The adaptation of the beyond cold water bootcamp course for Inuvialuit communities in Northwest Territories, Canada

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ABSTRACT
Boating-related fatalities in the Northwest Territories (NWT) are well above the national average. These fatalities are exacerbated by very cold water, and water and boating safety resources that lack relevance to residents of northern communities. We utilised an iterative, participatory approach to create a plain language, culturally and geographically adapted version of a cold water survival course, "Beyond Cold Water Bootcamp". The purpose of this research was to determine what adaptations are necessary to create appealing and pertinent boating safety interventions for Inuvialuit communities in the NWT and to demonstrate the value of generating such interventions. First, we conducted a focus group with boating safety experts to gain feedback on the first draft of the adapted course. We then subsequently completed a pilot of the course with community members in Tuktoyaktuk, NWT, and we obtained their feedback and suggestions. We then trained a local community member to deliver the course and conducted another focus group with residents. Using reflexive thematic analysis, our results demonstrated the value of culturally and geographically adapted boating safety interventions for Inuvialuit communities and the importance of relinquishing colonial power structures and enabling community members to independently adapt and disseminate knowledge.

Most drownings are preventable by employing targeted health promotion and injury prevention interventions; however, despite being the third leading cause of unintentional injury worldwide, there is a dearth of injury prevention efforts to combat drowning (World Health Organization [1]. Globally, drowning disproportionately affects people who experience marginalisation and reside in rural settings [1]. Within rural and remote northern Indigenous communities in Canada, boating is an important part of daily life and culture [2]. While boating fatalities have declined in most regions of Canada, they have not declined in the northern territories – the Northwest Territories, Yukon, or Nunavut [3], regions in which cold water abounds. In addition, boating fatalities disproportionately affect Indigenous populations in Canada when compared to the rest of the population [4]; this signifies an important health disparity that must be examined and addressed.

Previous boating safety interventions in northern Canada have not been appropriately tailored to the needs of Indigenous residents of northern communities [5–7]. The aim of our research was to identify what adaptations are necessary to develop an applicable and engaging boating safety resource for an Inuvialuit community in the NWT. Through our research, we also strived to demonstrate the value of culturally and geographically adapted boating safety interventions to lower the incidence of boating-related fatalities in the Inuvialuit Settlement Region. For our research, we used an iterative participatory approach to adapt an existing cold water survival course, Beyond Cold Water Boot Camp [8], to meet the boating safety needs of residents of the Inuvialuit Settlement Region. We utilised a plain language approach to ensure the intervention was developed at an appropriate language level and could be easily understood by our target audience [9]. Using reflexive thematic analysis of our community-based research, our results demonstrate value of adapting cold water boating safety interventions for Inuvialuit communities and the importance of relinquishing colonial power structures and enabling community members to independently adapt and disseminate knowledge.

Situating the research
This research was conducted within the Inuvialuit Settlement Region (ISR), which covers much of the
northwestern NWT. This region is home to the Inuvialuit, who are the Inuit of the Western Arctic. In June 1984, the Inuvialuit and the Government of Canada signed the Inuvialuit Final Agreement (IFA) [1010–12]. The present day ISR contains six communities: Aklavik (pop. ~630), Inuvik (pop. ~3400), Paulatuk (pop. ~300), Sachs Harbour (pop. ~125), Tuktoyaktuk (pop. ~1000), and Ulukhaktok (pop. ~500) [11]. This research was conducted with residents of Tuktoyaktuk, which is located on the Beaufort Sea. Many of its residents travel on the land to traditional hunting or fishing locations for harvesting purposes [12].

Inuvialuit, like other Indigenous peoples, have been greatly affected by the consequences of colonialism [13]. Prior to contact with European settlers, Inuvialuit life was focused on hunting, fishing, food-gathering, and cultural activities [14]. European contact had detrimental health consequences for the Inuvialuit and led to unequal power dynamics between the Euro-Canadians and the Inuvialuit that created systemic degradation of Inuvialuit practices and lifestyles, including the residential school system [14,15,16]. The residential school system, described by the 16, as cultural genocide, forcefully assimilated Indigenous children, causing the erosion of traditional knowledge and beliefs as well as Inuvialuit language [14].

Five of the six communities (all but Inuvik) within the ISR partnered with researchers at the University of Ottawa and the University of Manitoba on a larger research project concerning boating safety about which the research presented in this paper is a part. Leaders in these communities all expressed concerns about, and a desire for, more boating safety education within their communities. This project was funded by (blinded for review). Importantly, this research received ethics approval from the Research Ethics Board at the University of X and the University of Y (blinded for review), and was also granted a NWT Research Licence by the Aurora Research Institute.

**Beyond Cold Water Boot Camp**

In many northern Indigenous communities, geographic isolation and limited access to emergency medical services results in laypeople being responsible for the management of many emergencies [17]. In conjunction with the high frequency of water-related fatalities, it is important that residents of these communities are trained to prevent, and are prepared to assist in, cold water related emergencies. Created by the CSBC in conjunction with Dr. Gordon Geisbrecht from the University of Manitoba and numerous other partners in southern Canada, the Beyond Cold Water Boot Camp programme was designed to inform first responders to extract, transport, diagnose, and treat victims exposed to cold water [8]. The original version of the Beyond Cold Water Boot Camp is typically a full-day course, with a second optional day to complete instructor training. It emphasises the idea that professional rescue resources are not always available to assist in times of need, which is especially pertinent to the North. This original iteration of this course had high language level and was not specifically geared towards northern Indigenous communities. Considering the relevance of cold water immersion in these communities and the role of laypeople as first responders [17], it is vital that the information presented in this course be accessible to northern Indigenous communities, such as those in the ISR.

**Literature review**

Canada features a multitude of waterways utilised daily by people across the country for recreation, travel, and employment. The use of these rivers, lakes, and oceans does not come without risk, as indicated by the prevalence of drowning in unintentional injury fatalities in Canada [18]. Certain populations in Canada experience higher rates of drowning fatalities. Between 1991 and 2013, residents of the three Canadian Territories had the highest rate of drowning deaths at 13.6 per 100,000, compared to the national average of 1.6 per 100,000 [19]. A rate of eight and a half times the national average suggests there are unique conditions in the North that impact the likelihood of drowning. Much of the population in the Territories identifies as Indigenous, including 52% of people in the NWT [20], 86% in Nunavut [21], and 23% in the Yukon [22]. Statistics show that Indigenous populations are disproportionately represented in drowning fatalities. While 5% of the population in Canada identifies as Indigenous peoples, Indigenous peoples comprise 10% of drowning fatalities [4]. The CRC [3] explained that this increased incidence of drowning is partially attributed to the role that boating plays in daily life for Indigenous peoples. Indigenous peoples in Canada use boats for recreation, daily travel, hunting, and fishing more frequently than non-Indigenous people [3].

Although drowning deaths occur as a result of participation in various activities, boating-related incidents account for 33% of all unintentional drownings per year in Canada [4], and 62% of boating-related drowning fatalities across Canada involved powerboats [23]. Drownings involving powerboats most frequently occurred in the North as shown by the fact that
between 1996 and 2000, the three Territories had an annual rate of 3.62 drownings per 100,000 involving powerboats, compared to the Canadian average of 0.33 [23].

Cold water is a major risk factor in boating incidents. Cold water is classified as water between 10°C and 20°C, while extremely cold water is anything less than 10°C [24]. Cold water adds an additional element of risk in any immersion, and can lead to death from drowning, hypothermia, and occasionally from cardiac problems such as arrhythmia [24]. Between 2013 and 2017, 100% of the water-related deaths in the NWT occurred in natural bodies of water [25]. As Canada’s Territories are found in the northernmost areas of the country, immersion in natural bodies of water makes cold water a particular concern.

**Culturally appropriate safe boating interventions in Canada’s North**

Across the domains of health research, it has been determined that culturally appropriate interventions are consistently more effective than usual care or control conditions [26]. Additionally, the delivery of culturally adapted boating safety interventions has been shown to be better received by Indigenous peoples than those that are not [2,27]. These culturally adapted resources are well received due to tailoring the method of delivery and use of culturally and geographically appropriate resources. Although boating safety interventions have been offered in the North for years, previous research has shown that many of these efforts have not been co-developed with residents to ensure that they are tailored to the cultures and geographies of northern communities [5–7].

According to 27, the “failure to include community members in the development of water safety resources risks maintaining the status quo as the current resources that have been developed do not reflect the lives and experiences of northerners” (p. 6). When non-Indigenous, southern-based Canadians independently develop and disseminate drowning prevention education, interventions can marginalise Indigenous water safety knowledge and fail to account for the realities of living in close proximity to water [6]. By incorporating the knowledge of members of local populations, more effective interventions can be developed.

**Cultural adaptation through plain language**

Although incorporating Indigenous language and phrasing into risk communication interventions may improve understanding by community members who speak an Indigenous language [28], comprehension of the material encompasses more than just the language in which it is presented. One of the fundamental requirements of a risk communication intervention is the use of appropriate language, which includes converting high-level technical or scientific terminology into user-friendly language [9]. The creation of resources that are more user friendly is known as a plain language approach. Plain language is achieved when readers of a target audience can find the information they need, understand that information the first time they read it, and can act on appropriately on that understanding [29]. There is a wealth of research, endorsed by numerous fields, which supports the development of plain language materials to enhance clarity, appeal, and comprehension [30].

Effective plain language writing involves careful forethought and the input of different types of individuals. 31, indicated that plain language material should be produced by a team of people, including a writer, one or more content specialists, and readers that represent the intended audience. There are two important steps that must occur to produce effective plain language resources. One step is to determine what information the writing and content specialist wants to convey. The other step is to analyse the target audience to better understand its members’ needs and abilities. These two steps form the base to create a concise and effective resource [31]. Upon completion, the best way to determine the efficacy of plain language writing is to receive feedback from readers/users to ensure that compression goals have been achieved [29].

After the target audience and the main points have been decided, plain language writing involves more than simply limiting writing to common words and short sentences [31]; plain language writing is not a specific linguistic technique, but rather a process standard that includes testing the writing to ensure it achieves its desired purpose [29]. To allow for clarity and understanding, each section of writing should be limited to one idea, and each sentence should not be overloaded. Sentences must be simple with clear syntax to assist the reader in understanding a sentence more quickly [32]. Further, all sentences should engage the reader through the use of active voice [33]. Words should be kept to common, monosyllabic words, and complex words should be thoroughly explained [31]. Additionally, quantitative information can be challenging for readers to understand, and therefore should be explained through metaphors, images, or stories. By making the aforementioned changes to complex writing, better comprehension levels can be achieved while maintaining context [31].
The way information is presented visually is just as important as the written language [33]. Headings can act as a way to divide large quantities of information into manageable sections. Headings should be placed in a sans serif type face, whereas a serif typeface should be used for general text [34]. Text colour should be dark on a light background as this is the best contrast for comprehension. Finally, graphics and illustrations can be very useful to add interest to text [33]. Certainly, visual choices within plain language writing should be made mindfully as they are a powerful tool to aid in comprehension, particularly for those with lower levels of education and reading comprehension.

When compared to the non-Indigenous population in Canada, Indigenous people experience levels of lower education attainment. In the non-Indigenous population in Canada, 29% of people aged 15 years and older have a university certificate or degree at or above the bachelor level, compared to only 3.6% of Indigenous people living in the Inuvialuit Settlement Region (ISR) of the same age group [3536–38]. In addition, only 18% of the total population aged 15 years and older in Canada have no certificate or degree, compared to 59% of Indigenous peoples living in the ISR [35]. Recognised that lower education levels may increase individual risk of injury. 37, argued that lower education levels are created and sustained by colonialism embedded within policies in Canada. 38, argued these complex issues related to colonialism must be considered in the future development of boating safety interventions in the Canadian North. Without addressing the consequences of colonialism, such as lower levels of education, drowning prevention strategies will not reach maximum efficacy with Indigenous communities [39]. The development of plain language boating safety inventions is a necessary step to ensure comprehension and appeal to the populations in Canada’s North.

**Methods**

The first phase of this research project involved the first three authors collaborating to pare down the course content to its most vital components and to identify resources that feature northern images. The third author is the creator of the original Beyond Cold Water Boot Camp course and therefore served as the content specialist to achieve the first step of plain language writing. We then presented this first iteration to a group of experts and conducted a focus group to collect their feedback on the course. Focus groups are a common data gathering technique used by social scientists in program evaluation [4041]. The first author was the primary moderator of the focus group, while the second author acted as an additional moderator when necessary. The expert group was comprised of nine boating and water safety experts from across Canada, many of whom have experience delivering and teaching boating and water safety interventions in northern Canada. We asked the participants to take notes of their questions or suggestions throughout the presentation, and they were then given the opportunity to provide this feedback during the focus group. The first author asked individual participants to share their insights and suggestions through open-ended questions, including, “Was there any technical information presented in the course that you would change?”; “Was there any information you felt was missing from the course?”; “Was there any information that was confusing or unclear?”; and “Do you have any suggestions about the delivery of the course?” With their suggestions, we further refined the course and generated specific recommendations regarding presentation style.

After making the changes based on their feedback, we subsequently delivered a pilot course online with six community members in Tuktoyaktuk, NWT, and we obtained their feedback through a second focus group. This phase of the research project allowed us to better understand the target audience, which is the second step to plain language writing. One of the primary suggestions made by the community members was to engage a local instructor to deliver the course. After the appropriate changes and additions had been made based on their feedback, we trained a local community member, the fourth author, to deliver the course. He then delivered the course to five community members with the researchers watching through a video platform. Finally, we completed a third focus group with the five participants to gather opinions and suggestions for further adaption of the course.

The first author was the primary moderator for both the second and third focus groups. The second author was also present to provide comments and act as an additional moderator. We asked the participants in these two focus groups several questions, including the following: “Do you feel that any of the information in the course should be removed?”; “Was any of the information unrealistic or irrelevant for the North?”; “What other information should be included in the course?”; “What information in the course was new to you?”; “What did you like about the course?”; “Do you think it is important for more women to take the course?”; and ‘Is there anything that you learned today that will change your behavior in the future when you’re out on the water?’ The first and second author encouraged the discussion between participants
that developed from their responses to these initial questions. As moderators, the first and second authors also asked probing questions in response to the participants initial answers to generate a deeper understanding of their feedback. All participants’ names have been changed to protect anonymity.

**Data analysis**

41, approach to thematic analysis has been widely used to analyse qualitative data. They presented a six-phase guide for analysis. The first phase is familiarisation with the data. The researcher must read and re-read the original data set to become acquainted with its contents. The second phase is coding which is done by generating labels that isolate portions of the entire data set that are important to the research question. The third phase is generating initial themes which involves examining the codes to identify broader patterns and collecting the data relevant to each potential theme. The fourth phase is reviewing and refining the proposed themes and verifying that they tell an accurate story of the data. The fifth phase is defining and naming the themes by reviewing each theme and clarifying its scope and focus. The sixth phase is writing the final analysis which includes contextualising it within existing literature and relating it back to the initial research question. 42, stressed that the process is not meant to be linear and that movement between phases should occur.

In 2019, Braun and Clarke published a paper introducing reflexive thematic analysis, which built on their original thematic analysis framework. They argued that meaning in a data set does not simply emerge, but rather it is generated by researchers and their analytic processes, which are informed by their positionality [424345]. In this research, the first three authors are Euro-Canadian, southern Canada-based scholars who are outsiders to the ISR. This position has undoubtedly informed our analysis of the data. However, we viewed and interpreted the data with this position in mind and strived to identify preconceived notions and biases and how they affected our interpretation of the data. Furthermore, the fourth author is an Inuvialuit resident of the ISR and provided invaluable insight into the collection, analysis, and presentation of the data.

**Results**

The results of this research are divided into two subsections. In the first section, we describe the themes we constructed from the data from the first focus group with the expert advisors. In the second section, we describe the themes we constructed from the second and third focus groups with community members in Tuktoyaktuk, NWT.

**Expert advisory group**

**Demonstrating, testing, and practicing of the material**

Many members of the expert advisory group spoke about the importance of encouraging participant engagement with the presented course material by employing demonstrations and recommended the creation of opportunities for testing and practicing the material and rescue techniques that are taught. Demonstration was considered important to provide participants with practical instruction on the use of tools such as reboarding devices, signal mirrors, and rescue flares. Tom, an expert in designing boating safety presentations, described the need for “a little bit more education on how to use stuff”. He continued, “it’s nice that you’ve covered off flares, which I think is great, and signal mirror. But I think a good idea would be to say where and when”. Tom also highlighted how proper demonstration can be important for safety: “Let’s show how to deploy [flares] because people can get injured very easily on deploying flares. I mean, they’re pyrotechnics: you can get burned, you can cause fires, you can be temporarily blinded”.

Many participants expressed the importance of testing and practicing how to implement the information shared in the training. Isaac, a member of the Canadian Coast Guard Auxiliary, argued that practice can be a valuable tool to combat the stress in an emergency situation: “When you talk about using the rope to get back into the boat, I think it’s important that we stress the need to test it in a controlled environment. … you seldom make the best decisions when you’re panicked”. The participants also suggested that when practice may not be possible, such as in conditions where the water is cold year round, then discussing scenarios may be a valuable alternative. Emily, a National Lifeguard instructor suggested the following:

Having scenarios and practicing like in group discussion, and getting people to like, go through a scenario discussing, like, what would they do? That way they can practice those decision-making skills, because in a real-life scenario, they’re not going to be able to make those decision-making skills like very quickly.

**Utilise an interactive and appropriate presentation style**

The second theme was the importance of an interactive presentation that was appropriate for the specific
The participants provided valuable advice to improve the interactive elements. Many participants spoke about the importance of including pictures and videos in the presentation. Anna, a National Lifeguard instructor, explained her preference for videos: “I’m a very visual person. So, I found it very helpful to see those … see a real person actually using them and participating”. Sophie, a member of the Canadian Safe Boating Council, explained the value of images when eyesight and/or literacy may pose a problem, and some kids, and maybe adults too, can’t really see as well. So, reading might be a lot for them. The more words, the smaller it is, the harder it is to read. Pictures are really great. So, if you, you know, and you do have the pictures in there, so anywhere where you can beef up some pictures, you know, that might be good.

The participants also addressed that diversity presented in the media was important. Max, an aquatic supervisor in the Northwest Territories explained, “not just have images of a bunch of white people boating. So, the more diversity we can fit into it, I think is a really good thing”.

The participants also discussed how the presentation might be made more engaging if it incorporated storytelling and was given by instructors who have personal experience with the material. The idea of incorporating stories was prominent. Tom said, “It’d be nice if there was a little more storytelling … there’s an opportunity to be able to tell some more stories and some add some relevance”. He suggested that if given by local instructors, they could incorporate their own stories: “maybe there’s opportunities to be able have … some kind of stories [from local instructors] that back this stuff up”. Sophia felt that having local instructors would be “a really good thing that creates a sustainability type model”. Isaac emphasised the importance of encouraging participants to speak up to generate a more interactive presentation. He said,

I think it’s important … to establish even before you start the presentation, that these things work out much better if in an interactive mode, where people can cite examples of where something has happened. And we all learn more from a lot of these things …

Availability of the resources in the North

The third theme was the importance of considering what resources are available in the North. The participants shared their own experiences working in northern communities and leading boating safety interventions. The participants highlighted how considerations of specific northern nuances may inform the perceived credibility of the instructor. Sophia explained, “What’s readily available in the South may not be in communities … So, I would just be sensitive maybe to that and [try not to introduce] something that isn’t actually available”. The participants also described how the consideration of availability of certain items may change the recommendations presented in the course. On the topic of flares Sophie said, “I don’t know how many or types of flares are available in community … but [it’s] something you might just want to check on or be sensitive to”. She summarised her point by explaining, “One thing that I’ve learned in the North is you make do with whatever you possibly can”. However, Gary, a cold water safety expert, described that caution must be taken before making recommendations,

My theory, my philosophy is if you’re going to teach something, it should be something that will actually work. And if you give alternatives that aren’t as good, and they don’t work, but they’re simpler or cheaper, people will get the impression, “Oh, I don’t need to buy I don’t need to get a signal mirror. I’ve always got a can of sardines. I’m good.”

**Tuktoyaktuk focus groups**

**Ice**

Although the original Beyond Cold Water Bootcamp course was focused on boating and subsequent cold water immersion, the northern residents identified that falls through ice were also a grave concern for cold water immersion. Jacob, a community member, described his past experience with cold water immersion: “You actually have two of us here that have been in the water for half an hour or more, but fortunately we’re still sitting here”. When asked about the incident he said, “hunting trips and thin ice. Gone through the ice”. Thomas, the local marine coordinator, advised, “I think a really good component … to add to this [course] is falling through the ice”. He also explained how vehicles going through ice are becoming a large problem in the community: “To give you a little update, right now in Inuvik, we had four vehicles go through the ice this year”.

**Risk taking and relationships with the land**

The second theme encompasses the relationship that the participants described as having with the land and the water and how that relationship affects their willingness to take risks. The participants noted that their familiarity of, and confidence with, the land and water makes them more likely to take risks. Thomas described, “I guess a lot of us have that confidence that we’ve done this for 40 years now and … we’re familiar with it [and think] nothing is going to happen – and we take
that for granted”. He explained how such confidence can alter safety precautions: “[W]e always had this confidence that we’ve done this before [so] we don’t need life jackets”.

The participants also explained that the desire to be on the land also influences risk-taking behaviour. Thomas argued,

We take chances because we want to go out on the land … everyone of us here is very familiar with it. It’s the way we grew up. It’s our livelihood. No matter how much you talk to people and tell them it’s still too dangerous [at a certain time of year], that drive is there to get out there.

Nevertheless, Thomas expressed the value of safety interventions: “Now with these programs and the tools and the education we’re getting, it might not save all the lives, but it’s definitely going to save some, which is a bonus because if we can help one person, we’re doing our job”.

The results of the focus groups also demonstrated the value participants gleaned specifically from this adapted course. When asked what he enjoyed about the course, Zach said, “Pretty much the whole course is good information. Stuff we need to know because our environment is extreme. And if something happens to us out there, then at least we know, we know how to deal with the situation”. The authors noticed that many participants referenced the tragic occurrence of community members not returning home from their boating trips. The participants also explained that the risk of boating and cold water is well known within the community. Zach, a local community member, said, “we all know someone who’s been in an accident and lost their loved ones in a boating accident”. Thomas said, “[the course] would be a nice thing to offer to everyone before they go out at least to give them a little better chance to come home at the end of the day”. When asked if they would be referencing and adopting the information they had learned, participants responded positively. Thomas said, “I really liked the ideas and I’m going to be implementing some of this stuff into my programs now”. Wesley, a local community member agreed, he specified he felt better prepared to “respect the equipment we’re given and use it properly … It’s awesome”.

**Instructor characteristics**

The participants explained that the type of instructor would influence interest in and the perceived value of the course within the community. Thomas felt that an instructor with relevant life experience would be valuable: “[Jacob’s] actually experienced going through the

ice himself, and you know it’s people like that that we need to have in here to educate some of the more younger youth who go out just on a springtime hunt or something”. The participants felt that an experienced local instructor would bring more knowledge to share than someone who is inexperienced. For example, Thomas suggested, “Add like an experienced harvester to share their knowledge. I mean we all do it, but there are people who make an actual living up here [on the land and water], [They're] very knowledgeable”.

In addition to experience, the participants also described the value of a personal relationship with the instructor. As Jack, a local community member described, “people tend to absorb information from people they know”. We saw the benefit of this value as being bidirectional. While the community members valued the local instructor’s knowledge, the local instructor was also able to challenge the participants’ assertions that they “always” wore lifejackets when boating. He noted that the participants were not telling the truth and said that he had witnessed them failing to wear lifejackets while boating.

During the focus groups, we inquired as to how more participants might be encouraged to take the course. When asked if there would be value in having a women’s only presentation with a female instructor, Thomas said,

[A women’s only presentation] might actually work if we can tie something into it to make it more interesting cause I do think some women might feel intimidated being around men … most of the ladies here wait for their husband or their other half or a family member to take them [boating], so maybe just reaching out to them and letting them know that this is a good education for everyone, because I think people tend to listen to their mothers more, and it’d be a good way to go.

Nancy, the only female participant and a member of the Coast Guard Auxiliary, agreed: “Yeah, you should try to get the ladies out more cause a lot of them you know they travel alone in springtime”. Having a woman instructor was also seen as potentially providing a more comfortable atmosphere for male course participants. As Jack explained, “Maybe they [men] won’t feel like they’re saying something stupid or something if they don’t know. That’s another intimidating factor for a lot of people to speak out”.

**Discussion**

Through our research we have demonstrated important findings concerning the inclusion of local knowledge in adapting a cold water boating safety intervention with Inuvialuit communities. In our first phase, expert
advisors provided valuable suggestions for course content and presentation styles. Despite many of the experts having previous experience in designing and leading boating safety interventions in northern Canada, they nonetheless missed important details that were brought up by community members in focus groups that occurred after each iteration of the course. This circumstance highlights the importance of collaborating with community members to avoid perpetuating colonial power structures and develop relevant interventions. Community members in Tuktoyaktuk, NWT, identified additional content to be addressed, described cultural and geographic nuances related to their community and advocated for the value of having a local instructor deliver the course. This valuable knowledge improved the salience and credibility of the course and would not have been attained without community members’ perspectives.

**Effects of colonialism**

As described by 43, the development of a successful injury prevention intervention requires comprehension of the historical, social, and cultural contexts in which the intervention will occur. We worked to make our injury prevention intervention culturally and geographically relevant for Inuvialuit population, which is a population that faces the historical and sustained effects of colonialism [44]. To achieve our goal of creating a plain language cold water boating safety intervention, we had to consider the comprehension of the target population, which is affected by educational attainment and literacy level [31]. 45, described how literacy is shaped by one’s socio-political context:

> Literacy is both a cultural and a social expression, and therefore it is always inherently political. Literacy practices operate within a sociopolitical context, and that context is defined and legitimated by those who have the power and authority to do so. (p. 4)

The historical legacy of residential schools and colonisation of education have been identified as root causes of ongoing health disparities in Indigenous communities in Canada [46]. Presently, the effects of colonisation persist and cause Inuit in Canada to experience lower levels of education attainment compared to the total population [47]. Educational attainment is strongly associated with greater individual and community health and well-being [48]. Research has shown this relationship is mediated by health literacy, making it a valuable area of focus for health promotion and injury prevention [49]. Specifically, within the context of boating safety, 2, argued that lower levels of educational attainment within northern Indigenous communities may cause individuals to underestimate the risks of unsafe boating practices. Therefore, addressing health literacy and the sustained effects of colonialism are paramount when designing cold water safety interventions for Inuvialuit.

In any and all efforts to address the consequences of colonialism, it is vital to recognise that Indigenous peoples are active agents of change. Part of addressing the consequences of colonialism is recognising the autonomy and expertise of populations that have historically experienced marginalisation. Our finding regarding the importance of having a local instructor and including community members in the course development represent steps towards addressing the marginalisation of Inuit voices in health interventions. 50, described that providers of previous Indigenous health interventions have tended to come from outside Indigenous cultures and communities. Their attempts to account for Indigenous cultures in interventions have too often been superficial at best. 50, argued that to adequately consider Indigenous culture, one must ensure that Indigenous knowledge plays a fundamental role in the theorising, implementing, and evaluating of interventions. A deep cultural grounding is generated when interventions are built on the lived experiences of local populations and informed by local beliefs [50]. Therefore, empowering community members to adapt and lead their own interventions is a step towards self-determination and more effective interventions.

7, highlighted the roles that trust and power play in risk messaging for Indigenous peoples in northern Canada. When white, southern, and colonial voices disseminate knowledge of boating safety practices, they often perpetuate colonial power structures. For example, 7, found that when water safety programmes are primarily taught in the North by seasonally employed southerners, information is perceived by many residents as irrelevant, ineffective, and even dangerous. Nevertheless, community members in Taloyoak, Nunavut, and Tuktoyaktuk, NWT, welcomed the combination of Indigenous knowledge with the southern-based, non-Indigenous knowledge, as they felt the combination provided relevant safety knowledge about new technologies while maintaining cultural and geographic appropriateness. This suggests that our approach of training a local instructor on the adapted southern-based course and empowering them to incorporate their own knowledge and stories may be an effective strategy for combining two knowledge systems.
Culture
A local instructor also plays a valuable role in connecting with the participants and improving their understanding of the presented material. In our results, we described how the local instructor contested participants’ assertion that they always wore lifejackets while boating. This was only possible because of his personal relationships with the participants and his knowledge of the realities of his community. Furthermore, as described in the results, the participants noted that they are more likely to listen to and believe information from someone they know and respect.

In addition to employing a local instructor, including members of the community and their experiences in the iterative development and execution of the intervention is vital in addressing the effects of colonialism and improving the salience of the course. By including local voices and lived experiences, we aimed to support community members’ ownership of their own health and injury prevention practices. Our findings demonstrated that working with community members to co-design and lead an intervention harnessed the power of local experts and garnered additional trust from participants. Additionally, the inclusion of these voices provided valuable local perspectives that would have otherwise been neglected. 51, highlighted that community ownership of injury prevention begins through community action. This can be accomplished by including or modifying elements in an injury prevention intervention for Indigenous populations based on recommendations from the community for which the intervention is being designed. This practice enables the linking of research expertise with local realities and supports self-determination of Indigenous communities [5152–5355–57]. 28, described the importance that constituent-involving strategies combat this oversight and achieve cultural and geographic appropriateness. Such strategies capitalise on the lived experiences of members of the target population and can provide crucial insights into cultural characteristics that cannot be easily observed.

Our findings also demonstrate that individuals in Tuktoyaktuk have the confidence and desire to be on the land and the water that is ingrained within their culture. Participants described that years of experience and familiarity with local waterways and land has generated a high level of confidence that no incidents will occur – despite the fact that they reported that most residents of Tuktoyaktuk have lost a loved one in a boating-related incident. Indeed, participants described that they are willing to take risks because of their strong desire to be on the land and the water. This high level of confidence and desire is paramount, while safety considerations are thus sometimes secondary. 52, described how culture informs decision making surrounding behaviour that involves risk, and they found that accounting for cultural differences is vital in generating injury prevention interventions. In Inuvialuit communities, it is important to account for the connections that community members have with the land and water and how they influence their willingness to take risks. Suggesting that one refrain from being on the land in favour of safety may not resonate with community members. Instead, providing valuable knowledge to increase safety while maintaining cultural practices is likely to be much better received and adopted. Despite the cultural considerations regarding risky behaviour, our participants expressed there is value in boating safety interventions and gaining knowledge to further their likelihood of a safe return home.

Geography
In addition to culturally adapted interventions, our findings support the need for geographically adapted resources. Our expert advisors are extremely knowledgeable about the risks of cold water; however, they are not experts in the lived experiences of northerners. 53, emphasised the value of linking health promoting knowledge to both cultural identity and land use for Inuit. Our participants’ suggestion that ice be included in the presentation represents a unique circumstance that would not have been considered in a southern boating intervention. In the South, ice safety is primarily a winter concern and is generally not associated with boating safety interventions that are typically presented in the summer. However, consulting the community members allowed us to understand that, in addition to boating incidents, ice-related incidents frequently resulted in individuals experiencing cold water immersion. This understanding allowed us to expand the content of the course to meet the needs of the community. Changing ice patterns due to climate change [54] conflict with traditional knowledge and therefore increase the frequency of ice-related incidents. Our research supports 55, assertion that there is a need to combine Western and traditional Indigenous knowledge to generate relevant safety interventions that reflect the effects of climate change on the ice conditions in the Canadian Arctic.

Gender
Another sociocultural construct that plays a large role in injury prevention is gender roles. It has been well documented that males are more highly represented than females in boating-related drownings in Canada [4].
This has resulted in numerous boating safety interventions being targeted towards men [e.g. 38]. We do not deny that this is an important consideration in boating fatalities; however, we were interested in knowing the participants’ opinions regarding the value of educating women about boating safety. Our participants expressed that a female-only offering of the cold water immersion course would be valuable and likely well received. One of our participants – notably the only woman, mentioned that females in Tuktoyaktuk are travelling alone in boats more often; without further education, the numbers of women represented in boating-related incidents may rise. Additionally, boating safety education for women in northern Indigenous communities may benefit others in the community. As expressed by one participant, “people tend to listen to their mothers more”. 56, found that a health education intervention was effective at improving the knowledge, attitudes, and practices of mothers regarding injury prevention in children. Previous research has also advocated for targeting women in health behaviour interventions due to their influence on men. For example, 57, found that women encourage the positive health behaviours of males. Specifically, 57, found that women are more likely than men to monitor the health behaviour of their respective spouses. Therefore, increasing the boating safety knowledge of women may allow them to influence their children’s – or spouse’s – behaviour. This is an area for future research.

Conclusion

This project affirms the importance of co-producing culturally and geographically adapted cold water safety interventions with Inuvialuit. Our findings demonstrate the value of including local voices and Inuvialuit knowledge in conjunction with Western knowledge to generate the most effective cold water safety interventions. Cultural considerations in program design must address the unique relationship that Inuit residents have with the land, and how this relationship influences their willingness to take risks. Geographic considerations must include situating the intervention within local contexts and considering the changing conditions due to climate change.

Based on our findings, we also advocate for the importance of relinquishing colonial power structures and empowering community members to create, adapt, and independently disseminate the knowledge. The trust that is garnered through local connections and common culture enhances the salience of the intervention. Finally, our findings show that northern residents believe there is value in independently educating women about boating safety. This project represents an important step to reducing cold water boating-related fatalities in the ISR.

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