

# Pilot Evaluation of Obesity-Specific Health-Related Quality of Life Following a 12-Week Non-Randomized Lifestyle Intervention in Youth

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## Short report

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# Abstract

Youth health-related quality of life (HRQOL) was measured before and after a 12-week family and community-based intervention using the obesity-specific HRQOL tool, Sizing Me Up<sup>®</sup>. This project enrolled 68 youth (10.88 years  $\pm$  2 years; 54% male; 50% non-Hispanic white). In addition to total QOL, we used paired t-tests to examine the Sizing Me Up sub-scales: Emotion Physical, Social Avoidance, Positive Attributes and Teasing. A greater reduction in change score indicated a larger increase in quality of life sub-scale. Significant improvements from baseline to follow-up were found in the total HRQOL (mean change = -5.27, SD 10.76,  $p=0.00$ ) and for the sub-scores of: emotion (mean change = -8.06, SD 16.85,  $p\leq 0.000$ ) and teasing-related QOL (mean change = -5.65, SD 16.79,  $p = 0.01$ ). Social avoidance attributes improved between baseline and follow-up (mean change = -3.92, SD 11.21,  $p=0.007$ ). The Sizing Me Up<sup>®</sup> instrument detected significant and positive changes in quality of life after the intervention. Sizing Me Up<sup>®</sup> could provide a clinically meaningful tracking of quality of life among youth with obesity.

## Introduction

Health Related Quality of Life (HRQOL), comprised of social, physical and psychological well-being and functioning over time,<sup>1,2</sup> is reportedly lower among youth<sup>1</sup> with obesity.<sup>3</sup> Compared to youth without obesity, youth with obesity have an increased susceptibility to comorbid conditions, especially depression and cardiovascular risk factors.<sup>4</sup> These can be amplified by psychosocial stressors as these risk factors are reported to a greater degree among obese youth.<sup>5,6</sup> These stressors have a direct impact on a child's metabolism through the use of maladaptive coping behaviors such as overeating and limited physical activity.<sup>3</sup> Additionally, there is a clear link between psychosocial stressors and obesity, as shown by increased cortisol levels among youth with higher levels of central adiposity, which contribute to overall cardiometabolic risk.<sup>7</sup>

This 12-week lifestyle intervention, Actively Changing Together, or ACT!, has been fully described elsewhere.<sup>8,9</sup> Briefly, paper-and-pencil surveys were administered to participating children (ages 8-14) with obesity (BMI at or above the 85<sup>th</sup> percentile for age), and their co-enrolled parent or guardian at baseline and at conclusion of the 12-week intervention. The intervention, based on social cognitive theory, addressed a variety of topics including weekly group physical activity, nutrition education, parental problem solving, bullying and psychosocial issues, and reducing sedentary time. All participants were recruited through medical clinic referral and incentives were provided at baseline and upon completion of the intervention.

All parents/guardians consented to the research, and all youth were assented. The study was reviewed and approved by the university Institutional Review Board.

## Methods

The objective of this study was to pilot test the obesity-specific HRQOL instrument in this community- and family-based, lifestyle intervention in a population of non-Hispanic white and Mexican American youth with obesity. We previously reported our findings from the Pediatric Quality of Life instrument<sup>8</sup>, but we also wanted to employ an obesity-specific HRQOL. Obesity-specific HRQOL was measured with the Sizing Me Up<sup>®</sup> instrument (SMU), a 22-item obesity-specific measure assesses social, physical and psychological well-being and to our knowledge, had not previously been evaluated among Hispanic/Latino youth. The tool is suitable for use with children and adolescents 5-13 years of age, and is available in Spanish and English,<sup>10</sup> which was important for our population. Five core scales (Emotional Functioning, Physical Functioning, Social Avoidance, Positive Social Attributes and Teasing/Marginalization) are examined to capture HRQOL from the youth's perspective.<sup>11</sup>

Higher mean scores on the SMU instrument mean better obesity-specific HRQOL. Paired t-tests were used to compare youth scores across all SMU subscales in at baseline and immediately after the 12-week intervention concluded. The greater the reduction in change score, the bigger the improvement in obesity-specific quality of life. All analyses were run on SPSS v.25.0 software (IBM Corp) with  $p < 0.05$ . The data that support the findings of this study are available on request from the corresponding author (KBE), and will require approval from the university IRB. The data are not publicly available due to containing information that could compromise research participant privacy/consent.

## Results

Sixty-eight youth (10.88 years old  $\pm$  2 years; 54% male; 50% non-Hispanic white) completed in the study (Table 1). There were no significant differences between obesity-specific HRQOL scores when examined by sex or language of the participants. Significant improvements were observed across multiple SMU subscales: Emotion ( $t[61] = -8.06, p = .000$ ), Teasing ( $t[61] = -5.65, p = .010$ ), Avoidance ( $t[62] = -3.92, p = .007$ ), and Total HRQOL ( $t[62] = -5.27, p = .000$ ) (Table 2).

## Discussion

There are numerous obesity-specific HRQOL instruments, although most are for use in adults.<sup>12</sup> There is general guidance on suitable HRQOL instruments,<sup>13</sup> and there are reviews of generic HRQOL instruments,<sup>14</sup> in addition to reviews of disease-specific instruments.<sup>15</sup> The most widely employed instrument for assessing general HRQOL in youth, the Pediatric Quality of Life Inventory (PedsQL<sup>™</sup>),<sup>16</sup> was also employed in this study and reported previously.<sup>8</sup> The Child Health Utility (CHU9D) is a another generic pediatric quality of life instrument developed in the UK.<sup>17</sup> Alternatively, the Impact of Weight on Quality of Life (IWQOL)-Kids tool, like SMU, was also developed by the team at Cincinnati Children's Hospital.<sup>12</sup> The Kid-KINDL includes six domains, compared to PedsQL's four domains.<sup>18</sup> In their 2019 comparison study, Pakpour et al<sup>18</sup> also found that the SMU tool was significantly related to BMI, and the other two generic instruments (PedsQL and Kid-KINDL) did not.

We chose the SMU tool for this project because it was specifically developed for children and adolescents with obesity, it was available free of charge, and in Spanish, which was essential for our study as it included fifty-percent Spanish-speakers. Both the PedsQL and the SMU instruments showed improvements in total quality of life in our study, however, the SMU tool was able to examine secondary issues specific to youth living with obesity (e.g., Teasing/Marginalization, etc). We believe those secondary issues are important to consider when working with youth who have obesity.

Some strengths of our study included that all participating youth met the criteria for having overweight or obesity (BMI  $\geq$  85<sup>th</sup> percentile for age) and were referred by a health care provider. The community where this research was conducted has approximately 50% population of Latino ancestry, primarily of Mexican decent, and this was reflected in our study participant demographics. This allowed for an ethnically/racially mixed study population. The intervention was also designed to include health care providers, family members, and community resources – it was not siloed into one “partner” group. However, some of the weaknesses of our study include the small sample size, the limited ethnic/racial diversity (Mexican-Americans and non-Hispanic whites only), and the large number of dropouts as the follow-up period progressed into six and twelve months after the intervention concluded.

Assessment and tracking of obesity-specific HRQOL is essential to understanding the unique physical and psychological factors linked to youth obesity. The positive improvements observed via the SMU tool after this lifestyle and community-based intervention demonstrate that psychosocial health, particularly in regards to obesity-specific domains, significantly improved in this group of youth. Results in this study of SMU paralleled those findings from Peds-QL<sup>TM</sup> tool, a more widely-used tool, which was also used in this study and reported previously<sup>8</sup>. A systematic review<sup>19</sup> called for more interventions that target adolescence age groups, which our study included. More recently, Soltero et al<sup>20</sup> reported similar positive improvements in quality of life through a culturally-tailored, randomized controlled community intervention trial targeting Latino youth. Programs like these, which bring together community resources, families, and healthcare providers, while also using culturally- and linguistically-appropriate approaches, can offer successful and economical interventions to improve outcomes for youth with overweight or obesity. This improvement was seen using the SMU tool in our study. Quality of life assessment tools used for the general population might miss the unique experiences of those living with obesity, and this is particularly true for youth.

## **Declarations**

COI: The authors have no conflicts of interest to declare.

Consent: All participants consented and assented to this research.

Roles of Authors: Drs. Yi-Frazier and Briggs Early conceived the idea for the study, planned the study design, and lead the data collection. Dr. S. Randhawa presented an earlier version of this project in poster

form at Experimental Biology 2017, and drafted the manuscript and tables. Drs. N. Randhawa and Hassanin drafted the manuscript and tables. Dr. Yi-Frazier ran the statistical analysis.

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## Tables

Table 1. Youth Demographics

	<i>N</i> = 68	n (%)
Sex	Male	37 (54)
	Female	31 (45.6)
Language	English Speakers	34 (50)
	Spanish Speakers*	34 (50)
Age in years	Range	7-14
	Mean	10.88
	Std Deviation	2

\*n=4 chose Spanish versions of the survey tools

Table 2. Baseline and follow-up Sizing Me Up Scores, including the mean change pre- and post-intervention.

	Baseline		Follow-up		Paired samples t-test		
	Mean	SD	Mean	SD	Mean Change	SD	P value
Emotion score	78.14	23.9	86.20	17.6	-8.06	16.85	.000
Physical score	85.24	12.9	87.75	14.0	-2.51	12.42	.113
Teasing	84.14	22.7	89.78	15.5	-5.65	16.79	.010
Positive Attributes	39.73	21.7	45.41	22.0	-5.68	23.74	.064
Avoidance	91.75	11.1	95.66	8.1	-3.92	11.21	.007
Total Quality of Life	72.86	12.4	78.13	11.5	-5.27	10.76	.000