

# Health-Related Quality of Life according to the Socioeconomic Status of Living Areas in Iranian Children and Adolescents: Weight Disorders Survey

Roya Kelishadi<sup>1</sup>, MD; Saeid Safiri<sup>2</sup>, PhD; Shirin Djalalinia<sup>3</sup>, MD; Sareh Miranzadeh<sup>1</sup>, MD; Mohammad Esmaeil Motlagh<sup>4</sup>, MD; Hamid Asayesh<sup>5</sup>, MSc; Shaghayegh Beshtar<sup>6</sup>, MD; Morteza Mansourian<sup>7</sup>, PhD; Armita Mahdavi Gorabi<sup>8</sup>, PhD; Omid Safari<sup>9</sup>, MD; Mostafa Qorbani<sup>9,10</sup>, PhD

<sup>1</sup>Department of Pediatrics, Child Growth and Development Research Center, Research Institute for Primordial Prevention of Non Communicable Disease, Isfahan University of Medical Sciences, Isfahan, Iran;

<sup>2</sup>Managerial Epidemiology Research Center, Department of Public Health, School of Nursing and Midwifery, Maragheh University of Medical Sciences, Maragheh, Iran;

<sup>3</sup>Development of Research & Technology Center, Deputy of Research and Technology, Ministry of Health and Medical Education, Tehran, Iran;

<sup>4</sup>Department of Pediatrics, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran;

<sup>5</sup>Department of Medical Emergencies, Qom University of Medical Sciences, Qom, Iran;

<sup>6</sup>Student Research Committee, Alborz University of Medical Sciences, Karaj, Iran;

<sup>7</sup>Department of Health Education and Promotion, School of Health, Iran University of Medical Sciences, Tehran, Iran;

<sup>8</sup>Department of Basic and Clinical Research, Tehran Heart Research Center, Tehran University of Medical Sciences, Tehran, Iran;

<sup>9</sup>Non-communicable Diseases Research Center, Alborz University of Medical Sciences, Karaj, Iran;

<sup>10</sup>Chronic Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

## Correspondence:

Mostafa Qorbani, PhD;  
Non-communicable Diseases Research Center,  
Alborz University of Medical Sciences, Postal  
code: 31485/56, Karaj, Iran

Tel/Fax: +98 21 32558920

Email: mqorbani1379@yahoo.com

Received: 5 July 2017

Revised: 12 December 2017

Accepted: 17 December 2017

## What's Known

- Data are scarce on health-related quality of life (HRQoL) among general Iranian students and adolescents.
- There is no earlier survey on HRQoL according to socioeconomic status (SES) disparities in Iran.

## What's New

- Present study determined HRQoL in terms of SES disparities among Iranian children and adolescents.

## Abstract

**Background:** Health-related quality of life (HRQoL) has become a major concern in the field of children's health research. We assessed HRQoL among Iranian children and adolescents according to the socioeconomic status (SES) of their living region.

**Methods:** Via multistage cluster sampling from rural and urban school students aged 6 to 18 years, this nationwide study was conducted from 2011 to 2012. HRQoL was assessed using the adolescent core version of the Pediatric Quality of Life questionnaire. Through survey data analysis methods, the data were compared according to the SES of the living region, sex, and the living area.

**Results:** Overall, 23043 students participated in the survey (participation rate=92.2%). The mean age of the participants was 12.55±3.31 years. Boys accounted for 50.8% of the study population, and 73.4% were from urban areas. At national level, the mean of the HRQoL total score was 81.7 (95% CI: 81.3 to 82.1) with a mean of 83.5 (95% CI: 83.0 to 84.1) for the boys and 79.8 (95% CI: 79.1 to 80.5) for the girls. The highest and the lowest scores, respectively, belonged to social functioning (90.0 [95% CI: 89.7 to 90.3]) and emotional functioning (78.2 [95% CI: 77.7 to 78.7]). The highest total HRQoL score belonged to the second highest SES region of the country (mean=83.1; 95% CI: 82.5 to 83.7). The association between total HRQoL and the score of all the subscales and SES in the living area was statistically significant (P<0.001).

**Conclusion:** The results of the present study showed that in the children and adolescents, SES was associated with HRQoL. Accordingly, HRQoL and the related SES differences should be considered one of the priorities in health research and health policy.

Please cite this article as: Kelishadi R, Safiri S, Djalalinia Sh, Miranzadeh S, Motlagh ME, Asayesh H, Beshtar Sh, Mansourian M, Mahdavi Gorabi A, Safari O, Qorbani M. Health-Related Quality of Life according to the Socioeconomic Status of Living Areas in Iranian Children and Adolescents: Weight Disorders Survey. Iran J Med Sci. 2019;44(1):18-27.

**Keywords** • Quality of life • Child • Adolescent • Iran

## Introduction

According to the World Health Organization, health-related quality of life (HRQoL) is defined as "not only the absence of disease and infirmity, but the presence of physical, mental and social well-being."<sup>1</sup> It has been suggested that HRQoL can predict future health, need for health care, and different levels of health among

high-risk children.<sup>2,3</sup>

The association between socioeconomic status (SES) and health is reported in many epidemiological studies.<sup>4, 5</sup> In developed countries, individuals from a high SES background report better health than those from a low SES background.<sup>6</sup> Children and adolescents living in low SES regions are likely to experience more mental problems than those in high SES areas.<sup>7</sup> Additionally, there is proof of associations between SES, functional health, and subjective well-being.<sup>8</sup> The results of several studies have indicated that SES is allied to health behaviors,<sup>9</sup> low self-rated health status,<sup>10</sup> and mortality.<sup>11</sup> The association between SES and health has been assessed in previous investigations; nonetheless, there is a paucity of information on this association in children and adolescents.

There is a dearth of data on HRQoL among general Iranian students and adolescents and to our knowledge, there is no earlier survey on HRQoL in terms of SES disparities in Iran. Reliable information on HRQoL in children and adolescents can be useful in political decision-making and interventions at individual, regional, and community levels. We, therefore, sought to determine HRQoL according to SES disparities among Iranian children and adolescents.

## Patients and Methods

The present study was developed as a complementary part of a national survey of school students' high-risk behaviors, entitled "Childhood and Adolescence Surveillance and Prevention of Adult Non-communicable disease (CASPIAN-IV).<sup>12, 13</sup> This complementary study of the CASPIAN-IV study was entitled the "Weight Disorders Survey" and was developed to assess the determinants of weight disorders among Iranian children and adolescents. It was performed in collaboration with the Iranian Ministry of Health and Medical Education, the Child Growth and Development Research Center, Isfahan University of Medical Sciences, and Alborz University of Medical Sciences. The survey was conducted among 23000 students aged 6 to 18 years from urban and rural areas of Iran's provinces. Students were selected by multistage cluster sampling from the urban and rural areas of different cities in 30 provinces of Iran (83 clusters of 10 students in each province). Stratification was done in each province based on the living area (urban/rural), sex (boy/girl), and education level (elementary/intermediate/high school). The sampling was proportional to size with an equal sex ratio. The number of the

samples in living area and education level was proportional to size in each province. The cluster sampling method with equal clusters was used in each province to reach the necessary sample size. Clusters were defined at the level of schools, and 10 students were selected in each cluster. The sampling frame was defined based on the Information Bank of the Ministry of Education. In each province, schools were categorized by the type and name of the school and the number of students was added cumulatively in each province. Ten students were randomly selected from the clusters when the clusters were defined in each province. Finally, 83 clusters were selected.

The present investigation was conducted in accordance with the Declaration of Helsinki. The ethics committees and other relevant national and provincial regulatory organizations gave ethical approval. The participants received complete explanation of the objectives and protocols of the study, and they were given assurances of confidentiality and anonymity. Participation in the study was voluntary, and all of the potential participants had the right to withdraw from the study at any time. Written informed consent and oral assent were obtained from the parents and the students.

Self-administered questionnaires were filled in by the students at school under the supervision of health-care professionals. A trained team recorded the required information in a checklist and performed the examinations based on the standard protocol using calibrated instruments.<sup>12-15</sup>

Sociodemographic variables, prenatal factors, lifestyle information, family dietary habits, and history of chronic diseases were addressed in the questionnaires. The reliability and validity of all the questionnaires were confirmed through previous studies.<sup>16, 17</sup>

A standard questionnaire, previously validated in Iranian children and adolescents, was employed to assess the quality of life among the studied students.<sup>17, 18</sup> The internal consistency reliability and Cronbach's alpha of this questionnaire were 0.91 and 0.73, respectively. Via the Adolescent Core version of the Pediatric Quality of Life (PedsQL), which measures HRQoL in children and adolescents aged between 2 and 18, a total of 23 items on physical, emotional, social, and school functioning domains were evaluated and a psychosocial HRQoL summary score was derived from the mean of the aggregated items.<sup>19</sup> Physical functioning contained 8 items, and the other 3 items were defined as the psychosocial score with 5 items. The questions were scored as follows: 0=never a problem; 1=almost never a problem; 2=sometimes a problem; 3=often a problem;

and 4=almost always a problem. For ease of interpretability, the items were reverse scored and linearly transformed to a 0 to 100 scale; thus, higher scores reflected a better HRQoL.

We categorized Iran into 4 subnational regions according to previously defined criteria based on geography and SES by Farzadfar et al.<sup>20</sup> Some variables from the national census including literacy rate, family assets, and employment rate were combined using principal component analysis (PCA) to calculate regional SES. According to the PCA method, the central region had the highest SES, followed by the west, north–northeast, and the southeast regions.

The mean of the total HRQoL score and its subscales according to the SES of the living area, sex, and the living area was reported with 95% confidence intervals (CIs). The mean of the total HRQoL score and all the subscales between the boys and girls and between the rural and urban students was assessed using the T-test. The association between the total HRQoL score and all the subscales and the SES of the living area was assessed using ANOVA. The data were analyzed via survey data analysis methods in the STATA Corp. 2011 (Stata Statistical Software: Release 12. College Station, TX: Stata Corp LP. Package). A P value less than 0.05 was considered statistically significant.

## Results

Following the executive procedures, finally 23000 students participated in the survey (participation rate=92.2%). The mean age of the studied students was 12.55±3.31 years, and 50.8% of them were boys. Additionally, about 73.4% of the participants lived in urban areas.

At national level, the mean of the total score of HRQoL was 81.795% ( CI: 81.3 to 82.1), with a mean of 83.5 (95% CI: 83.0 to 84.1) for the boys and 79.8 (95% CI: 79.1 to 80.5) for the girls. At national level, the highest score belonged to the social functioning of the participants (90.0 [95% CI: 89.7 to 90.3]). It is considerable that between these 5 subscales, the lowest score belonged to emotional functioning (mean=78.2; 95% CI: 77.7 to 78.7). The mean of the total, school, psychosocial, and emotional scores of HRQoL in the rural areas was significantly higher than that in the urban areas (P<0.001). In addition, the mean of the total HRQoL score and its subscales (except for social functioning) in the boys was significantly higher than that in the girls (P<0.001).

The mean (95% CI) of the total HRQoL score and its subscales is shown according to the SES of the living area stratified by sex and living area in table 1. Based on our findings, the highest

**Table 1:** Mean (95% CI) of the total PedsQL and its subscales at regional level stratified by sex and living area

Region	Physical Functioning	Emotional Functioning	Social Functioning	School Functioning	Psychosocial Functioning	Total Score
Lowest SES (southeast)						
Boys	83.8 (82.2-85.5)	81.9 (79.8-84.0)	89.2 (87.6-90.9)	82.2 (80.8-83.5)	84.3 (82.9-85.7)	84.1 (82.7-85.5)
Girls	81.9 (80.2-83.6)	73.9 (71.8-76.0)	88.4 (87.0-89.8)	75.7 (74.1-77.3)	79.1 (77.7-80.5)	80.0 (78.6-81.4)
Urban	83.4 (81.8-85.0)	77.5 (75.3-79.8)	89.6 (88.1-91.1)	79.0 (77.3-80.7)	81.9 (80.4-83.4)	82.4 (80.9-83.8)
Rural	82.2 (80.5-84.0)	78.2 (76.1-80.3)	87.8 (86.2-89.5)	78.6 (77.0-80.2)	81.4 (79.8-82.9)	81.6 (80.1-83.1)
Total	82.8 (81.7-84.0)	77.7 (76.2-79.3)	88.8 (87.7-89.9)	78.8 (77.6-80.0)	81.6 (80.5-82.7)	82.0 (80.9-83.0)
Second lowest SES (north-northeast)						
Boys	85.9 (84.7-87.2)	82.1 (80.3-83.8)	90.8 (89.7-91.9)	80.0 (78.4-81.6)	81.2 (79.6-82.8)	81.3 (79.7-82.9)
Girls	84.0 (82.7-85.4)	75.0 (73.2-76.9)	90.4 (89.5-91.2)	70.3 (68.3-72.3)	74.1 (71.9-76.2)	75.1 (72.9-77.3)
Urban	85.3 (84.1-86.5)	78.2 (76.5-79.8)	90.7 (89.9-91.6)	74.0 (72.4-75.6)	76.6 (75.1-78.2)	77.3 (75.8-78.9)
Rural	84.3 (83.0-85.7)	79.8 (77.8-81.8)	90.2 (89.1-91.3)	78.8 (76.8-80.9)	80.8 (78.8-82.9)	81.0 (78.9-83.0)
Total	85.0 (84.1-85.9)	78.7 (77.4-79.9)	90.6 (89.9-91.3)	75.4 (74.2-76.5)	77.8 (76.7-78.9)	78.3 (77.3-79.4)
Second highest SES (west)						
Boys	84.3 (83.5-85.2)	80.9 (79.8-81.9)	90.5 (89.7-91.3)	83.9 (83.1-84.6)	85.0 (84.2-85.7)	84.7 (84.0-85.4)
Girls	84.7 (83.9-85.5)	76.0 (74.8-77.1)	90.9 (90.3-91.6)	76.5 (75.5-77.5)	80.3 (79.4-81.3)	81.5 (80.5-82.4)
Urban	84.4 (83.7-85.1)	78.4 (77.4-79.3)	90.7 (90.1-91.3)	80.1 (79.2-81.0)	82.5 (81.7-83.3)	82.9 (82.1-83.7)
Rural	84.8 (83.7-85.9)	78.7 (77.1-80.2)	90.8 (89.8-91.7)	80.7 (79.5-81.9)	83.2 (82.0-84.3)	83.6 (82.6-84.7)
Total	84.5 (83.9-85.1)	78.5 (77.7-79.3)	90.7 (90.2-91.2)	80.2 (79.5-80.9)	82.7 (82.0-83.3)	83.1 (82.5-83.7)
Highest SES (central)						
Boys	84.1 (83.1-85.1)	79.8 (78.5-81.1)	88.6 (87.5-89.7)	81.5 (80.5-82.5)	83.3 (82.3-84.2)	83.6 (82.6-84.5)
Girls	83.4 (82.4-84.4)	75.6 (74.2-77.0)	89.2 (88.3-90.1)	76.4 (75.7-77.1)	80.3 (79.5-81.1)	81.4 (80.6-82.1)
Urban	83.6 (82.8-84.4)	77.5 (76.4-78.6)	89.0 (88.3-89.8)	78.8 (78.1-79.6)	81.7 (81.0-82.4)	82.4 (81.7-83.0)
Rural	84.3 (82.7-86.0)	78.5 (75.9-81.1)	88.4 (86.5-90.4)	79.6 (77.6-81.6)	82.1 (80.3-83.9)	82.9 (81.2-84.5)
Total	83.7 (83.0-84.4)	77.7 (76.7-78.7)	88.9 (88.2-89.6)	78.9 (78.2-79.6)	81.8 (81.1-82.4)	82.4 (81.8-83.0)

total HRQoL score belonged to the second highest SES region of the country (mean=83.1; 95% CI: 82.5 to 83.7). After that, the highest SES region (mean=82.4; 95% CI: 81.8 to 83.0), lowest (mean=82.0; 95% CI: 80.9 to 83.0), and finally second lowest (mean=78.3; 95% CI: 77.3 to 79.4) ranked second to fifth. The associations between the total HRQoL score and the score of all the subscales and the SES of the living place were statistically significant ( $P<0.001$ ). Moreover, the mean of the total HRQoL score and its subscales at national level stratified by sex and living region is presented in figure 1.

87.4 (95% CI: 84.8 to 90.0) and 48.4 (95% CI: 42.4 to 53.8).

### Discussion

In the present study, we assessed HRQoL based on SES disparities at national and regional levels among Iranian children and adolescents. Our results showed that statistically SES was not associated with the level of HRQoL, with Iranian students from the lowest SES reporting almost the same level of HRQoL as their counterparts from the highest SES. In addition, there was a slight increment in quality of life in our second highest SES group compared to the other SES categories, indicating that HRQoL can be affected not only by SES but also by the climate of different areas. It is deserving of note that the western part of Iran enjoys a more favorable climate than the other parts. Our results are inconsistent with those reported by previous studies.<sup>21, 22</sup> Previous research has demonstrated that children from low-income families have a low HRQoL and tend to report poor health.<sup>21</sup> The results of a study among Austrian elementary school children indicated that factors associated with HRQoL included family's income status, parents' quality of life, children's school performance, and life events such as divorce.<sup>23</sup> Varni et al.<sup>24</sup> reported that family's SES had a significant relationship with children's quality of life. There is a well-recognized relationship between SES and health, but less is known about how SES affects the perception of HRQoL, specifically in children. There is a close relationship between SES and mental health, and lower levels of SES are correlated with a rise in the prevalence of mental disorders. A recent representative nationwide study on Iranian children and adolescents reported that those from low SES regions experienced more mental problems and had lower life satisfaction levels than those from high SES areas.<sup>7</sup> Likewise, previous studies on Iranian children and adolescents have shown that the SES of the individual and the SES of the living area are associated with psychiatric well-being.<sup>25, 26</sup>

In the current study, the HRQoL in the boys was higher than that in the girls in all the SES regions. The results of a study by Laaksonen et al.<sup>27</sup> showed that girls reported significantly lower emotional function than boys; their results chime in with those of other previous studies.<sup>28-30</sup> Our results were also concordant with the findings of a previous study in Iran, which showed that the frequency of self-rated health was higher in boys than in girls.<sup>31, 32</sup> One of the factors that cause this difference between boys and girls is emotional functioning. Recent studies

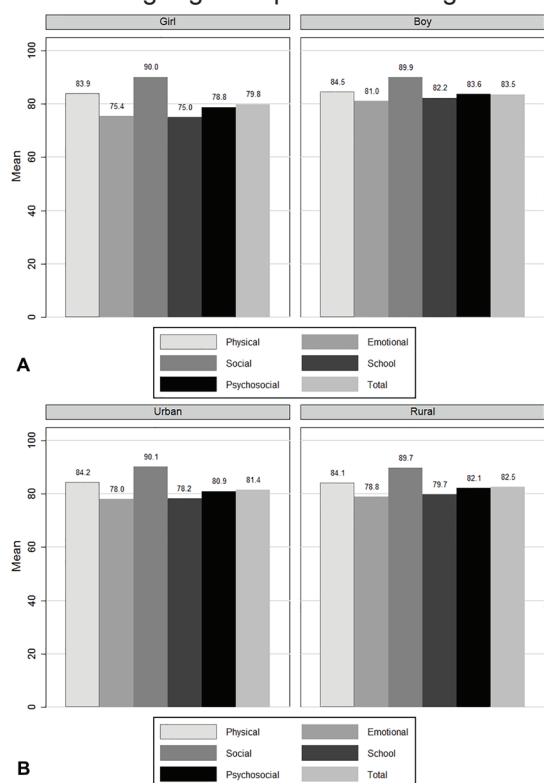


Figure 1: Mean of the total PedsQL and its subscales at national level stratified by sex (a) and living area (b).

Table 2 shows the mean (95% CI) of the total HRQoL score and its subscales at provincial level stratified by sex and living area. At provincial level, the lowest and the highest scores of physical functioning were 78.4 (95% CI: 75.6 to 81.3) and 88.1 (95% CI: 85.7 to 90.6), respectively. For emotional functioning, these were respectively 71.1 (95% CI: 67.7 to 74.4) and 85.3 (95% CI: 81.1 to 89.5). Considering the social functioning, the highest score was 93.5 (95% CI: 90.1 to 96.8) and the lowest score was 84.5 (95% CI: 82.7 to 86.3). The highest school functioning score was 85.6 (95% CI: 83.1 to 88.1). The lowest score of school functioning was 47.8 (95% CI: 42.5 to 53.1). In the evaluation of psychosocial functioning, the highest and the lowest calculated scores were correspondingly



**Table 2: Mean (95% CI) of the total PedsQL and its subscales at provincial level stratified by sex and living area**

Province	Physical Functioning	Emotional Functioning	Social Functioning	School Functioning	Psychosocial Functioning	Total Score
<b>Western Azerbaijan</b>						
Boys	81.9 (78.9-85.0)	83.1 (79.9-86.3)	89.3 (86.6-92.0)	84.9 (83.0-86.8)	85.8 (83.5-88.1)	84.4 (82.0-86.9)
Girls	85.3 (82.4-88.2)	75.5 (72.1-78.9)	90.1 (88.2-92.1)	78.3 (75.6-81.0)	81.3 (79.0-83.6)	82.7 (80.4-85.1)
Urban	83.1 (80.2-86.0)	78.3 (75.1-81.4)	88.7 (86.5-90.9)	80.3 (77.8-82.8)	82.4 (80.3-84.6)	82.7 (80.5-84.9)
Rural	84.8 (82.2-87.4)	81.5 (78.5-84.5)	91.9 (89.8-93.9)	84.2 (82.3-86.1)	85.9 (83.8-88.0)	85.5 (83.7-87.3)
Total	83.6 (81.5-85.8)	79.3 (76.9-81.7)	89.7 (88.1-91.4)	81.6 (79.7-83.4)	83.5 (81.9-85.2)	83.6 (81.9-85.2)
<b>Ardabil</b>						
Boys	84.9 (79.1-90.8)	81.5 (76.4-86.7)	89.6 (84.4-94.7)	85.2 (81.5-89.0)	85.4 (81.2-89.5)	85.2 (81.1-89.2)
Girls	82.8 (79.4-86.2)	78.1 (74.1-82.1)	89.1 (86.7-91.5)	78.6 (75.3-82.0)	80.8 (77.7-83.9)	80.9 (77.8-84.1)
Urban	83.4 (79.8-86.9)	78.7 (74.9-82.5)	89.3 (86.7-91.9)	80.5 (77.3-83.7)	82.2 (79.3-85.0)	82.2 (79.3-85.1)
Rural	84.4 (80.0-88.8)	82.2 (78.7-85.8)	89.1 (83.7-94.5)	82.9 (77.4-88.4)	83.4 (77.5-89.3)	83.0 (76.9-89.2)
Total	83.5 (80.5-86.6)	79.3 (76.0-82.6)	89.3 (86.9-91.6)	80.9 (78.0-83.8)	82.4 (79.7-85.0)	82.4 (79.7-85.0)
<b>Guilan</b>						
Boys	88.1 (85.7-90.6)	84.3 (81.1-87.5)	91.8 (89.5-94.1)	84.6 (82.4-86.7)	86.9 (84.5-89.2)	87.3 (85.2-89.4)
Girls	85.8 (82.8-88.9)	75.9 (72.2-79.5)	92.3 (90.5-94.0)	75.2 (72.7-77.8)	81.1 (78.8-83.4)	82.8 (80.3-85.2)
Urban	86.6 (84.2-89.1)	79.4 (76.2-82.5)	92.1 (90.4-93.8)	79.3 (76.8-81.7)	83.6 (81.4-85.7)	84.6 (82.6-86.7)
Rural	88.2 (85.8-90.5)	82.6 (79.9-85.2)	91.7 (89.3-94.2)	82.1 (79.9-84.3)	85.5 (83.6-87.4)	86.4 (84.8-88.1)
Total	87.0 (85.0-89.0)	80.1 (77.6-82.6)	92.0 (90.6-93.5)	79.9 (77.9-81.9)	84.0 (82.3-85.7)	85.1 (83.4-86.7)
<b>Mazandaran</b>						
Boys	82.8 (77.3-88.2)	75.9 (66.6-85.1)	87.0 (83.2-90.7)	65.3 (61.3-69.3)	65.3 (61.4-69.3)	65.4 (61.4-69.4)
Girls	82.4 (79.6-85.2)	76.3 (70.1-82.4)	93.5 (90.1-96.8)	47.8 (42.5-53.1)	48.1 (42.4-53.8)	48.1 (42.4-53.8)
Urban	82.6 (77.5-87.7)	73.8 (64.9-82.7)	88.5 (85.1-91.9)	55.7 (51.2-60.2)	55.8 (51.3-60.3)	55.9 (51.3-60.4)
Rural	82.7 (77.9-87.4)	80.3 (74.4-86.2)	90.5 (82.5-98.4)	64.7 (59.3-70.1)	65.2 (59.2-71.3)	65.1 (59.2-71.1)
Total	82.6 (78.9-86.4)	76.0 (69.5-82.4)	89.1 (85.4-92.8)	57.6 (53.7-61.5)	57.8 (53.8-61.7)	57.8 (53.8-61.8)
<b>Golestan</b>						
Boys	84.2 (81.8-86.6)	82.3 (79.1-85.6)	91.3 (89.3-93.3)	84.6 (82.5-86.7)	86.0 (83.9-88.1)	85.3 (83.4-87.3)
Girls	82.3 (78.6-86.0)	74.4 (69.5-79.2)	89.7 (87.8-91.6)	75.2 (73.2-77.2)	79.6 (77.1-82.0)	80.4 (77.7-83.1)
Urban	83.7 (80.5-87.0)	78.4 (74.0-82.7)	91.4 (89.8-93.0)	79.4 (76.5-82.3)	82.9 (80.4-85.3)	83.1 (80.6-85.5)
Rural	83.2 (80.8-85.5)	80.0 (76.8-83.2)	89.8 (87.7-91.9)	82.5 (80.3-84.8)	84.1 (81.9-86.3)	83.7 (81.7-85.8)
Total	83.5 (81.4-85.5)	79.2 (76.4-81.9)	90.7 (89.3-92.0)	80.8 (78.9-82.8)	83.4 (81.7-85.1)	83.4 (81.7-85.0)
<b>Northern Khorasan</b>						
Boys	87.5 (84.9-90.2)	82.9 (79.9-85.9)	90.5 (88.6-92.5)	84.2 (82.1-86.3)	85.9 (83.7-88.0)	86.5 (84.4-88.6)
Girls	85.1 (81.9-88.3)	78.1 (73.9-82.2)	90.5 (88.5-92.5)	76.7 (74.3-79.2)	81.5 (79.0-84.0)	82.6 (80.0-85.3)
Urban	86.9 (84.2-89.6)	80.5 (77.3-83.8)	90.8 (88.9-92.6)	81.5 (79.2-83.8)	84.2 (81.9-86.5)	85.1 (82.8-87.4)
Rural	85.3 (82.7-87.9)	81.5 (77.4-85.6)	89.9 (87.9-91.9)	79.5 (76.1-83.0)	83.4 (81.0-85.7)	83.9 (81.7-86.2)
Total	86.5 (84.4-88.5)	80.8 (78.2-83.4)	90.5 (89.1-92.0)	81.0 (79.0-82.9)	84.0 (82.2-85.7)	84.8 (83.0-86.6)
<b>Khorasan Razavi</b>						
Boys	83.5 (81.0-86.0)	78.6 (73.7-83.5)	89.7 (86.8-92.7)	83.5 (80.8-86.2)	83.9 (80.6-87.3)	83.8 (81.0-86.6)
Girls	82.8 (81.4-84.2)	72.4 (69.7-75.1)	88.9 (87.7-90.1)	75.3 (73.3-77.4)	78.8 (77.5-80.2)	80.2 (79.0-81.4)
Urban	83.6 (82.1-85.1)	75.1 (72.2-78.0)	89.0 (87.4-90.6)	77.6 (75.3-79.9)	80.6 (78.6-82.5)	81.6 (80.0-83.2)
Rural	81.0 (78.8-83.3)	73.3 (67.9-78.7)	89.8 (88.2-91.3)	81.6 (78.2-85.1)	81.6 (79.0-84.2)	81.4 (79.1-83.7)
Total	83.1 (81.8-84.4)	74.7 (72.2-77.3)	89.2 (87.9-90.5)	78.4 (76.4-80.5)	80.8 (79.1-82.4)	81.5 (80.2-82.9)
<b>Sistan and Baluchestan</b>						
Boys	81.5 (79.5-83.5)	79.6 (76.1-83.0)	86.2 (82.8-89.5)	81.1 (78.5-83.7)	82.1 (79.4-84.7)	81.8 (79.5-84.1)
Girls	80.2 (76.8-83.7)	74.3 (69.9-78.6)	86.8 (83.8-89.8)	75.7 (73.1-78.4)	78.6 (75.6-81.6)	79.0 (76.0-82.1)
Urban	79.8 (76.5-83.0)	74.9 (70.1-79.7)	87.1 (83.6-90.6)	78.2 (75.1-81.3)	80.0 (76.6-83.3)	79.9 (76.7-83.0)
Rural	81.8 (79.3-84.3)	78.6 (75.4-81.7)	85.9 (82.9-89.0)	78.4 (76.0-80.8)	80.6 (78.0-83.2)	80.8 (78.4-83.3)
Total	80.8 (78.8-82.8)	76.8 (74.0-79.7)	86.5 (84.2-88.8)	78.3 (76.4-80.3)	80.3 (78.2-82.4)	80.4 (78.4-82.4)
<b>Hormozgan</b>						
Boys	86.1 (81.9-90.3)	85.3 (81.1-89.5)	92.2 (89.9-94.4)	82.3 (80.0-84.7)	86.6 (84.0-89.2)	86.4 (83.6-89.3)
Girls	78.4 (75.6-81.3)	73.4 (68.6-78.2)	87.7 (85.4-90.0)	74.3 (72.3-76.3)	78.5 (76.3-80.6)	78.4 (76.3-80.6)
Urban	86.4 (82.9-90.0)	84.1 (79.7-88.5)	91.8 (89.7-93.9)	81.1 (78.7-83.4)	85.6 (83.2-88.1)	85.9 (83.3-88.5)
Rural	80.1 (76.4-83.8)	77.3 (73.3-81.4)	89.1 (86.9-91.2)	77.3 (74.5-80.1)	81.2 (78.9-83.6)	80.8 (78.4-83.3)
Total	82.9 (80.0-85.7)	80.3 (77.1-83.6)	90.3 (88.7-91.9)	79.0 (76.9-81.0)	83.2 (81.3-85.1)	83.1 (81.0-85.1)

Ilam							
Boys	84.6(82.5-86.8)	82.2 (79.5-85.0)	91.6 (90.0-93.1)	83.6 (81.3-86.0)	85.2 (83.1-87.3)	84.7 (82.7-86.7)	
Girls	86.6 (84.0-89.2)	81.8 (77.3-86.4)	92.1 (89.8-94.4)	79.5 (77.1-81.9)	84.3 (81.4-87.1)	85.0 (82.4-87.6)	
Urban	84.8 ( 83.0-86.5)	80.8 (78.1-83.4)	91.5 (90.1-92.9)	81.6 (79.6-83.6)	84.2 (82.4-86.1)	84.2 (82.5-86.0)	
Rural	88.7 (84.6-92.9)	88.5 (84.2-92.8)	93.1 (89.5-96.6)	83.4 (80.2-86.7)	87.7 (83.8-91.5)	87.7 (84.0-91.4)	
Total	85.4 (83.8-87.1)	82.1 (79.6-84.6)	91.8 (90.5-93.1)	81.9 (80.2-83.7)	84.8 (83.1-86.5)	84.8 (83.2-86.4)	
Kermanshah							
Boys	84.2 (82.1-86.3)	79.4 (76.8-82.0)	90.8 (89.0-92.7)	82.2 (80.2-84.3)	84.1 (82.3-86.0)	84.1 (82.4-85.9)	
Girls	85.1 (82.3-87.9)	76.3(72.4-80.3)	91.2 (89.3-93.2)	75.6 (72.6-78.5)	80.0 (76.7-83.3)	81.2 (77.7-84.7)	
Urban	84.8 (82.7-86.9)	77.9 (75.4-80.5)	91.3 (89.9-92.8)	79.2 (77.0-81.5)	82.2 (80.1-84.4)	82.8 (80.7-84.9)	
Rural	83.6 (80.6-86.6)	79.2 (74.3-84.1)	90.5 (87.4-93.7)	81.8 (78.2-85.4)	83.8 (80.4-87.3)	83.8 (80.7-86.9)	
Total	84.5 (82.8-86.2)	78.3 (76.1-80.5)	91.0 (89.6-92.3)	79.7 (77.8-81.7)	82.6 (80.8-84.4)	83.0 (81.3-84.8)	
Kurdistan							
Boys	82.0 (79.6-84.5)	78.4 (75.8-81.0)	90.5 (88.4-92.6)	83.9 (81.5-86.2)	84.1 (82.0-86.3)	83.4 (81.3-85.4)	
Girls	85.4 (83.4-87.5)	75.1 (72.0-78.2)	93.3 (91.5-95.1)	77.7 (75.8-79.6)	81.9 (80.1-83.8)	83.1 (81.3-85.0)	
Urban	83.1 (81.3-85.0)	76.9 (74.7-79.2)	91.6 (89.9-93.3)	81.1 (78.7-83.5)	83.1 (81.4-84.8)	83.1 (81.6-84.7)	
Rural	84.1 (80.0-88.3)	76.5 (72.1-81.0)	92.3 (89.7-94.9)	81.2 (78.2-84.2)	83.3 (80.4-86.2)	83.6 (80.4-86.8)	
Total	83.6 (81.8-85.4)	76.9 (74.8-79.0)	91.8 (90.3-93.2)	81.1 (79.2-82.9)	83.1 (81.6-84.7)	83.3 (81.8-84.7)	
Hamedan							
Boys	84.3 (81.9-86.7)	81.7 (78.3-85.1)	90.7 (88.3-93.0)	84.7 (82.9-86.4)	85.7 (83.4-87.9)	85.2 (83.1-87.3)	
Girls	85.2 (83.4-86.9)	75.6 (72.4-78.7)	89.9 (88.5-91.2)	76.3 (74.7-77.9)	80.5 (78.7-82.2)	82.1 (80.4-83.7)	
Urban	84.6 (82.8-86.5)	79.4 (76.5-82.3)	90.6 (88.8-92.3)	81.5 (79.6-83.4)	83.8 (82.0-85.6)	84.1 (82.5-85.8)	
Rural	85.0 (82.5-87.5)	76.4 (71.8-81.1)	89.4 (87.9-91.0)	77.8 (75.1-80.5)	81.1(78.1-84.0)	82.3 (79.5-85.1)	
Total	84.7 (83.2-86.2)	78.6 (76.1-81.2)	90.3 (88.9-91.6)	80.5 (78.9-82.2)	83.1 (81.5-84.7)	83.6 (82.2-85.1)	
Zanjan							
Boys	87.1 (84.4-89.8)	84.2 (81.1-87.3)	92.3 (89.5-95.2)	85.6 (83.1-88.1)	87.4 (84.8-90.0)	87.3 (84.8-89.8)	
Girls	84.1 (82.3-86.0)	73.3 (70.4-76.2)	91.1 (89.5-92.8)	71.4 (67.6-75.3)	76.3 (72.6-80.1)	77.9 ( 74.2-81.7)	
Urban	86.2 (84.3-88.2)	78.5 (75.1-81.8)	92.6 (90.9-94.3)	77.5 (73.2-81.9)	81.1 (77.1-85.0)	82.1 (78.3-85.9)	
Rural	84.6 (81.4-87.8)	78.9 (74.7-83.1)	90.3 (87.1-93.6)	78.8 (74.7-82.9)	82.1 (78.4-85.7)	82.7 (79.2-86.2)	
Total	85.6 (83.8-87.3)	78.7 (76.0-81.3)	91.7 (90.0-93.4)	78.0 (74.9-81.2)	81.5 (78.6-84.3)	82.3 (79.6-85.0)	
Qazvin							
Boys	87.0 (85.4-88.6)	82.0 (79.0-84.9)	91.4 (89.4-93.4)	82.0 (79.2-84.8)	85.1 (82.9-87.3)	85.8 (83.9-87.6)	
Girls	86.3 (84.1-88.5)	75.2 (71.9-78.5)	91.4 (89.7-93.0)	75.5(74.0-77.0)	80.7 (79.0-82.3)	82.6 (80.8-84.4)	
Urban	86.7 (84.9-88.4)	78.3 (75.4-81.2)	91.1 (89.5-92.8)	78.6 (76.5-80.7)	82.7 (80.9-84.5)	84.1 (82.4-85.8)	
Rural	86.6 (85.1-88.1)	80.0 (76.5-83.5)	92.1 (90.6-93.7)	79.6 (75.6-83.6)	83.9 (81.4-86.4)	84.8 (83.0-86.7)	
Total	86.6 (85.3-88.0)	78.7 (76.3-81.1)	91.4 (90.1-92.7)	78.9 (77.0-80.8)	83.0 (81.5-84.5)	84.3 (82.9-85.6)	
Qom							
Boys	80.1 (77.9-82.2)	75.7 (73.1-78.3)	86.3 (84.4-88.1)	78.7 (77.0-80.4)	80.1 (78.4-81.8)	80.1 (78.3-81.8)	
Girls	79.7 (77.4-82.1)	71.1 (67.7-74.4)	88.4 (86.1-90.7)	75.5 (73.6-77.4)	78.2 (76.0-80.4)	78.8 (76.7-80.9)	
Urban	80.0 (78.4-81.6)	73.9 (71.7-76.0)	87.8 (86.4-89.2)	77.2 (75.7-78.6)	79.5 (78.1-80.9)	79.7 (78.3-81.0)	
Rural	73.7 (67.8-79.5)	61.6 (47.4-75.8)	82.3 (68.3-96.2)	74.2 (71.0-77.4)	72.7 (62.2-83.1)	73.0 (64.2-81.9)	
Total	79.9 (78.3-81.5)	73.2 (70.9-75.5)	87.4 (85.9-89.0)	76.9 (75.5-78.3)	79.1 (77.6-80.5)	79.4 (78.0-80.8)	
Tehran							
Boys	82.5 (79.5-85.5)	78.3 (74.0-82.7)	88.1 (84.8-91.5)	81.7 (79.2-84.2)	82.7 (79.8-85.6)	82.6 (79.9-85.4)	
Girls	84.5 (81.6-87.3)	76.8 (72.9-80.6)	90.6 (89.2-92.1)	77.5 (75.4-79.6)	81.5 (79.5-83.5)	82.5 ( 80.5-84.4)	
Urban	83.6 (81.4-85.8)	77.7 (74.7-80.8)	89.5 (87.5-91.5)	79.4 (77.6-81.2)	82.1 (80.2-84.0)	82.6 (80.8-84.4)	
Rural	81.6 (77.8-85.4)	75.4 (67.7-83.1)	87.0 (83.7-90.3)	83.7 (79.8-87.6)	82.0 (77.1-87.0)	81.9 (77.8-85.9)	
Total	83.5 (81.4-85.5)	77.6 (74.7-80.5)	89.4 (87.5-91.3)	79.7 (77.9-81.4)	82.1 (80.3-83.9)	82.5 (80.8-84.2)	
Semnan							
Boys	86.7 (84.5-88.8)	83.0 (81.0-85.0)	92.2 (90.6-93.8)	84.4 (82.4-86.5)	86.5 (85.0-88.1)	86.6 (85.0-88.2)	
Girls	82.9 (80.6-85.2)	75.0 (72.1-77.9)	90.6 (89.4-91.9)	77.1 (75.8-78.3)	80.7 (79.3-82.2)	81.4 (79.9-83.0)	
Urban	84.5 (82.7-86.3)	78.2 (75.9-80.6)	91.4 (90.4-92.5)	80.7 (79.1-82.2)	83.4 (82.0-84.8)	83.8 (82.3-85.2)	
Rural	86.0 (81.1-91.0)	82.6 (77.9-87.3)	91.2 (87.8-94.7)	80.3 (74.9-85.6)	84.3 (80.7-88.0)	84.8 (80.8-88.8)	
Total	84.7 (83.0-86.4)	78.9 (76.7-81.0)	91.4 (90.4-92.4)	80.6 (79.1-82.2)	83.5 (82.2-84.9)	83.9 (82.6-85.3)	
Kerman							
Boys	84.8 (82.3-87.3)	81.9 (79.0-84.8)	90.5 (88.3-92.7)	83.3(81.5-85.1)	85.1 (83.2-87.0)	85.0 (83.1-86.9)	
Girls	84.8 (82.9-86.8)	73.8 (71.5-76.0)	90.1 (88.5-91.8)	76.3 (73.7-78.9)	79.9 (78.2-81.5)	81.5 (80.0-83.0)	

Urban	84.9 (83.1-86.7)	77.0 (74.6-79.4)	90.6 (88.9-92.2)	78.8 (76.3-81.3)	81.9 (80.2-83.7)	82.8 (81.4-84.3)
Rural	85.1 (82.1-88.2)	78.6 (74.6-82.5)	89.80 (87.2-92.3)	80.2 (77.0-83.4)	82.8 (80.2-85.3)	83.5 (81.1-85.9)
Total	84.8 (83.3-86.4)	77.2 (75.0-79.3)	90.3 (88.9-91.6)	79.2 (77.2-81.2)	82.1 (80.6-83.5)	82.9 (81.7-84.2)
<b>Fars</b>						
Boys	83.7 (81.3-86.2)	76.8 (73.4-80.1)	88.0 (85.2-90.7)	81.8 (79.8-83.8)	82.2 (79.8-84.6)	82.7 (80.5-85.0)
Girls	82.2 (79.8-84.6)	73.1 (69.9-76.2)	90.4 (88.9-91.9)	76.7 (74.6-78.7)	80.0 (78.1-81.9)	80.7 (78.8-82.6)
Urban	82.6 (80.6-84.5)	74.6 (71.8-77.5)	89.4 (87.6-91.1)	79.5 (77.7-81.3)	81.1 (79.4-82.9)	81.6 (79.9-83.3)
Rural	83.6 (80.2-87.1)	74.9 (70.9-78.9)	89.3 (86.7-92.0)	77.3 (73.9-80.7)	80.4 (77.4-83.4)	81.5 (78.5-84.4)
Total	82.9 (81.1-84.6)	74.7 (72.3-77.1)	89.3 (87.9-90.8)	78.9 (77.3-80.5)	80.9 (79.4-82.5)	81.6 (80.1-83.1)
<b>Kohgiluyeh</b>						
Boys	86.8 (84.8-88.9)	80.9 (78.7-83.1)	91.0 (88.9-93.1)	84.5 (82.6-86.3)	85.4 (83.9-86.9)	85.8 (84.3-87.2)
Girls	85.8 (84.1-87.5)	77.3 (74.5-80.1)	90.8 (88.3-93.4)	76.2 (72.8-79.5)	79.5 (75.9-83.0)	80.6 (77.0-84.1)
Urban	86.7 (85.2-88.2)	80.3 (78.2-82.3)	91.1 (88.8-93.5)	79.1 (75.8-82.5)	81.8 (78.6-85.0)	82.5 (79.4-85.6)
Rural	85.6 (83.3-87.8)	76.7 (73.4-80.0)	90.6 (88.3-92.9)	81.6 (79.1-84.1)	82.9 (80.7-85.1)	83.8 (81.8-85.7)
Total	86.3 (85.0-87.6)	79.0 (77.2-80.8)	90.9 (89.2-92.7)	80.0 (77.6-82.3)	82.2 (79.9-84.4)	82.9 (80.7-85.2)
<b>Alborz</b>						
Boys	83.4 (82.5-84.2)	79.2 (77.5-80.9)	84.5 (82.7-86.3)	80.1 (78.8-81.4)	81.3 (79.9-82.6)	82.0 (81.0-83.1)
Girls	83.6 (82.8-84.4)	79.6 (78.1-81.2)	85.1 (82.9-87.4)	76.4 (75.2-77.6)	80.4 (78.9-81.9)	81.5 (80.4-82.6)
Urban	83.4 (82.7-84.1)	79.6 (78.3-80.8)	84.9 (83.2-86.6)	78.1 (76.8-79.3)	80.8 (79.7-82.0)	81.7 (80.9-82.6)
Rural	83.4 (82.4-84.4)	78.3 (75.6-80.9)	83.7 (80.7-86.7)	79.0 (77.3-80.8)	80.3 (78.1-82.6)	81.4 (79.7-83.1)
Total	83.5 (82.9-84.0)	79.4 (78.3-80.6)	84.8 (83.3-86.3)	78.3 (77.3-79.3)	80.8 (79.8-81.9)	81.8 (81.0-82.5)
<b>National</b>						
Boys	84.5 (84.0-85.1)	81.0 (80.3-81.7)	89.9 (89.4-90.5)	82.2 (81.6-82.8)	83.6 (83.0-84.2)	83.5 (83.0-84.1)
Girls	83.9 (83.3-84.4)	75.4 (74.7-76.2)	90.0 (89.6-90.5)	75.0 (74.3-75.7)	78.8 (78.1-79.5)	79.8 (79.1-80.5)
Urban	84.2 (83.8-84.7)	78.0 (77.4-78.6)	90.1 (89.7-90.5)	78.2 (77.6-78.8)	80.9 (80.3-81.4)	81.4 (80.9-81.9)
Rural	84.1 (83.4-84.8)	78.8 (77.8-79.8)	89.7 (89.1-90.4)	79.7 (78.9-80.5)	82.1 (81.3-82.9)	82.5 (81.7-83.2)
Total	84.2 (83.8-84.6)	78.2 (77.7-78.7)	90.0 (89.7-90.3)	78.6 (78.2-79.1)	81.2 (80.8-81.6)	81.7 (81.3-82.1)

have illustrated that gender differences play an important role in emotional behavior.<sup>33, 34</sup> Data show a direct relationship between psychosocial and emotional functioning and social functioning in boys and girls. Students who have a high social function with their peers are more active in physical terms<sup>35</sup> and, thus, enjoy, a high HRQoL.

Our findings apropos high HRQoL scores among the rural inhabitants compared to their urban counterparts are concordant with previous studies insofar as they showed that students in rural areas were more satisfied with their life and experienced less psychiatric distress and violent behavior.<sup>7, 31</sup>

The differences in the results of investigations in this field have become one of the most controversial areas of discussion. Based on the current evidence, a complex set of physical, mental, and social factors could affect the results. It has, therefore, been recommended that in each community, preventive and controlling health programs be planned based on the specific criteria of the same population.<sup>3, 5, 31, 33-35</sup>

The salient limitation of the present study is its cross-sectional nature, which precludes an inference of causality vis-à-vis the findings. Nevertheless, the main strength of the study lies in its large sample size for the evaluation

of the impact of SES on HRQoL in different geographical parts of Iran in a large and representative sample of Iranian children and adolescents. In addition, to the best of our knowledge, the present study is the first study in Iran to assess the association between HRQoL and SES using a validated questionnaire.

## Conclusion

Our study showed that children and adolescents with SES disparities had different levels of HRQoL. Our results add to the current information on HRQoL in a general sample of Iranian children and adolescents in various SES regions and provide data for health policies for the primordial and primary prevention of a low HRQoL at regional level.

## Acknowledgement

This nationwide survey was conducted in Iran in collaboration with the Ministry of Health and Medical Education, Ministry of Education and Training, Child Growth and Development Research Center, Isfahan University of Medical Sciences, and Endocrinology and Metabolism Research Center of Tehran University of

Medical Sciences.

**Conflict of Interest:** None declared.

## References

- World Health Organization. Constitution of the World Health Organization. Basic Documents, Supplement, October 2006. Geneva: World Health Organisation. 2006.
- Landgraf J. Quality-of-life measures in chronic diseases in childhood. *Quality of Life Research*. 2002;11:609-11. doi: 10.1023/A:1016375023244.
- Simeoni MC, Sapin C, Antoniotti S, Auquier P. Health-related quality of life reported by French adolescents: a predictive approach of health status? *J Adolesc Health*. 2001;28:288-94. doi: 10.1016/S1054-139X(00)00198-1. PubMed PMID: 11287246.
- Mackenbach JP. Mind the gap--hierarchies, health and human evolution. *Int J Epidemiol*. 2002;31:684. PubMed PMID: 12055174.
- Marmot MG. Status syndrome: a challenge to medicine. *JAMA*. 2006;295:1304-7. doi: 10.1001/jama.295.11.1304. PubMed PMID: 16537740.
- Lynch JW, Smith GD, Kaplan GA, House JS. Income inequality and mortality: importance to health of individual income, psychosocial environment, or material conditions. *BMJ*. 2000;320:1200-4. PubMed PMID: 10784551; PubMed Central PMCID: PMCPMC1127589.
- Ahadi Z, Qorbani M, Kelishadi R, Ardalan G, Taslimi M, Mahmoudarabi M, et al. Regional disparities in psychiatric distress, violent behavior, and life satisfaction in Iranian adolescents: the CASPIAN-III study. *J Dev Behav Pediatr*. 2014;35:582-90. doi: 10.1097/DBP.0000000000000103. PubMed PMID: 25370299.
- Sanmartin C, Berthelot JM, Ng E, Murphy K, Blackwell DL, Gentleman JF, et al. Comparing health and health care use in Canada and the United States. *Health Aff (Millwood)*. 2006;25:1133-42. doi: 10.1377/hlthaff.25.4.1133. PubMed PMID: 16835196.
- Newsom JT, Kaplan MS, Huguet N, McFarland BH. Health behaviors in a representative sample of older Canadians: prevalences, reported change, motivation to change, and perceived barriers. *Gerontologist*. 2004;44:193-205. PubMed PMID: 15075416.
- Grundy E, Sloggett A. Health inequalities in the older population: the role of personal capital, social resources and socio-economic circumstances. *Soc Sci Med*. 2003;56:935-47. doi: 10.1016/S0277-9536(02)00093-X. PubMed PMID: 12593868.
- Bassuk SS, Berkman LF, Amick BC, 3rd. Socioeconomic status and mortality among the elderly: findings from four US communities. *Am J Epidemiol*. 2002;155:520-33. doi: 10.1093/aje/155.6.520. PubMed PMID: 11882526.
- Kelishadi R, Motlagh ME, Bahreynian M, Gharavi MJ, Kabir K, Ardalan G, et al. Methodology and Early Findings of the Assessment of Determinants of Weight Disorders among Iranian Children and Adolescents: The Childhood and Adolescence Surveillance and Prevention of Adult Noncommunicable Disease-IV Study. *Int J Prev Med*. 2015;6:77. doi: 10.4103/2008-7802.162953. PubMed PMID: 26425332; PubMed Central PMCID: PMCPMC4564901.
- Kelishadi R, Rezaei F, Djalalinia S, Asadi M, Miranzadeh S, Motlagh ME, et al. Is duration of breastfeeding associated with anthropometric measures in children and adolescents? the weight disorders survey of the CASPIAN-IV study. *International Journal of Pediatrics*. 2016;4:3299-313.
- Kelishadi R, Ardalan G, Qorbani M, Ataie-Jafari A, Bahreynian M, Taslimi M, et al. Methodology and Early Findings of the Fourth Survey of Childhood and Adolescence Surveillance and Prevention of Adult Non-Communicable Disease in Iran: The CASPIAN-IV Study. *Int J Prev Med*. 2013;4:1451-60. PubMed PMID: 24498502; PubMed Central PMCID: PMCPMC3898452.
- Group WHOMGRS. WHO Child Growth Standards based on length/height, weight and age. *Acta Paediatr Suppl*. 2006;450:76-85. doi: 10.1111/j.1651-2227.2006.tb02378.x. PubMed PMID: 16817681.
- Kelishadi R, Majdzadeh R, Motlagh ME, Heshmat R, Aminae T, Ardalan G, et al. Development and Evaluation of a Questionnaire for Assessment of Determinants of Weight Disorders among Children and Adolescents: The Caspian-IV Study. *Int J Prev Med*. 2012;3:699-705. PubMed PMID: 23112896; PubMed Central PMCID: PMCPMC3482997.
- Gheissari A, Farajzadegan Z, Heidary M, Salehi F, Masaeli A, Mazrooei A, et al. Validation of Persian Version of PedsQL 4.0 Generic Core Scales in Toddlers and Children. *Int J Prev Med*. 2012;3:341-50. PubMed PMID: 22701775; PubMed Central PMCID: PMCPMC3374492.
- Jafari P, Bagheri Z, Ayatollahi SM, Soltani Z. Using Rasch rating scale model to reassess the psychometric properties of the Persian version of the PedsQL 4.0 Generic Core



- Scales in school children. *Health Qual Life Outcomes*. 2012;10:27. doi: 10.1186/1477-7525-10-27. PubMed PMID: 22414135; PubMed Central PMCID: PMC3353856.
- 19 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;39:800-12. doi: 10.1097/00005650-200108000-00006. PubMed PMID: 11468499.
  - 20 Farzadfar F, Danaei G, Namdaritabar H, Rajaratnam JK, Marcus JR, Khosravi A, et al. National and subnational mortality effects of metabolic risk factors and smoking in Iran: a comparative risk assessment. *Popul Health Metr*. 2011;9:55. doi: 10.1186/1478-7954-9-55. PubMed PMID: 21989074; PubMed Central PMCID: PMC3229448.
  - 21 Lubetkin EI, Gold MR. Comprehensibility of measures of health-related quality of life in minority and low-income patients. *J Natl Med Assoc*. 2002;94:327-35. PubMed PMID: 12069212; PubMed Central PMCID: PMC32594346.
  - 22 Olson LM, Lara M, Pat Frintner M. Measuring health status and quality of life for US children: relationship to race, ethnicity, and income status. *Ambul Pediatr*. 2004;4:377-86. doi: 10.1367/A03-156.1. PubMed PMID: 15264941.
  - 23 Felder-Puig R, Baumgartner M, Topf R, Gadner H, Formann AK. Health-related quality of life in Austrian elementary school children. *Med Care*. 2008;46:432-9. doi: 10.1097/MLR.0b013e3181648e95. PubMed PMID: 18362824.
  - 24 Varni JW, Burwinkle TM, Seid M. The PedsQL 4.0 as a school population health measure: feasibility, reliability, and validity. *Qual Life Res*. 2006;15:203-15. doi: 10.1007/s11136-005-1388-z. PubMed PMID: 16468077.
  - 25 Heshmat R, Qorbani M, Ghoreishi B, Djalalinia S, Tabatabaie OR, Safiri S, et al. Association of socioeconomic status with psychiatric problems and violent behaviours in a nationally representative sample of Iranian children and adolescents: the CASPIAN-IV study. *BMJ Open*. 2016;6:e011615. doi: 10.1136/bmjopen-2016-011615. PubMed PMID: 27531729; PubMed Central PMCID: PMC35013516.
  - 26 Kelishadi R, Jari M, Heshmat R, Motlagh M, Ardalan G, Bahreynian M, et al. Does the prevalence of psychiatric distress and violence behaviors of children and adolescents differ according to the socioeconomic status of the living region? The CASPIAN-IV study. *Minerva Pediatr*. 2015.
  - 27 Laaksonen C, Aromaa M, Heinonen OJ, Koivusilta L, Koski P, Suominen S, et al. Health related quality of life in 10-year-old schoolchildren. *Qual Life Res*. 2008;17:1049-54. doi: 10.1007/s11136-008-9388-4. PubMed PMID: 18787979.
  - 28 Upton P, Eiser C, Cheung I, Hutchings HA, Jenney M, Maddocks A, et al. Measurement properties of the UK-English version of the Pediatric Quality of Life Inventory 4.0 (PedsQL) generic core scales. *Health Qual Life Outcomes*. 2005;3:22. doi: 10.1186/1477-7525-3-22. PubMed PMID: 15804349; PubMed Central PMCID: PMC1079918.
  - 29 Reinjfell T, Diseth TH, Veenstra M, Vikan A. Measuring health-related quality of life in young adolescents: reliability and validity in the Norwegian version of the Pediatric Quality of Life Inventory 4.0 (PedsQL) generic core scales. *Health Qual Life Outcomes*. 2006;4:61. doi: 10.1186/1477-7525-4-61. PubMed PMID: 16972987; PubMed Central PMCID: PMC1584218.
  - 30 Marklund B, Ahlstedt S, Nordstrom G. Health-related quality of life in food hypersensitive schoolchildren and their families: parents' perceptions. *Health Qual Life Outcomes*. 2006;4:48. doi: 10.1186/1477-7525-4-48. PubMed PMID: 16901348; PubMed Central PMCID: PMC1564003.
  - 31 Kelishadi R, Djalalinia S, Qorbani M, Mansourian M, Motlagh ME, Ardalan G, et al. Self-Rated health and life satisfaction in Iranian children and adolescents at the national and provincial level: the CASPIAN-IV study. *Iran Red Crescent Med J*. 2016;18. doi: 10.5812/ircmj.28096.
  - 32 Heshmat R, Kelishadi R, Motamed-Gorji N, Motlagh ME, Ardalan G, Arifirad T, et al. Association between body mass index and perceived weight status with self-rated health and life satisfaction in Iranian children and adolescents: the CASPIAN-III study. *Qual Life Res*. 2015;24:263-72. doi: 10.1007/s11136-014-0757-x. PubMed PMID: 25038635.
  - 33 Groh AM, Fearon RP, Bakermans-Kranenburg MJ, van Ijzendoorn MH, Steele RD, Roisman GI. The significance of attachment security for children's social competence with peers: a meta-analytic study. *Attach Hum Dev*. 2014;16:103-36. doi: 10.1080/14616734.2014.883636. PubMed PMID: 24547936; PubMed Central PMCID: PMC34021853.
  - 34 Na JY, Wilkinson K, Karyn M, Blackstone

S, Stifter C. A Synthesis of Relevant Literature on the Development of Emotional Competence: Implications for Design of Augmentative and Alternative Communication Systems. *Am J Speech Lang Pathol.* 2016;25:441-52. doi: 10.1044/2016\_AJSLP-14-0124. PubMed PMID: 27537831.

35 Shin KM, Cho SM, Shin YM, Park KS. Effects of Early Childhood Peer Relationships on Adolescent Mental Health: A 6-to 8-Year Follow-Up Study in South Korea. *Psychiatry Investig.* 2016;13:383-8. doi: 10.4306/pi.2016.13.4.383. PubMed PMID: 27482238; PubMed Central PMCID: PMC4965647.