How community environment shapes physical activity: Perceptions revealed through the PhotoVoice method

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A B S T R A C T

A growing body of evidence shows that community environment plays an important role in individuals' physical activity engagement. However, while attributes of the physical environment are widely investigated, sociocultural, political, and economic aspects of the environment are often neglected. This article helps to fill these knowledge gaps by providing a more comprehensive understanding of multiple dimensions of the community environment relative to physical activity. The purpose of this study was to qualitatively explore how people's experiences and perceptions of their community environments affect their abilities to engage in physical activity. A PhotoVoice method was used to identify barriers to and opportunities for physical activity among residents in four communities in the province of Alberta, Canada, in 2009. After taking pictures, the thirty-five participants shared their perceptions of those opportunities and barriers in their community environments during individual interviews. Using the Analysis Grid for Environments Linked to Obesity (ANGELO) framework, themes emerging from these photoelicited interviews were organized in four environment types: physical, sociocultural, economic, and political. The data show that themes linked to the physical (56.6%) and sociocultural (31.4%) environments were discussed more frequently than the themes of the economic (5.9%) and political (6.1%) environments. Participants identified nuanced barriers and opportunities for physical activity, which are illustrated by their quotes and photographs. The findings suggest that a myriad of factors from physical, sociocultural, economic, and political environments influence people's abilities to be physically active in their communities. Therefore, adoption of a broad, ecological perspective is needed to address the barriers and build upon the opportunities described by participants to make communities more healthy and active.

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1. Introduction

Physical activity (PA) is widely recognized as important for preventing obesity and many chronic diseases, however statistics reveal a high prevalence of sedentary behavior worldwide (Hallal et al., 2012; WHO, 2010). Physical inactivity is considered the fourth leading risk factor for mortality (WHO, 2010), thus a multitude of interventions have sought to increase PA (Sallis et al., 2006; Ding et al., 2011; McCormack and Shiell, 2011; Williams et al., 2012).

Approaches targeting the influence of the environment on health behaviors such as PA emerged in response to failures of interventions targeting individuals (Sallis et al., 2006). Thus, since the 1990s, there has been a renewed interest in how environment affects health outcomes (Cummins et al., 2007; Ding et al., 2011; Saelens et al., 2012). In contrast to individual-based strategies, environmental interventions have the potential to promote health behaviors at the population-level and produce a long-lasting effect in terms of PA promotion, in addition to their relative cost-effectiveness (Sallis et al., 2006; WHO, 2004; WHO, 2010). Yet, achieving positive changes in health outcomes through environmental intervention is more complicated than simply changing the physical environment.

While members of a population share a common physical environment, how that environment influences behavior is socially constructed by the processes and interactions between the person, attributes of the environment, and other people (Yen and Syme, 1999; Cummins et al., 2007; Macintyre et al., 2002). Cultural meanings, social networks, socioeconomic context, and power relationships all shape the population’s interaction with their physical environments, creating a complex milieu bounding an individual's ability to engage in physical activity. Furthermore, the environment is an actor in human behavior: the individual can...

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make choices about where they live and what they do, but these choices are bounded by the tangible and intangible resources available in their environment.

Several researchers (Macintyre et al., 2002; Swinburn et al., 1999; Sallis et al., 2006; Harrington and Elliott, 2009; Yen and Syme, 1999; Cummins et al., 2007) have reinforced the need for more sophisticated studies that consider environment a complex entity, involving interrelationships between the physical, sociocultural, economic, and political structures that affect the way people perceive and experience the environment where they live. The multiple dimensions of environment act as interdependent driving forces, directly and indirectly influencing people’s lives, their health, and more specifically, their ability to adopt and maintain healthy behaviors (Swinburn et al., 1999), such as engaging in regular PA. Thus, changes to the physical environment, while necessary, alone would be insufficient to promote healthy behaviors (Foster and Giles-Corti, 2008; Sallis et al., 2006; Schulz et al., 2013). For instance, an exclusive focus on the availability of PA infrastructure may not be a sufficient prerequisite to encourage people to use these spaces if deterrents, such as costly program fees or lack of peer support to use the PA spaces, are not also addressed. The critical interdependence between physical (e.g., PA infrastructure) and non-physical (e.g., fees or peer support) environmental conditions must be recognized in efforts to promote conditions that foster healthy behaviors. Identifying the diverse aspects comprising environment may be crucial when creating supportive environments for PA, which are characterized by positive and sustainable opportunities for active living.

Among the ecological models developed to study people’s interactions with the environment where they live, the Analysis Grid for Environments Linked to Obesity (ANGELO) framework (Swinburn et al., 1999) is a prominent conceptual framework that has been largely used to explore obesogenic environments (i.e., environments that encourage sedentary behaviors and unhealthy eating) (Findholt et al., 2011; Harrington and Elliott, 2009; Hennessy et al., 2010; Saimon et al., 2013). With the purpose of identifying and distinguishing the types and levels of environmental influences on health behaviors, the ANGELO framework categorizes the environment by type (physical, sociocultural, economic, or political) and size (microenvironmental settings or macroenvironmental sectors). Applying this framework to PA, physical environment encompasses the availability of PA opportunities in the community (e.g., presence and condition of sidewalks affecting walking or running options). Sociocultural environment refers to the social and cultural context characterized by a community’s values and beliefs, which influences people’s perceptions and attitudes related to PA (e.g., in a community experiencing high rates of crime, people may not take part in active transportation or leisure-time walking, especially at night, due to beliefs that their safety may be compromised, c.f., Findholt et al., 2011; Hennessy et al., 2010). Economic environment explores the costs for PA participation (e.g., high membership fees or lack of government subsidies that influence access to recreation facilities). Finally, the political environment refers to the rules (including regulations, laws, and policies) that enable or constrain PA engagement (e.g., municipal policies prioritizing biking or restricting street hockey). While macro-environments refer to broad sectors (e.g., industry and government), micro-environments are defined as local settings (e.g., homes and schools).

The relationship between environment and PA engagement has been investigated through objective and subjective measures. Objective measures for environment, captured through observational audits or archival datasets analyzed with spatial statistics or a Geographic Information System (GIS), offer more accurate indicators (Brownson et al., 2009). However, these measures have an important shortcoming: they do not capture how residents perceive or value particular environmental features, which may affect their PA behaviors (Brownson et al., 2009; Brug et al., 2006; Foster and Giles-Corti, 2008). Considering that environmental perceptions are linked with utilization of objective environmental factors related to PA and with active living behaviors, it is important to understand how people perceive opportunities to engage in healthy behaviors in the environment where they live (Brownson et al., 2009; Foster and Giles-Corti, 2008; Hennessy et al., 2010). However, similar to objective measures, perceived environmental measures when used in survey-based, cross-sectional studies have shown some limitations. For example, the use of closed-ended questions precludes researchers from taking into account the interchangeability of the environment and the meanings that people attribute to it (Busco et al., 2012). In some cases, qualitative studies are the most appropriate means to explore these issues because they can capture nuances of the relationships between individuals and environment (Cummins et al., 2007). By revealing how people experience and perceive the environment and how environment affects people’s health behaviors, qualitative studies provide an opportunity for the elaboration of hypothesis and the identification of opportunities for interventions (Cummins et al., 2007; Hennessy et al., 2010; Richter et al., 2002) to promote PA and other health promoting behaviors.

Among qualitative data-collection methods, PhotoVoice has emerged as a powerful community-based participatory research approach that enables participants to portray, reflect, and express issues affecting their community through active engagement in research (Catalani and Minkler, 2010; Wang, 1999; Wang and Burris, 1997). In this approach, participants are given cameras to photograph images they feel are related to a particular community issue and, once the pictures have been taken and printed, they discuss the issue and what it means to them with researchers, by telling the stories behind the pictures they took. The combination of photographs and stories elicits rich data on participants’ everyday lives that enables researchers to perceive the world through the community’s eyes, leading to a better understanding of local expertise and knowledge on a particular issue (Guell and Ogilvie, 2013). Moreover, data from PhotoVoice studies may facilitate conversations with decision-makers about how to undertake positive and relevant community change (Nykiforuk et al., 2011; Palibroda et al., 2009; Wang and Burris, 1997).

The aim of this PhotoVoice project was to identify environmental barriers to and opportunities for PA engagement among 35 residents of four communities in Alberta, Canada. Use of the PhotoVoice method was particularly relevant for this project. Findings from a PhotoVoice project may help to reveal how the complex, interdependent aspects of the environment are perceived by individuals in the context of their health behaviors, which is an important refinement of the current literature that relies on socioecological theories emphasizing only the environment’s physical attributes (Harrington and Elliott, 2009; Yen and Syme, 1999). PhotoVoice may provide insights on the multiple dimensions of environment that people perceive as influencing their health behaviors; for example, when considering PA engagement, a participant may take a photograph of a recreational facility that offers PA equipment and programs. While this is a visual depiction of an attribute in the physical environment, the participant’s story about the photograph may reveal economic barriers such as high costs for using the facility or sociocultural barriers such as dressing room standards that do not adequately accommodate cultural needs for preserving modesty. In this hypothetical example, the physical, economic, and social aspects of environment intersect in the participants’ discussion of their photographs. Thus, PhotoVoice is an appropriate method for gaining a greater understanding about the
role of the community environment on shaping peoples’ abilities to adopt healthy behaviors. In addition to uncovering people’s perceptions on physical features relevant to PA in their community, this project sought to capture the meanings people attribute to PA in their community environment, i.e. the connections they develop with and to their community in that context (Nowell et al., 2006). PhotoVoice would facilitate the emergence of these meanings and connections through participants’ photographs and associated stories, allowing the researchers to use conversation about the photographs to better explore the perceived and experienced community environment where health behaviors are shaped and enacted. Further, PhotoVoice is a method explicitly utilized in participatory and activist research, to emphasize and respect the participants’ knowledge contributions. Participants are considered experts and, through their involvement in the research, they are the potential architects of environmental changes in their communities (Nowell et al., 2006). As such, PhotoVoice is an appropriate method for (1) research that aims to investigate the complexities of communities and people’s relationships with their environments, and (2) participatory research design, where the findings may influence community policies or interventions to address local needs, e.g., in supporting PA engagement.

2. Methods

This PhotoVoice project was part of a larger community-based participatory research project, which employed qualitative and quantitative methods to investigate relationships between community environments and health behaviors in four communities throughout the province of Alberta, Canada (Nykiforuk et al., 2012). The aim of this PhotoVoice project was to understand participants’ perceptions of PA within their community environments.

2.1. Setting

Data collection was conducted in four communities. Located in northern Alberta, St. Paul and Bonnyville are two small semi-rural municipalities each with a population of approximately 5000 people at the time of data collection. North Central Edmonton is made up of 11 continuous neighborhoods within the City of Edmonton and had a population of 39,689. Medicine Hat and its suburb Redcliff are located in southeast Alberta and together had a population of over 60,000. Further information on these communities can be found in Nykiforuk et al. (2011).

2.2. Recruitment and study sample

Recruitment in all communities consisted of articles in local newspapers, posters displayed at strategic locations, and e-mail fan-outs through local organization mailing lists. A total of 35 people participated in this study, the majority of whom were women (74.3%). Most participants were adults between the ages of 25 and 64, with a few participants younger (11.4%) and older (17.1%). In this paper, the term “youth” is used to describe participants between the ages of 16 and 24, and “senior” for individuals over the age of 65. Categories of participants’ annual household income ranged from less than CAD$ 25,000 (34.3%) to more than CAD$ 100,000 (17.1%). A $30 gift certificate to a local supermarket was given to each participant as compensation for his/her time.

Ethical approval was obtained through a University institutional review board (Nykiforuk et al., 2011). All participants signed a written informed consent form prior to participation.

2.3. Data collection

The PhotoVoice project occurred over three months in the spring of 2009. Initially, one-on-one semi-structured interviews (60 min) were conducted to understand participants’ perceptions of PA and of their community’s strengths and weaknesses in terms of PA opportunities. Following the interview, participants were given digital cameras and were instructed on their operation. They were asked to take pictures of places or things they perceived as obstacles or opportunities for engagement in PA in their community over a two-week period. Minimal direction on the photography mission was given to the participants in order to reduce researchers’ influence on participants’ ideas and, by extension, what was included in the photos (including location, types of PA, etc.); the participants, as experts, chose what, when, where, and how many photographs to take. Thereafter, all photographs were printed; each participant took, on average, 13 photographs.

Shortly after the two-week photo-taking period, a follow-up semi-structured interview (90 min) was conducted with each participant to discuss the photographs. Participants were asked to select the most representative or descriptive photographs and were encouraged to explain why they had taken the photograph (i.e., what was the purpose for taking that photograph and what they were trying to show). A semi-structured interview guide, which asked the participants to discuss their thoughts about how what they photographed “made it easier or harder to be physically active”, was drawn upon if needed to foster conversation. Participants determined the quantity of photographs discussed; this varied depending on the length of the ‘story’ or explanation associated with each photograph. This interview process continued until most of the allotted interview time had passed or until participants had shown signs of fatigue or boredom.

Trained research assistants conducted both interviews while an observer took notes. All interviews were digitally recorded and were transcribed verbatim. Detailed information about the PhotoVoice method used in this project has been provided in Nykiforuk et al. (2011).

2.4. Analysis

Given that the purpose of this project was to investigate barriers to and opportunities for PA discussed through the photographs taken by the participants (i.e., via photo-elicted interviews), only the transcripts of the follow-up interviews were analyzed. While photographs were treated as documents that contextualized and illustrated participants’ words, the content of each photograph was not coded. Using QSR International’s NVivo 10 qualitative data analysis software, two researchers (APB and LMN) independently performed line-by-line coding of the interview transcripts.

The next step of data analysis was informed by socio-ecological theories used in public health (Sallis et al., 2006; Macintyre et al., 2002; Yen and Syme, 1999) and operationalized by ANGELO framework (Swinburn et al., 1999), which was used to categorize emergent themes by type of environment implicated. The researchers employed inductive coding to code the ideas that emerged from the interviews. The codes were grouped into themes, which were then organized based on the four types of environment articulated in the ANGELO framework (i.e., physical, sociocultural, economic, and political environment) (Swinburn et al., 1999). Findings organized according to the size of environment (micro and macro) – other components of the ANGELO framework – are
### Table 1
Physical activity opportunities and barriers, according to the type of environment.

<table>
<thead>
<tr>
<th>Themes</th>
<th>Opportunity</th>
<th>Barrier</th>
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</thead>
<tbody>
<tr>
<td>Physical environment</td>
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<tr>
<td>Sidewalks</td>
<td>“To me, it looks very inviting in terms of encouraging one to walk down that sidewalk. Because for #1 it is in very excellent walking condition.” (female, adult)</td>
<td>“[…] when I was walking around particular areas that we not commonly walked on, sidewalks would just randomly stop and go into dirt road.” (female, youth)</td>
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<tr>
<td>Bikeways/racks/walking trails</td>
<td>“It is along the river valley, so it is actually scenic and you can go running and you can ride your bike […] having those structures in place facilitates you using them.” (female, adult)</td>
<td>“[…] it is a beautiful boardwalk […] if you would step off in most areas you would twist your ankle or get hurt. Because, there is no gradual slope, it is just a drop off;” (female, adult)</td>
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<tr>
<td>Parks/squares/natural spaces</td>
<td>“I used to […] run, walk, bike, there was lots to do. We have a lot of parks in town, every neighborhood has a park.” (female, adult)</td>
<td>“[…] there is still sand in this playground, a lot of the playgrounds that is being replaced with that rubber pour stuff, because there are concerns with what you find in the sand […] I know parents who also have teenagers who wouldn’t let their kids play there when they were young for that reason.” (female, adult)</td>
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<tr>
<td>Recreational facilities/athletic courts</td>
<td>“And it is super important to have a recreational facility in your community. It is a meeting place where you can meet other people and do physical things and you can work out and be happy and healthy and just outrageously important.” (female, adult)</td>
<td>“There is no place, at least that I am aware of, where people can just go and exercise if they want to, like on a stationary bike or a treadmill;” (female, adult)</td>
</tr>
<tr>
<td>Distance from home to leisure locations and PA programs</td>
<td>“Well living, of course, close to the center of the city makes it more likely that I will do things like ride my bike to work, or I can walk to work or jog to work quite easily. […] So I don’t have to be reliant on a car and still more active by walking a few blocks instead of to the garage.” (male, adult)</td>
<td>“It is just something that we would want to be by the river valley, because I think then I would be more motivated to go for a run and it would be a lot easier to take the dogs for longer walks.” (female, adult)</td>
</tr>
<tr>
<td>Convenience of public transport</td>
<td>“I find just even having that [train] makes me get out and be more physical than if I had a car […] I like that I have a little bit of a walk to get to the train.” (female, adult)</td>
<td>“My son wanted to go there [lake] today but I didn’t give him a ride. That is the drawback about [town’s name] too for the kids, to get out, there is no transit system in [town’s name], so they are trapped.” (female, adult)</td>
</tr>
<tr>
<td>Street lighting</td>
<td>“Maybe it could be better just because it is more lit up, because of these two lights that are there [basketball court], and there is always kind of people around.” (female, adult)</td>
<td>“It [walking trail] is not lit up or anything so that would deter you in the first place.” (female, adult)</td>
</tr>
<tr>
<td>Traffic safety</td>
<td>“There [are] some pretty good speed bumps, so it is a little – say for people have to slow down […] I like the idea of the speed bumps because you have children and adults playing there.” (female, adult)</td>
<td>“Too much traffic to bike to town […] it is just scary.” (female, adult)</td>
</tr>
<tr>
<td>Equipment ownership</td>
<td>“I use it [bicycle] to get back and forth to work. I enjoy riding my bike when I get the opportunity to go out with friends and ride […] because it is a bike because it is activity.” (male, adult)</td>
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</tr>
<tr>
<td>Esthetics of natural and built environment</td>
<td>“I chose to live there, for the reason that there is a lot of green space and natural trees. […] It gives you the desire to get out of the house.” (female, adult)</td>
<td>“They are not at all shaded and they are in the middle of no trees, and no shade and you never see any kids at those parks.” (female, adult)</td>
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<tr>
<td>Climate and pollution conditions</td>
<td>“So I actually think my area because it is quieter it encourages, it makes me want to go out for walks more.” (female, adult)</td>
<td>“In the winter it is harder to get out and be active. […] in the summer you could just get out and decide to go for a walk.” (female, adult)</td>
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<tr>
<td>Information about programs/activities</td>
<td>“So basically this is the sign that tells you anything that is going on in [town’s name]. […] often they will announce any sort of recreational activities, upcoming events” (female, adult)</td>
<td>“Because some day you can find information about the swimming pool in one place, or some day you can find information about some other activity, but not all together.” (male, adult)</td>
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<tr>
<td>Community-based PA programs</td>
<td>“[…] we have summer programs for the kids there […] And skating lessons and skating, as well as we have a couple of gatherings” (female, adult)</td>
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<tr>
<td>Sociocultural environment</td>
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<tr>
<td>Sociocultural esthetics</td>
<td>“I feel like that [graffiti] is art […] they’ve made it a little bit artsy looking, so it is nice.” (female, adult)</td>
<td>“[…] some graffiti on the garage that the homeowner didn’t, hasn’t cleaned up yet. And that just shows that if we allow things like this to start, they can become a menace […] So we need to be vigilant about cleaning those areas up to make our outdoors more enjoyable for users.” (male, adult)</td>
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<tr>
<td>Safety</td>
<td>“Because the more we as the community use our community [the less space there is for] criminal activity. So our focus is, let’s focus on us and by focusing on us the end result will be crime prevention.” (male, adult)</td>
<td>“I wonder why people don’t walk in our area […] I think people don’t feel safe around here, because of things they see. They see the homeless people with their carts and the girls standing on the corner.” (female, senior)</td>
</tr>
<tr>
<td>Social involvement</td>
<td>“I think my involvement with the community league certainly helps with promoting wellbeing in people around […] just to see people come into the community that they feel that they are part of it and that makes me happy.” (female, adult)</td>
<td>“[…] so he [neighbor of a park] wouldn’t throw the ball back or let them come and get it. […] sometimes there are some frictions.” (male, adult)</td>
</tr>
<tr>
<td>Motivation for PA</td>
<td>“That is my dog who insists on going for a walk everyday not matter what. […] you are motivated to keep walking and see what is going on in the neighborhood” (female, senior)</td>
<td>“They [children] don’t have anyone saying ‘go to the swimming pool’ […] sometimes they don’t have anyone there at home with them to do something with” (female, adult)</td>
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<tr>
<td>Participation in recreational activities</td>
<td>“I am already fitter than them [her friends] because I can bike around [lake’s name] and then bike home, and bike into town and they can’t. [It] makes me feel better.” (female, youth)</td>
<td>“What a lot of our kids are doing now for fun, is they are playing video games, or watching movies, which are both sedentary activities […] I know some kids that are consumed by that and don’t get out and about and do any of this stuff.” (female, adult)</td>
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(continued on next page)
Youth refers to the participants aged 16–24 years; adults were comprised of participants aged 25–64 years; and seniors are those participants aged 65 years or over.


Table 1 (continued)

<table>
<thead>
<tr>
<th>Themes</th>
<th>Opportunity</th>
<th>Barrier</th>
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</thead>
<tbody>
<tr>
<td>Car culture</td>
<td>“Driving I find to school, it is super stressful. You are having to deal with a parking lot [ … ] it takes as much time to load three kids into the car. Like walking is easier so [ … ] my kids can tell you that walking to school is much healthier than driving.” (female, adult)</td>
<td>“We get into a car mentality where we just get into our car to go everywhere [ … ] it is like a mentality that we just get in our car rather than walk two blocks. It is kind of crazy[ … ] It is not good for their health.” (female, adult)</td>
</tr>
</tbody>
</table>

Economic environment

Affordability to recreational facilities

“I would never join a gym unless it was free, just simply because of the cost.” (female, adult) | “These are all moms with young families and they can’t afford it [recreational facility] [ … ] it is just so expensive to drop in” (female, adult) |

Public spaces and PA programs with no cost

“[Taekwondo] is free [ … ] which is fantastic because we are a single income family so there is not a lot of extra money to go to activities” (male, adult) | “Everybody was into soccer because there was no charge for the soccer fields before, because they would just go and play in a park [ … ] and now it is a shame that those areas are vacant and everybody goes to an area where they have to pay.” (female, adult) |

Fundraising to support PA

“They built the brand new school, and they didn’t have money for [playground] equipment. [ … ] We donated stuff and they raised lots of money and they bought that equipment.” (female, adult) | “You have to go work the bingo that night because your kids are in soccer and hockey whatever.” (female, adult) |

Partnerships with the community

“You see oil companies and [business’s name] always donating money for these places [sports facilities].” (male, adult) | “So the people that have contributed to the cost of these [soccer fields] you know, are kind of frustrated. [Hotel’s name] has contributed a lot of money because they were going to get feedback but then the town turns around and makes a trailer park.” (female, adult) |

Government financial support for PA infrastructure/programming

“The city gives us a grant and we can also apply for a provincial grant, so it does lessen the cost for us, but it does cost us. It costs the community league.” (female, adult) | “They [the town] didn’t put sidewalks in and I think it is because it added an extra half million dollars to the cost of the project.” (male, adult) |

Cost of maintaining the PA infrastructure

“… I think it is one thing to have them available, but it is also to make that connection to the community and get them engaged.” (female, adult) | “It is a really good little facility for our town, but I know that there are some councilors that would prefer to see this filled in with dirt and used as a greenhouse rather than a swimming pool, because it’s a very costly facility” (male, adult) |

Political environment

PA programming and promotion

“[The community] offers healthy nutrition choices and healthy active lifestyle choices and makes those available, but I think it is one thing to have them available, but it is also to make that connection to the community and get them engaged.” (female, adult) | “The best thing to do would be to promote neighborhood parks as a family. [ … ] all these areas have parks, or even school yards with beautiful toy play facilities and nobody is utilizing them.” (female, adult) |

Government support for PA infrastructure

“The improvements that they [town] have made on the avenue are terrific and they are going to be great for getting a lot out enjoying the street life, and being part of the community, and adding to the security end.” (male, adult) | “And the biggest obstacle I have is, in fact, the bureaucracy in the [city’s name] [ … ] they talk the talk but they don’t walk the walk. [ … ] The city said this [cycling trail] isn’t a very high priority.” (male, senior) |

Local policies/regulations influencing PA

“People in our neighborhood are super good at following the city bylaw of shoveling […] It is very rare to not be able to walk because stuff hasn’t been shoveled.” (female, adult) | “They [town] don’t charge for parking […] and they don’t discourage driving, so” (female, adult) |

Rules affecting the access to recreation areas

“There is nothing like that open on the weekends […] And you want to, so then the only place you can go is [name of a fast food’s playground].” (female, adult) | “And you want to, so then the only place you can go is [name of a fast food’s playground].” (female, adult) |

3. Findings

The analysis findings suggest that themes related to the physical (56.6%) and sociocultural (31.4%) environments were discussed more frequently than those of the economic (5.9%) and political (6.1%) environment themes. The themes for each type of environment are shown in Table 1, where opportunities and barriers discussed by participants are identified through representative quotes. Except for the themes ‘equipment ownership’ and ‘community-based PA programs’ (both in physical environment), which were only identified as opportunities, as well as the themes ‘cost of maintaining the PA infrastructure’ (economic environment) and ‘rules affecting the access to recreational facilities/parks’ (political environment), which were considered only barriers, all themes presented positive and negative influences to PA behavior. It is noteworthy that participants talked about barriers and opportunities for themselves as well as their perceptions of how other people living in their community might also be affected.

3.1. Physical environment

In the physical environment (Table 1), photo-elicited interviews show how important the physical infrastructure (e.g., availability of soccer fields and tennis courts) in the participants’ community environments were in terms of PA engagement. Participants reported an opportunity for and a barrier to PA for each of the themes, based on a contraposition between existence/lack, good/bad conditions, close/further, convenient/inconvenient, and pleasant/unpleasant. Equipment ownership (e.g., swimming pool or bicycles) and community-based PA programs were only mentioned as opportunities.

Participants usually evaluated not only the availability, but also accessibility and physical conditions of sidewalks, bikeways/racks/walking trails, parks/squares/natural spaces, and recreational facilities/athletic courts. For example, some participants highlighted reported elsewhere (Nieuwendyk et al., 2014). ANGELO framework was chosen because of its simple categorization of the various dimensions of environment and its potential for identifying areas for intervention (Hennessy et al., 2010; Saimon et al., 2013).
that both lack of and poor shape of sidewalks would impede walking for themselves and for other people with mobility impairments in their community. A woman aged 89 years, for instance, reported, ‘[...] the sidewalk is also very uneven and broken [...] I am looking from the seniors point of view, who have either walkers or canes and sometimes the tips of them can get stuck in those cracks, and they are apt to fall.’ Another example included the surfacing material under playground equipment; this was linked to the perception of unsafe and unsanitary conditions. For example, in the theme ‘parks/squares/natural spaces’ in Table 1, a woman reported that she along with other parents in her community consider sand a barrier and, therefore, they do not take their children to those outdoor play spaces. The availability and quality of the PA infrastructure were emphasized as positive factors in people’s decisions to be active. It is worth mentioning that physical conditions of leisure locations per se did not have a clear pattern when considering the use of these spaces. Some areas with precarious or not updated infrastructure were reported as being well used due to the lack of options available in the community; likewise, parks with better or new equipment were used less by community members because it would not be easy to get there, for example.

The geographical positions of leisure locations in the community were defined as either opportunities or barriers based on the walking distance from participants’ homes (or their perceptions about distance from other people’s homes, e.g., when discussing how barriers may affect seniors in the community). The lack of recreation areas within walking distance was mentioned by participants as limiting access for themselves and for other people who do not have a car or who cannot drive (e.g., children and seniors). But, several participants who had automobiles reported that they preferred not to drive to distant recreation areas or facilities. Thus, shorter walking distances between home and these areas could encourage PA.

Linked to this theme was convenience of public transport. Participants explained that public transport not only decreases car use leading to a reduction of their sedentary behavior, but also may promote PA because it is used in combination with active modes of transport (walking or cycling to and from the bus and train stations as shown in Table 1). They also explained that other people in their community might restrict their activities due to a lack of bus transportation and train routes connecting transport users to key destinations, such as parks and green spaces.

Some participants also noted that poor street lighting would discourage themselves and other people who live in their community from participating in outdoor PA after dark. Most participants described how appropriate lighting in recreation areas would enhance outdoor PA and would potentially engage more people who might be fearful about crime or might not have time to exercise during daylight hours, as exemplified by the quote in Table 1.

Absence of traffic signals, drivers’ lack of awareness, heavy traffic, and high vehicular speed were constantly mentioned as deterrents to walking, cycling, or even to playing in recreation areas close to roads. For instance, telling the story behind a picture of two parks/squares/natural spaces as shown in Table 1. They also explained that other people in their community might restrict their activities due to a lack of bus transportation and train routes connecting transport users to key destinations, such as parks and green spaces.

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Participants identified that having home fitness equipment (e.g., treadmills) supports their PA engagement, particularly in adverse weather conditions. For many participants, urban green spaces, gardens, flowers, and trees conveyed a sense of naturalness, peace, and enjoyment that motivates them to be outside and physically active, especially for walking in leisure-time (Fig. 1). They also mentioned that the appreciation of style and design of local architecture is an incentive to their engagement in outdoor activities. But, the scenery was not only assessed in terms of beauty; functionality of urban green areas was also considered, such as provision of natural shaded areas for children to play in, as seen in the quote for barrier in Table 1. This quote shows that for some participants esthetics characteristics of natural and built environments might impact PA.

Concerning adverse environmental conditions, participants described that pollution (e.g., noise and car fumes) and extreme weather conditions (e.g., ‘too hot’ or ‘icy conditions’) make their engagement in outdoor PA more difficult. In contrast, favorable weather conditions, quietness, and no pollution create inviting areas for outdoor activities, as shown in Table 1.

Participants said that availability of and easy access to information about programs and activities play an important role in the PA engagement of community members, including themselves. To participants, the lack of advertising or insufficient information on signs and posters represented an important barrier; many of them commented that they and other people might be unaware of opportunities for PA, which would be available in their community. According to the participants, community-based PA programs followed by a proper, large-scale dissemination might lead to higher PA. Field trips, swimming pool parties, and skating lessons were cited as examples of activities available in their communities with a great involvement of people, especially children.

3.2. Sociocultural environment

Themes in the sociocultural environment included esthetics, safety concerns, social involvement, motivation for PA, participation in recreational activities, and car culture (Table 1). Poor esthetics such as trash and debris, vandalism, and graffiti were described as hindrances to PA. Through the photographs taken, participants described rundown neighborhoods, graffiti on private property, signs of vandalism, and litter on the streets and recreational areas. According to the participants, these characteristics revealed the ugliness and dirtiness in their community that may restrict their outdoor PA engagement. For instance, when talking about her volunteer work with an organization aimed to keep the community streets clean, a woman said, ‘I kind of regret doing it, because it shows me, I guess the nastiness or the ugliness of our neighborhood.’ Some participants reported that these factors might also affect other community members’ abilities to engage in PA. However, graffiti was also identified as an artistic expression that beautifies the environment and encourages walking and cycling, as well as enhances the social ties among youth involved in these markings.

Fears of crime (e.g., burglary and harassment) constrained many participants from doing outdoor PA. Participants told stories about criminality (including direct and indirect victimization), street prostitution, as well as sales and consumption of illicit drugs on the streets and in recreation areas, and how this affects their PA, particularly walking (see Fig. 2 and the quote provided in Table 1). Despite feeling unsafe, some participants reported that this intimidating situation does not stop them from doing their daily outdoor activities. For instance, when describing his daily walks, a man said, ‘there are some pretty big homeless camps up there [park]. So, that I mean raises a little bit of the issue, safety issues.
Personally I don’t, it is not a big deal for me, because I am pretty good at dealing with people, but I know some people do have fear of the what some people might do, down in the dark along the river valley.” The promotion of group activities involving the use of public spaces was appointed as a strategy to combat this fear of crime and to encourage PA. Unattended dogs were another safety-related barrier reported by some participants who avoid going to some off-leash dog parks or even walking through certain streets. For example, a woman noted, “I guess I would have to get used to, find a place where there aren’t any barking dogs […] and try to avoid them or don’t go on that street where there [are] barking dogs.” On the other hand, others said that they do not feel intimidated by unleashed dogs.

Involvement in associations aimed at promotion of activities, participation in social events organized by the community, and interactions with community members (all included in the ‘social involvement’ theme) were viewed as facilitating the practice of PA for participants and for all residents, as seen in the quote provided in Table 1. However, participants expressed negative perceptions towards the lack of socio-political engagement of residents in community issues, which would be reflected in the shortage of PA opportunities.

Motivation for PA was comprised of peer support, walking the dog, and domestic chores. Peer support involved facilitators and obstacles for transporting children to recreation places, as well as the presence or lack of a companion to walk or to engage in PA, as exemplified in the quote for barrier in Table 1. Walking the dog and domestic chores (e.g., gardening and repairs in the home) were viewed as opportunities for themselves (Fig. 2) and for others to do PA periodically or even on a daily basis.

Another theme that exemplifies the importance of a community’s attitudes, beliefs, and values in PA was participation in recreational activities. This theme referred to the dominant activities and sports in the community. Sedentary habits (e.g., playing video games and watching television) were viewed as the major reason for the reduction in the outdoor activities (as shown in Table 1), while physically active hobbies (e.g., riding bicycles) were examples of PA and sports participants and other people are involved in the community.

The growing reliance on automobiles was viewed as an important contributor to the increasing engagement in sedentary behaviors either for participants or for all residents in their community (e.g., quote illustrating barrier in Table 1). The mentality of using the vehicle instead of walking, cycling or using public transit was criticized, especially for short distances between destinations. By contrast, some participants recognized that the vehicle could help them to get to recreation areas, increasing their opportunities for being physically active. For example, a man...
pondered, “I am kind of neutral with the car because we do so much, because it takes the kids and the dog and [me] to the valley. So we get some physical activity at the other end of it.”

3.3. Economic environment

In the economic environment (Table 1), there were six themes, including affordability, public spaces and free PA programs, fundraising, partnerships, financial support from the government, and costs associated with maintenance of PA infrastructure. Costs for recreation activities were perceived as a particular problem. Some participants talked about their own experiences (e.g., quote used to illustrate opportunity in Table 1), while others described the possible difficulties low-income families in their community may face (e.g., quote used for barrier in Table 1 and Fig. 3). The use of public spaces and the availability of free PA programs were considered important opportunities for families who cannot afford fees of recreational facilities. Conversely, the access to private recreation areas may be constrained due to their higher fees. Costs involving the construction and maintenance of recreational facilities were cited as factors directly and indirectly affecting participants’ health behaviors, and their perceptions of what others in the community may be experiencing. Fundraising, donations by community members and private organizations, and financial support from government for recreation infrastructure were recognized as fundamental in the provision of a range of activities and settings for PA, as seen in the quote for opportunity in Fig. 3. However, participants noted that high investments in building new facilities or upgrading of existing ones can create some challenges for community, such as a constant need for volunteers to periodically work bingos to raise money for an exercise facility or the lack of social and financial return to the organizations who partnered with the community. Moreover, high costs of maintaining PA infrastructure has led to a questioning about financial viability of recreation facilities for local governments. Participants also criticized governments’ lack of sustainable funding for community projects.

3.4. Political environment

In the political environment (Table 1), perceived opportunities and barriers included PA programming and promotion in the community, government support for PA infrastructure, policies and regulations influencing PA, and rules affecting access to recreation areas. In general, these themes were discussed through a collective perspective as affecting the entire community. The role of government in supporting PA programs was mentioned as crucial to promote the use and access to public spaces. For instance, in the quote for opportunity in Fig. 4, a woman mentioned how satisfied she was with the local government making renovations in the parks. The lack of political will for promoting active living was considered a barrier; the marginalization of cycling infrastructure in the decision-making process described by a participant reveals this obstacle (as shown in the quote for barrier in Table 1).

Participants explained that local policies may influence their own and other people’s abilities to participate in PA in a positive way (e.g., shoveling rules encourage walks in the wintertime) or negative way (e.g., absence of taxes or fees for parking does not discourage car use in downtown). Rules affecting access to recreation areas were only identified as barriers. Participants reported that operating hours restrict access and use of some facilities (as seen in the quote for barrier in Fig. 4), particularly for children during summer vacation; complaints were more related to outdoor aquatic activities mainly regarding the short summer in Canada.

In summary, these findings reveal the multiple dimensions of environment (classified in physical, sociocultural, economic, and political) affecting people’s PA behaviors. Not only are physical attributes of the environment important influences on PA behaviors, but also are the social contexts and prevailing values in the community, economic costs, and the political will necessary to support PA infrastructure and programming. As foreshadowed by socioecological theory, although different environmental characteristics were classified according to the ANGELO framework’s categorization of environments in this study, their influences on people’s PA behaviors were not independent from each other. For example, a participant who emphasized the existence of a park in his community (physical environment) as a positive aspect also reported he did not go walking there because of safety concerns (sociocultural environment). Similarly, other participant complained that, although the swimming pool in the community was close to his home (physical environment), he could not use it because of the hours of operation were not convenient (political environment). For some people, membership fees (economic environment) were not considered a problem, but they said they did not use the facility as much as they wanted because they had no one to exercise with (sociocultural environment). Thus, participants’ images and associated stories illustrate the many ways aspects of environment intersect in shaping PA opportunities — and barriers — and the importance of an intersectoral approach by policy-makers and other stakeholders to improve PA prospects.

4. Discussion

Participants identified a number of barriers and facilitators that they perceived as influencing their own and other people’s
decisions to engage in PA in their community environment. Although data were collected from four communities, stories behind the pictures were similar. Participants' perceptions with respect to the enablers and restraints in their community environments were focused more on themes linked to the physical and sociocultural environments than those related to the economic and political environments. Although physical environmental attributes were most commonly discussed in the photo-elicited interviews, it is important to recognize that participants also spoke to other aspects of the environment influencing their abilities to be physically active. Indeed, participants perceived that their and other people's abilities to engage in PA would be affected by a varied range of environmental factors, such as the existence of social activities that stimulate interactions among people and encourages active behaviors, as well as low costs and availability of financial support to help them afford activities and sports. Further, some participants appeared to connect their and other people's abilities to be physically active to a political context favorable to the promotion of healthy behaviors in their community. These findings suggest that restricting conceptualization of environment to its physical features may undervalue the influence of the environment on people's lives; this is especially important given that most research on health behaviors has focused on physical environmental characteristics into themes and then organized these themes into four types of environment based on a well-known theoretical framework (Swinburn et al., 1999), the themes revealed interdependency within and across the four types of environment.

Specifically, the findings show that the presence or lack of recreational areas is important for influencing people's abilities to be physically active. Some participants identified recreational deserts in their communities, that is, areas with limited access to PA resources where they could be active — while this may be considered solely a deficiency of the physical environment, it is not. Economic and political factors determine the allocation of resources in a community, as well as the means for people to pursue alternative modes of PA access. This is of concern considering physical opportunities for PA may lead to inequitable differences in the engagement in sports and exercises, and, consequently, in health conditions (Edwards and Tsouras, 2006; WHO, 2010). In addition to recreational deserts, areas with precarious resources to support active, healthy living have been reported as barriers by previous studies (Findholt et al., 2011; Hennessy et al., 2010) and having a negative impact on PA levels (Wendel-Vos et al., 2007). Interestingly, in this research, there was no clear pattern between physical conditions of recreation facilities and use of these areas; this is because other factors, such as the lack of options in the community or higher membership fees (economic environment), would play a more important role in the PA engagement than the quality of infrastructure at these recreational facilities.

Similar to the findings of other studies (Lockett et al., 2005; Mahmood et al., 2012), the low quality or lack of sidewalks or bike lane markings were described as obstacles that compromised walking and cycling for travel, recreation, or exercise. Systematic reviews, however, have found no supportive evidence for the association between perceived presence of sidewalks and PA (Wendel-Vos et al., 2007; Raine et al., 2008). Previous PhotoVoice research focused on children (Findholt et al., 2011; Fusco et al., 2012; Hennessy et al., 2010) and elderly (Chaudhury et al., 2012; Lockett et al., 2005) have also suggested that improvements in walking and cycling infrastructure might foster engagement in active mode of commuting and leisure-time PA. In the current study, most participants advocated for the expansion of pedestrian and bicycle infrastructure, especially for the building of safe sidewalks and separate lanes for cyclists.

Themes related to traffic safety were also found to affect PA participation, as described by others (Fusco et al., 2012; Saimon et al., 2013; Torres et al., 2013; Wendel-Vos et al., 2007; Sallis et al., 2006). Among traffic hazards, the lack of traffic calming strategies and the disrespect of drivers to the pedestrians and cyclists negatively impacted participants' perceptions of a safe environment. Some participants also complained about the absence of government in regulating traffic safety issues (political environment). These findings suggest that, in order to increase the sense of security and create a safe atmosphere that encourages engagement in outdoor PA, urban and transportation planners should prioritize restrictions on vehicle speed, among other measures to slow traffic (e.g., speed bumps and traffic signs) and increase visibility of pedestrians and cyclists (e.g., marked crosswalks and pedestrian crossing lights). Efforts should also be used to strengthen traffic law enforcement to raise safety awareness and respect of drivers to the pedestrian and cyclist's right-of-way — a point advocated by some participants. Moreover, special attention should be drawn to the influence of social environment in PA, considering that some participants emphasized the car dominance (sociocultural environment) in their community environments. These findings indicate that it is important to support healthy role models and imagery that

**Fig. 4.** Examples of photographs and quotes for political environment.
may positively shape beliefs, values and attitudes concerning active transportation in order to reduce vehicular traffic volume and increase walking and cycling. Car culture (sociocultural environment) may also be undermined through the increase in the taxes and fees on parking facilities (Edwards and Tsouros, 2006). As some participants reported, local policies discouraging the car use may have a crucial role to play in promoting PA.

Consistent with previous research findings (Chaudhury et al., 2012; Edwards and Tsouros, 2006), this study showed that low-quality public transport not only discourages active transportation (through modal splits), but also may impose obstacles in the access and sustained use of some recreational areas that are inconveniently located in the community. In some photo-elicited interviews, the absence of this infrastructure seemed to reinforce the car culture reflected in a strong reliance on automobiles for transportation, which, in turn, may have led to a reduction of active commuting, according to some participants. Other research has also pointed out this relationship (Hallal et al., 2012; Sallis et al., 2006). Based on these findings, it might be opportune to emphasize that transport planning should develop convenient and reliable public transport, making it easier to access leisure locations that are not within walking distance — in rural areas this may require further collaboration between municipal and provincial transportation planners as a result of shared jurisdiction of local roads and highways. Further, access to public transport may reduce urban sprawl by promoting the integration of communities, deter car dependence, and encourage PA through trips involving walking and cycling (Edwards and Tsouros, 2006).

Beautiful scenery was assessed by the naturalness of green areas and landscape architecture. Through the photographs, participants said that these spaces invoked a sense of wellbeing and satisfaction in being outdoors. For most participants, poor esthetics due to social nuisances (such as graffiti, trash and debris) was a deterrent to PA. Other studies have shown that attractive, enjoyable scenery affects both outdoor activity (Saimon et al., 2013; Wendel-Vos et al., 2007) and wellbeing (Guell and Ogilvie, 2013). These findings show the multivocality within a community, and the challenges in incorporating differing definitions of esthetics when constructing inclusive public spaces.

Many participants raised concerns about social disorder in the community, such as criminal activity (e.g., drug dealing and drug use), prostitution, loitering, and gangs. These findings echo some research showing that neighborhood incivilities discourage participation in PA (Sallis et al., 2006; Kirk et al., 2010; Foster and Giles-Corti, 2008; Hennessy et al., 2010; Mahmood et al., 2012; Richter et al., 2002). The perception of crime-related safety might not correspond to the real risk of victimization and exposure to unsafe or dangerous situations. In fact, prior research has shown the discrepancies between real and perceived safety related to crime (Foster and Giles-Corti, 2008). Given the importance of the sense of vulnerability and fear of crime in affecting PA behavior (Foster and Giles-Corti, 2008; Saimon et al., 2013), it is crucial not only to enhance actions for crime prevention (e.g., community policing and natural surveillance), but also promote community environments in order to amplify the sense of safety and remove barriers to outdoor PA. As some participants suggested, initiatives to encourage people to use public spaces in their communities and increase social interaction should involve the promotion of walking groups, festivals in the parks, sport events, farmer’s market, and so forth. The quote of a participant (Table 1) is illustrative of this relationship, by stating that the more people use community spaces, the more they feel safe and are encouraged to engage in outdoor PA.

In the economic environment, it was mentioned that low-income groups (some participants talked about themselves, while others referred to poor people in their community) might not use recreation spaces available in their community, if they cannot afford membership fees. Expensive memberships for recreation facilities were also described as deterrent in other PhotoVoice studies (Richter et al., 2002; Torres et al., 2013). Moreover, recent literature has reported that socioeconomically disadvantaged people have reduced access to recreation facilities and lower PA levels (Raine et al., 2008; Kirk et al., 2009). These findings suggest that strategies aimed at reduction of socioeconomic disparities in PA levels should consider reducing fees of recreation facilities or introducing governmental subsidizes, especially for single income families. Another feasible and effective strategy would include the promotion of PA programs with no cost, eliminating economic barriers and enabling PA engagement for the entire population (WHO, 2004). Efforts to create partnerships with local organizations and initiatives financially supported by the government could be critical to build and maintain free or cost-reduced PA programs tailored to the community health needs, without unduly increasing the residential tax burden for these services.

Although themes of political environment only represented 6% of all themes discussed in the photo-elicited interviews, some participants emphasized the central role that rules and policies play in influencing people’s abilities to engage in PA. According to them, rules concerning local or private recreation facilities would have a profound effect on the access and use of these areas by the community. For example, participants explained their difficulties in using swimming pools and athletic courts due to the limited hours of operation of these facilities. On the other hand, some participants emphasized that public policies at the government level would be critical in terms of providing opportunities and programs for PA to the community. However, some participants complained about the lack of commitment from the government agencies, which would have led to an increasing gap between discourse on the creation of healthy communities and actions to promote real changes in the community, as seen in the quote for barrier in Table 1. These participants’ perceptions are very critical, especially considering that World Health Organization (WHO, 2004; Edwards and Tsouros, 2006) has urged governments at local and national levels to assume a leading role in the creation of supportive environment for PA engagement, by providing PA programs and other non-intentional opportunities for PA. Based on the PhotoVoice findings and recommendations made by WHO (WHO, 2004; Edwards and Tsouros, 2006; WHO, 2010), one can suggest that, in order to bridge rhetoric and practice, community demands should be considered in the formulation and implementation of public policies. Furthermore, supporting bottom-up, participatory planning would be essential to achieve the goals for PA promotion, as PhotoVoice studies have advocated (Nykiforuk et al., 2011; Torres et al., 2013; Wang, 1999).

Public initiatives addressing participants’ needs and interests of a friendly, conducive environment to PA may also have a positive impact on society’s culture, shaping attitudes and beliefs related to PA (sociocultural environment), encouraging people to incorporate PA into their daily routine (Swinburn et al., 1999).

Overall, these findings may help to fill gaps in the growing literature on the relationship between environment and health behaviors, by showing that the influence of the environment is not restricted to its physical attributes, which have been the most investigated components of the environment hitherto. Sociocultural, economic, and political environments not only shape physical environments, but also play an important role in people’s abilities and, therefore, should be given due consideration in future research and interventions. These findings suggest that investigations examining only physical environmental influences on health behaviors are unable to fully explain the role of the environment and may underestimate its impact. The lack of associations or
inconsistent findings found in quantitative studies, for instance, may be the result of an incomplete rendering of environment that did not appropriately incorporate sociocultural, economic, and political characteristics. To obtain a comprehensive understanding, it is critical to explore the other facets of the environment where these health behaviors are enacted, encouraged or constrained. Additionally, this data may help substantiate theoretical frameworks that have advocated the inclusion of multiple dimensions of the environment (Cummins et al., 2007; Macintyre et al., 2002; Yen and Syme, 1999) in the investigation of health behaviors.

5. Situatedness

A potential limitation of this research is that its findings may have limited transferability with other qualitative studies in this field, since data were collected in four communities in Alberta, Canada. Another limitation is the inability to compare the findings from the PhotoVoice project with information on the actual PA of participants. Nevertheless, the consistency of the findings across four communities of disparate geographic location within the province may indicate that environmental barriers and opportunities are consistent, concrete, and meaningful. Furthermore, the themes discussed in the photo-elicited interviews are similar to previous studies, suggesting that the barriers and facilitators are common to many communities.

This study has various strengths. Firstly, as a qualitative study, this research offered a deeper understanding of the relationship between environment and PA, by providing insights into how individuals perceive, interact with, and relate to the environment where they reside. It is expected that different themes from those investigated in surveys and diverse meanings attributed to the environmental characteristics emerge in qualitative studies (Cummins et al., 2007). Indeed, based on these findings, it could state that some questionnaires with closed-ended questions are neglecting relevant environmental features or even some nuances that have influenced people’s decisions to be active (e.g., economic and political obstacles in the promotion of PA opportunities).

Secondly, PhotoVoice elicited rich data that provided a broad understanding of residents’ perspectives on the interdependent aspects of community environment influencing their abilities to be physically active. By giving opportunities to the participants to capture through their own lenses what really matters to them, they portray and voice concerns about their community environment. That is, instead of researchers and outsiders asking and suggesting which environmental attributes could be barriers and facilitators to PA engagement, this strategy allowed community members to guide researchers’ eyes to the things and places most significant to them. Moreover, by telling their own stories in their own way, participants shared their perceptions of how specific characteristics of the environment affect PA, and also explained how these characteristics were interrelated in the context where they live. As a result, the photo-elicited interviews helped researchers interrogate the parts (or themes) that community environment is comprised of (simplicity), but at same time helped them understand the community environment as a whole (complexity). Further, the rich data elicited through the photographs provided meaningful insights that was shared in community reports and presentations to municipal councils in hopes that the residents’ knowledge and perceptions of their communities may guide policymakers’ decisions in designing policies tailored to the community members’ needs.

Finally, given the lack of studies integrating environmental conditions and personal behavior determinants (Brug et al., 2006), this study provided a rich set of information that might assist in the development of a comprehensive theory of environmental correlates to PA or help substantiate the existing theoretical frameworks.

6. Conclusion

This study may substantiate the multifaceted nature of the environment in shaping people’s abilities to be physically active. The photo-elicited interviews showed that recognizing the multiple dimensions of the community environment – namely physical, sociocultural, economic, and political environments – are central to understanding PA engagement. Despite the imbalance in terms of themes discussed among the types of environment, participants perceived barriers and opportunities for PA in each of the four environments and identified specific areas that may be amenable to intervention. These findings suggest that environmental interventions that only emphasize the increase of the availability of PA opportunities in the community may not be effective; other factors play an important role in people’s active living decisions, such as cultural aspects reinforcing sedentary behaviors, economic constraints limiting access and/or use of recreation areas, and lack of political will in providing PA opportunities. Consistent with previous research (Yen and Syme, 1999; Cummins et al., 2007; Macintyre et al., 2002), this study shows that a broader understanding of environment is needed to obtain a more nuanced picture of the particular mechanisms that shape health behaviors and that must inform the design of effective interventions that promote PA at the population level. A significant finding is the need for the adoption of a broad, ecological perspective to tackle physical inactivity. From this study, it is clear that barriers and opportunities for PA are a result of a myriad of interrelated environmental factors, which should be addressed in an ecological way to encourage the incorporation of PA into people’s daily routines. This may be translated into a call for intersectoral and cross-ministerial action for strategic health intervention and healthy public planning that address not only the physical attributes of environment, but attends to sociocultural, economic, and political concerns as well. The community residents that participated in this study identified clear and specific PA barriers and facilitators amenable to intervention; what remains is the allocation of resources and the will to act on those needs by the local and provincial stakeholders with the power to do so. For instance, recent efforts to promote healthy built environments and healthy cities movements have taken initial steps to foster collaboration between public health, urban planning, and architects and engineers—an important first step in this regard. Developers and municipalities can also use studies such as these to inform new developments, revitalization efforts, and programming in their communities, integrating supportive PA environments in healthy community design.

To this end, future research should be done in close partnership with government, community, and industry stakeholders to explore how the interconnection among factors from physical, sociocultural, economic, and political environments translates into effective real-world initiatives. Accumulated knowledge will be useful in providing critical insights that may guide the development of both assessment tools for quantitative studies and the design and evaluation of tailored, appropriate community-based interventions. Future studies focusing on particular types of PA (e.g., walking and biking), specific settings (e.g., green areas and playgrounds), and overlooked population groups (e.g., adolescents and low-income families) are needed in order to identify environmental factors that might distinctly influence equity in various people’s abilities to engage in PA in a community.

The environmental issues that emerged from the four types of environment in this PhotoVoice study should be taken into account by policymakers when formulating community interventions to increase PA levels. Overall, the findings reinforce the need for intersectoral policies and programs addressing the barriers identified by participants to help make communities more healthy and active.
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