Socio-Economic Inequalities in Health-Related Quality of Life Among Iranian Adolescents

Azam Maleki

Zanjan University of Medical Sciences

Elham Faghihzadeh

Zanjan University of Medical Sciences

Samaneh Youseflu (✉ s.yoseflu@yahoo.com)

Isfahan University of Medical Sciences

Shahram Arsang-Jang

Zanjan University of Medical Sciences

Shahnaz Zamani barjasteh

Zanjan University of Medical Sciences

Research

Keywords: Health related quality of life, socio-economic, inequality, adolescence

Posted Date: September 13th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-860966/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background: One of the main concerns of public health is increasing inequality of health status, that has adverse effect on people's life. The aim of the current study is to analyze the role of socio-economic factors as a predictor of health-related quality of life (QoL) among Iranian adolescence.

Method: A cross-sectional descriptive study was conducted on 576 adolescents aged 15 to 18 years, in Zanjan province from December 2020 to February 2021. The samples were selected using the Multi-stage sampling method. Data were collected by a demographic checklist, and KIDSCREEN-52 questionnaire and analyzed by SPSS ver.16. The Health Equity Assessment Toolkit (HEAT) Version 4.0 (beta) was used to assess adolescents' QoL inequalities in terms of socio-economic subgroups.

Result: The results show that, 27.2 adolescents had low quality of life. The score of physical and autonomy components of QoL were significantly more in male versus school environment in female students. Also, the asset, father's, and mother's education, and family income in female students, and the asset and family income in male students were significantly related with the quality-of-life ($p < 0.05$). The risk of lower QOL in the poorest quintile was 1.32 times more than in the richest quintile. The consideration index of Asset in terms of sex was 4.5 and the modified Gini index was more than 0.5 in females and males.

Conclusion: Our findings highlight the significant effects of socio-economic inequality on HRQL of Iranian adolescence. Requires a targeted policy approach to reach the poorest quintile for improving the quality of life of adolescents.

Background

Adolescence as a major transition period is one of the most critical, and sensitive stages of life for adolescents and their families. Upon entering this course of life, they experience profound physical, psychological, social, and cognitive changes, so it is very important to pay attention to the health and well-being of them from different aspects (1, 2). Because their health and well-being are essential for their growth and development, including the acquisition of emotional and cognitive abilities for independence, completion of education, transition to employment, civic participation and the establishment of lifelong relationships (1–3). Furthermore, childhood-living conditions considered as the basis, and foundations of lifelong health (4).

Since in this period, many health features are at their peak, this period is often considered the healthiest period of a person's life, and it seems that this period has fewer health needs than childhood or adulthood (1). For this reason, little investment has been made in adolescent health, and their health needs and concerns in the primary health care system are neglected (5). In recent years, many differences have been reported in terms of needs, risks and factors related to adolescent health between and within countries, which require proper planning and action (1, 3).

Assessing the quality of life of youth and adolescents is of great importance due to the rapid emotional and cognitive changes that are characteristic of this age group (5, 6). Health-Related Quality of Life (HRQL) is a measure used to assess physical and social functioning, mental health, and well-being as health outcomes among children and adolescents, as well as to evaluate population-based intervention programs (6). The components of adolescents' quality of life are different from those of adults because in addition to the physical and psychological components, their relationship with family and peers and the school environment should also be considered, which is less important in adulthood (7). Therefore, the quality of life of adolescents should be considered in different dimensions. Measuring quality of life can improve clinical decision making, evaluate the quality of medical care, estimate health care needs in a particular population, understand the different causes and consequences in health, and ultimately health policy (8, 9). Some experts consider the quality of life of children and adolescents as a mental and changeable feeling about their health and believe that this feeling is a reflection of their desires, hopes, expectations in relation to their current and future life situation, which is influenced by factors such as gender, age, personal and family characteristics, as well as economic and social status (10, 11).

The socioeconomic status indicated an overall measure of the economic and social status of people or their families relative to others, which were measured by income, occupation, and education (12). The socio-economic status, and family environment are related to adolescence health condition, so that unhealthy habits, unavailability of healthcare services, and face higher socio-economic pressure are more seen in people who have low socioeconomic status (5, 13). Furthermore, the availability of material and social resources and reactions to stress-inducing conditions by peers, and their family can impress adolescent health (13, 14). Also, the socio-economic status is related to health inequality (15). There is an enormous body of evidence showing the effect of socioeconomic status on children and adolescent's quality of life (5, 10, 14, 16).

The adolescence QoL is influenced by many factors, such as socioeconomic status, parental educational level, better work status, household income, age, gender, higher family wealth, high level of social capital, migration, positive family climate, personal factor (i.e., self-efficacy, optimism, sense of coherence), and social support (5, 10, 14, 16).

One of the main concerns of public health is increasing inequality of health status, that has adverse effect on people's life. Considering the importance of assessing the HRQL of adolescents as an indicator of justice in health and its impact on social and individual factors, the aim of the current study is to analyze the role of socio-economic factors as a predictor of HRQL among Iranian adolescence.

Material & Method

Type of study & Study setting

The cross-sectional study was conducted in Zanjan, a province northwest of Iran from December 2020 to February 2021. The study setting included all health centers that were located in the capital of the province. The study population included all adolescents who were referred to the centers.

Participants & Sampling procedure

Considering the acceptable percentage of quality of life 50 % (17), statistical error 5%, acceptable accuracy 5%, and 1.5 the correction factor for the impact of cluster randomized sampling, the total sample size was estimated at 576 people. Inclusion criteria were healthy adolescents, aged 15–18 years, and willingness to participate in the study. Eligible adolescents were selected using the multi-stage sampling method in this way. In the first stage, to access the diversity of socio-economic samples, the residential areas of Zanjan city were clustered into four-level based on municipal zoning. The city has 4 municipal zoning and 35 health centers. In the second step, three health centers were selected randomly in each selected area. In the third stage, the eligible cases will be randomly selected using her personal identification number through a national electronic identification system (CIB), and then data will be collected through interviews by trained providers. In this way, they called the households and after explaining the objectives of the study and obtaining verbal consent to participate in the study, the questionnaires were completed according to the statements of the participants. If there are no eligible people in the household, or did not want to participate in the study, or did not answer the phone number after two calls the selected number is removed and the next number replaced. The protocol of the current study was approved by the Ethics Committee of Zanjan University of medical science (The code "A-11-344-15-6"). The consent was obtained from all participants and they all made sure that their information will be kept private and confidential.

Measures

Demographic questionnaire:

A self-designed questionnaire was used to assess socioeconomic and demographic characteristics including Age, Sex, Birth rank, Father's job, Mother's job, Father's education, Mother's education, Family income, Family home ownership status, Insurance, and Asset. To collect the household asset data, we used a questionnaire in which we asked if their family owned any of 16 household assets. Then household assets categorized into quintiles. We also collect family' the income status on a qualitative scale at three levels" lower than adequacy", "Adequate", and" More than adequacy".

The KIDSCREEN-52 questionnaire

The KIDSCREEN is a self-report measure to assess children's and adolescents' health-related quality of life that aged from 8 to 18 years. The time frame refers to the past week. The questionnaire was developed and tested within a European public health project. The questionnaire included ten dimensions: Physical- (5 items), Psychological Well-being (6 items), Moods and Emotions (7 items), Self-Perception (5 items), Autonomy (5 items), Parent Relations and Home Life (6 items), Social Support and Peers (6 items), School Environment (6 items), Social Acceptance (Bullying) (3 items), Financial Resources (3 items). The scoring of each question is in a five-point of a Likert scale, with the frequency of a particular behavior or feeling (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always) or the severity of attitude (1 = not at all, 2 = partially, Shows 3 = average, 4 = very much, 5 = infinite). The following questions are scored in reverse (12-13-14-15-16-17-18-21-22-23-50-51-52). The overall scores ranged from 52 to

260. A higher score means a better quality of life. In this study, the overall score of QOL was categorized in tertile levels. The score lower than 25%, 25 to 75%, and more than 75% of total scores were considered poor, moderate, and good level, respectively.

The internal consistency reliability of the instrument was reported by Cronbach's alpha method in all dimensions between 0.77 to 0.89 (7). The Persian version of the KIDSCREEN-52 has adequate reliability and validity in Iranian adolescents (18).

Statistical analysis

The data were analyzed using the Statistical Package for Social Science (SPSS) 16. Descriptive statistics including the mean $\pm$ SD, frequencies, and percentage used to describe the demographic status of participants. The independent t-test and chi-square test were also used to compare the dichotomous and ordinal variables between the groups, respectively.

The principal component analysis (PCA) was used to reduce the large data sets of asset ownership variables into a smaller number of dimensions. Because smaller data sets are easier and faster to analyze without extraneous variables to process. S

A total of 6 items were retained with higher eigenvalues (> 1) accounting for 51.164% of the variance. They were considered one of the socio-economic indices in this study.

The Health Equity Assessment Toolkit (HEAT) Version 4.0 (beta) was used to assess adolescents' QOL inequalities in terms of socio-economic subgroups. A summary measure of health inequality, including Concentration Index, Ratio (R), and Modified Gini was used to report numerical results. The Gini index < 0.2 represents perfect income equality, $0.2-0.3$ relative equality, $0.3-0.4$ adequate equality, $0.4-0.5$ big income gap, and above 0.5 represents a severe income gap.

Results

The results of demographic characteristics of students have been shown in Table1 according to the results, the highest percentage of participants in the study was male (50.3%) and aged 16 years (35.1%). Most of them have more than 1 in birth rank (51.7%), having insurance (81.4%) and have lower than adequate family income (51.7%). Most her/his fathers (34.6%) and mothers (30.3%) had diploma education level. Furthermore, the job status of her/his father (40.1%) and mother (80.1%) was a self-employed and unemployed respectively (Table1).

Table 1
Baseline socio-demographic characteristics of participants

Variables		Frequency (%)
Age(year)	15	135(23.3)
	16	203(35.1)
	17	161(27.8)
	18	80(13.8)
Sex	Female	288(49.7)
	Male	291(50.3)
Family home ownership status	Leased	95(16.4)
	Personal	470(81.2)
	Other	14(2.4)
Father's job	Unemployed	51(8.9)
	Worker	65(11.4)
	Self-employer	229(40.1)
	Government employee	133(23.3)
	Other	93(16.3)
Mother's job	Unemployed	464(81.1)
	Employed	108(18.9)
Mother's education	Illiterate	30(5.2)
	Primary	132(22.9)
	Guidance	108(18.7)
	High school& diploma	175(30.3)
	College	132(22.9)
Insurance	Yes	468(81.4)
	No	107(18.6)
Birth rank	1	279(48.3)
	> 1	299(51.7)
Family income	Lower than adequacy	390(67.5)
	Adequate	155(26.8)

Variables		Frequency (%)
Father's education	More than adequacy	33(5.7)
	Illiterate	24(4.2)
	Primary	94(16.3)
	Guidance	93(16.2)
	High school& diploma	199(34.6)
	College	165(28.7)

QOL status of participants

The mean (SD) and median QOL were 196.51(17.22) and 196.00 respectively. Furthermore, the percentage of a poor, moderate, and a good level of QOL was 27.2%, 49.8%, and 23% respectively.

Socio-Economic Inequality

Considering the median cutoff point of the quality-of-life score, the socio-economic inequality, and the quality-of-life compared between male and female students. The result showed that the asset, father's education, mother's education, and family income in female students, the asset and family income in male students were significantly related factors with the quality-of-life($p < 0.05$) (Table2).

Table 2
Socio-economic inequality of QoL in term of gender

Variables		Lower Than Median		Upper Than Median		P Value
		Female	Male	Female	Male	
		N(%)	N(%)	N(%)	N(%)	
Asset Quantile	Poorest	40(26.5)	28(20.9)	20(16.0)	27(18.8)	Female = 0.045 Male = 0.021
	Poorer	28(18.5)	37(27.6)	19(15.2)	31(21.5)	
	Middle	39(25.8)	27(20.1)	29(23.2)	20(13.9)	
	Richer	25(16.6)	26(19.4)	28(22.4)	26(18.1)	
	Richest	19(12.6)	16(11.9)	29(23.2)	40(27.8)	
Father's Job	Government Employee	30(19.4)	25(18.0)	38(27.9)	41(28.1)	Female = 0.08 Male = 0.062
	Self-Employer	62(40.0)	50(36.0)	58(45.0)	59(40.4)	
	Worker	22(14.2)	22(15.8)	8(6.2)	13(8.9)	
	Other	23(14.8)	27(19.4)	17(13.2)	25(17.1)	
	Unemployed	18(11.6)	15(10.8)	10(7.8)	8(5.5)	
Mother's Job	Unemployed	132(84.1)	111(81.0)	104(80.6)	117(79.6)	Female = 0.444 Male = 0.762
	Employed	25(15.9)	26(19.0)	25(19.4)	30(20.4)	
Father's Education	Illiterate	10(6.3)	4(2.9)	4(3.1)	6(4.1)	Female = 0.041 Male = 0.128
	Primary	35(22.2)	21(15.0)	19(14.7)	19(13.0)	
	Guidance	27(17.1)	31(22.1)	16(12.4)	19(13.0)	
	High School, Diploma	57(36.1)	47(33.6)	49(38.0)	46(31.5)	
	College	29(18.4)	37(26.4)	41(31.8)	56(38.4)	
Mother's Education	Illiterate	9(5.7)	9(6.4)	2(1.5)	10(6.8)	Female = 0.006 Male = 0.118
	Primary	41(25.9)	36(25.7)	30(23.1)	25(17.0)	
	Guidance	39(24.7)	29(20.7)	17(13.1)	23(15.6)	
	High School, Diploma	39(24.7)	39(27.9)	53(40.8)	44(29.9)	
	College	30(19.0)	27(19.3)	28(21.5)	45(30.6)	
Family income	Lower than	120(75.9)	117(83.0)	71(55.0)	82(55.4)	Female

	adequacy					= 0.001
	Adequate	34(21.5)	20(14.2)	48(37.2)	52(35.1)	Male = 0.001
	More than adequacy	4(2.5)	4(2.8)	10(7.8)	14(9.5)	
Family home ownership status	Personal	117(74.1)	117(83.0)	108(83.1)	126(85.1)	Female = 0.117
	leased	36(22.8)	22(15.6)	21(16.2)	16(10.8)	Male = 0.211
	other	5(3.2)	2(1.4)	1(0.8)	6(4.1)	

The comparison of quality-of-life component scores between male and female students showed that the physical and autonomy components were significantly more in male versus school environment components score was in female students more (Table 3).

Table 3
the comparison of quality-of-life components between male and female

QOL components	Sex	Mean (SD)	P value
Physical	Female	18.62(3.00)	0.001
	Male	19.44(3.02)	
Psychological Well-being	Female	22.50(3.02)	0.984
	Male	22.51(3.26)	
Moods and Emotions	Female	29.47(3.61)	0.450
	Male	29.23(4.27)	
Self-Perception	Female	19.42(2.97)	0.786
	Male	19.35(2.90)	
Autonomy	Female	17.66(2.94)	0.036
	Male	18.17(2.96)	
Parent Relations and Home Life	Female	23.64(2.94)	0.120
	Male	23.26(3.00)	
Financial Resources	Female	10.54(2.08)	0.521
	Male	10.64(1.94)	
Social Support and Peers	Female	18.94(4.36)	0.979
	Male	18.93(4.38)	
School Environment	Female	21.99(2.91)	0.044
	Male	21.47(3.29)	
Social Acceptance (Bullying)	Female	13.71(1.38)	0.514
	Male	13.79(1.51)	
Total score	Female	179.16(16.04)	0.03
	Male	179.20(14.40)	

There were economic-related inequalities in the QOL of adolescents in Zanjan. The score of QOL increases with increasing economic status. QoL was lowest in the poorest quintile (40.3) and the highest in the richest quintile (65.7). The risk of lower QOL in the poorest quintile was 1.32 times more than in the richest quintile (Table 4). The consideration index of Asset in terms of sex was 4.5 and the modified Gini

index was more than 0.5 in females and males. The result showed that the quality of life in both sexes was affected by economic status (Table 5).

Table 4
Economic- related inequality in QOL

Asset	affected population	Estimate	CI 95%		Setting average
Poorest	24.0 %	40.3	32.0	48.5	47.9
Poorer	19.8	43.5	33.4	51.8	
Middle	19.8	43.5	34	52.7	
Richer	18.3	50.9	41.3	60.6	
Richest	18.1	65.7	56.5	74.9	
Risk Q1/Q5 = 24/19.8 = 1.32					

Table 5
consideration index of Asset in term of sex

Index	N of obs.		Index value	Std. error	P value
Modified Gini	Female	276	.61403232	.00097112	0.001
	Male	280	.61981277	0.00132458	0.001
Absolute concentration index			4.5	-	

Discussion

This study describes the HRQL of a sample of Iranian adolescence, and also asses the influential factors of HRQL in 15–18-year-old adolescents. Our results show that the majority of participants had moderate, and good levels of HRQL. The component of HRQL was different between female, and male adolescence. In males, physical and autonomy components were more than females, and school environment components had more effect on HRQL of female adolescence. Moreover, there are positive correlations between socio-economic backgrounds and HRQL.

Many studies highlight the importance of socioeconomic inequality on the adolescence quality of life (5, 13, 15, 16). In this regard, Hovsepian et al. study reported a positive association between socioeconomic status, and school functioning, psychosocial function, and total score of HRQOL in both male, and female students. Moreover, in their study all components of HRQL except its social subscale were low in female adolescence (19), while in our study, boy adolescents only have better scores in the physical, and autonomy components of HRQL than girls.

The field of autonomy examines the adolescent's freedom of choice, self-sufficiency, and independence, and considers the individual's opportunities to create leisure and social activity (20). Upon entering to this period of life, very profound biological, psychological and social changes occur in adolescents (1, 21). The need for connection can create a conflict between the desires of the adolescent and their family, thereby putting his or her independence at risk (21). We observed a lower score of autonomy component in girls, that indicated more communication problems with parents. It seems that socio-cultural issues related to gender role, preference and more attention for the male sex, brain development, and different physiological changes following puberty play an important role in this difference.

The school environment was one of the main predictors of HRQL and has a greater impact on girls vs boys. Similar to our results, Gaspar et al. show that female students compared with male had a lower level of quality of life in all domains except school environments (22). In the same sense, another study revealed that adolescents with positive perceptions about their school climate had good self-rated health, school satisfaction, and quality of life (22).

Explaining the role of gender differences in health-related quality of life, Hyde states in his gender similarity hypothesis that males and females are similar in most psychological variables. Only in variables such as motor behavior, aggression, and some aspects of sexual activity, there are differences between the two sexes (23). Furthermore, physical changes during puberty in girls, such as the onset of menstruation and hormonal imbalances, decreasing their psychological well-being compared to boys (24). We also observe that female adolescents in compared with males had lower scores in the physical component. In this regard, Michel state that physical changes during puberty and conflict with exaggerated cultural norms of beauty make girls feel more unbalanced in their physical and mental well-being (25).

In this study, the relationship between income inequality and HRQL was evaluated using the Concentration Index, Ratio (R), and Modified Gini Index. The Gini index as one of the measures of health inequality examines the distribution of income, or in other words, the distribution of wealth among a population. The Gini coefficient is a number between zero and 1 (0 denoting complete equality and 1 complete inequality). We observed a modified Gini index more than 0.5 in females and males, that indicated a severe income gap. With assessing the relationship between these variables, and HRQL reveal that the quality of life in both sexes was affected by economic status. Our finding also reveals that socio-economic variables that affect HRQL are different between the male, and female adolescence. The parental education was one of the main predictors of female adolescence, and variables such as asset, and family income was effective on HRQL of both groups. These results are consistent with the findings of other studies in this field (5, 13, 15, 16). In line with our study, Spurrier et al. reported a high level of HRQL among children in families of higher income, educated, as well as employed. Moreover, they reported living in original family with both parents has a positive impact on HRQL (26). Also, in Barriuso-Lapresa, et al. study, there was a high quality of life, and mental health for children of mothers who had a university degree, and high social classes (27). The results of one path analysis show that the major effects of socio-economic status (eg, occupational prestige, household income, and parental

education), and social supports on HRQL, and health behavior such as smoking, and toothbrush in adolescents (28). Another study demonstrated that gender, ethnicity, maternal education level, socio-economic status and weight status are main predictors of HRQL (29).

Our study was conducted during the second peak of the COVID-19 pandemic. Previous literature has documented the negative effects of this pandemic on both HRQL and family income (30–33). Studies have shown that the COVID-19 outbreaks have caused the biggest shock to the world economy, so that the implementation of government disease control policies, such as social exclusion and quarantine, has led to the temporary closure of businesses (30, 31). Shrinking the global economy, increasing unemployment, poverty, income inequality, gender inequality, and widening the gap between different countries are just some effects of this pandemic (31, 32). All of these factors can have adverse effects on a person's quality of life. Tran et al. study shows a negative effect of COVID-19 on household income, and psychological health. And they state that having a chronic disease, female gender, and living in a family with 3–5 members were related to low-quality life (34). In another study, during the outbreak, socio-economic inequality was one of the main predictors of death in Brazilian children (35). Ravens-Sieberer et al. reported that children, and adolescence experienced a high level of anxiety, mental health problems, and low HRQL after COVID-19 pandemic, and socioeconomic status, migration background and limited living space had the greatest impact (36). In Adibelli et al. study, the score of the quality of life of children was good, but their parents reported that in their children gained weight, tendency to sleep and internet use increased during the pandemic (37).

Limitation

One of the limitations of this study is that we didn't assess the influence of other variables such as psychological wellbeing, parental relationship, COVID-19 related issues, which can affect HRQL of adolescence. It has been suggested that future studies consider them in the study design. However, this study was conducted during the COVID-19 pandemic, but their information (such as disease status, the impact of COVID-19 on their socioeconomic status, quarantine, etc.) is not available. Also, the design of this study is cross-sectional, so the causal relationship between the variables is not predictable. However, according to the definition of the WHO, adolescence is in the age range of 11 to 21 years, and we only included 15 to 18 years of age (middle adolescence age) in the study.

Conclusion

Our findings highlight the significant effects of socio-economic inequality on HRQL of Iranian adolescence. Since having a healthy society requires improving the quality of life, it is suggested that health policymakers consider a comprehensive planning in the field of economic equality, and improving the quality of life of adolescents. Socio-economic inequalities should also be considered when designing interventions to improve adolescents' quality of life.

Abbreviations

HRQL: Health Related Quality of Life

SPSS: Statistical Package for Social Science

PCA: Principal Component Analysis

HEAT: Health Equity Assessment Toolkit

Declarations

Ethics approval and consent to participate

The protocol of the current study was approved by the Ethics Committee of Zanjan University of medical science (The code “A-11-344-15-6”). The consent was obtained from all participants and they all made sure that their information will be kept private and confidential. All procedures were in accordance with the ethical standards of the Regional research committee and with the Declaration of Helsinki 1964 and its later amendments. Informed consent was obtained from all participants included in the current study.

Consent for publication

All the adolescents were informed about the aims of the project, and gave a written consent before participating in the study

Availability of data and materials

The data sets used and analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare no conflict of interest.

Funding

There are no sources of funding for this research. All costs were covered by researchers.

Authors' contributions

A.M, and E.F contributed to the conception and design of the study; S.Y, A.M, Sh.Z did the literature search; A.M, E.F, and Sh.A performed the statistical analysis; S.Y and A.M wrote the first draft of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

Acknowledgments

We are grateful to the entire colleagues of Zanjan University of Medical Sciences (Zanjan, Iran) for their contributions in accomplishing this project. The study was supported by Zanjan University, Tehran, Iran.

References

1. Sawyer SM, Azzopardi PS, Wickremarathne D, Patton GC. The age of adolescence. *The Lancet Child & Adolescent Health*. 2018;2(3):223-8.
2. Susman EJ, Koch PB, Maney DW, Finkelstein JW. Health promotion in adolescence: Developmental and theoretical considerations. *Early Adolescence: Routledge*; 2020. p. 247-60.
3. Patton GC, Sawyer SM, Santelli JS, Ross DA, Afifi R, Allen NB, et al. Our future: a Lancet commission on adolescent health and wellbeing. *The Lancet*. 2016;387(10036):2423-78.
4. Sawyer SM, Afifi RA, Bearinger LH, Blakemore S-J, Dick B, Ezeh AC, et al. Adolescence: a foundation for future health. *The lancet*. 2012;379(9826):1630-40.
5. Spurrier NJ, Sawyer MG, Clark JJ, Baghurst P. Socio-economic differentials in the health-related quality of life of Australian children: results of a national study. *Aust N Z J Public Health*. 2003;27(1):27-33.
6. Zaror C, Pardo Y, Espinoza-Espinoza G, Pont À, Muñoz-Millán P, Martínez-Zapata MJ, et al. Assessing oral health-related quality of life in children and adolescents: a systematic review and standardized comparison of available instruments. *Clinical oral investigations*. 2019;23(1):65-79.
7. Ravens-Sieberer U, Gosch A, Rajmil L, Erhart M, Bruil J, Duer W, et al. KIDSCREEN-52 quality-of-life measure for children and adolescents. *Expert review of pharmacoeconomics & outcomes research*. 2005;5(3):353-64.
8. Chen H, Cohen P. Using individual growth model to analyze the change in quality of life from adolescence to adulthood. *Health and Quality of Life Outcomes*. 2006;4(1):10.
9. Theofilou P. Quality of life: definition and measurement. *Europe's journal of psychology*. 2013;9(1).
10. Otto C, Haller A-C, Klasen F, Hölling H, Bullinger M, Ravens-Sieberer U, et al. Risk and protective factors of health-related quality of life in children and adolescents: results of the longitudinal BELLA study. *PLoS One*. 2017;12(12):e0190363.
11. Wallander JL, Schmitt M, Koot HM. Quality of life measurement in children and adolescents: issues, instruments, and applications. *Journal of clinical psychology*. 2001;57(4):571-85.
12. Adler NE, Ostrove JM. Socioeconomic status and health: what we know and what we don't. *Ann N Y Acad Sci*. 1999;896:3-15.
13. Poulain T, Vogel M, Sobek C, Hilbert A, Körner A, Kiess W. Associations between socio-economic status and child health: findings of a large German cohort study. *International journal of environmental research and public health*. 2019;16(5):677.
14. von Rueden U, Gosch A, Rajmil L, Bisegger C, Ravens-Sieberer U. Socioeconomic determinants of health related quality of life in childhood and adolescence: results from a European study. *J Epidemiol Community Health*. 2006;60(2):130-5.
15. Hovsepian S, Qorbani M, Asadi M, Hatami M, Motlagh ME, Mahdavi-Gorabi A, et al. Socioeconomic Inequalities in Quality of Life in Iranian Children and Adolescents: The Weight Disorder Survey of the CASPIAN-IV Study. *Journal of research in health sciences*. 2019;19(3):e00451.

16. Devenish B, Hooley M, Mellor D. The Pathways Between Socioeconomic Status and Adolescent Outcomes: A Systematic Review. *American Journal of Community Psychology*. 2017;59(1-2):219-38.
17. Arsanjani Shirazi A, Javadifar N, Javadnoori M, Haghighi Zadeh MH. A Study of Health-Related Quality of Life among Female High Schools Adolescents in Ahvaz in 2014. *RUMS_JOURNAL*. 2015;14(8):643-54.
18. Nik-Azin A, Naenian MR, Shairi MR. Validity and Reliability of the Health Related Quality of Life Questionnaire (Kidscreen-52) In a Sample of Iranian Students. *Journal of Community Health Research*. 2014;3(3):210-24.
19. Hovsepian S, Qorbani M, Asadi M, Hatami M, Motlagh ME, Mahdavi-Gorabi A, et al. Socioeconomic Inequalities in Quality of Life in Iranian Children and Adolescents: The Weight Disorder Survey of the CASPIAN-IV Study. *Journal of research in health sciences*. 2019;19(3):e00451-e.
20. Zimmer-Gembeck MJ, Collins WA. CHAPTER NINE Autonomy Development during Adolescence. *Blackwell handbook of adolescence*. 2008;8:175.
21. Ravindran N, Hu Y, McElwain NL, Telzer EH. Dynamics of mother–adolescent and father–adolescent autonomy and control during a conflict discussion task. *Journal of Family Psychology*. 2020;34(3):312.
22. Zullig KJ, Ward RM, Scott Huebner E, Daily SM. Association between Adolescent School Climate and Perceived Quality of Life. *Child Indicators Research*. 2018;11(6):1737-53.
23. Hyde JS. The gender similarities hypothesis. *American psychologist*. 2005;60(6):581.
24. Bisegger C, Cloetta B, Von Bisegger U, Abel T, Ravens-Sieberer U. Health-related quality of life: gender differences in childhood and adolescence. *Sozial-und Präventivmedizin*. 2005;50(5):281-91.
25. Michel G, Bisegger C, Fuhr DC, Abel T. Age and gender differences in health-related quality of life of children and adolescents in Europe: a multilevel analysis. *Quality of life research*. 2009;18(9):1147-57.
26. Spurrier NJ, Sawyer MG, Clark JJ, Baghurst P. Socio-economic differentials in the health-related quality of life of Australian children: results of a national study. *Australian and New Zealand Journal of Public Health*. 2003;27(1):27-33.
27. Barriuso-Lapresa L, Hernando-Arizaleta L, Rajmil L. Social inequalities in mental health and health-related quality of life in children in Spain. *Pediatrics*. 2012;130(3):e528-e35.
28. Gomes AC, Rebelo MAB, de Queiroz AC, de Queiroz Herkrath APC, Herkrath FJ, Rebelo Vieira JM, et al. Socioeconomic status, social support, oral health beliefs, psychosocial factors, health behaviours and health-related quality of life in adolescents. *Quality of Life Research*. 2020;29(1):141-51.
29. Loh D, Moy F, Zaharan N, Mohamed Z. Disparities in health-related quality of life among healthy adolescents in a developing country–the impact of gender, ethnicity, socio-economic status and weight status. *Child: care, health and development*. 2015;41(6):1216-26.
30. Shahbazi F, Khazaei S. Socio-economic inequality in global incidence and mortality rates from coronavirus disease 2019: an ecological study. *New Microbes and New Infections*. 2020;38:100762.

31. Patel J, Nielsen F, Badiani A, Assi S, Unadkat V, Patel B, et al. Poverty, inequality and COVID-19: the forgotten vulnerable. *Public health*. 2020;183:110.
32. Abedi V, Olulana O, Avula V, Chaudhary D, Khan A, Shahjouei S, et al. Racial, economic, and health inequality and COVID-19 infection in the United States. *Journal of racial and ethnic health disparities*. 2021;8(3):732-42.
33. Nobari H, Fashi M, Eskandari A, Villafaina S, Murillo-Garcia Á, Pérez-Gómez J. Effect of COVID-19 on Health-Related Quality of Life in Adolescents and Children: A Systematic Review. *International Journal of Environmental Research and Public Health*. 2021;18(9):4563.
34. Tran BX, Nguyen HT, Le HT, Latkin CA, Pham HQ, Vu LG, et al. Impact of COVID-19 on Economic Well-Being and Quality of Life of the Vietnamese During the National Social Distancing. *Front Psychol*. 2020;11:565153-.
35. Martins-Filho P, Quintans-Júnior L, de Souza Araújo A, Sposato K, Tavares CS, Gurgel R, et al. Socio-economic inequalities and COVID-19 incidence and mortality in Brazilian children: a nationwide register-based study. *Public Health*. 2021;190:4-6.
36. Ravens-Sieberer U, Kaman A, Erhart M, Devine J, Schlack R, Otto C. Impact of the COVID-19 pandemic on quality of life and mental health in children and adolescents in Germany. *European Child & Adolescent Psychiatry*. 2021.
37. Adıbelli D, Sümen A. The effect of the coronavirus (COVID-19) pandemic on health-related quality of life in children. *Children and Youth Services Review*. 2020;119:105595.