

# Quality of Life and associated modifiable social factors in Sri-Lankan children with overweight and obesity: a cross-sectional study

**Shamaali Gunawardana**

University of Colombo Faculty of Medicine <https://orcid.org/0000-0003-2965-262X>

**Chanduli Binari Gunasinghe**

University of Colombo Faculty of Medicine

**Maddage Samudra Harshani**

University of Colombo Faculty of Medicine

**Sumudu Nimali Seneviratne** (✉ [sumudu@pdt.cmb.ac.lk](mailto:sumudu@pdt.cmb.ac.lk))

<https://orcid.org/0000-0003-2960-9269>

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## Research article

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# Abstract

## Background

Data on quality of life (QoL) of children in South Asia affected by overweight and obesity is limited. This study assessed QoL in Sri Lankan children with overweight and obesity from children's and parents' perspective and modifiable social factors potentially affecting QoL of these children.

## Methods

Self-reported QoL and parental-perception of QoL were assessed in 8-12 year-old children with overweight and obesity (n=110), referred for obesity management at a tertiary-care children's hospital in Sri-Lanka, using linguistically validated Pediatric Quality of Life inventory (PedsQL™) 4.0 (Child-Self Report and Parent-Proxy forms). Social factors affecting QoL were also collected. Data was analyzed by non-parametric tests.

## Results

The median overall QoL was 80.4 (Inter Quartile Range [IQR] 69.6, 89.5). Physical QoL was lower than psychosocial QoL (78.1 vs 81.7,  $p=0.032$ ). Parental-perception of children's QoL correlated with child-reported QoL, but was lower for overall, physical and psychosocial QoL. Obese children had lower overall QoL, and lower QoL in physical and social functioning, compared to overweight children, and body mass index (BMI) was inversely correlated with physical and social functioning. Social factors associated with lower QoL were: being bullied ( $p=0.005$ ), not getting regular exercise ( $p=0.017$ ) and having difficulties in finding suitable clothes ( $p < 0.001$ ).

## Conclusions

Children with overweight and obesity from Sri Lanka appeared to have lower QoL than healthy children, with greater impairment of physical QoL than psychosocial QoL. Lower parental-perception of QoL, higher BMI, bullying, lack of regular exercise and lack of suitable clothing, were associated with lower QoL. Potential strategies to improve QoL include promoting regular exercise and a range of children's clothes to fit larger children, and prevention of bullying.

## Background

Childhood overweight and obesity is increasing rapidly both globally and in Sri Lanka. Global prevalence of childhood obesity was 7.8% in boys and 5.6% in girls in 2016 [1,2]. A recent community survey showed

a prevalence of 11.3% for overweight and 10.3% for obesity among 5-18 year olds in the Western Province, Sri Lanka, in 2019 [3]. Obesity has a negative impact on all aspects of child health, including physical, psychological and social well-being. While lifestyle factors associated with childhood obesity, and metabolic complications of obesity are well documented in Sri Lankan children [4–6], there is limited data on effects of childhood obesity on psychosocial well-being and quality of life from Sri Lanka, and the South Asian region.

Quality of life (QoL) describes the subjective wellbeing of an individual centered on his/her perception of life, based-on expectations, goals and standards [7]. QoL is a multidimensional variable, and both generic and disease-specific tools are available to assess health-related QoL [8]. Generic tools can be used to assess both healthy and ill individuals, and are useful for making comparisons [8]. QoL assessments differ between children and adults, due to differing influence from family, school, and friends, and reduced ability of children to make significant changes to their context by themselves [9]. Therefore, tools have been developed specifically to measure QoL of children: Pediatric Quality of Life Inventory (PedsQL) and Child Health Questionnaire (CHQ) are two generic tools used to measure QoL in children [8,10]. Assessment of children's quality of life from their parents' perspective are also included in some tools [8,10].

Previous studies have reported that QoL of children with overweight and obesity is lower than that of children of normal weight, and deteriorates with increasing body mass index [11,12]. In one study, QoL of severely obese children was similar to that of children with cancer [13]. Most of these studies however, are from developed countries [11,12]. Studies on QoL are lacking from Sri Lanka and other developing countries from the South Asian region, despite childhood obesity being a rising problem in South Asia. Due to considerable differences in socio-cultural aspects including high parental expectations from school children, and differing societal perceptions on ideal body weight and lifestyle standards, findings from QoL studies from other regions may not be directly applicable to South Asia [14]. Furthermore, previous studies have highlighted the need of exploring factors which could potentially affect QoL of overweight/obese children, in order to introduce new management strategies to improve their QoL [11,15]. Therefore, we conducted this study to assess QoL in Sri Lankan children aged 8-12 years with overweight and obesity using a generic international QoL questionnaire (PedsQL™ 4.0), including both children's and parental perception and other modifiable social factors associated with QoL.

## Methods

### Study design and setting

This cross-sectional, observational study was conducted between July to August 2016 at the Professorial Unit specialized obesity clinic and nutrition clinic of the Lady Ridgeway Hospital, a large tertiary care children's hospital in Colombo, and the main pediatric referral center in Sri Lanka. Ethical clearance was obtained from Ethics Review Committees of Lady Ridgeway Hospital and Faculty of Medicine, University of Colombo. Information sheets explaining purpose, risks and benefits of the study were provided, and informed written consent obtained from all participating families.

## **Study population**

The study sample consisted of 110 children aged between 8-12-years with a body mass index (BMI)  $> +1SD$ , who presented to the obesity clinic/nutritional clinic, during the study period. Exclusion criteria included any other major disability, or undergoing obesity management interventions  $> 1$  year.

## **Data collection and Measurements**

### **Quality of life**

Child Self-Report and Parent Proxy-Report forms of the PedsQL™ 4.0 Generic Core Scales (8–12 years) [10], a validated International Questionnaire [16, 17] was used to assess QoL. Original English questionnaires were translated into Sinhalese per standard linguistic validation guidelines provided. Forward translation was done by two independent translators and a single reconciled Sinhalese version was produced which was back-translated into English and compared with the source instrument to make amendments to the forward translated version. Pilot testing was done using the respondent debriefing method. Written approval for linguistic validation was received for the final translated questionnaire.

Each questionnaire contained 23-items classified under four subscales (physical, emotional, social, and school functioning scales) which described four subcomponents of QoL: physical, emotional, social and school functioning. For each item, participants were instructed to select one out of 5 options; never a problem, almost never a problem, sometimes a problem, often a problem or almost always a problem and between 0–4 marks were allocated. Items were reverse scored and linearly transformed to a 0-100 scale. Higher scores indicated better QoL. Two summary scores were derived from subscales; physical and psychosocial health summary scores to describe physical and psychosocial QoL respectively. Physical health summary score was the same as physical functioning scale; psychosocial health summary score was derived from emotional, social and school functioning scales; overall QoL was derived from all four scales, as per provided scoring instructions [10].

### **Socio-demographic data and factors associated with QoL**

An additional questionnaire was used to collect socio-demographic data (age of child, gender, district of residence, religion, ethnicity) and possible/perceived modifiable social factors influencing QoL of overweight/obese children (being bullied by other children, having siblings or close friends with similar body habitus, being on diet control, obtaining adequate exercise, facing difficulties in finding suitable clothes that fit). Social factors were based on information gathered during several clinic based focus

group discussions held with overweight/obese children prior to study commencement (Mid 2015-early 2016).

Parents and children were seated separately, to facilitate children's independency and PedsQL™ Child Self-Report questionnaire was administered to children and Parent Proxy-Report to the accompanying parent. The additional questionnaire was filled in collectively by parents and child. An investigator was present to clarify any doubts.

## **Anthropometric measurements**

Height of children was measured using a stadiometer (Seca 213 portable stadiometer, Seca GmbH & Co.KG, Germany) and weight was measured using a weighing scale (Seca 803 digital flat scale, Seca GmbH & Co.KG, Germany) complying with standard techniques. BMI was calculated using the standard equation; dividing weight in kilograms (kg) by height in meters squared ( $m^2$ ). World health organization (WHO) BMI z-score charts for age for girls and boys were used to categorize children as overweight and obese (BMI > + 1SD = Overweight, BMI > + 2SD = Obese, BMI > + 3SD = Severely Obese) [18].

## **Data Analysis**

Data was analyzed using SPSS statistical software, using appropriate non-parametric tests. Child-reported and Parent-reported QoL were compared using Wilcoxon test, while Spearman correlation was used to assess the association between scores. Influence of gender, degree of obesity and social factors on Child-reported QoL was analyzed using Mann-Whitney U test. Association between BMI and Child reported QoL was assessed using Spearman correlation. Effect size was evaluated using Cohen's standards: with correlation coefficients of 0.10–0.29, 0.30–0.49 and  $\geq 0.50$  representing small, medium and large associations respectively [19]. Significance level was set at 0.05.

## **Results**

### **Socio-demographic characteristics of the study participants**

One hundred and ten children and their parents participated in the study.

Participants from all main ethnicities and religions in Sri Lanka were included. There was a male preponderance (63% male, 37% female). Majority of the participating children were obese 77 (70%) with 8 (7%) being severely obese, while 33 (30%) were overweight. Table 1 describes socio-demographic characteristics.

### **Quality of life: PedsQL Child Self-Report Scores**

The median Child Self-Reported overall QoL of the study population was 80.4 (Inter Quartile Range [IQR] 69.6, 89.5). Physical QoL was lower than psychosocial QoL (78.1 vs 81.7,  $p=0.032$ ). At the subscale level, lowest QoL was reported in physical functioning 78.1 (IQR 65.6, 88.4), which was lower than social and school functioning ( $p=0.022$ ) (Table 2). Obese children had lower Child Self-Reported QoL than overweight children in overall QoL, physical and social functioning. BMI was inversely correlated with QoL in physical and social functioning (Table 2).

Table 1: General Characteristics of the Study Population

Variable	Category	All participants (n=110) number = n	Percentage% <sup>[1]</sup>
Age (years)	8-<9	27	24.5%
	9-<10	14	12.7%
	10-<11	25	22.7%
	11-<12	21	19.1%
	12-<13	23	20.9%
Gender	Male	69	62.7%
	Female	41	37.3%
Ethnicity	Sinhala	90	81.8%
	Tamil	8	7.3%
	Muslim	12	10.9%
Religion	Buddhist	82	74.5%
	Catholic	11	10.0%
	Islam	12	10.9%
	Hindu	5	4.5%
District of residence	Colombo district	62	56.4%
	Other districts	44	40.0%
	No response	4	3.6%
BMI category	Overweight	33	30.0%
	Obese	69	62.7%
	Severely Obese	8	7.3%

Table 2: Child Self-Reported QoL (median [IQR]) in the Total Study Population, Comparison between Overweight and Obese Children and Correlation between BMI and QoL

	n	ALL[2] (n=110)	Overweight(OW) (n=33)	Obese(OB) (n=77)	p-value[3] (OW vs OB)	Spearman's correlation coefficient (r)[4]	Significance of correlation coefficientC
Overall QoL	109	80.4 (69.6, 89.5)	83.7 (71.7, 93.5)	78.3 (69.0, 87.0)	0.049*	-0.184 (small)	0.055
Physical QoL / Physical functioning	109	78.1 (65.6, 88.4)	84.4 (71.9, 93.8)	75.0 (62.5, 87.5)	0.028*	-0.197 (small)	0.040*
Psychosocial QoL	109	81.7 (72.5, 90.8)	83.3 (76.7, 93.3)	80.0 (71.7, 89.2)	0.106	-.0.164 (small)	0.088
Emotional functioning	110	85.0 (65.0, 91.3)	85.0 (70.0, 95.0)	80.0 (65.0, 90.0)	0.370	-0.083	0.391
Social functioning	109	85.0 (70.0, 95.0)	90.0 (80.0, 95.0)	80.0 (62.5, 95.0)	0.042*	-0.237 (small)	0.013*
School functioning	109	85.0 (70.0, 90.0)	85.0 (70.0, 90.0)	80.0 (70.0, 90.0)	0.312	-0.081	0.400

### **Quality of life: Parent-Proxy-Report and associations between parental and children's perceptions**

Parental perception of their child's QoL based on *PedsQL Parent-Proxy Report*, and comparisons and correlations with Child Self-Reported QoL are shown in Table 3. Medium to large positive associations were observed between children's self-reported QoL and parents' perception of children's' QoL for overall QoL, all summary scores and subscales ( $p < 0.01$ ), except emotional functioning where the association was small ( $r = 0.229$ ). However, parental perception of overall, physical and psychosocial QoL, and QoL on physical and school functioning subscales was significantly lower than QoL self-reported by children.

### **Social factors associated with quality of life**

Associations between social factors and Child Self-Reported QoL are shown in Table 4. Participants who reported being bullied, getting inadequate exercise and having trouble finding clothes that fit had a significantly lower overall QoL, while gender, presence of siblings or close friends with overweight/obesity, and being on diet control did not significantly affect QoL.

Both physical and psychosocial QoL were impacted in children who faced difficulties in finding adequate clothes sizes, while psychosocial QoL was impaired in those being bullied (p=0.001) and getting inadequate exercise(p=0.031), with most impact being seen on social and school functioning (Table 4).

Table 3: Comparison and Correlation between Child Self-Reported and Parent Proxy-Reported QoL

	<i>PedsQL Child Self-Report Scores</i> median (IQR)	<i>PedsQL Parent-Proxy-Report Score</i> median (IQR)	<i>p</i> -value[5]	Spearman's correlation coefficient (r) [6]	Significance of correlation coefficientb
Overall QoL	80.4 (69.6, 89.5)	74.5 (60.9, 87.0)	0.001**	0.515 (large)	<0.01**
Physical QoL/ Physical functioning	78.1 (65.6, 88.4)	75.0 (56.3, 87.5)	0.005**	0.399 (medium)	<0.01**
Psychosocial QoL	81.7 (72.5, 90.8)	76.7 (65.0, 86.7)	0.017*	0.442 (medium)	<0.01**
Emotional functioning	85.0 (65.0, 91.3)	75.0 (65.0, 90.0)	0.096	0.229 (small)	0.016*
Social functioning	85.0 (70.0, 95.0)	80.0 (60.0, 90.0)	0.101	0.444 (medium)	<0.01**
School functioning	85.0 (70.0, 90.0)	75.0 (63.8, 90.9)	0.031*	0.470 (medium)	<0.01**

[1] Percentages may not add up to 100 due to rounding. BMI, Body Mass Index

[2] ALL represents the total study population.

[3] Significance of difference of QoL scores between overweight and obese groups.

[4] Correlation between BMI values with QoL scores. Effect size was evaluated using Cohen's standards: with correlation coefficients of 0.10-0.29, 0.30-0.49 and  $\geq 0.50$  representing small, medium and large associations respectively.<sup>19</sup>

\*Statistically significant at p<0.05 level.

QoL, Quality of Life; BMI, Body Mass Index.

[5] Significance of difference between *PedsQL Parent Proxy-Report Scores and PedsQL Child Self-Report Scores*.

[6] Correlation between *PedsQL Parent- Proxy-Report Scores and PedsQL Child Self-Report Scores*. Effect size was evaluated using Cohen's standards: with correlation coefficients of 0.10-0.29, 0.30-0.49 and  $\geq 0.50$  representing small, medium and large associations respectively.<sup>19</sup>

*\*Statistically significant at  $p < 0.05$  level. \*\*Statistically significant at  $p < 0.01$  level.*

*QoL, Quality of Life; IQR, Inter Quartile Range.*

## Discussion

This study revealed that Sri Lankan children with overweight and obesity had an overall PedsQL QoL score of 80.4, with lower physical QoL (78.1) compared to psychosocial QoL (81.7). Parents' perception of children's QoL was lower but correlated positively with child reported QoL. QoL of children who were overweight and obese was adversely affected by increasing degree of obesity, being bullied, lack of adequate exercise, and problems in obtaining appropriately fitting clothes.

Overall QoL reported by children with overweight and obesity in this study appeared to be lower than original QoL scores described by Varni et al. [16] for similar aged healthy children in United States (83.0), but higher than scores described for acutely and chronically ill children (78.7 and 77.2 respectively), with the same pattern observed for psychosocial QoL. However, physical QoL in our study population appeared to be lower than that of acutely ill children as well as healthy children. A Sri Lankan study [20] which assessed QoL using PedsQL™ in Sri Lankan children with asthma and healthy controls aged 12–14 years, reported higher mean QoL scores for overall (87.2), physical (88.7) and psychosocial (86.3) QoL in healthy children, compared to our observations of QoL in overweight/obese Sri Lankan children aged 8–12 years. Compared to children with asthma, however, overall and psychosocial QoL of our study participants appeared to be higher while physical QoL of our study participants was lower [20]. Therefore, Sri Lankan overweight/obese children appear to be having lower QoL in relation to healthy children. Further, they had greater compromise in physical QoL, perhaps exceeding those faced by children with asthma and acute illnesses.

In comparison to findings of QoL studies using PedsQL™ in children with overweight/obesity elsewhere in the world, Sri Lankan overweight/obese children in this study, appeared to have higher psychosocial QoL, while overall QoL was similar. Mean/median overall QoL in obese children ranged from 65.2 to 81.1 in other studies, as compared to a median of 78.3 in our study, while for overweight children, mean/median overall QoL ranged from 79.7 to 82.9 in other studies, and was 83.7 in our study [13, 21–26]. Although our study population reported a lower physical QoL score compared to psychosocial QoL, the opposite was observed in previous studies (physical QoL 67.2 to 88.4, psychosocial QoL 62.5 to 79.9) [13, 21–23, 25, 26].

Many studies, including our study demonstrated that parents of overweight/obese children often appear to perceive their children's overall QoL to be lower than reported by children themselves, albeit with good positive correlation between the two [11, 12, 24]. One reason that is postulated is that parents could be more conscious of long-term negative consequences of obesity in their children, while the children themselves, may have a more short-term view, and thus, a more positive outlook [27]. However, while several studies showed better agreement between child-reported and parent-reported QoL on physical and school functioning [22, 28], parents in our study reported significantly lower perception of QoL in physical and school functioning, compared to children themselves. In many South Asian countries, parents often consider school education as a major factor enabling social mobility for the whole family [14]. The lower perception of QoL by parents of overweight/obese children in physical and school functioning in our study, may perhaps reflect increased expectation of South Asian parents for high performance at school in both athletic and academic fields, exceeding children's' expectations. Further, parents may not be aware of the ability of their children to achieve academic/educational competence despite being in disadvantaged circumstances (educational resilience) [14].

Research on social factors associated with impaired QoL in children with overweight/obesity is important to gain a deeper insight into the issue, and to identify new approaches to improve QoL [11, 15]. Previous studies have shown peer-victimization to be associated with lower QoL in overweight/obese children [11, 29]. In our study, similarly, being bullied exerted a negative impact on emotional, social, school functioning, and overall QoL, underlying the importance of measures to reduce obesity-related bullying to improve the wellbeing of these children. Better classroom support, encouraging peers to give better support, and increasing coping skills of overweight/obese children could be helpful strategies [30–32].

We have shown that QoL in children getting adequate exercise was associated with better psychosocial QoL, including social and school functioning. A previous study has similarly reported lower psychosocial QoL in less physically-active overweight children [33]. Therefore, promoting exercise among overweight/obese children appears important, not only for weight management and metabolic health, but also for improving psychosocial wellbeing.

In this study, we studied associations between QoL in overweight/obese children with some novel social factors such as: difficulty in finding/ fitting in to age-appropriate clothes; being on diet control; and having overweight/obese siblings or friends; which have not been reported before. Interestingly, we found overall QoL, and all subcomponents of QoL to be lower in overweight and obese children who had difficulties in finding suitable clothes. This finding is further supported by a previous study showing that buying clothes was an activity that obese children disliked [30]. This is a less well recognized factor that, perhaps, could be addressed by highlighting this issue to stakeholders in the clothing industry in the locality, to help ally a common problem faced by overweight/obese children in everyday life, which is impairing their QoL.

Associations of QoL of overweight/obese children with gender and degree of obesity have been studied by previous research in other parts of the world. Previous studies have shown controversial results on gender-based difference in QoL of overweight and obese children, with some studies reporting a higher

QoL in boys than girls [11, 12] while some have reported similar QoL between the genders [13, 26]. Our study findings collude with the latter. A decrease in QoL with increasing degree of obesity has been well described [23, 24]. Further, previous studies have shown a strong to moderate negative relationship between QoL and increasing degree of obesity mainly in physical and social functioning, while emotional and school functioning remain relatively less affected [12, 23, 24, 34]. Similarly in physical and social functioning, we have shown QoL to be lower in obese compared to overweight children and a significant decline with increasing BMI, while emotional and school functioning did not show a significant difference. Programs for management of children with obesity, should therefore, try to understand and enhance the resilience of these children in emotional and school functioning, in addition to focusing on improving physical and social wellbeing in these children [14, 24].

## **Generalization of results**

Our study sample included families from the three main ethnic groups (Sinhalese, Tamil and Muslim), and four main religions (Buddhist, Catholic, Hindu and Islam) in Sri Lanka. Further, as the study setting was a tertiary care referral centre, children residing throughout Sri Lanka were included. Thus, we believe that these study findings are generally applicable to all Sri Lankan children with overweight/obesity. It should be noted, however, that this study was conducted in a clinical setting rather than a community setting. A few studies have compared QoL in overweight/obese children between community and treatment-seeking settings, with some showing no difference in QoL assessments between hospital-based versus community settings [24], while others have shown lower QoL in clinical settings [11]. Thus, repeating this study in a community setting could result in similar or higher QoL scores.

Strengths of this study include using a pre-validated, international generic QoL questionnaire, using stringent translation procedure as outlined. It enabled us to obtain QoL results which are acceptable, and comparable with children from other regions and other conditions, to obtain a more in-depth appreciation of the impact of overweight/obesity on QoL of children in Sri Lanka. Further, this questionnaire is available, with permission from the copyright owners, for future studies on QoL in Sri Lankan children, which would help further reduce research gaps in this area. Inclusion of a control group of healthy children would provide useful information in future research.

## **Conclusions**

To the best of our knowledge, this is the first study to assess QoL in children with overweight and obesity in Sri Lanka. Our findings emphasize the importance of addressing impairment of QoL faced by overweight/obese Sri Lankan children, especially in physical functioning where most distress was documented. Further, parental perceptions were lower, but showed good correlation with child self-reported QoL, which signifies that parents are quite attuned to their children's issues, and possibly more concerned about impaired wellbeing of their child, than the children themselves. This emphasizes the importance and value of parental involvement in management of childhood obesity.

This study documents for the first time, novel modifiable social factors associated with impaired QoL of overweight/obese children in Sri Lanka, such as difficulties in finding age-appropriate clothes that fit, as well as previously documented factors such as bullying. It also demonstrates the protective effects of regular exercise on psychosocial QoL of overweight/obese Sri-Lankan children for the first time, and the relative resilience of these children in emotional and school functioning, even in the context of increasing BMI. Prevention of peer victimization of overweight/obese children, promoting physical activity and enlightening the clothing industry on the need of a range of children's clothes to fit larger children, are potential strategies which could improve QoL of children with overweight/obesity in Sri Lanka, as well as elsewhere.

## **Abbreviations**

QoL: Quality of Life; PedsQL: Pediatric Quality of Life inventory; BMI: Body Mass Index; WHO: World Health Organization; IQR: Inter Quartile Range

## **Declarations**

### ***Ethics Approval and Consent to Participate***

Ethical clearance was obtained from Ethics Review Committees of Lady Ridgeway Hospital and Faculty of Medicine, University of Colombo (Reference: CSRP/16/019). Information sheets explaining purpose, risks and benefits of the study were provided, and informed written consent was obtained from the accompanying parent of each participating child.

### ***Consent for publication***

Not applicable.

### ***Availability of data and materials***

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

### ***Competing interests***

The authors declare that they have no competing interests

### ***Funding***

This project was conducted without any funding

### ***Authors' contributions***

SG drafted the manuscript, performed the statistical analysis and was extensively involved in acquisition of data. CBG was extensively involved in acquisition of data and substantially contributed to drafting the manuscript. MSH was extensively involved in acquisition of data and substantially contributed to drafting the manuscript. SNS conceptualized the study, supervised and provided expert advice, critically revised the manuscript to produce the final manuscript. All authors have read and approved the final manuscript.

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## Table 4

Table 4: Association between Social Factors and Child Self-Reported QoL (median [IQR])

	n	Overall QoLa	Physical QoL/ Physical functioning[1]	Psychosocial QoLa	Emotional functioninga	Social functioninga	School functioninga
Male Gender	68	80.4 (69.6, 87.0)	81.3 (65.6, 87.5)	82.5 (71.7, 89.2)	80.0 (70.0, 90.0)	80.0 (67.5, 95.0)	85.0 (75.0, 90.0)
Female Gender	41	79.3 (72.6, 92.4)	78.1 (65.6, 89.3)	81.7 (75.0, 93.3)	90.0 (65.0, 95.0)	85.0 (70.0, 100.0)	85.0 (70.0, 90.0)
<i>p</i> -value		<b>0.531</b>	<b>0.802</b>	<b>0.417</b>	<b>0.344</b>	<b>0.197</b>	<b>0.905</b>
Not getting bullied	83	81.5(73.3, 91.3)	81.3 (65.6, 93.3)	83.3 (75.0, 91.7)	85.0 (70.0, 95.0)	85.0 (70.0, 100.0)	85.0 (75.0, 90.0)
Getting bullied	25	75.0 (67.4, 79.3)	75.0 (65.6, 84.4)	73.3 (60.0, 83.3)	70.0 (60.0, 90.0)	75.0 (55.0, 85.0)	75.0 (60.0, 80.0)
<i>p</i> -value		<b>0.005**</b>	<b>0.273</b>	<b>0.001**</b>	<b>0.039*</b>	<b>0.003**</b>	<b>0.001**</b>
Getting adequate exercise	67	83.7(73.9, 90.8)	81.3 (65.6, 93.3)	83.3 (75.0, 92.5)	85.0 (70.0, 95.0)	85.0 (77.5, 97.5)	85.0 (77.5, 90.0)
Not getting adequate exercise	42	76.1(65.2, 86.4)	75.0 (62.5, 84.4)	77.5 (61.7, 87.5)	82.5 (60.0, 90.0)	77.5 (60.0, 95.0)	80.0 (65.0, 90.0)
<i>p</i> -value		<b>0.017*</b>	<b>0.078</b>	<b>0.031*</b>	<b>0.193</b>	<b>0.025*</b>	<b>0.019*</b>
Not having trouble finding age appropriate clothes that fit	56	84.8 (76.1, 91.8)	84.4 (71.9, 93.8)	86.7 (77.5, 93.1)	87.5 (75.0, 90.0)	88.8 (80.0, 100.0)	88.8 (77.5, 90.0)
Having trouble finding age appropriate clothes that fit	52	75.5 (64.4, 80.4)	71.9 (57.8, 84.4)	76.7 (60.0, 83.3)	70.0 (60.0, 90.0)	80.0 (52.5, 90.0)	80.0 (70.0, 87.5)
<i>p</i> -value		<b>0.000**</b>	<b>0.002**</b>	<b>0.001**</b>	<b>0.026*</b>	<b>0.001**</b>	<b>0.010**</b>
Has overweight/ obese siblings or friends	45	80.4(70.7, 89.8)	81.2 (68.8, 93.8)	83.3 (71.7, 91.7)	85.0 (65.0, 90.0)	85.0 (80.0, 95.0)	85.0 (75.0, 90.0)
Doesn't have overweight/ obese siblings or friends	59	78.4(69.6, 87.5)	75.0 (62.5, 85.9)	81.7 (73.3, 90.0)	85.0 (70.0, 90.0)	85.0 (65.0, 95.0)	80.0 (67.5, 90.0)
<i>p</i> -value		<b>0.476</b>	<b>0.154</b>	<b>0.785</b>	<b>0.705</b>	<b>0.650</b>	<b>0.689</b>
On diet control	46	79.9 (69.6, 86.4)	75.0 (64.3, 84.4)	83.3 (75.0, 90.0)	85.0 (65.0, 90.0)	80.0 (75.0, 95.0)	80.0 (75.0, 90.0)
Not on diet control	61	79.3 (69.6, 92.4)	81.3 (68.8, 93.8)	80.0 (71.7, 91.7)	80.0 (65.0, 95.0)	85.0 (65.0, 95.0)	85.0 (70.0, 90.0)
<i>p</i> -value		<b>0.673</b>	<b>0.095</b>	<b>0.717</b>	<b>0.911</b>	<b>0.585</b>	<b>0.722</b>

[1] Data are median (IQR).

\*Statistically significant at  $p < 0.05$  level. \*\*Statistically significant at  $p < 0.01$  level.

QoL, Quality of life; IQR, Inter Quartile Range.