

# Healthy Lifestyle Fitness Camp: A Summer Approach to Prevent Obesity in Low-Income Youth

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## ABSTRACT

**Objective:** To examine the effect of participation in a summer camp focused on nutrition and fitness among low-income youth.

**Methods:** In 2011–2012, overweight and obese youth (n = 126) from Fresno, CA participated in a free 6-week summer program, *Healthy Lifestyle Fitness Camp* (HLFC), which included 3 h/wk of nutrition education provided by University of California CalFresh and 3 hours of daily physical activity through Fresno Parks and Recreation. The researchers used repeated-measures ANOVA to examine changes in weight, waist circumference, and waist-to-height ratio (WHtR) between HLFC and the comparison group (n = 29).

**Results:** Significant pre–post WHtR reductions were observed in HLFC: 0.64 to 0.61 ( $P < .001$ ). In addition, WHtR reductions were maintained in HLFC 2 months afterward whereas an increase occurred in the comparison group ( $P < .007$ ).

**Conclusions and Implications:** Understanding the impact of nutrition- and fitness-themed summer camps during unstructured months of summer is integral to obesity prevention among low-income youth.

**Key Words:** summer day camp, low income, nutrition education, physical activity, childhood obesity (*J Nutr Educ Behav.* 2016;48:208–212.)

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## INTRODUCTION

School, after-school, and clinic-based programs have successfully improved the weight status and/or cardiovascular health of youth.<sup>1–8</sup> However, these successes can be undermined during the summer when youth regain weight in the absence of structured programs.<sup>9–12</sup> Although the prevalence of overweight and obesity, defined as body mass index (BMI)  $\geq$  85th percentile, has decreased in children aged 2–5 years, it exceeds

34% in youth aged 6–11 and 12–19 years<sup>13</sup> and remains a major public health concern.<sup>14–17</sup> Moreover, ethnic and racial disparities persist. Among youth aged 2–19 years, the prevalence of overweight and obesity is highest among non-Hispanic black girls (36.1%) and Hispanic boys (40.7%).<sup>13</sup> These differences emphasize the importance of programs targeting high-risk youth, especially during the summer.<sup>13</sup>

Over the summer, youth may experience greater than expected increases

in weight and waist circumference<sup>9–12</sup> and decreases in moderate physical activity.<sup>18</sup> Changes in diet when low-income youth are on vacation may contribute to an increase in BMI over the summer<sup>19</sup> because youth are away from healthier school cafeteria options. Regardless of socioeconomic status, youth who spend most of their vacation under parent care gain the most weight and report the least activity.<sup>12</sup> Independent of caregiver arrangement, youth at the highest BMI percentiles gain significantly more weight during summer than do youth at lower BMI percentiles.<sup>10,12,20–22</sup>

Prevention of excess weight gain and abdominal adiposity is important to lower the risk of chronic diseases, including type 2 diabetes mellitus and cardiovascular diseases.<sup>23</sup> Indicators of risk for cardiovascular disease in youth include elevated weight, waist circumference, and waist-to-height ratio (WHtR)  $\geq$  0.5.<sup>10</sup> This ratio is comparable across ethnic groups and pubertal stages and is a sensitive indicator of abdominal adipose accumulation and metabolic imbalances.<sup>24</sup> Many childhood obesity intervention studies report only changes in weight and BMI, which may not capture

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decreases in fat mass that are offset by increases in muscle mass. Inclusion of WHtR as an outcome is worthwhile because abdominal adipose accumulation is an important factor in future adulthood disease risk.<sup>25</sup>

Nutrition- and fitness-themed summer camps targeting overweight youth may have an important role in preventing excess weight gain that occurs during vacations.

The *Healthy Lifestyle Fitness Camp* (HLFC) was a free community-based summer camp in Fresno, CA for low-income overweight and obese youth aged 9–14 years. In 2010, a pilot study reported HLFC's success in teaching campers to like more fruits and vegetables.<sup>26</sup> A few studies have examined the effect of nutrition- and fitness-themed summer camp programs for low-income families on preventing health risks in overweight youth.<sup>4,5,7,27,28</sup> Because summer care options can be limited in low-income communities owing to cost, more research is needed to determine whether expanding summer programs might contribute to preventing childhood obesity.<sup>5</sup> Therefore, the purpose of this study was to determine whether low-income youth in HLFC, compared with those in a camp not focused on nutrition and fitness, exhibit greater pre–post changes in weight, waist circumference, and WHtR after the 6-week camp.

A health-focused summer camp can be sustainable through university–community partnerships involving Cooperative Extensions and local parks and recreation departments.

## METHODS

### Study Design

In 2011 and 2012, the researchers conducted a quasi-experimental study to determine whether participation in HLFC could improve anthropometric measurements in overweight and obese youth. The comparison group (CG) attended a camp that was not focused on nutrition and fitness. The City of Fresno Parks and Recreation operated both camps within the same neighborhood, with no overlap in participation.

### Participants and Recruitment

The Institutional Review Board at University of California, Davis approved the protocol for the study. All procedures aligned with standards of the Helsinki Declaration of 1975, revised 2008. The sample size calculation was based on 2010 HLFC pilot data. The study required 20 participants per group to have 80% power to detect a minimal change of WHtR of 0.03 among youth, adjusting for attrition.

Fresno Parks and Recreation HLFC staff recruited campers using radio, fliers, and visits to local schools advertising a free-of-cost camp that focused on summer fun, nutrition, and fitness. To be eligible for the study, youth met the following criteria: (1) they resided within low-income neighborhood served by the camp<sup>29</sup>; (2) they were aged 9–14 years; (3) they had a BMI z score  $\geq +1$  and/or WHtR  $\geq 0.5$ <sup>10,25</sup>; (4) they had no metabolic disease as determined by medical examination; and (5) 1 parent or caregiver was willing to participate in weekly education nights. Study-eligible youth, who had been wait-listed for HLFC and subsequently enrolled in the comparison camp, were recruited for the CG. Children signed assent forms and parents signed consent forms.

### Intervention

The HLFC was a 6-week summer day camp. The aim of the program was to promote diet and physical activity that adheres to the Dietary Guidelines for Americans.<sup>30</sup> Campers partici-

pated in 3 hours daily of moderate physical activity taught by Fresno Parks and Recreation staff and trained fitness professionals,<sup>18</sup> including sports, structured high-intensity games, fitness workouts (sit-ups and push-ups), and dancing (Zumba). The Summer Lunch Program provided free snacks (eg, graham crackers, nut butter, apples, carrots, and low-fat milk). Weekly, the campers participated in 3 hours of nutrition education and a Friday field trip. The CG consisted of games (physically active and sedentary), arts and crafts, and some non-health focused cooking activities. Both groups participated in Friday trips.

A team of 4 University of California CalFresh educators taught the nutrition lessons using the *EatFit* curriculum, which was designed for middle school students and based on Social Learning Theory.<sup>31</sup> Key obesity prevention messages included eating more fruits and vegetables, decreasing sugar-sweetened beverages, eating healthier types of fats, and increasing daily moderate to vigorous physical activity. Parents also received nutrition education and a physical activity component in a weekly class, using *Eating Smart•Being Active*,<sup>32</sup> which is designed for low-income families and delivers the same messages.

### Instruments

The researchers collected anthropometric and demographic data 2 weeks before and after camp, and then 2 months afterward. Five University of California Program Educators, federally known as the Supplemental Nutrition Assistance Program (SNAP), who were different from the original team, attended standardization training led by the first author to ensure precision and accuracy in collecting measurements.<sup>33</sup> Subjects were weighed and measured in light summer clothing. Waist circumference was measured using a Seca 201 ergonomic circumference measuring tape, which is a retractable cinching tape. Heights were measured using a portable adult/child stadiometer (Model PE-AIM-101). Weights were measured using a portable digital scale (Seca 813 Electronic Flat Scale, Chino, CA).

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