

ORIGINAL RESEARCH

Feasibility study of asset mapping with children: identifying how the community environment shapes activity and food choices in Alexander First Nation

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ABSTRACT

Introduction: It is estimated that First Nations children living on reserves are 4.5 times more likely to be obese than Canadian children in general. Many First Nations children living on reserves have limited healthy food and physical activity options. Understanding how community factors contribute to First Nations children's lifestyle choices is an understudied area of research. Furthermore, rarely has health research elicited First Nations children's perspectives of their communities. The purpose of this study was to understand the external behavior-shaping factors that influence the lifestyle behaviors of First Nations' children. Asset mapping with children was used to understand how community resources impacted children's activity and eating options.

Methods: Alexander First Nation is in central Alberta. Asset mapping was one component of a research project in the community to identify risk factors for children developing diabetes. Participants were a convenience sample of two high school students working at the local health centre and seven grade six children. Maps, photographs, and a tour of the town site enabled participants to identify places and spaces where they were active or could obtain food. For each of these assets, a description of how it was used and how it could be modified for better usage was derived from notes and transcripts using content analysis. Assets were grouped into usage categories, which were then mapped onto a layout of the community and presented at a community meeting to address childhood obesity.



Results: Twenty-five places and spaces were identified as being activity or food related. Breakfast and/or lunch, concession foods (snack foods, eg chocolate bars, potato crisps) were obtained at school; meals and snack foods where cultural gatherings occur; and snack foods at the local store. Healthy food choices were limited. Children and youth were active at different locations in town, with only two spaces beyond the town site identified as locations for activity. Youth recommended the construction of a leisure centre, that healthier food be sold at the local convenience store, and the development of a community garden and berry farm.

Conclusions: In the ecological framework, weight status is considered embedded within the larger ecology of individual lives because of interrelationships between an individual's personal dimensions and other components of an individual's external environment. Asset mapping with children and youth in Alexander First Nation helped to achieve an understanding of the community factors that shaped their health behaviors. Asset mapping not only produced a list of places and spaces where they played, met, and ate, but also showed where they most preferred to be. Further, the exercise enabled children to express how assets could be improved, and the assets they would like in their community, to promote healthy behaviors. The findings enabled adults to contextualize other community data collected about children (ie obesity prevalence, physical activity levels), to better understand how the presence and the condition of places and spaces in the community shaped the physical activity and eating behaviors of children and youth, and how local resources could be modified to be more health promoting.

Key words: asset mapping, child, child behavior, community-based participatory research, environmental determinants, First Nations, health behavior, Indians, North American, obesity, qualitative research.

Introduction

First Nations are one of three groups of Aboriginal peoples in Canada¹. Obesity is highly prevalent in First Nations, as are chronic diseases such as type 2 diabetes mellitus (T2DM)². The high prevalence of obesity among First Nations children suggests that the genesis of obesity-related chronic diseases such as diabetes begins early in life, and that the environments in which children live limit physical activity and access to healthy foods^{3,4}. About 40% of First Nations live on a reserve, which is an area of land set apart for the use and benefit of a First Nation Band⁵. It is estimated that 36.2% of First Nations children (0 to 11 years) living on a reserve are obese⁶ compared with 8.2% of Canadian children (2 to 17 years) in general⁷. These findings suggest that First Nations children living on-reserves may be exposed to more obesity-inducing environments than non-Aboriginal children³.

Obesity among First Nations is partly the result of inactivity coupled with food insecurity and a decrease in the consumption of traditional Aboriginal foods such as lean game meat and berries in favour of energy-dense market foods^{3,8,9}.

Community factors such as poverty and poor infrastructure are also contributing influences⁴. For example, poverty in many households limits access to healthful foods because of their expense, and increases exposure to cheaper foods higher in calories, which may contribute to unhealthy weight gain and obesity^{4,10,11}. Limited access to a community grocery store with economical healthy food choices is also an infrastructure-related issue faced by many First Nations communities located on a reserve⁴.

A social ecological perspective can be used to explain the development of First Nations obesity⁴. From this perspective, weight status is embedded within the larger ecology of individual lives because of relationships between an individual's personal dimensions (eg biomedical, attitudinal, and behavioral) and the other components of their life context (eg social, organizational, community, public policy, and physical environments)^{12,13}. Thus, an understanding of community-level factors that facilitate or impede the adoption of healthy behaviors is needed to prevent obesity^{3,4}. However, the relationship between community factors and their potential contribution to childhood obesity in First Nations is a vastly understudied area of research^{3,4,8,9}. To better



understand the relationship between community factors and how they impact children's health, First Nations children and youth, like other children and youth, must be engaged to elicit their perspectives about the communities in which they live. Historically, the perspectives of children have been rarely sought, given that the focus of research in relation to children's health and social care has traditionally been on those responsible for children¹⁴. This adult focus is based on assumptions regarding adults' greater knowledge of 'what is best'¹⁴. Although research soliciting the voices of children and trying to understand the perspective of children on issues affecting them has been increasing over the past few decades^{14,15}, research aimed at including Canadian Aboriginal children's opinions about issues affecting their wellbeing has been rare^{16,17}.

Given the negative historical experience many Aboriginal populations have had with research¹⁸⁻²⁰, including First Nation children in obesity research is insufficient. Working with Aboriginal communities to address obesity prevention requires the use of community-based participatory research (CBPR), centering on inclusivity and partnership, and reflecting the social and cultural norms of a community²¹. In addition, research must be strengths-based, identifying and building on assets and resiliencies already in a community rather than merely listing problems to be remedied. One strengths-based approach is asset mapping, which chronicles the resources of a community and views the community as a positive place with assets to be preserved and enhanced, not just deficits to be corrected²²⁻²⁴. Assets can be people, physical structures, natural resources, institutions, businesses, or organizations that represent the positive side of a balance sheet resulting from an accounting and valuation of resources^{22,25}. Asset mapping is well-suited for conducting research with, rather than on, First Nations children. The method allows children to share stories about themselves with reference to where they live, as well as capturing emotional connections to spaces and places²⁶. The information children provide can be used to develop targeted health promotion programs to prevent obesity. Despite its potential utility in health programming, asset mapping with children has had limited research application^{14,15}.

This manuscript describes how asset mapping was used to engage elementary school children and high school youth living on a First Nation reserve, the Alexander First Nation (AFN), in identifying places (buildings) and spaces (outdoor areas) in the community related to active living and food availability choices. The aim was to understand the external behavior-shaping influences that shape the individual health behaviors of the First Nations boys and girls. The asset mapping was one part of a multi-component CBPR project to examine child health indicators (eg weight status) and community or environmental issues related to risk for developing T2DM. Insights gained from the research culminated in the development of a community action plan for T2DM prevention in children.

Method

Setting and study design

This study took place on the main reserve land of AFN in the Province of Alberta, which is 55 kilometers northwest of the city of Edmonton. The approximately 1000 people who live on AFN are primarily Cree²⁷. The community includes family dwellings, farmed fields, small lakes, marshes, and tracts of forest and grassy fields. There is a small town site with housing clusters, a gas station and convenience store, community hall, play areas, Kipohtakaw Education Centre (kindergarten to grade 12), elders' lodge, administrative and community-service offices, and a few other structures. The last federal census in 2006 indicated that median after tax household income in the community was well below the provincial average (\$34,176 versus \$63,361 CDN)²⁷.

A research objective to reduce risk factors for the development of T2DM in children was conceptualized by an AFN community leader (an elder) in collaboration with University of Alberta researchers. The multicomponent research project was a formative assessment of school children's health, to conclude with the development of a community action plan for T2DM prevention. Asset mapping was one part of the overall study. Other components of the



research revealed a high prevalence of childhood obesity and physical inactivity, thereby reinforcing the importance of health-promoting interventions.

Data collection

Asset mapping included two phases which were conducted by the same two researchers for consistency. In both phases, children and youth identified community assets, described how they perceived them, identified how to make current assets more usable, and named additional assets they would like to have in the community. Assets of interest were outdoor areas and buildings on the reserve related to children and youth's activity and food availability choices. To obtain information about assets, the following questions were used: Tell me more? Who uses this? Is there anything that makes this [named asset] hard to use? What do you see and know about this place? Do people like this [named asset], why or why not? Is it easy to use this [named asset], why or why not?²⁸.

Phase 1 was completed in August 2008. Two high school summer students hired by the Education Department completed a two-day visual asset mapping of the community by undertaking a 'pre-drive' interview, visual asset mapping^{29,30}, and an 'ideal-world' interview. For the pre-drive interview, the students responded to the following scenario: 'Let's say you have a friend coming to visit you in Alexander. It's their first time in Alexander. What would you show them? Where would you hang-out?' For the 'ride-along' interview, the youth were driven to five locations that cumulatively gave a visual viewing of the whole town. They identified assets they saw, and were then asked about those places and spaces where they spent time, were active, or obtained food, as a means of obtaining responses from them while they were actively in specific contexts²⁹. These assets were photographed and marked on maps of the town site and reserve. For the ideal-world interview, the students were asked about the spaces and places they would like in their community to promote good nutrition and physical activity if money was not an issue. Sessions were no more than 1.5 hours duration each^{15,31}. Written notes were taken by one researcher while the other led discussion.

Phase 2 was completed in October 2009. The information and photographs from Phase 1 were used in an audiotaped group interview with grade six students from the Kipohakaw Education Centre. Participants were 2 boys and 5 girls who assented to the study, received parental consent, and were present on the day of the interview. The interview was two hours long and included one recess break. It was comprised of a photo review, missing assets, and 'ideal-world' discussion. In the photo review, photographs of the assets identified by the high school students were projected onto a screen. For each photograph, children were asked to identify what was in the picture and then to provide descriptive information. Maps of the townsite and reserve were projected onto a screen and children were asked to identify if there were places and spaces not acknowledged by the high school students. These were marked on the maps and children were asked questions about them²⁸. The interview ended with an ideal-world discussion in which students were asked what changes they would like in the community if money was not an issue.

Data analysis

Written notes from Phase 1 were typed and the digital recording from Phase 2 was transcribed. Names and identifying information were removed from transcriptions. The observations provided by children and youth were compared against the primary researcher's two-and-a-half years geographic knowledge of the community. No discrepancies were observed. Content analysis completed by the primary researcher was used to derive categories from the notes and transcripts³². Places and spaces were grouped into usage categories and mapped onto a layout of the community.

Ethics approval

The study was approved by a Health Research Ethics Board, Health Panel B at the University of Alberta (approval number: B-040307) and by the community's Chief and Council, its governing body. A research steering committee, which included University of Alberta researchers and community elders, educators, health workers, and individuals representing community departments, reviewed the research protocol to ensure appropriateness and cultural sensitivity.



The steering committee reviewed the manuscript for acceptability and made recommendations to remove references to specific cultural events named by children to protect their sacredness. Consent and assent were obtained from parents, and children, respectively, before children took part in this study. The high school students who were 16 provided their own consent to participate.

Results

Types of places and spaces identified

In total, 14 places and 16 spaces were identified. The high school youth identified 26 of them; eight in the pre-drive interview and 18 in the ride-along interview. The children identified four not pointed out by the youth. Of the places and spaces, 14 were used regularly (Fig1), eight were used occasionally, two were used rarely (Fig2), one (school building and grounds) had usage that was regular or occasional depending on whether school was in or out of session, and five buildings (education department, boarded building, public works, church, day care) had no current use by children or youth because they did not have access to them. In terms of the 25 assets with usage; 16 provided activity, four were where food could be acquired, and five provided both activity and food.

Places and spaces where children and youth acquire food

Meals and snack foods were obtained at buildings where cultural events occur (ie round building lodge, community hall), where Aboriginal Head Start and the School hot lunch programs take place, and where Health Services programming take place during summer months. Concession food (snack foods, eg chocolate bars, potato crisps) was sold at the school, at the grounds where powwows – a social gathering and fair that often includes competitive cultural dancing – take place, at places where there are vending machines (ie old gymnasium), and at locations where snack foods are for purchase (ie gas station convenience store).

Places and spaces where children and youth are active

For the children, the trails in and around town were of greatest interest and had the greatest use. For example, one child said, 'This trail is awesome.' When asked to explain this comment, other children said, 'A jump right there' and 'and some people go biking, or some people go sledding... down there 'cause 'cause at the beginning, it goes like that.' Youth indicated that the ice rink, convenience store, and the outdoor school basketball court were places where they meet.

Despite extensive probing about the larger reserve and having a map of the reserve available to prompt discussion, participants only identified a pond and the campground beyond the town site as places where there was potential for activity. Indeed, one elementary student stated 'And the most part where we hang out is... in the town site.' When asked why, the respondent said, 'Because it's fun and there's lots of places you can go ...trail in the bushes and you can go under the bridge...'

Places and spaces that could be modified to improve healthy living

Participants discussed how places and spaces could be enhanced or used in different ways to improve healthy living. Two examples are shown (Table 1). The outdoor ice rink was one place that could be modified to increase physical activity. Youth suggested fixing the basketball nets located in the rink for use over the summer months, cleaning the surrounding area of glass and garbage, fencing the rink to keep balls and pucks inside, turning on the lights at night so the rink surface could be played on, flooding the surface with water for skating and hockey in winter, opening the rink shack to keep people warm during winter activities, and using the ice rink in planned activity programs. When talking about a regularly used playground (old town park), a child said, 'You know and it would be so cool if they can fix up our park, it is so boring now.' When asked why the park needed to be fixed, children stated: 'Cause it's been vandalized', 'Cause it's got graffiti all over it', 'and the park's getting all broken up', and 'There was a board, board going around it and now all the boards are just all over in the park and there's lots of glass, garbage.'

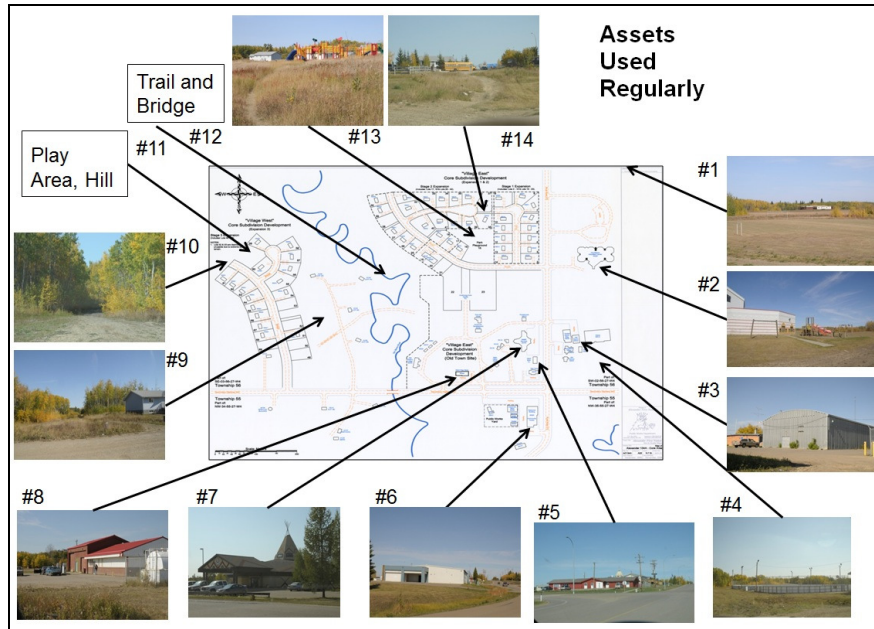


Figure 1: Places and spaces used regularly by children and youth in Alexander First Nation. #1 Powwow Grounds, #2 School (during school): building and grounds, #3 Old gym, #4 Outdoor ice rink, #5 Head Start, #6 Community Hall, #7 Health Centre, #8 Gas station/Convenience store, #9 Kipco: trail to Old Town, #10 Kipco trail, #11 Play area, hill, #12 Trail and bridge, #13 Old Town park, #14 Old Town trail.

With respect to the gas station convenience store, which was the only place in the community where groceries could be purchased, youth mentioned that the selection of healthy foods (eg milk, bread, cheese, pasta) was limited, with most items for sale being high fat and sugar foods and drinks (eg soda pop, potato crisps, candy). The food availability at the gas station convenience store was described in the following ways: 'Hard to find food you like. You know what you're going to get before you go, you know what's there, little selection,' 'You get munchies [snack food] there', and 'There is some healthy food, but not much.' Youth stated that potato chips on the bottom shelf of the store should not be consumed because of mice soiling food. Youth recommended that foods they perceived to be healthy be made available at the gas station convenience store such as breakfast cereals, fruits, vegetables, bread, bacon, and meat (chicken, hamburger, pork chops).

Preferred places and spaces

Children wanted a new park to be constructed in the community in the area of big bear bush once the bush was removed. The new park would have a skating rink, swings, and stage. It would be fenced and be open from 07.00 to 22.00 hours to prevent graffiti and misuse. Other suggestions included a golf course with a restaurant that would hire youth from the community, all-terrain vehicle trails, a bike/skateboard park, walk/run/bike trails including some that would be paved, and a park/picnic area with a gazebo and park area with flowers, apple trees, and a decorative water fountain. Youth recommended that a grocery store be built. They suggested a community garden and the development of a one to two acre U-Pick berry farm with raspberries, cherries, and Saskatoon berries (*Amelanchier alnifolia*) that could be maintained by youth. In their ideal world, the youth desired a leisure centre with an indoor rink, weight room, pool, gym, ice hockey rink, rollerblading rink, and exercise room. They drew it in the shape of a teepee, a traditional First Nations tent.

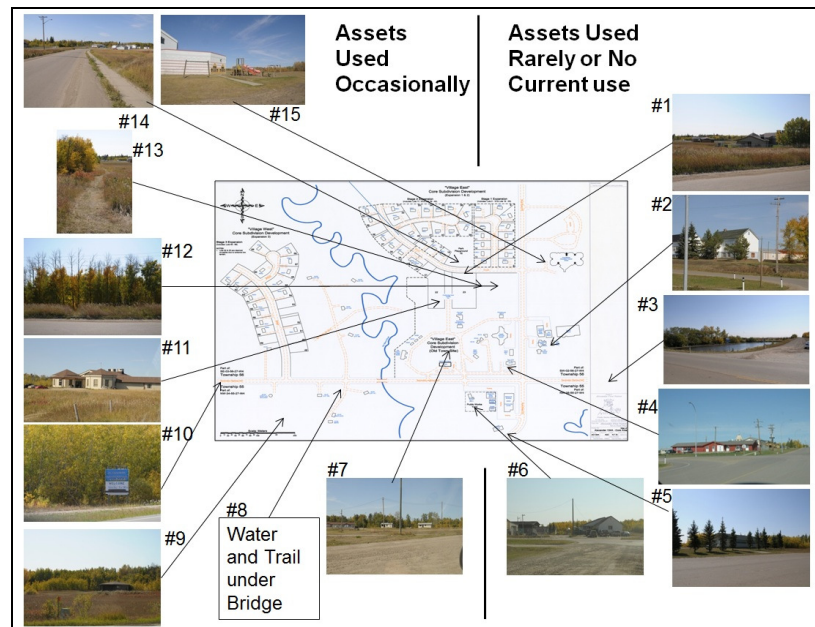


Figure 2: Places and spaces used occasionally, rarely, or never by children and youth. #1 Field around Elder’s Lodge, #2 Education Department and boarded building, #3 Ponds across from welcome sign, #4 Day care, #5 Church, #6 Public Works, #7 Grounds behind gas station, #8 Water and trail under the bridge, #9 Special occasion lodge, #10 Camp grounds, #11 Elders Lodge, #12 Big bear trail, #13 Trail by big bear bush, #14 Old Town road, #15 School (when school is done for the day) building and grounds.

Table 1: Two places identified by youth for improvement in Alexander First Nation during visual asset mapping

Description by youth	Usage as described by youth	Changes recommended by youth
Old Community Building		
<ul style="list-style-type: none"> An open indoor area with exercise equipment, volleyball and basketball nets, and food vending machines 	<ul style="list-style-type: none"> Adults and children in the community use it year-round Youth programs are held in the building as well as powwow and dance practice Hours of operation are not consistent. It is open sporadically, usually during work hours, and is often closed It is open less in summer because people are not around to open it 	<ul style="list-style-type: none"> New floor Increase its size New equipment Improve accessibility Ideally have a place like Spruce Grove Tri-Leisure Centre with an indoor pool
Gas Station/ Convenience Store		
<ul style="list-style-type: none"> Food available: pop (soda), juice, water, potato chips, ice cream, candy, cheese, milk, pasta Vermin in the store It is in fair condition 	<ul style="list-style-type: none"> Everyone uses it from kids to Elders Easy access to food; open year-round from 9 am to 11 pm There is a limited selection of food 	<ul style="list-style-type: none"> Needs more variety of foods There is unused space that could be a restaurant Needs healthier foods



Discussion

How children live, play, eat and drink, spend their leisure time, and get to and from school all have individual, social, cultural, economic, and environmental determinants³³. To be effective, interventions for the prevention of childhood obesity must therefore take environmental influences into account, among other things^{34,35}. This study used asset mapping to achieve an understanding of the community influences that shaped the health behaviors of boys and girls. The asset mapping exercise produced a list of places and spaces where children and youth play, meet, and eat. It also showed where they prefer to be the most. Further, children and youth expressed how they think existing places and spaces could be improved, and what assets they would like in their community to promote health behaviors.

Asset mapping was affirming research

Asset mapping engaged children and youth in producing a positive assessment of their community's assets rather than just identifying community deficits or needs^{22,23,25}. In contrast to many research approaches, asset mapping provided community members with information to affect positive changes. At the end of this Child Health project, all study findings, including the results of asset mapping, were presented at a community workshop that explored community strengths and challenges in providing services, programs, and resources to promote healthy living and prevent obesity. The asset mapping results helped workshop participants see the positive attributes in their community that promoted good health for children and youth (eg trails, ice rink, and playgrounds) and gave clear direction on which structures and areas could be enhanced to further support good health (eg more healthy foods at the convenience store and improved hours for the old community building). Results also indicated that children enjoyed unstructured play time on trails that had not been planned but had been created over time by children's use.

Strengths

The places and spaces where children and youth played and ate were identified by the boys and girls themselves rather than by adults, who are likely to view the community through a different lens. This is of value for research aimed at facilitating community changes to promote health behaviors for children, because it helps to ensure that programming is focused on what would be most likely to affect the greatest change.

Using photographs and maps to help the elementary school children identify assets had advantages over merely asking them where they ate and played. Children in grade six, 11 to 12-year-olds, are beginning to think abstractly^{36,37}; hence, photographs can substitute for actual observations of spaces and places. Photographs accommodated the more concrete processing level of the children and aided their memory recall. Thus, the use of photographs facilitated the collection of a rich volume of data in a relatively short amount of time because photo elicitation 'mines deeper shafts into a different part of human consciousness than do words-alone interviews'³⁸.

Limitations

The sample size was small and mostly included females, which may limit the generalizability of the findings. Richer data may have been obtained had elementary school children been able to participate in a 'ride-along' throughout the community. However, working with the children in the school environment allowed for group interviews to take place with limited classroom disruption. Although it would have been ideal to have had more grade levels participate, other grades were participating in different research-related activities. Due to concerns regarding logistics, participant burden, and the (potential) cognitive limitations of younger children to engage in abstract thought, the study focused on grade 6 children. Although inviting older boys and girls (ie grades 7-12) to participate at school was considered, this



option was not taken up because of poor participation among these grades in other aspects of the research.

Conclusion

Children possess the capacity to create permanent, sustainable changes and contribute substantially to the programs and policies that affect their generation³⁹. Indeed, the inclusion of children in discussions and actions affecting them is a right enshrined in article 12 of the United Nations *Convention of the Rights of the Child*⁴⁰. This study demonstrated that children's ideas can play an important role in projects to help transform a rural community⁴¹. Given the multidimensional nature of the causes of obesity, prevention and/or intervention strategies require research methods, such as asset mapping, to illuminate factors that influence individual health behaviors. Findings from asset mapping enabled researchers and community members to contextualize other community data about children (ie obesity prevalence, physical activity levels); to develop an understanding of the physical environment where children and youth play and eat; and to better understand how the presence and the condition of places and spaces shape the physical activity and eating behaviors of children and youth.

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