The Impact of Aerobic Exercises In Reducing Obesity among African-American Adolescents

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The prevalence of obesity is common among African-American adolescents compared to other races. Obesity has a lingering health effect on this population, and leads to an increased risk of cardiovascular disease, diabetes, and hypertension. Evidence suggests the use of structured moderate to vigorous aerobic exercises for a specific duration reduces total body fat in obese African-American adolescents. Given the evidence, implementation of aerobic exercises can reduce total body fat in obese adolescents, resulting in improved health and decrease comorbidities associated with obesity. Parental involvement and safe neighborhoods should also be considered when promoting aerobic exercises among the African American population.

Key Words: Obesity, body mass index (BMI), percent body fat, aerobic exercise, physical activity, fitness, African American, Blacks, adolescents, teens, teenagers, youth.

Obesity is a serious health issue worldwide. Since 1970, the prevalence of obesity among young children and adolescents has tripled (Centers for Disease Control and Prevention [CDC], 2018b). In the United States, obesity among racial groups, particularly communities of color, is on the rise compared to counterparts. According to the CDC (2018a), the prevalence of obesity among non-Hispanic Blacks is 22.0% compared to 14.1% among non-Hispanic Whites. Current data show that African-American adolescents have second highest rates of obesity (20%), especially those from low socioeconomic status, compared to 14.1% of White adolescents (Tate, Dillaway, Yarandi, Jones, & Wilson, 2015). Tomayko, Flood, Tandias, and Hanrahan (2015) further concluded there is nearly a 12% rate of childhood obesity associated with lower socioeconomic status. Despite the attention from governmental officials, private sectors, and the media on this emerging obesity crisis, rates are still on the rise.

Adolescent obesity is significant because it contributes to increasing morbidity and risk for cardiovascular disease, diabetes, hypertension, and fatty liver disease. Additionally, the effect of obesity on adolescents leads to psychosocial problems, such as poor school performance, poor self-image, social isolation, and depression (Pulgarón, 2013). Obesity does not vanish as adolescent youths become adults, thus becoming a burden to society. The estimated cost of obesity-related health problems is staggering, at around $190 billion dollars, with $14 billion in childhood obesity healthcare costs (Cawley & Mejerhoefer, 2012). Without any significant changes in adolescent obesity, the result will lead to negative consequences, including economic burden and public health disparities.

Although numerous programs are available to tackle obesity, including school- and family-based interventions aimed at improving lifestyles habits, obesity continues to rise among African-American adolescents (Stea et al., 2016). New exercise guidelines suggest that children ages 6 through 17 years should get at least one hour of moderate to vigorous exercise or activity a day, with great emphasis on aerobic exercises, such as swimming, running, or biking. Additionally, exercise activity should include muscle- and bone-strengthening activities, such as climbing activities and playing sports (Piercy et al., 2018).

The purpose of this literature review is to provide evidence of the effectiveness of aerobic exercise programs on reducing obesity among African-American adolescents. It is anticipated that identification of high-level research in support of aerobic exercise for African-American adolescents will aid in reducing obesity rates and provide additional tools that can be used in primary care or schools.

Literature Review

A systematic review search was conducted using CINAHL, MEDLINE, PsychInfo, and Cochrane library data-

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bases. The review conducted focused solely on use of aerobic exercises and physical activity intervention for obesity reduction among African-American adolescents. Key terms used included *obesity, body mass index (BMI), percent body fat, aerobic exercise, physical activity, fitness, African-American or Blacks,* and *adolescent or teen or teenagers or youth*. These terms were searched alone or in combination. The initial search of aerobic exercise or physical activity and obesity yielded 6,590 articles. The search was then narrowed by applying a limiter to include African-American or Blacks, adolescents or teenager. The search was limited to articles published between 2012 and 2017 in the English language, thus reducing the result to 11 articles. Abstracts and cross-references of articles were examined, leading to the exclusion of seven additional articles. Of the final four articles, three articles studied African American, Caucasian, Hispanic, and other races, and one article did not identify races of adolescent participants in the study (see Figure 1).

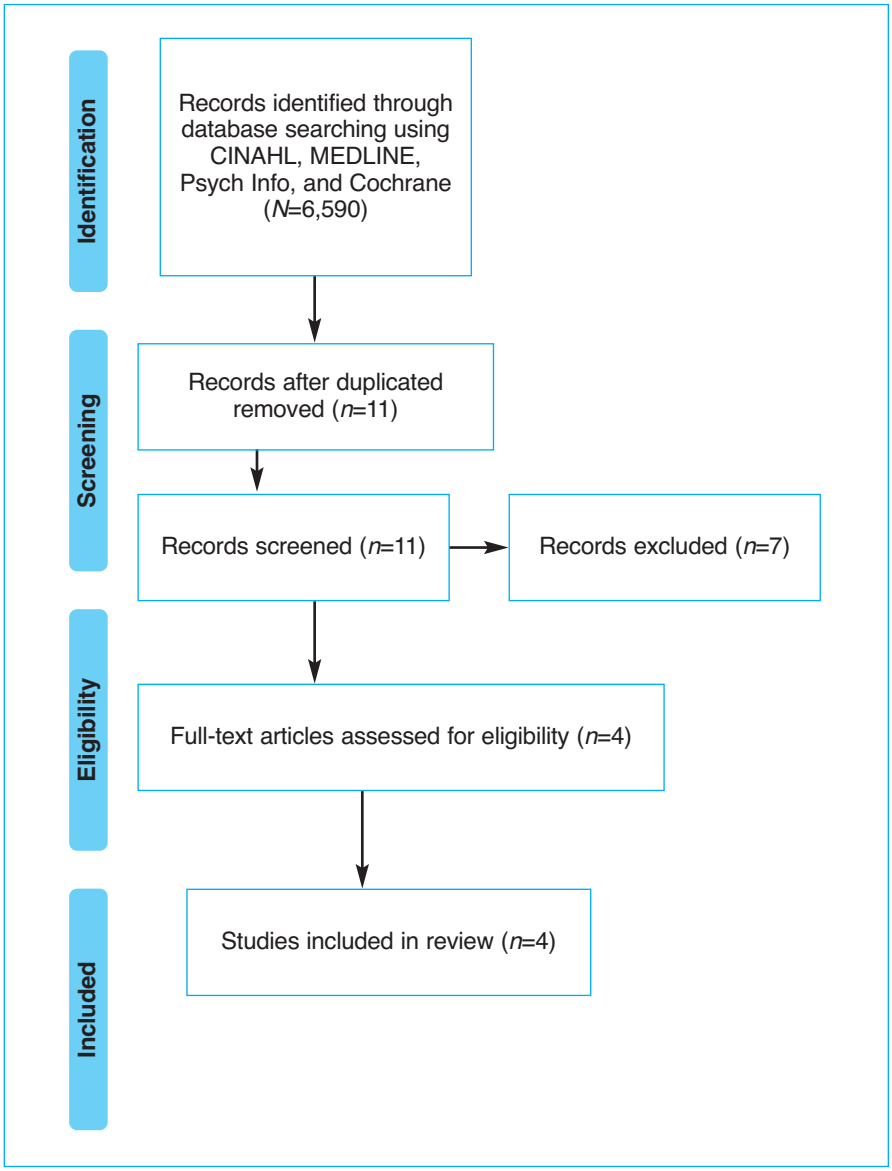
Lee and colleagues (2013) agree that the use of aerobic exercise among obese adolescents reduces visceral adiposity. In their study, 44 African Americans and Caucasian obese girls ages 12 to 18 years were randomized to a program of either aerobic exercise, resistance exercise, or no exercising groups without calorie restriction for 3 months. Results showed that aerobic exercise had a significant effect in reducing the percentage of body fat and visceral adiposity, with -1.70 ± 0.85% and -15.56 ± 7.64 cm^2, respectively, after 3 days per week of participation for 3 months compared to the other two groups. This study supported that the use of aerobic exercise is beneficial among obese adolescents in reducing the total percent body fat and visceral adiposity associated with obesity without losing weight.

Lee and colleagues (2012) conducted a randomized controlled trial (RCT) involving 45 African-American and Caucasian obese boys ages 12 to 18 years randomized to three groups: aerobic exercise, resistance training, or non-exercising group. The study assessed the use of aerobic exercise and resistance exercise training in decreasing abdominal fat. Participants of aerobic exercise and resistance training were required to attend 180 minutes per week of training, whereas no training was required for the non-exercising group. At the conclusion of the interventions, both the aerobic and resistance groups showed a significant ($p<0.05$) reduction in total fat and visceral adiposity compared to the control group. The use of aerobic and resistance exercise for obese adolescents was effective in reducing obesity

Monteiro and colleagues (2015) conducted a quantitative study that randomized 48 obese adolescents into three groups. The concurrent group exercise consisted of aerobic exercise and resistance training, aerobic exercise group, and control group for 20 weeks' study. Of the 48 study participants, 32 participants were randomized into either the concurrent or aerobic group, and 16 were in the control group. Both training groups were supervised for 50-minute sessions, three times a week. The data analysis concluded there was significant statistical reduction in the percentage of body fat in both concurrent training and the aerobic group as compared to no change to the control group ($p=0.042$). In this study, aerobic exercise was superior in reducing obesity.

Ruotsalainen, Kyngäs, Tammelin, and Kääriäinen (2015) conducted a systematic review of RTCs dated from 1950 to 2013 to examine effects of physical activity and exercise on obe-

Figure 1.
Flow Diagram of the Study Selection Process



sity in adolescents using the preferred reporting items for systematic review and meta-analysis (PRISMA) principles. Participants in the study were a combination of African American, Caucasian, Hispanic, and other races. Interventions ranged from supervised exercise programs using a variety of methodologies via face-to-face meetings or Internet or telephone calls. Participants were recruited from a variety of settings, including schools, hospitals, and through the media. The intervention of interest was supervised exercise and promotion of physical activities. Two studies reviewed included dietary restrictions for participants. The examination of studies from the designated years of interest resulted in only 14 studies that were quantitative RCTs. Of the 14 studies included in the analysis, the authors concluded that supervised exercise interventions were most effective in reducing BMI in adolescents.

Christiansen, Qureshi, Schaible, Park, and Gittelsohn (2013) conducted a qualitative research study, including 20 African-American adolescents in an urban setting. Thirteen in-depth interviews were conducted of which 7 were in focus groups to determine perceptions of barriers to physical activities, such as unsafe and crime infested neighborhoods. Participants' perception was that their neighborhood was unsafe, which limits their ability to both play outside and walk to their neighborhood food outlets. Additionally, they reported that because of their environment, it was only acceptable to spend time outdoors when accompanied by an adult. Investigators concluded that addressing the social environment and neighborhood of low-income African-American obese adolescents will facilitate a safe place for physical exercise.

Several studies have shown that low socioeconomic status is highly correlated with higher rates of childhood obesity, rather than ethnicity and race (Rogers et al., 2015). Socioeconomic status plays a major role in health outcomes. African Americans are disproportionally lacking in family education, employment rate, and income per household compared to other races/ethnicities in America, which are the fundamental causes of healthcare disparities. Reeves, Rodrigue, and Kneebone (2016) suggest that Blacks are 7 times more likely than Whites to be low income, live in a high-poverty area, and reside in a jobless household.

In general, African-American adolescents tend to reside in economically disadvantaged areas with unsafe environments. Evidence suggests that violence and neighborhood fear may increase the risk of obesity and metabolic syndrome in the African-American community, most specifically among adolescents. Such environmental factors contribute to decreased physical activity, leading to an increased risk for obesity and other metabolic disparities (Assari, Lankarani, Caldwell, & Zimmerman, 2016).

Unsafe neighborhoods significantly contribute to low outdoor physical activity and poor overall health among African-American adolescents. Interventions and policies to improve neighborhood safety in African-American communities may improve factors contributing to obesity among African-American adolescents, such as neighborhood fear and decreased outdoor physical activity (Assari et al., 2016).

In summary, the literature supports that aerobic exercise is effective in reducing obesity among adolescent and youth with or without dietary restrictions. However, no studies were found regarding the use of aerobic exercise, specifically in the African-American adolescent population for reducing the incidence of obesity. African-American adolescents would also benefit from promotion of aerobic exercise, resulting in a reduction in obesity if implemented.

Limitations and Strengths

The study by Lee and colleagues (2013) was limited to healthy, obese, African-American and Caucasian adolescent girls. Therefore, it is unknown if findings will remain true in other racial groups or unhealthy obese adolescents. Further, these authors did not adjust the baseline differences due to the study's small sample size. An earlier study by Lee and colleagues (2012) was strictly under supervision, and compliance improved in the exercise group; thus, the study cannot be generalized to non-supervised exercise therapy in obese adolescent population who might not have the opportunity to access resources for support. One strength in these two studies was the prescribed exercise regimen, which led to high attendance in exercise groups among obese adolescents (Lee at al., 2012, 2013). Prescribed exercises may bring enjoyment and motivate obese adolescents to participate in the exercise. Monteiro and colleagues (2015) did not randomized the control group due to the anticipation of high dropout rate from the control group. However, because trained staff supervised participants at the designated centers in the study by Monteiro and colleagues (2015), there was a significant decrease in body fat in obese adolescents who received exercise training. Of the studies examined, most were done using randomized selection, which limited the bias.

Implications for Practice

Findings provide evidence for practitioners, community leaders, pediatricians, state or local officials, parents, and physicians that aerobic exercises appear to be efficacious for improving the percentage of body fat in obese adolescents, and this can be effectively applied to obese African-American adolescents. Further, providers need to understand that at least 60 minutes of moderate to vigorous aerobic exercises at least 3 days a week is needed for optimal weight reduction (World Health Organization, 2014). Consideration should be given to the environment where youth reside and that a safe neighborhood is imperative in promoting exercise. The other recommendation for advanced practice nurses is to monitor BMI regularly for all children from birth. This will provide clear evidence of children at risk for obesity, thus allowing early interventions and opportunities for discussing weight changes, especially among African-American children and their families.

Conclusion

Findings from these studies will shed light that the use of aerobic exercise can significantly reduce body fat in obese adolescents, thus improving their overall health and eliminating the risk of developing obesity comorbidities. Because obesity is more prevalent in African-American adolescents, research is needed that will only target this population. The use of aerobic exercises in combination with lifestyle intervention of healthy eating may be necessary for eliciting a healthy improvement in percentage of body fat in obese African-American adolescents.

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