



Use of Community Based Participatory Research to Design Interventions for Healthy Lifestyle in an Alternative Learning Environment

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Abstract

Introduction/Objectives: Childhood obesity develops as the result of the interplay between individual and environmental factors. Community based participatory research (CBPR) is an effective tool for improving health of communities. There is limited research on CBPR for facilitating healthy lifestyle in community schools with an alternative learning environment. The objective of the study was to explore student and staff perspectives via focus groups on barriers and facilitators for healthy eating and physical activity in a community school with alternative learning environment and to prioritize, design, and implement suggested interventions to improve healthy lifestyle. **Methods:** We conducted qualitative research through 8 focus groups of middle and high school students (n=40) and 2 focus groups of school staff (n=8). The school community and research team subsequently identified and implemented interventions for facilitating healthy lifestyle in students within the school environment. **Results:** Barriers identified for healthy lifestyle included lack of motivation, lack of healthy food options at school, inadequate knowledge about healthy lifestyle and insufficient opportunities for physical activity. Facilitators for healthy lifestyle were support and motivation from mentors and knowledge about healthy nutrition. Key strategies implemented were addition of healthier food options, educational materials for healthy eating, creation of a walk path, standing desks in classrooms and additional equipment in the school gymnasium. **Conclusions:** Formative feedback from students and staff was helpful in the implementation of strategies for facilitating healthy lifestyle among students within a community school with an alternative learning environment.

Keywords

alternative learning environment, community based participatory research, healthy lifestyle, nutrition, physical activity

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Introduction

A healthy lifestyle consisting of healthy nutrition and physical activity is recommended in all children and adolescents, with short- and long-term benefits for health.¹ National surveys suggest that majority of adolescents do not meet recommended dietary intakes for specific nutrients and overall nutritional goals.^{2,3} Physical activity has numerous health benefits for youth including increased cardiorespiratory and muscular fitness, improved cognition, and reduced risk of depression and/or anxiety.^{4,5} However, a very small proportion of adolescents report engaging in recommended levels of both aerobic and muscle strengthening activities.⁶

School-based interventions, especially multicomponent interventions aiming to promote healthy eating and physical

activity, have been shown to be effective in promoting healthy lifestyles and, ultimately, decreasing body mass index (BMI) in children.^{1,7-9} Community Based Participatory Research (CBPR) is a collaborative approach to investigate health topics of importance within a community. It entails exchange of ideas and expertise between community

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members, organizational representatives, and researchers in design, implementation, and dissemination of the research process.^{10,11} Community-based interventions developed using participatory approaches with qualitative research methods have been shown to help children lose weight and prevent them from gaining weight.¹²⁻¹⁴

Alternative schools, also known as alternative learning centers, provide a specialized setting for students who need nontraditional pathways to personal, academic, and social success. Though the range of services offered at these schools vary widely, these schools provide an environment that seeks to reduce barriers to learning and provide support for students who are at risk for academic failure due to a wide range of complex and often inter-related personal and social factors (eg, recent immigration, adolescent pregnancy, trauma, learning disorders, mental illness, and substance use disorders).¹⁵ There is limited research on interventions that have evolved from CBPR in community schools with an alternative learning environment.¹⁵⁻¹⁸

The objective of the study was to use a CBPR approach to understand barriers and facilitators to healthy eating and active lifestyle among middle and high school students and staff in a community school with an alternative learning environment and to implement interventions to promote healthy eating and physical activity amongst students.

Methods

The Alternative Learning Center (ALC) in Rochester, MN is a combined middle school and high school within Rochester School District 535 in Minnesota that provides viable educational options for students who are experiencing difficulty in traditional educational systems. As a full-service community school, the ALC represents an integrated educational model in which the school functions as a collaborative hub and students and their families can access a range of resources and services to support academic success. Students in this school have frequently experienced personal, social, academic and/or financial challenges.

Relative to the general population, a greater proportion of students at the ALC belong to racial and ethnic minority groups (62%, school district average 40%), qualify for free and reduced lunch (78%, school district average 38%), and receive special education services (38%, school district average 14%). The impetus of the study was the finding of very high rates of obesity amongst students during health screening (50%, almost 3 times the national prevalence of obesity).

The study was conducted in 3 phases over a period of 18 months. In keeping with the tenets of CBPR, key community stakeholders, including students, teachers, and administrative staff, were engaged in each phase. The objective of phase 1 was identification of perceived barriers and facilitators for healthy eating and physical activity for

students in a community school with an alternative learning environment. The second phase involved active participation of the school community (students, teacher, and administrative staff) in designing and prioritizing interventions to facilitate healthy eating and physical activity based on feedback from phase 1 and the third phase involved the implementation of these interventions in the school environment.

Phase 1 (Focus Groups with Key Stakeholders)

A total of 10 focus groups were conducted (8 student and 2 staff). The student focus groups consisted of 40 students (22 male, 18 female) ages 14 to 20 years stratified by sex and age. A total of 4 female focus groups (2 groups for students 14-16 years of age and 2 groups for students 17-20 years of age); and 4 male focus groups (2 groups for students 14-16 years of age and 2 groups for students 17-20 years of age) were conducted. We elected to conduct focus groups stratified by age and sex because of data that appears to suggest that participants may be more willing to share their opinions on eating and physical activity in same sex groups.^{19,20}

A total of 167 students consented to participate. Out of these, 40 were chosen randomly to participate in the focus groups. The ALC had 22 teachers on staff at the time of the study and all of them were invited to participate. Eight staff members participated in 2 focus groups, including the Physical Education and Health teacher. All study participants spoke English.

Each focus group lasted 1.5 hours and was conducted by 2 members of the research team trained in qualitative research. Focus group questions were developed by the collaborative team of community and academic research partners. The questions were semi-structured and open-ended. Focus groups were audio recorded and transcribed verbatim.

Phase 2 (Prioritization of Interventions) and Phase 3 (Implementation of Interventions)

A community dietitian and 2 wellness exercise specialists joined the research team and school community to form the program development team. Six program development sessions were conducted (3 with students and 3 with staff) to discuss all recommended interventions and prioritize the top 5 Healthy Living Initiative components. The top 4 themes for interventions were chosen in phase 2. In phase 3, the study team along with the school students and staff examined the feasibility of the various interventions suggested in phase 2. Those interventions that were felt to be sustainable and feasible from the financial and administrative perspective were prioritized and implemented. The interventions were subsequently implemented with active support of the school principal, assistant principal, teachers, and students.

Table 1. Representative Quotes Regarding Barriers and Facilitators and Interventions for Healthy Eating.

Barrier themes	
Easy access to fast food	“You don’t have time for anything except fast food so.” (S)
Expense of healthy foods	“I’d say moneywise and price. Because I’ve like, the unhealthier foods and like boxed, processed, snacky foods—those are normally a lot cheaper than the fruits, the vegetables, the healthy stuff.” (S)
Limited food choices in the school environment	“I worked at another high school and they have a salad bar where the kids have the opportunities to kind of build their own salads.” (T)
Taste of healthy foods	“Kids don’t like the healthy [food]. It’s too bad.” (T) “Unhealthy food tastes better than healthy food is what makes it difficult.” (S)
Advertisements of unhealthy foods	“It seems that unhealthy foods are advertised more than healthy foods so that’s kind of going to go into your brain.” (S)
Facilitator themes	
Cooking and nutrition class	“The purpose of the foods class is to learn how to make, to cook meals so that you know how to cook it. And like they let you take home recipes.” (S) “When I’m eating like sitting around the dinner table, sometimes the food plate pops up in my head. Like the split your plate into fours and so your proteins go in this, your grains, um your ah whatever goes in there.” (S)
Food bank as school partner	“And Channel One does a nice job because a lot our kids don’t have the resources at home even as well. So they give us food.” (T)
School garden	“They harvest and use the food out of there. We have extras out there, so kids, staff, anybody coming in, can take whatever is there, free. There’s vegetables out there, potatoes, tomatoes, beans, peppers, zucchini, squash, and it’s there to take.” (T)
Intervention themes	
Provide more palatable healthy food choices at meals and snacks	“So I have kids who bite into the apples and they’re like. . .ohh. . .it’s mushy. You know it’s not like crisp.” (T)
Increase students’ knowledge about foods served	“That is a good idea to just have them put the recipe out. Just like have the nutrition facts.” (S)
Provide more appealing healthy foods	“We have like oranges, apples, and bananas. And they’re really like icky ones too. They don’t look appetizing like they have like bruises on them.” (S)
Visual reminders about healthy foods	I have seen these book marks that say like little healthy snacks that you can make at home or whatever.” (S)

Abbreviations: S, student; T, teacher.

Data Analysis

Data were coded by 2 independent coders using a codebook developed by open reading of the transcripts by 4 team members. Two coders then independently coded all the transcripts using the NVivo-9 software and synthesized focus group content categories/themes for further discussion. The two coders periodically met and discussed coding processes and resolved issues with coding through deliberation. The study was approved by the Mayo Clinic Institutional Review Board.

Results

The results of the focus group interviews were organized into 2 major categories: (1) Healthy Eating and (2) Physical Activity. Emergent themes (individual and environmental)

in barriers, motivators/facilitators, and recommendations for promoting healthy eating and physical activity were identified.

Perceived Barriers and Facilitators of Healthy Eating

Environmental barriers identified by students and staff included limited healthy food choices at school, poor taste of school meals, easy access to unhealthy foods in the school neighborhood, and high cost of healthy foods (Table 1).

The role of social media and advertising in influencing students’ food choices was also noted. Individual factors identified by students as barriers to healthy eating included poor taste, addiction to fast foods, inadequate knowledge about healthy nutrition, and choosing to eat fast food.

Another theme that emerged was that, when students were given more choices, they would not eat the healthy options.

Themes that facilitated healthy eating behaviors were the school garden, access to a snack cart with healthy food choices in the classroom, and nutrition education (eg, during a cooking class).

Recommended Interventions to Promote Healthy Eating

The top 4 themes for intervention suggested by students and staff to facilitate improvement in eating habits were identified. These included: increase availability of healthy food options at schools; provide whole fruits and vegetables instead of packaged ones; grow vegetables in the school garden; and increase palatability of healthy foods and expose students to a greater variety of healthy options (Table 1).

Another suggestion of students and staff was to increase the engagement of students via their involvement in menu selections and organization of fun afterschool evening family activities centered on healthy food and nutrition including family games, cooking classes or cooking events.

Perceived Barriers and Facilitators for Physical Activity

Major barriers to physical activity identified by both students and staff were categorized into 2 domains: individual and environmental factors (Table 2). Individual factors described as barriers to physical activity by both students and staff included lack of motivation and/or interest.

Lack of exposure to and/or knowledge of different physical activities were major themes as barriers to physical activity.

Health concerns such as asthma and feeling self-conscious around other students (more common on females) emerged as barriers to physical activity. Students also identified time constraints as a result of competing commitments such as school assignments, work during off school hours, or child care (for those students that were parents) as a barrier to their overall physical activity.

Environmental barriers to physical activity included limited access to the gymnasium; lack of access to green space within and in the vicinity of the school; restrictions to participation in school team sports; and lack of gender-restricted exercise space. Access to the gymnasium within the ALC was a significant concern that most students and staff reported. The ALC had a policy that the gymnasium can be used by students only when there is adult supervision. Although the gymnasium had equipment that could be beneficial for students, it was felt to be outdated and, additionally, there was a lack of personnel to supervise students and therefore it was underutilized.

An environmental barrier to physical activity was unavailability of structured sports activities in the school. Students who were interested in participating in a high school sport needed to enroll at a different area high school and maintain minimum academic requirements; this could be challenging for ALC students.

Another barrier was lack of access to nearby bike trails and safety concerns.

Themes about facilitators for physical activity based on interviews with students and staff centered on an outstanding Physical Education teacher; and the support of peers and family members in pursuing active lifestyles (Table 2). Students also discussed being motivated to be physically active in the school environment when there were incentives, and when they were involved in activity selection.

Recommended Interventions to Increase Physical Activity

The top 4 themes for interventions suggested by students and staff to increase physical activity were identified. A personal responsibility and mentorship theme emerged in the students recommendations (Table 2). Students asked for individual coaching to help set achievable goals. They felt surrounding themselves with physically active peers would be helpful and they could also help other students when they were struggling to reach their physical activity goals.

Students suggested that teachers be proactive and encourage programs that enhance physical activity. Students also wanted to learn in class the benefits of being physically active and get help to follow through when they sign up for physical activity programs. Both students and staff recommended increasing physical activity opportunities within the school environment outside of Physical Education class.

Students suggested more organized sports events in the school. Some examples included fun class competitions; active games including basketball class tournaments; obstacle course or a climbing wall; and classes like Zumba or Yoga.

Students and staff recommended increased access to the gymnasium before or after school. Students wanted to use the gymnasium during open hours and be able to use the equipment during lunch time or after school. Both students and staff recommended updating and improving the variety of gymnasium equipment; and adding private areas for gender specific exercise programs. Staff suggested the implementation of a group/team walk activity after lunch and having dedicated days at ALC for exercise-fun days or activities to do as a whole school.

Recommendations to increase physical activity in the classroom included the use of standing desks; exercise videos; small group exercise programs during advisory period; and open discussion about intimidation and body image.

Table 2. Representative Quotes Regarding Barriers, Facilitators, and Interventions for Physical Activity.

Barrier themes	
Lack of motivation/interest	“Definitely laziness because like if you don’t have like the willpower of wanting to do it and like and you just want to sit and be lazy and what not.” (S) “I don’t know, how do you light the fire in them?” (T) “A lot of them do not have the drive. They do not have the desire to be physically active.” (T)
Lack of exposure/knowledge to different activities	“if I don’t know, like there’s a new game that I don’t know then it’d be like a little bit difficult because I need to get the hang of it.” (S) “I think for my students it’s a lot of, um, a lack of exposure or a lack of activity or opportunity to find activities that they are interested in.”(T)
Limited access to the gymnasium	“Um, maybe if the teacher is not in the building. They’ll probably just leave and the door will be locked and so you won’t be able to get in. And, that’s the only place you can go [to work out] in this school so.” (S)
Financial concerns	“There’s scholarships to pay the registration fee [for sports activities], but it’s not free once you are in it. I mean, there are still things you have to purchase . . .their car isn’t reliable if they have a car.(S)
Unavailability of structured sports activities	“Whereas the mainstream high schools have. . .if you are interested in any kind of a sport—girls and boys and spring sports, winter sports, swimming. . .all kinds of sports that are available, but not in this school.”(S)
Lack of access to close bike trails and safety	“There is no sidewalk up until, you know, like a half. . .quarter mile and then they’re more. . .” (T)
Facilitator themes	
Teachers as role model and mentor	“Like the gym teacher she motivates me to get out there, get exercise, like she pushes me to do beyond what I believe I can do.” (S)
Peer participation	“I think that if they’re doing it for. . .with other kids it makes a difference and if it’s a school-like thing, it tends to make a difference.” (T)
Involving students in activity selection	“it makes you more like kind of encouraged to actually go do something because you get to choose what you want.” (S)
Role modeling	“You know if I’m expecting them to do something I need to be able to do it myself with them, so if I have them do a mile, I’m running the mile with them.”(T)
Intervention themes	
Individualized, gendered or small group activity sessions	“It might help a little bit. Because like girls tend to feel more insecure um in front of guys. So could separate the genders.” (S)
More opportunities for physical activity	“Ah, just if you have gym class you go every day. And do whatever you scheduled for that day.”(S) Probably add a more like larger workout room would like be good (S)
Organized sports events	“Like for graduation last year they had a rock wall climbing. That was really fun.”(S)
Make gymnasium accessible and useable for students	“Probably like having somebody in the gym like after school so you can go in there and run around and stuff if you have time after school.” (S)

Abbreviations: S, students; T, teachers.

Interventions Implemented: ALC Healthy Living Initiative

The process of determining what interventions to implement took a period of 3 months and implementation occurred over a period of 6 months. The implementation has been completed and all the measures implemented are still in place. Several initiatives were implemented after the formative assessment (Table 3). Students and staff replaced unhealthy free food choices in the snack cart with healthier foods under the guidance of a registered dietician. Water infuser stations were placed throughout the school and a group of students rotated with the assistance of a teacher

champion in preparing the fruits or vegetables for the water infusers. The food pantry previously had non-perishable food items donated by local food bank randomly placed in boxes. Students organized the food pantry and placed various food groups in clearly labeled boxes. Healthy fruits and vegetables from the garden were placed by the school entrance in an easily displayed manner along with cards with healthy recipes. The school staff organized an annual healthy cooking event with families as part of this initiative.

The physical activity components included mapping an indoor walking track; installing a climbing wall in the gymnasium; updating gymnasium equipment; and changing the

Table 3. Implemented Interventions to Improve Healthy Eating and Physical Activity.

Healthy eating interventions

- Free recipe cards on the school table with free garden produce for students to take home
- Addition of infused water stations
- Redesign of classroom snack cart stations and addition of “Smart Snacks”- healthy options in school
- Organization of the food closet according to MyPlate food groups
- Organization of school family cooking events

Physical activity interventions

- Creation of an indoor walking track around hallways
- Installation of a bouldering/climbing wall in the gym
- Addition of fitness equipment in the gymnasium including multiuse machines; treadmills; exercise mats with instructions; and suspension trainers to help create more workout opportunities
- Provision of foam rollers, mats, grip strengtheners, and mini cycle-pedals in classrooms
- Modification of classroom equipment by addition of standing desks, foot cycles, and hand grip strengtheners

classroom environment (Table 3). A walk path was marked within the school to encourage students and staff to walk in between classes. ALC students and staff designed a system to allow students to check in at the assistant principal’s office, to be able to walk a mile during a classroom break. A horizontal bouldering-climbing wall was installed in the gymnasium. Outdated equipment in the gymnasium was replaced with more current equipment including suspension trainers and other multiuse instead of single use equipment. A treadmill, elliptical machine, yoga mats, and exercise mats with instructions were added to the school gymnasium. The classroom environment was changed with the addition of standing desks, foot cycles, and hand grippers to facilitate active movement during classes, which reduce sedentary behavior and, in some studies, may improve classroom behavior.²¹ The standing desks were evenly distributed among classrooms in all grade levels and according to teacher preference and subject matter.

Discussion

Drawing on the tenets of CBPR, our study engaged students and staff to identify key barriers and facilitators for healthy eating and physical activity at a community school with an alternative middle and high school. Students in alternative learning environments disproportionately hail from marginalized communities and face high rates of adversity and poverty associated with significant health disparities. This assessment informed the development of a school-based and community-driven Healthy Living Initiative, which leveraged the strengths of the students and school community and worked directly to overcome the identified barriers. To our knowledge, this is the first study to describe such a process of formative assessment and intervention in a community school with an alternative learning school environment.

Key environmental themes identified through the formative process included lack of healthy food options, inadequate opportunities for physical activity, and insufficient education about healthy nutrition and physical activity. Key

individuals themes noted were lack of motivation, self-consciousness and perceived inadequate knowledge about healthy nutrition and physical activity. Similar themes have previously been noted in high school students in the traditional educational systems in the United States^{14,18,16} as well as in other countries such as Morocco.²²

Strategies recommended by students and staff members included integrating a greater variety of healthier food options at school, increasing education regarding nutrition and physical activity, and enhancing opportunities for physical activity during the school day including greater access to the school gymnasium and more support from staff. These recommendations were similar to those noted by other investigators in high schools within the traditional educational system.^{14,16,18,22} Similar interventions aimed at improving healthy food options at school and improving knowledge about healthy foods have been shown to lead to 50% reduction in incidence of overweight in schools relative to control schools in the school district of Philadelphia.⁹ A similar multicomponent intervention targeting community, school, family, and students in a school system with similar demographics and socioeconomic status resulted in a statistically significant decrease in body mass index and prevalence of obesity.²³

Interventions to increase opportunities for physical activity included addition of a walk path within the school, allowing students to walk between classes, addition of standing desks, and addition of updated equipment in the gymnasium. Recent reviews of the available literature suggest that interventions that focus only on physical activity can be effective in reducing BMI in children aged 6 to 12 years, and adolescents aged 13 to 18 years.²⁴ It is likely that some of these interventions will lead to reduced sedentary activity in the students as well which in turn has been shown to lead to decreased caloric intake and improvement in weight status.^{25,26}

The strengths of the study are the use of CBPR to engage students, teachers, and staff in both the assessment of barriers and facilitators to healthy lifestyle and the subsequent

implementation of several strategies aimed at encouraging healthy eating and physical activity in response to the feedback obtained from key stakeholders in an alternative learning environment for middle and high school students. CBPR offers a unique approach for translating evidence-based models and research knowledge into effective and sustainable interventions. It is particularly suited for health conditions such as obesity that are influenced by health behaviors and various social determinants of health.

The alternative learning environment was well-positioned for this process and for the multicomponent intervention. First, because of the extremely high prevalence of obesity and the high rates of poverty compared to the traditional schools in the same school district, the community recognized the urgent need to address poor nutrition, exercise, and obesity and the complex contributing socio-ecological factors. The ALC is also oriented toward a community approach and the school administration was supportive of interventions to address the comprehensive needs of students, including their health needs. Another important strength of the program was the diversity of measures implemented to facilitate healthy eating and physical activity among students, which allowed us to incorporate a range of suggestions of many students and teachers. Most of the interventions were guided by the assessment of stakeholders and included fun activities such as addition of a climbing wall in the school gymnasium and addition of a walking path in the school. A limitation of the study is the lack of longitudinal follow up after implementation of the interventions employed subsequent to the formative assessment. We were unable to examine the results of the implementation of the interventions on eating habits and physical activity of the students due to significant turnover in the student population in this school even within the same school year. Students attending this school often drop out due to socio-economic challenges. Other students often return to the traditional schools once their academic performance has improved in the alternative learning environment. Nonetheless, a similar process of community engagement to develop a multicomponent intervention could be utilized to identify unique community barriers and facilitators to health and then adapt a multicomponent intervention that meets these needs.

Conclusions

In conclusion, we utilized community based participatory research to identify barriers and facilitators for healthy eating and physical activity among middle and high school students in a community school with an alternative learning environment. Input from students and staff in the school was obtained to identify interventions to improve nutrition and physical activity in the school setting. Subsequently several interventions in the school environment were implemented in order to facilitate healthy habits.

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