Journal of Physical Activity Research, 2021, Vol. 6, No. 1, 17-20
Available online at http://pubs.sciepub.com/jpar/6/1/3
Published by Science and Education Publishing
DOI:10.12691/jpar-6-1-3

Effect of After School Program with Physical Activity on Body Mass among Black American Middle School Students

Lei Guo*, Ardashia K. Peay

Department of Kinesiology and Recreation Administration, North Carolina Central University, Durham, NC 27707
*Corresponding author: lguo@nccu.edu

Received March 05, 2021; Revised April 09, 2021; Accepted April 20, 2021

Abstract The purpose of this study was to examine whether or not there was a significant difference in body mass index (BMI) between Black American middle school students who participated in physical activities in the afterschool program and those who did not. A total of 49 sixth to eight grade middle school Black American students participated in this study, with 27 in the physical activity group. The body mass was calculated by using the Body Mass Index (BMI) Calculator for Child and Teens. No significant difference in BMI was found between the two groups. Since the average BMI score in the group with physical activities was in the healthy category and the group with no physical activities in the overweight category, it may still indicate that physical activity played a role in weight control. However, due to both of the two groups showed a relatively high BMI score, more effective treatments, such as a combination of healthy diet program and physical activity program, are recommended to fight this obesity pandemic in the minority youth groups.

Keywords: *after school program, physical activity, obesity, body mass*

Cite This Article: Lei Guo, and Ardashia K. Peay, "Effect of After School Program with Physical Activity on Body Mass among Black American Middle School Students." *Journal of Physical Activity Research*, vol. 6, no. 1 (2021): 17-20. doi: 10.12691/jpar-6-1-3.

1. Introduction

While obesity has become a growing issue in the United States over the years, childhood obesity has more than tripled in the past 50 years where as the rate of participation in physical activity has declined in those same years for both children and youth [1]. The percentage of children aged 6-11 years in the United States who were obese increased from 7% in 1980 to nearly 20% in 2008, while adolescents aged 12-19 years who were obese increased from 5% to 18% [2]. Of particular concern is the disproportionate effect the obesity epidemic has had on minority children, who have greater prevalence of obesity than is seen in white children [3].

Overweight and obese youth are prone to multiple health problems. Obese youth are more likely to have risk factors for cardiovascular disease such as high cholesterol or high blood pressure [4]. They are also more likely to have pre-diabetes which may develop into diabetes [5] as they climb into adulthood. Also, it is likely that if youth are overweight or obese, they will be overweight and obese as adults as well [6].

Obesity is considered to be related to reduced physical activity. Six to eight-year-old boys have decreased participation in physical activities by 24% while girls have decreased participation by 36% [7]. Opportunities for recess and physical education are disappearing from urban schools and fewer than 1 in 3 teens get an adequate amount of regular physical activity [7].

Physical activity and participation in sport have been linked to a variety of physical and psychosocial health outcomes for youth [6], including antidepressant and anxiolytic effects [8]; increased levels of self-esteem [9]; enhanced future occupational outcomes and reduced social isolation [10]; broad social benefits and skills [11], gaining confidence and learning positive emotions and strategies [12].

In year 2000, a report from the Secretary of Health and Human Services and the Secretary of Education to the President recommended that after school programs should be one means to provide youth with opportunities to be physically active [13]. Children in an after school setting are spending significantly more time in moderate and vigorous physical activity [14]. However, only 8.4 million K-12 children participate in after school programs and at least 15 million kids have no place to go after school [7]. In 2005, 40% of students from kindergarten through eighth grade were in at least one weekly non parental after school program. These students spend 7.3 hours per week in a school or center based after school programs [14].

Mahoney, Lord, and Carryl [15] conducted a longitudinal study to examine the role of after school program participation in the development of child body mass index and obesity status over time. The results of

their study showed that the 22% of children were clinically obese at baseline and 29% at follow-up. Seventy-three percent of the children obese at the baseline were also obese at follow-up. They found that children who were regular after school program participants had significant lower body mass index (BMI) than those who were not.

However, the results are not consistent among the studies on the effect of participating in physical activity in after school programs. For example, Madsen et al. [3] found that while the BMI among other minority children was decreased after attending an after school program, the BMI among Black American Children increased. Dzewaltowski, et al. [16] evaluated the prevention of childhood obesity through increase of physical activity and fruits and vegetables in after school programs. Their study found that there was not much change in BMI between the intervention group and control group.

Moreover, increased obesity-related health disparities should draw more attention toward at-risk populations including racial/ethnic minorities, and those with low socio-economic status who are more likely to become obese. Currently, almost 10% of non-Hispanic black and 7.6% of Hispanic youth in the US aged 2–19 years have severe obesity [17]. Therefore, there is the need to examine the effect of after school programs with physical activity among Black American youth.

2. Methods

2.1. Participants

Two public middle schools in an urban city with mainly Black American population were chosen to participate in this study. The standards for participating in this studies were: 1) Black American Middle school students, 2) Participation in an after school program, and 3) Returning of the consent form signed by the parents.

2.2. Instrumentation

BMI Calculator for Kid and Teen from the CDC was used to calculate the body mass index. The participants' birthdate, height and weight were collected and then put into the BMI calculator. According to CDC BMI chart for children, a child whose BMI is between 18.5 to 24.9 is in the healthy weight range, and below 18.5 is considered underweight. Kids who measure at the 25 to 29.9 are considered overweight, at or above 30 obese.

2.3. Data Analysis

Data were analyzed by using SPSS. Descriptive data, such as total number of male and female, and average BMI, were reported. The Mann-Whitney U Test was used to compare the difference of BMI between the students with and without the physical activity component. The Mann-Whitney U Test was used because of the low number of consented students. To determine a significant difference between BMI of students in physical activity after school programs and those that did not participate in the physical activities, a Mann-Whitney U Test was performed at the .05 alpha level.

3. Results

A total of 49 Black American middle school students were qualified for this study (see Table 1). The participants were 34 sixth graders, 10 seventh graders, and 5 eighth graders. Among them, 27 students were participants of after-school program that enforced physical activities (PA) and 22 students were not participants of after-school program that enforced physical activities (NPA). The student's ages ranged from 11 to 15, of whom were 27 females and 22 males. Among the participants, only 38.8% were considered as healthy in weight (BMI from 18.5 to 24.9). 22.4% were overweight, and 38.8% obese.

The descriptive statistics of the BMI data is shown in Table 2. The participants had a mean BMI=24.594, which is in the BMI category of a normal weight. There was a standard deviation of SD=5.2375. The minimum BMI calculated was 16.2, which were in the BMI category of underweight; and the maximum BMI calculated was 35.3, which were in the obesity category. The average BMI for the participants who engaged in the physical activity component of the after school program was 24.15, which was within a normal weight range. The average BMI for those who were not engaged in the physical activity component was 25.14, which was in the overweight category.

Table 1. Participants Information

	M	F	6th grade	7th grade	8th grade	Total	PA	NPA
N	22	27	34	10	5	49	27	22
Healthy	8	11	11	5	2	19	11	7
Overweight	6	5	6	4	2	11	7	5
Obese	8	11	17	1	1	19	9	10

Table 2. BMI for participants

BMI	N	Mean	SD	Min	Max
All	49	24.594	5.2375	16.2	35.3
PA	27	24.15	5.34	16.2	35.3
NPA	22	25.14	5.17	17.6	34.2

The Mann-Whitney U Test was used to test if there was a significant difference between the two groups in BMI (Table 3). There were 27 students who participated in the physical activities in the after school programs. These students had a mean rank of 23.89 and a sum of ranks of 645. There were 22 students who did not participate in the physical activity component of the after school programs. These students had a mean rank of 26.36 and a sum of ranks of 580. The Mann-Whitney U was 267 with a z=-.603 and a p value of p=.546. Therefore, no significant difference for BMI was found between the two groups.

Table 3.Mann-Whitney U Test Rank Results for BMI

	N	Mean Rank	Sum of Ranks
PA	27	23.89	645
NPA	22	26.36	580

4. Discussion

The purpose of this study was to exam if there was a significant difference in BMI between after school participants who engaged in the physical activity component and those who did not. Although no significant difference was found based on the Mann-Whitney test in this study, the physical activity group showed an average healthy BMI, while the non-physical activity group's average BMI was in the overweight category. This may suggest that physical activity in after school program still played a role in keeping youth in healthy weight.

After school programs serve children and youth of all ages, and encompass a broad range of focus areas including academic support, mentoring, youth development, arts, and sports and recreation. The activities in which children and youth engage outside of school hours are critical to their development, highlighting the need for quality after school programs in all communities. The demand for after school programs is strong. Nearly 10 million children and youth participate in after school programs annually; 10 million in summer camps; and 6 million in 4-H programs [18]. In addition, Schools establish a safe and supportive environment with policies and practices that support healthy behaviors and opportunities for students to learn about and practice healthy eating and physical activity behaviors [2]. Therefore, one possible option for schools to fight and prevent obesity is through the use of after school physical activity programs.

However, activity levels in after school program are well below recommendations. Beets, Huberty, and Beighle [5] observed that children attending after school programs spent approximately 26.6 minutes per day in physical activity, and only 16.5% of them met the 4600 steps per day guideline. Therefore, there is a need for more after school programs that provide a physical activity component. Reviews of after school programs have provided insights into shared features of high quality after school programs, including sport-based programs, from which to suggest best practices and principles to guide program development and implementation [19]. Sports-based youth development programs have an essential role to play in promoting healthy youth who contribute to society. They can provide settings and experiences that enable positive developmental experiences to occur if program organizers, staff, and volunteers are intentional in how they go about implementing these programs. Sport programs must also establish clear goals and use youth development best practices to foster healthy lifestyles and contribute to youth now and in the future for physical fitness habits [20].

There are also after school programs that develop an individual's basic physical skills and personal qualities, such as strength, discipline and self-esteem. The After-School Corporation [21] has a Team Fitness Challenge that comprises of a 10 station circuit of skill-building activities that include rope jumping, ball passing, kicking, hopping, jumping jacks, sit-ups, push-ups, and a relay run. The curriculums for these types of programs are to help students understand the concept of "fitness" and improve their endurance, muscle strength, flexibility, speed, agility, and hand-eye coordination. They have programs for middle and high school students and offer training to incorporate physical activity into after school programs and have eight key lessons when doing so.

Minority groups are disproportionally affected by the obesity epidemic [22]. The prevalence of child obesity in the United States is higher among Hispanic and black than white children [17]. One national cohort study found that black children were more likely to experience early-onset and later-onset obesity than were white children [23]. In this study, although the average BMI for all the participants is in the healthy weight category, it is very close to the over-weight category. Special focus should be on the minority children and youth group in order to prevent more serious weight issues in their adulthood. After school programs have the great opportunity to serve as the leading role in this very urgent need.

In order to increase the effectiveness of the programs, nutritional programs are recommended to be included to fight this obesity pandemic [24]. One of the reasons that no significant difference was found in these two groups could be that physical activity alone was not effective enough in significant weight loss. Along with increasing the physical activity levels, the after school programs should also educate the participants about healthy diet, and provide healthy food/snack for those who could not afford. This is consistent with the general strategy of the World Health Organization (WHO), showing the necessity of effective health programs conducted in school settings combining physical activity and dietary intervention. It is well known that in order to reduce body weight, one needs to have less calorie intake and more calorie consumption. Therefore, the combination of a healthy diet program and increased physical activity should be more effective than using only one of the two approaches.

This study was limited by the relatively small number of participants in each group. It may not be able to generalize to the general population. In the future, more participants could be recruited to the study to see if there is a significant difference in BMI between the two groups or not. This study could be considered as a pilot study and is still valuable to show the current weight condition of the black youth in the after school program and the value of the physical component. More research studies should be conducted in this line to help alleviate the obesity

pandemic in our society, especially in the minority youth groups.

5. Conclusion

No significant difference in BMI was found between the Black American middle school students who participated in physical activities in the afterschool program and those who did not. Since the average BMI score in the group with physical activities was in the healthy category and the group with no physical activities in the overweight category, it may still indicate that physical activity played a role in weight control. However, due to both of the two groups showed a relatively high BMI score, more effective treatments, such as a combination of healthy diet program and physical activity program, are recommended to fight this obesity pandemic in the minority youth groups.

References

[1] Centers for Disease Control and Prevention. (2020). Adolescent and school health: Childhood obesity facts. (2020). Retrieved from http://www.cdc.gov/healthyyouth/obesity/facts.htm.

[2] Centers for Disease Control and Prevention (2011). After-school programs: Making a difference in America's communities by improving academic achievement, keeping kids safe and helping working families. Retrieved from http://afterschoolalliance.org/documents/factsResearch/2011_Outcomes.pdf.

[3] Madsen, K., Thompson, H. R., Wlasiuk, L., Queliza, E, Schmidt, C., & Newman, T. (2009). After-school program to reduce obesity in minority children: a pilot study. *Journal of Child Health Care, 13*(4) 333-346.

[4] Freedman, D. S., Zuguo, M., Srinivasan, S. R., Berenson, G. S., & Dietz, W. H. (2007). Cardiovascular risk factors and excess adiposity, among overweight children and adolescents: The Bogalusa heart study. *Journal of Pediatrics*, *150*(1), 12-17.

[5] Beets, M. W., Huberty, J., & Beighle, A. (2012). Physical Activity of Children Attending Afterschool Programs. *American Journal of Preventive Medicine, 42*(2), 180-184.

[6] D'Agostinoa, E. M., Patela, H. H., Hansena, E., Mathewb, M. S., Nardia, M. I., & Messiah, S. E. (2018). Effect of participation in a park-based afterschool program on cardiovascular disease risk among severely obese youth. *Public Health, 159* (June), 137-143.

[7] After school all-stars. (2011). Retrieved from http://www.after-schoolallstars.org/site/pp.asp?c=enJJKMNpFmG&b=854685.

[8] Landers, D. M., & Petruzzello, S. J. (1994). *Physical activity, fitness and health: Proceedings and consensus statement*. (pp. 868-882). Champaign, IL: Human Kinetics.

[9] Marsh, H. W., & Kleitman, S. (2002). Extracurricular school activities: The good, the bad, and the nonlinear. *Educational Review*, (72), 464-466.

[10] Eccles, J. S., Barber, B. L., Stone, M., & Hunt, J. (2003). Extracurricular activities and adolescent development. *Journal of Social Issues, 59*(4), 865-889.

[11] Weiss, M. R., & Ferrer Caja, E. (2002). *Motivational orientations and sport behavior*. (2 ed., pp. 101-183). Champaign, IL: Human Kinetics.

[12] Scalon, T. K., Babkes, M. L., & Scalon, L. A. (2005). *Participation in sport: A developmental glimpse at emotion*. (pp. 437-456). Mahwah, NJ: Erlbaum.

[13] Bodily, S., & Beckett, M. K. (2005). Making out-of-school-time matter: Evidence for an action agenda. Santa Monica, CA: Rand Education and Rand Labor and Population. Retrieved from http://www.rand.org/pubs/monographs/2005/RAND_MG242.pdf.

[14] Coleman, K. J., Geller, K. S., Rosenkranz, R. R., & Dzewaltowski, D. A. (2008). Physical activity and healthy eating in the after-school environment. *Journal of School Health*, *78*(12), 633-638.

[15] Mahoney, J. L., Lord, H., & Carryl, E. (2005). After-school program participation and the development of child obesity and peer acceptance. *Applied Developmental Science*, *9*(4), 202-215.

[16] Dzewaltowski, D. A., Rosenkranz, R. R., Geller, K. S., Welk, G. J., Hastmann, T. J., & Milliken, G. A. (2010). Hop'n after-school project: An obesity prevention randomized controlled trial. *International Journal of Behavioral Nutrition and Physical Activity*, (790), 1-12.

[17] Ogden, C. L., Carroll, M. D., Lawman, H. G., Frar, C. D., Kruszon-Moran, D., Kit, B. K. et al. (2016). Trends in obesity prevalence among children and adolescents in the United States, 1988-1994 through 2013-2014. Journal of the American Medical Association, 315(7), 2292-2299.

[18] Yohalem, N., Pittman, K., & Edwards, S. (2010). *Strengthening the Youth Development/After-School Workforce: Lessons Learned and Implications for Funders.* Washington, DC: The Forum for Youth Investment and Cornerstones for Kids.

[19] Coatsworth, J.D. & Conroy, D.E. (2007). Youth sport as a component of organized after-school programs. *New Directions for Youth Development*, 115, 57-74.

[20] Perkins, D. F., & Noam, G. G. (2007). Characteristics of sports-based youth development programs. *New Directions for Youth Development*, (115), 75-84.

[21] After-school sports & fitness. (2002). *A TASC Resource Brief*, 1-4.

[22] Knowlden, A. P., Sharma, M. (2013). Systematic review of school-based obesity interventions targeting Black American and Hispanic children. *Journal of Health Care for the Poor and Underserved*, *24*, 1194-1214.

[23] Li, C, Goran, M. I., Kaur, H., Nollen, N., & Ahluwalia, J. S. (2007). Developmental trajectories of overweight during childhood: Role of early life factors. *Obesity, 15*, 760-771.

[24] Glabska, D., Guzek, D., Mellova, B., Zadka, K., Zywczyk, K., & Gutkowska, K. (2019). The national after-School athletics program participation as a tool to reduce the risk of obesity in adolescents after one year of intervention: A nationwide study. *International Journal of Environmental Research and Public Health, 16* (3): 405-422.