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ORIGINAL PAPER

Perspectives on Physical Activity Among Immigrants and Refugees to a Small Urban Community in Minnesota

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Abstract Immigrants and refugees to the United States exhibit relatively low levels of physical activity, but reasons for this disparity are poorly understood. 16 gender and age-stratified focus groups were conducted among 127 participants from heterogenous immigrant and refugee groups (Cambodian, Mexican, Somali, Sudanese) in a small Minnesota urban community. We found many similarities in perceived barriers and facilitators to physical activity between heterogeneous immigrant and refugee groups. While the benefits of physical activity were widely acknowledged, lack of familiarity and comfort with taking the first steps towards being physically active were the most significant barriers to physical activity. Participants described being motivated by social support from family, friends, and communities to be physically active. Our findings suggest that shared experiences of immigration and associated social, economic, and linguistic factors influence how physical activity is understood, conceptualized and practiced.

Keywords Immigrant and refugee health · Physical activity · Focus groups

Introduction

Immigrants and refugees often arrive to the United States (US) healthier than the general population [1], but with time, their cardiovascular risks approximate and often exceed those of the US average, including rising rates of obesity [2, 3], hyperlipidemia [4], hypertension [5], diabetes [6], and cardiovascular disease [7, 8]. In general populations, low levels of physical activity are associated with these adverse health outcomes [9–11], and promoting physical activity is a specific objective of Healthy People 2020 [12, 13]. Among immigrants and refugees to high income nations, physical activity is lower than the non-immigrant populations [14–17], and interventions aimed at

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increasing physical activity within 10 years of arrival may be particularly effective [2].

Reasons for sub-optimal physical activity in these populations are complex and poorly understood [18, 19]. A recent review identified cultural/religious factors, issues of social relationships, socioeconomic challenges, and environmental factors as barriers to physical activity among migrant groups to high income countries [20]. Cultural barriers are necessarily heterogeneous, but may include gender norms that make physical activity difficult for women [21], competing priorities for children (e.g., academics taking priority over sports) [22], and cultural norms that do not promote leisure-time physical activity [23]. Social support for physical activity is relatively low among immigrants and refugees and is a likely mechanism for sub-optimal physical activity [24–26]. For example, Latina women who know positive physical activity role models in their community are more likely to be physically active [27]. Socioeconomic barriers to physical activity include low literacy, low education and poverty [28]. Poverty in countries of origin may beget (initial) poverty in a new country, rendering these populations susceptible to the same economic barriers that contribute to the physical activity gap among racial/ethnic minorities in general [29]. Finally, environmental barriers, including low perceived safety, new climate/weather barriers, and relatively low access to recreational facilities [30, 31] may all contribute to sub-optimal physical activity among immigrants and refugees.

While studies to describe these factors have grown in recent years, there are gaps in knowledge, particularly among non-Hispanic populations [20]. Further, it is important to explore the heterogeneity of experience and norms that contribute to behaviors among immigrants and refugees to high income countries [32]. Development of physical activity interventions requires identification of commonalities between groups in order to be practically implemented, as well as identification of differences so that targeted interventions do not inadvertently exclude subset groups. To address these commonalities and differences, we present an in-depth qualitative study of barriers and facilitators to physical activity among adults and adolescents from heterogeneous immigrant and refugee groups in Minnesota through a community-based participatory research (CBPR) approach.

Methods

CBPR Approach and Partnership

CBPR is a means to collaboratively investigate health topics within a community, whereby community members and academics partner in an equitable relationship through all phases of the research process [33–35]. CBPR is an effective means of approaching health topics among immigrant and refugee populations [36–43].

Our CBPR partnership began in 2004 between Mayo Clinic and the Hawthorne Education Center, an adult education center that serves approximately 2,500 immigrant and refugee community members per year. Between 2005 and 2007, this partnership matured by formalizing operating norms, adapting CBPR principles, and adding many partners to form the Rochester Healthy Community Partnership (RHCP) with a mission to promote health and wellbeing among the Rochester community through CBPR, education, and civic engagement to achieve health for all (www.rochesterhealthy.org). Since 2007, RHCP has become productive and experienced at deploying data-driven programming with immigrant and refugee populations [36, 37, 44]. Community and academic partners conduct every phase of research together.

Setting

This study took place in Rochester, MN, a small metropolitan area in southeast Minnesota. According to 2007–2011 American Community Survey estimates, there are 14,172 foreign-born residents in the metro area. Asia (41.3 %), Latin America (20.2 %) and Africa (17.6 %) ranked highest for world region of birth. Focus groups were conducted to explore barriers and facilitators to physical activity and nutrition among adults and adolescents from diverse participating immigrant and refugee groups in Rochester, MN: Cambodian, Mexican, Somali, and Sudanese. This work is a precursor to a federally-funded, participatory intervention development project through RHCP—Healthy Immigrant Families: Working Together to Move More and to Eat Well. This paper reports on the results pertaining to physical activity only.

Participants

A stratified purposeful sample [45, 46] of immigrant and refugee families was invited by RHCP community partners to participate in focus groups on physical activity. Since the resulting intervention will be family-based, focus groups were conducted among adults and adolescents within each participating group (Somali, Mexican, Cambodian, Sudanese). There were separate focus groups with adult women, adult men, girls, and boys (ages 11–18 years), for a total of 16 focus groups over a 6 month period, July–December 2011. This study was approved by the Mayo Clinic Institutional Review Board.

Data Collection

We developed focus group guides jointly with RHCP community and academic partners based on literature review and consensus. Focus group questions assessed participants' understanding of physical activity, soliciting description of how participants practice physical activity, barriers to being physically active, and recommendation of how they could be more physically active. Focus group guides were pilot-tested and refined before use [47].

We used social cognitive (learning) theory (SCT) as a framework to develop the focus group questions for the study [48]. This theory addresses the interplay of individual factors (e.g., self-efficacy to become physically active) and social environmental factors (e.g., social support) on behavior change. Low self-efficacy is an influential determinant of inactivity [49], and a socially supportive family environment is an important influence on physical activity in general populations [50, 51], among families with low socioeconomic position [51, 52], and among immigrants [26]. Other key constructs of SCT are outcome expectations or the consequences that result from enhanced physical activity (e.g., weight loss) [53, 54].

Focus groups (n = 16) were conducted at various community locations as arranged by community partners, including Hawthorne Education Center, a Mosque, a church, a temple, and a community center. Food was provided and participants received gift cards. Sessions lasted 90–120 min each and were conducted by moderators from participating community/language groups who underwent RHCP-sponsored focus group training [55] and have experience conducting focus groups in their communities. Note takers were present at each session. Linguistic concordance between moderator and participants was achieved in 13 of the 16 focus groups. For the three focus groups where there was discordance (Cambodian men and women; Mexican women), trained medical interpreters were utilized.

Focus groups sessions were digitally recorded, translated to English (if applicable), and transcribed. Translations were done by native-language speaking focus group moderators; translation integrity was verified by native-language speaking RHCP members. Focus group moderators reviewed transcripts for accuracy.

Data Analysis

Focus group transcripts, transcripts of post-focus group debriefings, and notes were used as materials for analysis. A qualitative analysis team composed of eight RHCP academic and community partners (AM, GA, GB, CF, JR, KT, SM, MW) read all transcripts before reducing the data for analysis. Transcripts were coded independently by two analysts using inductive analysis, resulting in code lists [46]. Discrepancies in code lists were examined, discussed and debated until consensus was reached between all analysts. The final code list was used for paired coding of all materials. Final themes and sub-themes were developed through a deliberative process among analysts. Analytic memos and data tables were created to inform presentation of results. Analysis was facilitated by NVIVO-9 software (QSR International).

Results

A total of 16 focus groups were conducted among 127 participants. Demographics of participants are shown in Table 1. There were three major themes, each containing a series of sub-themes identified as primary areas that participants described as barriers or facilitators to physical activity: knowledge and practice, barriers, and motivation.

Knowledge and Practice

Physical activity was conceptualized and described in many different ways, including intentional exercise, sports, and chores around the house. In general, there was a thorough understanding of how physical activity was related to health. Further, participants conveyed many advantages of being physically active that extend beyond the biomedical (e.g., lower risk of diseases, longevity) to the psychosocial (e.g., enhanced self-confidence, happiness, and lower stress). This sense of wellbeing and self-efficacy was the most prevalent set of reported benefits to physical activity. Finally, participants stated that physical activity and healthy diet were intimately related and that one could not address one without the other. Sub-themes related to knowledge of physical activity and representative quotes are shown in Table 2.

The ways in which participants conceptualized and described their knowledge and practice of physical activity was similar between groups. However, there were gender differences; namely, women were more likely to associate physical activity with housework and recreational activities, while men talked about physical labor at work and sports. Similarly, there were generational differences; adults were more likely to equate physical activity with work and recreational activities, whereas adolescents were more likely to associate physical activity with exercise and sports. Adolescent girls talked about social activities like going for walks with friends. Adults often contrasted their activities in the US with activities in their countries of origin. For example, Mexican men spoke about playing organized sports more in Mexico. Women noted more physical labor in their home country in contrast to less

Table 1 Demographics of study participants

Focus groups	N	Gender (% female)	Age (mean + SD)	Years lived in US (mean + SD)	Language most commonly spoken at home (% English)	Mean annual household income (US dollars)	Education level (% high school equivalent or less)
Cambodian							
Adult (2)	14	71	58.8 ± 13.2	18.6 ± 10.1	0	14,862	100
Adolescent (2)	15	60	14.6 ± 1.5	9.1 ± 5.8	0		
Latino							
Adult (2)	14	50	42.8 ± 5.4	12.7 ± 7.5	0	24,000	86
Adolescent (2)	22	59	14.8 ± 1.7	12.2 ± 3.7	27		
Somali							
Adult (2)	15	47	40.2 ± 11.3	11.1 ± 4.2	0	28,092	60
Adolescent (2)	21	43	14.3 ± 1.1	11.2 ± 3.7	24		
Sudanese							
Adult (2)	11	45	47.7 ± 12.2	8.5 ± 4.5	9	24,857	45
Adolescent (2)	15	53	14.3 ± 1.9	12.8 ± 2.9	33		

physical labor and more indoor work in the US. Adult participants from Cambodian and Somali groups described sweat as an indicator for physical activity (i.e., without sweat, they felt as if they were not physically active).

Barriers

Overall, almost all participants described more barriers to physical activity in the US than in their home countries. Those who had come to the US as adolescents or adults also underlined that they felt as if they still were in a process of transition learning how to overcome the barriers to being physically active in their new country of residence. Participants reported spending more time outdoors in their home countries for both work and social activities than they do in the US and that time spent outdoors tended to result in more physical activity than time spent indoors. Similarly, participants stated that work inside and outside the home required less physical activity in the US than it did in their home countries. Additional barriers described included lack of time, cold weather, lack of transportation to exercise facilities, lack of motivation or interest in formal exercise, competing time spent with electronics, and a lack of places to gather as groups for physical activities that were affordable and linguistically welcoming. Some adult participants stated that there seemed to be more time for physical activity in their country of origin. They explained that in the US, they worked all day—primarily indoors—and they were too tired after work for physical activity. In their countries of origin, they may have walked or biked to work and still had energy for a sport after work.

Importantly, taking the “first step” towards engaging in physical activity for individuals and families in a new country was described as a major hurdle for many of the participants. For example, joining an exercise facility or exploring its programming was seen as insurmountable for many participants. This lack of familiarity with how to effectively and efficiently be physically active in this country was viewed as a fundamental barrier for all groups. However, participants were hopeful that, once these initial hurdles were cleared, they could be more physically active. While this is hypothetical, it supports the difficulties participants described in taking the first steps towards physical activity. Sub-themes related to physical activity barriers and representative quotes are shown in Table 3.

While our results indicate that immigrants and refugees share common ways to conceptualize barriers to physical activity, we found important generational and gender differences. First, taking the “first step” towards engaging in physical activity (e.g., familiarity with gyms and other facilities, familiarity with US sports, etc.) was not viewed as a barrier for adolescent participants like it was for adult participants. Some adult participants cited a sense of frustration in their perceived inability to optimally impact physical activity in their families due (in part) to these generational differences in familiarity. Second, Somali women said wearing religious and culturally appropriate clothing was sometimes a barrier to comfortable physical activity. Finally, adult and adolescent female participants perceived less flexibility in their schedules to be physically active than men due to their obligations towards children and the household.

Motivation

“Togetherness” and social support from diverse sources were viewed as important motivators for healthy living by all participants. “Being together” was a main theme

Table 2 Knowledge and practice of physical activity among immigrants and refugees to Minnesota

Sub-theme	Summary	Representative quotes
Physical activity can be conceptualized in many different ways	Participants expressed knowledge that physical activity and its associated health benefits may be manifested in a variety of ways. These manifestations included intentional exercise, sports, and chores around the house In general, adolescent participants' knowledge about physical activity related to intentional exercise or sports, whereas adults were more likely to associate chores or other daily movements with physical activity	*SudW*: "To be physically active to me could be a variety; it could be exercising, walking, if somebody is running or riding bicycles. There are so many ways you can be physically active" *SomM*: "You can be physically active in different ways…cleaning your driveway is kind of active, cutting the grass, washing the dishes, all those things keep you active" *HisG*: "Physical activity is like maybe to get the mail or something instead of like riding, well, in the car. You could like walk there. Or like to a friend's house instead of like having your mom take you, you could walk" *HisM*: "I think, to be physically active, you need to have an exercise routine. I think it should be something, apart from work or another activity. You need a routine to help your body and mind and be healthy"
Physical activity has many advantages	Participants talked about physical activity as something positive. Topics that were frequently referenced as advantages to being physically active were: Long-term health benefits (live longer, weight loss, cardiovascular benefits) Improved daily life (less stress, more happy, improved sleep, improved stamina, feel good) Improved self-confidence	*SomB*: "Prevents diseases…high blood pressure, diabetes, cholesterol, heart disease" *SomB*: "More physical activity, you're like more social with people" *HisG*: "You have more self-confidence, like if you know that you're in shape and you like…if people are not in shape they don't like think of themselves like they're worth anything, so if they're in shape they would think more of themselves, so they would have more self-confidence" *SomG*: "When you exercise you like…I feel like I on take on the world"
Physical activity is associated with sweat and sun	Some adult participants identified sweat or sun as an important factor in physical activity. Physical activity is associated with sweating and/or sun exposure. These ideas were most prevalent among Cambodian adults (sweat) and Somali adults (sun), but were cited less emphatically among several groups	*CamM:* "He goes walking and he sweats and he knows he has gotten a good workout and dries himself off. I owe my long life to exercise" *CamW*: "At home back in Cambodia and what-not it is pretty hot there so most of the adults they do farm rice or they have their own fruit farms or what-not, so it's almost like exercise for them because they do sweat" *SomM*: "When we were in Somalia, it was good. People walked without going to the gym or exercising. They used to sweat"
There is a strong connection between physical activity and eating a healthy diet	Participants described a synergy between a healthy diet and physical activity. For example, when you eat healthy, performance in sports improves. Or, being physically active makes you eat better	*SomB*: "So if you don't eat healthy you're not physically able to do more stuff and if like you eat more nutritious food your life would be active" *SomB*: "If you like workout or do something healthy but not eat healthy foods, you're not really gaining anything or losing anything…you stay the same." *SomW:* "You have to balance your activity, your food, going to the gym, exercising, and life"
Work involves physical labor and is like exercise	Participants frequently described work as exercise. This was especially true among the adult groups	*CamW*: "I have noticed that when I was working, that exercise is the most important thing, but when I was working my upper and lower extremities were able to move and everything, but in April when I went to visit my daughter I felt ill and I have been ill for the last 5 months, so since I have stopped exercising I have noticed a lot of changes in my body. I have noticed that there is a lot of tightness and movements that are not easy for me anymore" *HisG*: "Well I work, and I'm a waitress, so it's kind of like speed walking 100 %, and usually I'm in soccer every season, but this season I'm not, so…" *HisM*: "I work on a farm. It's physical. See that's the only physical thing that I have, doing that, but I work 10 h" *SomG*: "I feel like I exercise at my work though because all I do is walk"

Table 2 continued

Sub-theme	Summary	Representative quotes
Housework is exercise	Participants (predominantly women) described how they keep physically active in and around the house with housework gardening, snow shoveling, sweeping, cooking, washing dishes or walking up and down stairs	*SomW*: "First of all, the exercise, if I were to ask you a question…you don't have to do activity by exercising or going to the gym. If a person wants to do activity, she could do it at home. Activity is part of your life, your movement, your work—all are activity. So you have to balance…We don't sit. We don't even sit. We are busy all day"
		CamW: "Doing the dishes; we do the dishes all day long. At times we are working hard right there all day long"
		SudW: "We are from a culture that women are trained to work around the house. We do most of our chores around the house. We get together…we do things around the house…cleaning is non-stop, laundry…there is always something. My house has two levels, so I am running up and down to the laundry room…all these chores I think keep me more active"
Being active is not easy and requires sacrifice	Participants stated that becoming active requires an awareness that you need to do it or that it is good for you. In order to be physically active one has to set priorities and decide what is most important. In order to fit activity into the busy schedule, one has to make decisions and sometimes sacrifice	*SudM*: "Being active of course you need to take away all the laziness in your body… For example I have one of my sons…at home, he always used to be lazy, watching TV all the time. So I usually encourage him every day, let him go around and around the house at least once a day"
		SomB: "They (family members) ride bikes to work, even though they can afford [other motorized transportation]"
Playing sports and running is being active	Participants cited many different sports and exercise activity as being active. This was especially true for adolescent participants	*SomB*: "When I go out to…when we go play out at the court people just come, like a lot of people at the college, and they tell each other like we're gonna play [ball] today and stuff like that"
		CamB: "I run because I don't like to play all the ball, so I run around the gym 20 or 30 times"
Recreational activities are physical activities	Participants discussed physical activity practices as part of recreational activities, e.g., walking outside, walking the dog, walking to school, etc.	*CamG*: "Well sometimes I like go to like my friend's houses and just like do stuff with them and go to the park, go on walks and stuff like that. Even like school, like you don't really think about it but like you walk to and from other classes so…"
		HisW: "So they just recently got a little puppy, they haven't had him for a while, but that now it's almost like who gets…it's a fight to see who walks the dog, so it helps them a lot. If she goes her husband will normally go, and her little girl. But, after dinner in particular it's nice because then, you know, they kind of get a conscience of well, I'm not going to go watch TV or go lay down, so they walk the puppy"
Being physically active involves socializing	For all groups, being together was cited as important when being physically active. It might mean doing recreational activities together or playing sports together, walking together, being with family, not going alone	*SomB*: "They (friends) walk and think talking would be fun so they'd start walking together and think like they're not doing like physical stuff but they are actually… they are actually losing weight and…"
		SomG: "Going on family walks. I usually go with walks with my mom"
		HisM: "Sometimes, I start playing Wii at home. Say I get home from work, or for some reason, I can't go work out. I can't leave the house for some reason; I just turn on the Wii and start playing with the kids, and it's great. It's great fun, you know… and for the kids, it's more of a game, and they don't realize they are exercising. So instead of them watching TV and watching cartoons or whatever it is, it's better for them…and they don't know that it's a workout because it is a game, but you can spend time with your children and you family and yourself. You're all working out at the same time, so that's really good"

CamW Cambodian woman, *CamM* Cambodian man, *CamG* Cambodian girl, *CamB* Cambodian boy, *HisW* Hispanic woman, *HisM* Hispanic man, *HisG* Hispanic girl, *HisB* Hispanic boy, *SomW* Somali woman, *SomM* Somali man, *SomG* Somali girl, *SomB* Somali boy, *SudW* Sudanese woman, *SudM* Sudanese man, *SudG* Sudanese girl, *SudB* Sudanese boy

Table 3 Barriers to physical activity among immigrants and refugees to Minnesota

Sub-theme	Summary	Representative quotes
Lack of time	Participants described the variety of competing work, family and school demands for their time that limit time for physical activity	*SudW*: "Because I am doing two jobs and at the same time I go to school… you have to wake up early morning and prepare breakfast and … pack up the kids and all those things"
		SomB: "They're [parents] just too busy because they work like overtime or something and they just come home and sleep. That's basically what they do"
		SomB: "Like some of the parents, they have a lot of kids to take care of and have like other kid relatives. Money is their first priority"
Excessive workload	Adult participants described the fatigue they feel from working long days. Beyond the limitations this puts on time, this work drains energy levels and motivation to exercise	*SudM*: "I wake up at 3 o'clock in the morning, I come home at 5 o'clock, no sun, nothing. You get up in the dark; you come back in the dark, so. It is miserable. But then like uncle say, that is the American way"
Lack of transportation to exercise facilities	Adult participants described how lack of transportation limits access to organized exercise; adolescents saw public transportation as a solution	*CamW*: "If you really think about it, over at the church the programs are free…the exercise program and stuff like that, but the only thing that's more of a block is the transportation. If we could get everybody to get transportation out there then it is good"
Time spent with electronics	Participants described the amount of time that is spent with electronics such as computers, videogames, television, social media, and movies as time not spent being physically active	*SudM*: "We have a problem here: TV and games…The kids, they like to play…to watch a game or play the game and eat too much, that's what I discovered. They can just down the hall to figure they can get something and snack down there and then you can see, you know, what you can spend a week when there is no school. You will see that in your budget, and when they have school, you know so"
Not needing to be as physically active to maintain a home or working life in the US	Participants described the lack of need to be physically as active to do the work of living (job, homemaking, etc.) in their country of residence as in their home country	*SomM*: "When I was in Somalia, you don't need time to set aside for physical activity. Physical activity was part of the life. I get up early in the morning. For example, my elementary school was more than 5 km away from my home. Every day, I had to walk 5 km to the school and 5 back. That's pretty much…you're done with your physical activity for the day"
Weather	Participants described the limitations to physical activity because of the cold Minnesota weather and snow	*CamW*: "If it was the summer we could go outside and exercise very easy but in the winter is it truly difficult to exercise"
		CamM: "The snow. The snow creates a little difficulty and the winter season because naturally his body feels more tired and wants to sleep and just huddle up in a blanket all of the time, but it is mind over matter. You can break that habit…"
Illness	Adult women described the limitations to physical activity because of such symptoms as pain and swelling	*SomW*: "I just feel pain all over. It's a challenge. The intense pain I think comes from the change in lifestyle, change in the weather. It's this weather. The weather is what caused the pain. You can't get out of bed. You want to cover yourself with the blanket, but when the heat is high, it's difficult to breathe. It bothers me. When you turn it off, you feel much better"

Table 3 continued

Sub-theme	Summary	Representative quotes
Not having a place to gather for group exercise	Adult participants described the lack of gathering places for physical activity that were available to groups of people that share the same language and culture	*SudM*: "I think we have lack of centers here. We need some time a community center… Our people, some of them, they don't have access to a lot of things here"
		HisM: "There [are] no places for the public, for the general population to go … where you can go and grab your ball, throw some hoops, and go in the wintertime… some place indoors to run, because you can't run outside, but for the public, not just for membership, you know, for everyone"
Cost or access to facility for physical activity	Participants described the cost of access to facilities as a limiting factor for physical activity; funding is needed for child care and memberships	*SudM*: "Even financial, for example…we won't see you here. You have to pay for example a certain amount of money so they be allowed to go to [gym] for 6 months for example…maybe. But some people they don't have this money for this"
Gender is a barrier to physical activity for women	Adult and adolescent female participants perceived less flexibility in their schedules to be physically active than men due to their obligations towards children and the household	*SudG*: "Usually girls stay home cook, clean, do all the stuff while the guys usually are the healthier ones because they go outside, they can play, more time, but us girls usually home from afterschool, do homework, clean, and then just stay home and take care of the kids"
		SomG: "They [Somali boys] don't have any responsibilities holding them down. The teenage guys don't really have responsibility, like holding them back you know, and we have more responsibilities to do, you know. They have like more free time to do…exercise and stuff. You're like in the house and all you have to do is like clean, babysit."
Unfamiliar gym culture	Participants described lack of knowledge of how to exercise in a gym or with gym equipment and get involved, especially if language is a barrier	*SudM*: "Some of the people are unaware or uneducated about how to get out and get involved in activities… if you have a family with low income you can go to YMCA you know, and get it going with your family. Some people they …have no clue"

CamW Cambodian woman, *CamM* Cambodian man, *CamG* Cambodian girl, *CamB* Cambodian boy, *HisW* Hispanic woman, *HisM* Hispanic man, *HisG* Hispanic girl, *HisB* Hispanic boy, *SomW* Somali woman, *SomM* Somali man, *SomG* Somali girl, *SomB* Somali boy, *SudW* Sudanese woman, *SudM* Sudanese man, *SudG* Sudanese girl, *SudB* Sudanese boy

described as motivating physical activity. First, pursuing physical activity together as a family was described as an empowering experience for parents who saw it as their task to serve as role models for their children to help them live healthier lives. Second, adolescents described physical activity as a rare opportunity to be together with their busy families for something that was seen as important for everybody. Third, adult and adolescent participants acknowledged that they were more likely to maintain physical activity if it was with family or friends. In this sense, togetherness was viewed as an important factor to motivate physical activity through shared accountability. Finally, participants described a sense of community arising from being physically active together (with family or friends) as a positive experience, potentially bearing a synergistic effect on their larger communities.

As discussed above, the concept of "togetherness" was closely tied to the idea of role models. Participants stated that they were motivated by positive role models for physical activity among people from their community. Participants said they were more likely to engage in physical activity if they saw and knew people from their communities who have been successful in striking the balance between life's obligations and being physically active.

Participants related a balance between "togetherness" and their "individual responsibility", whereby the individual was described as ultimately responsible for her/his own motivation and health behaviors. It was generally acknowledged that a person has to make the decision to be physically active and stay committed to it. While participants highlighted a social responsibility for encouraging others to engage in more physical activity (e.g. within a

Table 4 Motivations to be physically active among immigrants and refugees to Minnesota

Sub-themes	Summary	Representative quotes
Doctors' advice is considered important and taken seriously	Participants described how adults take doctors' advice on physical activity seriously	*SudB*: "I think it's…the parents…when the doctor tells them to, they'll consider it as something more serious, so they will actually start to do the exercising and they won't give up as easy"
Motivation comes from oneself: personal responsibility	Some participants were aware that being motivated is a personal thing that comes from oneself. A person has to make the decision to be physically active and stay committed to it	*CamW*: "That is really hard because it is up to them if they want to take care of themselves and they want to take care of their health, then they would come, but if they don't want to then they won't come"
		HisG: "Anybody can just go out to the park and go play basketball with their family, but it takes them to say that they want to go outside…rather than go sit down and watch a movie. Like it just…it, I mean its motivation in themselves. They have to decide"
Motivation comes from other people: Family/friends, role models etc.	Participants realized that they cannot do it on their own. Support from others such as going to the gym together, pep talks, caring about each other's health were considered very important	*CamW*: "My husband is very, very healthy. Seven days a week; biking, running and he goes to the gym 7 days a week, so now I am doing it too, although I am pregnant he still makes me do it"
	Participants were inspired by people they know who are successful at being physically active	*SomG*: "Daily recordings of somebody else, like somebody watching you lose weight…because you know how we don't like really…you hear stuff from other people's…other people other than yourself?"
		SomW: "I would say if you stop by my door asking me to come along, I would"
Electronics/technology can either be positive motivators or negative motivators	Participants related that electronics such as TV and video games could be helpful in motivating them to exercise without being aware of the work that is involved; but at the same time they could prevent them from going outside to be physically active when they become addicted to those devices	*SomG*: "I remember I used to have a treadmill and right on top, like right in front of the TV and I don't notice how long I'm working out…I swear"
		HisM: "Sometimes it's difficult to do something, you know, when you start getting addicted to a TV show and you know it continues on so you want to watch the next episode, and pretty soon, you watch the next episode after that episode after the one you wanted to watch and now you got 2 h booked in the evening for watching TV. By the time you have those two over with, it's 9 o'clock and you don't feel like exercising at 9-o'clock and I'm going to get ready for bed"
		SudG: "And technology nowadays like Facebook, phones and stuff…you'll just be sitting down and doing that the whole entire day"
"Seeing is believing"	Participants described how motivated they are when they actually see the results and benefits of exercising such as losing weight, being more energized	*HisG*: "The scale. Like if you go to the scale and after like 3 days of exercising you check how many pounds you lost, if you lose like pounds that motivate you even more…to lose even more to go to your desired goal. On the other hand, if you don't lose weight it's kind of hard for you to keep going"
	However, inability to meet a goal (e.g., weight loss), could sometimes become a negative motivator to continue exercise or physical activity	*CamG*: "You get more energized, pumped-up each time"
"Lead by good example"	Adult participants described how "leading by good example" could be challenging and yet are great motivators for young people	*HisM*: "But also your kids need to see you and need to watch you exercise because then they will do it themselves. If I tell my kids they need to be involved in soccer, then they tell me, 'Why are you trying to get me involved when you're not practicing anything? You're not running yourself.' I tell them they need to be physically active, but then they tell me that 'you're not active, so why should I be?'"

Table 4 continued

Sub-themes	Summary	Representative quotes
Religious/cultural beliefs as positive or negative motivator	Some adult participants described how their culture and religion does not permit them to wear the required outfit for gyms and work-out facilities. They also described how exercise areas are not separated for men and women Some adult participants stated that they are compelled to be physically active as part of their religious beliefs	*SomW*: "Each person has adapted in her own way, but there are things that we need that we don't have because we wear hijab (lose fitting clothes that cover nearly entirely body). When at the YMCA, the exercise equipment is difficult to use, men and women are exercising together and that's forbidden in our religion. They can't go running in the morning wearing tight running clothes. The religion doesn't allow it. Even if they are not religious, the culture doesn't allow it" *SomW*: "I used to go to the YMCA…, but I used to go there with my abaya (loose fitting clothes). Then the staff there told me that I could not wear the abaya because it was risk for injury. I told them that I paid to be there and that I was going to use the machine. We argued and went to the supervisor to settle it. He suggested I wear clothes that were a little shorter, so that it won't reach the machine. What have I covered?" *CamM*: "The Monks were really clear about exercise and activity and they are really clear about telling them that meditation and physical activity was all part of exercise too"
Physical activity as disease prevention	Participants stated that when they see other people with life threatening disease such as diabetes, they are compelled to be more active	*CamW*: "Yes, [they exercise] because they want to be healthy. They see a lot of people just passing by, they all just die and they don't want to die; they are afraid"
"Being together"	Participants were aware that doing activities together as a family and as a community serve as great positive motivation to other members of the community	*HisW*: "So she's saying, you know, building communities to for kids, where she sees a lot of um, you know, kids who look like him who go in teams and participate in organized sports… just more of a sense of community" *SudG*: "I think like if a family like does stuff together like work out together and what not and just go do physical stuff together, I think they're more likely to be more fit because they encourage each other and they can like tell each other 'oh no don't eat that, that's unhealthy' or whatever, so I think that would help"

CamW Cambodian woman, *CamM* Cambodian man, *CamG* Cambodian girl, *CamB* Cambodian boy, *HisW* Hispanic woman, *HisM* Hispanic man, *HisG* Hispanic girl, *HisB* Hispanic boy, *SomW* Somali woman, *SomM* Somali man, *SomG* Somali girl, *SomB* Somali boy, *SudW* Sudanese woman, *SudM* Sudanese man, *SudG* Sudanese girl, *SudB* Sudanese boy

family or community), the individual was viewed as main actor and initiator to becoming physically active. In addition, many participants said that these activities were only sustained if they were able to directly link their physical activity to a tangible observed benefit (e.g., weight loss). Sub-themes related to motivation and representative quotes are shown in Table 4. These themes were very similar across cultures, gender, and generations.

Discussion

In this paper, we described how Cambodian, Somali, Mexican, and Sudanese immigrants and refugees conceptualized physical activity. The similarities in findings between ethnic groups suggest that cultural norms are not the dominant factors shaping physical activity behaviors among immigrants and refugees to developed countries. Instead, these behaviors may reflect, in part, the social, economic, and environmental factors that influence physical activity of all persons living in the US [56]. Indeed, previous studies suggest that socioeconomic position may be the strongest predictor of physical activity among immigrants to the US [57]. Further, we identified key barriers and motivators to being physically active that are unique to immigrants and refugees. While our participants were culturally heterogeneous, they share the experience of immigration to the US with limited English

language proficiency and low socioeconomic position. These shared experiences shape their physical activity behaviors in a more significant manner than cultural norms and experiences. Since interventions to promote physical activity in a new country are most likely to be successful prior to a decline in healthy behaviors [2] (i.e., as soon as feasible after immigration), our findings have important implications for intervention development.

Participants had varied understandings of what physical activity meant to them but all agreed that there were benefits to being physically active. This implies that future interventions to promote physical activity among immigrants and refugees should not focus only on education. Instead, interventions should combine education with efforts to strengthen the individual and community-based facilitators to physical activity while mitigating the complex personal, societal, and environmental barriers. Similarly, recent reviews suggest that multi-component interventions (which recognize the sociocultural complexity and extend beyond education) are needed to influence physical activity among immigrants and refugees [20, 58]. For example, our findings of gender differences in practices and barriers suggest that interventions should be intentional about addressing gender-specific migration experiences as it relates to physical activity. This sort of intentional intervention work was demonstrated by a successful gender-exclusive swim program for Somali women in Seattle, WA, USA [59]. Finally, our finding that perceptions of physical activity are closely tied with perceptions of healthy eating suggests that these multi-component interventions should include a dietary component.

Consistent with previous literature, we found several economic (e.g., cost, transportation, competing priorities) and environmental (e.g., weather) barriers to being physically active [20]. However, a consistent barrier in all adult groups was the lack of familiarity with how to be physically active in a new country of residence. Taking this "first step" towards being physically active seems challenging for many study participants. Therefore, intervention work should assure broad immigrant participation to avoid sociolinguistic isolation and embarrassment while guiding them through a wide range of physical activity and exercise opportunities. It is promising that participants were confident that once this "first step" of being physically active in a new country is achieved, then these behaviors could be sustained. Further, our data that describes "togetherness" as a motivator to being physically active relates to existing literature that argue that interventions to promote physical activity should acknowledge the role of social support from friends and families [50, 52, 60].

This study has limitations. First, while the study includes heterogeneous immigrant and refugee groups, it was conducted in a single community with implications for generalizability to other immigrant and refugee communities or ethnic groups. Further, though focus groups were age, gender, and group-stratified, recruitment was based on a convenience sample of participants. Finally, though this was a large study for qualitative inquiry, saturation of themes from each subset group (e.g., adolescent Cambodian females) was insufficient to draw conclusions about each of these subsets. This limitation also extends to the fact that our study included both immigrant and refugee participants. Results of a previous study show that the risk of cardiovascular death may be higher for refugees to high income nations than for immigrants [61]. The role of physical activity in this discrepancy is unclear. Nevertheless, by including both immigrants and refugees in focus groups, we may have missed the opportunity to explore nuances of the refugee experience that is different from the immigrant experience of physical activity in a new country. Similarly, focus groups were not stratified by duration of residence in the US. This precludes an analysis of perceptions according to this variable.

Conclusions

We found similarities in barriers and facilitators to physical activity between heterogeneous immigrant and refugee groups, suggesting that the shared experiences of immigration and related social, economic, and linguistic factors have a significant influence on how physical activity is understood, conceptualized and practiced. While the benefits of physical activity were widely acknowledged, lack of familiarity and comfort with taking the first steps towards being physically active were identified as the most significant barriers to physical activity. Accordingly, participants felt motivated by social support from family, friends, and communities to be physically active. These findings may inform intervention work among immigrants and refugees to the US to promote physical activity.

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