・Develop FS response plan
・Ensure the active involvement of appropriate food, agencies, and groups in the community
・Identify immediate and continuous food problems likely to be encountered by disaster evacuees
・Estimate the accessibility of FS resources in the community, such as personnel, supplies, and equipment
・Assign FS roles and associated responsibilities

(6) Reporting problems, needs, and the status of the activities
・Providing receipts and outstanding invoices
・Submitting a report and assisting in the evaluation of meal services

(7) Briefing the number of evacuees, problem areas, and resource requirements
・Training at the designated reception centers
・Supervising

Table 6. Responsibility of each position defined by terms in Canada.

Position	Terms	Responsibilities
Public Health Agency of Canada (Office of Emergency Response Services)		• Distributing Mobile Feeding Units and emergency hospital (pre-packaged units)
Emergency Social Services (ESS) Director		• (1)* Appointing and training FS Coordinators • Testing organizational response procedures
Food Service (FS) Coordinator	[Prior to a disaster]	• (2) Selecting FS planning and organizing committee, and (3) selecting a Food Supervisor for each designated reception center in the community • (4) Notifying the ESS Director about buildings relevant for FS • Establishing good relationships with external assistances • Developing an FS measure plan with the FS Planning Committee • Testing the plan through regular FS exercises, then rectifying and renewing the plan • Coordinating the FS plan with the five other ESS plans • Ensuring that all FS operational sites have sufficient equipment and supplies • Planning Food Resource Survey and briefing survey workers on its procedures and information

Continued on next page

Position	Terms	Responsibilities
	[During a disaster]	• (4) Ensuring the provision of FS logs and providing regular reports, including operational matters, to the ESS Director • Reporting to the ESS coordination center and initiating and monitoring FS operations • Coordinating food supplies, including distribution to reception centers
	[After a disaster]	• (4) Submitting a report on FS emergency measures to the ESS Director • Ensuring that FS staff participate in stress management sessions
FS Planning Committee	[Prior to a disaster]	(5) Assisting the FS Coordinator • to ensure the active involvement of appropriate food agencies and groups in the community • to develop FS response plan • to identify immediate and continuous food problems likely to be encountered by disaster evacuees • to estimate the accessibility of FS resources in the community, such as personnel, supplies, and equipment • to assign FS roles and associated responsibilities
Food Supervisors at reception centers	[During a disaster]	• (6) Reporting to the FS Coordinator on problems, needs, and the status of activities • (7) Briefing FS workers on the number of evacuees, problem areas, and resource requirements • (7) Training FS workers at the designated reception centers • (7) Supervising FS workers • Developing schedules for work • Directing operation at the reception centers • Mobilizing staff when the FS is implemented and establishing FS in a reception center • Ensuring maintenance of nutritional variety as per Canada's Food Guide • Maintaining proper sanitation practices and safe working conditions • Assuring hygiene and sanitation guidelines are followed • Appointing a responsible person to keep an up-to-date log of borrowed items, messages, and donations • Setting up the supervisory office • Checking food service space • Setting boundaries for food service coverage • Checking numbers to be fed at the reception centers • Checking the needs for a mobile team • Setting up priorities • Defining special dietary needs and cultural food preferences • Checking supplies and restocking as necessary • Contacting food suppliers and backup staff • Verifying safety and security measures in a food area • Contacting other reception centers • Providing public information on meal hours and menus • Keeping a list of prepared foods that could pose health risks

Continued on next page

Position	Terms	Responsibilities
	[After a disaster]	• (6) Providing receipts and outstanding invoices to the FS Coordinator • (6) Submitting a report to the FS Coordinator and assisting in the evaluation of meal services • Arranging supply and equivalent inventories • Returning borrowed property and equipment, obtaining receipts • Examining a food service area to ensure orderliness and emptiness of refrigerators • Restoring the rest of the premises to their original conditions, restocking equipment and suppliers if necessary • Inspecting a kitchen area together with the building's owner and informing them about any damages. Composing letters of appreciation for staff and donors of goods, services, and facilities
FS worker at reception centers	[During a disaster]	[Chef] • Preparing a menu that aligns with basic nutritional guidelines using available supplies • Ensuring optimal organization of a kitchen for maximum efficiency and safety • Creating a work schedule • Assigning and supervising work • Guaranteeing proper storage of food supplies • Overseeing efficient organization of stock • Ensuring that relevant sanitation and safety standards are met in cooking, food distribution, and food storage areas [Cooks and Assistant Cooks] • Preparing stipulated meals and delivering them to a service counter • Ensuring that a sufficient supply of hot water can be provided • Making food for transportation if required [Food Servers] • Establishing a service counter, garbage disposal units near cafeteria exits, and self-service stations for cutlery, milk, sugar, and condiments • Serving portions as per the chef's specifications • Preparing food during meals • Conveying leftover food to a kitchen and preserving it appropriately [Dishwashers and Cleaners] • Organizing a distinct dishwashing area for dishes and serving equipment • Maintaining cleanliness in the area • Cleaning and sterilizing garbage containers and floors • Washing and sterilizing garbage containers • Washing floors

This table is based on "Emergency food service: planning for disasters" [58].

*Note: This number is in line with Figure 3.

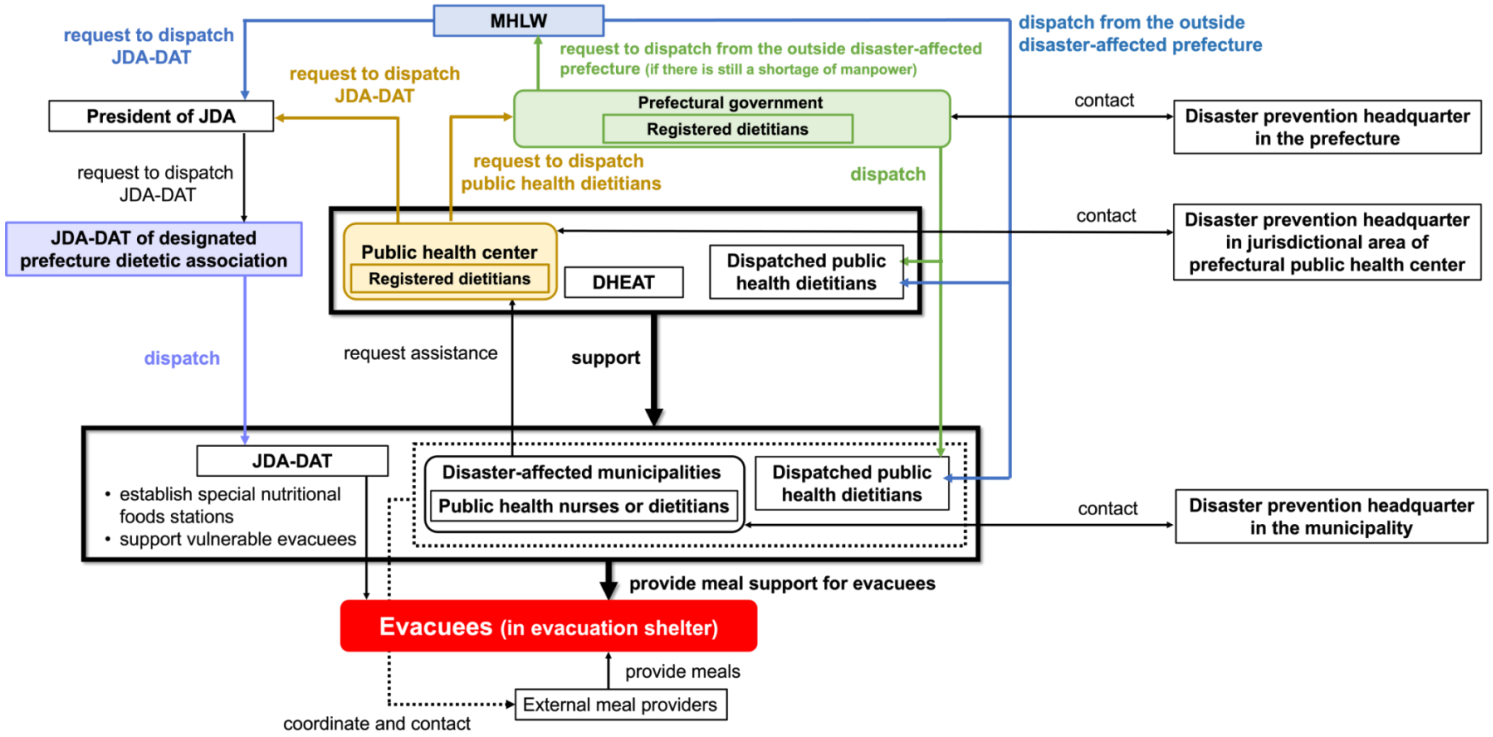

Figure 4. Japan's emergency food services model (based on "Guidelines for food and nutritional assistance in large-scale disasters" [64] and "Guidelines for food and nutritional assistance in disasters" [68]).
MHLW: Ministry of Health, Labour, and Welfare; DHEAT: Disaster Health Emergency Assistance Team; JDA-DAT: Japan Dietetic Association-Disaster Assistance Team. The colored shapes (blue, green, purple, and yellow) indicate those that dispatch human resources or have more than two responsibilities toward other staff members.

In Japan, Manual numbers 1, 3, and 6–8 describe the organization chart [62,64,67–69]. Manual numbers 1 and 6 mainly focus on care for those who need special foods, such as mothers and infants [62,67]. Manual number 3 describes overall disaster food and nutritional assistance in association with governments [64]. Manual number 8 explains the personnel roles [69]. Hence, we show the organization chart using Manual number 3 (Figure 4) [64]. Moreover, we used the chart of the JDA-DAT to show how it works with the MHLW, public health center, and prefectural dietetic association, referring to Manual number 7 [68] (Figure 4). Table 7 presents the model roles in meal provision during an emergency in Japan, corresponding to Figure 4 in Manual number 3 [64]. In this model (Table 7 and Figure 4), the players of food and nutritional support are to be public health officers in disaster-affected municipalities (nurses and dietitians), dispatched public health dietitians, and members of the JDA-DAT [64]. Public health dietitians in disaster-affected municipalities and dispatched dietitians work on the frontline, providing meal support for evacuees by contacting other departments [68] or external meal providers, including volunteer organizations and boxed meal vendors [64,69]. Members of the JDA-DAT mainly provide aid for vulnerable evacuees [64]. The JDA-DAT consists of staff and a leader who has completed training. After calling for dispatch, the JDA-DAT provides on-site support by teaming up with public health dietitians in disaster-affected areas (Manual number 7) [68]. Manual numbers 3, 6, and 8 state the necessity for these staff to collaborate with external agencies, such as nutritional organizations, dietary improvement volunteers, and restaurants [64,67,69]. The public health center, prefectural government, MHLW, and Disaster Health Emergency Assistance Team (DHEAT) are in charge of logistical support [64,67,69]. The DHEAT comprises five prefectural or municipal officials: Doctors, public health nurses, pharmacists, registered dietitians, and clerical workers [63,64,67]. According to Manual number 3, registered dietitians in prefectural structures support the public health center and coordinate the dispatch of dietitians or registered dietitians [64]. The MHLW issues the tailored “Nutritional Reference Values for Feeding at Evacuation Shelters” (NRVs) for the disaster-affected prefectures [67].

Table 7. Responsibility of each position during each period in Japan.

Position	Terms	Responsibilities
• Public health nurses or dietitians in disaster-affected municipalities • Dispatched public health dietitians	[During a disaster]	• Spreading awareness about healthy diets • Providing health education and self-help assistance • Offering meal assistance through food aid, stockpiles, mass feeding, and boxed meals • Enlightening mass feeding volunteers to secure adequate nutrient provision • Providing meal assistance for vulnerable individuals • Ensuring hygiene management and providing sanitation advice • Monitoring stockpiles, relief supplies, meals, and evacuee needs • Conducting dietary surveys of meals at evacuation shelters • Creating a health action plan and business restart plan • Liaising with JDA-DAT and external meal providers such as boxed meal vendors and volunteers for hot-meal services [Responsibility limited to public health nurses or dietitians in disaster-affected municipalities] • Planning external assistance contents • Requesting assistance from the public health center
• Registered dietitians in public health centers • Disaster Health Emergency Assistance Team (DHEAT) • Dispatched public health dietitians	[During a disaster]	• Assisting dietitians working in disaster-affected municipalities, dispatched public health dietitians, and JDA-DAT • Assessing health issues • Procuring and distributing resources • Contacting food sanitation inspectors • Collecting disaster information • Assessing the food service status of mass retailers and supermarkets • Securing the lifeline status • Analyzing dietary surveys and evaluating the nutritional status • Determining the priority measures • Contacting municipalities, prefectures, and the disaster headquarters (Public health center coordinates the human resource request from municipalities and asks the prefecture for support.) [Responsibilities limited to registered dietitians in the public health center and dispatched public health dietitians] • Collecting support requests • Requesting the dispatch of dietitians, registered dietitians, and JDA-DAT • Planning the contents of external assistance
Registered dietitians in prefectural government	[During a disaster]	• Assisting public health centers • Contacting MHLW, disaster headquarters, public health centers, and JDA-DAT (Prefectural government dispatch dietitians or registered dietitians at the request of the public health center. If the manpower is still insufficient, it coordinates and requests the dispatch of dietitians or registered dietitians to MHLW.)

Continued on next page

Position	Terms	Responsibilities
Ministry of Health, Labour, and Welfare (MHLW)	[During a disaster]	• Issuing Nutritional Reference Values for Feeding at Evacuation Shelters (NRVs) to the disaster-affected prefecture • Contact prefectures (MHLW requests the prefecture to dispatch public health dietitians from outside the disaster-affected prefectures.)
Japan Dietetic Association-Disaster Assistance Team (JDA-DAT)	[During a disaster]	• Contacting public health centers, municipalities, and prefectural governments • Establishing special nutritional food stations for vulnerable individuals • Providing meal assistance, especially for vulnerable evacuees

This table is based on "Guidelines for food and nutritional assistance in large-scale disasters" [64].

3.1.2. Food service plan

According to the Canadian EFS manual, the FS coordinator and planning committee create a FS plan in collaboration with municipal departments such as engineering, public health, and fire. A FS plan is required to describe the FS worker personnel, FS resources, supplies, and equipment. After developing trained workers and locating equipment and supplies, disaster response procedures should be tested, and their performance should be evaluated. This exercise should be conducted with minimal food supplies and staff, unforeseen issues (breakdown of equipment), emergency meals, hot-meal services, and improvised feeding areas. The ESS director or FS Coordinator plans these exercises [58].

In Japan, prefectural and municipal governments develop regional disaster prevention plans and examine their contents annually under the Basic Act on Disaster Management. Public health dietitians from prefectural governments should position the contents of food and nutritional assistance, including food supply systems, nutritional support, and promotion of household stockpiling in these plans by collaborating with disaster-related departments [64]. At the municipal level, public health dietitians also need to describe nutritional management in regional disaster prevention plans based on prefectural disaster prevention plans (Manual number 2) [63]. The regional disaster prevention plans need to be reviewed in normal times to prepare for emergency situations (Manual number 6) [67]. The use of action cards that present specific roles or responsibilities is recommended, so that registered dietitians in public health centers can learn how to work with public health dietitians or those dispatched to disaster-affected areas (Manual number 7) [68].

3.1.3. Staff training

In Canada, FS coordinators train or arrange staff training. The training program covers community emergency planning, including the roles of the municipal emergency response, the outline of the FS service, resource survey, directory, and log (how to complete the forms), FS operational guidelines, FS at reception centers, emergency food management, and FS plan [58].

In Japan, public health dietitians are required to participate in training to learn the laws or concepts of emergency health activities to improve their ability to collaborate with other organizations. Regular training is necessary to strengthen disaster food and nutritional assistance in each municipality (Manual number 3) [64]. Under Article 15 of the JDA-DAT management outline, the JDA-DAT also has to undergo 18 h of staff training before providing nutritional aid on-site. During training, staff can learn about nutritional assessments, recipes for disaster situations, and nutritional instructions for vulnerable evacuees, such as patients with dysphagia, people with food allergies, infants, and patients with chronic diseases (Manual number 7) [68]. Training involving disaster headquarters, those who serve hot meals, logistics personnel, registered dietitians, and public health nurses is recommended [63,64].

3.1.4. Survey and directory

In Canada, the Food Supervisor appoints staff to maintain log sheets. The EFS manual has three types of sheets: The Food Service Log Sheet, Accounting Log Sheet, and Donation Log Sheet (Food). The FS Coordinator trains recorders to preserve log sheets during emergencies. In the Food Service Log Sheet, recorders describe events in the reception centers and their measurements. This log provides data on the equipment or supplies rented, borrowed, and purchased. Staff members are also instructed to record the costs, names of the providers, and their contact addresses. The Donation Log Sheet (Food) was developed to ensure food safety. The FS Supervisor at the reception center provides a list of prepared foods that may cause health problems and contacts a public health inspector. The following information should be provided when food donations are delivered: Type of food, time of arrival, time of serving, necessity for refrigeration, and any notifications from the public health inspector. In addition to these three types of sheets, the FS Coordinator is responsible for planning the Emergency Food Resource Survey and informing survey participants about the procedures, including how to implement them. The survey allows the FS Coordinator and FS Planning Committee to be informed about food supply sources in the community and the prepared equipment in the reception centers. Survey results are listed in the Food Service Directory and should be reviewed at least once a year [58].

In Japan, Manual number 7 states that the JDA-DAT should conduct a chronology to record food and nutritional activities over time, such as when and what was donated to evacuation shelters. This information should be submitted to registered dietitians in public health centers [68]. Health assessments, including nutrition for vulnerable individuals, should be conducted, as described in Manual numbers 3, 6, 7 [64,67,68]. As shown in Table 7, public health officials in disaster-affected municipalities or dispatched public health dietitians conduct dietary surveys of meals. The surveys are to be analyzed by logistical supporters, such as registered dietitians in public health centers (Manual numbers 3, 7, and 8) [64,68,69]. Regarding disaster prevention, Manual number 3 states the necessity for preparing food sources and cooking equipment in places for hot-meal services [64].

3.1.5. Support for non-evacuating people

In Canada, the EFS manual describes the necessity of using mobile canteens or field kitchens for providing food to those who live in remote and inaccessible sites. In addition, developing maps to indicate the location of remote feeding sites is encouraged [58].

In Japan, Manual numbers 3, 4, and 6–8 indicate that evacuees sheltering at home should also receive nutritional aid [64,65,67–69]. Manual numbers 7 and 8 recommend planning dietary

assessments or surveys outside the evacuation shelters for those who are at home or staying in cars [68,69]. Due to the limited understanding of the conditions of home-based evacuees during past disasters, compiling a registry of those taking refuge at home and ensuring food delivery to them is essential [69].

3.2. Nutritional considerations described in the detected documents

3.2.1. Nutritional standard

Canada has no NRVs for disasters. Instead, the EFS manual suggests following Canada's Food Guide, which is a national food guide created by Health Canada [58]. The latest version of the guideline, published in 2019, indicates the desirable proportions of vegetables and fruits, protein foods, and whole grains in one meal. This guideline portrays a single portion of food for these three food groups to provide an image of a healthy diet without specifying serving sizes [70].

In Japan, the MHLW issues NRVs for meal provision, planning, and assessment [64,68,69]. NRVs display values for energy and nutrients that are at risk of deficiency during catastrophes, including proteins and vitamins B_1, B_2, and C [64,68]. In the event of a large-scale disaster, tailored NRVs are issued for disaster-affected prefectures, tailored for population composition by sex and age groups, using data from the latest census [64,69]. In past disasters, reference values of specific nutrients were also set to prevent deficiency: Calcium for adolescents, vitamin A for children, and iron for those with active menstrual cycles. The adequate intake value of sodium was also presented for the prevention of hypertension [68,69].

3.2.2. Model menus

The EFS manual shows the model menus for each target group. For meal categories such as soup and main dishes, adequate food quantities for 50, 200, and 500 evacuees are presented as standards. Furthermore, menus for evacuees are described for use from 1 to 3 days after disasters. Additionally, the menus from 1 to 3 days after disasters for emergency workers are also shown. Although the menu contents are similar to those for adult evacuees, they must include between-meal snacks such as hot beverages or broths, citrus fruit juice, nuts and dried fruits, and granola bars or similar substitutes. There are menus for infants (4–12 months) and children (1–6 years), each of which is further categorized into four and three age groups, respectively, with specific amounts of food [58].

In Japan, 1-day model menus based on food groups (staples, potatoes and vegetables, protein sources, milk, dairy, and fruits) are shown by the presence or absence of heat sources (Manuals number 2 and 3) [63,64].

3.2.3. Specific guidelines for vulnerable evacuees

In Canada, special attention is given to vulnerable evacuees. The manual specifies the types of food that should be consumed by different target groups, including infants (4–12 months of age), young children (1–6 years of age), and patients following a liquid or soft diet. Breastfeeding is recommended for infants; however, adequate quantities and kinds of formula are shown as alternative solutions. Food requisition guidelines for infants aged between 4 and 12 months are presented for each food group. Allowed or prohibited foods for those consuming liquids or soft diets are also described. In reception

centers, a Food Supervisor is assigned to accommodate special dietary needs and cultural food preferences [58].

In Japan, all eight documents mention the importance of dietary considerations for vulnerable evacuees. Manual numbers 4–6 specialize in maternal and child nutrition during emergencies and describe the necessity of continuous breastfeeding and the correct use of formula milk [65–67]. Manual number 4 emphasizes the need to develop support measures for maternal, infant, and young child feeding during emergencies, involving women in the planning process [65]. Although reception at the evacuation shelters can identify the number of vulnerable evacuees (patients with dysphagia or dietary restrictions, food allergic individuals, infants, and pregnant women), the number of vulnerable evacuees should be estimated through health checkup information from normal times to prepare stockpiles [64]. As seen in Manual numbers 1 and 3–7, the JDA establishes special nutritional food (special care food) stations for those who cannot consume regular meals served in evacuation shelters; this system was first operated during the heavy rains of 2015 [62,64–68]. Special nutritional food stations can be set, for instance, at public health centers or the office of prefectural dietetic association [64,69]. In this station, special nutritional foods are separated from normal-type foods [62], which enables registered dietitians to provide adequate types of meals for vulnerable evacuees [68]. As listed in Table 7 and Figure 4, the JDA-DAT mainly provides dietary support for vulnerable evacuees [64].

3.2.4. Feeding workers

According to the EFS manual, the EFS feeds evacuees, emergency workers, and volunteers. Rescue workers are recommended to drink large amounts of fluids, eat small amounts four to five times a day, eat a variety of nutritional meals, eat regularly, and avoid drinking stimulating beverages. This manual also includes precautions regarding the type of food provided to those who extract bodies from a crash or remains from a fire. For these workers, foods that bring back memories from rescue work, such as chicken legs, meat with bones, and meat with burnt skin, should not be served [58].

As for Japan, we could not find such dietary considerations for workers in any of the eight documents.

4. Discussion

4.1. Food service management

4.1.1. Model structure for disaster nutrition management

As summarized in Tables 6 and 7 and Figures 3 and 4, the model of the emergency food management body and its system differed between Canada and Japan. In Canada, ESS mainly depend on volunteers [35]. Regarding the FS planning committee, external business operators such as volunteer organizations and restaurant owners with food-serving know-how are incorporated as EFS members. Taiwan also achieved successful outcomes in shelter management during the 2024 Hualien Earthquake by introducing public–private partnerships based on past disaster experience [71]. Utilizing the potential of volunteers in emergency food services was similar to that in the USA and Italy [20,21].

Although Japanese manuals recommend getting help from external supporters in food services [64,69] and conducting training with these supporters [63,64], the model of the organization

chart was mainly covered by the government and municipal staff (Figure 4). However, past disasters have shown the difficulty in sustaining emergency responses by these staff. Not taking one holiday each week [72] and lack of rest [73] were the risk factor of mental distress for public servants. In the 2011 Great East Japan Earthquake, volunteers reached the disaster-stricken area; however, municipal officers were confused about what to ask of them [74]. According to Manual number 2, public health dietitians in municipalities should describe nutritional management in the regional disaster prevention plan [63]. However, the number of dietitians in the administrative organizations is small [69], and it is common for one dietitian or registered dietitian to be assigned [75]. The number of assigned public health dietitians per 100,000 population by each municipality was approximately 2.45 [75]. Furthermore, in most cases, disaster management departments have no dietitians [69]. According to a 2018 survey, only 12.9% of municipalities collaborate with public health dietitians or registered dietitians to develop regional disaster prevention plans [76]. Half of the municipalities did not describe food and nutritional management in the regional disaster prevention plan in 2018 [63]. The current staff allocation of registered dietitians or dietitians in municipalities may have caused this low percentage of planning for disaster food nutrition. Furthermore, the previous report [63] also indicates the low awareness of food and nutritional assistance in Japan, whereas the ESS program in Canada regards food as a basic evacuee need [14,38,58]. Consequently, Japan should incorporate volunteer organizations or external supporters with food service know-how in the planning committee, as seen in the EFS manual [58], for smooth and efficient support immediately after disasters.

4.1.2. Survey and directory

The governments of both countries have designed survey sheets for emergency food services. In Canada, food service, accounting, and donations are recorded in log sheets during an emergency. Moreover, an Emergency Food Resource Survey should be conducted during normal times. Survey results should be in the Food Service Directory, which is reviewed at least once a year [58]. A previous Japanese document recommended preparing foodstuffs or cooking equipment beforehand for hot-meal services during an emergency [64]. In July 2025, the Basic Act on Disaster Management was revised to mandate that the heads of each local government disclose the status of their material stockpiles [77]. This initiative is a step toward mitigating health issues during emergencies in Japan.

4.1.3. Support for non-evacuating people

Manuals in both countries describe strategies for providing food to those not in reception centers or evacuation shelters. Disabled people or older adults may be unwilling to stay in evacuation shelters due to concerns about communal living and confusion with other evacuees [65,69]. Those vulnerable evacuees may struggle to access food during an emergency. In a previous study, populations that were deaf and hard of hearing experienced food insecurity during the COVID-19 pandemic [78]. In addition, lack of transportation or living in remote areas could prevent residents from evacuating to shelters and accessing food [69]. In fact, it was difficult to send relief supplies to isolated villages after the 2024 Noto Peninsula Earthquake [79]. In Canada, approximately 80% of indigenous communities live in fire-prone areas; their geographical isolation hampered access to aid during the 2023 wildfire [80]. During emergencies, administrative officials may be too busy to take note of their living situations [69]. Although both countries have outlined measures for these residents in case of food disasters,

strengthening community resilience is extremely important for survival [81]. Expanding access to food banks [82] and encouraging food stockpiling [62,63] during normal times are efficient strategies for those who may find it difficult to access reception centers or evacuation shelters. A previous study also reported that social capital, resources originating from members of a network or group, promotes social support and contributes to developing disaster prevention measures and disaster drills [83]. Since public rescue services may face challenges in reaching all disaster-affected areas immediately following an emergency [83], mutual support, such as assisting neighbors in need and promoting shared community resources, is crucial, particularly for those who cannot evacuate.

4.2. Nutritional consideration

4.2.1. NRVs and model menus

Canada's Food Guide is used for disaster food management in the EFS manual [58]. In the USA, the "Dietary Guidelines for Americans" are used in any federal food, nutrition, or health programs [84]. However, a previous study revealed difficulties in preparing food for emergencies based on the national food guide [85]. Whether Canada's Food Guide is an adequate nutritional reference for emergencies remains uncertain.

In Japan, the NRVs for disasters and the desirable consumption of each food group have been described. The NRVs for energy and nutrients tend to be inadequate in food supplies during emergencies. As box meals or hot-meal services during emergencies in Japan fail to provide some necessary nutrients [86], minimum values may make it easy for meal provision staff to plan nutritious menus. However, a previous study in Japan indicated that NRV values were infeasible due to limited food variety and low awareness among dietitians or registered dietitians [87]. Moreover, only 6.5% of municipal dietitians who knew NRVs (47.5%) applied this parameter to their disaster management plans [88].

Although both Japan and Canada provide references for emergency food services, some problems and concerns have been raised in each country. Taken together, these values should be revised considering their feasibility and ease of use for disaster meal supporters.

4.2.2. Specific guidelines for vulnerable evacuees

Both Japan and Canada require staff to consider vulnerable evacuees with special meal assistance. An inappropriate diet may cause aspiration pneumonia and malnutrition, particularly among older individuals [89]. Infants and young children who are fed milk or baby foods also require feeding assistance. Staff in evacuation shelters have to manage the adequate distribution of breast-milk substitutes [65]. In Japan, JDA-DAT plays an important role in providing meal support to vulnerable evacuees through its specialized knowledge and skills [64]. Furthermore, special nutritional food stations operated by JDA-DAT deliver special foods to this population [68]. These Japanese systems enable effective, secure, and reliable delivery of special foods to those in need, which may be a strength of the country. However, older individuals may have difficulty eating special foods because labels, such as cooking methods, are too small for them to read. Moreover, the shortage of food intake among lactating women is also an issue in evacuation shelters [90]. Overall, Japan has a support system for providing meals to vulnerable people; however, some issues still need to be examined.

4.2.3. Feeding workers

According to the EFS manual [58], the EFS program feeds disaster workers and volunteers as well as evacuees. The menus for workers are also described for use from 1 to 3 days after a disaster in Canada. Although the menu contents are almost similar to those for adult evacuees, they must include between-meal snacks such as hot beverages or broths, citrus fruit juice, nuts and dried fruits, and granola bars or similar substitutes [58].

In Japan, volunteers bring food with themselves to avoid placing a burden on the disaster-stricken areas [91]. The Disaster Volunteer Center, a hub to coordinate the evacuees' needs and receive volunteer applications, does not cover the cost of meals [91]. Past disasters have shown that volunteers were appreciated by some municipal staff as precious human resources [74]. According to a previous study [92], young people did not participate in disaster volunteering due to economic difficulties or the absence of financial support in volunteer activities. As seen in the Canadian EFS manual [58], support for volunteers, including feeding, may be an important incentive to get them to help.

4.3. Limitations

In this study, we only focused on the national standard of disaster food and nutrition assistance. Each province (Canada), prefecture (Japan), and municipality may have unique initiatives, and there may be slight differences in emergency food services. However, in the keyword searches for basic information collection (Supplementary file), there was dispersion in the number of materials about ESS in each province: A maximum of 67 (Alberta) and a minimum of 1 (Newfoundland and Labrador, Quebec, and Nunavut). This makes it difficult to grasp the overall emergency food services in the country. Moreover, we could not gather sufficient information from the supplementary file to describe emergency food services in Canada. Although the present study only used the EFS manual as a document of Canadian disaster nutritional assistance, differences could be found in the overview of disaster food assistance between Canada and Japan. To obtain actual experience in disaster meal provision in Canada, field surveys should be conducted; alternatively, areas that provided meal services in recent disasters should be interviewed.

5. Conclusion

Regarding the meal provision system, it may be desirable for Japanese municipalities to include external supporters with specific knowledge about serving meals in disaster planning. As shown in the EFS manual, feeding volunteer staff is also important for disaster management. Both Japan and Canada have outlined strategies for providing food to non-evacuating people; however, strengthening community resilience or social capital should be prioritized to prevent food insecurity, as learnt from past disasters. Our study may encourage the government or relevant organizations to engage external experts, review the emergency food services for both staff and evacuees, and promote community resilience, particularly in isolated areas, in case of future disasters.

Use of AI tools declaration

The authors declare they have not used Artificial Intelligence (AI) tools in the creation of this article.

Consent for publication

Regarding the reprinting of Figures, we obtained consent from the PHAC to describe the EFS organizational chart and outlines of the EFS manual. The citing organizational chart was approved by the Japan Dietetic Association and Japan Public Health Association.

Data availability

Access destinations to the ESS information are available in the references and Supplementary file.

Acknowledgments

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Conflict of interest

All authors declare no conflicts of interest in this paper.

Author contributions

NS and YW were in charge of administration and supervision. HS and YW contributed to funding acquisition. HS and NS conceptualized the study. HS designed the study including investigation and methodology. All data (websites, manuals, and guidelines) was collected, analyzed, and curated by HS. HS and NS interpreted and validated the data. The major contributors to the manuscript were HS and NS. All authors critically revised and commented on the previous versions of the manuscript. After revision, the final version of the manuscript was approved by all authors. NS was responsible for the submission of the manuscript.

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