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Imagining an Equitable Mental Health Ecosystem: Co-designing with Immigrant Women to Encourage Mental Health through Nature Interaction in an Urban Context
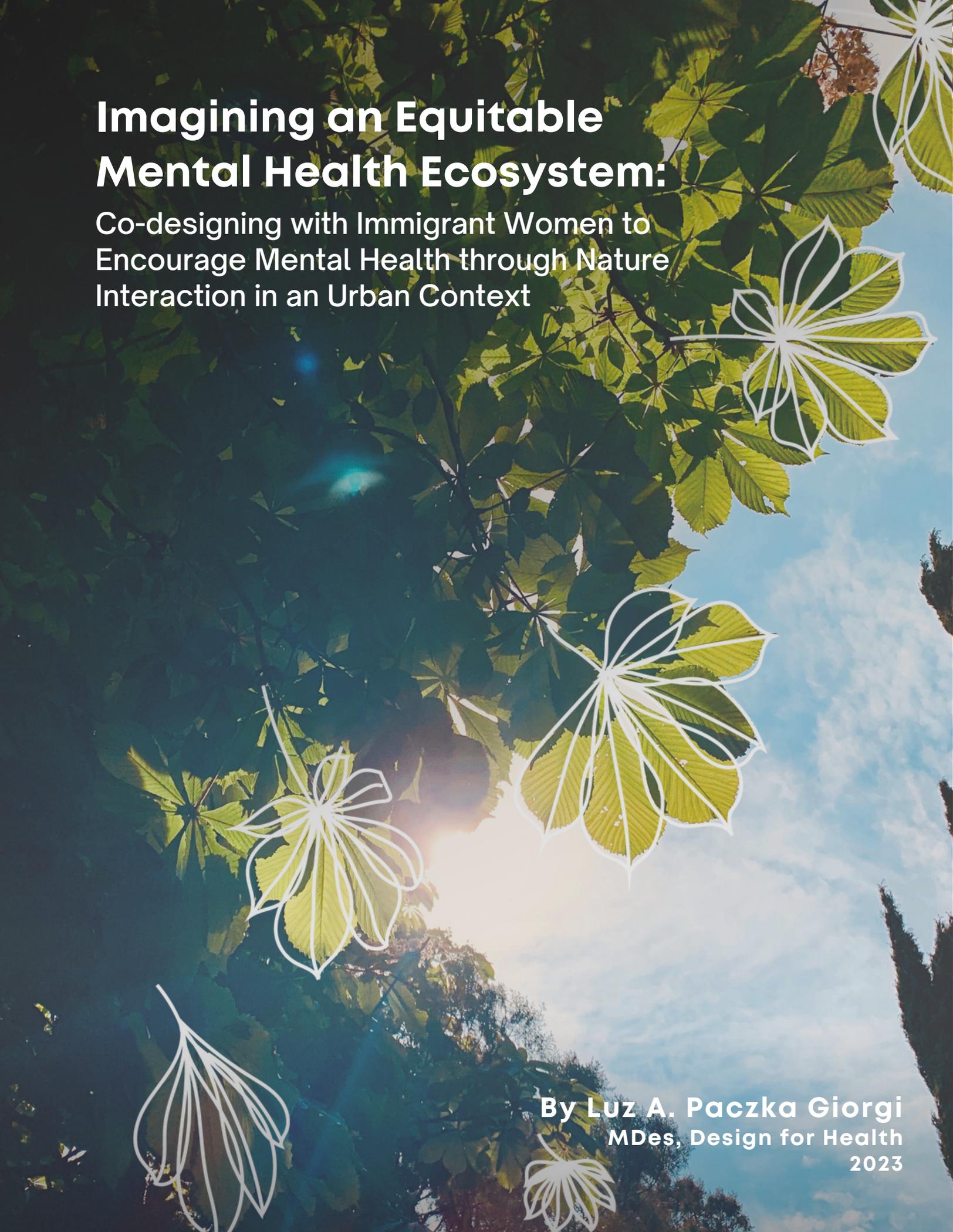
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By Luz A. Paczka Giorgi

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Imagining an Equitable Mental Health Ecosystem:

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Abstract

Immigrants currently represent a quarter of the Canadian population, and this continues to increase as more people move due to social, financial, political, and environmental causes. However, this population experiences a considerable decline in their health over time upon their arrival; thus, making immigrant health a crucial public health issue. Immigrant women in specific experience a variety of stressors including employment, family support, and cultural shock regarding gender roles, which put their mental health at high risk. Therefore, mental health inequities should be tackled by putting equity and intersectionality front and center. The wide amount of literature supporting the benefits of nature interaction on mental and physical health (Birch et al., 2020; Kotera et al. 2020; Lorentzen & Viken, 2022; Shanahan et al., 2015) makes it a promising method to support the mental health of immigrant women, as well as the overwhelmed health system. Based on the complexity of the health issue identified, this design research project aimed to use a participatory approach to gather key insights from immigrant women to acquire an understanding of the needs and potential interventions to achieve accessible nature interactions for public mental health. For this study, twenty-one immigrant women from various geographical backgrounds living across the Greater Toronto Area were recruited to participate in one-on-one interviews and two co-design sessions. These activities revealed that immigrant women indeed experience positive emotions as a result of nature interactions. However, they also experience barriers like distance, time, and lack of information that keep them from engaging with nature more often. Furthermore, their participation also uncovered key areas of concern in the immigrant experience, which contribute to a high amount of daily stress, and little to no time for self-care and emotional relief. Using systems design tools during the co-design sessions served to identify the main areas of challenge for this population across the system, as well as specific values and practices that participants would like to see across system scales. The emergent character of the design research approach used, led to the development of an Equitable Mental Health Ecosystem model (see Figure 1). This model is a service design ecosystem that could facilitate equitable mental health by providing alignment to mental health providers and major funding bodies through three sets of foundational values and practices that guarantee equitable and intentional support for a diverse population. Acknowledging the mental and social burdens behind the immigrant experience, adopting the proposed model can be life-changing to those populations that for decades, have encountered barriers in their mental health-seeking journey. In conclusion, this study approaches a complex community health topic to propose a service ecosystem model that attempts to make mental health care accessible, resilient, community-driven, sustainable, and equitable.

Key words:

Co-design, Participatory design research, Immigrant health, Women's health, Mental health, Health equity, Intersectionality, Service ecosystem design

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1. Introduction

1.1. Framing the Health Challenge

Migration is becoming a current global health determinant as every year, more people move between countries due to social, political, and ecological situations. In Canada, the most recent census (Statistics Canada, 2023) determined that almost a quarter of the Canadian population is composed of immigrants, and this percentage will constantly increase in the coming years. The topic of immigrant health is crucial to address in the Canadian context since research has shown that, although arriving immigrants tend to be healthier than the Canadian population, migrants' health declines as their years in Canada increase – this has been termed the "healthy immigrant effect" (Gushulak et al., 2011; Ng, 2011). Addressing the challenges that contribute to this decline could lead to the (re)design of culturally competent, equitable and accessible health services, systems, products, and spaces. In fact, current health policy models (Athari, 2020) that are aware of this phenomenon, recommend that federal and provincial governments make immigrant health a priority.

Health challenges related to global health crises may pose a higher risk to vulnerable populations – the mental health crisis is no exception to this trend. Since the immigrant experience comes with a variety of social, economic, and emotional stressors in a short period of time, immigrants are at a high risk of confronting mental health issues (Robert and Gilkinson, 2012). As a subset of the immigrant population, immigrant women experience other stressors that involve employment, economic uncertainties, family support, and cultural shock regarding gender roles (Ahmad et al., 2004; Delara, 2016), which put them at an even higher risks of developing mental health issues. Recognizing that immigrant populations will continue to increase worldwide, it is crucial that we develop further knowledge and health strategies to support this population.

Although there are different approaches to supporting mental health, there is recent evidence that has explored nature interaction tools and strategies and their physical and psychological benefits (Birch et al., 2020; Kotera et al. 2020; Shanahan et al., 2015). In fact, a specific research

group (Lorentzen & Viken, 2020; Lorentzen & Viken, 2022) demonstrated that immigrant women living in Norway experienced a variety of benefits that resulted from interacting with nature, including: mood enhancement, promotion of social interactions, facilitated familiarization with the environment and culture, facilitated attachment and sense of belonging to a new community. Other research groups (Leikkilä et al., 2013; Peters et al., 2010) have explained the important role of urban nature in the promotion of social cohesion and intercultural interaction in European cities. They also emphasize the importance of the design of these urban nature spaces and suggest the crucial involvement of stakeholders along the process. In Canada, there has only been one study that examined how immigrant families living in Montreal, accessed public urban green spaces to deal with inadequate housing, social isolation, and psychological stress (Hordyk et al., 2015). There is a clear lack of Canadian studies that approach this intersectional health issue, and, considering the supporting Canadian research that recognizes the relevance of more holistic mental health models for immigrant and racialized women (Ahmad et al. 2004; MacDonnell et al., 2012), it is crucial that health designers, workers, researchers and seekers, embark on the journey towards (re)design of mental health support resources crucial for the growing immigrant population.

1.2. Aim and Research Questions

The aim of this project is co-designing with immigrant women to acquire an understanding of the needs to achieve mental health through nature interactions. To explore this, the study was designed to involve two main data gathering phases: (1) exploration, and (2) co-design. Although there is plenty of supporting research regarding the mental health benefits of nature interaction, there are no studies looking at the specific experience of immigrant women in Canada. Thus, it was important to confirm the perspectives and experiences of the individuals who participated in this study, instead of assuming their experience is that of other immigrants in other cities and countries. As such, the related research questions were the following:

- How do immigrant women perceive nature?
- What role does nature play in women's migrant experience in Canada?

- How does nature experience interact with women's mental health?

Since co-design was the goal of the study, the main research question was:

- How can we engage in co-design with immigrant women, to understand the context needed to promote mental health through nature interactions while in an urban context?

Note that this research question was revised twice along the study as data analysis and insight gathering progressed (see Figure 4). This revised version will be shared in the Discussion section of this text to fit the storytelling of this study.

1.3. Research Approach

Currently, public health aims to shift to a more holistic model that considers the strong influence of physical, social, and environmental determinants of health and well-being (Delara, 2016). For instance, in Canada, Shanahan et al. (2014) have stated that urbanization can expose people more to detrimental health conditions, while abstaining them from getting the health benefits from being exposed to nature. Since large urban cities are immigrant destinations due to the larger labour demand (Statistics Canada, 2012), this specific ecosystem must be considered to develop resilient, equitable and inclusive mental health tools and practices.

In a population as diverse as Canada's, it is crucial that we use intersectionality as a theoretical framework to address health challenges and inequities to analyze the multi-faceted structures influencing individual experience across social scales (Bowleg, 2012; National Collaborating Centre for Determinants of Health and National Collaborating Centre for Healthy Public Policy, 2016). This lens can aid in the understanding of the variety of physical, social, economic, and emotional determinants of immigrant mental health.

This study embraces a participatory approach to include the population of interest who are ultimately experiencing the health issue at-hand, and who would have a direct effect from any design outcomes (Vaughn and Jacquez, 2020). This study uses a research-to-action approach to listen to the lived experiences of immigrant women to prioritize their needs and expectations surrounding mental health tools and services, while living in an urban context. Toronto, being

the most diverse city worldwide (Toronto, 2016) and having access to natural spaces in and outside the city, is a great location to recruit immigrant women to participate in the investigation of nature exposure in urban settings, and co-design a tool that could support other women in their mental health-seeking and immigration process.

2. Methods

This co-design project consisted of four phases: (1) a literature review on the intersection of immigrant health, mental health, women's health, and nature interactions; (2) semi-structured one-on-one interviews with (n=10) immigrant women living in the Greater Toronto Area (GTA); (3) two co-design sessions with (n=15) immigrant women living in the GTA, and (4) data analysis for design concept development. From these phases, two were explorative (1,2), one was collaborative (3), and the final one used the insights gathered to develop a design concept. The project received Research Ethics Board approval from OCAD University (REB #102296).

2.1. Participants

Participants were recruited through a digital poster shared through social media, and through snowball sampling. All participants who expressed interest met the inclusion criteria; however, four individuals had to be excluded due to lack of availability, and two because of lack of response. From the included participants (n=21), ten participated in the one-on-one interviews, twelve in the first co-design session, and nine in the second co-design session. All participants were female-identifying individuals, who had emigrated to Canada (not as refugees) within the last five years, lived in the GTA, and were advanced or fluent in English. In addition, all participants were able to choose the activities they wanted to take part of, and they received monetary incentives at the end of each study activity they participated in (i.e. pro-rated). In a similar manner, all participants read and signed a consent form before participating in the project; therefore, they all participated in a voluntary manner and were aware they could withdraw at any given time.

2.2. Interviews

The researcher conducted semi-structured interviews in an individual manner, which allowed for clarification when needed, and lasted between 20 and 51 minutes. The interview questions were designed to address two topics: (1) the individual's experience emigrating to Canada before, during and after moving (e.g. 'Have you used any resources, services or websites that specifically support immigrants or newcomers in Canada? If so, what were they?', 'Where in your immigration experience do you think you could have received more external support?'), and (2) the individual's relationship to nature and experiences with nature interactions (e.g. 'In a day in your life, how would you say you encounter nature?', 'Would you say you enjoy spending time in nature?', 'What counts as nature for you?', 'What access to natural sites do you have around where you live?'). The pre-planned questions were open-ended and allowed for follow-up to acquire further insight into each participant's experience when needed. In most cases, participants would go on and explain their answers before even asking them to elaborate, which showed the openness and interest of participants in being part of this study.

The interviews were conducted either in-person (in a convenient location both for the interviewees and the researcher) or online, through Zoom, according to the interviewee's preference. All interviews were recorded, with the consent of the interviewees, for further data analysis. All data collection and analysis were carried out by the researcher. The data was transcribed with NVivo Transcription, and then analyzed using NVivo. Data analysis happened through coding of transcripts, followed by thematic analysis to identify key areas of consideration in the development of this project. The data collected in this part of the study guided the design and chosen activities for the co-design sessions.

2.3. Participatory Research

Due to the collaborative nature of this project, co-design was selected as the approach to engage participants in a group creation setting. The goal was to gain key insights that could lead to an intentional and efficient design outcome. To achieve this, the main activity of each session consisted of participatory building of systems maps (adapted from Jones and Van Ael, 2022) to acquire an understanding about the needs and expectations of the participants. Each workshop

was planned ahead of time, and the activities were specifically designed for the study. Both sessions were run in-person at the Design for Health Studio in the OCAD University campus, and each one ran for 2 hours, 30 minutes.

2.3.1. Co-Design Session 1

A total of ten immigrant women from seven different countries in origin came together for the first co-design session. During this session, the participants split up into three groups (two groups of three people, and one of four people), and each group co-created a journey map (see Figure 1) of the regular day of an immigrant woman persona they created.

The co-design session consisted of three different sections: (1) creation of an immigrant woman persona, (2) journey mapping the day of this persona, including activities, potential stressors, thoughts, and emotions, and (3) inclusion of potential nature interactions that aligned with the persona's day and consequential thoughts and emotions. It is important to note that section three of the journey mapping was not revealed to the participants until it was time to engage in that section, to not influence the participants' mapping of regular daily activities and upcoming stressors.

All of the journey mapping was guided by colour-coded prompt cards (see example in Figure 2) that provided participants with characteristics for their persona (e.g. 'mother', 'professional', 'students'), their living situation (e.g. 'apartment', 'house', 'urban area'), season (e.g. 'summer', 'winter), activities (e.g. 'go to work', 'bike', 'go to a community meet up'), potential stressors (e.g. 'sick pet', 'COVID-19 outbreak at kids' school', 'forget a word in English'), as well as a variety of nature interactions (e.g. 'go play with the snow', 'have a picnic', 'find a cool rock'). Recognizing that the development of these cards was limited to the researchers own lived experiences, participants were allowed to create their own cards. In between sections 2 and 3 there was a short group-wide debrief, as well as a short break. At the end of the session, there was a final debrief in which each group shared their work with the rest of the participants, allowing for interventions of the participants external to each group.
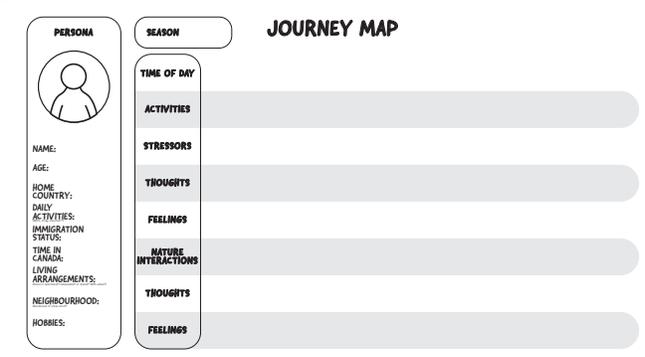
Figure 1. Journey map created for the first co-design session.

Figure 2. Example of "Nature interaction" prompt cards provided to the participants for the journey mapping.

The journey maps produced were photographed with the consent of the participants, which was complemented by field notetaking for data analysis. The data gathered during this session guided the design of the final co-design session.

2.3.2. Co-Design Session 2

A total of eight women from seven different countries in origin, came together for the second co-design session. The main focus of this session was to co-create a Three Horizons (3H) map (Jones and Van Ael, 2022; Sharpe et al, 2016; see Figure 3) in order to: (1) envision an ideal future that the participants desire, (2) understand the concerns of the participants with the
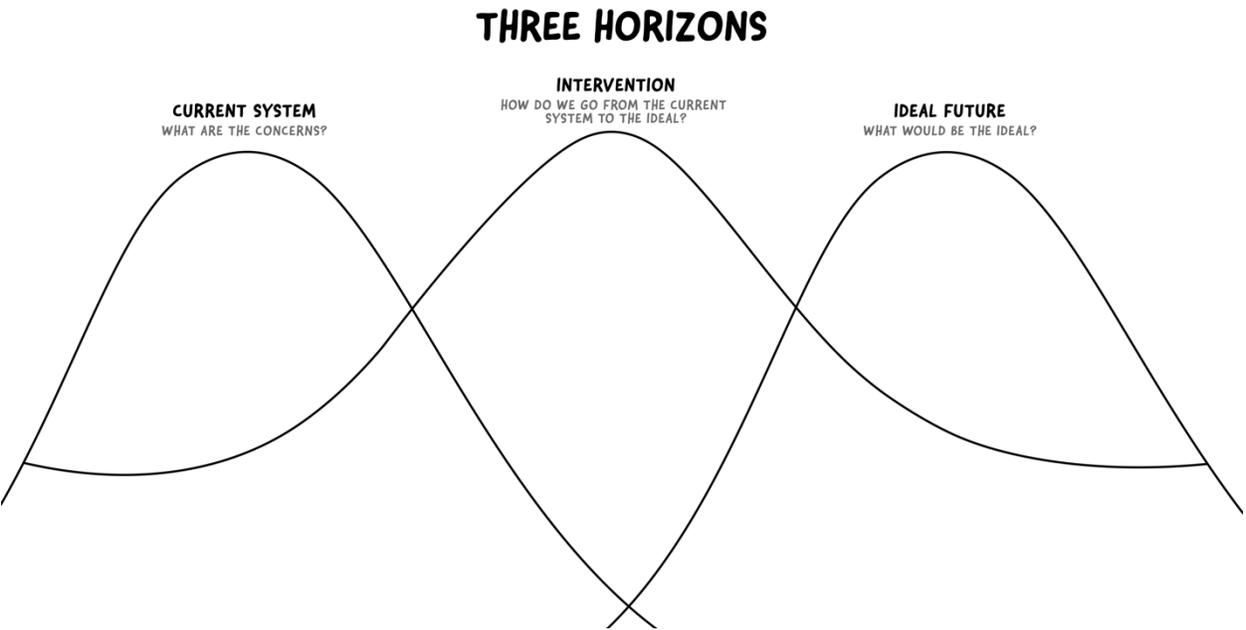
Figure 3. Version of Three Horizons Map created for the second co-design session. Based on Jones and Van Ael, 2022.

current system, and (3) the potential connections between the current system and what needs to happen in order to reach that ideal future.

For this collaborative mapping session, participants were asked to focus on their experiences as immigrant women as they filled out the 3H map. For the mapping, each participant was provided with a set of coloured sticky notes to use in the different "horizons". Each "horizon" was worked on one at a time; however, participants were allowed to build on previous horizons if they were able to think of additional information after moving along in the mapping. During the first part of the session, participants were given 5 minutes to individually put down words, sentences or images that would reflect their ideal future on blue sticky notes, which was followed by group sharing and conversation. After a short break, participants came back to work on the first "horizon" of the model. For this, they were given 5 minutes to individually use pink sticky notes to put down words, sentences or images related to their concerns with the current system. Once again, the individual work was followed by group sharing and conversation. For the final horizon, participants were instructed to put down elements of the current system that could be further (re)developed to achieve the ideal future they envision. For this, they were asked to use green sticky notes if the ideas involved nature elements, and yellow sticky notes for non-nature related elements. Following this final "horizon" there was a group debrief and final discussion.

The conversation surrounding the 3H mapping was audio recorded, and the 3H map was photographed; all with the consent of the participants.

3. Results and Discussion

Individuals who agreed to participate in this study were eager to share their experiences and communicated – both verbally and through their interactions – their motivation to collaborate as a community to transform the current state of the system. Data gathering and analysis happened after each activity; therefore, this section will expand on the findings of the one-on-one interviews, and the co-design sessions. The data was able to provide insights regarding the different ways in which immigrant women might define nature, the (unanimous) thought

regarding its positive effect on mental health, perceived risks to access natural spaces, the need for community and the potential of doing this through nature interactions, barriers accessing nature when living in the city, and the specifics around the need for social support throughout the immigration process. See Table 1 for a summary of key findings from each data gathering activity, followed by a discussion of the different insights from a social change perspective.

3.1. Interviews

3.1.1. Immigration Experiences

In this study, negative mental health impacts were analyzed in terms of emotional states and amount of stress individuals experienced. Data analysis indicated that there was a greater number of stressors experienced during and after landing, than before migrating. Key areas that influenced their mental health included: (1) having a social support network; (2) integrating to sociocultural, health, and political structures; and (3) undergoing financial and professional adaptations.

Having a Social Support Network. Despite the different geographical origins of the participants, they all agreed in the emotional weight that comes during the landing and two to four years after that. Participants mentioned that realizing they had no social support network right after moving, made the adaptation process emotionally harder. Even though some participants moved countries with a partner, they were still in need of finding a group of people or a space to share their challenges, get some emotional relief, and ask questions related to daily life practices in their new context.

> "Moving here was basically just the two of us starting something new; we didn't have any support system here, so that was stressful. […] Since we already knew how to speak English, it was easier. But I think for other people, a barrier would be the language, and knowing where to look for information, because there is an overwhelming amount of information, and sometimes you don't know if it's true. […] But what I have in my mind right now is that the thing that I really needed the most when I arrived in Canada was community, for sure."

Activity	Summary of Findings	Key Insights
Interviews	Immigrant experience: • The time after arrival was more stressful than before moving, and there was less external support • Main need after migrating was having a support network ○ COVID-19 made this even harder • Best advice was from people who had gone through the experience themselves • Value in informal sources of information Nature interactions: • Nature elicits positive emotions and facilitates emotional relief • The main barriers keeping immigrant women from accessing nature are: (1) lack of time, (2) distance, and (3) lack of information	• Despite the different perceptions participants had regarding nature, there is an overall want and need for more nature experiences. However, there is a lack of a context that facilitates it • Having a social support network is crucial for the mental health of immigrant women • There is a social and financial imbalance that comes from the first years being here that is not being actively addressed by the system
Co-Design Session #1	The mental health toll of the immigrant experience: • Immigrant women have very busy days that leave little time for self care • Stressors come from both overt and covert societal expectations • There was a shift from negative to more positive emotions and thoughts when introducing nature interaction in a regular day	• Immigrant women have multi-faceted and diverse experiences This means they might need different types of support, and might also encounter distinct barriers to access this support • There is a need for community, as well as inclusion in decision-making in spaces and systems that intersect with their experience • Existing tools and programs could be leveraged to include nature as a mental health approach. If they already do it, the focus should be on making them more accessible to a wider population Revised Research Question: *How might we promote a sense of awe towards nature to encourage mental health of immigrants, while being in an urban context?*
Co-Design Session #2	• There is a need for support from the system in the following areas: social, housing, professional development, financial development, healthcare, and community • Participants expressed not feeling supported by the system; they can see the issues, but also what potential solutions can be • All the activities that come after landing lead to multiple stressors that put immigrant women's mental health at risk. But, not feeling the support of the system, adds a layer of helplessness which makes it harder to cope with • In order to reach the ideal future, interventions should embrace nature-centred approaches, as well as education and communication strategies	• Transparency and inclusion in decision-making processes can support the integrations of immigrant women into their new context • Immigrant women have felt neglected and unsupported by higher levels of the system for years. However, they are aware of the needs of their community, and are open to participating in the (re)thinking of systemic solutions Revised Research Question: *What resources in social and natural ecosystems would encourage mental health of immigrant women?*

"[I think I needed more external support in] having a sense of community. When we got here, we didn't really know anyone, except for my partner's co-workers. So, it was difficult to find a group that gave a different kind of support, especially since when I moved here most things were online... and coming here, we had no one."

Since one of the inclusion criteria of this study was to have moved within the last five years, most of the participants moved during or right before the COVID-19 pandemic, which made socializing and getting social support more difficult.

"Once we got here, I did try to reach out to a few places who offered services for newcomers, but, because of the pandemic, a lot of things were online, and those places were offering help for urgent situations. [...] Since I do speak the language and honestly was in a good situation, I didn't feel worthy of those services. And besides that, the other programs that they offered that were more social were mainly online, so after coming from working online [for so long], I was done with [virtual] interaction, so I decided to not go that way. I also tried to volunteer around my neighbourhood and things like that, but most things were online, so I didn't do much."

Interestingly, three participants shared they had family and/or friends who had gone through the migration process before them, and moving would mean reuniting or getting physically closer to these persons. Therefore, the perceived social isolation other participants felt, was replaced by more positive emotions tied to reconvening with emotionally significant others.

"My partner and I were the last people [in our families] that hadn't migrated. ... So, our immigration was the best thing that could happened to us because we felt connected. I had the feeling that I was joining [my family], not losing them somehow."

Integrating to Social, Cultural, and Political Structures. Some participants shared perceiving there was a societal expectation of quick integration into the regular daily structures of their new context. However, the high number of stressors they experienced in a short amount of time, combined with the widely different structures – mainly health and political ones – made it more difficult for individuals to understand the operation of these structures; therefore, elongating and increasing the experienced stress in their engagement of these regular activities.

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Participants who expressed having a lack of social support network, also indicated recurring to informal sources of information to look for further guidance. These sources of information tend to be in social media or audiovisual platforms (e.g. Facebook groups, and YouTube channels) in which people who had gone through similar immigration situations, shared their experience or explanations as to how to deal with specific situations.

> "I guess you can prepare a little bit about what to expect, but you cannot really be certain of the experience until you are actually experiencing it. […] Like what documents to get first and the locations where you need to go to get the first is important. […] So, I looked it up myself [in] this Facebook group for newcomers like me, [where people] help each other by sharing experiences and sharing resources. So that was more helpful than specific government offices. […] I also [perceived that] in some of the government offices, they expect you to have like a little bit of background about what you should expect from them. But when you arrive, being new to the Canadian thing, you might not know what to exactly do. […] So that was also really frustrating."

> "[Moving was] very stressful because of the processes that we needed to follow, and the lack of basic information like how to rent an apartment. [When we arrived, we had] no help from anyone; I was surprised because I thought Canada was a very "pro immigrants" country. […] It was very difficult for us to [figure out how to] rent an apartment, to open a bank account, or to do the things you need to do to settle on a new country. […] We expected it to be [hard, but still] those types of things were the most difficult."

Unfortunately, individuals also shared their concerns behind financial scams and risky situations of people who take advantage of new immigrants, mainly related to rentals and filing of taxes. The participants who shared this had encountered these scamming situations but had been able to get out of it; nevertheless, they acknowledged the fact that other people might be taken more advantage of and there is still not too much awareness about the issue.

> "Sometimes people scam newcomers. […] For example, I didn't sign a lease for my first place, they didn't let me invite people over, and I had to pay in cash, but I didn't [know it

was illegal] until I moved to my current place. And I know this is a problem with the system."

Once again, the three participants who had friends or family who had already migrated to Toronto, expressed getting help from these individuals as crucial to their adaptation after the move.

"All the information I got was from my dad and if he hadn't given me that information, it would have been difficult to find it on my own. [I had] help with all that information so it was easier for me than other people. [...] When you have someone else who helps you, it's a kind of support that feels good."

"Sometimes you can read about the basic information [online], but it's not until you live it, or you learn from someone who went through it that you get to know the little ins and outs. We did ask the one friend we had who had already moved here, and that friend helped us a lot. But if you don't have someone, if you really don't know anyone here, I think it's very hard."

Undergoing Financial and Professional Adaptations. Another situation of concern involves the financial instability that may come after migration. This instability might be caused by the expenses related to moving, as well as the change in currency from the home country to Canadian currency.

"Even though I was upper/middle class in my home country, here I'm kind of broke because my currency doesn't have any value in Toronto, especially with the housing situation. So, I didn't realize that until I came here. [...] And if it's difficult for Canadians, then for people who are coming from somewhere else, it's likely more difficult. For me, it's something that makes me realize that this dream of migrating doesn't make sense because your status here doesn't give you any kind of right. Especially when you don't have the support of the government, for example, in case that you get sick."

Furthermore, one of the participants shared the great emotional weight that was related to the professional transition after moving since their specific profession is not transferable in Canada. Unfortunately, some academic credentials – including that of physicians and pharmacists – are

not transferable when training happened outside Canada or the United States (Guo, 2009; Senthanar et al., 2020), and accreditation would mean financial and time resources for the individual, which is often not viable for new immigrants trying to have a stable income to solidify their move. The participant who experienced this, shared they were able to acquire some information related to this before moving to Canada, but nothing was conclusive. It was until they migrated and tried to transfer their credentials that they encountered several barriers that kept them from continuing practicing their profession in their new home.

> "[The migration] procedure was not difficult for us, but we missed one point, that our professional credentials are not valid in Canada. … [The institution in charge] didn't accept my specialty because they said: "We don't recognize your [professional] jurisdiction to give you this certification"."

The diverse stressors and challenges experienced after migrating clearly influenced the participants' mental health state. In fact, participants agreed that it is critical to access to real stories or depictions of what migrating to Canada means, before going through the process.

3.1.2. Nature Interaction Experiences

The latter part of the interviews was geared towards understanding the participants' perceptions and relationship towards nature, both before and after their migration experience. Despite the varying individual ways of defining nature, all participants recognized that nature positively influences mental health. In addition, individuals also shared the different ways in which they experience nature in their lives as immigrants, and the barriers they have experienced, or they think other immigrants might experience.

Perceptions of Nature and its Role in their Mental Health. To understand the way in which participants perceive nature, they were asked to describe how would they encounter nature in a regular day in their life. The way in which participants defined nature varied in terms of scale (e.g. "The weather is nature.", "I guess my cat is also considered nature" versus "I don't see nature in a regular the day because there are no parks around my home."). However, all participants agreed that interacting with nature elicited positive emotions that provided them

emotional relief and facilitated a sense of connection with themselves and with the environment.

> "I encounter nature every day. [...] When I walk my dog, we try to go through the streets with the most trees... which is very refreshing and soothing; it really helps me to distress a little bit. [Right now, in my life] I want to be more in touch with the planet and the trees. I feel like I need to see trees in my day to day."

> "For me, going to a park or to the beach or to the lake, is like trying to get away from the noise of the city, the danger of the stress of getting a job or having to send a curriculum. [...] Listening to the sounds of nature, like the creaking of the fallen leaves under my feet, or the birds at the beach by the lake. All of that actually relaxes me; it brings me to a peaceful state of mind."

> "Another big thing for us when choosing where to move in Canada, was the water. [...] We chose to live [in Toronto] because there's Lake Ontario and I find water soothing. Sometimes it's nice to go for a walk by the lake, and although I haven't gone for a swim there, it's nice to just have a body of water like that nearby."

Nature Interactions After Migrating. Although the participants in this study were from different countries, none of them came from a country with similar seasonal changes to the ones that happen in Canada. Therefore, the type of nature interactions they described often involved themes around the extreme weather changes that come with the seasons (e.g. snow; leaves on the trees; seasonal outdoor activities). Frequently, participants expressed the significant role of sunlight – which they considered a nature interaction – in their mood.

> "Being here I have noticed how much I appreciate sunlight. It really makes a difference for me to get actual sunlight. I've become aware of that need here since we can get a lot of days without real sun. But sunny days are awesome for me."

Barriers Accessing Nature. Besides the emotional benefits participants experienced from nature interactions, they all expressed interest in engaging more with nature or spending more time outdoors. Therefore, it was crucial to explore the barriers they have experience, or they had perceived could keep others from experiencing nature. Data analysis showed that the main

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barriers keeping people from accessing nature were: (1) lack of time, (2) distance, (3) urban planning, and (4) lack of information or gear. All these barriers interact with each other because the pressures and instabilities that might be related to their immigration status, can contribute to the specific context that limits their resources to engage in nature interactions.

"I feel time and public transport are the most the most important barriers. For example, if you want to go hiking in Toronto, you can only go to the Beaches, Woodbine Beach, High Park… a few specific areas of Toronto. But they are not really for hiking; they are just like pathways. I feel if you want to do real hiking, you have to plan everything in advance. I will say, sometimes it could be more of a money-related issue because [some people might not be able to afford the transportation], which would make the nature experience more of a luxury."

"I think mainly transportation [is a limiting factor to access nature]. We have heard about many beautiful places with nature around the city, but they are far away, and I feel the transportation here is not as good as I expected it to be. I feel you need a car but for example, we don't even have a driver license here."

"I think the way the city is planned is not nature-centred at all. In fact, it's the opposite because there are all these massive buildings. And if you live downtown, nature is not really present."

"During winter it's difficult to encounter nature. I know there's some people who do winter camping, but it's a totally different experience that requires more planning, and I guess equipment, because it's not only about camping, but also about keeping yourself warm."

3.2. Co-design Sessions

As mentioned in the Methods section, both co-design sessions consisted of collaborative systems mapping, which provided key insights surrounding (1) the current context of immigrant women living in a Canadian urban context, (2) the impact this might have on mental health, and (3) the potential to support mental health with systems transformation.

3.2.1. First Co-Design Session: Journey Mapping

The Emotional Weight of Daily Experiences. During this session, participants created three different personas who were all immigrant women, but differed in age, marital status, dependents, profession, and ethnocultural identity. Then, participants proceeded to delineate the activities and related stressors of these personas' day, as well as corresponding thoughts and emotions. Despite working in independent groups, the three personas had busy days that left little to no time for self-care or dealing with mental health concerns. Some of the most frequent negative emotions brought up in the journey maps included: overwhelm, tiredness, frustration, anxiety, and confusion. A few positive feelings were included in the journey maps, such as: excitement, accomplishment, and gratefulness.

At the end of this first section of the journey mapping, participants openly reflected on the fictional – yet plausible – day of their persona and said that, seeing all the different activities and stressors, provoked feelings like anxiety and helplessness. In one of the journey maps, participants expanded on the weight of gender role-related expectations, which – for the persona – was tied to increased activities related to family, which exposed her to more stressors and less time for herself as an individual. For another persona, there was emphasis on the impact of age-related societal expectations and how there was a mismatch following the move between countries. For instance, this persona was a professional who – if she was back home – she was expected to be professionally settled. However, being a recent immigrant, networking and building professional experience takes time. Participants shared how, even though there was no specific entity holding their persona accountable for not having a job, she could still feel the emotional pressure of starting from scratch to build a professional name.

At the end of the co-design session, participants voluntarily stayed (without being asked to) to continue sharing and discussing their experiences as immigrant women, which included challenges, improvements, and ideas for solutions. Even though this group gathered to engage in co-design, they expressed that simply having the space to talk and feel heard was deeply valued. This confirms the need for a sense of support and community, as well as the importance

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of inclusion throughout the process of developing or improving services, programs, spaces, or policies that interact with their experience.

Finally, these findings also suggest that the experience of being an immigrant woman living in Toronto is an intersectional experience not only being shaped by place of origin and gender, but also by individual contexts. This multi-layered experience can contribute to these women experience diverse stressors that challenge their mental health but can also indicate them encountering a variety of different barriers that keep them from accessing the support they need. This highlights the importance for a holistic and resilient mental healthcare approach that adapts to the changing population and their needs.

Bringing in Nature Interactions into Immigrant Women's Daily Activities. For the second part of the journey mapping, the participants integrated nature interactions in the day of their personas and were asked to expand on thoughts and emotions related to these. It is important to highlight that the nature interaction prompt cards involved interactions across scales, and that would fit into the timeline of the corresponding persona's day. For instance: "Smell freshly steeped tea", "Find a cool rock", "Snuggle your pet", "Do a winter sport", "Learn about a native plant", "You smell a skunk nearby", "Go for a run/bike ride along the lake". Since the nature-centred activities were aligned into the already mapped days of personas, we were able to analyze the shift in thoughts and emotions at a certain time of day from a post-stressor versus post-nature interaction point of view. Interestingly, there was an overall shift in emotions and thoughts when nature-focused activities were introduced (see Table 2 for some of the shifts in emotions and activities). In some cases, more negative emotions lingered while positive emotions entered the persona's mental state; thus, suggesting nature activities are a potential coping mechanism for emotional relief throughout a regular day.

The reveal of nature interaction cards elicited feelings of surprise and curious realization. Based on the participants comments, this was because of the diversity in scale regarding nature interactions. Since participants were not given a specific definition for "nature" or "nature interaction" during previous communication, they had made certain assumption as to how these nature interactions could look like, which might have differed to the ones in the cards.

Despite the misconception, they all demonstrated eagerness to add on to their persona's journey map. This insight led to the revision of the design research question to the following:

How might we promote a sense of awe towards nature to encourage mental health of immigrants, while being in an urban context?

Table 2. Examples of shift in thoughts/emotions related to stressors, after integrating nature interactions.

Stressor	Corresponding Thought/Emotion	Nature Interaction	Shift in Thought/Emotion
"Your phone/laptop needs fixing."	• Worry about money • Overwhelm	"Look outside the window and see the tree outside."	• Having an empty mind • Hopeful • Calm
"You woke up late and have to take your kid(s) to school."	• Not enough time • Worry	"Become familiar with a tree along your daily route."	• Sense of belonging
"Realize you're running low on groceries when having breakfast."	• "I need to go grocery shopping." • More expenses	"Have homemade jam!"	• "OMG I can't believe I made this, it's so yummy!" • "I have to try more stuff like this."
"They call you from back home with bad news." "Feeling homesick."	• Nostalgia • Frustration • Conflicting feelings	"Take care of indoor plants."	• "My orchids are so resilient!" • "I should call grandma for tips to take care of my plants." • Worried but happy

3.2.2. Second Co-Design Session: Three Horizons Mapping

Due to the nature of the 3H Map (based on Jones and Van Ael, 2022), the findings gathered during this co-design session were categorized as: concerns regarding the current system (H1), potential strategies to reach the desired future (H2), and the ideal future (H3). Refer to Table 3 for a summary of the findings for each horizon. Following, the findings will be explained in the order that they were discussed during the co-design session.

The Ideal Future for Immigrant Women. Participants shared a variety of ideal scenarios and characteristics of the envisioned future system they wanted to be part of, as immigrant women.

Overall, their responses (see Table 3) were related to increased accessibility and security around the following topics: (1) social support, (2) housing, (3) professional development, (4) healthcare, (5) financial development, (6) access to community/sociocultural services, (7) system/infrastructure, and (8) education and communication.

Despite the different backgrounds of the participants, there was an overlap in the types of experiences these women have had, and the values they would like to see in their ideal future. These are the values and practices they identified as crucial:

- trustworthiness
- honesty
- equal opportunities
- accessible resources
- cross-cultural communication
- community-based services

This speaks to an overall need for their circumstances to be considered more actively across the system. This also indicates the need for transparency during a complex transition – such as moving to a new country is – to remove that layer of confusion and worry to daily activities and adjustment time.

Concerns of the Current System. The responses regarding concerns about the current system involved the same topics mentioned in the previous section, with the addition of (9) mental health impacts (see Table 2). Since this part of the mapping activity involved recalling personal experiences that might have occurred in recent years, it elicited more emotional responses. All participants were open to sharing their thoughts and reflections to confirm the use of more mental resources when coping with such issues – which often led to a sense of overwhelm and powerlessness – and highlighted the need to tackle those concerns.

This horizon provided insight into the existing challenges that become a mental burden to these women, but that might also lead to physical, financial, social, or financial repercussions. For instance, one of the topics that came up during interviews as well as this session was that of looking for housing as a new immigrant. One of the first barriers an immigrant might encounter is that rentals often depend on a credit score, which an individual would not have if they have never lived in this country. Although there are some people who might offer alternatives to credit score checks for immigrants, these rental options are often overwhelmed with requests,

or are to rent a place that is secluded and might not be in optimal conditions. Furthermore, there are scams that take advantage of people's situation and might lead to a financial loss for these individuals who are already at a disadvantage. The challenges communicated during this part of the session also let through feelings of frustration, but at the same time, motivation to identify a solution. This demonstrated the importance of including stakeholders – such as immigrant women – in the (re)development of services, policies, or programs across areas, whether that is housing, urban planning, healthcare, art, and culture, or more.

Innovation Strategies to Achieve the Desired Future. Following the conversation of the first and third horizons, we transitioned to the identification of interventions that could approach the concerns brought up in H1, to enter that path towards the ideal future. The responses individuals shared included the topics mentioned in the previous two sections, with the addition of: (9) communication and education (see Table 3). Furthermore, a subset of the responses directly considered nature interactions as central to some interventions, while still fitting in seven of the nine overarching themes. The proposed nature-centred interventions could provide individuals with emotional relief, community connection, as well as obtaining a sense of belonging to their new home.

Additionally, the introduction of interventions associated with communication and education strategies was coherent with the current perceptions immigrant women have of the system (e.g. "Official website do not have an honest depiction of what being an immigrant will be after moving"), and their expectations for an ideal future (e.g. "Transparent and community-driven advice"). The barriers these women have experienced have branched from long-standing neglect from higher level decision-makers and service providers in the system. Nevertheless, this group shows deeply aware about the issues they face as a community, as well as vocal about their needs. This reiterates the importance of participatory (re)design of the existing system accessible to immigrant women.

Table 3. Key findings of Three Horizons (3H) map collaboratively built during the second co-design session.

		Horizon		
	Theme	Concerns Regarding the Current System (H1)	Innovation Strategies to Achieve the Ideal Future (H2)	Ideal Future (H3)
Key Findings	(1) Social support	• Expected cultural assimilation • Hostility towards not knowing practices • Lack of connection to culture-based spaces	• Park trips to network while being exposed to nature* • Leverage community to introduce nature in group settings* • List of easy nature-related activities to do in Toronto (include: pet-friendly, kid-friendly, gear needed, etc)* • Have a buddy assigner to you when you arrive • Leverage community to avoid the feeling of alienation • Community as a way to put pressure in governmental policies and mandates	• Having access to a community of female immigrants to join • Having a support network or being part of a community • Having access to community-based immigration advice • Easier access to immigrant community services
	(2) Housing	• Scammers targeting immigrants • Rentals depend on credit score		• Facilitated access to housing; having support when searching for your first rental • Living in a comfortable, spacious and sunny space
	(3) Professional development	• Job hunting is difficult • Immigrants are targets for labour exploitation • Transfer of credentials is not straightforward and often a long process		• Decreased barrier to job opportunities • Equal opportunities despite immigration status • Translation of education and job experience • Immediate access to career opportunities and professional development experiences
	(4) Healthcare	• Difficult to find a reliable (or any) family doctor • Lack of healthcare capacity • Lack of culturally competent mental health • Wait for specialized care is too long, which might intervene with having access to essential medication		• Have a family doctor (not private) • Easier and more inclusive healthcare
	(5) Financial development	• Low salaries for immigrants • Rentals depend on credit score • Lack of guidance for taxes	• Funding for community groups/support networks	• Financial stability or security • Equal salaries

		• Scammers targeting immigrants • Doing taxes is confusing and there is hardly any guidance	• Funding and support for groups already supporting immigrants	
	(6) Access to community/ sociocultural services	• Lack of advertising for immigrants • No guidance as to how to start your life as an immigrant in Canada	• Identify existing community groups and leaders • Leverage social media and existing tools to connect people • Invest in more accessible and better designed information for family activities, free activities, family-friendly, etc • Disseminate knowledge about weather/nature in Canada* • Spaces where cross-cultural understanding of the land/environment in Canada are discussed* • Creativity and nature activities/spaces*	• <u>Trustworthy</u> organizations focused on supporting immigrants • Easier access to immigrant community services • Access to arts and culture spaces • Having a sense of community around folk with similar background to yours – a stepping stone to meet folks from other communities as well • Information in different languages (or having interpreters)

	(7) System/ Infrastructure	• Language barriers
		• Hostility towards not knowing how things work here
		• Lack of representation and advocacy at higher levels
		• Lack of support for time-sensitive legal processes
		• Not an honest depiction of what living in Canada is for immigrant women
		• Participants perceive that Canadian state does not show to be concerned about the well-being of immigrants
			• Making more parks in downtown Toronto*
			• Plant more trees in the city*
			• Make it easier to reach nature around Toronto by public transit; more options of transportation to explore outside the city*
			• Explore alternatives to capitalist-centred approaches
			• Allocate reasonable funding to community/immigrant services organizations
			• Start a discourse around the struggles experienced by immigrants
				• Having better facilities to apply for Permanent Residency
				• Information in different languages (or having interpreters)
				• Integrate the following values into the system:
				  o Community-based
				  o Trustworthy
				  o Transparent
				  o Cross-cultural
				  o Participatory

	(8) Education and communication	• Immigration Services does not show an honest depiction of what living in Canada is for immigrant women	• Literacy as a source of empowerment • Leverage social media and existing tools to connect people • Invest in more accessible and better designed information for family activities, free activities, family-friendly, etc • Clear information that is easy to find	• Communication between immigrants, indigenous, and even settler colonial communities that want to be aware of the struggles of different groups • Highlight the value of informal sources of information
	(9) Mental health impacts	• Pressure in managing finances • Processing the difference between expectations vs. reality might lead to struggles that result in pressure or guilt	• Go to nature to relax* • Walking to learn more things about your neighbourhood*	

*Nature-related intervention

3.3. The Evolution of the Research Question and Design Outcome

The emergent nature of the participatory methodology used, led to a reflective analysis of the study itself, more specifically, the design research question (see Figure 4). The research question was revised along the data gathering process since key insights from primary and secondary research provided a better understanding of the current experience of immigrant women living in the GTA, as well as the challenges they need to overcome to acquire mental health support through nature interactions.

The initial research question aimed at setting up participatory methodologies and framing the initial exploratory activities (i.e. interviews to acquire a better understanding of the context).

> *How can we engage in co-design with immigrant women, to understand the context*
> *needed to promote mental health through nature interactions while in an urban context?*

It must be noted that this question assumes mental health can be encouraged through nature interaction, and that participants have access to nature for this purpose. The data gathered during the interviews and first co-design session confirmed the emotional benefits of nature (see section 3.1.2.). Nevertheless, immigrant women shared experiencing barriers – such as time and distance – that prevent them from accessing nature in addition to the wide number of activities and stressors in their day to day, and that lead to convoluted days with little to no time for self-care, or emotional relief. Therefore, the research question was revised to the following:

> *How might we promote a sense of awe towards nature to encourage mental health of*
> *immigrants, while being in an urban context?*

This research questions takes into consideration the time and distance constraints for accessing nature and aims to promote encounters with nature within their current reality.

As we delved deeper into the interventions needed to go from the current system to the ideal future envisioned by these immigrant women, it became clear that shifts must occur across socioecological system levels. Thus, the research question was revised one last time:

What resources could contribute to social and natural ecosystems that encourage mental health of immigrant women?

Although the sense of awe introduced in the previous version of the research question is not included in this updated one, it assumes that the ideal social and natural ecosystems allow for awe towards nature to happen. Therefore, this revised research question focuses on the systemic barriers that immigrant women may encounter through their mental health-seeking path. In other words, these research questions evolved as we learned about the complexity and wide reach of the issues putting immigrant women's mental health at risk. Ultimately, this led to acquiring Social Ecosystem Design as an approach to address this complex health challenge.

RESEARCH QUESTION:
How can we engage in co–design with immigrant women, to understand the context needed to promote mental health through nature interactions while in an urban context?

Assumptions:
→ Nature interactions encourage mental health
→ Immigrant women in the GTA have access to nature
→ Immigrant women in the GTA want to interact with nature

RESEARCH QUESTION VERSION #3:
What resources could contribute to social and natural ecosystems that encourage mental health of immigrant women?

Assumptions:
→ Existing ecosystems are not encouraging the mental health of immigrant women

RESEARCH QUESTION VERSION #2:
How might we promote a sense of awe towards nature to encourage mental health of immigrants, while being in an urban context?

Assumptions:
→ Nature is already present, immigrant women just have to acquire that sense of awe
→ The system allows and encourages a sense of awe towards nature

Figure 4. Evolution of the Research Question and its corresponding assumptions.

Ultimately, the different versions of the research question are not meant to replace one another but inquire more deeply into the root issues that contribute to our problem of interest. Each version of the research question looked at a different aspect of the issue. The first question and corresponding methods zoomed in to the issue to inquire about individual experiences (i.e. one-on-one interviews), then moved on to a slightly bigger scale to investigate

the social and ecological contexts of these women (i.e. journey mapping), to finally look at system-wide observations (i.e. three horizon mapping). Figure 5 depicts the evolution and widening of the envisioned design intervention as guided by the collaborative process.

The increasing scale of the interventions is comparable to Buchanan's order of design (Buchanan, 1992; Jones, 2013), which considers the inclusion of different types of design (in his case scaling up from graphic, to industrial, to interaction, to systems) for creative problem solving in complex situations. This
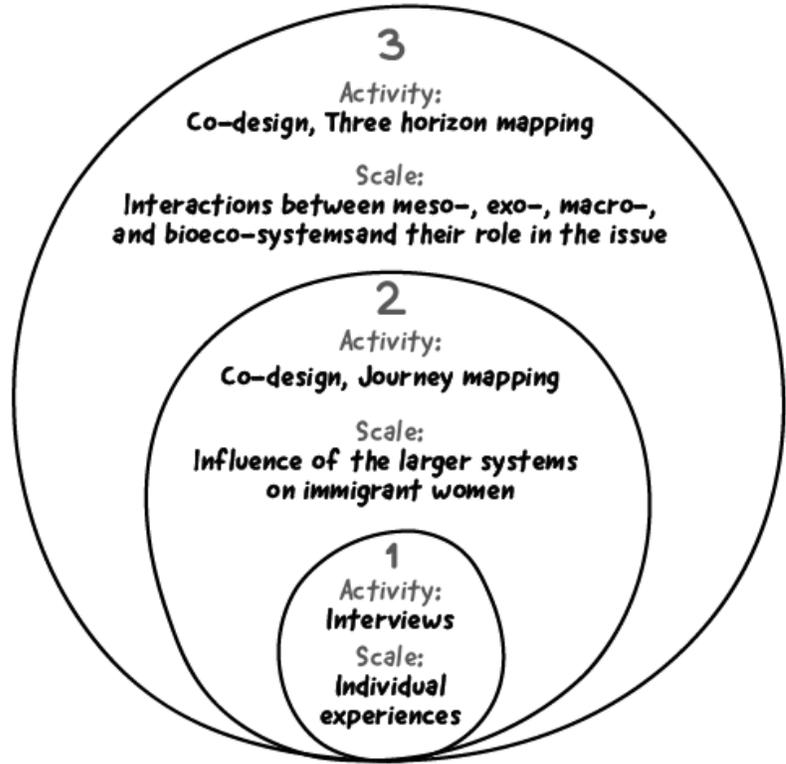
Figure 5. The data gathered through the activities that were part of this study, guided the design outcome to consider increasing scales of design interventions.

study confirmed the complex challenges behind immigrant women's mental health, and the need for involvement of diverse types of design and stakeholders, across scales. At the same time, this study also embraces Buchanan's orders of design as it considers the different types of design that are part of the system, and thus, might be used to either hinder or improve the issue at hand. The following section will discuss the design outcome proposed, which sets the ground for this future transformation to more beneficial and intentional design.

4. The Design Outcome: Systems Ecosystem Design

As mentioned earlier, the collaboration with immigrant women geared this project into a service design approach. To analyze the data and better understand the ecosystem inhabited by immigrant women, the responses for the interviews and co-design sessions were used to

build a Social Ecosystem Map (adapted from Jones and Van Ael, 2022; see Appendix A). This map served to identify key stakeholders and influential actors in the daily experiences of immigrant women, across micro, meso, exo, macro, and bio-ecosystems. The suggested interventions that came from the 3H Map can guide key recommendations for actors (e.g. friends, family, ethnocultural community), organizations (e.g. community centres), and institutions (e.g. Immigration, Refugees, and Citizenship Canada) to contribute to the ideal future.

The data about the specific concerns voiced by the participants was arranged using a Multicapitals Systems Map (adapted from Jones and Van Ael, 2022; see Appendix B). Through this map, the main issue of concern ("The mental health of immigrant women in Canada is at high risk.") was put in the centre, and related issues were organized around in the following categories: natural, financial, manufactured, human, social, cultural, political, and digital. Since these categories conform the different elements and practices encountered across the system, they offered an opportunity to identify the specific issues that can be approached through interventions such as the ones brought up during the second co-design session, as well as other themes suggested by relevant social transformation and community-based literature. Prioritizing the values defined by the participants throughout the co-design sessions is essential to arrive to an intentional and efficient solution that addresses their needs.

Based on the key insights provided by the data analysis, as well as the revised research question, the design approach to arrive to a solution was that of Service Ecosystem Design.

4.1. Service Ecosystem Design

A great issue in service design is that of translation and implementation into the real world, especially when the context it enters is greatly complex. For this reason, there has been an emphasis in practices that include thorough prototype testing or stakeholder involvement when the goal is to achieve social transformation (Hillgren et al., 2011). An upcoming approach to this challenge is that of Service Ecosystem Design, which aims at implementing newly developed services in practice by highlighting the need for value cocreation, consideration of visible and invisible institutional arrangements, and reflexivity and reformation feedback loops

for intentional and long-term service design (Vink, 2021). This service design approach is suitable for this project because of its participatory nature and systems tools used to acquire insights about the system in which immigrant women are living in.

4.2. Equitable Mental Health Ecosystem Model

The developed model (see Figure 6) has three foundational elements: (1) adhering to values for intervention, (2) engaging in participatory (re)development, and (3) doing intentional design for the system. Each of these elements has a set of values or guidelines that facilitate an equitable mental health ecosystem, and that can lead to social change. It is important to note that although those different values and guidelines were designated to one of the foundation elements, they still interact and intersect with the other values and guidelines that are part of the model. Following is an explanation of each of the foundational components.

4.2.1. Adhering to Values for Intervention

The following values were identified as being key to an ecosystem with equitable mental health:

- Equity front and centre
- Support all throughout
- Transparent
- Education and literacy as a form of empowerment
- Decolonial

- Value co-creation
- Community-driven
- Regenerative
- Appreciative of nature and the land
- Appreciative of all cultures
- Culturally competent

Some examples of how these values could look when applied through design are the following:

1. *Appreciative of nature and the land* – Developing policy that builds on the right to access nature, and which can expand to urban planning so that individuals have access to nature despite their context (e.g. determine a number of trees per residential block; policy that allows mindful foraging in public nature spaces)

2. *Culturally competent* – Having social workers that speak the language or share cultural experiences of the population surrounding a mental health centre
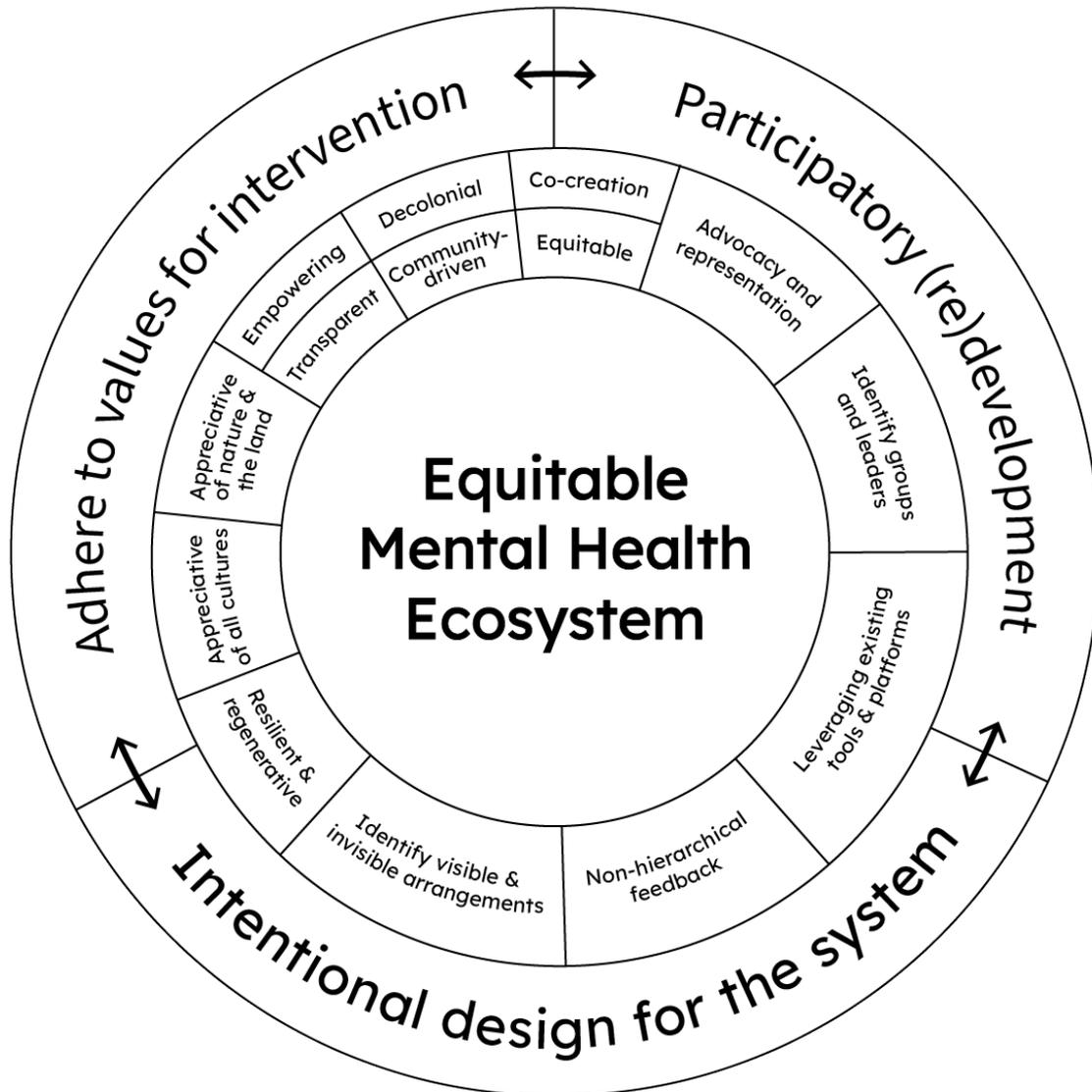
Figure 6. Equitable Mental Health Ecosystem model: the service design ecosystem developed as a response to the collaboration with immigrant women.

4.2.2. Engaging in Participatory (Re)development

The collaboration with immigrant women highlighted the need and motivation to be included in the design or the updating of services across ecosystem scales. The service ecosystem design developed, suggests participatory (re)development can occur through the following practices:

- Identifying community groups and leaders
- Leveraging existing tools and platforms already being used
- Advocacy and representation at higher levels

- Co-creation as a go-to approach for (re)development across design scales

For instance, one of the practices that came up during the interviews and co-design sessions, was the use of social media platforms to acquire information about activities around the city, or key resources about daily living in Canada. To further translate the identified practices into action, we can imagine these digital platforms being leveraged to identify groups and leaders within a community, whom could be involved along the design process and be encouraged to advocate for the needs of their community in, for example, a new immigrant support group within a community centre.

4.2.3. Doing Intentional Design for the System

One of the outcomes of service ecosystem design that makes it an ideal method to use in complex contexts, is that it facilitates intentional and long-term design. For this to occur, actors must be involved in the ongoing building and shaping existing institutional arrangements; however, this can only happen if the arrangements themselves overtly allow for feedback and its application (Vink, 2021). Therefore, I propose the following practices to allow for intentional design of the system to happen:

- Identifying visible and invisible arrangements and interactions across the ecosystem; active understanding of the system
- Allow for non-hierarchical feedback across the ecosystem
- Reflexivity and reformation

An example of how active understanding of a system could look like is encouraging immigrant community centres to use systems maps and tools to, collaboratively, gain a deeper understanding of the system they are embedded in, as well as the key stakeholders that might intersect in their journey. This could help these centres prioritize the needs of their community and identify fundamental partnerships that could make their service to the community more significant.

4.3 Implementation of the Equitable Mental Health Model

The model developed can be turned into an explanatory communication tool – for instance as a website or a guidebook – which can be shared with mental health providers and major funding bodies aiming to provide equitable access to mental health support. By sharing it with such organizations and institutions, the model can provide alignment in terms of practices and values encouraged by the system (e.g. community-driven, appreciative of nature and the land), as well as reflective (re)building of the system (e.g. non-hierarchical feedback). Overall, implementing this Equitable Mental Health Model can promote resiliency and equitable access across programs, systems, and services.

5. Conclusion

5.1. Goals

This project used a participatory approach to understand the needs of the immigrant women population in Toronto, especially regarding mental health and the possibility to facilitate it through nature interactions. Due to the emergent nature of codesign, the initial research question was revised twice throughout the project. Nevertheless, it maintained the essence around imagining a tool that could lead to equitable mental health care for vulnerable populations, such as immigrant women. All the elements of the initial project design were integrated into the final service ecosystem model created for this project.

5.2. Contributions and Applicability

The Equitable Mental Health Ecosystem model has the possibility of providing alignment for mental health service providers and major funding bodies (across local, provincial, or federal levels) to define the types of practices and values that should take part in mental health services. This model can be brought into pre-existing services, or it can be applied in the development of new ones to guarantee equitable and intentional support for the diverse population of Canada.

5.3. Limitations

The small sample size of this project is a limitation; however, this was a necessity due to the time and work capacity resources available for this project. Future studies should include a wider sample size, and if timing allows, allocate more time for participatory activities to have enough time both for creating a safe and trustworthy space for the participants, and to not restrict data gathering time, which can potentially lead to the loss of insights.

Another limitation of this project was that, since the data gathered was only from immigrant women, the concerns and potential interventions brought to the table were from their specific perspective. To further the findings of this project, it is necessary to include other stakeholders that are involved in the immigrant mental health experience (e.g. immigrant office workers, social workers, policy makers, financial advisors). Such actors could be recruited to also engage in co-design to concretize the applicability and tangible examples of each element of the model developed. Increasing our understanding of the perspectives of other actors could increase the model's capability for implementation.

5.4. Future Steps

As highlighted throughout this document, immigrant health is a crucial topic to be addressed in Canada as it affects a quarter of the entire population. Therefore, efforts towards bringing awareness about the needs expressed by immigrant women should be brought to the eyes of decision-makers, and key organizations and institutions that can have a positive impact on the issue of concern. This can be done through academic knowledge dissemination, which can further support funding applications for other projects involving co-design with immigrant individuals, or projects tackling immigrant health and well-being. Additionally, sharing of findings across different scales and communication platforms can contribute to community-based projects, and initiating a dialogue and awareness at a social level, which can spread across the system.

Future research and design involving immigrant and community health should prioritize community-based and participatory methodologies. As mentioned earlier, the mental health of

immigrant women is put at risk by diverse interactions across social and ecological system scales. I suggest future research involves other stakeholders in addition to immigrant women, who can provide key observations for a more intentional solution. If these stakeholders belong to different system scales (e.g. community centre manager, institution representative, mental health provider), then the focus can be on concretizing viable solutions that can decrease barriers to mental health support across social and natural ecosystem levels. For this, I want to emphasize the involvement of designers is crucial to consider the different types of design that might already be part of the system, and which play a role in the interactions between the system and, in this case, immigrant women. Such efforts can be applied to identify specific design tactics that benefit immigrant women's mental health.

5.5. Final Thoughts

The participatory approach of this project shaped the final design outcome, and even though it was not a tangible tool, it came about based on the needs of the population, which is crucial as we aim to build more equitable health systems.

The openness and motivation of the participants involved in this study, shows the need to address key issues that are affecting their health and wellbeing, and at the same time the interest in being involved in finding solutions to these concerns.

Overall, as an immigrant woman myself, I feel deeply motivated to keep working with the community to use collaborative innovation to gear the system towards one that provides equitable mental and community health for everyone.

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Appendix

Appendix A – Social Ecosystem Map

Legend:
- ═══ Alliance
- → Predominent influence
- --- Informal or emergent
- ∿∿ Oscillating relationship

Bio-ecosystem
Macrosystem
Exosystem
Mesosystem
Microsystem

IMMIGRANT WOMAN
Family — Friends

Ethnocultural community (digital and physical)

Religious centre

Workplace

School (for the woman or her family)

Neighbourhood

Community centres

Organizations offering services to immigrants

Dominant culture

Arts and culture spaces

Provincial and national parks outside the city

Urban environment

Urban flora and fauna

Parks in the city

City ravines

Rivers passing through the city

Lake Ontario

CRA

Government of Canada

Public transit system

IRCC

Government offices (e.g. Service Ontario, Service Canada)

NATURAL

DIGITAL

FINANCIAL

MANUFACTURED

POLITICAL

HUMAN

CULTURAL

SOCIAL

Memories from nature experiences can lead to positive emotions.

Nature interactions at different levels provide emotional release and support familiarization with the new home.

Barriers in accessing natural spaces in and around Toronto, mainly due to time and transportation constraints.

Official government websites are not user friendly digital resources are often wordy and confusing

Turn to unofficial channels: the immigrant population has independently responded to confusing digital info by creating their own content (e.g. in Facebook groups, YouTube channels, etc.)

Financial adaptation after moving to Canada; shift in financial status compared to back home.

Difficult to get rentals or loans that are based on credit score (new immigrants would not have one right after arriving).

Lack of support after migrating: gov. provides limited info about immigration and jobs; their support does not go far. Limited funding for programs for immigrants.

Lack of representation: people often feel the reality of being an immigrant is not depicted in official immigration resources.

Immigration status defines what you can or cannot do in the country.

The mental health of immigrant women in Canada is at high risk.

The urban planning of neighbourhoods in which immigrants tend to live in, do not have that much access to green spaces.

Public transit tends to be in repair and does not always reach the places people want to go or it takes too long.

Cultural shock coming from contrasting cultures between home country and Canada. It can also be experienced through gender roles and different social interactions.

Expected cultural assimilation: despite being covert, daily processes and practices in the current system expect for people to know "how it is done here".

Need for a community that provides emotional and structural support.

Digital communities have been a resource people go for recommendations and more genuine experiences.

Feeling homesick.

Potential experience of discrimination.

Healthy immigrant effect: the health of immigrants decreases as their time in Canada increases.

Lack of culturally competent health services: the process of migrating and seeking health in a different system can be complicated.

Too much stress! Busy days due to the intersectionality of immigrant women can be a barrier.