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Fostering food preservation practice: Lessons from a community train-the-trainer program on Canada's west coast

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Local food systems programs in Canada's rural and remote communities support residents to improve their access to healthy food by strengthening various social practices within the system. Designing programs to strengthen social practices can help address food insecurity by providing a support structure where people can build competencies and access materials necessary to engage in practices like food preservation, and make meanings that will encourage them to sustain their engagement. The elements needed for successfully establishing a social practice–competencies, materials, and meanings–must be present. Unfortunately, food preservation programs in Canada's local food systems have not fully embedded structures to bring all three elements of social practice together or undertake a participant-focused program assessment. Consequently, we do not know the potential of local food preservation to meet peoples' various needs or the challenges that program participants experience practicing food preservation. This paper uses a social practice framework to determine the extent to which a community food preservation program on Canada's west coast strengthened the three elements of social practice. Findings from interviews show that in line with the paper's three objectives, participants of a community train-the-trainer program (1) built and shared food preservation competencies, (2) accessed materials to practice food preservation, and (3) formed meanings to support their continuous engagement in food preservation. The paper shows how a social practice framework can support a participant-focused program evaluation and provide a practical and straightforward tool for assessing food systems programs.

KEYWORDS

local food systems, food preservation, social practice, train-the-trainer, Canada

Introduction

In North America, initiatives are emerging to strengthen local food systems (LFSs) and support people to enhance their access to healthy food and to combat food insecurity–the unstable availability and access to healthy food (Sitaker et al., 2014; Community Food Centres Canada, 2018). Local food systems are complex webs of actors and activities involved in food procurement, distribution, processing/preservation,

consumption, and disposal at the community or regional level (Edge, 2013). Some common examples of interventions aimed at strengthening LFSs include financial vouchers for beneficiaries to purchase healthy food through farmers' or community markets (Dimitri et al., 2014; Community Food Centres Canada, 2018); school and community garden programs (Stluka et al., 2019); and incentives for local food growers to manage food production costs, raise their income, and pass savings onto people (Sitaker et al., 2014). Such interventions are concentrated within the food procurement, distribution, and consumption components of LFSs and often target behavioral change in individuals, whereby people are expected to make healthy food choices.

Community food preservation education programs are also emerging to offer people a practical way to better meet their food needs from LFSs year-round (Bulley, 2012; Fogarty and Atkinson, 2018). In Canada, such initiatives have sought to strengthen food preservation practice among residents of rural and remote areas where accessing food through conventional grocery stores can be a challenge due to the prohibitive cost of nutritious food (Bulley, 2012; Fieldhouse and Thompson, 2012; Dillabough, 2016). For example, a family of four in northwestern Ontario pays $1,912.68 more for healthy food per year than a similarly-sized family in Toronto (Melillo, 2018). Poverty and limited economic opportunities in rural and remote areas also make affording healthy food challenging for residents, particularly after spending money on other expenses like housing (Batal et al., 2021). Also, a decline in food knowledge, including food procurement and preservation skills, can exacerbate food insecurity in rural and remote communities, with people unable to secure alternative forms of food provisioning (Fieldhouse and Thompson, 2012). The decline in food knowledge among Canadians has been driven by the increased consumption of ultra-processed ready-to-eat food that requires little to no preparation skills (Moubarac, 2017). For Indigenous People, who inhabit many of the more remote areas in the country, food knowledge decline is also linked to the intergenerational effects of Canada's colonial policies, such as the residential school system, which removed children from their homes and communities where food procurement and preservation skills were taught (Batal et al., 2021). In response to these food access challenges experienced by residents of rural and remote regions, some communities have designed food preservation programs to help locals build adequate knowledge and access resources to procure and preserve affordable seasonal food from LFSs (Ferber, 2012; Fieldhouse and Thompson, 2012).

Food preservation–treating and handling food to reduce spoilage–is particularly important for people who use LFSs to enhance food and nutritional security, social interactions, food knowledge building, food systems awareness, income generation, and food waste reduction (Bulley, 2012; Martindale and Schiebel, 2017). Local food systems offer seasonal food that often reaches people shortly after harvest, thus safeguarding freshness, quality, and nutritional value (Hendrickson et al., 2015). Preserving such quality seasonal food enables people to keep them off-season for year-round consumption, securing their food and nutritional needs, including times when people experience economic challenges that affect their ability to access food (Materia et al., 2022). Additionally, LFSs are structured to support interaction amongst people who use them through spaces like community kitchens and farmers' markets (Irshadd, 2010). Therefore, practicing food preservation within such systems allows people to socialize, learn from one another and build food knowledge (Pleasant, 2007). Similarly, interactions among people within LFSs encourage growers to produce a variety of food that meets consumers' needs and preferences (Hendrickson et al., 2015) and thereby increase the diversity of preserved food available for year-round consumption. Furthermore, preserving food within LFSs increases people's awareness of the seasonality of food, including when and how to procure them. In turn, such awareness encourages people to know more about LFSs and are encouraged to get involved in maintaining such food systems in various ways (Hendrickson et al., 2015). Additionally, preserving food may serve as a source of income for individuals who wish to sell preserved food through various structures such as farmers' markets or direct marketing (Ferber, 2012). Preserving food within LFSs also helps reduce food waste (Martindale and Schiebel, 2017). Local food systems are small-scale, and producers in rural and remote areas especially lack access to proper storage infrastructure, leading to post-harvest losses and increased food insecurity for people who rely on such food systems (Ridolfi and Dubois, 2019). Therefore, food preservation helps reduce food waste and safeguard the year-round supply of safe food (Martindale and Schiebel, 2017).

Food preservation and other activities such as cooking and shopping are examples of social practices within LFSs (Cohen, 2019). Social practices are interconnected routinized types of behavior (Reckwitz, 2002), and are carried out within a context where people are influenced by one another and share a standard of how these activities are supposed to be done (Reckwitz, 2002; Shove et al., 2012). People who participate in social practices also share norms, values, challenges, and meanings attached to such practices.

Efforts to strengthen social practices are considered an effective way of addressing many societal challenges, including food system challenges like food insecurity by helping to create the conditions and structures in which people learn, modify, and maintain desirable practices that bring about positive change (Cohen, 2019). Designing, implementing, and assessing LFS initiatives such as community food preservation programs can benefit from a holistic approach for determining how and why social practices are established and creating structures where people can continue to be supported to practice food preservation. However, to achieve desirable changes in a holistic way within any system, including LFSs, researchers have argued that three elements of social practice–competencies,

materials, and meanings–must be developed together (Reckwitz, 2002; Shove et al., 2012). Nevertheless, while a program can be designed to strengthen the competencies (e.g., workshop opportunities) and materials (e.g., equipment rental) of a social practice explicitly, the meaning element cannot be developed or strengthened in quite the same way. That is because people make their own meanings out of the practices they engage in. But structures can be put in place to help people to continue engaging in social practices and thus, indirectly, facilitate the development of meaning. If the right structures are not present to support people to continue engaging in social practices, such practices will likely be abandoned and participants will miss developing meaning that is critical for the success of a social practice (Reckwitz, 2002).

So, in the context of supporting food preservation practice within a given community or population, a holistic approach to programming would entail identifying and developing the competencies and materials needed for such practice in that particular setting. Similarly, it would require a structure where program beneficiaries and their activities can be monitored to identify potential problems preventing them from adopting food preservation practices and creating a support system to address such issues. A holistic approach also involves creating opportunities for continuous competency development and material provisioning. This is not just a one-time effort; strategies must be enacted to enable people to continue engaging in food preservation and *create meanings*. Those meanings, in turn, motivate ongoing engagement. According to research in areas such as food policy and consumer consumption, framing programs to strengthen social practices would mark a significant shift in policy, from the current focus on individual behavioral change to an increased emphasis on the context within which practices are carried out (Holtz, 2014; Cohen, 2019). Within LFSs, such a policy shift could mean supporting people to access and consume affordable healthy food within a structure where they can continue to learn, get inspired by others, and access the help they need as part of a supportive community, instead of solving food insecurity on their own.

Although the use of a social practice framework has emerged across various fields, most academic discourse around application of such a framework has been theoretical (Holtz, 2014). Consequently, we have limited evidence of real-world outcomes where a social practice framework has been applied. In the communities in Canada where food preservation initiatives have taken place, they only appear to address one or two of the three constituent components of social practice; either materials (Ferber, 2012; Fieldhouse and Thompson, 2012) or materials and competencies (Fogarty and Atkinson, 2018). Although some initiatives included group workshops and materials (Bulley, 2012; Fogarty and Atkinson, 2018), there are no examples of food preservation initiatives that explicitly monitored programs, identified challenges, and put structures in place for continued support. We know this because the small number of food preservation initiatives reported in Canada do not provide a participant-based assessment of experiences (e.g., McNicoll, 2011; Fogarty and Atkinson, 2018). Without such assessment, it is hard to know how well-programs address community needs in different parts of the country, the challenges that communities face when establishing food preservation practices, or the meanings that people attach to food preservation practices.

This paper addresses that gap. It does so by applying the social practice framework established by Shove et al. (2012) to critically examine a community training program developed to support food preservation knowledge and skills among residents of the Clayoquot Sound Biosphere Region on Canada's west coast. Using a participant-based assessment, we conducted the research according to three objectives:

(a) To describe the food preservation techniques that participants acquired through the program and how they are sharing such knowledge in the community,
(b) To determine the resources available to participants to support food preservation practice, and
(c) To explain the various meanings that participants attach to the practice of food preservation within LFSs.

Following this Introduction, we delve deeper into social practice theory, highlight its potential to support LFS initiatives, and consider how food preservation programs in Canada have incorporated social practice into their design to date. We then introduce the study region and describe our research design and specific methods. Our study results show how program participants acquire and share food preservation knowledge, access resources to support food preservation practice, attach various meanings to food preservation practice, and experience challenges in participating in these practices. We also report how participants assessed the food preservation program in which they participated in, including their suggestions for program enhancement. We discuss our findings in the broader context of LFSs and consider the suitability of adopting a social practice framework to help develop and assess LFS initiatives in the future, including food preservation. Our conclusion highlights the importance of putting structures in place when designing LFSs programs to support continuous food preservation practice and potential meaning-making.

Social practice theory

Social practice theory explains how individuals form, copy, maintain, and modify social practices within systems and how such actions can bring about changes (Shove et al., 2012). A practice is "a routinized type of behavior which consists of several elements, interconnected to one another: forms of bodily activities, forms of mental activities, 'things' and their use, a

background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge" (Reckwitz, 2002), p. 249). Activities of daily living embedded within food systems that humans carry out, such as shopping, food preparation, or preservation, are examples of social practices. Social practice theory assumes that people perform activities of daily living within socialized structures of practice (Spotswood et al., 2021). Although individuals perform social practices at different times and spaces, they are similar and guided by certain norms associated with such activities (Reckwitz, 2002). Thus, understanding routine human activities, including problems that may emanate from such engagements or finding solutions to such problems in a given context, must focus on changing social practices, not individual behavior.

As noted, social practices are formed from a convergence of three interrelated elements–competencies, materials, and meanings (Shove et al., 2012). The competency element encompasses the knowledge and skills required to engage in and maintain social practices within a system. Materials are the various resources individuals need to carry out social practices within a system–these include infrastructure, equipment, and financial resources. Finally, individuals practice multiple activities within a social context and are influenced by other people and customs attached to such practices. As such, each time people engage in a practice, they form interpretations and give meanings, regardless of how mundane. Individuals share the meanings attached to social practices across time and space within a system (Shove et al., 2012).

People act as carriers of social practice and can teach or influence others to copy such activities (Cohen, 2019). People can also adapt or abandon and pick up new practices to meet their needs and stay within the boundaries of what is the acceptable way of doing things. Similarly, structures can be put in place to strengthen the three elements of social practice within a system. In LFSs, for example, understanding nutritional insecurity problems through a social practice theory lens can offer a holistic means to engage in healthy food provisioning. This may include supporting people to build food procurement, preservation, and preparation competencies; creating support for people to access community garden spaces, take part in foraging, and access equipped kitchen spaces; and building a structure to identify and support competency or materials needs, or address other problems that may hinder healthy food provisioning.

When applied to our research context, elements of social practice can be targeted to empower people to preserve their food at home and potentially support year-round food access. By being part of a food preservation social practice, the burden of ensuring year-round food access weighs less heavily on individuals because they belong to a community of practice where they can support, influence, and learn from one another to maintain their practices and thus food security.

Analyzing Canadian food preservation initiatives through a social practice lens

Competencies

Competencies associated with food preservation include safe food handling, food preparation techniques, knowledge about preservation methods, the appropriate methods to use for various foods, and proper equipment operation (Andress, 2016). Having knowledgeable preservers in a community is essential for sustaining safe food preservation practices in LFSs and maintaining an adequate supply of preserved food for consumers. The lack of knowledgeable preservers in Canada's LFSs limits the supply of locally-preserved food for users of such food systems (Edge, 2013).

Most food preservation programs across Canada encourage knowledge acquisition at the individual and community level (McNicoll, 2011; Bulley, 2012; Fogarty and Atkinson, 2018). For example, the *Empowering Family Health* project in North Cariboo District, British Columbia (BC), the *Produce Preservation Program* in British Columbia, and the Community Cannery Initiative in southern Ontario trained residents in various food preservation techniques, including fermentation, drying, and canning (McNicoll, 2011; Bulley, 2012; Fogarty and Atkinson, 2018). While some of these programs helped individuals build their own food preservation knowledge, others, such as Produce Preservation Program, trained people to then help others acquire similar food preservation techniques in their communities (Bulley, 2012). In the Produce Preservation Program, trainees from 21 communities went on to teach other adults in their localities (Bulley, 2012). Unfortunately, this program ended in 2016, leaving a void in food preservation programming in the province.

Despite this loss, the 'train-the-trainer' model of knowledge building and sharing was found to be an effective strategy to strengthen community food literacy, including food preservation skills acquisition (Bulley, 2012). Program evaluators found that it is also vital to examine the experience of program beneficiaries (Yarber et al., 2015; Lai et al., 2017). Without such analysis, however, it is challenging to determine the nature of knowledge building and sharing that occurs in a food preservation initiative, including those with a train-the-trainer component. Because most initiatives do not assess trainee experiences, little is known about the food preservation knowledge and skills that have been shared in beneficiary communities or about the challenges that participants faced. Such information would be extremely useful to other communities looking to start their own food preservation program. Beyond knowledge and skills acquisition, access to various resources is essential for food system practices to become established in a community (Cohen, 2019).

Materials

The materials available to beneficiaries through food preservation initiatives can come in various forms, including equipment loan or rental, preservation manuals, workshop toolkits, and community spaces (e.g., community kitchens). The provisioning of food preservation equipment is ubiquitous in Canada's LFSs food preservation initiatives (Bulley, 2012; Fieldhouse and Thompson, 2012; Fogarty and Atkinson, 2018). Some communities have rented canning and dehydration equipment to residents, while others offer loans for program participants to purchase such equipment. For example, as part of the Government of Manitoba's *Northern Healthy Food Initiative*, beneficiaries can access revolving freezer loans to aid the preservation of seasonal food in participating communities (Fieldhouse and Thompson, 2012). Similarly, through the *Empowering Family Health* project, residents in British Columbia can access and utilize various food preservation equipment in spaces such as community halls and kitchens (Hernandez, 2016). What is rarely included in the reporting about food preservation equipment is the challenges users experience in using them. For example, after accessing initial loans to purchase freezers as part of an initiative, already struggling program beneficiaries can face additional challenges with funding the cost of energy (depending on the location and type of freezer), maintenance, and repairs (Kendall and Payton, 2008). A program study would reveal some of these challenges and allow communities to identify solutions. In addition to having on-site equipment, community kitchens that are set up to enable food preservation practice are often managed by knowledgeable individuals who can provide correct and safe food preservation information to users (Pleasant, 2007). Thus, both experienced and inexperienced residents can benefit from shared spaces such as community kitchens.

Other programs have provided residents with written resources such as food preservation books, manuals, or workshop kits to help individuals maintain safe practices and enable groups to organize workshops (Ferber, 2012). For example, the Root Cellars Rock Project workshop toolkit is a resource developed by the Food Security Network of Newfoundland and Labrador to help local organizations run food preservation workshops in their communities (Ferber, 2012). Although the provisioning of various resources and opportunities for knowledge acquisition as mentioned above can aid food preservation practice, people must attach meaning to a social practice to keep them engaged in it (Shove et al., 2012).

Meanings

Some food preservation programs have been designed to foster human connections through community workshops (Fogarty and Atkinson, 2018), while others seek to empower individuals to carry out food preservation at the household level (Fieldhouse and Thompson, 2012). In such cases, as people engage in LFSs activities, including food preservation, they attach various interpretations, sentiments, and significance to such activities (Diekmann et al., 2020). For example, in addition to securing their food needs, people participate in community canning kitchens because of the opportunity to socialize with other members of their community (Pleasant, 2007). Similarly, preserving at home offers people the chance to reconnect with family and other traditions associated with such activities (Andress, 2016). However, like other social practices, people must continue engaging in food preservation for meaning to be created.

Although having the proper food preservation competencies and materials can support people in preserving their food, as we highlighted above, other factors (e.g., equipment maintenance) could hinder them from participating in food preservation and potentially making meaning. Therefore, having a continued support system in place where problems can be identified and solved will potentially help people to keep practicing food preservation or other LFS practices long-term. Efforts have been made in Canada to support people in building food preservation competencies (including one-off group workshops) and enhancing access to food preservation materials. However, no program has reported having a structure to stay in touch with participants and provide continuous support to maintain food preservation practice. In order words, a review of the literature reveals that how people are supported to potentially make meanings from engaging in food preservation, and the types of meanings that people make, is less emphasized than the competencies and materials components of social practice. Thus, it appears food preservation programs in Canada have not supported the integration of all three elements needed for a social practice to establish.

Without a structure to keep up with program participants (including identifying and addressing problems), it is challenging to determine whether people participate in food preservation and make meanings from such activity or the type of meanings that people attach to food preservation. In turn, without meaning-making, people are less likely to keep participating in a social practice. Knowing the meanings that people attach to food preservation or other LFS practices is important because it helps a community know what motivates residents to participate. It can also inform future efforts to strengthen LFSs.

Adopting a holistic approach, where all three social practice elements come together as an integrated whole, is more likely to support residents of communities where there is unequal access to healthy and affordable food. This is because low-income residents may not be able to afford materials even if they have the competencies to preserve their food. Similarly, providing only materials in an initiative may create a void because beneficiaries may lack food preservation competencies and may not benefit much from having equipment or other resources that they cannot use. However, we need more examples of food

preservation programs that purposively bring together all three elements of social practice to better understand the potential for such interventions to address the food, social, and food-knowledge acquisition needs of residents in Canada, especially those rural and remote areas where accessing healthy food year-round can be such a challenge.

The study area and methods

Community and research context

The Clayoquot Sound Biosphere Region (CSBR) is located on the west coast of Vancouver Island, in British Columbia, Canada. The CSBR is the traditional territory of five nuučaan̓uł (Nuu-chah-nulth) nations – hišqʷiʔatḥ (Hesquiaht), ƛaʔuukʷiʔatḥ (Tla-o-qui-aht), tukʷaaʔatḥ (Toquaht), aaḥuusʔatḥ (Ahousaht), and yuułuʔiłʔatḥ (Ucluelet). The CSBR is home to 6,462 residents and includes 11 communities that the Clayoquot Biosphere Trust[1] (CBT) serves (Clayoquot Biosphere Trust, 2018a). These communities are Hesquiaht, Hot Springs, Ahousaht, Opitsaht, Tofino, Ty-histanis, Esowista, Ucluelet, Hitacu, Macoah, and Area C of the Alberni-Clayoquot Regional District (ACRD-Area C). However, as shown in Figure 1 below, our research participants reside in two communities–Tofino and Ucluelet.

The region is known for its thriving tourism industry, which creates jobs and income opportunities for residents. However, there are concerns that as living costs rise, necessities such as housing and food become increasingly unaffordable for the average resident (Clayoquot Biosphere Trust, 2019). Monthly housing expenses for residents have gone up by $674 or 27 percent between 2017 and 2019–cutting into food budgets (Clayoquot Biosphere Trust, 2019). Also, although there are grocery stores in Tofino and Ucluelet, the cost of healthy food in those communities is 12 percent higher than in the next town inland (126 and 101 km away from Ucluelet and Tofino, respectively)–making it challenging for residents to meet their food needs in addition to other expenses like housing. Further, the region gets winter storms each year that bring power outages. Also, the region lies in a tsunami hazard zone. While tsunamis are rather rare events, it is a concern along with winter storms that make emergency food preparedness an important issue for residents.

Notwithstanding these risks, residents have the potential to access and preserve affordable seasonal food through the region's LFSs (Clayoquot Biosphere Trust, 2018b). The mild weather enables residents to grow food outdoors and indoors year-round. However, due to rocky terrain, some residents need to ship soil for food production from outside their communities. In addition, residents can purchase local produce through intermediaries such as the Tofino Ucluelet Culinary Guild–a local non-profit organization that connects local producers to consumers (Clayoquot Biosphere Trust, 2018b). Residents can buy food boxes or buy in bulk from Tofino Ucluelet Culinary Guild or directly from producers. They can also harvest wild food, including berries and seaweed (Clayoquot Biosphere Trust, 2018b). Nevertheless, a community consultation championed by Eat West Coast (EWC) in 2017 revealed that few residents take advantage of the benefits that LFSs have to offer because they do not have the knowledge and skills to preserve their food safely (Clayoquot Biosphere Trust, 2018b). EWC is a regional food security program of the Clayoquot Biosphere Trust and our community partner. EWC Identified the need for a community 'train-the-trainer' food preservation education program to help residents enhance their food security (Clayoquot Biosphere Trust, 2018b), and launched such a program in the region in 2018 to help residents build and share safe food preservation techniques and access food preservation equipment. The program began with an initial two-day food preservation workshop for future trainers, who, in turn, taught other residents who did not attend the training.

Methodology and methods

Methodological guidance came from our commitment to follow community based participatory research approaches (Green and Mercer, 2001), which entailed working collaboratively with the community and following the community's directions about their research needs. To achieve this, initial discussions with the community about a research collaboration began in August 2018. Two planning visits were then made to the community in April 2019 and October 2019 before data collection began in January 2020. Following several engagements, the community expressed a need for our research to help them understand the impact of their food preservation program and how such initiative supports residents in a region where accessing affordable healthy food can be challenging.

Following a call for participation to all food preservation program graduates, eight participants (six women and two men/34–50 years of age) agreed to participate. We used semi-structured interviews to hear these participants' experiences. The in-person interviews occurred in the communities of Tofino and Ucluelet in January and February 2020. The interviews covered seven main themes shown in Table 1 below. The interviews revealed the food preservation knowledge that participants acquired from the program and how they were shared such knowledge in their communities. We also learned from the interviews the community resources available to

1 The Clayoquot Biosphere Trust (CBT) is the steward of the Clayoquot Sound UNESCO Biosphere Reserve and a community foundation for the communities of the biosphere region. While UNESCO retains the term reserve, Canadian biosphere reserves have universally and officially adopted the terminology of region.

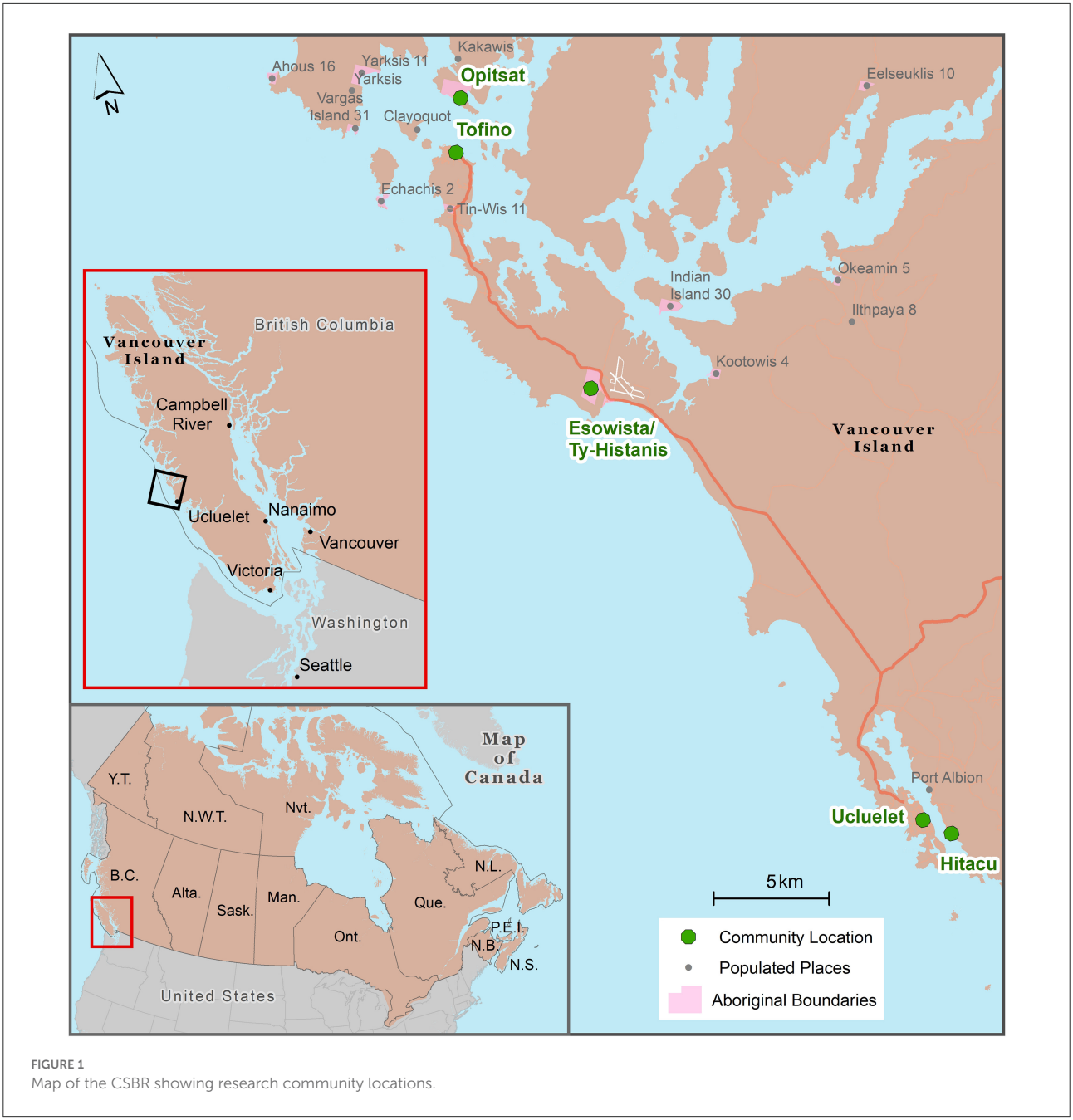

FIGURE 1
Map of the CSBR showing research community locations.

participants to support them practice food preservation and the meanings they made from such engagement. Additionally, we learned about the challenges that participants experienced with sharing food preservation knowledge in the community, the support they needed to resolve those challenges, and their suggestions to improve future community food preservation initiatives. The eight participants we interviewed were individuals who had completed the food preservation training from the communities of Tofino and Ucluelet. This number constitutes almost a third of the 26 graduates who completed the trainer program from the 11 communities in the region.

Given the purpose of our study was to learn about the community food preservation program, our study purposively drew from the small number of residents who had completed the training to become trainers in their various communities. Although the sample may appear small, we had reached data saturation by the sixth interview. The smaller sample size also enabled us to engage in deep conversation with participants, to hear their stories, and properly understand their experiences.

TABLE 1 Interview summary.

Themes/Codes	Participants ($n = 8$)
Food preservation knowledge acquisition	
Safe food preservation practices	8
Various food preservation methods	8
Equipment operation	8
Food preservation workshop delivery	8
How Grads are sharing food preservation knowledge in their communities	
Household level, teaching friends and family	8
School delivery	5
Community workshops	4
Available resources to support food preservation practice in the CSBR	
Funding	8
Equipment rental	6
Community training organization	6
Networking	6
Meanings that participants attach to food preservation practice	
Food security	6
Social connection	4
Connection to local food systems	4
Emergency preparedness	4
Challenges of sharing food preservation knowledge	
Equipment related	4
Time constraint	2
Difficulty recruiting youth	2
Reluctance to use certain equipment with youth	2
Support that graduates seek to resolve challenges	
Effective communication/collaboration between organizations	2
Equipment related	2
Funds for youth-specific initiatives	1
Help with workshop organization	1
Collaboration among graduates, school, etc.	2
Suggestions to improve future food preservation training	
Training content related	3
Advertisement related	2
Include other food system components	2

Additionally, participants shared the challenges they faced with sharing food preservation knowledge and the kind of solutions they would like to see. Participants also shared how they assess the food preservation program and their suggestions to improve the program. Qualitative analysis software NVIVO©12 was used to code all interview data, using both deductive and inductive approaches. The deductive coding was done in line with how the data addressed the study objectives. To generate the inductive codes, we read through the data to understand how participants constructed their experiences. Then, we developed codes to capture those interpretations. We grouped these codes into themes as presented in Table 1 below.

Results

Our findings are presented in accordance with the three key elements of social practice: competencies, materials, and meanings. We then highlight the main challenges that participants said they faced with regards to engaging in food preservation practice, and their assessment of the program.

Competencies: Food preservation knowledge acquisition and sharing

Supporting residents to build and share food preservation knowledge and skills was one of the components of the CSBR food preservation education program. As shown in Table 1, our study participants described the knowledge and skills they acquired through this program in four ways: safe food preservation practices, learning various food preservation methods, equipment operation, and how to become food preservation trainers. Participants reported learning several aspects of **safe food preservation knowledge**, including (1) differentiating between low acid and high acid food, (2) preparing various foods for proper preservation, (3) understanding measures to minimize the risk of contaminating food, utensils, and work area during preservation, (4) identifying proper and improper preserved food, (5) undertaking proper storage of preserved food, and (6) identifying spoiled preserved food. This is what one participant said about the importance of building safe food preservation practices. *It was interesting to learn something new, even though you have been doing something for years. It was good that it was about safe preserving, so over the years from the time my grandmother did it, and my mother did it to now that I am doing it, things have changed, so it is good to get new information* (P04, January 2020). Participants also learned two **food preservation methods** during the workshops – canning and dehydrating–along with safe equipment operation. Participants learned two types of canning methods: pressure canning, which involves using a pressure canner to preserve low-acid food such as meat; and boiling water bath canning, which is used to preserve high acid food such as tomatoes in a regular canner. Also, participants learned to dehydrate various food, including fruits and vegetables, using electric dehydrators. Regarding the safe operation of food preservation equipment, participants reported **learning how to use specific equipment**, including the pressure canner, canning pot, jar lifter, and food dehydrator. One participant described how they felt about learning various food preservation methods this way: *I have been doing some preserving at home too, but I was scared because I didn't know if I was doing it the right way, so I would follow recipes*

and do things that are really low-risk like Jams and pickles… Now I feel more confident, and I can try a lot of recipes (P06, January 2020). Also, participants were **trained to teach members of their community** the food preservation knowledge and skills they have acquired. Specifically, participants learned workshop delivery skills to prepare them to train diverse audiences in schools and community settings. This includes safety measures when teaching various demographic groups (e.g., children vs. adults) and encouraging participation during workshops. One participant shared their thoughts about learning workshop delivery skills this way: *Just because you know something doesn't mean you are confident to teach others. The first class I taught, I thought I was going to throw up, but after I answered some questions, I became better. I built that confidence through the food preservation training* (P02, January 2020).

Beyond building food preservation knowledge for personal use, the CSBR food preservation program was designed to encourage participants to share their knowledge with other residents who had not participated in the trainer workshops. Participants of our study explained three ways they are accomplishing that. These included sharing food preservation knowledge at home with family and friends, teaching students at elementary and secondary schools in Tofino and Ucluelet, and leading workshops in the community. Although participants could not quantify how many friends and family they had reached, schools and community workshops had reached up to a hundred residents by March 2020. For example, one of the participants reported: *I did two workshops last year in Tofino, there was a great turn out. And then, working with the schools, I have just integrated food preservation into various classes and the exploratory sessions in the school* (P01, January 2020). Another participant mentioned how they are passing on their knowledge: *I am running workshops on pressure canning in Ucluelet, I have got one in January, one in February, and one in March 2020* (P02, January 2020).

Materials: Resources available to participants to support food preservation practice

The CSBR food preservation program was designed to support participants to sustain food preservation practice beyond the workshop stage, including sharing knowledge with other members of their various communities. To facilitate support, the food preservation lead, EWC put in place specific mechanisms. As presented in Table 1, first, the EWC provided funds to subsidize the cost of running community food preservation workshops and other initiatives in schools and youth groups. Community trainers accessed these funds in the form of an honorarium for their services or grants to run food preservation initiatives with specific groups. At the same time, residents (workshop attendees) were eligible for a subsidized workshop fee. One participant talked about the resources they were able to access through the EWC: *EWC has done a lot already. I finished my training in December, and I have gotten a large grant to do an actual food preservation series with youth* (P05, January 2020).

Second, EWC provided food **preservation equipment** in various community locations so that residents can access them on a rental basis. At the time of writing, there was equipment available for rental in Tofino and Ucluelet, where our research participants reside. The equipment available includes canners, dehydrators, and various kitchen utensils. Third, the EWC collaborated with the non-profit group, Tofino Community Food Initiative, to support the new trainers to share their knowledge with others in the community. Specifically, the Tofino Community Food Initiative supported trainers through workshop organization, including designing workshop format, recipes, and other logistics associated with running a food preservation workshop. Fourth, the EWC maintained a community network system where they informed food preservation trainers about various opportunities available to them in areas ranging from workshop facilitation to re-skilling and grants that they can access to strengthen and share their knowledge with other members of their community. One participant shared their thoughts about the post-training networking: *when you are done with the training, EWC will email information to you about workshops coming on, so you get connected to a community. The fact that it had a continuity aspect to it made it more practical and special* (P01, January 2020).

Meanings: Significance that participants attach to the practice of food preservation within local food systems

Interviews revealed that the support from EWC enabled participants to continue engaging in food preservation and make meanings. Participants shared the meanings they attached to the practice of food preservation at the LFS level. As highlighted in Table 1, the most common meaning provided by participants was the potential of food preservation to enhance food security. Other meanings included encouraging social connection among community members, promoting human connection to LFSs, and strengthening emergency preparedness.

Participants described how practicing food preservation helped safeguard their food security in various ways, including changing their dependence on grocery stores, increasing their control over the level of processing of the food they consume, and improving access to local food during the year. One participant described how knowing food preservation changed their dependence on grocery stores in this way: *Absolutely, knowing how to preserve food has reduced my dependence on*

the grocery store. I have jams, pickles, canned tomatoes, canned salmon, canned peppers. Who wants to pay $6 for a jar of Jam at the store? I can't even begin to imagine what salmon would cost in the store "(P04, January 2020). Another participant commented on the control they felt from preserving their food and how such practice safeguarded access to healthy and tasty local food." *Store soups have a lot of salt and preservatives. I discover that my soups taste better, and they are more convenient because we always have them at home. When we don't have leftover food for lunch, I can pop a jar of soup open, and we can use that. I spend my summer collecting food. While it doesn't take me till the following summer, it definitely eases the burden that comes with buying food from the grocery stores* (P02, January 2020).

Participants also explained how food preservation within the region's LFSs offered them the opportunity to connect with one another. Specifically, participants saw food preservation as a practice that fosters social connections among community members. For example, one participant mentioned, *When I taught the workshop in Tofino, people came out not only to learn the skills but also to connect with others. I think food preservation is an activity that brings people together* (P01, January 2020). Another participant said, *I organize canning parties with my friends. People come out because they know that they will be bringing home a variety of canned food after the gathering* (P08, February 2020). Participants reported knowing more about their communities' LFSs because they practiced food preservation. Specifically, participants mentioned knowing more about the local food available in their communities, the best time of the year to access (availability and affordability) particular types of local food, and about fellow community members who participate in various LFSs activities, including food preservation.

Finally, participants valued the practice of food preservation as essential for emergency preparedness. They reported that knowing how to preserve food and having preserved food at home made them feel ready in the event of an emergency in the region, including power failures, road closures, or other disasters. One participant described the issue of emergency preparedness and food preservation this way: *Learning food preservation gives us a sense of food security. We are at the edge of the world. When there is an emergency, and the road is cut-off, we would have food* (P03, January 2020).

Challenges of sharing food preservation techniques and suggestions for solutions

Participants were asked about the challenges they experienced with sharing food preservation techniques in their communities. As presented in Table 1, challenges included accessing specific equipment not available in the community rental collection, the lack of time on the part of participants to teach others food preservation, difficulty recruiting youth for food preservation workshops, and participants' reluctance to use specific food preservation equipment (e.g., pressure canner) with young learners due to safety concerns.

Participants mentioned that in some instances, the equipment they needed to complete certain food preservation recipes was not available in the community rental collection. One example was the power blender that participants required to complete fruit-leather recipes with youth. Also, participants were divided on whether it was easy or not to find the time to teach the community workshops. For some, work and family commitments made this a challenge. For others, particularly those who already worked in schools, were able to include food preservation in their classes.

Getting youth to attend food preservation workshops was a challenge both in school and in community settings. Some participants linked the difficulty with youth recruitment to the remoteness of communities and the lack of affordable transportation in the area. There is no public transportation in the region, and communities are far apart. For example, the distance from Tofino to Ucluelet is 40 km, and young people without a driver's license and car, or who have no one to drive them around found it challenging to attend workshops. One participant described the challenge of getting youth involved, *The remoteness of some of the communities is probably the biggest hurdle for getting youth engaged. I think a lot of youth may not have options for activities. When things around food preservation get introduced, and they see it as the only option, then they may want to get involved. But there are other challenges with transportation* (P08, February 2020). Participants also mentioned having reservations about using specific food preservation with youth because of safety reasons. For example, participants felt that the pressure canner was not appropriate for use by children. However, not using a pressure canner limits the kind of recipes trainers can teach youth.

Additionally, participants mentioned various supports they would like to help them overcome the challenges they identified. Participants wanted to see more collaboration between local organizations that champion food preservation causes in the region. They also asked for more food preservation equipment making rounds in various communities, and more access to funding to reach youth. Participants also wanted more support with workshop organization and participant recruitment, and greater collaboration among schools, youth groups, and community trainers.

Participant evaluation of the food preservation program

We asked participants how they would assess the food preservation training they received to become trainers and

provide suggestions to improve the program in the future. Concerning knowledge content, participants shared that they would like to see additional content offered in future trainer workshops. Specifically, some asked to see Indigenous food preservation methods included in the workshops, such as traditional ways of smoking and drying meat, fish, and other local foods–these techniques were not taught in the training that our research participants attended.

Further, some participants thought that EWC could do more to advertise resources available to community trainers. Specifically, some suggested that the EWC should utilize social media to create more awareness about training opportunities, while others suggested that phone calls should be used in addition to emails to reach out to trainers. Also, participants suggested that expanding the food preservation initiative to include other food system components might help residents value food provisioning within the region's LFSs. Specifically, participants thought that in addition to food preservation, teaching future community trainers about the environmental and nutritional implications of local food provisioning might help trainers appreciate the significance of LFSs and potentially pass on such messages to other community members.

Discussion

The CSBR food preservation program utilized the train-the-trainer model to address the food preservation competency (i.e., knowledge) gaps among residents of the region. Studies from other disciplines, including health education and community family education (Yarber et al., 2015; Lai et al., 2017), have shown the train-the-trainer model to be a successful method of learning and sharing knowledge for multiple reasons, including the localization of programs to meet community needs. Our findings on the effectiveness of such a model in supporting knowledge building and sharing in the CSBR align with the report about the BC *Produce Preservation* program, where an initial set of trainers acquired food preservation techniques and successfully shared their knowledge with members of their communities (Bulley, 2012). However, our study contributes further to Canada's food preservation literature by highlighting program participants' voices, including the specific knowledge they acquired and how they share this knowledge with others. As a result, we know the areas where community knowledge transfer is concentrated in the CSBR (i.e., community spaces, schools, and households). By learning about these important spaces of food preservation knowledge transmission, this research revealed that knowledge sharing could be strengthened in multiple areas within a community.

To date, food preservation literature in the Canadian context does not highlight participants' voices when determining how food preservation programs can be improved (e.g., Bulley, 2012; Ferber, 2012; Fogarty and Atkinson, 2018). Consequently, we do not have a good picture of the challenges that people experience with practicing food preservation in the community. By contrast, our study highlights the challenges faced by community trainers in sharing their knowledge in the region, revealing that trainers may not always have the equipment they need to complete workshops with specific groups. Also, we showed that trainers might encounter difficulties recruiting others, specifically youth, to teach them about food preservation. We also revealed additional knowledge content that participants would like to see added in future trainer workshops, such as learning Indigenous food preservation methods. Highlighting this information about trainers' struggles and suggestions for future workshop improvement allows the community to channel support where it is needed.

The CSBR food preservation program was designed to deliver relevant training in response to local needs and contexts. For example, the preservation demonstrations and methods that participants learned were designed to empower them to preserve various local seasonal foods that can sustain them and their households in an emergency. We consider this a good practice because residents will know about food provisioning opportunities closer to home, including local food that they can preserve and incorporate into their emergency food packs. At the same time, we also acknowledge that the EWC program offerings did not adequately cover the local food context since Indigenous food preservation methods were not included in the initiative. Nevertheless, we found that other food preservation initiatives within Canada's rural and remote communities tend to structure training to enable residents to take advantage of locally sourced food. For example, as part of the North Cariboo district *Empowering Family Health* project, residents from five communities benefited from food preservation and foraging workshops (Fogarty and Atkinson, 2018).

One of the primary reasons why communities support their residents acquiring food preservation competency is to enhance food security (Bulley, 2012). However, unlike other food preservation initiatives within the Canadian context, we found that building food preservation competencies for emergency preparedness appears to be an essential component of food preservation practice in our study region. One reason for this is because of the study region's location in a tsunami hazard zone and occurrences of winter storms that sometimes cut off power supplies and transportation routes in the area. Understandably, acquiring food preservation skills for emergency preparedness may not seem wholly necessary for many Canadians. However, with recent occurrences of natural disasters across Canada, including the 2021 drought; wildfires; record low temperatures in winter; and flooding that affected food production lands, livestock, and transportation routes across British Columbia, perhaps, more communities should consider promoting food preservation for emergency food preparedness. A recent report has shown that these natural disasters will be prevalent in Canada in the coming years (Warren and Lulham, 2021).

Food preservation techniques have evolved in response to new knowledge. For example, what might have been considered safe (to consume) in the first half of the 20th century when home food preservation thrived in Canada's LFSs might not be considered safe today. Thus, to strengthen food preservation practice in a community, opportunities for building and sharing food preservation knowledge is necessary. Building and sharing safe food preservation techniques are also critical to avoid the effects of unsafe practices. For example, most foodborne Botulism[2] cases reported in the USA result from unsafe food preservation at home by preservers who lack the proper knowledge or ignore proper canning guidelines (CDC, 2019). Similarly, improper food preservation equipment use can cause adverse effects for preservers. For example, the CDC reported that home canners' inability to use a pressure canner to preserve certain (low acid) foods was one of the reasons for the 145 cases of foodborne Botulism recorded from 1996 to 2014 in the USA (CDC, 2019). Thus, building the competencies to operate a variety of equipment properly is equally vital for establishing food preservation practice in a community.

In addition to having the right competencies, access to materials is critical for maintaining social practices in food systems (Cohen, 2019). As highlighted by our study participants, EWC makes available various materials to support food preservation practice and knowledge transmission in communities. Our study, like Manitoba's *Northern Healthy Food Initiative*, stresses the importance of resource provisioning. For example, the provisioning of freezer loans as part of the *Northern Healthy Food Initiative* helped program participants to source and preserve seasonal food for year-round use (Fieldhouse and Thompson, 2012). However, our study further shows that providing a single resource, such as a particular piece of equipment, although helpful, is not always sufficient because residents face other challenges that may not be solved by having access to food preservation equipment or manuals. For example, although they had access to food preservation equipment and spaces, our research participants reported experiencing challenges recruiting youth to learn food preservation and using specific food preservation methods with the group. This information is vital for the communities to consider diverse strategies to encourage residents' engagement, including youth participation, in food preservation beyond equipment provisioning (Oloko et al., 2022). For example, a study showed that providing meals and involving parents in workshops will encourage youth to participate in food preservation learning initiatives (Oloko et al., 2022).

Like the *Northern Healthy Food Initiative*, community food preservation programs that also provide materials tend to focus on equipment or manual provisioning. For example, the *Root Cellars Rock Project* in Newfoundland and Labrador and the *Empowering Family Health* project in North Cariboo district, BC, offer food preservation kits and manuals (Ferber, 2012; Fogarty and Atkinson, 2018). Allowing residents to access a combination of materials, as we saw in the CSBR example, may help strengthen food preservation practice in a community. Also, without efforts to maintain a record of experiences of program beneficiaries, it is hard to know if the beneficiaries of previous programs encountered challenges with utilizing or accessing materials.

Finally, we know that social practices take hold in a food system because people attach certain meanings or significance to them (Cohen, 2019). In our study, participants saw food preservation practice within LFSs as being significant for food security, emergency preparedness, social connection, and connection to LFSs. It can be a challenge to compare our findings with insights from elsewhere because of a general paucity of published work, although reports by Fogarty and Atkinson (2018) and Ferber (2012) noted the food security meaning of food preservation practice for residents of rural and remote communities. Similarly, Schuchard (2020) and Simmons (2014) view food preservation as an activity to strengthen friendship, family bonds, and traditions.

Also, local and regional organizations promoting healthy eating within Canada tend to link food preservation practice with enhanced opportunities for consumers to know more about local food and possibly consume more of such food (Interior Health, 2013). Given that food preservation practice occurs within a larger social environment, important aspects of a community's relationship with food, including specific local foodstuffs, family recipes, and knowledge transmission norms, can be incorporated in food preservation activities to add meaning and thereby strengthen the practice locally. We learned about some popular local food that our research participants have preserved and shared. For example, salal berry (*Gaultheria shallon*) and kelp (*Nereocystis luetkeana*) are two local wild food that some participants said they enjoy and share with visitors as part of the west coast delicacies. Some participants gather salal berry and make Jam, while some harvest and dry kelp and incorporate into salads, soups, and other meals.

Conclusion

Our review of the CSBR food preservation program found that the program strengthened food preservation competencies among participants, including equipment operation, various preservation methods, and food safety procedures. The program

2 Foodborne Botulism is a severe disease that develops from consuming food contaminated by the botulinum toxin. Botulinum toxin is produced by the bacteria Clostridium botulinum (*C.botulinum*) that thrives in a moist oxygen-free environment such as improper canned foods (CDC, 2019).

also empowered participants to share food preservation knowledge and skills with others, including through schools and community workshops. Similarly, the program provided various materials needed for food preservation, including canners and dehydrators available for residents to rent. Our review of the program also revealed a structure in place to support residents to keep engaging in food preservation, which is vital for people to create meanings. There was a network system to keep in touch with participants, review their activities, and provide them with support to keep participating in food preservation. Participants shared various meanings they attach to food preservation, including food security, emergency preparedness, social connection, and connection to LFSs. Future research can determine if these meanings were sufficient to sustain the practice in the region.

Social practice theory offered a framework for determining the degree to which the CSBR community food preservation program was designed to support the establishment of food preservation practice in the region. The framework was useful for analyzing food preservation programs for two reasons. First, it allowed us to learn more about the meanings that users of LFSs attach to food preservation practice and therefore to better understand what motivates residents to continue to engage in food preservation. Second, it added to our understanding of the challenges that individuals experienced in establishing food preservation practices in their communities, such as engaging youth in food preservation learning and using specific food preservation equipment with young learners. Previous food preservation studies had not adequately captured this information.

While we found the social practice framework useful, it remains limited by the lack of specific guidelines for applying the meaning element to establish social practices. Although the social practice framework suggests that all three elements must be developed together for a practice to establish, there is not enough acknowledgment in social practice discourse of the different approach(es) needed to develop the meaning element. There is a need for more examples of how the meaning element can be operationalized and embedded in programs since meaning cannot be developed in a straightforward way, like competencies and materials.

We found that by adopting participant-focused assessment, however, we were able to elicit meanings that would support ongoing engagement in food preservation practice. Hence, this paper offers a practical strategy for applying a social practice framework, including the meaning element, to the assessment of a LFS program. Application of the framework, coupled with an assessment that engages participants directly, offers advice to program planners who seek to help local people to continue engaging in food preservation–vital for meaning-making and, ultimately, for food security at the local level or for rural and remote communities.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors according to the University of Saskatchewan ethics guidelines.

Ethics statement

The studies involving human participants were reviewed and approved by University of Saskatchewan Research Ethics Review Board. The patients/participants provided their written informed consent to participate in this study.

Author contributions

MO carried out the literature search, interviews, data analysis, writing/correction of drafts, and co-authored the final manuscript. MR and JR supervised the research, contributed in shaping the research design, corrected drafts leading up to the final manuscript, and co-authored the final manuscript. All authors have approved the final version of the manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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