

# Immigrant women, nature and mental health

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## **Immigrant women, nature and mental health**

### **Abstract**

*Purpose:* There is a need for cost-effective strategies to counteract mental health challenges among immigrant women. This study aimed to identify how nature might improve the mental health status of immigrant women residing in Norway.

*Design:* Qualitative data were gathered through individual interviews with 14 immigrant women from Iran (2), Poland (2), Palestine, Afghanistan, Congo, Kenya, Thailand, Russia, Portugal, Latvia, Colombia, and Bulgaria.

*Findings:* The qualitative content analysis revealed that interaction with nature positively influenced the immigrant women's mental health. This occurred due to the following: 1) exposure to nature itself, leading to mood enhancements; 2) familiarization with the new country's culture, nature, climate, and language, facilitating feelings of mastery, attachment, and belonging; 3) social interactions, promoting immediate well-being and future social support; 4) interacting with nature in familiar ways, reducing feelings of alienation/loss; and 5) physical activity, improving mood and stress-related conditions. These mental health improvements were a result of interactions with various types of natural environments.

*Value:* This study supports the promotion of interaction with nature among immigrant women as part of low-cost public health work. Practitioners should consider multiple arenas for potential nature-related mental health gains.

### **Keywords**

Immigrant, women, nature, outdoor recreation, mental health, public health

### **Introduction**

An increasing proportion of the Norwegian population is comprised of individuals with immigrant backgrounds (Statistics Norway, 2019), and such individuals are particularly prone to mental health problems (Abebe, 2010; Abebe et al., 2014; Statistic Norway, 2017). Such challenges have been attributed to immigrants' stressful experiences in their home countries, to the migration process, and/or to their acculturation processes (Abebe, 2010). Previous research has identified that the acculturative stressors are related to language difficulties, perceived low levels of social support, perceived discrimination, feelings of loss, and economic deprivation (Abebe, 2010; Straiton et al., 2019; Walker et al., 2011). The existing research shows that, in general, immigrant women are especially at risk for mental health problems (Abebe, 2010; Statistic Norway, 2017), possibly due to other pre-migration experiences of war or conflict and post-migration experiences of social integration and status than men (Abebe, 2010). These findings indicate that there is a need for cost-effective public health measures that target this Norwegian population subgroup.

Public health research has paid attention to the role of nature in improving health issues (Tzoulas et al., 2007). A large body of research supports the finding that being exposed to nature can have potential mental health benefits, such as improving one's stress and mental fatigue (e.g., Kaplan, 1995; Shin et al., 2010; Stigsdotter et al., 2010), mood (Bowler et al., 2010; Park et al., 2010; Sonntag-Öström et al., 2011), outlook on life, and well-being (Maller et al., 2006). Additional research has also indicated that interacting with nature might facilitate social interactions (Maller et al., 2006) and physical activity (Calogiuri and Chroni, 2014), rendering additional mental health-related benefits (Hansmann et al., 2007; Maller et al., 2006; Reiner et al., 2013).

Based on the existing information, Norwegian public health authorities have announced the prioritization of the promotion of outdoor recreation among immigrants (Ministry of Health and Care Services, 2014). However, most studies that explore the relationship between one's mental health and interactions with nature have been conducted with general populations in Western countries (e.g., Van den Berg et al., 2016). There is limited knowledge about whether and how nature can promote immigrants' mental health. Several European and American studies have indicated that the psychological benefits of nature exposure can apply to people from various cultures and ethnicities (e.g., Byrne, 2012; Gentin, 2011; Leikkilä et al., 2013; Peters et al., 2010; Özgüner, 2011). In addition, studies have also suggested that interacting with nature might facilitate an immigrant's attachment and sense of belonging to the new community (Gentin, 2011; Hordyk et al., 2015; Leikkilä et al., 2013; Peters et al., 2010; Peters et al., 2016; Rishbeth and Finney, 2006). A few studies (Hordyk et al., 2015; Horolets et al., 2018) have shown that interacting with nature can help immigrants create and nurture their family and friendship ties, contributing to the development and maintenance of their social capital. However, previous studies have also indicated that interactions with nature might render adverse mental health effects due to experiences with discrimination and feelings of nostalgia and alienation, as such interactions might remind immigrants of the differences between their home and host countries' landscapes (Stodolska et al., 2017).

Although there has been an increase in the number of studies that investigate the connection between immigrants' mental health and nature, there are only few on this topic. In addition, this issue has been scarcely addressed in the Norwegian context. It is useful to explore this topic in the Norwegian context, as the immigrants in Norway have different ethnicities and home country natural environments than the immigrants studied in the existing research. Also, Norway may differ in regard to culture, natural environments, and climate compared to the countries where the other existing research has been conducted. It is necessary to explore female immigrants in particular, as this subgroup is more at risk for mental health problems (Abebe, 2010; Statistics Norway, 2017). The present study thus explores how, for immigrant women residing in Norway, interactions with nature are related to mental health status.

## **Methods**

The present study is part of a larger study that explores immigrant women residing in Norway in regard to their attitudes towards nature, their use of nature, the constraints and facilitators in regard to how they interact with nature, and the health-related impacts arising from interactions with nature. We adopted an explorative approach, as there has been little research conducted on these issues in Norway. A qualitative research design allows for an in-depth understanding of the investigated issues. Individual interviews were considered particularly useful as they provide for additional clarification whenever language barriers might arise (Barriball and While, 1994).

We recruited the interviewees through both a public health center and Norwegian language practice gatherings in two southeastern Norwegian municipalities. We included an ethnically diverse sample, which allows us to understand how immigrants across different ethnic backgrounds might have similar experiences with nature. Fourteen women from Iran (2), Poland (2), Palestine, Afghanistan, Congo, Kenya, Thailand, Russia, Portugal, Latvia, Colombia, and Bulgaria agreed to participate in the study. They were between 27 and 70-years-old and had lived in Norway for between 1 and 43 years at the time of the interview. While all 14 women had emigrated as adults, seven emigrated for work-related reasons (for their spouse or themselves), four emigrated as refugees, and three emigrated to marry a Norwegian man. Eight of the interviewees had university-level education from their home countries, but only two had an education-relevant job in Norway. Four of the interviewees worked and received an income, two were unemployed, three worked as volunteers, one was a housewife, two were retired, and four attended Norwegian language training schools. Five of the interviewees lived with their husbands and minor children, five lived with their husbands only, one lived with her children only, one lived with friends, and two lived by themselves. In their home countries, half had lived in large towns with limited surrounding nature, while the rest had lived either rurally or in small towns surrounded by nature.

The interviews were semi-structured and contained open-ended questions that focused on the study's themes. The public health perspective indicates that one's distance to natural environments is significant (Calogiuri and Chroni, 2014); therefore, the current research was originally aimed at exploring the aspects of the participants' nearby natural environments. "Nature" was therefore defined as any natural space in the nearby environment, either humanmade or wild areas, exemplified as parks, woods, the ocean, playgrounds, etc. However, we expanded the study's focus to include all types of natural environments, as the interviewees repeatedly discussed their experiences with all kinds of natural environments both nearby and far away (e.g., gardens, local woods, and far away fjords). The researchers met during the data collection phase to share their interview experiences, which resulted in minor adjustments for the later interviews.

The interviews were conducted between November 2016 and March 2017, either in the interviewees' homes or in a meeting room at a local library and lasted between 33 and 74 minutes. In four cases, close family members or friends were present during part of the interviews. Interviews were conducted in Norwegian by either one or the other of the two present study's researchers, both being females with West-European backgrounds. There were some language difficulties in two of the interviews, which were solved by switching to English or asking questions in different ways. The researchers ended the interviews when they felt that no new information on the topic would be obtained. The interviews were tape-recorded and were transcribed verbatim. The Norwegian Centre for Research Data approved this project, and the interviewees provided written informed consent forms prior to the interviews.

We relied on a qualitative content analysis method to analyze the material (Graneheim et al., 2017; Graneheim and Lundman, 2004). This method is based on both a phenomenological and a hermeneutic approach, including both descriptions close to the text (the manifest content) and interpretations of the underlying meaning of the text (the latent content). We used an abductive approach to ensure a more complete understanding of the data, which involves moving between inductive and deductive approaches (Graneheim et al., 2017). We started the analysis process by reading the transcripts several times to obtain a sense of the whole data (Graneheim and Lundman, 2004). We then performed a data-driven analysis, which means that we abstracted meaning units to codes through an inductive approach. We identified differences and similarities between the codes, and we sorted them into tentative sub-categories, categories, and themes. This was followed by a

complementary deductive analysis process, in which we viewed the data in light of the existing related empirical and theoretical literature. The first author led this process and discussed the findings with the second author. The analysis ended when the researchers agreed on the categories and themes. The analysis process was conducted in Norwegian, and the quotes were later translated into English.

## Findings

All interviewees interacted to a greater or lesser extent with different types of natural environments. The analysis clearly revealed that such interactions with nature positively influenced their mental health. In regard to how these mental improvements occurred, five essential themes emerged: 1) Nature as an arena for mood enhancements and mental restoration, 2) Nature as an arena for learning, 3) Nature as an arena for social interactions, 4) Nature as an arena for encouraging feelings of continuity between the home and new countries, and 5) Nature as an arena for physical activity. These categories are elaborated on in the following subsections, and the findings are exemplified by participant quotes.

### *Nature as an arena for mood enhancements and mental restoration*

All interviewees expressed an appreciation for nature and indicated that exposure to such environments makes them feel happy and content. The participants generally shared similar strongly positive mental experiences as a result of being in nature, and many women specifically emphasized nature's mood enhancing effects. Several participants focused on how interacting with nature was particularly useful when they were facing mental health challenges. In this regard, some women referred to how difficult it was after they arrived in Norway; more specifically, being far away from their home country friends and family, having a limited social network, and not understanding the language led to feelings of isolation, loneliness, sadness, depression, and frustration. Some women referred to experiencing similar negative emotional states when they had to stay indoors during the long and cold Norwegian winters. These women underlined the importance of seeking outdoor environments in such periods to counteract the negative feelings. Some participants referred to nature's ability to "remove the suffering."

*"When I walk along the river, I am breathing fresh air, and... thinking... just positive! [laughter] It is very good for my health and for my body and for how I feel. [...] But it is not good to only sit at home! When I came to Norway, at first, I sat at home and tried to read something but did not understand... tried to watch television, did not understand. It was a very difficult period! But, afterwards, I came to nature. Nature helped me! Today, I feel very good, but last year I was so sad because I did not have friends, no Norwegian friends, no family, and I was alone at home ... but nature helped me! Nature helped me!" (Bulgarian interviewee)*

*"And it is very important if you are a little depressed and so, so just go for a walk and it helps. It really helps! It eases a little. One must not just sit inside. [...] There is plenty to gain from nature!" (Colombian interviewee)*

Many interviewees also highlighted the calming, stress-reducing, and energizing effects of being present in natural environments:

*"...if I find somewhere with water and a forest and nature, I do not have to be there just to swim, I can just sit and look at nature and watch... It gives me... I get quieter, I get more*

*energy, positive energy. I do! I remember doing it sometimes when I was alone. [...] [when] I was bored at home. [...] [When] I felt sad..."* (Iranian interviewee)

Some women emphasized the quietness of nature and explained that they sought such environments in attempts to escape the many overwhelming auditory and visual stimuli they experienced in urban areas. One interviewee discussed how she and her husband chose a rural living environment in Norway to be surrounded by a calming nature environment. Another interviewee reflected upon her general need to withdraw from crowded and noisy environments after having lived under such circumstances for a while:

*"... I studied in [a large city in her home country], and it was very interesting, because I always felt for leaving the city in weekends [...] So, I am one who maybe needs to be out in nature more than in such a big hectic city."* (Latvian interviewee)

Some interviewees explained that the Norwegian nature's silence strongly contrasted with the noisy, over-populated large cities they used to live in (in their home countries), where private and tranquil outdoor areas were difficult to find. Some women emphasized that natural environments allowed them the space to think or to "be with themselves:"

*"No, [in her home country], we did not have nature. The only thing we have is beach, a long, long beach. And we are always looking for a quiet place. Because you always find people everywhere. So, when I came here, I really liked it. I liked it because there was silence ... you need to think more... and you need to be with yourself."* (Palestinian interviewee)

When discussing nature's mood enhancing and calming influences, the interviewees referred to a myriad of ways that they interact with nature. The majority of women relayed that they would observe beautiful landscapes; for instance, the women mentioned that they would view green spaces from their apartment building windows, or would take in a lake's scenery after walking through the neighboring woods, or would find a picnic spot by the ocean after driving for a few hours, or would observe a famous fjord during a road trip across Norway. Some women referred to sitting on the porch surrounded by potted flowers, or to smelling and tasting wild berries, or to listening to a bird's song, or to a walking in an apple garden or along a river. One interviewee underlined how meaningful nature's details are:

*"One: View! Beautiful view! One: Fresh air! One: Large trees! Small flowers! Or stones! Many stones! It is so nice! If you look at a little flower in springtime... [laughter]... it is amazing! If you can look at it! Look at that!... [] ... Small things are important all the time! It is the puzzle of life!"* (Bulgarian interviewee)

However, the analysis revealed that some interactions with nature could also generate negative mental health effects. For example, nature's stillness and beauty, as described by the Palestinian interviewee as giving her "space to be with herself," also evoked within her many negative, tiring thoughts. Such thoughts were mainly related to worries about how her future in Norway would turn out. Although this interviewee expressed a positive relation to nature, she still preferred going for walks in urban environments because all of the urban stimuli helped to distract her from negative thoughts:

*"... Sometimes I tell myself: 'No, just go and do not think about things!' But no, it is difficult because you look around and the thoughts come. Because, in Norway, wherever you go, you see very beautiful trees and... scenes around you. It motivates the thoughts to come..."* (Palestinian interviewee)

Furthermore, many of the interviewees expressed a fear for wild animals, assaults, or getting lost in certain natural areas (especially in woods). For the Congolese interviewee, woods were associated with soldiers and dead bodies. Others mentioned that they were not familiar with woods as a type of natural environment. For such reasons, several interviewees avoided woods if they were without a companion, while others still visited such areas but their fears seemed to counteract the possible mental health gains to some degree.

### *Nature as an arena for learning*

The analysis revealed that different types of involvement with natural environments can lead to various learning and habituation processes, which is related to the interviewees' mental health statutes because these processes can strengthen their feelings of mastery, belonging, and attachment. First, engaging with nature appeared to facilitate the interviewees' familiarization with Norwegian culture in general and with outdoor lifestyles. Many interviewees discussed that they experienced the country's customs and practices while either visiting natural sites or communicating with Norwegians about nature outings. For instance, one interviewee reflected on how she struggled with what she described as the Norwegian culture of organizing and planning, as exemplified by Norwegians wanting to discuss their future nature outings so far in advance. She characterized her own people's lifestyles as being much more spontaneous:

*"Yes, very, very different. There [in her home country], we do not have...eh, rules. [...] We are very spontaneous. [...] It is just "Oh, today there is nice weather, so we..." ... I just cook and we go. But, in Norway, we get to know in advance; "For that day you have to..." , "You have to bring such and such..." [laughter]. So, there are rules." (Palestinian interviewee)*

For many years after she arrived in Norway, she thought that this planning and organization was stressful and frustrating; however, as time passed, she became increasingly accustomed to and accepting of this practice.

Further, several interviewees had observed, during their own times interacting with nature, the distinct ways in which ethnic Norwegians usually spend time in nature. These interviewees were particularly concerned with the distinctions between the ways in which people from their home countries engage with nature and the "Norwegian outdoor life culture" (as the interviewees refer to it). In this regard, they discussed how entire nuclear Norwegian families would go on nature excursions together, irrespective of weather conditions, often to engage in physical activities and to enjoy each other and nature itself. Further, the interviewees discussed how the Norwegians did not interact with nature for practical purposes such as gathering food:

*"Norway was a shock regarding outdoor life [...] because I had not seen people focus so much on going out to enjoy nature with their whole family. I liked it very much. I thought it was exciting... It is quite important for the family. And I did not have this experience in my home country." (Polish interviewee)*

*"...we have more practical outdoor lifestyles than [Norwegians] ... For example, we often go and pick mushrooms or.... But it always has to do with something practical." (Latvian interviewee)*

The analysis indicates that interactions with nature also served as a catalyst to familiarize the interviewees with both their nearby and far away physical environments. In general, the

interviewees recounted that they extensively used various nearby natural environments, including wooded areas, seaside and riverside paths, lakes, sporting grounds, and playing fields. Several interviewees also described the daytrips or overnight road trips they took to natural sites lying farther away. In addition, using these environments also allowed the interviewees to become familiar with the Norwegian landscape and vegetation. Some interviewees described how they learned about Norwegian botany during nature outings with Norwegians or with immigrants who had lived in Norway for a long time. These interactions subsequently increased their knowledge about plants, flowers, berries, and mushrooms.

Engaging with natural environments over time also allowed several interviewees to become accustomed to the typical conditions in Norway's harsh winters such as the coldness and darkness:

*“So, in the beginning it was a bit sad and depressing for me to experience the dark season. [...] ...but... the last few years, let us say, maybe ten years ago, I have changed a lot, and I have become even more concerned with nature, and discovering the sky ... It is incredibly great to experience the winter ... it is very nice [...] And to see the blue hour, that is so amazing! [...] ...and yes, I do not think it is that bad now.”* (Colombian interviewee)

Several of the interviewees were particularly concerned with becoming fluent in Norwegian as quickly as possible to get jobs or enroll in higher education. Several of the interviewees discussed how the natural environments became arenas for learning the new language when they visited nature with Norwegians.

#### *Nature as an arena for social interaction*

Although a few interviewees preferred to spend time in nature by themselves to tranquilly reflect on their lives, meditate, or otherwise achieve the maximum health benefits from experiencing nature, the majority of interviewees stressed that they preferred to engage with nature while with others. Typically, the interviewees visited nature with close family members, friends, or other members of their established social networks (e.g., church communities). For instance, several interviewees went for walks in the woods, picnicking by the ocean, or playing soccer at a sporting ground with their husbands, nuclear families, children, or friends. In this way, nature appeared to be a convenient arena to engage in social activities with existing social networks, which seemed to render both immediate mental health enhancing effects through fun and happy experiences and future mental health benefits by nurturing their social ties. This seemed to be of particular importance for some of the interviewees who had faced a mentally challenging period after settling in Norway. For instance, the Palestinian interviewee underlined that she preferred to be in nature with other people to have fun and to distract herself from her many worrying thoughts about her new life in Norway.

However, many of the interviewees expressed that they had small social networks and had a desire to make new friends. They wanted to become acquainted with both other immigrants and ethnic Norwegians. Several interviewees noted that nature may be a suitable arena for creating such friendships and for expanding their social networks. Various interviewees highlighted that organized nature-based hiking groups, in particular, could serve as a potential setting for such relationship attainments. The Iranian interviewee expressed this sentiment, as she was planning to attend such a group outing for the first time the following week:

*“Yes, because you can find woods everywhere here. The Norwegians grew up with woods and such in nature, but it is new for us. Therefore, it is preferable with a group. That can be one cause. But the other reason is that one does not feel alone, especially for foreigners who live*



*alone here. One feels more social when one is with a group. And then you can get to know people... and can visit each other after the trip... another day... It will be exciting, I think, to be with a group!"* (Iranian interviewee)

However, none of the interviewees had yet to partake in such groups. While one interviewee had become acquainted with a few ethnic Norwegians through a joint nature-based activity (climbing), it appeared that the interviewees had not yet developed new friendships or increased their social networks through their usual interactions with nature. Nearly all interviewees focused on how difficult it was to get to know Norwegians. Several women expressed that the Norwegians were polite but did not seem interested in further contact. A number of interviewees described the Norwegians as having introverted personalities, being focused on their close family members, and needing time for themselves.

Still, as previously shown, several interviewees highlighted the importance of seeking outdoor natural environments when they felt isolated, lonely, or depressed, not only for the mental health benefits of exposure to nature itself, but to feel better by being able to see and be surrounded by other people.

#### *Nature as an arena for encouraging feelings of continuity between home and new countries*

The analysis suggests that interactions with nature might strengthen the interviewees' mental health statuses by reducing their feelings of loss and/or alienation. Many of the interviewees were concerned with what they had left behind in their home countries, expressing that they missed their families, friends, and traditional social gatherings. The majority of interviewees also highlighted the vast differences between their home and new countries in regard to the cultures, social norms, and language. A few interviewees described how they struggled with adapting to the numerous changes:

*"Yes, it is a challenge! When I hear that refugees are coming, I think: 'Oh, it will be tough, yeah!' I like it here, me. I am not complaining. Norway is a great country. Exciting. [...] But we have very, very many things to learn and to get used to as refugees. Here, it is very, very different!"* (Palestinian interviewee)

Many of the interviewees sought natural environments and nature-based activities that resembled what they were used to and had appreciated in their home countries. These interaction types seemed to evoke good memories and positive emotions and appeared to help bridge their old and new lives, which alleviated stress for some of the interviewees. For example, the Latvian interviewee reflected upon her need to visit the ocean:

*"[...] Yes, and we went to the sea. My mom loved it very much, and we were often there. [...] Yes, and that place is still very special to me, I must definitely be by the sea a little in the summer, because of... my childhood."* (Latvian interviewee)

This interviewee also brought with her the Latvian traditional springtime practice of draining liquid from birch trees for drinking purposes. Also, the Palestinian interviewee expressed a strong attachment to the beach due to positive experiences with such environments in her home country. She took many joyful excursions to various Norwegian beaches with her husband and children in the summer months, which seemed to improve her worrisome, stressful, and depressed everyday life. One interviewee expressed that she missed the large garden filled with flowers and vegetables at her family's house back home, and she longed for eating vegetables and berries straight from the ground or the trees. In compensation, since her current house does not have a garden, she plants potted flowers, vegetables, and herbs on both the terrace and along the indoor window boards.

### *Nature as an arena for physical activity*

Although the interviewees were generally little concerned with physical activity when asked about the perceived benefits of engaging with nature, the majority of them did interact with nature through various forms of physical activity. The primary physical activity completed in nature for most interviewees was walking, with other activities including bicycling, strength training, playing with their children, and climbing. However, while the women focused more on nature's mental health benefits, their statements suggest that some of the mood enhancing and calming effects (which they attributed to nature) might have occurred from physical activity. For instance, several interviewees described how they felt discouraged and lacked the motivation to go out for a walk, especially in bad weather, but that these negative feelings were replaced by a strongly improved mood and feelings of pleasure and happiness after finishing a walk.

### **Discussion and Conclusion**

The aim of this study was to explore the role of natural environments in regard to the mental health of immigrant women in Norway. The findings suggest that natural environments are especially promising settings for improving this target group's mental health, indicating the following pathways: 1) exposure to nature itself, 2) familiarization with diverse aspects of the new country, 3) social interactions, 4) engaging in familiar nature-based activities, and 5) physical activity. We will subsequently discuss how these dimensions could potentially interact and work to benefit different aspects of immigrant women's mental health.

### *Aspects of mental health*

The most prominent findings of the present study are related to nature's ability to improve one's mood, reduce stress, and retrieve energy. These mental health benefits seemed to occur through all types of sensory experiences in nature, although the interviewees emphasized nature's visual sensations the most, such as enjoying beautiful landscape views or visually noticing nature's details. These findings are generally in line with the following: 1) the results obtained in numerous studies on the general populations in diverse Western countries (e.g., Bowler et al., 2010; Sonntag-Öström et al., 2011; Stigsdotter et al., 2010); 2) the growing base of studies targeting the immigrant populations in Western countries (e.g., Byrne, 2012; Gentin, 2011), and 3) theories that attempt to explain nature's restorative effects (e.g., Kaplan, 1995; Ulrich et al., 1991). Multiple interviewee statements support the mechanisms of nature's restorative role portrayed by such theories, for instance giving one feelings of fascination and of "being away".

The similarity between findings for this target group and the existing related research's findings for both general and immigrant populations (that exposure to nature positively impacts mental health), suggests that nature's influences may be partially independent of ethnical and/or cultural backgrounds. Our findings regarding nature's stress reduction role are also supported by studies that demonstrated how interactions with nature can improve stress-related physiological and endocrinal markers such as blood pressure, heart rate, and cortisol (Park et al., 2010). This indicates that there might be at least a partial biochemical explanation for why exposure to nature improves mental health, which helps explain why similar findings have been identified across varying ethnicities and cultural backgrounds. However, the interviewees did not always perceive the natural environments as being restorative. Some fear that they will be assaulted or will become lost when alone in the

woods. Furthermore, one interviewee reported that nature's calming and beautiful sceneries evoked stress-enhancing thoughts within her. Likewise, although not emphasized by interviewees in the present study, other studies have revealed that experiences with discrimination in natural environments can produce negative mental health effects (Stodolska et al., 2017). These findings suggest that people's backgrounds and previous experiences, but also various aspects of their nature experiences in their new country of residence, still need to be considered when discussing the potential mental health gains from exposure to nature.

In general, the fact that mood and stress improvements were related to various types of interaction with nature suggests that public health practitioners should consider multiple arenas for potential nature-related mental health gains. Also, the interviewees valued the natural elements that were very close in proximity (e.g., garden plants), which indicates that mental health improvements can be achieved via very low-cost and low-threshold strategies. These aspects should be more thoroughly investigated in the future.

Although less explicitly expressed, this study finds that interactions with nature are also related to other dimensions of immigrant women's mental health. It is expected that becoming acquainted with the new country's culture, geography, nature, climate, and language via interactions with nature will further enhance the immigrants' mental health statuses by increasing their attachment to their new countries and local neighborhoods. The findings from existing studies corroborate these results (Peters et al., 2016; Rishbeth and Finney, 2006). Such familiarization processes might improve one's mental health also by encouraging feelings of mastery and empowerment (Zimmerman, 1995). Also, these processes might lower the threshold for further contact with nature and thus promote the above-mentioned additional mental health benefits. Our findings that immigrants' continual interactions with similar natural environments (i.e., similar to the environments in their home countries) may result in fewer feelings of loss and alienation also corroborate the existing research's findings (Askins, 2009; Hordyk et al., 2015; Jay and Schraml, 2009; Lovelock et al., 2011; Peters et al., 2016; Stodolska et al., 2017). However, it is possible, as Stodolska et al. (2017) argue, that such familiar activities and natural sites might also stimulate feelings of nostalgia and alienation and ultimately render adverse mental health effects.

Although many of the interviewees expressed having small social networks and desires for new friendships (with other immigrants and with ethnic Norwegians), it does not appear that such relationships develop easily in natural environments. Also, other researchers have found that immigrants visit nature mainly to interact with people they already know (Gentin, 2011; Gobster, 2002; Stodolska et al., 2017), and that interactions between immigrants and the majority population in those environments are largely limited and cursory (Jay and Schraml, 2009; Peters et al., 2010; te Kloeze, 2001). However, certain previous research (Rishbeth & Finney, 2006) has established that sustained friendships (even cross-ethnic ones) can be developed through participation in outdoor group activities. Various interviewees indeed remarked that they desired attending nature outing groups particularly for that purpose. Notwithstanding, our study suggests that natural sites, by being places where one can see and be surrounded by other people, might benefit immigrant women who feel isolated and lonely even if very little social interaction occurs. This is accordance with studies that have shown that weak social ties in neighborhoods (i.e. unpretentious everyday contacts) might also contribute to feelings of comfort, security, and belonging (e.g., Henning and Lieberg, 1996). We also found that immigrants who visit nature with their close family members, friends, or other existing social networks might experience an improvement in their mental health. It is expected that both amusing natural excursion experiences (e.g., playing ball with one's child or chatting with a friend) and the maintenance and strengthening of existing social bonds can further promote social

cohesion, social support, and social capital (Alvarez et al., 2017; Seeman, 1996). In line with these findings, it has been argued that it may indeed be of particular importance for immigrants to socialize with their families and their ethnic communities in an adaptation process, as this may give them a break from the host country's alien environments (Stodolska et al., 2017).

As shown, this study suggests that various types of interactions with natural environments might contribute to enhancing the mental health of immigrant women in Norway. As discussed, some of these mechanisms (e.g., nature's mood enhancing and restorative influences) are general and thus also apply to non-immigrant populations (Bowler et al., 2010). Further, a number of influences (e.g., immigrants feel stronger senses of belonging when they become familiar with the community's natural areas) might also apply to anyone who moves to a new place within the same country. Regardless, it appears that several of the mental health promoting processes are specifically related to immigrants, such as becoming acquainted with the new culture, language, and climate. Furthermore, the majority of identified mental health improving processes are particularly important for the immigrant population, and immigrant women in particular, as this subgroup generally struggles more with different mental health issues (Abebe, 2010).

#### *Study limitations and avenues for future research*

The validity of the study's findings might have been influenced by several factors (Graneheim and Lundman, 2004). For instance, the presence of children, husbands, and/or friends in some of the interviews might have distracted the interviewees or else prevented them from answering honestly. However, since the study's general topic was not very sensitive, we do not believe that this was of great importance. The interviewees did not validate the analysis due to limited resources. However, we expect that the iterative analysis process and the researcher's triangulation approach strengthened the validity of the findings.

Due to its limited size, it could be argued that the current study can only be viewed as a pilot study. To improve our understanding of this topic, it is necessary to conduct more studies on immigrants in Norway with larger samples that are both qualitative (to attain more in-depth knowledge) and quantitative (to produce generalizable findings). However, our study does provide the literature with significant information, which should be considered by those who are responsible for promoting the health of the female immigrant population in Norway. Particularly, it seems essential to assure that those who provide public health measures and mental health care to this population subgroup are aware of the multiple possible pathways to enhanced mental health which lie in interacting with nature. The correspondence between our findings and the findings of studies conducted in other countries, and the similarity in interviewee responses (regardless of their diverse backgrounds), indicates that the results might be at least partially independent of home or host country. Thus, the findings might also be relevant for female immigrant populations in other Western countries. However, our findings, such as fearfulness of certain unfamiliar natural environments and stress-enhancing thoughts provoked by being surrounded by beautiful natural landscapes, also support previous researchers' conclusion that immigrants cannot be regarded as a homogenous group (e.g., Kloek et al., 2015). This suggests that several aspects beside merely being an immigrant should also be considered, both in research and practice. In general, future research should focus on the similarities across ethnic groups and between immigrants and the major population, and future studies should also consider the differences both across and within ethnic groups based on subcultures, previous experiences with nature, reasons for migration, length of stay in the new country, acculturation levels, perceived discrimination when visiting natural sites etc. Given that a

few findings were related to Norway's specific conditions (e.g., its polar nights and rough winters), it is important that future related research distinguishes between different host countries. To optimize the public health work in this field, future research should also identify what prevents and facilitates these health-promoting behaviors.

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