

## ORIGINAL RESEARCH

# Do teen mentors improve the effectiveness of a culturally-adapted lifestyle intervention in Arab American youth? A randomized, controlled study

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## ABSTRACT

**Objective:** Rates of overweight and obesity have been steadily increasing among Arab American youths. The current study aimed to measure the effectiveness of a translated and culturally adapted health education curriculum, Just for Kids!, for 3rd, 4th and 5th grade children delivered by trained high school aged mentors compared to the same content delivered by an adult group leader in a classroom setting. The contribution of a culturally-specific lifestyle intervention targeting parents on the effectiveness of the curriculum was also assessed.

**Methods:** A four-group randomized controlled trial was used, which incorporated a pretest-posttest design to evaluate and compare the effects of two curriculum delivery methods. Study participants were randomly assigned to teen mentors or adult led groups.

**Results:** Nutritional knowledge improved in all groups with the most significant increase noted in individually-mentored participants with parental involvement. Individually-mentored participants with parental involvement ( $n = 17$ ) had improved intentions (mean = 1.600,  $p = .990$ ) and self-efficacy (mean = -1.233,  $p = .946$ ) toward being physically active (mean = 1.600,  $p = .990$ ) relative to participants in the adult-led group with parental involvement ( $n = 26$ ).

**Conclusions:** Study results supported the use of teen mentors in obesity prevention among Arab American children. Improved attitudes, intentions and self-efficacy toward eating healthfully were found among all participants in this study.

**Key Words:** Obesity, Arab American youth, Youth obesity Interventions, Mentor program

## 1. INTRODUCTION

Rates of overweight and obesity have been steadily increasing among Arab Americans, a rapidly growing segment of the U.S. population. Although little is known about the exact prevalence of obesity among Arab American youth, a study conducted by Abou-Medien and Shamo (2005) found that about 28% of fifth grade Arab American youth in Michigan

are overweight, and about 17% are obese.<sup>[1]</sup> Obesity is a major risk factor for several chronic diseases including diabetes, hypertension, cardiovascular disease, cancer, and premature death.<sup>[2]</sup> A recent study demonstrates that teen obesity predicts the future risk of cardiovascular disease. Thus, a large proportion of Arab American youth are at increased future risk for increased morbidity and mortality later in life.<sup>[3]</sup>

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Despite this alarming observation, there remains a lack of culturally-specific and age-appropriate lifestyle interventions targeting this unique population.

Health behaviors in children have been shown to be impacted by multiple factors, therefore interventions must leverage and integrate several sectors of a child's world to be effective.<sup>[4]</sup> A critical consideration for this population is culture. Several strategies to prevent childhood obesity in the U.S. have been established,<sup>[2]</sup> however, the translation of these effective programs into the culturally unique, largely immigrant, and medically underserved Arab American community is unquestionably a challenge. Culture shapes health behaviors namely diet and leisure patterns which tend to be target components of lifestyle interventions.<sup>[5]</sup> Thus there is a need to identify culturally-specific and community-based approaches to obesity prevention that will have the reach and sustainability among youth of this at-risk ethnic group. Culture is not the only crucial consideration when developing an intervention for school-age children. Parents largely influence the child's nutritional choices, serve as the facilitators of physical activity (e.g., transporting children to sporting venues), and the primary decision-makers as to whether the family engages in an active lifestyle.<sup>[6]</sup> Parents function as role models for their children (especially younger children). Parents' personal behaviors and interactions with their children can either influence the value of physical activity or promote sedentary behaviors. These communicated family norms affect a child's behavior.<sup>[7]</sup> Thus, intuitively, parental involvement is an essential component to any school-based intervention. Though culturally sensitive care guides have been developed to help providers care for Arab American families,<sup>[8]</sup> we have been unable to locate any published studies investigating parental influences on the health behaviors of children in the Arab American community.

Age is also an important consideration. It is prudent to determine the optimal age at which to intervene in order to ensure a long-term impact. Children in third and fourth grade are one of the most physically active segments of the population.<sup>[9]</sup> This is an ideal time to influence children to increase their regular physical activity and reinforce healthy dietary choices, as children's behaviors in these two areas usually become less healthy as they progress through the pre-teen period.<sup>[10,11]</sup>

Mentoring is also key to initiating and sustaining positive health behaviors. Mentoring is a psychosocial intervention that brings two people together into a social relationship allowing a more knowledgeable individual, usually older, to share their experience with a person that is less knowledgeable in order to provide support and guidance.<sup>[12,13]</sup> The

presence of a "positive" mentor in the life of a young person has been shown to support healthy growth and development and serve as a shield against potential social risks.<sup>[14]</sup> Mentors may help children overcome personal and social barriers, expose them to new relationships and opportunities, and assist in developing decision making and problem solving skills that facilitate success in everyday life.<sup>[15]</sup> Traditional models of mentoring include adults supporting children to reverse academic failure, substance abuse, and other social risks.<sup>[16,17]</sup> Teen mentors can have a significant influence on elementary school-age children as they serve as powerful role models for younger children and can be as effective in promoting positive behaviors and attitudes to reduce high risk behaviors as adult mentors.<sup>[18,19]</sup>

We incorporated these factors (culture, parental role modeling, impressionable age, and teen mentoring support) to adapt the existing health education and lifestyle curriculum "Just for Kids"<sup>[20]</sup> for Arab American youth. Our overall goal is to identify effective interventions to reduce the future burden of chronic illness and enhance quality of life in the socially and economically disadvantaged Arab American population by using cost-effective community participatory approaches. This study has two specific aims. The primary aim of this study is to compare the impact of a teen-mentoring program to an adult delivered group education on the effectiveness of a culturally-adapted lifestyle curriculum for children in 3rd through 5th grades. The second aim is to compare health behavior outcomes among participants whose parents participated in a culturally specific lifestyle intervention that promotes physical activity and healthy lifestyle choices compared to participants whose parents did not participate in the intervention.

## 2. METHODS

This was a four-group randomized controlled trial, which incorporated a pretest-posttest design to evaluate and compare the effects of two curriculum delivery methods (teen-mentoring versus adult-led education). All eligible school children were invited to participate, but only one child from each family was selected, via randomization, to be included in data analysis for this study. Youth participants were randomly assigned to teen mentors or to adult-led groups. Excluded siblings were randomized to one of three adult-led groups. Teen-mentored youth participants were assigned to mentors of the same gender when possible. Parents of all recruited children were invited to attend separate educational sessions. Prior approval for all study procedures was obtained from the Institutional Review Boards of Oakland University and Wayne State University and the Dearborn Schools Board.

## 2.1 Participants

### 2.1.1 Youth participants for lifestyle intervention

Youth participants were recruited from an elementary school in Dearborn, MI whose student body is largely Arab American. Approximately 140 students were enrolled in third, fourth, and fifth grades. Several meetings with the school staff, the parent liaison, and the study investigators were conducted to discuss the details of the research including the methodology and the experimental intervention. A brief presentation about the intervention was given to school staff and students at an assembly during school hours. The research team worked with school staff to develop flyers describing the research study, in both English and Arabic languages. These flyers were sent home with children. The flyers also included information about the separate intervention targeting the parents and a parental consent form for their child's participation. Parental consent and participant assent were completed in English or Arabic, as appropriate, prior to the start of the study.

### 2.1.2 Parents attending separate parent-focused intervention

During a parent-teacher organization meeting at the elementary school, the study was described to parents, in Arabic and English. All parents were invited to attend the parental intervention if their child(ren) would be participating in the study. Consent was obtained from all parent participants before the start of the first session.

### 2.1.3 Teen mentors

Mentors were recruited from a high school which was in close proximity to the selected elementary school and one with a predominant Arab American student body. A parent liaison of the high school identified students that may be interested in serving as positive role models for children. Potential mentors were contacted through email and a meeting was held to discuss the program in detail. A letter, in both Arabic and English, was given to mentors and their parents, which described details of the study. Parental consent and assent was obtained for each mentor prior to the start of the intervention.

### 2.1.4 Adult mentors

The research staff presented information to school staff involved in the study regarding the role of adult mentors. School administrators were asked to identify potential adult leaders for the group sessions. An alternate adult leader was identified and agreed to serve as a "substitute" if needed.

## 2.2 Intervention

### 2.2.1 Curriculum

The design, content, and delivery of the intervention was formulated to enhance adoption and overcome barriers. The Just

for Kids! program is a theoretically based health curriculum that uses cognitive, behavioral, and affective techniques to promote behavioral changes in diet and physical activity.<sup>[20]</sup> The techniques focus on increasing knowledge, attitudes, self-efficacy, and perceived control over ones' behavior in regular physical activity. It addresses the roles of exercise and food in promoting health, moderation in sedentary activities, and encourages children to set reasonable behavioral goals for themselves. Consistent with the focus of the Just for Kids! curriculum, the effectiveness of the health education curriculum was measured using concepts from the theory of planned behavior, self determination theory, and social cognitive theory.

An advisory committee composed of community members and research staff was charged with reviewing the curriculum to ensure that content was culturally appropriate; modification and cultural adaption of the curriculum was made as recommended. Lessons within the curriculum encourage behavior modification through reinforcement, self-monitoring, planning, and goal setting, while emphasizing the importance of physical activity, moderation of sedentary activities, and the role that food has on health. Self-acceptance, processing of emotions, positive self-evaluation, and assertiveness are also integrated into the curriculum.<sup>[20]</sup>

### 2.2.2 Teen mentor and adult mentor training

Teen mentors were trained on two separate days utilizing The Developmental Mentoring Mentor's Handbook: Children with Adolescent Mentors, Cross Age Mentoring (CAMP) Program.<sup>[21]</sup> Responsibilities of mentors, which were included in the CAMP training guide, were reviewed and reinforced. Research staff provided verbal and written information on the curriculum and answered any questions. Each mentor was provided with a mentor handbook, an instructor guide for the curriculum, and a copy of the participant workbook.

Adult mentors completed one training session. Content of the Just For Kids! curriculum was reviewed by research staff and any questions regarding the curriculum were answered. Adult leaders were given an instructor guide and a copy of the participant workbook. Contact information was exchanged between research staff and adult leaders.

Contact information was exchanged between research staff and teen- and adult-mentors to ensure communication. Lessons were reviewed with research staff prior to weekly sessions and an outline of each session was emailed to teen- and adult-mentors to ensure congruent delivery for each study arm.

### 2.2.3 Teen-mentoring sessions

All mentor/mentee dyads met at the same time in the cafeteria of the school building. Dyads spent the first 50 minutes of the face-to-face meeting interacting around the structured Just For Kids! activities. Participants received their own Just For Kids! workbook. One lesson from the Just for Kids! curriculum was covered each week. Mentors read the story from each lesson aloud to their mentee, then assisted their mentees with the activities at the end of each lesson. Once the lesson was completed, mentors and mentees spent one hour in the school gymnasium interacting in unstructured physical activity. At the conclusion of the session, mentees were released to their parents. Research staff members supervised all weekly meetings and were available to answer questions or address participant concerns. Prior to the latter three weekly lessons, mentors met with research staff for debriefing and to ask questions and conduct problem solving.

### 2.2.4 Adult-led group sessions

Adult mentors received the culturally adapted Just for Kids! curriculum in a structured classroom setting each week for one hour after school at the elementary school they attended. Participants received their own Just For Kids! workbook. Adult mentors read each lesson aloud to children and activities at the end of each lesson were completed as a group in the classroom. Lessons took longer in a group setting than in the mentor/mentee dyads. Consequently, each session lasted nearly 60 minutes, which rarely allowed time for physical activity in the gymnasium. At the conclusion of the session, the children were released to their parents. Adult mentors were debriefed and had the opportunity to discuss experiences and ask questions at the end of each session.

### 2.2.5 Parent sessions

Parents attended four 90-minute weekly group sessions. These sessions were held in the cafeteria of the elementary school and delivered by a registered nurse. The content of the sessions focused on lifestyle intervention that emphasized physical activity, weight loss, and healthy lifestyle choices.<sup>[5]</sup> Education included examples of healthy snacks and menu planning, as well as, information about how to modify traditional Arabic food cooking techniques. Sessions included time for parents to ask questions.

## 2.3 Outcome measures

All measures were collected prior to the start of the intervention and within one-month post-intervention. Measures comprised of items adapted from published studies showing acceptable psychometrics (Cronbach's alpha 0.65-0.95) and validity when used among children.<sup>[22-27]</sup> Pre and post-test nutritional knowledge was measured using a 15-item ques-

tionnaire intended for use with the Just for Kids! curriculum. Responses of the questionnaire were summed and given percentage scores. Behaviors were assessed using questions that inquired about attitude, intentions, and self-efficacy on healthy eating and exercise. Attitude toward eating healthfully was assessed by asking participants to rate "I think for me, eating healthfully in the next week would be..." with 6 different responses ("fun/boring", "good/bad", "easy/hard") on a scale from 1-5; the internal consistency reliability of this scale was 0.71. Attitude toward being physically active was measured by participants rating "I think, for me, being physically active in the next week would be..." with 10 different responses ("fun/boring", "good/bad") using a 1-5 scale; the internal consistency reliability coefficient was 0.79. Responses to 5 questions for intentions about eating healthfully were measured using a 1-5 scale to rate "In the next week, starting tomorrow, I plan to eat...". Intentions about physical activity targeted 3 measures, participants responded to "In the next week, starting tomorrow, I plan to do an activity on my own time, in addition to what I have to do in school that makes me..." on a 1-5 scale; the internal consistency reliability coefficient for this item was 0.79. Self-efficacy for eating healthfully assessed 5 behaviors, participants were prompted to rate "I am sure I'm able to..." on a scale 1-5; the internal consistency reliability coefficient for this item was 0.73. Physical activity self-efficacy was assessed using a 1-5 scale which rated 3 target areas using the prompt "I am sure I'm able to do an activity on my own time on most days, in addition to what I have to do in school..."; the internal consistency reliability coefficient was 0.73.

Height and weight of study participants were measured to calculate body mass index (BMI) percentiles. Height was obtained using a calibrated 6 foot height chart secured to a wall. Participants removed their shoes and were instructed to stand up straight, with their heels and backs against the wall, while looking straight ahead. Height was obtained using a T-square lowered to the top of the participant's head and measured to the nearest 0.25 inches. Weight was measured using a Siltec PS500L calibrated scale (Siltec Inc., Lake Stevens, WA) after participants removed their shoes and any extra layers of clothing (e.g. sweatshirt or jacket). BMI percentile for age and gender was calculated using the Centers for Disease Control and Prevention's (2015) BMI calculator and recorded for each participant.<sup>[2]</sup> Blood pressure was obtained from seated participants using an automatic blood pressure monitor and an appropriately sized cuff. Blood pressure measurements were completed twice on each participant and the average blood pressure was recorded.

### 2.4 Statistical analysis

Participant demographics, behavior measures, BMI and blood pressure are summarized with descriptive statistics. Regression analysis was used to determine internal consistency reliability coefficient for measures. A paired-sample *t*-test was utilized to compare pre- to post-intervention changes in behavior, BMI, and blood pressure within each intervention group. An independent samples *t*-test was used to compare differences in behavior change, BMI, and blood pressure between intervention groups.

### 3. RESULTS

Study participants consisted of 72 elementary school children. The curriculum was delivered by 20 teen mentors (10 mentors participated on two different days to mentor a sec-

ond participant) and 3 adult mentors (a fourth adult mentor was utilized as a substitute as needed). Participant demographics are presented in Table 1. Participants were almost entirely Arab American (98.6%), ages 8-11 years, and were 44% female. Most participants or their ancestors migrated from Lebanon (66.2%), followed by Iraq (18.3%), Palestine (8.5%), Yemen (5.6%), and Morocco (1.4%). Teen mentors were 15-17 years of age and included 14 females and 6 males. Adult mentors were staff members at the school who had daily interactions with participants prior to the intervention. Participation of parents varied at each meeting, ranging between 27 to 43 individuals, with the highest turnout seen at the last session. Each parent attending group sessions had at least one child participating in the intervention.

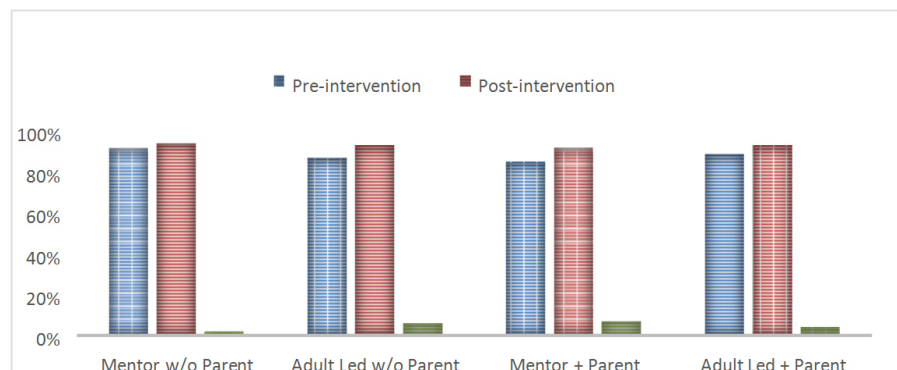
**Table 1.** Participant Demographics

Variables	N	Individual Mentor N (%)	Group Mentor N (%)
<b>Gender</b>			
Male	40	17 (56.7%)	23 (54.8%)
Female	32	13 (43.3%)	19 (45.2%)
<b>Grade</b>			
3rd	20	7 (23.3%)	13 (31%)
4th	27	13 (43.3%)	14 (33.3%)
5th	25	10 (33.3%)	15 (35.7%)
<b>Age</b>			
8	17	9 (52.9%)	8 (47.1%)
9	21	14 (66.7%)	7 (33.3%)
10	27	14 (51.9%)	13 (48.2%)
11	7	5 (71.4%)	2 (28.6%)
Mean Age	72	9.4 (SD 1.00)	9.3 (SD 0.92)

Note. SD: standard deviation; N: number of participants.

Overall knowledge of healthy foods slightly improved among all participants (see Figure 1). Mean questionnaire scores showed a small increase from pre- to post-intervention among all participants. The largest increase in nutritional knowledge was among mentored participants with parental

involvement (n = 16). Adult-led participants without parental involvement (n = 16) had a marginally higher increase in their nutritional knowledge than adult led participants with parental involvement (n = 26) and mentored participants without parental involvement (n = 14).



**Figure 1.** Pre- to Post-Intervention Change in Nutritional Knowledge

Regarding behavioral measures, both mentored (n = 30) and adult-led (n = 42) participants had significant improvements in their one-week self-reported eating habits ( $p < .01$  for both groups) and perceived self-efficacy ( $p < .05$  for both groups). However, only the adult-led group had significant improvement in attitude towards physical activity ( $p = .02$ ) (see Table 2).

Mentored participants with parental involvement (n = 17) had improved only on self-efficacy toward eating healthfully ( $p = .03$ ). Among adult led with parental involved participants (n = 16) behavior improvement were noted in the measures of intentions toward eating healthfully ( $p < .01$ ), self-efficacy ( $p < .01$ ), and in their eating habits in the past one week ( $p < 0.001$ ) (see Table 3).

**Table 2.** One Sample *t*-test Pre/Post Intervention of Behavior for Mentor/Group

Behavior	Mean M/G	SD M/G	T M/G	p M/G
<b>Toward Eating Healthfully</b>				
Attitude	-0.47/-0.45	3.28/2.77	-0.78/-1.06	.22/.15
Intentions	-0.67/-0.81	3.73/3.35	-0.98/-1.57	.17/.06
Self-efficacy	-1.20/-1.12	3.62/2.54	-1.81/-2.86	*.04/**< .01
In the past week	-1.73/-1.62	3.77/3.51	-2.52/-2.99	***< .01/**< .01
<b>Toward Physical Activity</b>				
Attitude	0.80/-1.12	3.09/3.42	1.42/-2.12	.92/* .02
Intentions	1.47/0.31	3.59/3.15	2.24/0.64	.98/.74
Self-efficacy	1.37/0.67	3.31/2.85	2.26/1.52	.98/.93

Note. SD: Standard Deviation, M: mentored group, G: adult led group; Significant: \*  $\alpha = .05$ ; \*\*  $\alpha = .01$ .

**Table 3.** One Sample *t*-test Pre/Post Intervention (Mentor + Parent)/(Group + Parent)

Behavior	Mean (M+P)/(G+P)	SD (M+P)/(G+P)	T (M+P)/(G+P)	p (M+P)/(G+P)
<b>Toward Eating Healthfully</b>				
Attitude	0.00/-0.79	3.34/2.66	0.00/-1.91	.50/* .03
Intentions	0.03/-1.31	3.47/3.43	0.05/-2.47	.52/**< .01
Self-efficacy	-0.90/-1.33	2.55/3.33	-1.93/-2.60	*.03/**< .01
In the past week	-0.23/-2.69	3.74/3.15	-0.34/5.23	.37/**< .001
<b>Toward Physical Activity</b>				
Attitude	0.07/- 0.60	4.10/2.82	0.09/-1.37	.54/.09
Intentions	1.60/0.21	3.58/3.12	2.45/0.45	.99/.67
Self-efficacy	-1.23/0.76	3.13/3.01	2.16/1.64	.98/.95

Note. SD: Standard Deviation, M+P: Mentored group + Parent involvement, G+P: Adult led + Parent involvement; Significant: \*  $p = .05$ ; \*\*  $p = .01$ ; \*\*\*  $p = .001$ .

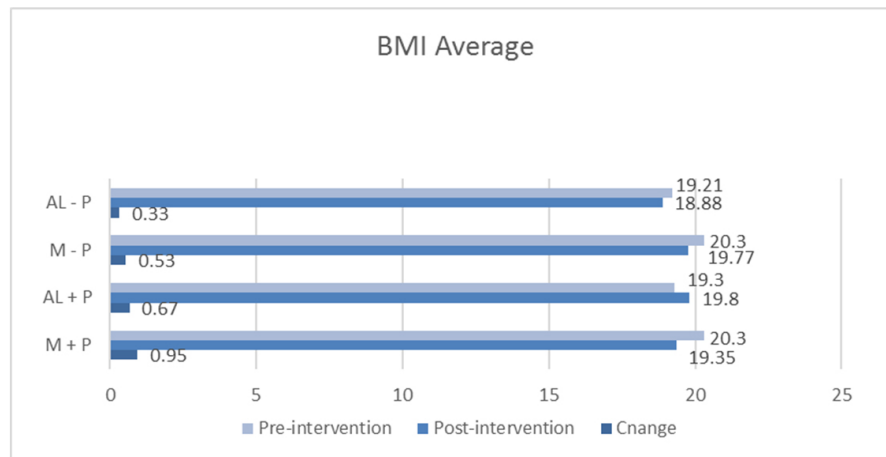
Pre-intervention BMI of all participants was compared to post-intervention BMI to identify and compare differences within groups. A post-intervention decrease in the average BMI was noted in all groups. The average BMI in the men-

tored groups with and without parental involvement was lower relative to that in the adult led participants with or without parental involvement (see Table 4 and Figure 2).

**Table 4.** Mentor/Adult Led BMI mean, max, and min change

Participant	N	Mean	SD	SE	Minimum	Maximum
Mentor	30	-0.86	0.80	0.146	-2.30	0.90
Group	42	-0.54	0.59	0.09	-2.10	0.90
Parent Involved	42	-0.77	0.65	0.10	2.30	0.30
Parent uninvolved	30	-0.53	0.75	0.14	2.10	0.90

Note. N: Number of participants, SD: Standard Deviation, SE: Standard Error.



**Figure 2.** Body mass index change per group

*AL-P: Adult led without parental involvement, M-P: mentor group without parental involvement, AL+P: Adult led with parental involvement, M+P: mentor group with parental involvement*

Pre- and post-intervention blood pressure (BP) measurements were averaged for all participants. No significant change in systolic or diastolic blood pressures was noted in any of the

groups. Table 5 summarizes the descriptive statistics of BP changes in each group.

**Table 5.** Blood Pressure Change

Variables	N	Mean	SD	SE	Minimum	Maximum
Parent Involved	42	0.02	10.93	1.69	-26.00	21.00
Parent Uninvolved	30	3.40	10.65	1.94	-18.00	38.00
Mentor	30	0.17	11.60	2.12	-26.00	23.00
Group	42	2.40	9.90	1.53	-18.00	28.00

Note. N: Number of participants, SD: Standard Deviation, SE: Standard Error

#### 4. DISCUSSION

Our findings provide promising support for delivery of a culturally-adapted lifestyle intervention by teen mentors to Arab American children. All groups showed a slight increase in nutritional knowledge with the largest increase seen in the mentored group with parental involvement. Both teen-mentored and adult-led groups showed significant improvements in healthy eating self-efficacy and self-reported eating habits. Only the adult-led group had a significant improvement in attitude towards physical activity. The largest change in BMI was seen in the mentored group with parental involvement; the change in BMI remained larger in the mentored group even without parental involvement.

Parental involvement appeared to enhance beneficial effects of the intervention. Without parental involvement, mentored children had less increase in knowledge than adult-led children. Furthermore, adult-led children with parental involvement showed significant improvements in two additional dietary behavior measures compared to the aggregate group.

The positive effects of parental involvement seen here are consistent with previous studies that incorporated health education for parents into their interventions.<sup>[28]</sup>

Improved attitudes, intentions, and self-efficacy toward eating healthfully noted in this study are consistent with results of previous research utilizing health education classes and promotion of healthy food options.<sup>[29,30]</sup> The slight improvement seen among the mentored participant group with parental involvement, regarding intentions and self-efficacy toward physical activity, are consistent with other studies that have addressed physical activity. Previous studies have shown that slight change in physical activity behavior occurs without including a hands-on approach to physical activity.<sup>[31]</sup> The minor BMI changes observed among all participants are typical of studies with a duration of six months or less.<sup>[30,32,33]</sup> Parental involvement improved outcomes of behavior for many measures, this is consistent with previous research study results that incorporated health education for parents into their interventions.<sup>[28]</sup>

Surprisingly, mentoring did not have the effect on behaviors that was expected and seen in previous studies.<sup>[34–36]</sup> Although mentoring had a positive effect on healthy eating self-efficacy and one-week eating habits, there was little difference in behavior and knowledge outcomes in this group when compared with the adult-led group. Further research utilizing mentors in the promotion of health among school age children are needed to determine if the amount of time mentors and participants spend in intervention programs impact health behaviors of participants. Additionally, culture may impact the effectiveness of mentoring as an intervention delivery method. The cultural emphasis on respecting authority in Arab culture may make Arab American children more likely to change their lifestyle habits due to adult or parental direction. However, from a practical standpoint, delivery of health promotion activities in an after school setting, by teen mentors, is economical and convenient. Additional benefits of utilizing teens to mentor children include increased knowledge of teens regarding healthful lifestyles, ability to improve leadership and decision making skills of the mentors, and improved community ties.

Study findings also demonstrate that the rates of overweight and obesity within the predominately Arab American population are similar to the rates of overweight and obesity reported among other minority groups in the U.S.<sup>[37]</sup> Approximately 40% of study participants were found to be overweight or obese with a BMI  $\geq$  the 85th percentile prior to the intervention, while 30% of participants had a BMI  $\geq$  the 85th percentile post-intervention. Many factors contribute to childhood obesity including socioeconomic background, geography, genetics, and culture.<sup>[38]</sup> Other contributors to the rates of childhood overweight and obesity include sedentary lifestyle, high caloric intake, and low consumption of fruits and vegetables.<sup>[2]</sup> The rates of overweight and obesity revealed during this study indicates that a serious need for primary prevention exists in this population.

### Limitations

Limitations of this study include its short duration, language barriers, and the education and/or literacy level of participants. Shortening a 10-week curriculum to 8 weeks may have reduced the potential for long-term effects on healthy behaviors. Interventions with a duration of six months or longer

have been shown to improve participant retention of health education.<sup>[33]</sup> Delivery of the curriculum to participants by different mentors and adult leaders may have impacted participant understanding of the lessons. Furthermore, mentors read lessons aloud to mentees in a school cafeteria where other mentor/mentee dyads were also reading/listening to lessons, which likely was distracting and presumably disruptive to the learning process. Lessons were taught in English, a small percentage of participants were not fluent English speakers and may not have had a total understanding of the lessons they were taught. Although the Just For Kids! curriculum is intended for third and fourth graders, some of the participants may have struggled to understand the content while older children may have found it difficult to listen to stories intended for younger children. Inconsistent participation among parents during parental sessions may have limited study results regarding parental involvement. Lastly, limitations of the study may also be due to the low internal consistency reliability coefficient of some of the subscales. Although a coefficient of 0.70 was found to be reliable, two of the subscales were just below 0.70 which may have decreased the reliability of these two particular behaviors.

### 5. CONCLUSION

This study confirmed that the rates of overweight and obesity within the predominately Arab American population are similar to the rates of overweight and obesity reported among other minority groups in the U.S. Study results supported the use of culturally-adapted lifestyle intervention to prevent obesity in Arab American children. Study results also supported the use of teen mentoring and parental involvement in obesity prevention among Arab American children. Improved attitudes, intentions and self-efficacy toward eating healthfully were found among all participants in this study.

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### CONFLICTS OF INTEREST DISCLOSURE

The authors declare that there is no conflict of interest.

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