Received: 10 November 2020 | Revised: 6 May 2021 | Accepted: 16 May 2021

DOI: 10.1002/osp4.535

SHORT COMMUNICATION

Obesity Science and Practice Open Access WILEY

Pilot evaluation of obesity-specific health-related quality of life following a 12-week non-randomized lifestyle intervention in youth

Sukhbir Randhawa[1] | Navkiran Randhawa[2] | Es-Haq Hassanin[3] | Joyce P. Yi-Frazier[4] | Kathaleen Briggs Early[5]

[1]Samaritan Health Family Medicine Residency, Watertown, New York, USA

[2]Franciscan Health Internal Medicine Residency Olympia Fields, Olympia Fields, Illinois, USA

[3]Department of Internal Medicine, The University of Texas Health Science Center at Tyler, Tyler, Texas, USA

[4]Center for Clinical and Translational Research, Seattle Children's Research Institute Seattle, Seattle, Washington, USA

[5]Department of Biomedical Sciences, College of Osteopathic Medicine, Pacific Northwest University, Yakima, Washington, USA

Correspondence
Kathaleen Briggs Early, Department of Biomedical Sciences, College of Osteopathic Medicine, Pacific Northwest University, 200 University Parkway, Yakima, WA 98901, USA.
Email: kearly@pnwu.edu

Funding information
Memorial Hospital; Safeway Foundation; Sage Fruit; Pacific Northwest University of Health Sciences Seed Fund

Abstract

Background: Health-related quality of life (HRQOL), a multifaceted construct for understanding health and healthcare outcomes, is comprised of eight domains of well-being and functioning over time and has become an essential factor in assessing outcomes for youth with obesity.

Aims: To evaluate the effect of a community based, lifestyle intervention, on obesity-specific HRQOL using the Sizing Me Up (SMU) in this group of Latino and White youth.

Materials and Methods: For this 12-week family and community-based intervention (ACT; Actively Changing Together), HRQOL was measured before and after the intervention concluded using the obesity-specific HRQOL tool, SMU. This study enrolled 68 youth (10.9 ± 2 years; 54% male; 50% non-Hispanic white). Paired *t*-tests were used to examine the Sizing Me Up sub-scales: Emotion, Physical, Social Avoidance, Positive Attributes, Teasing, and the total score. A greater change score indicated a larger increase in quality of life sub-scale.

Results: Significant improvements from baseline to follow-up were found in the total SMU (mean change = 5.27, SD 10.76, $p = 0.00$) and for the sub-scores of: emotion (mean change = 8.06, SD 16.85, $p \leq 0.00$), teasing (mean change = 5.65, SD 16.79, $p = 0.01$), and social avoidance (mean change = 3.92, SD 11.21, $p = 0.01$).

Conclusions: Sizing Me Up provided a clinically meaningful tool for this research study to evaluate obesity-specific HRQOL among Hispanic and non-Hispanic White youth with obesity.

KEYWORDS
obesity, quality of life, youth

At the time of this work, Drs. Sukhbir Randhawa, Navkiran Randhawa, and Es-Haq Hassanin were medical students at PNWU-COM.

1 | INTRODUCTION

Health-related quality of life (HRQOL), a multidimensional construct comprised of emotional, psychological, physical, and social domains of well-being and functioning over time,[1–4] is reportedly lower among youth with obesity.[5] These youth have an increased susceptibility to comorbid conditions, especially depression and cardiovascular risk factors, compared to youth without obesity.[6] Furthermore, comorbid conditions can be amplified by psychosocial stressors as these risk factors are reported to a greater degree among youth with obesity.[7,8] There is also a clear link between psychosocial stressors and obesity, as evidenced by increased cortisol levels among youth with higher levels of central adiposity, which contribute to overall cardiometabolic risk.[9] Together, youth with obesity are at greater risk for reduced HRQOL, and the complications that can arise from having a lower HRQOL.

There are hundreds of quality of life instruments aimed at a wide range of populations, including youth.[10–13] One of the more widely used instruments for assessing general HRQOL among youth is the Pediatric Quality of Life Inventory (PedsQL™),[14] which was also employed in this study.[15] The PedsQL™ is a 23-item, validated, age-specific survey, with two major subdomains of psychosocial and physical functioning averaged to form a total HRQOL score.[16] However, the PedsQL™ does not assess obesity-specific concerns.

In contrast to the PedsQL, Sizing Me Up, or SMU, was designed for use in community youth populations with overweight or obesity and associates well with other HRQOL instruments.[17–19] The SMU instrument, which is reported here, has been validated for use in varied youth populations with obesity,[17–20] and is available for use in both English and Spanish speaking youth.[18,21] A comparison study examined the PedsQL, the generic Kid-KINDL, and the SMU, and concluded that the SMU instrument was better at delineating those issues specific to having a larger sized body, compared to more general PedsQL or Kid-KINDL instruments.[17] Thus, our goal was to elucidate the effect of an obesity-specific intervention on obesity-specific HRQOL using the SMU.

1.1 | Research aims

This 12-week lifestyle intervention, Actively Changing Together, or ACT!, has been fully described elsewhere.[15,22] Briefly, participants in ACT showed improvements in waist circumference, and general QOL as measured by the PedsQL. However, obesity-specific quality of life was not reported. The a priori hypotheses for this study were that the ACT! program would improve both general *and* obesity-specific HRQOL in this study population of youth participants. Thus, the primary objective of the current study was to report the impact of the ACT! program on obesity-specific quality of life in enrolled youth. Specifically, the aim of this work was to pilot test an obesity-specific HRQOL instrument, SMU© instrument (SMU), in this community- and family based, lifestyle intervention within a population of non-Hispanic White and Hispanic youth with obesity.

2 | METHODS

2.1 | ACT program description

Adopted from Seattle Children's Hospital, this study brought the ACT! program to an agricultural community where there are substantial socioeconomic and health disparities, high rates of youth and adult obesity, and a high percentage (50%) of Hispanic/Latinos. Also, because in this medically underserved community, there were few available options for youth at-risk for obesity, or treatment opportunities and community resources for youth with already-existing obesity. The intervention included weekly 90-min meetings at the YMCA, where participating youth and their co-enrolled parent or guardian learned about, and participated in, healthy eating, increased physical activity and behavior modification strategies. The ACT! curriculum is based on social cognitive theory,[23] and addressed a variety of topics including group physical activity, nutrition education, parental problem solving, bullying and psychosocial issues, and reducing sedentary time. Incentives included gift cards ($25) at baseline and upon completion of the intervention, and free access for the families enrolled in the study to use the YMCA fitness facilities.

2.2 | Measures

Obesity-specific HRQOL was measured with the SMU instrument, a 22-item obesity-specific measure that assesses social, physical and psychological well-being. The tool is suitable for use with children and adolescents 5-13 years of age, and is available in Spanish and English,[20] which was important for this population. SMU uses five core scales (Emotional Functioning, Physical Functioning, Social Avoidance, Positive Social Attributes and Teasing/Marginalization) to capture HRQOL from the youth's perspective.[18] Higher mean scores on the SMU instrument mean better obesity-specific HRQOL. Zeller and Modi[20] have previously reported all psychometric properties including internal consistency, test-re-test reliabilities, and convergent validity; internal consistency coefficients ranged from 0.68 to 0.85. Similar to Zeller and Modi,[20] Tripicchio et al.,[18] and Pakpour et al.,[17] the reliability analysis in this current report had Cronbach alpha's ranging from 0.5 to 0.9 on the subscales. The Cronbach alpha for the total score was 0.83.

Paper-and-pencil surveys were administered to participating children (ages 8-14) with overweight or obesity (BMI at or above the 85th percentile for age),[24] and their co-enrolled parent or guardian at baseline and at conclusion of the 12-week intervention. The parent proxy report for SMU, called Sizing Them Up, was also used for co-enrolled parents of youth in ACT!, however, there were no significant differences between the parent proxy scores and the youth SMU scores, which was expected.[25–27]

Demographic characteristics including family income, family size, parent/guardian education, and primary language spoken at home, in addition to youth age and sex, were collected from caregivers at baseline, one week prior to the start of the intervention.

2.3 | Participants

The ACT! program was administered by a local community hospital in partnership with the YMCA. English or Spanish speaking youth between 8 and 14 years of age were referred to the program by a primary care provider upon meeting inclusion criteria (BMI-for-age ≥85th percentile). Participants were then contacted by the hospital coordinating the ACT! program to see if they wanted to participate. All parents/guardians consented to the research, and all youth were assented. The study was reviewed and approved by the university Institutional Review Board.

TABLE 1 Youth demographics

	N = 68	*n* (%)
Sex	Male	37 (54)
	Female	31 (45.6)
Language	English speakers	34 (50)
	Spanish speakers[a]	34 (50)
Age in years	Range	7–14
	Mean	10.9
	Std deviation	2

[a]*n* = 4 chose Spanish versions of the survey tools.

2.4 | Analysis plan

Descriptive statistics including means, standard deviations, and percentages were used to summarize the demographic characteristics and the SMU scales and subscales. Chi-squared tests were used to examine demographic characteristics by SMU scores.

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 change score indicated a larger improvement in obesity-specific quality of life. All analyses were run on SPSS v.25.0 software (IBM Corp) with $p < 0.05$.

3 | RESULTS

The final sample included 68 youth (10.9 ± 2 years; 54% male; 50% non-Hispanic White; 50% Hispanic/Latino) who completed the study (Table 1). The majority of co-enrolled parent participants identified as Spanish speaking Hispanic/Latino working mothers with a high school education or less. Seventy-five youth were initially enrolled, but seven participants were excluded removed from the dataset for various reasons (e.g., dropped out; family repeated ACT! program; incomplete or missing data), so those participants were not included in the analysis.

Means, standard deviations, and change scores of the SMU total score and subscales are reported in Table 2. There were no significant differences between obesity-specific HRQOL scores when examined by sex or language of the participants.

Significant improvements were observed from pre- to post-intervention across multiple SMU subscales and the total HRQOL score: Emotion ($t[61] = -8.06$, $p = 0.00$), Teasing ($t[61] = -5.65$, $p < 0.01$, Avoidance ($t[62] = -3.92$, $p < 0.01$), and Total HRQOL ($t[62] = -5.27$, $p = 0.00$) (Table 2).

4 | DISCUSSION

Obesity-specific quality of life is important to evaluate in interventions because obesity complicates the psychological and physical changes already naturally occurring during adolescence.[7] Obesity-specific quality of life improved with this community-based intervention program focused on healthy eating and behavioral modification. These results paralleled findings of general quality of life measures being impacted by culturally appropriate behavioral interventions for overweight or obese youth.[15,28]

The current study specifically found improvements to obesity-specific QOL in an underrepresented population with obesity – a group at higher risk for psychological and physical health-related disorders.[29] The SMU tool enabled examination of secondary issues specific to youth living with obesity (e.g., Teasing/Marginalization, Social Avoidance, etc). Those secondary issues, assessed via the SMU subscales, are important to consider when working with youth who have obesity. For example, teasing and feelings of marginalization through negative interactions with peers is a significant problem for youth at-risk for or living with obesity, and can contribute to long-term obesity,[30] and continues despite recent societal efforts to increase self-awareness of biases against obesity.[31] This is of particular importance for children and adolescents of Hispanic/Latino ethnicity, where they already face substantial health disparities, including increased cardiovascular disease risks, compared to their White counterparts.[32] Other research shows that social avoidance is a significant problem for youth with obesity, who are likely to benefit from a clinic-community partnered program, which is similar to how ACT was designed.[28] Interventions that focus on a broad spectrum of youth and family factors (e.g., how youth perceive the psychosocial ramifications of obesity), in addition to community such as ACT can impact more than the traditional physical markers of change, and may be overall more impactful and sustainable as a result.

Limitations of this study include the small sample size, and the large number of dropouts as the follow-up period progressed into 6 and 12 months after the intervention concluded, which prevented analysis beyond the initial conclusion of the intervention. Strengths of this study included that all participating youth met the criteria for having overweight or obesity (BMI ≥ 85th percentile for age) and were referred by a health care provider. The community where this research was conducted has approximately 50% population of Hispanic/Latino ancestry and this was

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	16.9	0.00
Physical score	85.24	12.9	87.75	14.0	2.51	12.4	0.11
Teasing	84.14	22.7	89.78	15.5	5.65	16.8	0.01
Positive attributes	39.73	21.7	45.41	22.0	5.68	23.7	0.06
Avoidance	91.75	11.1	95.66	8.1	3.92	11.2	0.01
Total quality of life	72.86	12.4	78.13	11.5	5.27	10.8	0.00

reflected in the study participant demographics. This allowed for an ethnically/racially mixed study population. The intervention was also designed to partner health care providers and family members with community resources – it was not siloed as the sole responsibility of one group.

5 | CONCLUSIONS

HRQOL assessment tools designed for the general population might miss the unique experiences of those living with obesity, and this is particularly true for youth. Assessment and tracking of obesity-specific HRQOL is essential to understanding the unique physical and psychological factors linked to youth obesity. With the increased focus on health disparities across the United States, more obesity interventions should include underrepresented groups from underrepresented communities (e.g., those without easy access to a tertiary care center, research or teaching hospital; rural residents, etc). While there are many validated instruments to choose from, this study employed both the PedsQL and the SMU instruments, and both were effective at measuring changes in HRQOL in this prospective study of English and Spanish speaking youth with obesity. SMU can be a useful tool for both researchers and clinicians to employ when seeking to better understand the obesity-specific HRQOL effects of an intervention. The positive improvements observed demonstrate that psychosocial health, particularly in regards to obesity-specific domains, significantly improved with a culturally tailored, healthy eating intervention program in this group of youth.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the prior contributions to the ACT project from Drs. Steven Engebretsen and Robert Sorrells, in addition to all the participants, the community health leaders involved, and the Family YMCA of Yakima.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

FUNDING

The Safeway Foundation, Memorial Hospital, Sage Fruit, PNWU Seed Fund, and the Family YMCA of Yakima.

AUTHOR CONTRIBUTIONS

Drs. Kathaleen Briggs Early and Joyce P. Yi-Frazier conceived the study design and executed the study. Drs. Sukhbir Randhawa, Navkiran Randhawa, and Es-Haq Hassanin cleaned and organized the data, and drafted the manuscript. Dr. Joyce P. Yi-Frazier ran the statistical analysis. All authors contributed to manuscript revisions.

ORCID

Kathaleen Briggs Early https://orcid.org/0000-0003-2224-2548

REFERENCES

1. Hayes M, Baxter H, Müller-Nordhorn J, Hohls JK, Muckelbauer R. The longitudinal association between weight change and health-related quality of life in adults and children: a systematic review. *Obes Rev*. 2017;18(12):1398-1411.
2. Cui W, Zack MM, Wethington H. Health-related quality of life and body mass index among US adolescents. *Qual Life Res*. 2014;23(7):2139-2150.
3. Schlarmann JG, Metzing-Blau S, Schnepp W. The use of health-related quality of life (HRQOL) in children and adolescents as an outcome criterion to evaluate family oriented support for young carers in Germany: an integrative review of the literature. *BMC Public Health*. 2008;8(1):414.
4. Centers for Disease Control, National Center for Chronic Disease Prevention and Health Promotion, Division of Adult and Community Health. *Measuring Healthy Days: Population Assessment of Health-Related Quality of Life*. U.S. Department of Health and Human Services; 2000. https://www.cdc.gov/hrqol/pdfs/mhd.pdf
5. Pont SJ, Puhl R, Cook SR, Slusser W. Stigma experienced by children and adolescents with obesity. *Pediatrics*. 2017;140(6):e20173034.
6. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011–2012. *J Am Med Assoc*. 2014;311(8):806-814.
7. Zenlea IS, Burton ET, Askins N, Pluhar EI, Rhodes ET. The burden of psychosocial stressors and urgent mental health problems in a pediatric weight management program. *Clin Pediatr (Phila)*. 2015;54(13):1247-1256.
8. Baskind MJ, Taveras EM, Gerber MW, Fiechtner L, Horan C, Sharifi M. Parent-perceived stress and its association with children's weight and obesity-related behaviors. *Prev Chronic Dis*. 2019;16:E39.
9. Karlén J, Ludvigsson J, Hedmark M, Faresjö Å, Theodorsson E, Faresjö T. Early psychosocial exposures, hair cortisol levels, and disease risk. *Pediatrics*. 2015;135(6):e1450-e1457.
10. Germain N, Aballéa S, Toumi M. Measuring the health-related quality of life in young children: how far have we come? *J Mark Access Health Policy*. 2019;7(1):1618661.

11. Haverman L, Limperg PF, Young NL, Grootenhuis MA, Klaassen RJ. Paediatric health-related quality of life: what is it and why should we measure it? *Arch Dis Child*. 2017;102(5):393-400.
12. Solans M, Pane S, Estrada MD, et al. Health-related quality of life measurement in children and adolescents: a systematic review of generic and disease-specific instruments. *Value Health*. 2008;11(4):742-764.
13. Hyland ME. A brief guide to the selection of quality of life instrument. *Health Qual Life Outcomes*. 2003;1:24.
14. Varni JW, Seid M, Kurtin PS. PedsQL 4.0: reliability and validity of the pediatric quality of life inventory version 4.0 generic core scales in healthy and patient populations. *Med Care*. 2001;39(8):800-812.
15. Engebretsen S, Sorrells R, Yi-Frazier JP, Early KB. Longitudinal quality of life improvement in underserved rural youth with obesity. *Obes Sci Pract*. 2016;2(4):444-455.
16. Varni JW, Limbers CA, Burwinkle TM. Parent proxy-report of their children's health-related quality of life: an analysis of 13,878 parents' reliability and validity across age subgroups using the PedsQL 4.0 Generic Core Scales. *Health Qual Life Outcomes*. 2007;5:2.
17. Pakpour AH, Chen C-Y, Lin C-Y, Strong C, Tsai M-C, Lin Y-C. The relationship between children's overweight and quality of life: a comparison of Sizing Me Up, PedsQL and Kid-KINDL. *Int J Clin Health Psychol*. 2019;19(1):49-56.
18. Tripicchio GL, Borner KB, Odar Stough C, Poppert Cordts K, Dreyer Gillette M, Davis AM. Confirmatory factor analysis of sizing me up: validation of an obesity-specific health-related quality of life measure in Latino youth. *J Pediatr Psychol*. 2017;42(4):457-465.
19. Cushing CC, Steele RG. Psychometric properties of sizing me up in a community sample of 4th and 5th grade students with overweight and obesity. *J Pediatr Psychol*. 2012;37(9):1012-1022.
20. Zeller MH, Modi AC. Development and initial validation of an obesity-specific quality-of-life measure for children: sizing me up. *Obesity (Silver Spring)*. 2009;17(6):1171-1177.
21. Lin YC, Strong C, Tsai MC, Lin CY, Fung XCC. Validating sizing them up: a parent-proxy weight-related quality-of-life measure, with community-based children. *Int J Clin Health Psychol*. 2018;18(1):81-89.
22. Grow HM, Hencz P, Verbovski MJ, et al. Partnering for success and sustainability in community-based child obesity intervention: seeking to help families ACT! *Fam Community Health*. 2014;37(1):45-59.
23. Bagherniya M, Taghipour A, Sharma M, et al. Obesity intervention programs among adolescents using social cognitive theory: a systematic literature review. *Health Educ Res*. 2017;33(1):26-39.
24. Centers for Disease Control. *Defining Childhood Obesity*. Centers for Disease Control and Prevention; 2018. https://www.cdc.gov/obesity/childhood/defining.html#:~:text=Overweight%20is%20defined%20as%20a,the%20same%20age%20and%20sex
25. Modi AC, Zeller MH. Validation of a parent-proxy, obesity-specific quality-of-life measure: sizing them up. *Obesity (Silver Spring)*. 2008;16(12):2624-2633.
26. Herzer M, Zeller MH, Rausch JR, Modi AC. Perceived social support and its association with obesity-specific health-related quality of life. *J Dev Behav Pediatr*. 2011;32(3):188-195.
27. Zeller MH, Ingerski LM, Wilson L, Modi AC. Factors contributing to weight misperception in obese children presenting for intervention. *Clin Pediatr (Phila)*. 2010;49(4):330-336.
28. Frerichs L, Smith NR, Lyden J, Gaskin K, Skinner A, Armstrong S. Weight-related quality of life and temperament as predictors and moderators of outcomes among treatment-seeking, low-income, ethnically diverse children with obesity. *Transl Behav Med*. 2020;10(1):244-253.
29. Hemmingsson E. Early childhood obesity risk factors: socioeconomic adversity, family dysfunction, offspring distress, and junk food self-medication. *Curr Obes Rep*. 2018;7(2):204-209.
30. Schvey NA, Marwitz SE, Mi SJ, et al. Weight-based teasing is associated with gain in BMI and fat mass among children and adolescents at-risk for obesity: a longitudinal study. *Pediatr Obes*. 2019;14(10):e12538.
31. Feeg VD, Candelaria LM, Krenitsky-Korn S, Vessey JA. The relationship of obesity and weight gain to childhood teasing. *J Pediatr Nurs*. 2014;29(6):511-520.
32. Isasi CR, Parrinello CM, Ayala GX, et al. Sex differences in cardiometabolic risk factors among Hispanic/Latino youth. *J Pediatr*. 2016;176:121-127.

How to cite this article: Randhawa S, Randhawa N, Hassanin E-H, Yi-Frazier JP, Briggs Early K. Pilot evaluation of obesity-specific health-related quality of life following a 12-week non-randomized lifestyle intervention in youth. *Obes Sci Pract*. 2021;7(6):803-807. https://doi.org/10.1002/osp4.535