Mental Health and Health-related Quality of Life in German Adolescents After the Third Wave of the COVID-19 Pandemic

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Abstract

Background: From March – June 2021, the third wave of the COVID-19 pandemic occurred in Germany. First and second wave evaluations showed an increase in mental health problems and a reduction of quality of life in adolescents. In August 2021, two vaccines against COVID-19 were approved for adolescents aged 12-17 years in Germany. Aim of the study was to assess mental health and health-related quality of life (HRQoL) after 1.5 years of COVID-19 pandemic in adolescents who decided to receive a vaccination.

Methods: In the German region of Siegen-Wittgenstein, all students from 12-17 years from secondary level schools, vocational schools and universities were offered a prioritized vaccination against COVID-19. Mental health and HRQoL were assessed at the first vaccination appointment by self- and parental report. Adolescents and their parents completed the Strength and Difficulties Questionnaire (SDQ) and the KIDSCREEN-10.

Results: Data from 1412 adolescents (49.2% female, 47.7% male; mean age 14.3 years, SD=1.64) and 908 parents were collected. Mean self-reported HRQoL was T=53.7 (SD=11.2), in boys significantly higher than in girls (56.0 vs. 51.3), and significantly higher in younger (12-14 years) than in older (15-17 years) adolescents (56.2 vs. 51.5). Parental-reported HRQoL was T=51.8 (SD=12.8). In total, 18.5% of adolescents reported clinically relevant psychological symptoms, especially peer problems (23.7%), emotional problems (16.7%) and hyperactivity (17.2%). Girls reported significantly higher scores on emotional, peer and total problems than boys, whereas younger adolescents reported more hyperactivity and less emotional and peer problems than older ones. Comparing the present data to evaluations after the first and second wave of COVID-19 in Germany, adolescents facing vaccination after the third wave rated a higher HRQoL and reported less mental health problems. The data from the present study are comparable to those from pre-COVID evaluations.

Conclusion: After 1.5 years of living with the pandemic, adolescents may have adapted to the changes in everyday life which has lowered the anticipated stress. Further, the relaxation of restrictions, better school organization and the prospect of the vaccination may have increased optimism, wellbeing and contentment, leading to declining but still alarming rates of psychological symptoms.

Background

Coronavirus disease 2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) is a highly infectious disease which was first detected in Wuhan, China in December 2019. The outbreak of COVID-19 was classified as a pandemic in March 2020 by the World Health Organization (WHO) (1). The most common COVID-19 symptoms are fever, cough, fatigue and shortness of breath, but also gastrointestinal symptoms or myalgia. The range of illness severity reaches from mild symptoms to severe course with a mortality rate in about 1-2% overall (1). Usually, children and adolescents have a much milder course of disease and a better outcome than adults, mortality is extremely low (2). In late

2020, first vaccinations were available against COVID-19. The German vaccination program started in December 2020 focused initially on vulnerable groups, as the elderly and immune-deficient people. In August 2021, two vaccines against COVID-19 were approved for adolescents between 12 and 17 years in Germany (3).

In Germany, multiple waves of the pandemic were identified: Wave 1 from March – May 2020, wave 2 from September 2020 – February 2021 and wave 3 from March – June 2021 (4). The pandemic led to nation-wide restrictions, as school and kindergarten closures, contact restrictions and economic shutdown. Working from home and home schooling were established, when possible, healthcare and social support systems were reduced to a minimum and most leisure time activities (e.g. sport clubs, gyms) were cancelled. This caused tremendous changes in the everyday life, especially in families and lead to an increased rate of stress and mental health problems, as well as to an increase of domestic violence (5).

First meta-analyses report increased rates of psychological problems in children and adolescents after the outbreak of COVID-19, mainly internalizing symptoms as anxiety, depression or posttraumatic stress (6,7). In Germany, the nation-wide COPSYP ('Corona und Psyche') study evaluated mental health and health-related quality of life (HRQoL) in children and adolescents after the first and second wave of COVID-19. The authors compared the results to pre-pandemic data of the representative BELLA study and found a significant decrease of HRQoL of about one standard deviation, as well as an increase of psychological problems from 19 to over 30% of children and adolescents affected (8,9).

The aim of our study was to assess mental health and HRQoL in adolescents after the third wave of COVID-19 in Germany. Adolescents who decided to receive a prioritized vaccination as part of a model project were included. Outcomes of the evaluation after the third wave will be compared to the COPSYP evaluations after the first and second wave of COVID-19 in Germany, as well as to pre-pandemic data.

Methods

The present study is part of a model project that was conducted from July to September 2021 in the German region of Siegen-Wittgenstein offering a prioritized vaccination against COVID-19 for adolescents, young adults and their caregivers. All students 12 years and older from secondary level schools, vocational schools and universities, as well as their accompanying caregiver were invited to receive a prioritized SARS-CoV-2 vaccination (BNT162b2 by Biontech/Pfizer). The start of the model project was announced in local newspapers and radios and on the homepage of the Siegen University. All interested adolescents, young adults and families could participate. Vaccinations were administered at the local vaccination center of the region Siegen-Wittgenstein and at the vaccination center of the Siegen University.

All adolescents aged 12-17 years and their accompanying caregiver participating in the model project were invited to complete a survey including questionnaires on sociodemographic data, history of COVID-19 infection and vaccination status of the adolescent and the family, as well as the adolescents'

motivational reasons for receiving a vaccination. Further, adolescents and caregivers were asked to complete two questionnaires on the adolescents' mental health as well as their current health-related quality of life (HRQoL). The participation in the survey was independent of receiving the vaccination. All participants and their caregivers were informed and provided written consent prior to their participation in the survey. The study was approved by the local ethics committee.

To assess psychological symptoms, the Strengths and Difficulties Questionnaire (SDQ) (10) was completed as self-report by the adolescents, and as proxy version by their parent. The SDQ is an internationally validated, standardized screening questionnaire for children and adolescents (age range 3–17 years) including 25 questions assessing symptoms on five scales ('emotional symptoms', 'conduct problems', 'hyperactivity', 'peer problems' 'prosocial behavior'). Each item has three answering options ('not true', 'somewhat true' and 'certainly true') coded with scores from 0 to 2, summed up for each scale (5 items). The Total Problem Score (TBS) was calculated by summing up the first four scale scores, except the scale 'prosocial behavior'. The subscale scores and the TBS were divided into clinical (>90th percentile), borderline (80th – 90th percentile) and average (<80th percentile) cut-offs according to German norms (11). In addition, the scales 'emotional symptoms' and 'peer problems' were combined to the composite scale 'internalizing problems', and the scales 'conduct problems' and 'hyperactivity' to 'externalizing problems' (12).

The current HRQoL of the adolescents was assessed by the KIDSCREEN-10 completed as self-report and as parental report by the accompanying caregivers. The KIDSCREEN-10 is a reliable and valid instrument designed for populations aged 8 to 18 years to assess subjective health and well-being (HRQoL) efficiently (13). The version comprises 10 items answered on a 5-point Likert scale summing up to a total global score. Reference norms are available for 11 European countries and are reported as T-values (14).

Statistical analyses were performed using IBM SPSS Statistics Version 25. Regarding descriptive data, non-parametric data are reported as relative and absolute frequencies, parametric data as means and standard deviation (SD). Group differences for interval data were calculated with Student t-tests or with Welch tests in case of inhomogeneity of variance. Comparisons to reference data (from wave 1, wave 2 or pre-pandemic) were calculated by one-sample t-tests and one sample Chi²-tests.

Results

The description of the sample including history of COVID-19 infection and vaccination status as well as motivational reasons can be found elsewhere (15). The present results focus on the current psychological symptoms and quality of life described by the adolescents aged 12-17 years and their parents.

Data from 1477 adolescents were collected, of whom 1412 were in the age range of 12-17 years. The remaining 65 cases were excluded from the analyses, as age was not reported (n=16) or was >18 years (n=49). Of the 1412 cases, 771 were in the age range of 12-14 years, 641 were 15-17 years. Mean age was 14.3 years (SD=1.64). 695 of the adolescents were female (49.2%), 674 male (47.7%), 13 diverse

(0.9%). In 30 cases (2.1%) sex was not reported. Due to small sample sizes, the diverse group (n=13) were excluded from the statistical analyses regarding sex group differences. Descriptives (means, SDs, relative and absolute frequencies) of this group can be found in the *Supplementary Material A*. In total, 16.8% (n=237) reported a migrant background, i.e. the participant or at least one parent was born abroad.

In total, 940 caregivers answered the questionnaires. 32 were excluded (age of child not reported in n=20; Age >18 years in n=12). Of the remaining 908 parents, mean age was 46.0 years (SD=5.98), in 22 cases age was not reported. In 72.0% (n=654) questionnaires were completed by mothers, in 22.4% (n=203) by fathers, in 2.2% (n=20) by other caregivers, in 3.4% (n=31) the person was not specified.

Self- and parent-reported HRQoL and mental health

Self-reported and parent-reported HRQoL and psychological symptoms of the total sample are outlined in table 1. The HRQoL reported by adolescents and parents is similar, whereas externalizing, internalizing and total mental health scores of the SDQ were higher in self-reports than in parental reports. More adolescents reported clinically relevant symptoms in total (18.5 vs. 13.0%) and especially in hyperactivity (17.2 vs. 8.9%) than their parents. Parents reported more emotional (20.9 vs. 16.7%) and conduct problems (18.8 vs. 11.9%) assumed to be present in their children than those reported in the self-version of the SDQ.

Self- and parent-reported HRQoL and mental health in different age groups

Table 2 shows differences in HRQoL and psychological symptoms between the age groups 12-14 years and 15-17 years. HRQoL was reported significantly higher in the younger than in the older group, but only by the adolescents themselves, not by parents. Regarding mental health, older adolescents report significantly more internalizing symptoms, but less externalizing symptoms than the younger ones. The parents of younger youths report significantly more externalizing and total problems, but not internalizing symptoms.

Self- and parent-reported HRQoL and mental health in boys and girls

In table 3 differences in HRQoL and psychological symptoms between girls and boys are outlined. Girls report a significantly lower HRQoL, more internalizing and total symptoms, but also more prosocial behavior than boys. From the parents' view show boys more externalizing but less internalizing symptoms than girls and have a significantly higher HRQoL.

Comparison to outcomes after the first and second wave of COVID-19

The German population-based COPSYP study assessed HRQoL and mental health of children and adolescents during the first year of the COVID-19 pandemic by using the same instruments (KIDSCREEN-10 and SDQ, self- and proxy-version) as in the present study (8,9). In the COPSYP study data from 1040 adolescents between 11-17 years (mean age=14.33 years, 48.8% male) were evaluated, which is comparable to the present sample. After wave 1 (May-June 2020), the self-reported HRQoL in adolescents

was $T=45.4$ (parent-reported $T=42.4$) (8), after wave 2 (December 2020-January 2021) the self-reported HRQoL in adolescents was $T=44.8$ (8). In one-sample t-tests, the HRQoL T-value of the current sample is significantly higher than the HRQoL after wave 1 (53.7 vs. 45.4; $p<.001$) and after wave 2 (53.7 vs. 45.4; $p<.001$) in the self-reports, as well as in the parental report after wave 1 (51.8 vs. 42.4; $p<.001$).

Regarding mental health, 30.4% reported clinically relevant SDQ total scores after wave 1, 30.9% after wave 2 (8,9). Compared to the present data, one sample Chi²-tests showed significant differences for both waves (wave 1: 18.5% vs. 30.4%, $p<.001$; wave 2: 18.5% vs. 30.9%, $p<.001$).

Comparison to outcomes before the COVID-19 pandemic

The German nation-wide longitudinal BELLA study assessed mental health and HRQoL in children and adolescents in multiple assessments from 2003-2006 (baseline) to 2014-2017 (11-year-follow up) using the SDQ and KIDSCREEN-10, as well (16,17). Mean self-reported HRQoL was $T=53.4$, mean parent-reported HRQoL was $T=53.6$, clinically relevant psychological problems were reported in 17.6% (8,16). The current HRQoL did not differ significantly in self-reported (53.7 vs. 53.4, $p=.291$), but was significantly different in parent-reported values (51.8 vs. 53.6, $p<.001$) compared to pre-pandemic data. Frequency of mental health problems did not differ significantly between current and pre-pandemic reports (18.5% vs. 17.6%; $p=.360$).

Discussion

The present paper is one of the first reports to follow up on the COPSYS-study on quality of life and mental health in adolescents after approximately 1.5 years of living with the COVID-19 pandemic. All in all, the results suggest a change of psychological stress in youths during the course of the pandemic. Whereas COPSYS and other authors show an increase in mental health problems and a decrease of HRQoL after onset of the pandemic (8,18), the present results show a similar level as in pre-pandemic times. The cross-sectional design prevents identifying causal attributions, but it can be discussed if stress adaptation processes, better pandemic management, and improved medical knowledge, as well as coping strategies and a significant reduction of lockdown measures during the summer have led to an increased capability of living with the virus and a more 'back to normality' feeling in the population. In addition, the prospect of imminent vaccination may have had a positive influence on the psychological well-being.

Health-related quality of life (HRQoL)

The HRQoL reported by adolescents and parents is similar, both scores are in the range of an average score ($T=50$, $SD=10$), which means that HRQoL is not limited in the present sample in general. However, age and sex differences in HRQoL occur, as it was assessed significantly higher in the younger than in the older group and higher in boys vs. girls. These results are in accordance with many former findings from population-based studies, that show an decrease of HRQoL in older adolescents and especially in girls (19–22). Explanations for these differences can be found in an earlier onset of puberty and hormonal

changes in girls, which lead to a physical and social transition period, challenges with new behavior, coping with the environment and can therefore decrease perceived well-being. Further, the vulnerability for psychological symptoms is increased in female adolescents which may impact psychological well-being (7).

Regarding changes of HRQoL after onset of the COVID-19 pandemic, comparable data is rare. In a systematic review about the effect of COVID-19 on HRQoL in children and adolescents, only six studies from different countries worldwide were included (18). Three studies reported a decrease of HRQoL, among them the German COPSYP study (23). Two did not find a significant change, and another did not report a change. The authors conclude that different aspects of COVID-19, e.g. lockdown and quarantine measures, social isolation/distancing, school closures, had negatively impacted the quality of life in children and adolescents (18). The difference to the present data is that the cited studies all were performed at the beginning of the pandemic, at the time when more strict arrangements were enforced in most countries. The current study was performed in summer 2021 in Germany, when infection numbers were low, restrictions were loosened, schools were open, and a vaccination was already available. The impact of COVID-19 on adolescent life was not so strong as the year before, which could have led to an increase in quality of life again. Therefore, our data indicate a partial reversibility of negative first impacts of lockdown on children.

Mental health problems

The present results show a moderate frequency of clinically relevant psychological symptoms in total (18.5% by self-report) which is similar to the pre-pandemic comparison rates used in the COPSYP study and are also consistent with results from a meta-analysis finding a pooled prevalence of psychological disorders in 17.6% (9,24). Other findings promote lower rates using stricter criteria (25). One must consider that the present evaluation used only questionnaire data and a less strict cut-off in the SDQ (80th percentile) to enable comparison with the COPSYP data, which could have overestimated the real prevalence. Further, our data only report symptoms, not rates of manifest psychiatric disorders.

Age and sex-specific differences are shown, as older adolescents report significantly more internalizing symptoms, but less externalizing symptoms than the younger ones, girls report more internalizing symptoms, and parents report more externalizing symptoms in boys than girls. This is in line with known data, e.g. that externalizing symptoms e.g. ADHD or hyperactivity are more common in younger children and decrease with age (26). On the other hand, internalizing symptoms as anxiety or depression have a higher incidence in females (27).

The rates of mental health problems in the present study are lower than reported in other publications after the outbreak of COVID-19. In the German COPSYP study prevalence rates increased to over 30% after wave 1 and 2 (8,23). Also, first meta-analyses support the data and report increased rates especially of depression (25-29%), anxiety (20-26%), sleep problems (44%) and post-traumatic stress symptoms (48%) (6,7).

Many of the cited authors see lockdown measures, social distancing and school from home to account for the increased rates, as they impact the social life and development of young people. This is supported by a recent study that found a negative association between lockdown measures and mental health of children (28). Although assessment tools differed between studies, the direction of the results is clear. Again, the difference to the current data lies in the date the studies were performed. All cited studies assessed mental health in the first year of COVID-19 outbreak where in nearly all countries exceptional circumstances and special regulations were introduced. The present data were collected at a time with less active regulations and when a vaccination was available to prospectively lower the restrictions.

Moreover, the reduced rates of psychological problems may be a result of an adaptation process to stress factors that has taken place. In the transactional stress theory of Lazarus, stress is defined as a relationship between an individual and the environment which can be influenced by two mediators, 'cognitive appraisal' and 'coping' (29). Whereas appraisal of a stressful situation (e.g. COVID-19 outbreak) is based on factors like expectancies, individual dispositions, predictability, controllability and influences the individuals' stress reaction, coping includes cognitive and behavioral strategies to manage, tolerate, or reduce the stress reaction (29).

The increased rates of mental health problems and reduced HRQoL in the first year of COVID-19 can be interpreted as reaction to the stress induced by worrying about health, unpredictable changes in social, economic and private life of the population. This is consistent with the impact of phase 1 and 2 of an epidemic where restrictions in public and private life and closures of health services may increase psychological stress, but also lower the possibilities to receive help, e.g. from health care systems (5). Phase 3 is seen as the 'return to normality' phase, where re-organizing and re-establishing services and practices take place. In this phase, coping strategies and new rules (e.g. vaccinations, tests, wearing masks) have been developed and decrease perceived stress as they make the situation more predictable and controllable. This may have influenced the mental health and general quality of life of our sample. Further, the decision of getting vaccinated can be interpreted as an individual coping strategy which in turn may increase self-efficacy and lower psychological stress.

Sample characteristics

The present sample included adolescents aged 12-17 years from a specific German region who decided to receive a vaccination against COVID-19. Although vaccination willingness is relatively high in Germany overall (30), recent international studies show that the decision for a COVID-19 vaccination in children and adolescents depends on vaccine safety and efficacy, of the perceived risk of infection transmission, and specific socio-demographic variables (31–33). Willingness to receive a vaccination is increased in older adolescents, in those using more social media, and those having both parents vaccinated (32); the willingness is decreased in those with higher distress over the effects (31), and in families with a lower income and a migration background (33). This is in line with the results of the present sample, as parental education level was high (>80% had a high- or medium level of education) (15) suggesting a

higher socio-economic status (SES) of the participating families. Further, 85-89% of the parents were already vaccinated (15) which increases the likelihood of their children getting vaccinated, as well.

Regarding these results, the sample does not represent a population-based group, which may have influenced the outcomes on HRQoL and mental health. Adolescents from families with a higher SES tend to have a higher quality of life and a lower risk of mental health problems (34), which may have underestimated the frequency of psychological symptoms in the population. In addition, the decision of getting vaccinated may lead to more positive thinking and optimism in adolescents, as they expect more normalization of daily life and less restrictions.

Strengths and limitations

This is one of the first study assessing HRQoL and mental health of adolescents in a large sample with over 1000 participants after the third wave of COVID-19 in a defined German region. The outcomes were measured as self- and proxy-report by valid and reliable, as well as internationally used questionnaires that allow comparison with other publications. The sample is not population-based, but representative regarding age and sex and comparable to the adolescent group tested in the COPSY study after wave 1 and 2. A limitation is the probably higher SES of the participants in the study, as only those willing to receive a vaccination were included. Therefore, our results can be generalized to samples that are vaccinated or intend to be, but not to the general population.

Moreover, one has to consider that mental health problems were assessed by questionnaires and not by clinical experts, which is why only psychological symptoms can be reported, not psychiatric diagnoses. Due to the cross-sectional study design causal attributions cannot be made.

Conclusions

This study aimed to assess mental health and HRQoL after the third wave of COVID-19 in adolescents who decided to receive a prioritized vaccination. Adolescents in the present study have lower rates of mental health problems and a higher HRQoL compared to research results assessed at the beginning of the pandemic. The outcomes are at a comparable level as in pre-pandemic times. It can be concluded that the improvement of mental health and HRQoL derives from an adaptation process, as adolescents learned to cope with the changes in everyday life which has lowered their anticipated stress. Furthermore, the decision to receive a vaccination can be seen as a personal coping mechanism which has increased optimism and raised hope. And at last, after 1.5 years of living with the pandemic, restrictions were loosened, schools are better organized allowing more normality and a presumably better quality of life than at the beginning of the COVID-19 outbreak, suggesting that the lockdown's negative psychosocial impact on children and youths reported before is in part reversible.

List Of Abbreviations

COVID-19 Coronavirus disease 2019

HRQoL Health-related quality of life

SD Standard deviation

SDQ Strength and Difficulties Questionnaire

TBS Total Problem Score

WHO World Health Organization

Declarations

Ethics approval and consent to participate

All participants and their caregivers were informed and provided written consent prior to their participation in the survey. The study was approved by the ethics committee of the Medical Association Westfalen-Lippe and the University of Muenster (No. 2021-372-f-S).

Consent for publication

Not applicable

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Not applicable

Availability of data and materials

The data that support the findings of this study are available from Prof. Dr. E. Moehler but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of Prof. Dr. E. Moehler.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

JH: analysis and interpretation of data, drafting the manuscript

EM, MZ, BH, TL1, TL2: interpretation of data, revision of manuscript

MW, TG, HB, UR, TL2, AK, AN, MZ, EM: conception and design of the study

TG, TL1, FB, TR: acquisition, data analysis and interpretation

All authors read and approved the final manuscript.

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Tables

Table 1: Self- and parent-reported HRQoL and psychological symptoms in the total sample

	Self-report (n=1412)	Parental report (n=908)
HRQoL^a		
General HRQoL index, mean T values (SD)	53.7 (11.23)	51.8 (12.84)
SDQ^b, composite scale mean scores (SD)		
<i>Externalizing</i>	5.1 (3.18)	3.8 (3.34)
<i>Internalizing</i>	5.4 (3.58)	3.5 (3.39)
<i>Total</i>	10.5 (5.60)	7.3 (5.76)
SDQ, clinically relevant symptoms (>80th percentile)^c		
<i>Emotional problems, % (n)</i>	16.7 (245)	20.9 (159)
<i>Conduct problems, % (n)</i>	11.9 (166)	18.8 (143)
<i>Hyperactivity, % (n)</i>	17.2 (239)	8.9 (68)
<i>Peer problems, % (n)</i>	22.7 (315)	24.8 (189)
<i>Prosocial behavior, % (n)</i>	8.9 (125)	7.9 (60)
<i>Total, % (n)</i>	18.5 (258)	13.0 (99)

^a 10-item General HRQoL index assessed by the KIDSCREEN-10

^b Strengths and Difficulties Questionnaire

^c % of adolescents having a score in the 'borderline' (>80th) or 'abnormal' (>90th percentile) range

Table 2: Self- and parent-reported HRQoL and psychological symptoms in different age groups

	Adolescents 12-14 years	Adolescents 15-17 years	Significance ^c
Self-report	<i>n</i> =771	<i>n</i> =641	
HRQoL^a			
General HRQoL index, mean T values (SD)	55.3 (11.06)	51.8 (11.17)	<.001***
SDQ^b, mean scores (SD)			
<i>Prosocial behavior</i>	8.2 (1.84)	8.3 (1.74)	.293
<i>Externalizing</i>	5.5 (3.34)	4.8 (2.96)	.002**^d
<i>Internalizing</i>	4.9 (3.54)	5.9 (3.55)	<.001***
<i>Total</i>	10.2 (5.79)	10.7 (5.36)	.107 ^d
Parent-report	<i>n</i> =547	<i>n</i> =361	
HRQoL^a			
General HRQoL index, mean T values (SD)	51.4 (12.96)	52.4 (12.64)	.344
SDQ^b, mean scores (SD)			
<i>Prosocial behavior</i>	8.4 (1.70)	8.4 (1.84)	.661
<i>Externalizing</i>	4.1 (3.47)	3.4 (3.08)	.004**
<i>Internalizing</i>	3.6 (3.51)	3.4 (3.20)	.484
<i>Total</i>	7.7 (5.90)	6.7 (5.47)	.032*

^a 10-item General HRQoL index assessed by the KIDSCREEN-10

^b Strengths and Difficulties Questionnaire

^c Student t-tests if not otherwise specified

^d Welch test due to inhomogeneity of variance

Table 3: Self- and parent-reported HRQoL and psychological symptoms in boys and girls

	Girls	Boys	Significance ^c
Self-report	<i>n</i> =695	<i>n</i> =674	
HRQoL^a			
General HRQoL index, mean T values (SD)	51.5 (10.70)	56.2 (11.22)	<.001***
SDQ^b, mean scores (SD)			
Prosocial behavior	8.4 (1.79)	8.1 (1.78)	<.001***
Externalizing	5.2 (3.25)	5.0 (3.13)	.338
Internalizing	6.3 (3.73)	4.4 (3.15)	<.001***^d
Total	11.5 (5.80)	9.4 (5.20)	<.001***^d
Parent-report	<i>n</i> =414	<i>n</i> =482	
HRQoL^a			
General HRQoL index, mean T values (SD)	50.6 (12.64)	52.9 (12.92)	.023*
SDQ^b, mean scores (SD)			
<i>Prosocial behavior</i>	8.4 (1.76)	8.4 (1.72)	.803
<i>Externalizing</i>	3.3 (3.07)	4.3 (3.50)	<.001***^d
<i>Internalizing</i>	3.8 (3.40)	3.3 (3.37)	.038*
<i>Total</i>	7.0 (5.42)	7.5 (6.03)	.207

^a 10-item General HRQoL index assessed by the KIDSCREEN-10

^b Strengths and Difficulties Questionnaire

^c Student t-tests if not otherwise specified

^d Welch test due to inhomogeneity of variance

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