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Child self-report and child-parent agreement regarding health-related quality of life under COVID-19 lockdown in the French Grand Est area

Stéphanie Bourion-Bédès a,b,*, Hélène Rousseau c, Martine Batt d, Pascale Tarquinio e, Romain Lebreuilly d, Christine Sorsana d, Karine Legrand a, R., Cyril Tarquinio a, Cédric Baumann a,c

a Université de Lorraine, APEMAC, équipe MICS, F-54 000 Nancy, France
b Centre Hospitalier de Versailles, Service Universitaire de Psychiatrie de l’Enfant et de l’Adolescent, 78157 Versailles-Le Chesnay, France
c Methodology, Data Management and Statistics Unit, University Hospital of Nancy, 54000 Nancy, France
d InterPsy, GRC Team, University of Lorraine, 54000 Nancy, France
e Pierre Janet Center, 57 000 Metz, France
f Clinical Investigation Center, INSERM, University Hospital of Nancy, 54000 Nancy, France

ABSTRACT

Nearly 1.6 billion of children and young people in more than 190 countries have been affected by school closures under the first lockdown due to the coronavirus disease. This study aimed to investigate child-reported and parent-rated health-related quality of life among 8- to 18-year-olds and the agreement between the children’s assessments and those of their parents during lockdown. A cross-sectional study was conducted among French children living in the Grand Est area. An online survey was used to collect data on the children’s sociodemographics, living environments, education and HRQoL. The latter was assessed with KIDSCREEN-27, which consists of five domains. Sex and age differences in parent ratings and child-reported data were analyzed using Mann-Whitney tests. Child-parent agreement was analyzed using the intraclass correlation coefficient (ICC). In total, 471 child-parent pairs from 341 households were included. Compared to European norms, children scored lower on all dimensions during the first lockdown: physical well-being (45.9/49.94 EU), psychological well-being (48.8/49.77 EU), parent relations and autonomy (47.7/49.99 EU), social support and peers (36.4/49.94 EU) and school (48.2/50 EU). Significant child-reported sex and age differences were identified for both psychological and physical well-being dimensions. Moderate to good agreement existed between children’s and parents’ ratings on all KIDSCREEN dimensions (ICC ranged from 0.60 to 0.76). The study suggests the need to focus on children’s social support and peers during epidemics and to consider the children’s self-reported HRQoL. Additional research should be conducted to identify ways of minimizing the gap between mental health needs and the services available and to help more children maintain their physical and mental health during the current crisis.

1. Introduction

Coronavirus disease 2019 (COVID-19), which is caused by infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), emerged in Wuhan, China (Zhu et al., 2020; Phelan et al., 2020) and rapidly spread worldwide, becoming a pandemic that affects every continent (World Health Organization, 2020). The increasing number of confirmed cases and deaths has led to panic and stress among the general public (Bao et al., 2020). To contain the spread of COVID-19, the French government decided to implement stringent containment measures nationwide on March 16, 2020. Although the incidence of COVID-19 among young children and adolescents is low, child and adolescent populations are indeed particularly vulnerable during a pandemic, as they are suddenly faced with the societal and economic changes that are necessary to control the disease and protect the population (Guessoum et al., 2020; Marques de Miranda et al., 2020; Singh et al., 2020). Whereas social support and peer interactions are essential for the normal psychological development and well-being of children and adolescents,
Moreover, it has been previously found that compared to adults, children have higher anxiety and stress than junior high school students (Zhang et al., 2020). A recent study also highlighted that high school students had higher prevalences of depression and anxiety symptoms, respectively (Xie et al., 2020). A recent study investigated the HRQoL in children and adolescents from the Grand Est region, which is the French region that was the third most severely affected by the disease during the first wave, and b) analyze child-parent agreement during the pandemic and the first lockdown.

2. Methods

2.1. Design and participants

This study was a cross-sectional analysis of data from the observational Feelings and Psychological Impact of the COVID-19 Epidemic Among Children, Adolescents and their Parents in the Grand Est Area (PIMS2-CoV19) study. An online survey was conducted from May 26th to July 6th, 2020, on a platform that was accessible with an internet connection. From a complete list of middle and high schools in the Grand Est area, schools were randomly selected using proportionate stratification for the baseline ascertainment and recruitment. In each selected school, the survey was disseminated through school institutional mailing lists. Inclusion criteria were schoolchildren aged 8–18 years living at home during the lockdown and one of the parents. Children and parents were instructed to access a link containing instructions and information about the study. The survey included an informed consent form; questions about demographics and living conditions during the lockdown; the Generalized Anxiety Disorder-7 (GAD-7), which was to be completed by the parents; and both generic versions of the KIDSCREEN-27 questionnaire, with a version to be completed by children and adolescents and another version to be independently completed by the parents (Ravens-Sieberer et al., 2014). All data were obtained at the time of the online survey. The process for recruitment of the sample is represented as a flow chart (Fig. 1). We counted 2763 e-parental connections, and 1742 parental agreements to participate. Among the 459 children aged 12–18 years living at home during the lockdown and one of the parents, 308 agreed to participate. Among the 271 children aged 8–11 years, 220 agreed to participate. In total, complete data were obtained for 341 parents and 471 schoolchildren.
aged 8–18 years. The study was conducted in full compliance with the national regulations and the principles of the Declaration of Helsinki. The anonymous nature of the web survey did not allow us to trace personal data in any way. The study protocol was approved by the Institutional Review Board (Comité National Informatique et Liberté-registration 2220408).

3. Measures

3.1. Health-Related quality of life

The KIDSCREEN-27 is the mid-length option among the KIDSCREEN instruments. It was derived using psychometric methods from the KIDSCREEN-52 to provide an instrument that might be useful in epidemiological and clinical studies (Ravens-Sieberer et al., 2007; Robitail et al., 2007). The French version of the questionnaire has been confirmed to have good internal consistency, with Cronbach’s alpha coefficients ranging from 0.8 to 0.84, and good reliability, with values ranging from 0.61 to 0.74 (Ravens-Sieberer et al., 2014). It measures five dimensions: physical well-being (5 items), which explores the child’s levels of physical activity, energy, and fitness, as well as the extent to which a child feels unwell and complains of poor health; psychological well-being (7 items), which examines the psychological well-being of the child, including their positive emotions and satisfaction with life as well as the absence of feelings such as loneliness and sadness; parent relations and autonomy (7 items), which explores their relationships with their parents, the atmosphere at home, and feelings of having enough age-appropriate freedom of choice as well as feeling satisfied with their own financial resources; social support and peers (4 items), which examines the quality of the interactions between the child and his/her peers as well as their perceived support; and the school environment (4 items), which explores the child’s perceptions of his/her cognitive capacity, learning and concentration, and feelings about school. The items in both the parent and child/adolescent versions are answered on a five-point Likert-type scale assessing the frequency with which the child experiences the given feeling as never (1), seldom (2), sometimes (3), often (4), and always (5) or the intensity as not at all (1), slightly (2), moderately (3), very (4), and extremely (5), with a 1-week recall period. Scores are coded from 1 to 5. Negatively formulated items are recoded, and higher summed scores indicate better HRQoL. Rasch scores are computed for each dimension and transformed into values with a mean of 50 and standard deviation of 10. Normative reference values are available for 11 European countries (KIDSCREEN Group, 2006). KIDSCREEN-27 takes approximately 10 min to complete.

4. Sociodemographic data and other characteristics

The collected demographic data were the children’s/adolescents’ age, sex, education level and learning conditions. Participants were stratified by age upon questionnaire completion as children (8–11 years old) or adolescents (12–18 years old) and by sex.

5. Statistical analyses

Data are represented as numbers and percentages for categorical variables and as the means ± standard deviations (SDs) for continuous variables. Mann-Whitney tests were used to compare scores between children’s age subgroups and sex subgroups separately. The results of the comparison tests by age group and then by sex were considered significant at the 2.5 % threshold, taking into account the multiplicity of tests (*2) in each dimension and each version (parent/child) of the KIDSCREEN-27. Comparison between means scores and EU reference values were made using t-test. Agreement between children’s and parents’ HRQoL ratings was assessed using ICCs in the whole sample and according to the children’s age and sex subgroups. ICC values < 0.4 were considered poor to fair, those between 0.41 and 0.6 were moderate, and those greater than 0.6 were substantial to nearly perfect (Bartko, 1966). To complete the analysis, the Bland and Altman approach was used as a complementary method to visually represent the agreement between raters. The resulting graph is a scatter plot, in which the Y axis shows the difference between the two paired measurements (e.g., parents’ ratings—children’s ratings) and the X axis represents the average of those ratings. The statistical limits of agreement between KIDSCREEN raters were estimated by calculating the mean difference and the standard deviation of the difference. More specifically, 95 % of differences will lie between the mean-1.96 SD and the mean + 1.96 SD if the differences are normally distributed. This approach allowed us to visually examine the extent of the disagreement. Formal agreement was only possible when the two scores (parents’ ratings—children’s ratings) were perfectly correlated (scatter is zero) and the bias (elevation and spread) between them was zero (Bland & Altman, 1995). Statistical analysis was performed using SAS 9.4 (SAS Inst., Cary, NC, USA).

| Sociodemographic and education characteristics (N = 471 children) | Full sample |
|---------------------------------------------------------------|-------------|
| Age Sex                                                      | 471 12.9 (3.0) |
| Male Female                                                  | 219 46.5 252 53.5 |
| Education level                                              | 187 39.7 171 36.3 113 24.0 |
| Primary school                                              | Middle school | High school |
| Time spent on schoolwork at home (missing = 4)               | ≥4 h a day | 2-4 h a day | 1-2 h a day | <1 h a day | 23 4.9 |
| Difficulty isolating at home                                 | Yes 62 13.2 | No 409 86.8 |
| Tensions and conflicts at home                               | Yes 137 29.1 | No 334 70.9 |
| Living environment characteristics (N = 341 households)      | Living arrangements (missing = 2) | Both parents | Single parent | Separated parents |
| No access                                                    | 230 67.8 19 5.6 90 26.6 |
| No confirmed and hospitalized cases                          | No confirmed but nonhospitalized cases | Confirmed and nonhospitalized cases | Suspected cases |
| No confirmed and hospitalized cases                          | No confirmed but nonhospitalized cases | Confirmed and nonhospitalized cases | Suspected cases |
| No confirmed and hospitalized cases                          | No confirmed but nonhospitalized cases | Confirmed and nonhospitalized cases | Suspected cases |
| No confirmed and hospitalized cases                          | No confirmed but nonhospitalized cases | Confirmed and nonhospitalized cases | Suspected cases |
| No confirmed and hospitalized cases                          | No confirmed but nonhospitalized cases | Confirmed and nonhospitalized cases | Suspected cases |
| No confirmed and hospitalized cases                          | No confirmed but nonhospitalized cases | Confirmed and nonhospitalized cases | Suspected cases |
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| No confirmed and hospitalized cases                          | No confirmed but nonhospitalized cases | Confirmed and nonhospitalized cases | Suspected cases |
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| No confirmed and hospitalized cases                          | No confirmed but nonhospitalized cases | Confirmed and nonhospitalized cases | Suspected cases |
| No confirmed and hospitalized cases                          | No confirmed but nonhospitalized cases | Confirmed and nonhospitalized cases | Suspected cases |
| No confirmed and hospitalized cases                          | No confirmed but nonhospitalized cases | Confirmed and nonhospitalized cases | Suspected cases |
| No confirmed and hospitalized cases                          | No confirmed but nonhospitalized cases | Confirmed and nonhospitalized cases | Suspected cases |
Children’s scores and parents’ ratings on KIDSCREEN-27 by children’s age and sex.

|                      | Total Sample | Age 8–11 Years | 12–18 Years | Sex | Boys | Girls | p* |
|----------------------|--------------|----------------|-------------|-----|------|-------|----|
|                      | N  Mean (SD) | N  Mean (SD)   | N  Mean (SD) |     |      |       |    |
| Physical Well-Being  |              |                |             |     |      |       |    |
| Child                | 471 45.9 (10.3) | 188 49.5 (9.7) | 283 43.6 (10.1) | < 0.0001 | 219 47.4 (10.2) | 252 44.7 (10.3) | 0.0049 |
| Parent               | 471 42.8 (9.4) | 188 45.4 (8.8) | 283 41.1 (9.3) | < 0.0001 | 219 43.4 (9.0) | 252 42.3 (9.7) | 0.22 |
| Psychological Well-Being |         |                |             |     |      |       |    |
| Child                | 471 48.8 (10.0) | 188 51.2 (9.2) | 283 47.2 (10.2) | < 0.0001 | 219 50.6 (9.4) | 252 47.2 (10.2) | 0.0008 |
| Parent               | 471 46.9 (11.3) | 188 49.0 (10.1) | 283 45.5 (11.8) | 0.0020 | 219 48.0 (11.3) | 252 45.8 (11.2) | 0.12 |
| Parent Relations & Autonomy |        |                |             |     |      |       |    |
| Child                | 471 47.7 (11.3) | 188 46.3 (9.6) | 283 48.6 (12.2) | 0.0404 | 219 47.8 (10.6) | 252 47.6 (11.9) | 0.62 |
| Parent               | 471 46.3 (12.2) | 188 44.8 (10.2) | 283 47.2 (13.3) | 0.0036 | 219 46.0 (12.2) | 252 46.5 (12.2) | 0.39 |
| Social Support & Peers |            |                |             |     |      |       |    |
| Child                | 471 36.4 (14.7) | 188 31.4 (15.7) | 283 39.7 (13.1) | < 0.0001 | 219 35.0 (14.8) | 252 37.6 (14.6) | 0.07 |
| Parent               | 471 32.9 (14.9) | 188 27.6 (15.0) | 283 36.5 (13.8) | < 0.0001 | 219 31.4 (14.9) | 252 34.3 (14.8) | 0.04 |
| School               |              |                |             |     |      |       |    |
| Child                | 471 48.2 (10.2) | 188 50.0 (9.8) | 283 47.0 (10.2) | 0.0025 | 219 47.7 (10.0) | 252 48.6 (10.3) | 0.37 |
| Parent               | 471 47.2 (10.5) | 188 48.9 (10.2) | 283 46.0 (10.6) | 0.0043 | 219 46.0 (10.4) | 252 48.2 (10.6) | 0.0091 |

Abbreviation: SD, standard deviation.

* Mann-Whitney test.

Fig. 2. Distribution of subdimension average scores of KIDSCREEN-27 for children aged 8 to 11 years.

6. Results

6.1. Sociodemographic, learning and living characteristics

The analysis included 471 child-parent pairs from 341 distinct households. As shown in Table 1, more than half of the children were female (53.5%). The average age was 12.9 years (SD = 3.0), 40 % of the children were younger than 12 years, and 39.7 % were identified as primary school graduates. One-quarter of the sample (25.7 %) reported spending<2 h/day on homework during the lockdown. Of the 471
participants, 29.1 % reported conflicts with family members in their house, and 13.2 % found it difficult to isolate themselves in the dwelling.

In the 341 households, 85 % of the respondents were mothers, more than one-third lived (38.6 %) in urban areas, and 6.5 % reported having no access to outdoor areas. Both parents were living in the same home in two-thirds (67.8 %) of the households. The mean number of children in the household was 2.1. More than one-third of the households (38.1 %) had a relative or acquaintance who had COVID-19, and 12.3 % had someone in their house who had COVID-19.

7. Kids’ HRQoL scores and parents’ ratings during the pandemic and the lockdown

The mean HRQoL scores of the children and the parents’ ratings are shown in Table 2. With regard to the KIDSCREEN-27 dimensions, the children’s highest average scores were 48.8 ± 10 for “psychological well-being” and 48.2 ± 10.2 for “school environment”, while their lowest average scores were 36.4 ± 14.7 for “social support and peers” and 45.9 ± 10.3 for “physical well-being”. Significant differences were found between age groups for all dimensions except the “parent relations and autonomy” dimension. Regarding psychological well-being, adolescents scored lower than children in the 8–11 year group (p < 0.0001). Regarding their physical and psychological well-being, girls scored lower than boys (p = 0.005 and p = 0.0008, respectively). No significant sex differences were found in the dimensions parent relations and autonomy (p = 0.62), social support and peers (p = 0.07) and school environment (p = 0.37). All scores provided by the parents were lower than those provided by the children. Average quality of life scores self-reported by children by age group in each subdimension were lower than the scores in the validation reference study (Ravens-Sieberer et al., 2007), as shown in Fig. 2 and Fig. 3.

8. Child-parent agreement on the KIDSCREEN-27

Table 3 shows the ICCs between children’s and parents’ scores on the KIDSCREEN-27. The ICCs between children’s and parents’ scores ranged from moderate (0.60 for psychological well-being) to good (0.76 for social support and peers). The Bland and Altman plots (Fig. 4) showed that the mean differences in pairwise agreement on items in the 5 dimensions of the KIDSCREEN-27 scores differed from zero. The 95 % limits of agreement between parents and children were: −3.09 for physical well-being (95 % CI = -3.76;-2.41, Figure 4 A1); −1.93 for psychological well-being (95 % CI = -2.79;-1.08, Figure 4 A2); −1.44 for parent relations and autonomy (95 % CI = -2.33;-0.54, Figure 4 A3);
3.49 for social support and peers (95% CI = -4.36; -2.62, Figure 4 A4); and -1.02 for school environment (95% CI = -1.79; -0.27, Figure 4 A5). Visual inspection of the Bland-Altman plot for the psychological dimension showed that when the average well-being score reported by the children was lower (x-axis), the parents’ assessment was fairly accurate, as shown by the relatively substantial proportion of cases along the zero-bias line. However, as the mean well-being score reported by the children increased, the parents’ scores increasingly differed, as indicated by the higher proportion of cases above and below the zero-bias line (Fig. 4).

9. Discussion

The children and adolescents in the present study had lower HRQoL scores than the large, representative, normative European sample in a previous reference study (Ravens-Sieberer et al., 2007; Ravens-Sieberer et al., 2014). The difference can be interpreted as being clinically important (Hirschfeld et al., 2020). These findings are in line with
would be valuable to consider both parent and child ratings. Further differences between children the degree of agreement between children and parents dyads was stronger when the children had lower HRQoL than adolescents for the dimension of social support and peer in (Ravens-Sieberer et al., 2007). In contrast, children had lower scores, highlighting that parents have a good perception of children’s feelings during the first lockdown due to the COVID-19 pandemic; such information could be valuable during future lockdowns. Regarding limitations, the sample was composed of children recruited through an online survey, and no information on the number of families who received the invitation letter was available, making it impossible to calculate the participation rate. For these reasons, it is difficult to generalize our results to either the entire French population of children and adolescents or to populations of children and adolescents in other countries. Children, adolescents and their parents in other countries might respond differently to being in lockdown and the need for social distancing. Larger surveys that involving collaborations among researchers from different countries should be conducted to increase the generalizability of the findings. Another limit is the ICC calculation. Approximately-one-third of the parents completed more than one questionnaire, meaning that several of their children participated in the study. The ICCs calculated in this study did not take into account the specificities of having several respondent children.

From the findings of this study, several key messages can be drawn. First, these findings highlight the need to develop programs to promote social communication among children aged 8 to 18 years, as very low levels of social support and peer interactions were reported in a French area that has been particularly affected by COVID-19. Second, even if children with worse quality of life seem to be identified by their parents, agreement between children and parents is worse among younger children in the psychological dimension. This finding highlights the need to use children’s self-reports in addition to parents’ ratings, even for younger children. Future studies should also identify the factors that influence children’s HRQoL to facilitate the development of effective interventions to support healthy development during the current crisis.

Funding

No funding.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Acknowledgements

We are grateful to the study participants, without whom this publication would not have been possible. Thanks to Antoine for his help in the formatting of the figures. We also thank the Centre Hospitalier de Versailles for editorial assistance.

Availability of data and materials: The data collected and analyzed during the current study can be obtained from the corresponding author on request.

Ethical approval and consent to participate: All procedures were conducted in accordance with the principles of the Declaration of Helsinki. The survey was anonymous to ensure the confidentiality and reliability of the data. The study protocol was approved by the Institutional Review Board (Comité National Informatique et Liberté-registration 2220408). All participants received detailed information regarding the purpose of the study and provided online informed consent to participate in the study.
