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Physical Activity for At-Risk Female Adolescents: The Importance of Creating a Meaningful Experience

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Abstract

An alternative program to traditional physical education for at-risk, female high school students to increase physical activity (PA) and improve health was implemented and assessed. It consisted of 90 minutes of activities, 3 times per week for 5 weeks of PA and nutrition education. Meaningful experiences to the students were emphasized and community partners were included. Surveys were provided pre- and post-program. From the pre-program survey, 59% reported their weight to be healthy, > 50% reported concern and desire to lose weight, while >60% reported participating in less than two days of PA per week or no school sports. From the post-program survey, a majority of students stated enjoying the run/walk activity and that they learned new facts about eating healthy. In addition, virtually all responded they would participate in program again. Thus, the addition of a meaningful experience for the students and involvement of community partners were key components creating a success alternative program for at-risk female students.

Keywords: Physical Activity, Meaningful Engagement, Adolescents, Physical Education, At-Risk

Background and Purpose

Research suggests that children and adolescents ages 6-17 require at least 60 minutes of moderate to vigorous physical activity (MVPA) per day (Elmesmari, Reilly, Martin, & Paton, 2017). According to a self-reported study conducted in the United States, daily physical activity (PA) requirements are mostly met in children in grades 1-6; however, less than one-third of high school students meet the requirements of daily PA (US Department of Health and Human Services, 2008). Thus, older children are at a greater risk of developing health-related issues related to PA compared to younger children.

The ability to meet the recommended 60 minutes of MVPA is dependent on many factors, and one includes physical education (PE) offered in school settings. While many factors influence the way that PE is taught in schools (e.g., enrollment, space, number of teachers), inadequate funding and state testing standards may require the elimination of PE classes and/or staff. Reduced offerings of PE in some school districts are highly damaging, particularly in those that educate students of low socio-economic status (SES) (Carlson, Mignano, & Norman, 2014). Low SES has been shown to impact both access to and education on PA.

These schools typically do not employ a PE teacher and provide five minutes or less of MVPA per day compared to schools with higher socio-economic status (Carlson et al., 2014). This amount is not enough to meet the daily requirements for PA and when summed over many months, and may have detrimental effects on the child's overall health and well-being.

Not meeting daily requirements for PA coupled with increased sedentary lifestyles have been linked to rises in incidence of obesity in both children and adolescents (Hu, Ramachandran, Bhattacharya, & Nunna, 2018; Wiklund, 2016; Williams et al., 2017). Children who are overweight or obese are three times more likely to become obese adults (Hu et al., 2018), which can potentially decrease quality of life and increase the risk of health-related issues later in life, including development of cardiovascular disorders, Type II diabetes, asthma, orthopedic issues, and certain cancers (Reilly, 2006; Wiklund, 2016). These "at-risk" children are most likely female, belong to an ethnic minority, and are of low SES (Anteneh, Gedefaw, Tekletsadek, Tsegaye, &Alemu, 2015; Reilly, 2006; Williams et al., 2017). It is argued the focus should be on increasing PA, decreasing sedentary behaviors, and implementing a healthy diet at an early age in these at-risk populations in order to decrease health-related issues that manifest itself in adulthood.

Extra-curricular programs focusing on implementing MVPA have the potential to reduce health-related concerns in children and adolescents and fill the gaps in the reduced PE offerings in schools of low SES. However, previous studies utilizing controlled PA interventions in at-risk children and adolescents in low SES schools show mixed findings. In a study by Resnicow and colleagues (2000), middle school and high-school girls completed a 2-hour, 2-year after-school program that focused on increasing knowledge of nutrition and improving upon PA (Resnicow et al., 2000). In addition to PA, psychosocial activities were implemented, and focus groups were used to assess health knowledge obtained by the students. Over the course of the intervention, the students significantly improved upon their nutrition knowledge and reported fewer calories consumed; however, a modest deceleration of weight gain was observed pre- versus post-intervention. Wilson and colleagues implemented a MVPA-driven intervention in 11-14 year old children that encourage the children to pick their own MVPA activities, followed by discussions on coping strategies and ways to adhere to PA (Wilson et al., 2005). The results showed that time spent performing MVPA was significantly higher in the intervention group than the control group. Wilson also examined improvement in PA in 24 schools before and after a 17-week intervention that focused on MVPA and intrinsic motivation (Wilson et al., 2011). The researchers found that their program, entitled "Active by Choice Today", was successful in reducing seasonal decreases in PA levels and increased levels of enjoyment midway during the intervention. Wilson and group attributed the success of their studies to the student's own self-motivation and efficacy, as based upon the Self-Determination Theory and the Social Cognitive Theory (Wilson et al., 2005; Wilson et al., 2011). However, post-analysis for the 2011 study revealed that the intervention was only successful during the after-school program, and that no difference in PA levels was observed in the treatment and control group post-intervention (Wilson et al., 2011).

These results suggest that the challenge does not lie in the implementation of a successful program while students are engaged in these programs and health and PA performance are measured acutely. Rather, the challenge lies in the long-term after the intervention ceases. For example, Robbins and colleagues, who implemented a 17-week intervention of 60 minutes of MVPA activity 2-3 days per week, showed that post-intervention increases in body weight and percentage of fat was reduced in the students, but this result failed to show statistical significance (Robbins, Ling, & Wen, 2020). Others have found that post-intervention, students showed declines in PA levels, declines in PA self-efficacy, and increases in sedentary behavior (Okely et al., 2017; Robbins, Pfeiffer, Maier, Lo, & Wesolek, 2012). Furthermore, the results from Seibert and colleagues' study showed control groups out-performing intervention groups for cardiorespiratory fitness levels during follow-up examination (Seibert, Allen, Eickhoff, & Carrell, 2019).

It is therefore suggested that PA alone may not be enough to see changes in health-related behaviors, and that the ability of adolescent and high school aged girls to adhere a healthy lifestyle is multifaceted and complex (Robbins et al., 2020). Resnicow and colleagues reported that the students were well aware of their inability to change their PA behaviors and had difficulty implemented what they learned in the program to real life (Resnicow et al., 2000). Girls may also hold a more negative perception of PA compared to boys, which influences adherence to PA programs (Seibert et al., 2019). It was also found that the lack of parental involvement and home life were variables found to negatively influenced adherence to PA (Resnicow et al., 2000; Wilson et al., 2011).

Adherence was also influenced by time constraints, lack of adequate staffing and funding (Seibert et al., 2019), lack of motivation and training in the teachers, and a general resistance to change school culture (Okely et al., 2017; Wilson et al., 2011).

An overlooked resource is the community partner, which may positively benefit after-school programming in at-risk youth in low SES schools. Community partners and other local businesses have the potential to provide additional resources to schools to expose the students to activities that they would not normally experience, such as intramural sports, dance, and yoga classes (Fahlman, Hall, & Gutuskey, 2014). Furthermore, students that do not get support at home may possibly do so with these community partners to pursue their health goals (Hu et al., 2018; Williams et al., 2018). Unfortunately, the data examining the usefulness of community partners are limited. One study by Okely and colleagues (2017) examined the viability of the link between after-school programs and the community during an 18-month PA intervention with 8th grade girls (Okely et al., 2017). Post-intervention data revealed that a successful link between the school and the community partner was not created. Further analysis revealed that the students were not aware of the resources that the community partners were offering. Thus, just having a community partner involved is only part of the solution; these partners must be an active part of the PA programs with schools throughout the whole process to ensure that students take advantage of these resources when the school program terminates.

Therefore, the purpose of this report was to describe the development, application, and outcomes of an after-school program on the health status of at-risk female high school students of low SES. Specifically, two novel components were incorporated: (a) the engagement of the students by providing a meaningful experience, and (b) the inclusion of community partners throughout the duration of the program. Making the program meaningful and student-centered was thought to affect the health status of the students by having them choose PA and educational activities in which they are most likely to adhere. The addition of the community partners aimed to decrease barriers to PA by providing resources to students to ensure further success in the program.

Development of the Process

Gannon University developed a nutrition and physical activity program at a local high school that focused on increasing participation in PA by creating a meaningful engagement. According to Kretchmar, the most successful PE programs engage the students in the activities and increases participation by the students find relevance in the activity (Kretchmar 2006). Therefore, it was important to determine the schools' capability to support the program, student needs and interests, and what aspects of the program the university could support. Interestingly, Okely (2017) utilized a similar methodology to assess decreased participation by girls in physical education in which they found three main reasons that paralleled our determinants. Okely reported that participation decreased due to limited variety or choices for activity, lack of available resources, and lack of expertise among teachers or staff. Upon evaluation for the intended program, the school and university's contributions were secondary to the student's needs and interests. If the program could develop educational programming that was meaningful to the students they would find relevance and engage in the activity; if there is no meaning, it is deemed irrelevant and they will disengage (Gibbons, 2009; Gibbons & Gaul., 2004). Thus, students will perceive having a choices and an attachment to the activity.

The school's capability to support the program was then determined by examining the educational climate and possible barriers or limitations. The identified high school was one of three high schools in the city district that was suffering from declining numbers, low state test scores, and unable to financially provide basic PE courses and athletics to their population. School officials were very helpful identifying three areas of attention: language barriers for some students, proper clothing and shoes for participation, and poor daily attendance of students. The noted language barrier came from the location of this high school, as the surrounding community boasted over a dozen different nationalities and cultures. School officials explained that it was very common that peer groups would have one student that was competent at speaking English to act as a spokesperson for their peers. Minority enrollment for this high school was 46% higher than the Pennsylvania state average of 32% for diversity. Of these students, 50% were Black, 22% were White, 15% were Hispanic, 11% were Asian, and 2% were classified as "Other". In 2018, the existing high school closed and merged with two other city schools. The last reported statistics before the merger revealed a proficiency in math and reading/language arts at 29% and 30%, respectively, below the Pennsylvania state average and a graduation rate of 51% (National Center for Education Statistics, 2017).

The second possible barrier or limitation for potential participants was proper clothing and shoes due to family income constraints and/or low SES. The school officials shared that 99% of students were eligible for free lunch, meaning these students was coming from a household with incomes at or below 130 to 185% of the established federal poverty designation (Food Research and Action Center, 2020). Consequently, the students were less likely to afford proper clothing or shoes for PE classes.

Poor daily attendance to school was the final barrier/limitation identified by school officials. School officials explained that the school district had very strict guidelines and rules about attendance and truancy; however they did not provide any statistics. Fluctuations in attendance are common for at-risk, low SES school districts (Nolan, Cole, Wroughton, Clayton-Code, & Riffe, 2013). The program, if properly structured, would provide students a chance to find a meaningful experience in the activities and possibly improve attendance.

The last development piece was determining the university's contribution and considerations for the program. Two areas of interest were identified: establishing physical activity guidelines for students and involving community partners. As previously mentioned, the goal for any program is to provide the students with 60 minutes of MVPA, which was not met with the current environment at the high school. In particular, the emphasis was placed on high school girls, who are more risk for sedentary behavior and who are more likely to benefit from such a program if it is gender-separated, focused on student-valued exercise options, and supportive (Gibbons & Gaul, 2004). Thus, a focus on lifetime activities with student contribution/feedback and real-time assessment of the program is also beneficial, as education lends itself to connecting disease prevention with the possibility of increasing optimal health.

The second area identified important to the success of the program was the involvement of community partners. Community partners were identified as one of two groups: (1) university students, and (2) community experts. Third-year university female students were recruited to participate in the program as part of a service learning experience. Students were accepted if they had taken the appropriate courses in nutrition and exercise science. Individuals with experience or certifications in-group fitness were also considered. The service learning opportunity for the university students afforded them the ability to use knowledge obtained in the classroom and apply it to a real-world setting. In addition, the university students served as mentors to the high school students as they shaped content and delivery of the program.

The university was also able to communicate to established community partners within a five-mile radius of the high school the need for resources needed to support the program. As a result, fitness instructors from the YMCA and iRock Fitness participated in the program, and a local grocery store, Giant Eagle, provided healthy food and snacks. According to the 2016 United States National Activity Plan, alternative programming to structured PE courses encourages regular and sustained PA (National Physical Activity Plan Alliance, 2016). The relationship between the high school and community partners also increases the possibility that students may utilize the services of these partners in the future.

Application of the Process

Thirty female high school students (age ranged from 14-18 years), from freshmen to senior year, were recruited from the chosen local high school to participate in the "Fit to Run" program. Student attendance fluctuated each week; at most 15-20 participated at one time. Attention was placed at recruiting at a high school that fit the criteria of at-risk: low SES, poor community resources, and minority and ethnic disparity. The program staff consisted of faculty members from the university, student mentors from the university, and professional exercise instructors from the surrounding community. Participation in this program was strictly voluntary, and ethics approval for this study was obtained through the university's Institutional Review Board prior to data collection.

The "Fit to Run" program consisted of 90 minutes of contact 3 times per week over 5 weeks. In the 90 minutes, the students were exposed to various forms of non-traditional PA (yoga, kickboxing, circuit training) while run/walk sessions were emphasized (hence, "Fit to Run"). Students were also educated on nutrition and healthy eating, and snacks and other food tastings were provided by the local grocery store. Because many students lacked proper exercise attire, funding was secured to provide each student appropriate clothing, running shoes, water bottles, and other essentials.

Baseline data were collected on basic body composition measures, including body mass index (BMI) and waist-to-hip ratio. Height and weight for BMI were collected using a physician's scale (Detecto, Webb City, MO), while waist-to-hip ratio was collected using a measuring tape. The baseline data were collected to assess the overall health of the participants; however, the main purpose of the program was to educate students on nutrition and physical activity programming through meaningful experience, and not monitor changes in weight or changes in body composition.

A questionnaire was given to participants at the beginning of the program. In it, students were asked to assess their overall health, perceptions of weight, exercise habits, and reasons for not participating in PA. For the first week, the university mentors selected the activities and a healthy snack. To provide meaningfulness to the program and increase enjoyment and self-motivation, the students were able to select the activities and snacks for the reminder of the program. Community partners were then contacted to provide services to accommodate the feedback provided by the students.

At the termination of the program, the students were given another survey, and were asked to describe what they liked or disliked about the program, and whether they would participate in the program again in the future.

Outcomes from the Program

The results from the body composition analysis revealed the average BMI of the students to be 22.86 ± 11, with 7 out of 14 females classified as overweight or obese. Waist-to-hip ratios were found on average to be 0.69 ± 0.27, with 5 females out of 14 classified as at-risk for potential heart disease and/or diabetes.

Of the 27 participants who filled out the survey at the beginning of the program, 55% reported health as good to excellent, while 45% reported health and poor to moderate. Though 59% reported their weight to be healthy, 51% reported the desire to lose weight and 53% reported occasional/frequent concern about gaining weight. In addition, 37% reported exercising to lose weight in past 30 days, while 19% reported dieting to lose weight.

When describing overall exercise habits, 63% of the students participated in 0-2 days of MVPA activity per week, and 67% did not participate in school sports. Reasons given for not participating in PA included time needed for employment, time for homework, being punished, lack of motivation, feeling lazy, and feeling fatigued. Despite these results, 70% reported interest in learning about alternative activities to improve upon their health and fitness levels. Those interested in alternative programming expressed reasons and barriers for participating, which can be found in detail in Figure 1.

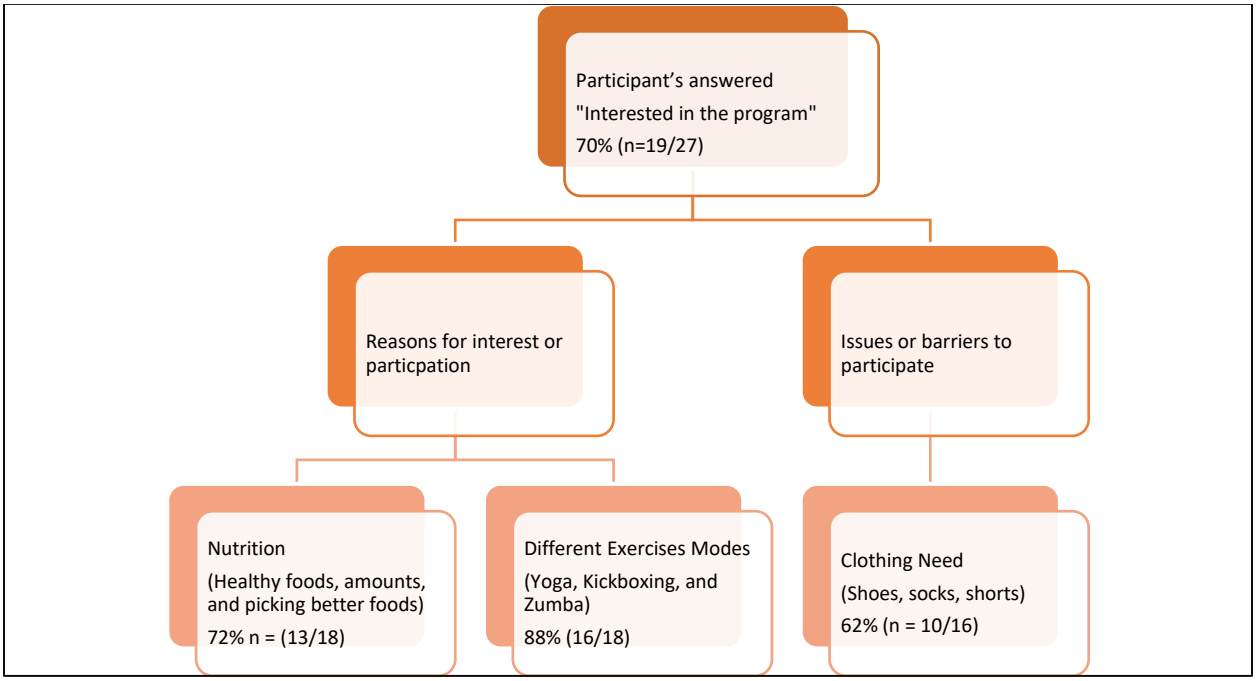

Figure 1. Pre-program needs assessment from 19 out of 27 students that responded on the first day of the "Fit to Run" program.

Thirteen students out of the original 27 students also completed a post-program assessment. Of the 13 students, 10 students expressed enjoyment in the run/walk activity and 11 stated that they learned new facts about eating healthy. Most importantly, 12 out of 13 students reported that they would participate in the "Fit to Run" program again. Examples of responses from students on what they learned from the program can be found in Figure 2.

Category of Learning in Program	Examples
Nutrition	"I didn't know my options and now I know about (a) little bit." "Fats are good for you somehow." "I like a lot more healthy foods now." "All foods are not good for you." "Stop eating pizza and eat salad."
Different Exercise Types or Modes	"To run in the gym with my friends." "YOGA!!" "Running and Jumping Jacks." "(The) Rubber bands were cool."
Balance and Stretching	"I didn't know about balance and how it can help me." "I didn't know I could balance better." "If you put out arm out, its easier for you to stay balanced." "I know how to keep my balance a little more now."
Running	"Because it's fun." "Keep your hands open like your carrying eggshells." "It was fun and I like that I got to exercise." "Run on your whole foot and not the tip of your toes." "I learned to always keep moving."

Figure 2. Examples to open-ended questions examining learning content from the "Fit to Run" program.

Discussion

The purpose of this project was to design and implement an after-school program that aimed to positively impact the health status of at-risk female high school students of low SES. For this program, two components were emphasized: (a) engagement of the students by providing a meaningful experience, and (b) inclusion of community partners.

The results from our assessments showed that despite the fact that over 50% of the students surveyed reported being healthy, a large number of students were classified as overweight or obese. In addition, a majority of the students reported participated in 0-2 days of moderate PA with little participation in extra-curricular sporting activities, which clearly fell short of the required 60 minutes per day of MVPA (Elmesmari et al., 2017). Because the students in the current study did not meet the daily requirement for PA, overall risk of obesity and associated problems were of concern. Furthermore, over half of the students reported concern about their weight and a desire to lose weight, regardless of their health status. These results are in alignment with the findings of Voelker and colleagues, who expressed that unhealthy perceptions of weight and distorted body image are prevalent in adolescents, particularly females (Voelker, Reel, & Greenleaf, 2015). Thus, a snapshot of the health status of the current cohort clearly indicated a need for the promotion of healthy body image through positive programming that stressed healthy eating and PA. However, despite these findings, a majority of students (70%) reported a desire to learn more about alternative health and wellness options. Thus, the need to offer an alternative program to traditional PE to teach these students about healthy eating and exercise was substantiated.

Because a major goal was to provide a meaningful experience to the students, the program by design allowed the students to choose activities to participate in each week. PA included run/walk activities, yoga and kickboxing classes, etc. The students were also able to choose healthy snacks, such as making their own granola mix. These activities were executed successfully through the inclusion of community partners to help with the PA activities (the second goal of our program). The post-program surveys showed that the majority of the students expressed enjoyment the activities through positive feedback and had expressed that they would participate in the "Fit to Run" program again. In addition, open-ended feedback from the students also demonstrated that they learned about various aspects of nutrition, the importance of running, other exercise modalities, and balance and stretching.

From these results, two important conclusions can be drawn. For one, providing a meaningful experience where the students had control over their own health resulted in enjoyment in the program and the desire to continue in the future. According to existing literature, providing a meaningful experience creates an intrinsic motivation due to enjoyment rather than an external reward (Deci & Rya, 1985). Once meaning is given to an activity, the students find relevance in the activity and it is continually performed (Gibbons, 2009; Gibbons & Gaul, 2004). Thus, students will perceive having a choice and an attachment to the activity if it is intrinsically motivating.

Two, the involvement of the community partners was invaluable to the success of the program. Inviting students from the university and individuals from local fitness facilities to aid in fitness and PA instruction provided the students with an PA experience that was vastly superior to what was offered during the school setting. The local grocery chains that provided healthy foods nutrition activities and exposed the students to healthy snacking. Because these community partners were local vendors, they also have the option to participate in the program each year. However, for a program to be a continued success, it needs to become a permanent offering at the high school and implemented on a yearly basis.

Overcoming barriers and limitations. While positive outcomes were observed from this program, barriers were encountered in its implementation. One such barrier involved language, as a number of students that participated were from different nationalities and cultures. To overcome this issue, a student that was competent at speaking English acted as a spokesperson for her friends. In addition, activities were created that emphasized movement over speech.

Two, many students lacked the proper clothing and shoes required for participation in PA. Available monies enabled the project coordinators to provide these items to the students, but facilitators need to be aware of this issue in low SES districts. Alternative funding may be required for these items, particularly from community resources.

And three, fluctuations in participation were observed, ranging from 15 to 20 students each week. Fluctuations in attendance are common for at-risk, low SES school districts (Nolan et al., 2013). For this study, the fluctuations in student attendance were attributed to prior after-school commitments (including employment and homework), truancy issues, and medical issues such as pregnancy. The type of program and the timing of it (in-school versus after-school) should be considered when implementing a program such as this, as they both effect participation and adherence rates.

Implications and future directions. Established curricula and programs have yielded positive outcomes for students, in particular for recognizing at-risk populations. However, if the intervention is a single standing event without follow-up, dissemination of results, and further training of health educators, the schools and its students will fall back into their previous procedures and habits. These interventions are only as good as the time that is invested after the intervention terminates.

The first step in any program creation is to identify at-risk populations, to use available, local community resources, and to create a specific meaningful experience for students. This becomes the backbone of the education process and the translation from theory to active practice. Community partners and other businesses can provide additional resources to these schools to expose the students to alternative activities (Fahlman et al., 2014).

Second, the involvement of a community partner for many years is critical. The “Fit to Run” program utilized money and resources from a local university for program conception and implementation, and involvement in these community partners assures that the program will be viable for a long period. However, partners are not limited to local universities or colleges. Facilitators may also reach out to and involve hospitals and other local non-profit organizations for these resources.

Third, the quality of the relationship between the facilitators and the students is also important. Having older, female student volunteers involved as mentors helped create a special bond between the female students and the mentors, which cannot be created with adult administrators. Utilizing alumni of the program, volunteers, and other community members can also help to create a meaningful experience in place of older students if university partnerships are not available.

Finally, a positive future outcome from such a program is the matriculation of students to the local university after high school graduation. Alumni from previous program at the high school called “Club Fit” have applied and were accepted to the university.

These former participants then became student facilitators for the "Fit to Run" program. The leadership experience that the former participants gained with these experiences may have not been possible without the participation in community-based programs.

In summary, a majority of the students reported a desire to learn more about alternative health and wellness options though the "Fit to Run" program, and many expressed that they would participate in this program again. To ensure successful implementation of such a program in a low SES school, it is important to not only create a meaningful experience for the students, but to also involve community partners as an invaluable resource.

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