

Finnish schoolchildren's perceived health-related quality of life deteriorates remarkably with age

Tarja Paakkonen^{1*}, Heikki Paakkonen²

¹Niuvanniemi Hospital, The National Institute for Health and Welfare, Kuopio, Finland

²Arcada University of Applied Sciences, Helsinki, Finland

*Corresponding author: tarja.paakkonen@niuva.fi

Abstract

Background: Information on individuals' functioning and disability is needed for numerous purposes in social and health care.

Objective: The purpose of the study was to assess the perceived health-related quality of life of Finnish schoolchildren aged from 7 to 17 years. We were interested to ascertain if changes of health-related quality of life with age could be discovered.

Method: The quality of life data (N = 4,776) were collected using *Revidierter KINDer Lebensqualitätsfragebogen* (KINDL-R). The survey was conducted in several comprehensive schools using tablet computers. The response rate was 95%. The quality of life data are presented as means and standard deviations. The rating scale was 0 to 100 points.

Results: The mean of respondents' (N = 4,776) health-related quality of life points was 72.1 (SD 11.0). Family as a factor impacting on the quality of life scored the highest points 78.2 (SD 16.1), while self-esteem got the lowest points 62.5 (SD 17.9). Adolescent girls' school-related quality of life points were 60.2 (SD 15.0) and adolescent boys' points were 61.7 (SD 14.4). Lower graders' and upper graders' quality of life differed very significantly so that the ratings of the lower graders were higher than the ratings of the upper graders. Finnish girls' quality of life as a whole was poorer than that of Finnish boys. The physical and emotional welfare as well as the self-esteem of young Finnish girls were poorer than those of their male peers.

Conclusions: The poor well-being of adolescents is recognized and accepted as a development-related phenomenon. Poor health-related quality of life experienced by adolescents may be interpreted as a symptom of a disease. Deterioration in health-related quality of life among adolescents should not be accepted as a development-related factor; that phenomenon should be further investigated and necessary measures taken to improve the quality of adolescent's life.

Keywords: health-related quality of life; child; adolescents; minor; KINDL-R

Background

Health-related quality of life (HRQOL) can be regarded as a concept to describe how health-related conditions are manifested in an individual's life. When assessing the quality of life, the respondent's subjective experience is decisive. World Health Organization's quality of life task force has defined quality of life as an individual's experience of his/her own life, in his/her own culture, and value system in relation to the individual's own goals, expectations, norms, and worries (1). Economic factors and those related to the wider environment are excluded from HRQOL.

Information on individuals' functioning and disability is needed for numerous purposes in social and health care. We need population-based scientific

data for the planning of social and health care services. In international studies, quality of life among children of different ages has been assessed using standardized instruments, such as *Revidierter KINDer Lebensqualitätsfragebogen* (KINDL-R) (2-6) and KIDSCREEN (7, 8). Data concerning the quality of life can be utilized in health-related decision-making (9), in the assessment of health risks (4), in relation to illnesses (5), and in economic analyses (10).

Systematic reviews demonstrate that perceived quality of life is a significant aspect of children's mental health and HRQOL is reduced in several diagnostic groups when compared to typical or healthy controls (11, 12). Distinguished reviews conclude that the assessment of HRQOL is useful

for endeavors to improve public health practices, especially by better integrating the child's perspective to the planning.

Children's parents have traditionally been the only sources of data concerning their children. Research data produced by the children themselves are needed because research has shown that parents' perceptions of their children's quality of life is not sufficiently representative (13). In general, parents assess the quality of their child's life more positively than the children do themselves, as reported in a German (2) and in a Norwegian study (14).

In Finland, the quality of life among children aged 10 to 12 years ($n = 986$) has been studied using the international PedsQL – quality of life instrument. The assessments were made by the children themselves and their guardians. The children reported lower values in the field of mental health than in the field of physical health. According to the results, the quality of life improved in relation to growth. A discrepancy was found between the assessments of parents and children (15).

The core of the Finnish education system consists of nine-year basic education (comprehensive school), which is compulsory. Every child permanently residing in Finland must attend compulsory education. Comprehensive school in Finland is for children from 7 to 16 years of age. Lower secondary education consists of grades from 1 to 6 (beginning at age 7) and upper secondary education from grades 7 to 9 (16).

It would be important to know what kind of support the schoolchildren need for good HRQOL and the prevention of mental health problems. A meta-analysis by Durlak et al. (17) reported that school-based interventions can enhance social-emotional competencies and attitudes about one's self, others, and the school environment. An equivalent result was obtained in a Finnish study (18).

As pointed out by Merikangas et al. (19), mood and behavior disorders begin to increase in adolescence. The prevalence of all mood disorders increased substantially from the 13- to 14-year-old age group to the 17- to 18-year-old age group.

The purpose of the study was to assess the perceived HRQOL of Finnish schoolchildren aged from 7 to 17 years. We were also interested to ascertain if changes of HRQOL with age could be discovered. Our aim was to produce data for the planning and developing of preventive and supportive service systems.

Materials and methods

Consent and permissions

The National Institute for Health and Welfare (THL) committee for research ethics has given an ethical review for the study (THL/1 686/6. 02.01t2013).

The committee's task is to ensure the ethicality of the research. The person in charge of the research was responsible for ensuring that the principles of research ethics were followed and all the participants' rights were guaranteed. Participation was voluntary. Research subjects had adequate information regarding the study before giving their consent. Permission to conduct the study was obtained from the principals of the respective schools or the respective municipal boards of education.

Practical arrangements were agreed with the schools' principals or other contact persons. The teachers or principals provided each pupil with a fact sheet containing information on the study, the collection of quality of life data, and responding to the inquiry. In general, pupils' parents were informed via electronic media. Parents not using electronic media for information between home and school received a paper notice concerning the study and collection of quality of life data. The notice contained a code of conduct in case of refusal. A total of 21 pupils refused to participate in the study, and this was communicated by their guardians in three cases.

This research project used the *Revidierter KINDer Lebensqualitätsfragebogen* quality of life instrument (KINDL-R) which has been developed in Germany and internationally validated (20, 21). The KINDL-R instrument includes six dimensions: physical welfare, emotional welfare, self-esteem, family, friends, and school. Statements are presented on these dimensions and responding pupils choose the response option most appropriate to themselves. The response scale includes five options, namely, never, seldom, sometimes, often, and all the time (22).

The KINDL-R instrument consists of several parts, the Kid and Kiddo instruments included. In this study, the Kid instrument was used for the younger respondents (7- to 13-year-olds) and the Kiddo instrument for the older respondents (14- to 17-year-olds).

The KINDL-R instrument has been developed for measuring HRQOL in children and adolescents through self-report. Psychometric testing of the KINDL-R questionnaire has revealed good scale utilization and scale fit as well as moderate internal consistency. The instrument has been found suitable for its purposes (10). Finnish researchers (23) have also evaluated the psychometric properties of the final data obtained using the KINDL-R instrument. The forms for the age group 8 to 17 year old were found to be valid, reliable, and feasible.

The national TOIMIA network improves the measurement of functioning in Finland. The TOIMIA network aims to harmonize and develop the measurement of functioning in Finland. Furthermore, it aims to unify the concepts of

functioning. Co-ordinated by the THL, the national TOIMIA expert network for the measurement and assessment of functioning has found the International KINDL-R instrument for assessing the HRQOL in children and adolescents suitable for evaluating their quality of life (24).

Data collection

The data ($n = 5,032$) were collected in 2014 as a total sampling from the upper and lower grades of one middle-sized city and two smaller towns and one big city. The data also include the quality of life data collected in 2015 from one big city's other school's upper and lower grades. In this study, the data were collected as a population-based sample from typically developed children without knowledge of demographic background factors of the respondents.

The response rate was 95% ($N = 4,776$). The survey was conducted in schools during lessons, mainly class by class, using tablet computers provided by the researcher and the research coordinator. The pupils responded using tablet computers. No such extensive data collection on the quality of life has so far been accomplished in Finland using tablet computers. The data were stored on an Internet server.

Guidance, supervision, and help in the response situation were provided by the researcher and the research coordinator. The pupils responded anonymously and their anonymity during the response situation was protected as well as possible. Teachers, teaching assistants, and other school staff could neither see the pupils' responses nor could they influence them. A few pupils had a personal helper to assist them. For pupils who were unable to read the researchers read the response alternatives aloud expressing no bias. The responses did not remain on the tablet computers and the researchers could not see the responses of an individual pupil. Pupils using a language other than Finnish completed the Finnish survey using tablet computers offering the various language versions of the KINDL-R instrument available on Internet. When necessary, the personal assistants interpreted the Finnish statements to a pupil in that pupil's first language. If the researcher considered that the language skills of the pupil were insufficient or an appropriate language version could not be found, the pupil did not respond at all.

The research protocol was adhered to as uniformly as possible in each class in the same way. The children were instructed in the same way to respond and given equivalent answers, considered in advance, to frequently asked questions. For instance, when the number of siblings was elicited the children were told beforehand that siblings mean other children in the family, including boys and possible step-sisters.

At any point in the responding process, the pupils had the opportunity to ask the researchers for more explanation. Some statements clearly raised more questions than others. For example, the statement "During the last school week I felt myself to be different than others", the pupils contemplated whether feeling different is a positive or negative issue. In the schools with the greatest number of pupils, a so-called residual inquiry was arranged in the same way as the actual inquiry. At those schools paper forms were left for the absentees to complete later. The share of the paper responses was two percent of the whole material.

Statistical Analyses

Statistical analyses were conducted using IBM SPSS version 22 statistical software. The results obtained using the quality of life instrument are rated according to the instructions of the developer of the instrument. According to these instructions, the statements on the Kiddo form (14- to 17-year-olds) "During the last school week I was worried about my future" (statement number 23) rating is reversed. Thus, the response alternative "Never" gets five points, and "All the time" gets one point. The final quality of life points is scaled in a range 0 to 100 and the reference values are given by the developer of the instrument. The reference ratings are made up of a German study with fourth graders ($n = 918$) and eight graders ($n = 583$) (22).

The quality of life data are presented as means and standard deviations. As the research data were not normally distributed, the differences between groups were tested using Mann-Whitney U test or Kruskal-Wallis test for medians. The level of statistical significance was set at $p < 0.05$.

The reliability of the sections of the instrument was studied using Cronbach's alpha. The generally accepted values for Cronbach's alpha vary between 0.70 and 0.90. If the instrument is multidimensional or if its items correlate with each other, alpha may be negative, which indicates that there is something wrong with the structure or rating of the instrument (6). The Cronbach's alpha values of the instrument of this study turned out to be 0.849 (the whole instrument), 0.607 (physical welfare), 0.614 (emotional welfare), 0.766 (self-esteem), 0.668 (family), 0.524 (friends), and 0.625 (school). In total, according to Cronbach's alpha values, the reliability and internal consistency of the instrument can be regarded as acceptable.

In this study, the Cronbach's alpha value related to school remained negative when calculated according to the instructions of the developer of the instrument. Therefore, the rating of statement number 23 ("I am worried about my future") was also scaled with those using the Kid form

(respondents aged 7 to 13) in the same way as with the Kiddo form. In this respect, the rating was made contrary to the instructions of the developer of the instrument in order to achieve enough reliability of the items.

According to the original rating, being constantly worried about one's future improves the quality of the lower grader's life. This also supports the reversal of the rating so that the less a lower grader worries about the future, the better is his/her quality of life. The rating has encountered a few such problems in other language versions. With a Taiwanese Kiddo form, the Cronbach's alpha of the item "school" likewise remained negative, but reliability was enhanced by reversing the rating of the statement "I felt myself to be different." In a Norwegian study,

reliability was enhanced by omitting the statement completely (4). Furthermore, in a Singaporean language version, the Cronbach's alpha of the item "School" remained low 0.40 (14).

Results

Overall score for HRQOL

The mean of all respondents' (N = 4,776) HRQOL points was 72.1 (SD 11.0). Family as a factor impacting on the quality of life scored the highest points 78.2 (SD 16.1), while self-esteem got the lowest points 62.5 (SD 17.9). Adolescent girls' school-related quality of life points were 60.2 (SD 15.0) and adolescent boys' points were 61.7 (SD 14.4) (Table 1).

TABLE 1. The quality of life ratings of the Finnish children and adolescents (n = 4,776) measured using KINDL-R instrument

The quality of life	Children 7 to 13-year-olds				Adolescents 14 to 17-year-olds				All 7- to 17-year-olds			
	Girls n = 1,679		Boys n = 1,749		Girls n = 654		Boys n = 689		N = 4,776*			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
The whole instrument	73.5	11.1	73.4	10.5	67.0	10.7	70.2	10.1	72.1	11.0	72.1	11.0
Physical welfare	75.2	16.9	76.2	16.2	64.8	16.6	71.1	15.5	73.6	16.9	73.6	16.9
Emotional welfare	78.3	14.5	77.9	14.0	71.7	14.7	76.0	13.6	76.9	14.4	76.9	14.4
Self-esteem	62.8	18.0	64.4	19.0	56.6	15.4	62.8	15.7	62.5	17.9	62.5	17.9
Family	79.9	15.5	77.8	16.0	76.2	17.5	77.4	16.3	78.2	16.1	78.2	16.1
Friends	73.1	15.9	72.3	16.1	72.5	14.8	72.7	14.4	72.7	15.6	72.7	15.6
School	71.9	15.6	71.6	15.4	60.2	15.0	61.7	14.4	68.7	16.0	68.7	16.0

*Data concerning the age of five respondents are missing, but their responses are included in the group all 7- to 17-year-olds

TABLE 2. Statistical comparison of means of quality of life points according to age group (7- to 13-year-olds versus 14- to 17-year-olds) and gender (boys versus girls). Measurements with Finnish children and adolescents (N = 4,776) using KINDL-R instrument

The quality of life	Statistical difference between age group	Statistical difference between gender group
The whole instrument	$p < 0.001$	$p < 0.087$
Physical welfare	$p < 0.001$	$p < 0.001$
Emotional welfare	$p < 0.001$	$p < 0.132$
Self-esteem	$p < 0.001$	$p < 0.001$
Family	$p < 0.001$	$p < 0.003$
Friends	$p < 0.351$	$p < 0.158$
School	$p < 0.001$	$p < 0.732$

Comparison of Finnish lower and upper graders' quality of life

Lower graders' and upper graders' quality of life differed very significantly so that the ratings of the lower graders were higher than the ratings of the upper graders (statistical significance in parentheses): total assessment of quality of life ($p < 0.001$), physical welfare ($p < 0.001$), emotional welfare ($p < 0.001$), self-esteem ($p < 0.001$), family ($p < 0.001$), and school ($P < 0.001$). The importance of the contribution of friends to quality of life did not differ between the lower and upper graders ($p = 0.351$) (Table 2).

When exploring whether lower and upper graders' quality of life differed according to gender, a statistically significant difference was found from the lower graders' ratings in the fields of self-esteem and family. The self-esteem ($p < 0.001$) and family ($p < 0.001$) scores of the lower grader girls and boys differed statistically significantly from each other. No statistically significant differences could be found in the total ratings of lower graders ($p = 0.358$), physical welfare ($p = 0.185$), and emotional welfare ($p = 0.277$). Among the younger pupils, ratings related to friends differed almost statistically significantly ($p = 0.054$) according to gender.

Among the upper graders, statistically significant differences according to gender were found in total ratings of quality of life ($p < 0.001$), and the items physical welfare ($p < 0.001$), emotional welfare ($p < 0.001$), and self-esteem ($p < 0.001$). No statistically significant difference could be found between upper grade girls and boys in the ratings of family, friends, and school.

Discussion

The purpose of the study was to assess the perceived HRQOL of Finnish schoolchildren aged from 7 to 17 years. The main finding was that the HRQOL deteriorated remarkably with age.

In general, the HRQOL of Finnish schoolchildren and adolescents was equal with previous European research findings. However, the quality of life of Finnish children and adolescents were 2.4 points lower (scale 0 to 100) than that of German schoolchildren, but 1.6 points higher than Norwegian children and adolescents (20). The quality of life of Finnish youth (14- to 17-year-olds) was 7.5 points higher than among Nepalese children participating in the study (21) and assessed using the KINDL-R instrument. Family plays a prominent role as a source of quality of life for Finnish children and adolescents. Relationships with parents are important for the growing child and adolescent.

Finnish girls' quality of life as a whole was poorer than that of Finnish boys and of German girls'. The physical and emotional welfare as well as the self-esteem of young Finnish girls was poorer than those of their male peers. A Finnish study previously found that Finnish girls had lower self-esteem and more symptoms of depression than Finnish boys (25). A similar difference has been reported in a German study: there was no difference in the quality of life of girls and boys aged 7 to 10. However, among girls aged 11 to 17, the dimension related to school, and among girls aged 14 to 17, dimensions related to physical wellbeing, emotions and friends were statistically significantly lower than boys (2). In Norway and Nepal (3), girls estimated their quality of life to be lower than boys did. These gender differences have been found to be consistent. Australian females' quality of life was poorer than that of males when measured using the KIDSCREEN-27 instrument (8). This trend also emerged in very large ($N = 125,732$) in the study of cross-national Health Behavior in school-aged children study (26) and in a KIDSCREEN study in Europe ($N = 21,590$) (7).

In addition, self-reported emotional symptoms had increased in females. This emerged in an analysis of time trends from 1998 to 2014 of Finnish adolescents' ($N = 4,508$) mental health. The researchers conclude that this finding may indicate

both an actual increase and an earlier onset of depressive disorders among females (27).

Our study shows that the self-reported quality of life of upper graders was lower than that of lower graders. The deterioration of upper graders' quality of life when compared with that of lower graders is alarming, since it may have implications for the use of health care services. For example, psychiatric service for young people is used more intensely than child psychiatric services in Finland.

An earlier Finnish study used the PedsQL quality of life instrument to measure the quality of life among children aged 10 to 12. It was found that the quality of life improves between the ages of 10 and 12 years. According to the findings of this study, the quality of life deteriorated over time, and a German study corroborates this (2). The reliability and validity of both the PedsQL and KINDL-R instrument have shown to be good. When using the PedsQL instrument, the respondent is asked to consider how things have been during the last month, and with the KINDL-R quality of life instrument, the time frame is one week.

Among young adults aged 18 to 24, the quality of life was threatened by poor education and unemployment (28). Another Finnish study has also reported the deteriorating quality of life among young adults aged 18 to 24. That study combined the data of different studies and used the 15-D quality of life instrument to estimate quality-assisted life years and life expectancy (29). The development of poor quality of life probably begins before early adulthood.

Previous research has shown that Finnish schoolchildren's satisfaction with school is fairly low by international comparison. Satisfaction with and enjoyment of school are prone to decline after the lower graders' initial enthusiasm (30). Schoolchildren's negative attitude toward school is an alarming issue. The United Nations' Committee on the Rights of the Child has considered the lack of satisfaction with school to constitute a threat to the realization of a child's rights. Finland has been recommended to ascertain the reasons for the low school-related satisfaction of Finnish children (31). The change for the worse occurs by the sixth class (32). The findings of this study, obtained using KINDL-R instrument are parallel.

Children and adolescents must be encouraged to contemplate the perceptions of their own welfare and factors having an impact on it. Participating in the study contributes to the child's and adolescent's abilities to recognize items related to the quality of life. Recognizing the quality of life assists in the pursuit of welfare, and, hopefully, encourages the child and adolescent to express, and an adult to notice factors promoting and threatening a good quality of life.

Strengths and limitations

Data collection accomplished by outside and neutral professionals, i.e., the researcher and the research coordinator enhance the reliability of this study. Pupils expressed that their satisfaction with their own perceptions was important and worth researching. The low number of refusals also supports this impression.

Also, the KINDL-R instrument contains forms for guardians in order to obtain another perspective on the quality of a child's or adolescent's life. Collating the responses, children and their guardians would necessitate identifiers. In this study, the data were collected without identifiers in order to maximize the response rate, and thus ensure comprehensive data concerning quality of life of children and adolescents.

The data as a whole are comprehensive. The form completed in Internet does not allow missing observations. In the paper forms, there were only some sporadic pieces of missing information.

To enhance reliability, close account was kept of the research situations, times, numbers of respondents, and so on, which was compared with the data stored on a server. All the possible disturbances in data transfer and net connections, as well as other deviations, were noted. The tablet computers had their own network connections. Thus, they were not dependent on the network connections of the schools. The network connections of the upper grades are often particularly heavily burdened because the pupils' own mobile phones are on the network at the same time. Roughly, 1% of the responses were lost due to unsuccessful net connections.

The data were gathered in the area of one part of Finland. In future, it will be beneficial to supplement the data to ascertain if the site of original data collection impairs the generalizability of the findings. As far as the smaller municipalities and cities as well as two schools of a big city are concerned, the data are a total sample, which improve the reliability of the findings. The population of the area where the data were gathered includes both mainstream population and immigrants who participated in the study. In this respect, the data are representative and can be generalized to the whole country.

According to the population register, in 2014, 9.7% of the Finnish population were aged 7 to 15. In the cities of the research area, the share of population of corresponding age was 10.9 and 11.5%. In the municipalities participating in the study, the share of corresponding age groups was 11.2 and 13.7%, respectively. Thus, when compared with the whole country, the share of school-aged population in the area studied is slightly higher.

Clinical significance

The poor well-being of adolescents is recognized and accepted as a development-related phenomenon. Poor HRQOL experienced by adolescents may be interpreted as a symptom of a disease. Deterioration in HRQOL among adolescents should not be accepted as a development-related factor; that phenomenon should be further investigated and necessary measures should be taken to improve the adolescent's quality of life.

It is absolutely essential to continue research on the HRQOL of children and adolescents, thereby assessing the feasibility and potential of the KINDL-R quality of the life instrument to respond to reasonable real-time needs for information related to decision-making concerning children and adolescents.

As researchers, we are unable to know all the reasons for the deterioration of the perceived HRQOL with age and why the girls have perceived their HRQOL worse than the boys have. Thus, it would be of the utmost importance to have the findings of the study to be evaluated by the schoolchildren themselves. They are the only ones who can describe and tell what impairs their HRQOL after moving to the upper grades at school, and what actions should be taken to prevent it.

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Conflicts of interest

The authors declare no conflicts of interest.

References

1. The WHOQOL Group. The World Health Organization quality of life assessment (WHOQOL): development and general psychometric properties. *Soc Sci Med* 1988;46:1569-85.
2. Ravens-Sieberer U, Erhart M, Wille N, Bullinger M; BELLA study group 2008. Health-related quality of life in children and adolescents in Germany: results of the BELLA study. *Eur Child Adolesc Psychiatry* 2008;17(Suppl 1):148-56.
3. Yamaguchi N, Poudel KC, Poudel-Tandukar K, Shakya D, Ravens-Sieberer U, Jimba M. Reliability and validity of a Nepalese version of the Kiddo-KINDL in adolescents. *Biosci Trends* 2010;4:178-85.
4. Lee PH, Chang LI, Ravens-Sieberer U. Psychometric evaluation of the Taiwanese version of the Kiddo-KINDL generic children's health-related quality of life instrument. *Qual Life Res* 2008;17:603-11.
5. Serra-Sutton V, Ferrer M, Rajimil L, Tebé C, Simeoni MC, Ravens-Sieberer U. Population norms and cut-off-points for suboptimal health related quality of life in two generic measures for adolescents

- the Spanish VSP-A and KINDL-R. *Health Qual Life Outcomes* 2009;7:35.
6. Ravens-Sieberer U, Görtler E, Bullinger M. Subjektive Gesundheit und Gesundheitsverhalten von Kindern und Jugendlichen – Eine Befragung Hamburger Schüler im Rahmen der schulärztlichen Untersuchung. [Subjective health and health behavior of children and adolescents - a survey of Hamburg students within the scope of school medical examination] *Gesundheitswesen* 2000;62:148-55.
 7. Michel G, Bisegger C, Fuhr DC, Abel T; KIDSCREEN group. Age and gender differences in health-related quality of life of children and adolescents in Europe: a multilevel analysis. *Qual Life Res* 2009;18:1147-57.
 8. Meade T, Dowswell E. Adolescents' health-related quality of life (HRQoL) changes over time: a three year longitudinal study. *Health Qual Life Outcomes* 2016;14:14.
 9. Wee HL, Ravens-Sieberer U, Erhart M, Li SC. Factor structure of the Singapore English version of the KINDL® children quality of life questionnaire. *Health Qual Life Outcomes* 2007;5:4.
 10. Bullinger M, Brütt AL, Erhart M, Ravens-Sieberer U; BELLA Study Group. Psychometric properties of the KINDL-R questionnaire: result of the BELLA study. *European Child & Adolescent Psychiatry* 2008;17(Suppl 1):125-32.
 11. Dey M, Landolt M, Mohler-Kuo M. Health-related quality of life among children with mental disorders: a systematic review. *Qual Life Res* 2012;21:1797-814.
 12. Jonsson U, Alaie I, Löfgren Wilteus A, Zander E, Marschik P, Coghill D, et al. Annual research review: Quality of life and childhood mental and behavioural disorders – a critical review of the research. *J Child Psychol Psychiatry*.2017;58:439-69.
 13. Ellert U, Ravens-Sieberer U, Erhart M, Kurth BM. Determinants of agreement between self-reported and parent-assessed quality of life for children in German - results of the German health interview and examination survey for children and adolescents (KiGGS). *Health Qual Life Outcomes* 2011;9:102.
 14. Jozefiak T, Larsson B, Wichström MF, Matzejat F, Ravens-Sieberer U. Quality of life as reported by school children and their parents: a cross-sectional survey. *Health Qual Life Outcomes* 2008;6:34.
 15. Laaksonen C. Health-related quality of life in school children – validation of instrument, child self assessment, parent-proxy assessment and school nursing documentation of health check-ups. Dissertation; Department of Nursing Science, Faculty of Medicine, University of Turku, 2012
 16. Education system in Finland. Retrieved from: <http://www.opf.fi/>
 17. Durlak JA, Weissberg RP, Dymnicki AB, Taylor RD, Schellinger KB. The impact of enhancing students' social and emotional learning: a meta-analysis of school-based universal interventions *Child Dev* 2011;82:405-32.
 18. Appelqvist-Schmidlechner K, Liski A, Pankakoski M, Solantaus T, Ojala T, Kampman M, et al. Together at school intervention programme: a pilot study on the feasibility and perceived benefits of a programme focusing on improving socio-emotional skills among schoolchildren in Finland. *Int J Ment Health Promotion* 2016;18:127-43.
 19. Merikangas K, He JP, Burstein M, Swanson SA, Avenevoli S, Cui L, et al. Lifetime prevalence of mental disorders in U.S. adolescents: results from the National Comorbidity Study-Adolescent Supplement (NCS-A). *J Am Acad Child Adolesc Psychiatry* 2010;49:980-9.
 20. Ravens-Sieberer U, Bullinger M. Assessing health-related quality of life in chronically ill children with the German KINDL: first psychometric and content analytical results. *Qual Life Res* 1998;7:399-407.
 21. Ravens-Sieberer U, Bullinger M. News from the KINDL-questionnaire – a new version for adolescents. In: Abstracts from the 5th Annual Conference of the International Society for Quality of Life Research, 15-17 November 1998, Baltimore, Maryland, USA. *Quality of Life Research* 1998;7:653.
 22. KINDL-R Manual. Retrieved from: <http://www.kindl.org/english/manual/>
 23. Korpilahti U, Lassander M, Valkeinen H, Hakulinen-Viitanen T. KINDL-R: Lasten ja nuorten terveyteen liittyvää elämäntilaa arvioiva geneerinen mittari [KINDL-R: the generic instrument for assessing the health-related quality of life of children and youth]. *Sosiaalilääketieteellinen aikakauslehti [J Soc Medicine]* 2015;52:170-81.
 24. Valkeinen H, Anttila H, Paltamaa J. Opas toimintakyvyn mittarin arviointiin TOIMIA-verkostossa (1.0) [Guide to evaluation the instrument of capacity in TOIMIA-network (1.0)]. Retrieved from: http://www.toimia.fi/opas/4_2.html
 25. Puuskari V, Aalto-Setälä T, Komulainen E, Marttunen M. Low self-esteem and high psychological distress are common among depressed adolescents presenting to the pediatric emergency department. *Scand J Child Adolesc Psychiatry Psychol* 2017;5:39-49.
 26. Torsheim T, Ravens-Sieberer U, Hetland J, Välimaa R, Danielson M, Overpeck M. Cross-national variation of gender differences in adolescent subjective health in Europe and North America. *Soc Sci Med* 2006;62:815-27.
 27. Mishina K, Tiiri E, Lempinen L, Sillanmäki L, Kronström K, Sourander A. Time trends of Finnish adolescents' mental health and use of alcohol and cigarettes from 1998 to 2014. *Eur Child Adolesc Psychiatry* 2018 Apr 27. doi: 10.1007/s00787-018-1158-4
 28. Vaarama M, Siljander E, Luoma ML, Meriläinen S. Suomalaisten kokema elämäntilaa nuoruudesta vanhuuteen [The quality of life experienced by Finns from youth to old age]. In: Vaarama M, Moisiio P, Karvonen S. *Terveyden ja hyvinvoinninlaitos (Eds.) Suomalainen hyvinvointi [Finnish Well-Being]*. Department of Health and Welfare (THL), University Press, Helsinki; 2010.
 29. Seppälä T, Häkkinen U. Laatupainotteisten elinvuosien kehitys Suomessa 1996 – 2009 [Development of quality-oriented life years in Finland 1996 – 2009]. In: Vaarama M, Moisiio P, Karvonen S. *Terveyden ja hyvinvoinninlaitos (Eds.) Suomalainen hyvinvointi [Finnish Well-Being]*. Department of Health and Welfare (THL), University Press, Helsinki; 2010.
 30. Kämppe K, Välimaa R, Ojala K, Tynjälä J, Haapasalo I, Villberg, et al. Koulukokemusten kansainvälistä vertailua 2010 sekä muutokset Suomessa ja Pohjoismaissa 1994 – 2010 –WHO –koululaistutkimus (HBSC-STYDY) [International comparisons of school experience in 2010 as well as changes in Finland and the Nordic countries 1994-2010 – WHO - Health Behavior in School-aged Children study, HBSC]. Education Tracking Reports, National Board of Education, Health Promotion Research Center, University of Jyväskylä. *Juvenes Print -Tampere University Press*; 2012.
 31. Harinen P, Halme J. Hyvä, paha koulu, kouluhyvinvointia hakemassa [Good school, bad school, searching for school-related well-being]. UNICEF Finland, Youth Research Network/Finnish Youth Research Society, Online Publication 56. Unigrafia Oy, Helsinki. 2012.
 32. Manninen A, Myllymäki E. Kouluviihtyvyys 5 – 6 -luokkalaisten käsityksissä kylä- ja kaupunkikouluissa. [School comfort – fifth and sixth-graders perceptions in rural and urban schools]. Master's thesis. Department of Education and Teacher Education, University of Oulu; 2014.