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Original Paper

Mother and Daughter Obesity Intervention: A Case Study

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Abstract

Healthy weight loss is a growing concern in an increasingly sedentary world. This study explored the effectiveness of the implementation of physical activity changes in the lives of three overweight mother daughter pairs from a rural area in Virginia. The intervention was over a six-week period. The physical activity intervention focused on the promotion of safe walking and fitness.

Keywords

Obesity, overweight, family intervention, physical activity

1. Introduction

There has been a dramatic rise in the prevalence of youth and adult obesity in the United States (U. S.) (Craig et al., 2018), demonstrating a strong association with adverse health outcomes (Centers for Disease Control and Prevention (CDC), 2020). Physical inactivity is a major contributor to this epidemic (Popkin, 2003). Unfortunately, most youth do not meet the recommendations for physical activity (Kann, 2018) and most adults are completely sedentary (Pleis & Lucas, 2009; Tucker et al., 2011). The similar patterns of obesity/overweight and unhealthy behaviors among adults and youth are often observed within families.

Evidence suggests a strong parental influence on child weight and lifestyle. Parents have a direct impact on their child's weight status (Golan & Crow, 2004) and obesity-related behaviors (Faith et al., 2012; Golan & Crow, 2004). Parental support predicts the physical activity levels of their child (Hinkley et al., 2008). The current research goal was to examine the effectiveness of a six-week family intervention targeting physical activity among mother and daughter pairs suffering from obesity/overweight.

2. Methods

The current study used a single-subject case study design to examine the effectiveness of an exercise education program. Participants were recruited via healthcare providers or responded to flyers and announcements at community centers and churches. Participants were three mothers (38-39 years old) and their daughters (9-12 years old) from a central rural county in Virginia who were all obese and/or

overweight.

All participants completed a six-week physical activity promotional program. The program met once per week at a local community center. At baseline, participants completed a consent/assent form, a demographic questionnaire, and participated in objective measures of their weight status.

Physical Activity Promotional Program

The first meeting with the three mother/daughter pairs (six participants) began with a welcome meeting to brief participants about the program and record baseline measurements. During the welcome meeting, mother and daughter participants were provided a pedometer and log book to track their physical activity. Participants met again after seven days from baseline measurement. Participants were given information booklets containing the advised physical activity program. Mothers and daughters were then guided through the circuit training exercises illustrated in the booklet provided to them. Meetings were held weekly over the next four weeks and all measurements were assessed. The group discussed challenges and successes with the physical activity program. The final meeting (week six) included final recommendations and measurements.

Data Analysis

A single subject design examined each participant's physical activity behavior and weight loss changes throughout the six-week intervention. Demographic variables described participants according to their age, ethnicity and body mass index (BMI). Participants' weekly physical activity and BMI were reported each week throughout the six-week program.

Measurement

Participants' weight status and physical activity were measured at baseline and each week for the next five weeks. Participating mothers reported the age and ethnicity for their daughter and themselves. Weight status was evaluated by directly measuring participants' height and weight at baseline and each week thereafter. Mother BMI was classified according to the CDC (2020) guidelines for weight status. Daughter BMI was categorized with consideration of age and gender (CDC, 2020).

Participants' physical activity was measured subjectively and objectively. All participants individually completed a physical activity survey, whereby they recollected their daily activity during the previous week. Each week, mothers and daughters recorded their pedometer readings in a log book at the end of each day. Mothers were asked to assist their child with the morning and evening recordings. Pedometer output was averaged over each week.

3. Results

Results are organized specific to each participating mother and daughter. Participants' weekly reported walking behavior, weekly recorded pedometer output, and weight status are reported below.

Descriptives

Mother A (age 38) and her daughter A (age 12) were African Americans. Both mother and daughter initially reported participating in minimal physical activities. Mother B (age 39) and her daughter B

(age 12) were African American/Hispanic. Mother B reported doing some walking prior to treatment but spent most of her time working. Her daughter reported doing minimal walking. Mother C (age 39) and her daughter (age 9) were Native American. Prior to intervention, both participants reported some walking and biking. Daughter C also reported occasional swimming and activities within her school's physical education class.

Participants' Pedometer Recording

All participants maintained a pedometer output log during baseline measurement and throughout the six-week treatment. Each participant recorded four to seven days of their output which was averaged into a weekly score. Results are reported below.

Mother A's walking steps increased from 7,442 at baseline to 8,908 during treatment week one; however, daughter A's walking decreased from 6,398 steps to 4,387 steps. During week two, both participants' walking steps decreased below baseline but then consistently increased each week thereafter. Overall, mother A increased her walking steps by 19% from baseline to the last week of treatment and her daughter increased by 9%.

Mother B and daughter B's walking increased by more than 1,000 steps from baseline to treatment week one. However, while mother B's steps continued to increase during week two (7,984), daughter B's steps decreased below her baseline (4,608). During week three daughter B's walking increased above baseline to 7,843 steps, indicating an overall 29% increase. Mother B's walking also decreased slightly to 5,655 steps, but sharply increased to 10,297 the following week. Finally, during the last two weeks of treatment mother B's steps were consistently above baseline reflecting an overall increase of 21%.

Mother C and daughter C consistently increased their walking steps each week. Specifically, mother C increased by almost 2,000 steps from baseline to week one. Furthermore, despite a small decrease during week five she increased by 1,000 steps or more each week throughout treatment. Ultimately, due to treatment mother C increased her steps by 60% from baseline to the last week of treatment. Similarly, daughter C consistently increased her walking steps each week. From baseline her steps dramatically increased from 4,404 to 11,223 and remained above 12,000 steps throughout the rest of treatment. Overall, daughter C increased her steps by 74% from baseline to the final week of treatment.

Weight loss

Mother A and daughter A each lost 9 lbs. during the first week following treatment. Mother A continued weight loss, ending the program with a total weight loss of 9.5 pounds. After a small regain during week two, daughter A had a total weight loss of 7 lbs. At baseline, mother A had a BMI of 38.4 and after six weeks of treatment reduced it to 36.9. Daughter A began treatment with a BMI of 43, which considerably exceeded the 85th percentile. At the end of treatment her BMI reduced to 41.8; however, remained above the 85th percentile.

Mother B and daughter B lost weight between baseline measurement and treatment week one. Specifically, mother B had a weight loss of 8 pounds following treatment and daughter B lost 0.5

pounds. During week two, daughter B's weight remained consistent while her mother lost 2 additional pounds. However, during week three both participants regained weight. Specifically, daughter B regained the 0.5 pounds she initially lost and her mother regained a total of 6 pounds. In the final three weeks, daughter B remained consistent until week 6 when she was able to drop 0.5 pounds. Mother B was successful in losing 6 pounds in the final two weeks of treatment, putting her total weight loss at 10 pounds. At baseline, mother B's BMI was 47.0 reducing to 45.7 by the end of treatment. Daughter B began treatment with a BMI of 33.3 and was only able to reduce it to 33.1, which remained considerably above the 85th percentile.

Mother C and daughter C dropped weight between baseline and treatment week one. Specifically, mother C lost 4 pounds and her daughter lost 2 pounds. During treatment week two, mother C again lost weight by dropping 2 pounds; however, her daughter regained. Throughout the rest of treatment mother C continued to lose weight, dropping 5.5 pounds during week four losing a total of 14 pounds by the end of treatment. Daughter C's weight loss continued to vary, but at the end of intervention she was able to maintain a 2-pound weight loss. At baseline, mother C's BMI was 40.4 decreasing to 38.2 by the end of treatment. Daughter C began treatment with a BMI of 22, which plotted above the 85th percentile. At the end of treatment, Daughter C reduced her BMI to 21 moving her just below the 85th percentile mark.

4. Discussion

Suggestions for future research is to include a larger participant population, expanding the overall demographics, and lengthening the duration of the study. With only six participants who were all from the same geographical area, having more participants with a broader range of location is crucial for the generalization of the results. While this particular study looked into the mother and daughter relationship exclusively, widening this research to males in the future would provide more data as well. Lastly, extending the time frame of the study would help measure and record data to look for any positive long-lasting results.

Currently, research is lacking on how influencing behavior change can aid in bettering health, particularly in the area of weight loss among children and families. As the obesity epidemic continues to grow, it is more important now than ever to find new and effective ways to achieve the goal of long-term obesity reduction. These results could lend progress to future physical activity programs focused on families and the prevention and recovery from overweight and/or obesity.

References

Ainsworth, B. E., Bassett, D. R., Strath, S. J., Swartz, A. M., O'Brien, W. L., Thompson, R. W., Jones, D. A., … Kimsey, C. D. (2000). Comparison of three methods for measuring the time spent in physical activity. *Medicine and Science in Sports and Exercise, 32,* 457-467.

Centers for Disease Control and Prevention. (2020). *CDC COVID Data Tracker*. https://covid.cdc.gov/covid-data-tracker/#cases_casesper100klast7days

Epstein, L. H., Wing, R. R., & Valoski, A. (1985). Childhood obesity. *Pediatric Clinic of North America*, *32*, 363-379.

Faith, M. S., Scanlon, K. S., Birch, L. L., Francis, L. A., & Sherry, B. (2012). Parent-child feeding strategies and their relationships to child eating and weight status. *Obesity Research*, *12*, 1711-1722. https://doi.org/10.1038/oby.2004.212

Geller, K. S., & Dzewaltowski, D. A. (2009). Longitudinal and cross-sectional influences on youth fruit and vegetable consumption. *Nutrition Reviews*, *67*(2), 65-76. https://doi.org/10.1111/j.1753-4887.2008.00142.x

Golan, M., & Crow, S. (2004). Parents are key players in the prevention and treatment of weight-related problems. *Nutrition Reviews*, *62*(1), 39-50. https://doi.org/10.1111/j.1753-4887.2004.tb00005.x

Hales, C. M., Fryar, C. D., Carroll, M. D., Freedman, D. S., & Ogden, C. L. (2018). Trends in obesity and severe obesity prevalence in US youth and adults by sex and age, 2007-2008 to 2015-2016. *JAMA*, *319*(16), 1723-1725. http://doi.org/10.1001/jama.2018.3060

Hinkley, T., Crawford, D., Salmon, J., Okely, A. D., & Hesketh, K. (2008). Preschool children and physical activity. A review of correlates. *American Journal of Preventive Medicine*, *34*(5), 435-441. https://doi.org/10.1016/j.amepre.2008.02.001

Kann, L., McManus, T., Harris, W. A., Shanklin, S. L., Flint, K. H., Queen, B., Lowry, R., … Ethier, K. A. (2018). Youth risk behavior surveillance — United States, 2017. *Morbidity and Mortality Weekly Report – Surveillance Summaries*, *67*(8). https://doi.org/10.15585/mmwr.ss6708a1

Pleis, J. R., & Lucas, J. W. (2009). Summary health statistics for U.S. adults: National Health Interview Survey, 2007. *Vital Health Stat Series*, *10*, 1-159.

Tucker, J. M., Welk, G. J., & Beyler, N. K. (2011). Physical activity in US adults: Compliance with the physical activity guidelines for Americans. *American Journal of Preventive Medicine*, *40*(4), 454-461. https://doi.org/10.1016/j.amepre.2010.12.016