SF FUERTE: PHYSICAL OUTCOMES AND FITNESS MEASURES IN A MULTI-DISCIPLINARY APPROACH TO YOUTH AND ADOLESCENT OBESITY

A thesis submitted in partial fulfillment of the requirements

For the degree of Master of Science in Kinesiology

By

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To my mom and my yaya, I cannot thank you enough.

You are my angels.
TABLE OF CONTENTS

Signature Page ii
Dedication iii
List of Tables vi
List of Figures vii
Abstract viii

Chapter 1: Introduction 1
Chapter 2: Methods 2
  Pilot Study 2
  Participants 3
  Intervention Procedures 4
  Statistical Analysis 12
Chapter 3: Results 13
  Descriptive Characteristics and Attendance 13
  Body Composition 16
  Cardiovascular Fitness and Aerobic Capacity 18
  Muscular Strength and Endurance 20
  Flexibility 21
Chapter 4: Discussion 23
  Limitations 25
  Results and Physical Fitness Testing 27
  Future Interventions and Parental Involvement 29
Conclusion 32
Chapter 5: Literature Review 33
  Obesity 33
FIGURES

Figure 1. Attendance Per Day 14
Figure 2. Student Adherence 15
Figure 3. Final Participant Adherence 15
Figure 4. Body Mass Index 17
Figure 5. % Body Fat 18
Figure 6. PACER 19
Figure 7. Aerobic Capacity 19
Figure 8. Curl-Up Test 20
Figure 9. Push-Up Test 21
Figure 10. Trunk Lift 22
Figure 11. Sit-and-Reach 22
Figure 12. 2010-2011 PFT San Fernando Students Meeting HFZ 43
Figure 13. 2010-2011 PFT LAUSD Students Meeting HFZ 44
ABSTRACT

SF FUERTE: PHYSICAL OUTCOMES AND FITNESS MEASURES IN A MULTI-DISCIPLINARY APPROACH TO YOUTH AND ADOLESCENT OBESITY

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Master of Kinesiology

Youth and adolescents are increasing body composition measures, increasing sedentary behaviors and decreasing their levels of physical activity. These factors are contributing to childhood obesity and may lead to type II diabetes and other preventable chronic diseases. The City of San Fernando has a high rate of overweight youth and adolescents and lack of resources for physical activity and nutrition education.

The purpose of this study is to investigate whether a multi-disciplinary intervention will improve physical outcomes and fitness measures among youth and adolescents in a predominantly Latino community. We conducted pre and post physical fitness evaluations using the Cooper Institute FITNESSGRAM test battery, among 59 Latino, male and female, youth and adolescents. Primary outcomes were body composition, aerobic capacity, muscular fitness, and flexibility. Results were statistically insignificant due to a final sample size of 5 youth and adolescents.

In conclusion, more research needs to be done to determine whether an 8-week multidisciplinary intervention will have positive results in preventing obesity within low-income Latino youth and adolescents.
Introduction

In the last three decades the number of overweight and obese youth and adolescents has increased while physical activity levels have decreased creating a nationwide public health issue (Loftin et al., 2000; Singh, 2009; Stovitz, 2008). Lack of physical activity and a hyper-caloric diet are contributing to overweight and obesity conditions across all genders and ethnicities leading to chronic diseases such as type II diabetes, metabolic syndrome and cardiovascular disease. Latinos from underserved communities face greater health disparities than their Non-Latino counterparts because additional factors are associated with pediatric obesity such as socio-economic status (income and educational attainment), access to nutritious foods and safe environments for physical activity (Singh et al., 2009).

Physical activity provides important health benefits and is a leading intervention in the battle against obesity (Meredith & Welk, 2007). Promoting and engaging youth and adolescents in regular physical activity through accessible community-based interventions can improve health related fitness components such as body composition, aerobic capacity, muscular strength and endurance and flexibility. The purpose of SF FUERTE was to investigate whether an 8 week multi-disciplinary intervention program including physical activity, and nutrition education, would improve physical outcomes and fitness measures among youth and adolescents in a predominantly Latino community. Through this multi-disciplinary approach to obesity, it is projected that youth and adolescents will achieve healthy fitness zone levels as defined by the Cooper Institute FITNESSGRAM over the course of an 8-week exercise and nutrition intervention.
Methods

Pilot Study

Tigers in MOTION (Moving Often Together and Improving Our Nutrition, T.I.M.) was an after-school physical activity program held at San Fernando High School (SFHS). T.I.M. was administered through the L.A.U.S.D. non-profit after-school organization, EduCare, who provides free after-school programming throughout L.A.U.S.D. schools. As volunteers of EduCare, four California State University Northridge (CSUN) Kinesiology graduate students designed and implemented an after-school fitness club tailored to the needs and interests of current SFHS students. With assistance and support from the SFHS Associated Student Body (ASB), a needs assessment survey was administered and outreach and marketing strategies were identified. The program offered on behalf of EduCare operated Monday through Thursday for 60-minutes and provided group fitness classes, non-traditional sports, lifestyle components and nutrition education led by CSUN graduate and undergraduate students. This after-school class was designed to attract adolescents with a variety of activities and to improve their knowledge of physical activity and exercise.

The T.I.M. afterschool fitness club faced many challenges such as student adherence, identifying a permanent meeting location, and recruiting volunteers. On average, a daily maximum of 4-5 students attended T.I.M. and with only 1 or 2 returning attendees the program consistently had new students. The low attendance and retention numbers made it difficult to establish rapport with the SFHS student body and gain their commitment to the after school fitness class. Identifying a permanent meeting location at SFHS was also a limiting factor because facility usage had to be coordinated between the boys and girls basketball team and
T.I.M. Priority was often given to the SFHS basketball teams resulting in lack of a permanent meeting location. Additionally, recruiting student volunteers for the T.I.M. pilot study was unsuccessful and though many CSUN Kinesiology undergraduate students showed interest in the proposed T.I.M. program the time between initial recruitment efforts and actual program implementation was too long. By the time of the initiation of T.I.M. many interns were unavailable due to schedule conflicts between class and T.I.M. The T.I.M. program leaders anticipated similar challenges if programming continued into the fall 2011 semester and as a result a summer program was adopted in the hopes of addressing the problems mentioned above.

The logic behind implementing a summer community-based fitness intervention versus continuing an after-school program at SFHS in the fall was to eliminate all barriers associated with student and volunteer participation, i.e., in the summer months, SFHS students and CSUN students would have less time constraints. Student outreach and volunteer recruitment began 10-weeks prior to the projected summer start date and program hours were established as 9:30 a.m. to 11:00 a.m. to accommodate the CSUN student volunteers assisting with an adult fitness program, “100 Citizens”, which was being conducted at a different site in San Fernando. Based on the spring pilot SF FUERTE program, marketing of the program to SFHS students, intern recruitment, facility usage, and participant retention rates were key factors addressed prior to the summer program initiation.

Participants

Male and female youth and adolescents between the age of 7 and 18 years participated in the 8-week community-based intervention in the City of San Fernando. Participants were considered eligible for the intervention if they 1) attended a school within the Los Angeles
Unified School District (LAUSD), and 2) completed the EduCare medical history questionnaire (Appendix A). Participants were excluded from the intervention if they experienced any medical issues in the past six months withholding them from moderate to vigorous physical activity. If all requirements were cleared and approved, the participants and their parents or guardians completed and signed the EduCare parental consent and registration form (Appendix B). Participants and parents or guardians were required to return all signed documents to a lead instructor.

**Intervention Procedures**

**Participant Recruitment**

Youth and adolescents were recruited over 10-weeks in the spring 2011 school semester utilizing the following methods:

- Through EduCare staff at SFHS, flyers were distributed to after-school clubs.
- Distribution of flyers at San Fernando High School during lunch and school sporting events.
- Banners with SF FUERTE information posted along SFHS cafeteria walls and halls.
- The Associated Student Body.
- Bi-monthly in-class presentations and special events such as pep-rallies, TigerFest and parent-teacher nights.
- The Tigers In MOTION pilot study.
- Presentation at the 100 Citizens program, an adult summer fitness program at San Fernando Recreation Park.
- The Health and Fitness Expo held at Las Palmas Park in the City of San Fernando.
• Local businesses, community centers and libraries.
• Word of mouth via students and teachers.

At the 100 Citizens program a brief presentation was given and flyers distributed in hopes of recruiting the participating women’s children. Youth and adolescents interested in the summer program were instructed to provide their name and contact information on a sign-up sheet. One week prior to program commencement interested individuals were contacted and reminded of the start date and time and instructed to bring a parent or guardian to fill out necessary paperwork.

Volunteer Recruitment

In hopes of addressing the limitations of the T.I.M. pilot study, an amplified volunteer recruitment strategy was necessary. A 1-minute promotional video intended for outreach and recruitment was made near the end of the T.I.M. pilot study showcasing the SF FUERTE fitness program including location, dates, and time. The video was a demonstration of muscular and cardiovascular training modalities used throughout the fitness program. Volunteers were recruited from the California State University Northridge Kinesiology Department utilizing the following methods:

• Fliers posted along Kinesiology Department walls.
• Kinesiology faculty and Kinesiology Majors Club emails and referrals.
• A series of in-class presentations showcasing the SF FUERTE promotional video.
• Social media via Facebook and word of mouth.
• An introductory meeting held spring 2011 semester.

Overall, 25 undergraduate students committed to the summer SF FUERTE intervention and assumed the assistant instructor roles. In addition, 3 CSUN graduate students, 2 representing
the Kinesiology Department and 1 representing the Nutrition, Dietetics & Food Science Department, designed, organized and operated the summer fitness intervention as lead instructors.

*Equipment Procurement*

Exercise and fitness testing equipment was made available by:

- Borrowed equipment from California State University Northridge, Kinesiology Department (medicine balls, soccer balls, cones, speed ladder, hurdles, resistance bands, jump-ropes, Lange skinfold calipers, mats, metronomes).
- EduCare (medicine balls, mats, jump-rope)
- Borrowed equipment from Kinetic Spark Fitness (dynamax ball, battling rope, kettle-bell, tornado ball).
- Borrowed equipment from Kinesiology faculty professor, Dr. Kim Henige (TRX® suspension).
- Graduate student personal contributions (digital weight scale, yard stick, measuring tape, FITNESSGRAM® software).

*Daily Protocol*

The intervention consisted of two components, an aerobic and resistance training exercise and a nutrition and lifestyle education component. The aerobic and resistance training component operated five days a week, Monday through Friday, for approximately sixty minutes at the Ritchie Valens Recreation Center located in the City of Pacoima, adjacent to the City of San Fernando and approximately 5 blocks from SFHS. The CSUN Food Science and Dietetics graduate student conducted the Nutrition and lifestyle education component Tuesdays and
Thursdays for approximately twenty minutes with assistance from volunteers. All nutrition lesson plans were approved by the Nutrition Department.

The structured exercise program incorporated progressive resistance exercises two days per week and cardiovascular endurance exercises most days of the week. The goal of each class was to have the majority of students engaged in moderate to vigorous physical activity for 45-60 minutes to induce the physiological stresses necessary for health-related adaptations such as improving body composition, and improving cardiovascular and muscular fitness. To ensure a moderate to vigorous intensity had been reached, participants were taught and instructed to check their heart rate to objectively determine at what level of intensity they were exercising and Borgs’ ratings of perceived exertion scale (appendix C) was used to subjectively determine participant intensity.

Daily fitness classes operated for 90-minutes and included a 10-minute warm-up, 10-minute cool down, and 60-minute age-appropriate aerobic conditioning or strengthening exercises led by Kinesiology undergraduate students supervised by graduate students. At each session participants were required to sign in with a lead instructor prior to engaging in any physical activity and a brief introduction to the days activities were discussed. The warm-up consisted of low-intensity dynamic movements to increase the body’s temperature, promote circulation, and safely prepare the body for moderate to vigorous physical activity. Warm-up exercises incorporated large-muscle groups in addition to movements that framed the day’s workout. Exercise duration and intensity level depended on individual participant fitness levels. To avoid fatigue and overload, modifications were made for those of low-fitness level. A number of exercises and drills were used including the following:
• Resistance training (body-weight, resistance bands, medicine balls, and battling ropes)
• TRX® suspension training
• ZUMBA®
• Cardio-Kickboxing
• High-intensity interval training (HIIT)
• Circuit-Training
• Yoga
• Agility drills and sport specific training.
• Obstacle courses and fitness challenges.

Mondays and Wednesdays were a combination of aerobic conditioning and resistance training. A group warm-up followed sign-ins and lasted approximately 10-12 minutes followed by instruction on the exercises and drills and proper use of equipment if any. Participants were then divided into groups by age and fitness level and assistant instructors were designated to a fitness station and instructed to lead a group of participants through the prescribed exercises using the available equipment while modifying for age and fitness level. Participants rotated from station to station every 8-10 minutes after being cued by a lead instructor. For safety and dehydration prevention, participants were given a 3-5 minute water break every 20-minutes of physical activity or as needed and water and cups were provided daily.

Tuesdays and Thursdays generally focused on aerobic conditioning in which youth and adolescents had the option of participating in a variety of pre-selected group fitness classes ranging from cardio kickboxing, ZUMBA®, and sports and agility drills. Each group fitness class lasted approximately 25 minutes, with a 3-5 minute water break in between or as needed. The
The second session began promptly after the water break. Zumba® and cardio kickboxing classes were led by a certified group fitness instructor and agility drills were led by assistant instructors. In addition, a 20-minute nutrition education session was conducted prior to physical activity.

Fridays consisted of fitness challenges and obstacle courses in which participants were randomly divided into teams. Fitness challenges and obstacle courses were designed to challenge aerobic and muscular endurance by creating complex drills requiring participants to engage in short bouts of vigorous physical activity.

Following exercise activities, an assistant instructor led a 10-minute cool down. The cool down consisted of yoga and flexibility exercises and low-intensity drills. Throughout the cool down participants were asked for feedback on the activities. Were the exercise drills too hard, somewhat hard or easy? Did they need more rest? And lastly, they were briefed on the possibility of experiencing delayed onset muscle soreness and told to stretch regularly.

**Instruments**

Anthropometric methods were used to measure height, weight, and body composition.

- Height was measured to the nearest inch in bare feet standing upright against a wall using a tape measure.
- Weight was measured to the nearest pound, lightly dressed, using a digital scale.
- Body composition was measured to the nearest .5mm using Lange skinfold calipers at the (R) triceps and (R) medial calf site, the average of three measurements per site was recorded.
- Body height and weight were used to calculate body mass index (BMI) level, as a component of body composition.
Cardiovascular fitness was assessed using the FITNESSGRAM® test battery, i.e. the PACER 20-meter shuttle run test. The PACER is a maximal multi-stage test designed to assess aerobic fitness in youth and adolescents. The objective is to run as long as possible back and forth across a 20-meter space at a specified pace that increases in speed and intensity each minute (Meredith & Welk, 2007). Participants were familiarized with the pace and procedure prior to data collection. Results were recorded as the total number of laps completed. If the participant failed to reach the line twice at the specified pace, they were instructed to stop.

Muscular fitness and flexibility was assessed using the FITNESSGRAM® test battery, i.e. the curl-up, push-up, trunk lift, and sit-and-reach. The curl-up test evaluated abdominal strength and participants were instructed to lay on their backs with knees bent and feet unanchored. Curl-ups were set to a specified cadence (1 curl-up every 3-seconds) using metronomes. The push-up test evaluated upper body strength and participants were instructed to lower their body to a 90-degree elbow angle and push up while set to a specified cadence (1 push-up every 3-seconds). For both the curl-up and push-up participants completed as many repetitions as possible while maintaining correct form. The trunk lift evaluated trunk strength and flexibility and participants were instructed to lie on their stomachs and raise their upper-body off the ground while keeping hips and legs in contact with the floor. Hamstring flexibility was not measured using the FITNESSGRAM® equipment and the following modification was instituted. A yardstick was placed on the floor and taped at the 9-inch mark. Participants sat on the floor with the yardstick between their legs and the “zero” end of the yardstick nearest to their body with feet ten to twelve inches apart and heels even with the tape at the 9-inch mark. Participants then stretched forward (keeping back straight) as far as possible and held position for 1-second and the best of three scores was recorded.
**Evaluation**

Fitness testing was held on Friday of the first and last week of programming and required the entire 90-minutes to complete. Assistant instructors were trained on proper usage of the FITNESSGRAM® test battery for 4-5 days leading to evaluations to ensure adherence to testing protocols and instructor competency. Prior to testing, participants were given an explanation of test procedures and given a description and demonstration of each test. After being briefed on testing protocol, participants were given a test-record sheet (Appendix D) and PACER sheet (Appendix E) and instructed to fill out their name, age, and date at the top of each sheet. Following completion of record sheets, participants were led by a lead instructor to have their height, weight and triceps and calf skinfold measurements recorded. Participants were instructed to remove shoes for height and weight and prior to measuring skinfolds of the right triceps and calf, participants were informed of the nature of the test and verbal consent was given to proctors before making physical contact.

Fitness testing components were separated into stations with the exception of the PACER 20-meter maximal multi-stage shuttle run test. For the PACER, all participants were tested at once with an assistant instructor as their lap recorder. Participants were given a 5-minute rest period between the PACER and test stations to allow for recovery and the remaining four fitness components (push-up, curl-up, trunk lift, and sit-and-reach) were separated into stations at which participants rotated from one to the other with a 2-minute rest period between stations. Participants were divided into groups of 3-4 and rotated as a group only after an assistant instructor recorded their results on the test sheet.
Participants were closely monitored for signs of fatigue and rest was given after the PACER and after two test rotations. The sit-and-reach, trunk lift, and skinfold measurements were taken three times each. The average of three was recorded for skinfold measurements and the best out of three for the sit-and-reach and trunk lift. At the end of the 8-weeks, participants were reassessed using the same FITNESSGRAM® battery.

Participants were able to view and record their results on a separate sheet but all test data was submitted to a graduate student. Following testing, an assistant instructor led a 10-minute group cool down following testing.

Statistical Analysis

Student participation and retention was assessed through daily sign-in sheets and descriptive data for anthropometric measurements and physical fitness testing are provided in lieu of statistical treatment due to a final sample size of 5 participants.
Results

Prior to commencement of the summer program 135 students from SFHS had expressed interest in participating by providing contact information. Of those 135 students only 13 attended the program. Other participants came from the 100 Citizens adult-fitness program and personal referrals of community members and student volunteers. A total of 54 youth and adolescents attended the program with an average of 15 participants daily (Figure 1). Approximately 25 participants were youth (≤12 years of age) and 29 were adolescents (≥13 years of age), 30 male and 24 female. Due to shortcomings in operations and participant retention to be discussed later, programming was shortened to 6.5-weeks instead of 8-weeks and our final sample size was limited to 5 participants who completed pre and post testing.

Descriptive Characteristics and Attendance

Daily student attendance mirrored the obstacles faced over the 6.5-week intervention. After the first three weeks of programming SF FUERTE relocated to SFHS resulting in a decline in attendance on days 11 and 12 as illustrated in Figure 1. This was due to the EduCare coordinators unavailability to supervise programs at Ritchie Valens Park and SFHS. Program outreach on day 13 at the 100 Citizens adult-fitness program increased attendance and also resulted in parental involvement that increased student adherence among youth. Two weeks before program completion local schools commenced their fall academic semester resulting in a second decline. The SF FUERTE program operated for a total of 32 days and the average attendance for youth (≤12 years) was 10.48 days and 7.14 days for adolescents (≥13 years).
Student adherence is displayed in Figure 2. Of the 54 participants 72% attended ≤10 days (30% adherence), 15% attended 11-16 days (31-50% adherence) and 22% attended 17-21 days (51-65% adherence). The highest adherence any participant reached was 75% with a total of 24 days in attendance. Participant adherence of the final sample size is displayed in Figure 3. It should be noted that participants “A” and “D” began attending three weeks into programming after recruitment at the adult-fitness 100 Citizens program leaving 19 days of exercise programming. Participant “A” attended 19 days (59% adherence), “B” attended 18 days (56% adherence), “C” attended 22 days (68% adherence), “D” attended 17 days (53% adherence) and “E” attended 19 days (59% adherence). The final five participants were the most consistent of all
54 and if taking the late recruitment into consideration participant “A” and “D” reached or were close to reaching 100% adherence.

**Figure 2. Student Adherence**

![Bar chart showing the number of students attending days 1 to 24.](chart)

**Figure 3. Final Participant Adherence**

![Bar chart showing the total number of days attended by participants A, B, C, D, and E.](chart)
The descriptive characteristics and anthropometric measurements of the five remaining participants are provided (Table 1) with each participant labeled an identifying letter as a tool of reference. Of the five participants, two were female and three were male and ages ranged from 9-14 years old. Each participant is representative of themselves and not a collective population.

<table>
<thead>
<tr>
<th>Age</th>
<th>Height (m)</th>
<th>Weight (kg)</th>
<th>Gender</th>
<th>Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1.4</td>
<td>43</td>
<td>Female</td>
<td>A</td>
</tr>
<tr>
<td>9</td>
<td>1.4</td>
<td>43.6</td>
<td>Female</td>
<td>B</td>
</tr>
<tr>
<td>10</td>
<td>1.5</td>
<td>36</td>
<td>Male</td>
<td>C</td>
</tr>
<tr>
<td>12</td>
<td>1.4</td>
<td>48</td>
<td>Male</td>
<td>D</td>
</tr>
<tr>
<td>14</td>
<td>1.7</td>
<td>50</td>
<td>Male</td>
<td>E</td>
</tr>
</tbody>
</table>

**Table 1. Descriptive Characteristics and Anthropometric Measurement**

**Body Composition**

The BMI and HFZ for each participant are displayed in Figure 4. According to the Cooper Institute FITNESSGRAM® healthy fitness zone standards for body mass index, participants “A” (21.4 kg/m²), “B” (22.5 kg/m²) and “D” (25 kg/m²) are categorized as “needs-improvement high risk” indicating a high potential and probability for future health problems if high BMI levels persist through the years. Participants “C” (16 kg/m²) and “E” (17.2 kg/m²) met the HFZ for BMI and are therefore considered healthy for their age and gender.
The percent body fat and HFZ for each participant is provided in Figure 5. Percent body fat is a direct estimate of body fatness and is therefore a more accurate method of measuring body composition (Meredith & Welk, 2007). According to the Cooper Institute FITNESSGRAM® healthy fitness zone standards for percent body fat, participant “A” (35.4% body fat), “B” (33.7% body fat) and “E” (33.3% body fat) are categorized as “needs-improvement high risk” for their age and gender. Participant “C” (17% body fat) met his HFZ criterion and participant “D” (32% body fat) is categorized as “needs-improvement some risk” indicating there is potential for future health risks but is not probable. BMI and percent body fat utilize different components for assessment, providing different results, and thus participant “E” is considered healthy under BMI standards and “needs improvement high risk” under body fat percentage and participant “D” is considered healthy under BMI and high risk under body fat standards so caution should be urged when utilizing these different body composition measurements. It is difficult to see change in body composition whether it be BMI or body fat.
percentage in a short-term intervention. Even long-term interventions, including those longer
than 6-months, generally exhibit a 1-3% change (Howe et al., 2010; Lazaar et al., 2007).

Cardiovascular Fitness and Aerobic Capacity

To assess aerobic capacity, Body Mass Index, # of laps completed (PACER), and age and
gender were used for each participant. Of the 5 participants, “A” and “B” were below the
recommended age for aerobic capacity testing and although they completed the PACER, their
results were not accounted for in the aerobic component. Within the PACER (Figure 6) an
increase in 9 laps was seen in participant “C” from pre and post surpassing the healthy fitness
zone (HFZ) for his age and gender adjusted criterion. Participant “D” decreased by 2 laps after
post-testing and did not achieve his HFZ level. Participant “E” increased 2 laps achieving his
HFZ level. For aerobic capacity (Figure 7), measured as VO2 max in ml/kg/min, participants “C”
at 51 ml/kg/min and “E” at 46.4 ml/kg/min achieved HFZ levels for their respective age and
gender. Although difficult to distinguish, participant “D” at 40.1 ml/kg/min missed the HFZ level
by .2 and categorized as “needs improvement some risk”. Increasing aerobic exercise is
recommended in order to achieve HFZ levels. Aerobic capacity and laps completed did not change much from pre to post suggesting either the intervention acted as cardiovascular maintenance versus improvement or the 6.5-week intervention did not present enough time for cardiovascular fitness adaptations to occur.

**Figure 6. PACER**

![Figure 6. PACER](image1)

**Figure 7. Aerobic Capacity**

![Figure 7. Aerobic Capacity](image2)
Muscular Strength & Endurance

In general, minor improvements were seen from pre to post measurements in the push-up and curl-up for all five participants with the exception of participant “D” who complained of muscle soreness the day of post-testing. The curl-up (Figure 8) displayed the most improvements, with 5 out of 5 participants meeting the HFZ levels for their age and gender adjusted criterion. In pre-evaluations participant “A” had zero curl-ups and after exercise programming accomplished 14 curl-ups to meet the HFZ. The push-up (figure 9) fluctuated among participants and out of 5 participants “B” and “D” performed fewer push-ups during post testing in comparison to pre-testing, “C” and “E” remained the same, and participant “A” showed improvement. Among the males, “C” and “E” surpassed the HFZ level; for the females, only “A” achieved the HFZ level for the push-up.

Figure 8. Curl-Up Test
Flexibility

The trunk lift (Figure 10) and sit-and-reach (Figure 11) remained the same for both pre and post measures for all participants. The maximum score on the trunk lift is 12-inches. In the trunk lift participants “C” and “E” did not meet the HFZ while all participants achieved the HFZ for the sit-and-reach.
Figure 10. Trunk Lift

![Trunk Lift Chart]

Figure 11. Sit-and-Reach

![Sit-and-Reach Chart]
Discussion

Latinos are the fastest growing minority group in the U.S. and as such their preventable health risks need to be addressed with accessible, culturally sensitive, multi-disciplinary interventions (Meir et al., 2010). A predominantly Latino community with high overweight and obesity rates among youth and adolescents due to unhealthy lifestyle behaviors of physical inactivity and poor nutrition was a call to action in the City of San Fernando. A review of the literature has shown that successful obesity prevention interventions incorporate nutrition education, behavior modification including a decrease in sedentary behavior, social support through family involvement and above all physical activity (Heinberg et al., 2010; James et al., 2008). Our overall objective was to promote lifetime physical activity by creating a fun, non-judgmental environment for exercise while improving health related fitness components through a multi-disciplinary, community-based intervention within the City of San Fernando.

An examination of multi-disciplinary interventions for Latinos showed that dietary control, an exercise program and parental involvement led to the greatest declines in body composition (Evans et al., 2009; Mier et al., 2010; Peres et al., 2004). The SF FUERTE approach to addressing obesity was multi-disciplinary in that it was culturally appropriate, incorporated nutrition education versus dietary control and concurrently had a strong physical activity and physical fitness presence. In consideration of cultural appropriateness SF FUERTE included popular Latino exercises such as Zumba® and soccer. Due to the community-based nature of SF FUERTE, nutrition education was thought to be more feasible and beneficial for behavior change than controlling for dietary intake. Thus, nutrition booklets containing lessons, activities and tips were given to each participant and discussions were led bi-weekly by the Nutrition, Food Science and Dietetics graduate student. Booklets were collected at the end of each session during
programming but participants were allowed to keep them once SF FUERTE came to an end. Physical activity and physical fitness were the most extensive components of the intervention. Promotion of lifelong physical activity was presented through a variety of fun exercises and combination of competitive and non-competitive activities, i.e., ultimate-frisbee, capture the flag, soccer, fitness challenges and obstacle courses. Most activities did not require a high skill level as required in sports, this may have increased the self-efficacy of participants and their likelihood to partake in activities.

Additionally, student volunteers (assistants) played a critical role in exercise programming. Volunteers were advised to develop relationships with participants to establish rapport and provide moral support and encouragement. Volunteers were also instructed to assist participants in nutrition education activities and in setting weekly goals that were attainable as part of lifestyle education. A few volunteers also assisted in the 100 Citizens program. Volunteering in both programs allowed them to give personal referrals for SF FUERTE and to develop relationships with the parents.

Although parental involvement was not integrated into the program their mere presence, as some stayed to observe, revealed a positive influence within youth adherence and effort. Most youth attending SF FUERTE had parents participating in the 100 Citizens program. Parental involvement in 100 Citizens could have contributed to a perceived significance in the SF FUERTE program. Often times parents stayed during SF FUERTE sessions and were actively involved in encouraging and motivating their children to participate and give maximal effort. As a result of parental role modeling and moral support, the elementary and middle school aged participants reached higher intensities than high-school aged participants and remained in the program for a longer duration.
Over the course of the intervention we noticed a shift in the demographic of participants. SF FUERTE initially consisted of high school aged (13-18 years) students recruited from SFHS. After relocating venues, commencement of summer school and outreach at 100 Citizens there was an influx of 7-12 year olds. During this transitional phase 6 high school aged participants remained and after four weeks of programming our teenage demographic lowered to 3 students. In contrast, the younger population (7-12yr olds) increased as the program progressed and were more responsive to our fitness and nutrition program. The spring pilot study and summer fitness program showed similar declines in attendance among adolescents suggesting future programs and marketing strategies should focus on elementary and middle school aged youth.

Limitations

The SF FUERTE intervention experienced a few challenges affecting the overall success of the program. As with T.I.M., participant retention was the greatest challenge. A total of 54 youth and adolescents attended at least 1 session. Most participants discontinued for several reasons, schedule conflicts, summer school, summer vacation, and possibly a lack of continued interest. Participant retention affected our results and outcome. The main limiting factors are outlined below and will be discussed in further detail.

- Student adherence and site relocation
- Student adherence and schedule conflicts

Student Adherence and Site Relocation

A major setback throughout our program was student adherence. In the first week of programming we had an average of 20 students attending daily from San Fernando High School (SFHS). This initial group of participants attended an average of 3 to 4 days a week and most
were teens from SFHS with a few middle school students and their younger siblings. The start of summer school meant EduCare would no longer be housed at the park but instead at SFHS and accordingly for SF FUERTE. Due to a lack of communication among lead instructors and the EduCare coordinator, four days were granted to notify all current participants of the relocation. Participants and parents were advised on site and phonecalls were made to everyone on the contact list that had previously attended a class. Monday and Tuesday of the following week, after transitioning to SFHS, attendance dropped to 6 students daily.

In efforts to maintain reasonable daily attendance, lead instructors attended the 100 Citizens program, an adult (predominantly women) fitness intervention housed at San Fernando Recreation Park, approximately 5-minutes east of SFHS, in efforts to recruit the women’s children. After gaining the interest of the mothers, attendance rates increased from an average of 6 students to 23 students daily. By Friday of third week our attendance increased to near 23 daily consisting of mostly 7-12 year olds.

Student Adherence and Schedule Conflicts

As mentioned prior, program scheduling was a challenge throughout the intervention. SF FUERTE was set to operate from June 27th to August 19th from 9:30 am - 11:00 am for a total of 8-weeks. Summer school at SFHS began July 11th, two weeks after the SF FUERTE start date and operated from 8:00 a.m. to 12:00 p.m. Changing SF FUERTE hours to a later start time (12:30 p.m.) was not an option due to school and employment commitments volunteers and graduate students had secured. Additionally, SF FUERTE was tailored to fit the SFHS academic calendar and not all schools in the area. Most of the surrounding elementary and middle schools commenced their fall academic semester the first and second week of August and SF FUERTE
was scheduled to end the third week, August 19th. With the possibility of losing all participants by the second week of August, lead instructors and faculty advisor, Dr. Steven Loy, decided it would be in the best interest of data collection to end the intervention early. Due to the schedule conflict the program was shortened to 6.5 weeks to allow for post-testing resulting in a final sample size of 5 participants.

Due to difficulties in student adherence for a variety of reasons, SFHS and the high-school aged population were not effective for program implementation. Although 135 SFHS students expressed interest in the summer fitness program it did not translate to participation as only 13 attended the program. Additionally, San Fernando Middle School (SFMS) was not yet a reliable site for outreach. SFMS faculty and CSUN graduate students had attempted program implementation in the fall of 2010. Unfortunately SFMS was unable to participate due to current administrative re-organizations. The results of the pilot and summer SF FUERTE programs suggest that extensive marketing and future programs should target the elementary aged population as they were the most consistent in attendance. Given the immediate commitment of the women from 100 Citizens, more program awareness can be generated by marketing to parent-centers at elementary schools, churches and adult fitness programs or to create a child-based program in tandem with the 100 Citizens program.

Results and Physical Fitness Testing

Inconsistent attendance and participant adherence prolonged pre evaluation data collection. Pre evaluation data collection was held on three separate occasions:

- Friday, July 1st (1st week of SF FUERTE).
- Friday, July 8th (2nd week of SF FUERTE).
• Friday, July 15th (3rd week of SF FUERTE, 100 Citizens).

This method of pre-evaluation data collection proved to be a limiting factor. Assessing body composition at different points in time for separate participants made it difficult to see a change in BMI and % Body-Fat measures over the course of the intervention and again the program was only 6.5-weeks in duration.

• Participants “B” and “C” were evaluated Friday, July 1st

• Participant “E” was evaluated Friday, July 8th.

• Participants “A” and “D” were evaluated Friday, July 15th

Additionally, participants were instructed to eat light meals before sessions, possibly making weight and body composition an inaccurate measurement. Thus, results are not a reflection of exercise programming but of individual program duration. “B” and “C” are the only participants who received the full 6.5-week exercise program before scheduled post-evaluations. These inconsistencies in evaluation and program duration have made it difficult to assess whether improvements were a product of exercise programming or residual fitness from non-SF FUERTE activities.

Aside from inconsistent attendance rates, testing protocol was a limiting factor. All interns were trained for one week prior to evaluation to ensure appropriate testing protocols and data collection methods were familiar to them. Two to three interns were assigned per test station, yet were not assigned the same station for post-evaluation. This inconsistency in data collection increased our potential for error predominantly in the push-up and curl-up tests. Testing termination criteria was not streamlined from intern to intern and with only two graduate students to supervise stations some participants might have scored better or poorer on any given
test. The lack of quality control of the testing situation underscores the need for training and consistency given the potential of larger numbers, the situation would have been worse. Anthropometric data was measured and recorded by the same lead instructor for pre and post evaluations.

Due to a small sample size and shortened exercise program, the data is not statistically meaningful. However, this intervention suggests there is a connection between youth and their parents and that the children’s age may be an important factor. Four out of the five participants, with the exclusion of participant “E”, presented parental involvement which may have provided a social support system for healthy behaviors and been a determining factor in adherence.

**Future Interventions and Parental Involvement**

Research has shown that successful weight management and obesity prevention programs are based around lifestyle and behavior change, moreover, including parents and the family leads to positive changes in BMI, insulin, and triglyceride levels (Heinberg et al., 2010; James et al., 2008; Mier et al., 2010). SF FUERTE included fitness, nutrition and lifestyle in the form of goal setting as a comprehensive intervention. Parental involvement was not mandatory yet many of the youths’ parents voluntarily attended and occasionally participated alongside their children.

In a study by Heinberg (2010), examining the influence of parent involvement and family factors on BMI in obesity treatment, parental involvement was significantly related to weight loss. The least involved families were 8 to 12 times more likely to have children with little to no weight loss. Parental involvement was a notable difference between the youth and adolescent participants. Generally, the adolescents found their own form of transportation (walking, public transit, biking) and as such made independent decisions whether or not to attend
where-as the youth relied on parents for transportation and decision-making. The adult fitness program “100 Citizens”, was similar to SF FUERTE in that it was a community-based program focused on increasing physical activity levels of adults in the City of San Fernando. Their adults (mostly women) had shown consistency in attendance and were committed to changing their lifestyle behaviors and consequently became role models for their children during programming. This resulted in higher attendance rates among youth. Integrating the parents and moreover the family unit, creates a social-support system that can encourage healthy behaviors for the child. Given this information future community-based interventions should include parental involvement and or a family component and emphasizes the importance of parents living a healthier lifestyle.

Community-based programs such as LIFT/Levántate are feasible options for obesity prevention and parental involvement. LIFT/Levántate (LL) is a non-profit organization providing culturally competent programs focusing on fitness, nutrition education and life skills while incorporating the family unit in local community settings. A notable difference from SF FUERTE and LL is the luxury of time, resources, the ability to adapt sessions to meet the needs of its audience and its family-based approach. Considering the need for volunteer recruitment and commitment, equipment procurement, rapport with SFHS, site availability, marketing, program planning, piloting and evaluating, there is a race against time to complete ones thesis and graduate. However, the basis for SF FUERTE was to identify if a program could be established that was based on its structure which could either be continued by the university or in tandem with the city’s parks system or other community organization. LL is an organization focused on relationship building and provided resources along with San Fernando Recreation and Parks Department. Essentially LL can set its own timeline making the program more manageable
but the recognition is that it is also less resource intensive relying on the once a month workshops to establish lifestyle changes. LL conducts surveys allowing for adjustments to be made based on the feedback resulting in modifications each month. Feedback was not asked after each SF FUERTE session though instructors interacted with the participants however, it seems the right questions may not have been asked.

Also, best-practices for participation has been outreach through parent centers at local elementary schools. LL attendees are predominantly mothers and their children with very few men. This is what also had been observed in the 100 Citizen programs resulting in that group being targeted for recruitment of their children. Targeting the women has been the most successful form of maintaining participant adherence and promoting physical activity and healthy lifestyle behavior within youth and adolescents in San Fernando. Although more investigation is warranted, women may be the key in obesity prevention for their decision-making authority in the household.
Conclusion

The SF FUERTE multi-disciplinary intervention was unsuccessful in improving body composition and health related fitness components in a 6.5-week intervention. Operating under the SFHS EduCare program was not an effective means of attracting participants and led to complications affecting student adherence at SFHS and Ritchie Valens. Future interventions should demonstrate year-round program sustainability to increase the likelihood of behavior change. Partnering with a city agency such as San Fernando Recreation and Parks could provide a permanent meeting location and long-term programming.

Physical activity and nutrition and lifestyle education should begin with the younger population. This may lead to long-term improvements in overweight and obesity rates by minimizing sedentary behaviors and fostering physically active lifestyles through the years. Marketing of programs should take place in locations where families convene such as churches, community agencies and parent centers at local schools. Involving parents and guardians is central to participant adherence and may have a greater impact on behavior change. Additionally, recruitment of student volunteers at the university level is beneficial in leading activities and establishing relationships with youth and parents.
Literature Review

Obesity

Obesity, defined as a body mass index (BMI) greater than or equal to the 95th percentile for age and gender, based on the 2000 CDC growth charts, has become a nationwide epidemic (CDC, 2010; Ogden, 2010). Childhood overweight and obesity rates have tripled in the past 30 years with 31% overweight and 18% obese (Lytle, 2012). Youth and adolescent obesity has become a major public health issue due to its likelihood of transitioning into adulthood leading to higher morbidity and mortality rates of chronic disease (Lowry et al., 2002; Parikh & Stratton, 2011). In today’s society low physical fitness, physical inactivity, and increased sedentary behavior, coupled with a poor diet have been linked to increased body composition (ratio of fat mass to fat-free mass) and chronic disease in children and adolescents (Mota, 2010; Stovitz, 2008). Encouraging children to meet the minimum 60-minutes of moderate to vigorous physical activity (MVPA) a day may reduce and/or reverse health risks. Overweight and obesity are known to have an impact on the rates of type II diabetes, metabolic syndrome and cardiovascular diseases (Butte et al., 2007; Huang et al., 2011; Sisson et al., 2009). Furthermore, studies have shown racial and ethnic disparities in obesity prevalence among the low-income Latino population (Ogden 2010). Evidence highlights the need for promoting healthy dietary and physical activity behaviors during childhood and adolescence in low socioeconomic populations as a means of obesity and chronic disease prevention throughout their lifetime (Carlson et al., 2008).

Causes of Obesity

Socioeconomic status & disparities
Past studies have investigated the relationship between socioeconomic status (SES) and children’s weight status. Economically disadvantaged Latinos generally live in low-income communities with environmental barriers to healthy eating and activity (Woodward-Lopez et al., 2006). Families from a low SES have many perceived barriers to health. In a survey conducted by the California Nutrition Network, 41% of Latinos felt that fruits and vegetables are too expensive (2005). This perception of unattainable produce is known as food insecurity in which Latino households with a low-income may be discouraged from shopping for fresh produce and other healthful foods. Their surrounding environment consists of fast-food chain restaurants and corner stores selling inexpensive, calorie-dense, high-fat, processed foods with low nutritional quality.

Additionally, many Latinos face health disparities and are not aware of their risk factors for developing type II diabetes or cardiovascular disease (CVD). Unable to afford health insurance, Latino’s do not have access to primary care physicians or preventive services such as routine health screenings. The Latino population is the fastest growing ethnic group in the U.S. By 2050 it is projected the Latino population will represent 24.4% of the total U.S population (Davidson, 2007). As the fastest growing ethnic group, health disparities need to be addressed to prevent a further increase in national obesity levels.

Poor Nutrition

Dietary patterns of Latino children tend to be of poorer nutritional quality compared to other ethnic backgrounds (Dave et al., 2010). Within low socioeconomic households, intake of sugar-sweetened beverages accounts for 15%-20% of children’s total caloric intake and less than 20% of youth consume the recommended 5 or more servings of fruits and vegetables per day.
(Carlson et al., 2008). Adolescents aged 12-19 years consume the highest amount of sugar sweetened beverages, the largest source of added sugar and calories within the U.S. diet (CDC, 2010). A diet high in sugar and fat is associated with obesity and leads to type II diabetes, atherosclerosis and coronary heart disease. Junk food is challenging to avoid. Poor nutrition foods can be found in school vending machines, at bake sales, school fundraisers, sporting events, and in some communities, food trucks with unhealthy food choices park outside schools and wait for school dismissal. There is also a high concentration of fast-food chain restaurants and convenience stores within low-income communities (Levi et al., 2010). Due to these factors it is important that children and adolescents are educated on proper nutrition to foster a healthy lifestyle.

Physical inactivity

Past studies have reported that high-levels of leisure-time sedentary behavior are associated with high levels of overweight, obesity, and chronic disease risk (Howe et al., 2010; Katzmarzyk et al., 2009). Leisure-time sedentary behavior includes total time spent watching television, or in front of a screen. Nearly half of U.S children exceed >2hours a day in sedentary behavior (Katzmarzyk et al., 2009) and it is important to limit this behavior because most children and adolescents tend to consume empty calories during this time (Lowry et al., 2002). It should also be noted that physical activity declines dramatically as children transition into adolescence and furthermore in adulthood (Byrd-Williams et al., 2010). The greater amount of time dedicated to sedentary behavior, the greater the risk of obesity and chronic disease, independent of meeting minimum recommendation of 60-minutes of physical activity a day (Lazaar et al., 2007; Katzmarzyk et al., 2009). According to the Behavioral Risk Factor Surveillance System, in Los Angeles County, 45.7% of the adult population (>18yrs) met the
minimum recommendation for moderate to vigorous physical activity and 28% for vigorous physical activity (Li et al., 2011). By contrast then consider the percentages who are not meeting the minimum recommendations. A cycle of unhealthy behaviors derives from adolescence and may be prevented through culturally sensitive interventions promoting physical activity.

The built environment or neighborhood can also affect the likelihood of physical activity. Safe, walk-able communities are associated with higher physical activity levels, less sedentary behavior and youth and adults who are less overweight (Elder et al., 2009). Communities, in which supermarkets, schools, parks and recreation centers are in walking distance from homes and affordable public transportation, may encourage active lifestyles among residents. Due to economic constraints many Latinos live in low-income neighborhoods with few areas for play and exercise and most schools in low-income communities tend to have low-quality physical education facilities with limited resources to meet the needs of over-crowded class sizes (Woodward-Lopez & Flores, 2006).

Child and Adolescent Obesity Trend

Across the United States (U.S.) there has been a steady increase in the national average BMI levels for children and adolescents. On a national level, obesity stands at 16.9% and overweight at 31.7% for children and adolescents aged 2-19 indicating more than half of U.S. youth and adolescents are overweight (Ogden, 2010). In comparison, in California, youth and adolescents are below the national average for overweight and obesity at 38% and in Los Angeles County rates are lower at 43% (Kids Data, 2010).

Of greater concern are rates among low-income minorities. In California, Latinos age 12 to 17 are the most likely to be overweight or at risk for overweight and report higher morbidity
rates due to preventable chronic diseases than any other ethnic group (Mier et al., 2010; Stovitz, 2008; Woodward-Lopez & Flores, 2006). Between 1994-2008 the prevalence of obesity among U.S Mexican-American adolescents aged 12-19 increased from 14.1% to 26.8% and 13.4% to 17.4% respectively for boys and girls with higher prevalence among Mexican-American boys versus their non-Hispanic white counterparts (Ogden, 2010). Epidemiological data suggests that minority children from lower socio-economic background have a 1 in 2 chance of being overweight or obese (Heinberg et al., 2010).

**Importance of Physical Activity & Physical Fitness**

Physical activity and physical fitness have many long-term health benefits; it helps develop and maintain healthy bones, and muscles and prevents many chronic diseases such as high blood pressure, diabetes, and CVD. Physical activity is an effective form of weight management and a key component in the prevention of obesity and chronic disease. According to the U.S. Department of Health & Human Services *Physical Activity Guidelines for Americans*, physical activity is defined as any bodily movement that enhances health (2008). Separate from physical activity, physical fitness refers to a set of attributes that people have or achieve relative to their ability to perform physical activity such as body composition, CVF, muscular strength and endurance and flexibility (Corbin, Pangrazi & Frank, 2000). Physical inactivity and low physical fitness is associated with a high risk for hypertension and type II diabetes, independent of overweight and obesity (Siegrist et al., 2011). The current Centers for Disease Control and Prevention (CDC) guidelines encourage children and adolescents to engage in moderate to vigorous physical activities (MVPA) at least 60 minutes a day, 5 or more days per week (Aires, 2010; CDC, 2011).
Regular physical activity in the form of sports, play and aerobic exercise or strength training can have a positive impact on body composition and healthy lifestyle promotion. One study examined the relationship between adiposity and physical activity in 54 overweight Hispanic adolescents. Results showed an increase in total physical activity by 28% was associated with a decrease of 1.4 kg of fat mass and 1% body fat (Byrd-Williams et al., 2010). Another study evaluated the efficacy of a 10-month, after-school, physical activity intervention on the prevention of age-related increases in body fatness and cardiovascular fitness (CVF). This study included 106 boys between the ages of 8-12 years and results showed that participants who attended the intervention at least 3-days a week had significant reduction in body fat, BMI and fat mass and no impact on CVF (Howe et al., 2010). Adiposity, body composition and insulin sensitivity may be improved through a comprehensive physical activity intervention (Sothern et al., 2000; Shaibi et al., 2006).

**Physical Activity Trends**

There is a dramatic decline in physical activity levels from middle to high school aged students, especially among females. In a weekly report by the CDC looking at national physical activity levels of high school students (2011), only 15.3% of students achieved the recommended 60-minutes of daily physical activity, a higher percentage of males (21.9%) compared to females (8.4%) met recommended levels and a higher percentage of 9th grade students (18.5%) compared to 12th grade students (13.1%). Additionally, a study in Hillsborough County, Florida investigated the prevalence of overweight and physical activity levels among economically disadvantaged middle and high school students. Results showed boys generally engage in more physical activity than girls and sixth-grade students reported higher levels of physical activity than ninth-grade students (Agazzi et al., 2010).
According to the California Department of Education, if grade 9 students successfully pass the physical fitness test, they are exempt from physical education class in grades 11 and 12. Given the decline in physical activity from middle to high school in all students, the requirement for physical education in California schools of only two of the four years is of concern as it may exacerbate the levels of inactivity. Schools and physical education teachers across the nation should focus on promoting and educating their students on the health-related benefits of regular physical activity.

*Physical Activity & Cardiovascular Fitness and Youth*

Although any level of physical activity is better than none, studies have shown positive correlations between high-intensity physical activity and CVF. Current guidelines state youth and adolescents should engage in 60-min of moderate to vigorous physical activity yet recent studies have stated that adolescents who engage in larger amounts of vigorous physical activity (VPA) have better CVF and less body fat than those only engaging in MVPA (Aires et al., 2010; Parikh & Stratton, 2011). High levels of CVF are associated with low levels of adiposity and metabolic syndrome.

The Aires et al. study compared levels of physical activity between normal weight and overweight/obese classifications for 111 youth between 11-18 years of age and analyzed how different intensity levels of physical activity (sedentary, light, moderate, vigorous and very vigorous) would correlate with CVF and BMI categories. Physical activity was assessed with an accelerometer for 7 consecutive days and CVF was assessed using the FITNESSGRAM maximal multi-stage 20-meter shuttle run test. Physical activity intensity levels were distinguished by use of accelerometers as counts per minute where 2000 to 2999 was moderate, 3000 to 4499 was
vigorous and >4500 was very vigorous. BMI was assessed by standard means for weight and height. Results showed a significant relationship between CVF and vigorous and very vigorous physical activity intensity levels (Aires et al., 2010). Overweight and obese children were less likely to complete more laps than their normal weight counter parts and total physical activity did not show an influence on BMI level. Aerobic capacity is considered the most important area of any fitness program because of its association with body fat, reduced risk of hypertension, coronary heart disease, obesity, type II diabetes and other health problems.

Similarly, a study evaluated the relationship between moderate and vigorous physical activity to fitness and fatness in 421 high school adolescents. Results showed that those who engaged in higher amounts of vigorous physical activity had significantly higher CVF levels and lower percent body fat than those who engaged in moderate physical activity, nevertheless, moderate intensities showed some improvement in levels of body fat (Gutin et al., 2005). These data suggest that although vigorous intensities have the greatest benefits, physical activity at any intensity is beneficial and can provide a platform to improve CVF. As CVF improves, one may be able to exercise at higher intensities, which will result in greater body fat reductions. It should be mentioned that when working with overweight and obese youth and adolescents, progressive aerobic training is appropriate due to the difficulty in maintaining high-intensity physical activity levels.

Muscular Fitness and Youth

According to the CDC adolescents should engage in muscle strengthening activities at least three days per week as part of their total sixty minutes of physical activity, yet, only 51% of the nations high school students meet this recommendation (2011). Most studies link muscular
fitness with metabolic risk factors, body composition and have shown positive responses in
insulin sensitivity, fat-free mass and increase in strength. In a bi-weekly progressive resistance-
training program on insulin sensitivity in overweight Latino adolescent males at risk for type II
diabetes there was a significant increase in insulin sensitivity independent of changes in total fat
mass and fat-free mass (Shaibi et al., 2006). Insulin sensitivity is the body’s response to glucose
and low insulin sensitivity is associated with metabolic disorders such as type II diabetes and
metabolic syndrome.

Similarly, Van Der Heijden determined the effects of a resistance-training program
without dietary intervention or weight loss, on body composition, fat accumulation, insulin
sensitivity and glucose metabolism in a group of 12 sedentary, obese, Latino adolescents. Each
participant was studied on two occasions, once at baseline and once three days after the final
exercise session. The resistance exercise program was led twice a week for one hour, weights
and repetitions were gradually increased from ~50% of their 3 repetition max (RM) to ~80-85%
of their 3RM dependent upon the participant’s ability; they would perform three sets of 12-15
repetitions. Over the course of the 12 week intervention, results showed an increase in strength,
lean body mass, hepatic insulin sensitivity and slight reduction in glucose production and did not
have an effect on total fat accumulation (Van Der Heijden et al., 2010). Incorporating strength
training and muscular fitness in physical activity and fitness interventions is important, and
essential in increasing insulin sensitivity and increasing fat-free mass. During puberty and into
teen years when most girls tend to gain fat mass, a fitness intervention incorporating aerobic
exercise and progressive resistance training can reduce the accumulation of fat mass.
**Physical Fitness Testing**

Physical fitness testing (PFT) is conducted annually across all public school children in California, in grades 5, 7 and 9 using the Cooper Institute FITNESSGRAM® test battery and standards. The FITNESSGRAM® is a comprehensive, health-related physical fitness battery developed to assist students in establishing lifetime habits of regular physical activity (CDE, 2011). Findings from the 1999-2002 National Health and Nutrition Examination Survey showed over 60% of 7th and 9th grade students scored in the healthy fitness zone for aerobic capacity, the most important indicator of physical fitness for adolescents reflecting a likelihood of developing chronic diseases (Pate et al., 2006). The California Department of Education 2010 PFT results showed similar results for aerobic capacity with 5th, 7th, and 9th grade students scoring above 60%, yet, only one in three students achieved the healthy fitness zone criteria in all six fitness areas; 28.7% of 5th grade students, 34.6% of 7th grade students and 38.5% of 9th grade students achieved the healthy fitness zone for all six areas (Torlakson, 2011).

**Physical Fitness Testing among Latinos**

Latinos make up 73.4% of the total students in the Los Angeles Unified School District (Ed-data). According to KidsData.org, 29.4% of Los Angeles Unified School District Latinos met 6 out of 6 fitness standards, compared to 27% of Los Angeles County and 31.9% of California Latinos (Torlakson, 2011). Similarly, in the last decade 7th grade Latinos have improved test scores, approximately 12.5% in 1990 and 21.4% in 2010, a 9% increase (KidsData, 2010).
FITNESSGRAM in San Fernando

A summarized report for the elementary, middle, and high school population was generated totaling the number of 5th, 7th, and 9th grade students from all L.A.U.S.D. schools in the City of San Fernando (Figure 12), an additional report is provided for all L.A.U.S.D schools (Figure 13). The average for each test component and the total number of students reaching HFZ levels for each criterion is displayed. PFT data was gathered from the California Department of Education physical fitness test assessment report for the 2010-2011 year. Elementary schools used for the summary include, Gridley Elementary, Morningside Elementary, O’Melveny Elementary, and San Fernando Elementary. San Fernando Middle school is the only L.A.U.S.D. middle school serving the City of San Fernando. The two high schools serving the City of San Fernando and used for this summary include San Fernando High School and Sylmar High School.

Figure 12. 2010-2011 PFT San Fernando Students Meeting HFZ

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Percentage of 5th, 7th, and 9th grade students meeting HFZ levels
The 2010-2011 PFT San Fernando summary shows the percentage of 5th, 7th, and 9th grade students achieving HFZ levels for each of the six components. As displayed in Figure 7, less than 50% of students across all three populations are in the HFZ for body composition, in contrast, LAUSD (Figure 8) shows slightly higher percentages of students meeting the HFZ for body composition. This indicates that more than 50% of the youth and adolescents in the City of San Fernando are either overweight or obese and have a BMI at or above the 85th percentile for overweight and 95th percentile for obese for their age and gender. Additionally, the rate of overweight and obesity worsens from 5th to 9th grade. Aerobic capacity is another important component where a decrease over time indicates a potentially high risk of cardiovascular disease in adulthood. In comparing San Fernando schools to LAUSD, it seems that San Fernando has more students achieving HFZ than LAUSD.
Comprehensive Interventions and Obesity

Benefits in the short- and long-term outcomes of weight management programs have been mixed. The most common intervention components include increased physical activity and/or reduced sedentary activities and/or quality of nutrient intake (Evans, 2009). Inclusion of physical activity and diet/nutrition education are vital components to every obesity intervention program, yet most fail to maintain retention over time. This lack of success may be due to the fact that lifestyles that contribute to the development of obesity are not effectively altered during weight reduction (Sothern, 2000). Successful programs should be designed to modify lifestyle behaviors by increasing physical activity levels during leisure time and educate adolescents to consume a proper diet (Bernsten, 2010). Past studies suggest multi-disciplinary interventions are more effective approaches to combating youth and adolescent obesity.

Evans and colleagues evaluated a six-month multi-disciplinary healthy weight management program targeting 64 urban, overweight adolescents and its effect on physical fitness, physical activity and blood lipid profiles (2009). The Teaching, Encouragement, Exercise, Nutrition and Support (T.E.E.N.S.) program at Virginia Commonwealth University assessed BMI, percent body fat, CVF, and physical activity levels. In addition, participants attended weekly 30-minute nutrition education and behavioral support sessions. Participants were required to exercise once a week at the T.E.E.N.S facility and twice a week at an offsite facility of their choice. Training sessions consisted of 30 minutes of treadmill or cycle ergometry followed by 30 minutes of resistance training (2-3 sets of 12-15 repetitions of 10 common exercises). Pre and Post data showed a 10.8% increase in CVF, 2.6% reduction in percent body fat, 7.2% reduction in total cholesterol, and 8.4% reduction in low-density lipoprotein, no significant changes were viewed in BMI. Due to limitations, such as a 61%
attrition rate, and lack of control group, authors warrant continued evaluation of the T.E.E.N.S program design.

In comparison, Sothern and his colleagues developed a structured, very low calorie diet (VLCD), a moderate-intensity progressive exercise program and behavior modification and program to assess the effectiveness of an outpatient weight reduction program and the impact of a multi-disciplinary approach on growth velocities and weight loss maintenance after 1 year (Sothern et al., 2000). In this intervention, 56 children, between 7-17 years, were entered into one of four cohorts, with 11 to 18 subjects starting every 3-months, over an 18-month period. Growth velocity and weight, expressed as a percentage of their ideal body weight (IBW), were measured at baseline, after 10-20 weeks and at 1-year. Moderately obese (150-199% IBW) and severely obese (>200% IBW) subjects remained in an acute 20-week, acute, VLCD program and mildly obese (130-149% IBW) subjects were enrolled in a 10-week VLCD program. Total calorie allowance was not mentioned. After the 10-20 week acute intervention, subjects were switched to a weight maintenance diet program for the remainder of the year or until goal weight (120% IBW) was achieved. The exercise component consisted of progressive moderate-intensity aerobic exercises and strength and flexibility exercises. Intensities remained at 45-55% of VO2 max throughout the acute phase and exercise prescriptions were tailored to the participants weight class. The final component was a behavior modification portion in which weekly group and families attended behavior modification sessions. Height, weight, BMI and triceps and subscapular skinfold thicknesses were routinely obtained. This study showed a significant decrease in body weight with an average of 9.4 kg, the mean ideal body weight decreased from 33.9% to 30.4%, and body fat decreased from 46.4% to 39.1% after the acute intervention. After
1 year, the average BMI (kg/m\(^2\)) was 25.0 (mild obesity), 29.0 (moderate obesity) and 34.8 (severe obesity).

Although the VLCD and exercise intervention study showed greater changes in weight loss and body fat via a strict diet and exercise program, only assumptions can be made of its effectiveness in improving physical fitness factors and increasing overall physical activity. The study can attribute its success to the strict diet, but whether or not the participants adhered to the diet post-intervention is not mentioned so further investigation should be warranted. The T.E.E.N.S. study assessed physical fitness, physical activity and physiologic characteristics through similar intervention components as the VLCD intervention. Yet, T.E.E.N.S. may be a better reflection of the importance of cardiorespiratory fitness and body composition in today’s adolescents.

A notable difference between the T.E.E.N.S. study and the VLCD intervention is the behavior modification portion, in T.E.E.N.S. participants individually attended sessions where as in the VLCD intervention, participants attended weekly group and family sessions, it is possible that family or parental involvement can have a greater influence on behavior change by educating the family unit rather than an individual participant, and providing a support structure.

In summary, both studies present effective program models for a multi-disciplinary approach to combat youth and adolescent obesity. Keeping in mind the physical activity recommendations for youth and adolescents, both aerobic exercise and strength training should be incorporated into a moderate to vigorous intensity, progressive, exercise program. Exercises and activities should be physically challenging to promote health-related fitness adaptations such as improved body composition, improved CVF and muscular strength/endurance and flexibility.
More attention and programming may focus on aerobic exercise at vigorous intensities in order to improve CVF and possibly impact adiposity and body composition. In addition, physical activity interventions in low-income Latino communities should focus on educating and promoting active lifestyles and healthy behaviors through culturally sensitive approaches. Taking into consideration the Latino environment and its limited access to healthy foods and areas for play, interventions should include discussions on nutrition and diet and minimizing sedentary behaviors such as screen time.
Reference


http://www.cde.ca.gov/ta/tg/pf/pftresults.asp


A. EduCare Medical History Questionnaire

Student's Name ____________________________________________________________ M  F ________________________________
Birth Date __________________________ School of Attendance ________________________________

HEALTH INFORMATION
Name of child's physician: __________________________ Telephone Number (____) ________________________________

1. Has your child been ill recently? If so, describe ____________________________________________________________

2. Has your child been exposed to a communicable disease during the past month? If so, which one? ____________________________________________________________

3. Will your child be taking prescribed or over-the-counter medication? Yes ______ No ______ Medication must be given to the teacher or center director and labeled with directions for use in the original pharmacy container. Name of medication: ____________________________________________________________

Attach completed "Request for Medication." Attachment A and/or E for prescribed or over-the-counter medications.

4. Has your child had penicillin? Yes ______ No ______ Is he/she allergic to penicillin? Yes ______ No ______

5. Is your child allergic to any other medicine? If so, list: ____________________________________________________________

6. Is your child allergic to any food? If so, list: ____________________________________________________________

7. Date of last known Tetanus shot: ____________________________________________________________

8. Has your child had any of the following? (If yes, please check):

___ diabetes  ___ asthma  ___ heart trouble/ murmur  ___ home sickness
___ epilepsy/ convulsive disorder  ___ frequent colds  ___ ear aches  ___ bowel problems  ___ car sickness  ___ bed wetting
___ migraine  ___ sinus trouble  ___ hay fever  ___ poison oak rash  ___ sleep walking
___ headache  ___ vomiting  ___ allergy to insect  ___ stings/bites  ___ other health problems

Parents/Guardians will be notified immediately of any illness or accident to their child. Please attach any additional information that will help the staff assist your child.

AUTHORIZATION FOR MEDICAL CARE

To the Center Director:

Should it be necessary for my child to have medical treatment or care while attending the outdoor education center, and I cannot be reached by telephone, I hereby give the center personnel my permission to use their judgment in obtaining medical care. I understand that any cost of the above will be my responsibility.

Signed this ______ day of ________________________ 20____ Signature of Parent or Guardian ________________________________

Address

TELEPHONE NUMBER WHERE PARENT OR GUARDIAN MAY BE REACHED:

Home (____) ______________ Business (____) ______________ Emergency Telephone (____) ______________

________________________________________________________

Review of health card and comment if indicated: ____________________________________________________________

School nurse's initials ________________________________

Rev. 4/05

OUTDOOR/HEALTH
B. EduCare Parental Consent and Registration Form

San Fernando High School
After School Program

FREE! Grades 9-12
Site Coordinator – Lorena Alvarado

INFORMATION

Name: ___________________________ Student ID: ___________________________

Grade: ______ Date of Birth: ___________ M or F Ethnicity: ______________________

Address: __________________________________________ Apt. # ______

City ___________________________ Zip ______

Home Phone #: ___________________________ Cell Phone #: ______________________

Email Address: __________________________________________

Parent/Guardian (1): __________________________________ Relation: ______________

Cell Phone #: ___________________________ Work Phone #: ______________________

Email Address: __________________________________

Parent/Guardian (2): __________________________________ Relation: ______________

Cell Phone #: ___________________________ Work Phone #: ______________________

Email Address: __________________________________

EMERGENCY CONTACTS

Name: __________________________________ Relation: ______________

Home Phone #: ___________________________ Cell Phone #: ______________________

REVISED: 4/18/12
B. (Continued) EduCare Parental Consent and Registration Form

San Fernando High School
After School Program

The program is free and runs daily.
Participation in some of the activities is limited and will be offered on certain days.

EMERGENCIES
In the case of emergency, EduCare will make every effort to contact the guardians of the child involved before any treatment is begun. However, in the event we are unable to make contact with the parents or guardians, we require that the parent or guardian sign this medical release in order for their child to participate in programs.

I HEREBY AUTHORIZE THE PHYSICIAN OR HOSPITAL SELECTED BY EDUCARE TO HOSPITALIZE, SECURE TREATMENT FOR, AND TO ORDER INJECTION, ANESTHESIA, OR SURGERY FOR MY CHILD.

It is further understood that the undersigned will assume full responsibility for any such treatment, including the payment of all costs and will hold the EduCare Foundation, its representatives and directors, counselors and staff, harmless.

Name of Insurance: ________________________________ Policy #: ________________________________

Parent/guardian Name (Print): ________________________________

Parent/guardian Signature: ________________________________ Date: __________________

Does your child have any physical/mental limitations we should know about? YES NO

Brief description: ____________________________________________

PHOTO RELEASE
In consideration of possible participation in EduCare programs, I hereby grant EduCare or any person authorized by EduCare to photograph, film, or tape program participants and to use, publish, copyright, and distribute images of my son/daughter. I release and discharge EduCare’s officers, employees and volunteers from any and all claims in connection with the use of the above images.

Parent/guardian Name: ________________________________ Parent/guardian Signature: ________________________________ Date: __________________

RELEASE OF LIABILITY
I hereby agree to hold harmless EduCare staff, directors and administration of any liability related to any and all EduCare activities and programs. I hereby acknowledge the existence of the implied risk associated with all programs for children and the area where such activities and programs take place.

I HAVE READ AND UNDERSTOOD ALL THE INFORMATION INCLUDED IN THIS CONTRACT AND BY SIGNING, I AGREE TO ADHERE TO THE TERMS OF THIS CONTRACT. IT IS FURTHER UNDERSTOOD THAT POLICIES AND TERMS OF THIS CONTRACT MAY BE CHANGED AND AMENDED, AND, THAT I SHALL BE INFORMED IN WRITING OF SUCH CHANGES WITH A 30 DAY NOTICE. I HAVE RECEIVED A COPY OF THIS CONTRACT.

Parent/guardian Name: ________________________________ Parent/guardian Signature: ________________________________ Date: __________________

Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, Title VI of the Civil Rights Act of 1964 and Title IX of the Education Amendments of 1972, as well as all other federal and state laws prohibit discrimination against individuals based on the following protected categories: age, disability (mental or physical disability or reasonable accommodation), ethnicity (national origin, and race), marital status, religion (including religious accommodation), sex (including sexual orientation or gender identity, pregnancy, childbirth or related medical condition), or any other basis protected by federal, state, local law, ordinance, or regulation.

REVISED: 4/18/12
C. Borg Rate of Perceived Exertion Scale

Table A1*

<table>
<thead>
<tr>
<th>15-Grade Scale</th>
<th>10-Grade Scale</th>
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<tr>
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<tr>
<td>7</td>
<td>0.5</td>
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<tr>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
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<tr>
<td>10</td>
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<td>11</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>5</td>
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<tr>
<td>13</td>
<td>6</td>
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<td>18</td>
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<tr>
<td>19</td>
<td>Very, very hard</td>
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### D. Physical Fitness Test Record Sheet

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<th>Age:</th>
<th>Gender:</th>
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<th>F</th>
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<tbody>
<tr>
<td>BMI</td>
<td>Height:</td>
<td>Weight:</td>
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<td></td>
</tr>
<tr>
<td>% Body-Fat</td>
<td>(R) Tricep:</td>
<td>(R) Calf:</td>
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<td></td>
</tr>
<tr>
<td>Push-Up (modified)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curl-Up</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Trunk Extensor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sit and Reach</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Fitness Zone</td>
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</table>
E. PACER Test Score Sheet

<table>
<thead>
<tr>
<th>Laps (20-meter Lengths)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
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<tr>
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</tr>
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</table>

Total Laps Completed _____

58