Article

Child and Adolescent Mental Health in a Period of Fewer COVID-19-Related Restrictions in an Urban Population in Germany

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Abstract: The aim of this study was to assess the mental health situation of children and adolescents during a period of less strict COVID-19-pandemic-related measures after the first pandemic wave. This cross-sectional study was conducted in July 2021 by carrying out an online survey among children and adolescents (aged 10–18 years) from Halle (Saale), Germany (*n* = 233). The questionnaire measured important aspects of mental health among young people, namely health-related quality of life (HRQoL, using the self-report version of the KIDSCREEN-10), mental health problems in general (using the SDQ), depressive symptoms (using the CES-DC), and psychosomatic complaints (using the HBSC symptom checklist). In addition, other important health issues such as sleep behavior and related difficulties, disordered eating, and any positive consequences of the pandemic were addressed. The results were analyzed using descriptive statistics. A total of 223 children participated in the survey. About 69.7% of the participating children and adolescents had a high HRQoL, while 10.5% displayed abnormal results on the SDQ. There were indications of emotional problems in 16.5% of the participants based on the SDQ subscales. Almost 44% of the participants were screened as positive for depressive symptoms on the CES-DC, with girls and older adolescents being more likely to be affected. This also applied for psychosomatic complaints. Here, irritability was experienced at least once a week or more frequently by 58.9% of the children and adolescents. Although we had a small sample size, this study showed a high prevalence of mental health problems regarding the SDQ and HRQoL. However, our study population showed a better mental health than comparable studies conducted earlier in the pandemic. Depressive symptoms were still substantially higher than those in pre-pandemic data. We hypothesize that this might reflect the fact that there were a few COVID-19-related restrictions at the time when our survey took place. Based on these findings, we assume that the mental health of children and adolescents differed between different phases in the pandemic.

1. Introduction

With the onset of the COVID-19 pandemic, for many people, everyday life changed drastically. Accordingly, it quickly became apparent that mental health would likely be affected by the pandemic. In the course of the last years, this has been shown regarding the mental health of healthcare workers [1–8], patients suffering from COVID-19 [9–11], and those affected by quarantine and other restrictions aiming to protect the population from COVID-19 [12–18]. Children and adolescents infected with SARS-CoV-2 were only occasionally physically affected and rarely hospitalized [19–21]. At the same time, it became apparent early on that the psychosocial consequences resulting from the measures implemented to mitigate the spread of COVID-19, which resulted in school closures and severe contact restrictions, often had a negative impact on the everyday lives of children and young people [13,22–26].

A particularly strong influence of quarantine and isolation came from common mental health problems [27,28]. Studies from different countries worldwide examined the impact on the psychological well-being of children and adolescents and reported an increased prevalence of mental health problems such as depression, anxiety, and loneliness [29–33]. Studies also investigated behavioral disorders among young people and found an increase compared to pre-pandemic studies [34,35].

In Germany, children and adolescents reported a lower health-related quality of life (HRQoL) during the first months of the pandemic and showed a higher risk of suffering from anxiety disorders, depression, and poor mental health in general, compared to pre-pandemic data [36,37]. Studies investigating mental health in later phases of the pandemic (e.g., in January 2021, when very strict contact restrictions and other rules applied) described an increase in mental health problems in children and adolescents in Germany [36–38]. In contrast to these surveys in the early pandemic, studies conducted in September and October 2021 showed an improvement regarding the mental health situation of children and adolescents in Germany, as more surveyed children and adolescents indicated an average or high quality of life [39]. Correspondingly, the prevalence of symptoms of depression and anxiety, as well as psychosomatic complaints, also showed a slight decrease, which, however, was described as not statistically significant [39,40].

The period during which the measures implemented to contain the COVID-19 pandemic were less restrictive (e.g., easy access to COVID-19 vaccination (from the age of 12), travel to many countries was allowed again, no contact restrictions, no more strict quarantine regulations after travel, and in parts of Germany, the mask requirement no longer applied [41,42]) has, so far, been insufficiently considered in research. However, these results can provide important information on the experience of stress or depict the duration of the convalescence of the psychological stress experienced after the reduction in pandemic-related restrictions.

Research conducted prior to the COVID-19 pandemic has consistently highlighted various social determinants that affect the mental health of children and adolescents. Notably, subjective socioeconomic status has been identified as a critical factor influencing mental health outcomes in this demographic [43–45]. In addition to socioeconomic factors, physical health has also been recognized as a pivotal determinant of mental well-being among young individuals [46,47]. Moreover, sleep disturbances have been identified as a significant contributor to the mental health challenges faced by children and adolescents. Research indicates that inadequate or poor-quality sleep can severely impact mental health, leading to increased levels of anxiety, depression, and emotional instability [48–52].

We developed this study to investigate the two following research questions: First, we aimed to assess how children and adolescents experienced the period of the COVID-19 pandemic from June to July 2021. During this time, the early pandemic was still an

important topic in media coverage and everyday conversations, but restrictions applying to children's everyday lives were minimal. Second, we aimed to examine which factors were associated with children's mental health situation during a time with more contact with peers and school attendance [53–55].

In addition to our main questions, this study aimed to examine which factors caused by the pandemic were perceived as being particularly stressful or positive by children and adolescents.

Furthermore, this study can be placed in context with other studies from this research area to develop hypotheses about the development of the mental health of children and adolescents during and after the COVID-19 pandemic.

2. Materials and Methods

2.1. Study Design and Sample

This study was conducted in Halle (Saale), Germany, and the surrounding districts between 14 June and 27 July 2021.

It used a cross-sectional design in the form of an anonymous online survey and was approved by the Ethics Committee of the Martin Luther University Halle-Wittenberg (Approval Number 2020-076). The study was conducted in accordance with the local legislation and institutional requirements. The participants' guardians/next of kin provided their written informed consent to participate in this study. Included were children and adolescents between the ages of 10 and 18 years.

The study sample consisted of the two study populations. One study population was recruited via the DigiHero study (population 1) as follows: If parents were part of the Digi-Hero cohort and provided appropriate information about children in the appropriate age group, the DigiHero study invited them to participate in the Child and Adolescent Mental Health Survey. Details on DigiHero's recruitment strategy are presented elsewhere [56]. The second study population (population 2) consisted of children and adolescents within the same age group who were recruited elsewhere (see below), and whose parents were not participants of the DigiHero study.

In order to be able to participate in the study, the parents of the respective children and adolescents of the second study population had to give their consent and register their child's e-mail address on the study's homepage. This way, the parents or legal guardian provided their consent for the children to participate in this study. Then, the access link for the study questionnaire was sent.

To ask parents for their children's participation, all schools in Halle [29] were asked via the federal state's school authority to pass on information about the study to the parents of their pupils. A reminder e-mail was sent to the schools two weeks later via the regional education authorities. In addition, posters and flyers were hung up in pediatric practices and our university's pediatric outpatient department.

Since the participants in the DigiHero study had a rather high socio-economic status (SES) overall, we tried to recruit children and adolescents with a lower SES externally. An attempt was made to achieve oversampling by contacting youth centres and social institutions for children and distributing flyers and posters in districts with mostly low-income families. We distributed flyers and posters in social facilities and associations with a social pedagogical focus. Flyers and posters in Arabic were used in order to reach a wider audience. We decided to translate the flyers and posters into Arabic since it is the most commonly spoken language among migrants in Halle, hoping to better reach the parents of children with a migration background.

2.2. Questionnaire

We developed the questionnaire using established instruments. These instruments are all internationally established, validated, and considered to be easily comparable across studies. These instruments have also been used in large-scale studies carried out before the pandemic, enabling comparability with pre-pandemic conditions. The questionnaire

consisted of 240 items in total. The instruments are described below in further detail and are listed in Table A1.

The first version of the questionnaire was piloted using the think-aloud method [57] with children and adolescents (both boys and girls, between 11 and 18 years of age). During the piloting, attention was paid to comprehensibility and processing time, as well as to substantive and formal comments and suggestions for change. Following the piloting, the questionnaire was revised again to make it easier to process and increase motivation to take part and complete the survey. Piloting did not lead to any substantial changes to the questionnaire.

2.3. Sociodemographic Variables

Regarding sociodemographic information, the survey included questions on the age and gender of the participants, parental occupational status, housing conditions, and migration background. In addition, variables related to lifestyle and living conditions were recorded, such as having a garden, a room of one's own, and a good internet connection. Questions were also asked about the number of siblings, the relationship status of the parents, marital status, religious affiliation, and education.

Subjective socio-economic status was measured using the MacArthur Scale [58].

2.4. Impact and Burden of the COVID-19 Pandemic

In order to specifically examine the influence or the burden caused by the pandemic, we explored the difficulties that the children and adolescents were confronted with during the period in question.

This section used open-ended questions. The participants were asked to describe what the three biggest difficulties of the pandemic were for them. The questions were formulated as follows: "What stressed you most about the pandemic/still stresses you? What did you find worst/do you still find it very bad?".

Similarly, the participants were also asked whether the pandemic and its associated restrictions had any positive effects on their lives.

2.5. Health-Related Quality of Life (HRQoL) and Mental Health

The instruments used in the study included the German version of the KIDSCREEN-10 to examine the HRQoL, which consists of 10 items providing a global HRQoL score that includes physical, psychological, and social components [59]. The evaluation of the KIDSCREEN-10 was based on the cut-off points for children/young adolescents (41.93 points) and older adolescents (40.26 points), as described by Hirschfeld et al. [60]. The KIDSCREEN-10 showed a good internal consistency and reliability (Cronbach's alpha = 0.82) and a good test–retest reliability/stability (r = 0.73; ICC = 0.72) [61]. The German version of the CES-DC was used to measure depressive symptoms [62], which consists of 20 items in total with a response scale of four values [62]. Higher scores on the CES-DC indicate higher levels of depression [63]. The CES-DC showed a median internal consistency (Cronbach's α) for all subscales and age groups of 0.67 [62]. The German version of the Strength and Difficulties Questionnaire (SDQ) used in this study assesses mental health problems in children and adolescents [64], focuses on 25 attributes, some positive and others negative, and is made up of five subscales [53,54]. Higher scores on the SDQ indicate a higher probability of abnormal behavior [64,65]. The internal consistency of the SDQ total score was α = 0.82 and showed only slight differences between genders. For the subscales, Cronbach's alpha was between 0.58 (conduct problems) and 0.79 (hyperactivity) [66]. Certain common psychosomatic complaints (e.g., headaches, irritability, and feeling low) that had occurred within the previous six months were examined using the HBSC symptom checklist [67,68]. Regarding the HBSC symptom checklist, various studies conducted in Europe have shown an internal consistency between 0.75 and 0.81 [69–72]. The SCOFF Scale was used as a screening instrument for disordered eating [73]. The German version of the SCOFF Scale showed a test–retest reliability of 0.73 and a maximum

accuracy of 82% (area under the ROC curve) [74]. The instruments are presented in more detail in Table A1.

In order to be able to summarize the individual health perceptions of the participants, the survey also contained a health scale in the form of a numerical rating scale. The respondents were asked how healthy they felt at the time they took part in the survey (0 = "very bad/sick" to 10 = "very good/healthy").

Since existing studies indicate that sleep behavior is also influenced by the COVID-19 pandemic, the questionnaire covered some typical characteristics of sleep behavior, such as duration of sleep (e.g., "How many hours do you currently sleep on average every night?"), sleep problems, nightmares, and energy levels during the day [75–77].

Since studies from other countries show that the eating behavior of many was also influenced by the various pandemic-related measures, eating disorder symptoms were also examined in the questionnaire [78]. The most common symptoms of bulimia and anorexia nervosa, as well as indications of other eating disorders (e.g., "EDNOS" = eating disorder not otherwise specified), were measured using the SCOFF Scale [73]. Due to its brevity and simplicity in comparison to other screening instruments for eating disorders, we chose the SCOFF Scale, despite its low sensitivity, in order to obtain a rough overview of the prevalence of typical eating disorders in the corresponding age groups among the participants [79].

2.6. Physical Health and BMI

BMI was calculated from information on body weight and height. The values were evaluated based on the corresponding standard values of the Robert Koch Institute for the respective age groups [80]. Values between the 10th and the 90th percentile were rated as being in the normal range.

2.7. Data Analysis

Data were analyzed using descriptive statistics. We report absolute and relative frequencies and means and their respective standard deviations and 95% confidence intervals.

The percentages described below refer to the population of children and adolescents who answered the corresponding questions. An available case analysis was applied to all instruments and items, so that the populations might differ depending on the instrument. For the analysis of the open-ended questions, the respondents' answers were coded using a qualitative content analysis [81]. In a second step, these codes were categorized and synthesized under broader categories. These categories were then used as categorical variables in further statistical analyses. For some analyses, the participants were divided into two subgroups according to their age (10 to 13 years and 14 to 18 years). To interpret the stratifications, we relied on the respective confidence intervals.

In accordance with the American Statistical Association guidelines for exploratory study designs, we did not calculate any statistical tests [82,83]. To further investigate the associations between socioeconomic characteristics, the extent to which the respondents' were affected by the pandemic in terms of their sleeping and eating habits (independent variables), and the respective health outcomes (subjective health and health-related quality of life; dependent variables), we calculated six multivariable linear regression models. Model 1 measured the association between sociodemographic factors and health-related quality of life, while Model 2 measured the association between sociodemographic factors and subjective health. Model 3 calculated the associations between pandemic-related factors (such as number of quarantines, home schooling experience, and family/friends affected by COVID-19) and health-related quality of life, while Model 4 measured the relationship between the described pandemic-related variables and subjective health. Model 5 and Model 6 investigated the associations between disordered eating behavior and sleep problems with health-related quality of life and subjective health, respectively. We report regression coefficients and their 95% confidence intervals.

All analyses were performed in SAS, using the software version 9.4 as well as the SAS Studio version 2023.10.

2.8. Handling of Missing Data

Missing details were dealt with according to the specifications of the respective instruments. In the KIDSCREEN-10, all participants who left more than one item unanswered had to be excluded. Imputation was applied to the SDQ if no more than 2 items per subscale were left unanswered. Regarding the CES-DC, participants with missing data were completely excluded from the calculation.

2.9. Availability of Data and Materials

The datasets used and analysed during the current study are available from the corresponding author upon reasonable request.

3. Results

In total, 223 children and adolescents took part in the survey. In total, 111 children and adolescents participated in the survey as part of the DigiHero study, and 112 participants participated outside of the DigiHero study via their parents' consent survey.

3.1. Sociodemographic Characteristics

The mean age was 14.3 years (range: 10–18 years). When asked about their gender, 55.4% (n = 93) of the participants identified themselves as girls, 41.7% (n = 70) as boys, and 2.9% (n = 5) as non-binary.

Most of the participants were born in Germany (n = 168 (99.4%)).

The majority of parents were married and most of the children stated that they lived in one household with both parents. Only 59.3% children answered the question on whether their parents were employed. Of those, 91.8% replied that their father was employed and 87.7% stated that their mother was employed. Of the 169 children who reported on their living conditions, 40.3% stated that they lived in a detached house and 59.7% affirmed that they lived in an apartment. The number of siblings who lived in the same household as the participants varied between zero and three. The corresponding mean was 0.96 siblings.

Almost all of the children (98.5%) who indicated that they lived in a detached house confirmed that there was a garden attached to it. Most of the participants who lived in an apartment also stated that the apartment had a garden, a terrace, or a backyard (69.7%).

Regarding the children's rooms, 97.6% of the children confirmed that they had their own room and nearly all of them described having their own working space to study or complete homework. Almost all participants (97.0%) stated that they had their own computer, tablet, or a similar device at home. Slightly fewer households were equipped with a printer (86.3%). Regarding internet accessibility, 50.3% of the children and adolescents described generally having a good internet connection at home, while 45.6% defined their internet access as generally good, but not always working (e.g., being overloaded during home schooling). Further details are shown in Table A2.

Subjective social status, as measured on the MacArthur Scale, displayed a mean of 6.71 (95%CI: 6.51; 6.91) and a median of 7 with a range from 3 to 10.

3.2. Health Status

Information on general physical health was provided by 172 participants. The mean value was 7.3 (95%CI: 5.09; 9.55). The lowest value (0) was chosen by 1.7% (n = 3) of the children, and the highest value (10) by 12.8% (n = 22).

Information on BMI (weight and height) was provided by 165 children. The mean BMI was 20.37 (95%CI: 19.68; 21.03). A total of 16.4% (n= 27) of the participants were classified as being underweight (weight was below the 10th percentile according to Kromeyer–Hauschild), while 7.3% (n = 12) were overweight or obese (weight was over the 90th percentile according to Kromeyer–Hauschild).

3.3. Health-Related Quality of Life (KIDSCREEN-10)

In total, 85 children and adolescents completed the KIDSCREEN-10 questionnaire. Of those, 48.2% (*n* = 41, 95%CI: 37.39; 59.08)) reported a low HRQoL, while 51.8% (*n* = 44, 95%CI: 40.92; 62.61)) reported a high HRQoL.

3.4. Mental Health

3.4.1. Overall Mental Health (SDQ)

A total of 182 participants were included in the calculations regarding the SDQ. In total, 10.5% (*n* = 18) of the participants scored abnormal results in the overall assessment of the SDQ. In the additional subscale of prosocial behavior, which was not included in the overall assessment of the SDQ, 85.2% (*n* = 155) of participants scored normal values, 11.5% (*n* = 21) borderline values, and 3.3% (*n* = 6) abnormal values.

Stratified by gender, the overall assessment of the SDQ showed "abnormal" and "borderline" results slightly more often among female participants (*n* = 11 (12.2%) and *n* = 17 (18.9%)) than among male participants (*n* = 4 (6.2%), and *n* = 10 (15.4%)).

In addition, we stratified the SDQ by age group for the 162 children who provided the relevant information necessary for stratification. Overall, behavioral problems were more frequent among the older participants. In the overall assessment—which took emotional or conduct problems, difficulties in contact with peers, and hyperactivity into account—80.3% (*n* = 49) of the age group from 10 to 13 years showed no abnormalities. In contrast, among the 14- to 18-year-olds, 67.3% (*n* = 68) reached normal values. Further details regarding the SDQ subscales are shown in Table A3.

3.4.2. Depression (CES-DC)

The CES-DC was completed by 166 children and adolescents. The results of the CES-DC showed that 44.6% (*n* = 74) of the participating children and adolescents screened positive for depressive symptoms. When stratified by gender, we found that the female participants reported depressive symptoms considerably more frequently (*n* = 53 (59.6%), 95%CI: 49.4; 69.8) than the male participants (*n* = 14 (21.5%), 95%CI: 11.5; 31.5). Less than half of the girls exhibited no symptoms of depression (*n* = 32 (36.0%), 95%CI: 25.8; 46.2). In contrast, 75.4% of the boys reported no symptoms of depression (*n* = 49, 95%CI: 65.4; 85.4).

Also, there was a clear difference between the two age groups. Of the older adolescents, 52.0% (*n* = 51, 95%CI: 42.2; 61.2) screened positive for depressive symptoms and a further 7.1% (*n* = 7, 95%CI: 0.0; 17.0) scored borderline values for being depressed. In contrast, 31.8% (*n* = 20, 95%CI: 20.6; 43.9) in the younger age group scored positive for depressive symptoms, while 68.2% (*n* = 43, 95%CI: 56.1; 79.4) did not suffer from any corresponding symptoms.

3.4.3. (Psycho-)Somatic Health Complaints (HBSC Symptom Checklist)

Among all psychosomatic complaints, feeling irritable was named most often, with 58.9% (*n* = 109) of participants feeling the sensation of irritability almost every week or more frequently. Overall, the most rarely reported psychosomatic symptom was drowsiness (with 19.5% of all respondents reporting it "almost every week", "several times a week", or even "almost every day").

In all the psychosomatic or physical complaints mentioned above, girls were affected considerably more frequently. Sleeping difficulties were least affected by this sex difference.

Also, psychosomatic complaints were reported by the older adolescents considerably more often compared to the children and younger adolescents. The details regarding the HBSC are shown in Table A4.

3.4.4. Disordered Eating According to the SCOFF Scale

In total, 19.2% (*n* = 33) of the participants screened positive for signs of an eating disorder. Girls reported signs of an eating disorder more often (*n* = 22 (23.7%), 95%CI: 15.02; 32.29) than boys (*n* = 9 (12.9%), 95%CI: 5.02; 20.70). Of the older adolescents, 20.2% (*n* = 21,

95%CI: 12.48; 27.91) of participants showed signs of an eating disorder compared to 16.9% (n = 11, 95%CI: 7.68; 25.66) in the younger age group.

3.4.5. Sleeping Habits

Questions regarding the duration of sleep at the time of the survey were answered by 162 participants. When asked "How many hours do you sleep each night at the moment?", the answer with the shortest duration was 4 h and the longest sleep duration was 12 h. The participants reported a mean of 7.6 h per night (95%CI: 7.39; 7.82).

At this point, the results of the HBSC symptom checklist should be briefly referred to again. Regarding the question about sleep problems, 49.7% (n = 92) of the participants who completed the questionnaire stated that they experienced sleep problems "almost daily" to "almost every week".

3.5. Worst Things during the Pandemic

A total of 402 responses regarding the worst things about the pandemic were given by the participants.

Most frequently (27.36%, n = 110) mentioned as the greatest burden during the COVID-19 pandemic first lockdown were the leisure and mobility restrictions. In second place, the lack of contact with friends and family members was commonly mentioned (18.66%, n = 75).

Almost as often as the contact restrictions, home schooling was named as a stressful factor (18.40%, n = 74). Emotional difficulties (10.95%, n = 44), arguments at home (7.21%, n =29), and fears of potential infections with COVID-19 among loved ones and the possible consequences (3.73%, n = 15) were often mentioned.

3.6. Positive Consequences

Overall, 28.25% (n = 63) of the participants described positive consequences that the pandemic had on their personal lives. Especially in terms of learning online and from home, these participants stated that they had become more independent and had found new ways of learning and improving their time management, as well as being enabled to develop their own daily structure (n = 16). Spending more time with family members was mentioned as an advantage of the pandemic as well (n = 10). Better handling of technology, digital networks, and computer programs was also reported (n = 9). In addition, some described that they had discovered new aspects of themselves or learned more about their weaknesses and, above all, their strengths (n = 8).

3.7. Further Stratifications

Further stratifications according to the variables of "Having a pet", "Number of siblings", "Internet quality", "School performance", "Type of school", "Drug use", "Religious affiliation", and "Social media usage" were carried out for all outcomes, but did not show any relevant differences between groups. Stratifications according to social status were originally planned, but could not be carried out due to the small number of participants with a low socioeconomic status.

3.8. Regression Analyses

Model 1 showed that there were no associations between quality of life and socio-demographic characteristics. However, there was a notable association with subjective social status, as follows: children who perceived their social status to be higher tended to report a higher quality of life. Similarly, no significant associations were found between subjective health and socio-demographic characteristics, as measured by Model 2. Nonetheless, a strong association existed between subjective health and subjective social status, as follows: children who rated their social status higher also reported a better subjective health. For further details, see Table A5.

Additionally, none of the variables measuring the impact of the pandemic showed any significant association with subjective health or quality of life (measured by Models 3 and 4). Detailed information can be found in Table A6.

Model 5 showed that children who experienced daily sleep problems and those with abnormal eating behaviors, as indicated by the SCOFF Scale, reported a lower quality of life. Furthermore, children with daily sleep problems also tended to describe a poorer subjective health (Model 6). For further details, see Table A7.

4. Discussion

Overall, the participants in this study had an average to high socioeconomic status and reported a good general physical health. The pandemic was described as being stressful due to factors such as home schooling and contact restrictions, but about about one-third of the respondents also indicated experiencing positive consequences from the pandemic. Accordingly, the participants often reported a good health-related quality of life (HRQoL) and showed a low frequency of emotional problems.

Comparing these results with other German studies, such as the first two surveys of the German COPSY study and a study from Mecklenburg–Western Pomerania, the participants of our study scored similarly in terms of HRQoL [84,85]. A third survey of the COPSY study, conducted at the end of 2021, about three months after our study took place, indicated a trend towards a better HRQoL compared to earlier pandemic surveys, which was not reflected to the same extent in our data [39].

It is noteworthy that the evaluation of HRQoL using the KIDSCREEN-10 in the aforementioned studies was based on standard deviations, while our study was based on the cut-off point values from the corresponding publication by Hirschfeld et al. [60]. Despite this methological difference, the HRQoL among our participants was more often rated as low compared to the first COPSY survey and equally often as low as the second COPSY survey [37,38]. Compared to the third COPSY survey, a low HRQoL was more frequently mentioned in our study [39]. Pre-pandemic conditions were reached neither in our study nor in the third COPSY survey. In summary, at the time of our survey, the quality of life of children and young people was still visibly affected by the circumstances of the COVID-19 pandemic. A fourth survey of the COPSY study in February 2022 showed results similar to our data, with over 40% of the participants reporting a low HRQoL [86].

In our study, 10.5% of participants showed abnormalities concerning their general mental health, as assessed by the SDQ. This prevalence roughly equals the pre-pandemic prevalence assessed in the BELLA study [87–89]. In this regard, no relevant differences in the overall mental health situation of children and adolescents in Germany before the start of the pandemic could be identified. The results of the fifth wave of the COPSY study also showed an improvement in the mental health of children and young people based on the SDQ. Although the participants in our study did not reach pre-pandemic values on this scale, our results align with the noticeable downward trend in mental health problems on the SDQ, as presented in the COPSY study [90].

A considerably higher percentage of depressive symptoms was found in our study compared to the BELLA study, where depressive symptoms, assessed using the PHQ (Patient Health Questionnaire-9 for Young Adults), were below 10% [62,91]. In our study, 43.9% of the participants reached scores that exceeded the cut-off points for depression. This relatively high percentage of depressive symptoms correlates with the results of the KIDSCREEN-10, but contrasts with the lower percentage of mental health problems determined with the SDQ. However, other studies have also reported increased levels of depression during and after the COVID-19 pandemic, although not to the extent observed in our results [92–94]. Similar values to the CES-DC results in our study were found in a study from Italy, conducted earlier in the pandemic (May 2020), where 60% of children and adolescents of the general population reported scores above the cut-offs for clinically relevant symptoms on the CES-DC [95].

The high percentage of participants scoring positive for depression on the CES-DC can possibly be explained by the long-term restrictions to many hobbies and activities, as well as social interactions, which likely suppressed the mood of children and adolescents, since mental health and sleep were continuously influenced by the pandemic and its associated measures [31,96]. Pre-pandemic studies have shown that loneliness, defined as dissatisfaction with number of friends or frequency of social contact, can be a stressor and trigger for depressive symptoms in children and adolescents [97,98].

It has also been proven in various studies that there is a close correlation between HRQoL and depression, which can also be seen in our data [59,99–103]. A clear correlation between the KIDSCREEN-52 and the CES-DC was already determined by the BELLA study [104]. In the KIDSCREEN-10, there also seemed to be the highest correlation between the index total score and the items for the mood and emotions dimension, which also covers depressive symptoms, which could explain the corresponding correlation of our HRQoL results with the results of the CES-DC [105].

The low HRQoL determined from the KIDSCREEN-10 indicates that the participants felt "unhappy, unfit and dissatisfied with regards to family life, peers and school life" [61], enabling a correlation with the CES-DC, which measures subjectively experienced depressive symptoms. Although the SDQ can correlate with HRQoL [106], it also reflects other dimensions of mental health problems, such as hyperactivity, prosocial behavior, and conduct problems [64].

In addition, it should be noted that the KIDSCREEN-10 and CES-DC refer to the last week in terms of their items, while the SDQ asks about the previous 6 months [59,63,64].

The results concerning psychosomatic complaints were in line with previous studies among children and adolescents during the COVID-19 pandemic. It was particularly striking that emotional complaints such as "irritability" and "feeling low" were clearly the most frequently experienced, while physical symptoms such as "abdominal pain" or "back pain" were mentioned less often and about as often as pre-pandemic [67,107]. Children and adolescents in different countries reported experiencing irritability with a similarly high frequency (over 50% described this phenomenon) during the pandemic [108–110]. These emotional complaints, which can occur in the context of depressive moods, match the increased occurrence of high scores in the CES-DC [111–114].

Another common mental health problem in children and adolescents is eating disorders, which often appear in comorbidity with depression, anxiety, and other mental illnesses [115–118].

The prevalence of eating disorders recorded in this study was 19.2% and was not drastically higher than that recorded in the pre-pandemic BELLA study, in which the prevalence was 19.3% (baseline study) and 13.8% (follow-up study), respectively [119]. Stratified by age group, our study also showed that older adolescents showed a slightly higher prevalence of disordered eating [120]. However, other international studies indicate an increase in the number of cases of eating disorders since the beginning of the COVID-19 pandemic [121–123].

In children and adolescents with an overall high SES, which is often associated with a safe family situation, easy access to educational opportunities, and other circumstances identified as resilience factors, the impact of the pandemic on mental health could, therefore, be rather slight in the long term.

5. Conclusions

Our study revealed that, at the time of data collection, certain aspects of mental health among children and adolescents showed improvement compared to earlier points in the pandemic.

However, HRQoL remained comparatively low and a higher proportion of participants exceeded the cut-off points for depressive symptoms compared to pre-pandemic studies. This suggests that the COVID-19 pandemic had a major impact on the mental health of children and young people, while also indicating a gradual diminishment of these effects

over time. Despite the extensive and far-reaching concequences of the COVID-19 pandemic, our findings align with other studies that suggest a visible trend of ongoing improvement in the mental health of children and adolescents. This trend also indicates the potential for further improvements in children and adolescents' mental health over time.

The insights from our regression analyses emphasize the critical role of subjective social status in mental health outcomes.

The participants in our study identified restricted mobility, a lack of contact with friends, and the challenges of home schooling to be the most stressful collateral effects of the pandemic. These findings suggest that, in the event of another lockdown or similar situations in the future, it is crucial to address these stressors early on and identify measures to mitigate their effects on children and adolescents.

Additionally, our study highlights the importance of recognizing and leveraging children's resources and the positive aspects of the pandemic experience, such as increased independence and enhanced family togetherness. These factors can be pivotal in providing better support to children and adolescents during extraordinary times.

In summary, this study makes an important contribution to the understanding of the multifaceted effects of the COVID-19 pandemic on youth mental health. It emphasizes the importance of subjective social status and specific behavioral factors, providing valuable insights that can inform future research and intervention strategies aimed at supporting the mental health and well-being of children and adolescents during crises.

Limitations

The main weakness of this study is its very homogeneous study population, as only a few participants with a migration background took part, the participants' SES was comparatively high, and their living conditions were rather similar. As a result, the situation of structurally disadvantaged children, e.g., those with a migration background or those from families with a low SES, could not be shown, and important determinants affecting their mental health could not be assessed. The number of participants should be mentioned at this point as well, as it is relatively small, which means that some stratifications and subgroup analyses were not possible. Another weakness of this study is its cross-sectional design, since other studies had to be used in order to contextualize our study results. Pre-pandemic data were used for comparison, which means that conclusions concerning temporal trends can only be derived to a limited extent, since the study populations consisted of differently composed samples.

Due to the age range of the participants, a further limitation can be identified regarding the differences in the mental development and age-related cognitive abilities of the children and adolescents who carried out the survey.

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. The authors declare that they have no competing interests. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

Appendix A Tables

Table A1. Instruments used within the online questionnaire.

Questionnaire	Item Count	Range	Categories	Dimensions	Time Period
Health-related quality of life; KIDSCREEN-10 (Global HRQoL index) [59]; commonly used for 8–18-year-olds	10	10–50	Not at all/a little/ moderately/fairly/ very much		Within the last week
depressive symptoms; CES-DC [62]; commonly used for 6–17-year-olds	20	0–60	0 (does not apply), 1 (applies a little), 2 (applies somewhat), 3 (applies very much)	Somatic (7 items), Depressed (7 items), Positive (4 items), Interpersonal (2 items)	Within the last week
Strengths and difficulties;SDQ (self-assessment, SDQ-S11-17) [64]; commonly used for 11–17-year-olds	25	0–50	Not applicable/partially applicable/definitely applicable	Emotional problems (5 items), behavioral problems (5 items), Hyperactivity (5 items), Problems with peers (5 items), Prosocial behavior (5 items, are not considered in the overall evaluation)	Within the last six months
(Psycho-)Somatic complaints; HBSC symptom checklist [67]; commonly used for 11–17-year-olds	8	-	5 level parameter values from "almost every day" to "rarely or never"	Included symptoms: Headache, Abdominal pain, Back pain, Difficulty falling asleep, Depression, Irritability, Nervousness, Drowsiness	Within the last 6 months
Disordered eating; SCOFF-Scale [73]; commonly used for 11–17-year-olds	5	-	Yes/no, dichotomous answer		Currently/no defined period

Table A2. Sociodemographic variables.

Socio-Demographic Characteristics		*n* Population 1	% Population 1	*n* Population 2	% Population 2	*n* Total	% Total
Gender	Female	59	62.77	34	45.95	93	55.40
	Male	34	36.17	36	48.65	70	41.70
	Non-binary	1	1.06	4	5.41	5	3.00
Age (mean: 14.3 years)	11–13 years	30	30.93	36	49.32	66	38.80
	14–18 years	67	69.07	37	50.68	104	61.20

Table A2. *Cont.*

Socio-Demographic Characteristics		*n* Population 1	% Population 1	*n* Population 2	% Population 2	*n* Total	% Total
Nationality	German	96	100.00	72	98.63	168	99.40
	Other	0	0	1	1.37	1	0.60
Parents' marital status	Married/ relationship	75	78.13	43	58.11	118	69.40
	separated	21	21.88	31	41.89	52	30.60
Number of siblings	Only child	15	15.79	8	11.11	23	13.80
	Sibling	80	84.21	64	88.89	144	86.20
Living with siblings	Yes	67	70.53	51	71.83	118	71.10
	No	28	29.47	20	28.17	48	28.90
Living with both parents	Yes	74	77.08	39	52.70	113	66.50
	No	22	22.92	35	47.30	57	33.50
Own Room	Yes	96	98.97	69	95.83	165	97.60
	No	1	1.03	3	4.17	4	2.40
Living conditions	House	40	41.24	28	38.89	68	40.20
	Flat	57	58.76	44	61.11	101	59.80
Chronic diseases	Yes	22	19.82	25	22.32	47	28.00
	No	89	80.18	87	77.68	121	72.00
Attending school	Yes	94	96.91	69	95.83	163	96.40
	No	3	3.09	3	4.17	6	3.60
Type of school	High school	72	76.60	53	76.81	125	76.70
	Secondary School	19	20.21	13	18.84	32	19.60
	Others	3	0.19	3	4.35	6	3.70

MacArthur Scale		Mean population 1	Standard deviation population 1	Mean population 2	Standard deviation population 2	Mean total	Standard deviation total
	MacArthur Scale	6.77	1.26	6.63	1.46	6.71	1.35

Table A3. SDQ Subscales.

Results	Overall Assessment % (95%CI) *n*	Emotional Problems % (95%CI) *n*	Conduct Problems % (95%CI) *n*	Hyperactivity % (95%CI) *n*	Problems with Peers % (95%CI) *n*	Prosocial Behavior % (95%CI) *n*
Abnormal	10.53 (5.88; 15.17) 18	16.48 (11.04; 21.93) 30	7.14 (3.37; 10.92) 13	13.19 (8.22; 18.15) 24	8.24 (4.21; 12.28) 15	3.30 (0.68; 5.92) 6
Borderline	16.96 (11.28; 22.64) 29	9.34 (5.07; 13.61) 17	4.40 (1.39; 7.40) 8	7.69 (3.78; 11.60) 14	20.88 (14.92; 26.84) 38	11.54 (6.85; 16.22) 21
Normal	72.51 (65.76; 79.27) 124	74.18 (67.76; 80.59) 135	88.46 (83.76; 93.15) 161	79.12 (73.16; 85.08) 144	70.88 (64.22; 77.54) 129	85.16 (79.95; 90.38) 155

Table A4. HBSC symptom checklist—experiencing (psycho-)somatic complaints at least once a week or more often stratified by gender and age group.

Symptoms	Girls % (95%CI)	Boys % (95%CI)	Age 11–13 y % (95%CI)	Age 14–18 y % (95%CI)	Total % (95%CI)
Irritability	64.52 (54.61; 74.42)	52.86 (40.87; 64.85)	48.48 (36.34; 60.63)	66.35 (54.86; 77.83)	58.92 (51.76; 66.07)
Feeling low	60.87 (50.71; 71.03)	27.54 (16.73; 38.35)	25.76 (15.13; 36.39)	60.78 (48.92; 72.65)	46.99 (39.70; 54.29)
Sleeping problems	55.91 (43.84; 67.98)	44.29 (32.21; 56.36)	40.91 (28.96; 52.86)	56.73 (44.69; 68.78)	49.73 (42.46; 57.00)
Headache	53.76 (43.44; 64.09)	15.72 (6.97; 24.45)	22.73 (12.54; 32.92)	46.15 (34.03; 58.27)	36.22 (29.23; 43.21)

Table A4. *Cont.*

Symptoms	Girls % (95%CI)	Boys % (95%CI)	Age 11–13 y % (95%CI)	Age 14–18 y % (95%CI)	Total % (95%CI)
Feeling nervous	38.71 (28.62; 48.80)	22.86 (12.77; 32.94)	25.76 (15.13; 36.39)	36.54 (24.83; 48.25)	32.97 (26.14; 39.81)
Stomachache	37.63 (27.60; 47.67)	8.57 (1.84; 15.29)	25.76 (15.13; 36.39)	25.96 (15.30; 36.62)	26.49 (20.07; 32.90)
Backache	34.41 (24.57; 44.25)	17.14 (8.10; 26.19)	13.64 (5.29; 21.98)	34.62 (23.05; 46.18)	26.49 (20.07; 32.90)
Drowsiness	29.03 (18.00; 40.07)	8.58 (1.77; 15.38)	15.15 (6.43; 23.87)	23.08 (12.83; 33.32)	19.46 (13.70; 25.22)

Table A5. Models 1 and 2.

Model 1 (SES and HRQoL) Variable	Regression Coefficient	95%CI
Parents married/in a relationship (Yes/No)	0.22	−2.08; 2.52
Parents divorced/separated (Yes/No)	0.12	−1.42; 1.66
participants have their own room (Yes/No)	1.77	−1.59; 5.13
Father employed (Yes/No)	−3.43	−5.9; −0.96
Mother employed (Yes/No)	0.40	−1.62; 2.42
MacArthur Scale (Scale from 0 to 10)	2.25	1.77; 2.73
Model 2 (SES and Subjective health) Variable	**Regression coefficient**	**95%CI**
Parents married/in a relationship(Yes/No)	0.49	−0.28; 1.26
Parents divorced/separated (Yes/No)	0.22	−0.34; 0.78
participants have their own room (Yes/No)	−1.55	−3.38; 0.28
Father employed (Yes/No)	−1.19	−2.09; −0.29;
Mother employed (Yes/No)	−1.31	−2.01; −0.61
MacArthur Scale (Scale from 0 to 10)	0.72	0.53; 0.91

Table A6. Models 3 and 4.

Model 3 (COVID-19 and HRQoL) Variable	Regression Coefficient	95%CI
Good home schooling experience (Yes/No)	8.67	−7.49; 24.83
Times quarantined (Number entered by participants in input field)	11.85	0.84; 22.86
Family members affected by COVID-19 (Yes/No)	14.33	5.37; 23.29
Friends affected by COVID-19 (Yes/No)	3.83	−3.2; 10.86
Model 4 (COVID-19 and Subjective health) Variable	**Regression coefficient**	**95%CI**
Good home schooling experience (Yes/No)	−3.24	−4.87; −1.61
Times quarantined (Number entered by participants in input field)	−0.96	−0.04; −1.88
Family members affected by COVID-19 (Yes/No)	2.45	1.28; 3.62
Friends affected by COVID-19 (Yes/No)	0.93	0.08; 1.78

Table A7. Models 5 and 6.

Model 5 (HRQoL) Variable	Regression Coefficient	95%CI
SCOFF-Scale screening positive (Yes/No)	−4.51	−6.38; −2.64
Sleep problems every day (Yes/No)	−6.40	−8.94; −3.86
Sleep problems every week (Yes/No)	1.77	−1.59; 5.13
Sleep problems several times a month (Yes/No)	−3.17	−5.6; −0.74
Sleep problems rarely or never (Yes/No)	1.95	−0.17; 4.07

Table A7. *Cont.*

Model 5 (HRQoL) Variable	Regression Coefficient	95%CI
Model 6 (Subjective health)		
Variable	**Regression coefficient**	**95% CI**
SCOFF-Scale screening positive (Yes/No)	−0.55	−0.98; −0.12
Sleep problems every day (Yes/No)	−1.36	−1.89; −0.83
Sleep problems every week (Yes/No)	0.16	−0.4; 0.72
Sleep problems several times a month (Yes/No)	−0.37	−0.9; 0.16
Sleep problems rarely or never (Yes/No)	0.73	0.24; 1.22

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