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Effects of a diabetes prevention programme on weight-specific quality of life in Latino youth

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Summary

Objective: To examine the effects of a diabetes prevention programme on weight-specific Quality of Life (QOL) in obese Latino youth.

Methods: Fifteen obese Latino adolescents (body mass index % = 96.4 ± 1.2; age = 15.0 ± 1.0) completed a 12-week culturally grounded, community-based intervention designed to improve physical and psychosocial health. Weight-specific QOL was assessed by the Youth Quality of Life-Weight module and compared with age, sex and ethnicity-matched lean youth.

Results: At baseline, intervention youth exhibited significantly lower weight-specific QOL compared with lean youth (70.8 ± 5.4 vs. 91.2 ± 2.2, $P = 0.002$). However, following the intervention, total weight-specific QOL increased by 21.8% among obese youth (70.8 ± 5.4 to 86.2 ± 4.3, $P < 0.001$) and was no longer different from lean controls. Significant increases in weight-specific QOL were noted across all subdomains including self (45.7%), social (11.9%) and environmental (36.2%) despite the fact that weight did not change (90.6 ± 6.8 to 89.9 ± 7.2, $P = 0.44$). The improvements in QOL were maintained for up to 12 months after the intervention.

Conclusion: Weight-specific QOL among obese Latino youth can be improved through lifestyle interventions to a level similar to lean peers. Further, weight loss may not be necessary to observe improvements in QOL.

Keywords: Adolescent, diabetes prevention, lifestyle, QOL.

Introduction

Obesity and type 2 diabetes disproportionately impact Latino youth (1,2). In addition, obesity is associated with reduced overall and weight-specific quality of life (QOL) which further contributes to poor health outcomes (3,4). To date, studies examining the associations between weight-status and QOL have been limited by cross-sectional designs and/or focus on clinical populations with very few including Latino youth (5). Therefore, the purpose of this study was to evaluate the impact of a community-based diabetes prevention programme on weight-specific QOL among obese Latino youth.

Methods

Participants – intervention

Fifteen obese Latino adolescents (eight females; seven males, body mass index [BMI] percentile = 96.4 ± 1.2, 15.0 ± 1.0 years) completed a 12-week diabetes prevention programme described elsewhere (6). Briefly, adolescents and families attended weekly lifestyle education classes delivered in groups to parents and children by bilingual/bicultural *promotoras* (health educators). Topics included health risks of obesity, nutrition education, self-esteem and empowerment. The curriculum was guided by Social Cognitive Theory (7) using an

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adapted ecodevelopmental framework (8) to support behaviour change and diabetes risk reduction. Health improvement rather than weight loss was the goal. Adolescents also attended three 60-min exercise sessions per week. These sessions included individual and group activities that consisted of structured aerobic and resistance exercise and unstructured physical activities and games. Heart rate was monitored on a weekly basis throughout the intervention with a target heart rate of 150 beats per minute for the majority of each 60-min activity session.

A subset of youth ($n = 9$) returned 12 months after the intervention for follow-up evaluation. Various reasons were identified for the missing follow-up data, including unable contact, not interested in returning and moved out of state. No baseline or post-intervention differences in demographic or QOL data were noted between those youth available at 12 months vs. those that did not return. The Arizona State University IRB approved this study and consent/assent was obtained from all parents/participants.

Participants – control

For comparison purposes, data from lean (BMI percentile = 57.5 ± 5.0) Latino adolescents matched for age and sex were recruited from the community through similar mechanisms.

Measures

Intervention youth were assessed for anthropometrics, cardiometabolic health and lifestyle behaviours with results published elsewhere (6). Prior to performing any of the aforementioned measures, weight-specific QOL was assessed using the Weight-Specific Youth Quality of Life instrument. The Weight-Specific Youth Quality of Life instrument is a 21-item instrument that captures three domains (self, social and environment) that are summed for a total weight-specific QOL score (9). The self domain pertains to a participant's feelings about themselves (example: I feel depressed about how much I weigh), the social domain pertains to relationships with others (example: Because of my weight it is hard to find a girlfriend or boyfriend) and the environment domain pertains to opportunities and challenges in a participant's social and cultural milieu (example: Because of my weight it is hard for me to find clothes that fit me). Total and subdomain scores are scaled from 0 to 100 with higher scores indicating a higher QOL. QOL was assessed at pre-intervention, post-intervention and 12 months.

Statistical analysis

Independent sample *t*-tests were used to compare lean with obese youth and paired sample *t*-tests were used to examine changes in QOL in response to the intervention. Data were analysed using SPSS 20 (IBM, Armonk, NY, USA) with significance set at $P < 0.05$.

Results

Compared with lean controls, intervention youth exhibited significantly lower baseline scores across all three subdomains of weight-specific QOL (Table 1). When subdomains were totalled, overall weight-specific QOL was 28.8% lower in intervention youth. Following the intervention, significant increases in self (45.7%), social (11.9%) and environmental (36.2%) QOL were noted and corresponded to a 21.8% increase in overall weight-specific QOL (Table 1). Post-intervention weight-specific QOL was increased to the level of controls. Notably, the improvements in QOL were observed in the absence of significant weight loss (90.6 ± 6.8 to 89.9 ± 7.2, $P = 0.44$) and were not correlated with changes in weight ($r = –0.26$, $P = 0.34$) or BMI ($r = –0.33$, $P = 0.23$). Twelve-month follow-up data suggested that increases in QOL were maintained over time

Table 1 Weight-specific quality of life in lean and obese youth

	Lean controls	Obese pre	Obese post	Intervention Δ (95% confidence interval)	Lean vs. pre *P*-value	Pre vs. post *P*-value	Lean vs. post *P*-value
Total	91.2 ± 2.2	70.8 ± 5.4	86.2 ± 4.3	15.5 (8.5–22.5)	0.002	<0.001	0.3
Self	90.6 ± 2.9	53.8 ± 6.8	78.1 ± 7.1	24.3 (13.1–35.5)	<0.001	<0.001	0.1
Social	93.6 ± 1.6	79.6 ± 5.1	89.1 ± 4.1	9.5 (3.7–34.1)	0.01	0.005	0.3
Environment	88.4 ± 4.8	63.0 ± 7.1	85.8 ± 4.4	22.9 (11.6–34.1)	0.007	0.001	0.7

Data expressed as mean ± SE or mean(95% confidence interval). Total, average of self, social and environmental domains; Self, youth's feelings about himself/herself; Social, youth's relationships with others; Environment, opportunities and obstacles in a youth's social and cultural milieu; Obese Pre, before intervention; Obese Post, following intervention; Intervention Δ, mean change in response to intervention.

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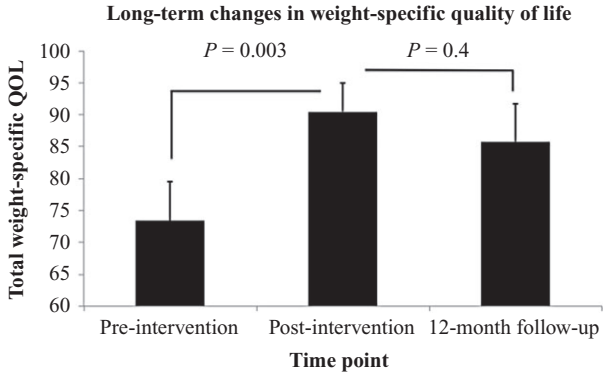

Figure 1 Changes in weight-specific quality of life (QOL) in a subset ($n = 9$) of obese youth with data available at pre-intervention, post-intervention and 12-month follow-up.

(Fig. 1) despite small but not significant increases in BMI (30.2 ± 1.9 to 31.2 ± 1.8, $P = 0.15$).

Discussion

Given the compelling evidence linking obesity with lower QOL in youth and the limited number of interventions describing changes in QOL, we examined the effects of a diabetes prevention programme on weight-specific QOL in obese Latino adolescents. Our baseline data extend previous findings on the detrimental impact of obesity on weight-specific QOL to Latino youth (3). However, to our knowledge, this is the first study to show that weight-specific QOL can be improved through lifestyle intervention in this population.

The intervention was designed to address sociocultural and biological factors that contribute to health disparities and was delivered in a community setting using a culturally grounded approach. This approach leveraged core values, beliefs, norms and traditions to promote healthy and sustainable behaviour change (10). Emphasis was placed on improving physical and psychosocial health rather than decreasing weight. Therefore, it is noteworthy that increases in weight-specific QOL were observed in the absence of significant weight loss. This represents a key and novel finding that can inform the design, delivery and assessment of obesity interventions. Given the limited number of successful weight-loss interventions in obese adolescents (11) and the fact that many obese adolescents remain obese into adulthood (12), efforts that focus on improving health indicators, such as QOL, rather than weight loss may be prudent (13). Our results are in contrast to those of Fullerton *et al*. who found that lifestyle intervention-induced increases in physical QOL (as measured by the PedsQL 4.0, Mapi Research Trust, Lyon, France) among Latino youth were dependent on weight loss (14). However, the authors noted that psychosocial QOL (also measured by the PedsQL 4.0) was not impacted and suggested that using weight-specific QOL measures such as that used in the present study may be more informative. Therefore, weight loss may improve physical QOL but other factors may be operational for improving weight-specific QOL in obese Latino youth.

The mechanisms underlying increases in weight-specific QOL are likely multifactorial. Lifestyle education classes specifically addressed psychosocial health and sessions were delivered in groups with parental as well as peer involvement. Rather than applying a restrictive dietary approach, youth were encouraged to engage with parents and peers to adopt healthy behaviours to promote health outcomes. Behavioural modifications to reinforce social support, self-efficacy and role modeling were used to facilitate individual and collective goals. Cultural constructs *familismo* (familism), *confianza* (trust), *respeto* (respect) and *personalismo* (personal interaction) were infused throughout the intervention for their specificity within the Latino community and to this specific population that included mostly (14 of 15) US born children who primarily (13 of 15) spoke Spanish in their homes. Cultural traditions and factors have been shown to serve protective roles among Latino youth at-risk for unhealthy behaviours (15). Lastly, the fact that the intervention was delivered by *promotoras* (ages 23–25) in the community rather than healthcare providers in a medical setting may have minimized any stigma associated with obesity and further contributed to enhanced psychosocial well-being. In addition to participant improvements in QOL, the culturally grounded intervention may have resulted in effects on the family as evidenced by increases in weight-specific QOL among parents (51.2 ± 7.6 to 79.9 ± 4.3, $P = 0.002$) determined by the obesity and weight loss QOL instrument (16).

The lifestyle education classes were supported by group-exercise sessions designed to facilitate skill building and fitness enhancement. Physical activity is a well-known correlate of QOL among adults and the beneficial effects of exercise on QOL are not weight-dependent (17). Less is known about the effects of physical activity on QOL among youth. A recent study found that exercise improves psychosocial functioning as measured by social competence and body image in obese adolescents independent of changes in body composition (18). Collectively, these studies suggest that exercise may be an important strategy for improving QOL among obese youth.

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Strengths of this study include measuring weight-specific QOL, the culturally grounded, community-based intervention and focus on a vulnerable group. Limitations include the absence of a true control group and the relatively small sample size, which limits the overall generalizability of the findings. While we did compare QOL findings with a lean comparison group, it is possible that increases in QOL may be moderated by baseline demographics factors (e.g. age, sex and weight status) as well as confounded by non-intervention influences.

Given the level of cardiometabolic risk among obese Latino youth and the few intervention studies targeting this population, we believe our findings extend the available science and represent an important contribution to the literature. These results provide an avenue for future studies to build from using larger samples and more robust research designs.

Conflict of Interest Statement

No conflict of interest is declared.

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