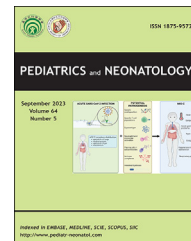


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Original Article

# Children's mental health during the second year of COVID-19 pandemic in Lithuania: Parents' and children's perspectives

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## KeyWords

children;  
COVID-19;  
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**Background:** Understanding the long-term consequences of the COVID-19 pandemic on children's mental health is needed to deal with it successfully. Our study focuses on the pandemic's impact on children's mental health in the middle of its second year in Lithuania.

**Aim:** To assess the impact of the pandemic and related restrictions on the mental health of 11–17-year-old children in the second year of the pandemic from the perspectives of children and parents.

**Methods:** 389 11–17-year-old children and 392 parents/guardians participated in the study. Data were collected from March 9, 2021, to April 30, 2021. A cross-sectional study was conducted with two online questionnaires. Children provided information about changes in emotions and behavior during quarantine, and the influence this had on interpersonal relationships. Parents/guardians answered questions on their children's emotional state, behavior, relationships, and daily life.

**Results:** Anxiety was the most frequent children's complaint. Girls reported the experience of getting angry more easily, anxiety, stress and tensions, profound tiredness, overall negative changes, and they were more worried about family and friends being infected, while boys were unable to participate in daily activities and were less worried about being infected. Children more frequently than parents reported severe loneliness, sadness, fatigue, impaired concentration, increased sleeping time, improved interpersonal relationships with friends and impaired ones with siblings, and feeling severely worried about family members or friends being infected. Parents more frequently reported children's inability to participate in daily activities, improved children-parent relations, and severe children's anxiety about being infected.

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**Conclusion:** In its second year, the pandemic continues to have an extensive negative impact on children's mental health. Significant discrepancies were found between children and parents' perceptions of quarantine consequences on children's mental health, as parents tend to underestimate it. Such undervaluation can be an obstacle to getting mental health services for those children in need of them.

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## 1. Introduction

The World Health Organization declared coronavirus disease 2019 (COVID-19) a pandemic in March 2020.<sup>1</sup> To decrease new numbers of COVID-19 infections at the beginning of 2020, many countries adopted social distancing policies. Studies conducted internationally in the first year of the pandemic showed that closing of schools, social distancing and isolation had a negative impact on the mental health of children.<sup>2–14</sup>

As COVID-19 heads into its third year, there are grey areas concerning long-term impact on mental health. The variety of studies conducted on the subject is expanding, comparing data collected in the pre-pandemic, early pandemic, and late pandemic periods. The vast majority of research is focused on adults, while findings of the aftermath of the global pandemic on children's mental health are less common. The question remains regarding how children's mental health reacts to such prolonged adversity – with increased suffering or with improved adaptation.

Data provided by UNICEF show that globally during the second year of the pandemic at least 1 in 7 children has been directly affected by lockdowns, while more than 1.6 billion children have suffered some loss of education. Nearly 40% of 6- to 16-year-olds, and half of 17- to 23-year-olds, reported that their mental health had gotten worse during the quarantine, girls being more affected than boys.<sup>2</sup>

Multiple studies' results showed that children had disrupted sleep rhythms, eating habits, and physical activities during quarantine in the first year of the pandemic.<sup>3–5</sup> Studies reviewed by Imran et al. showed that anxiety, sadness, frustration, loneliness, depression, disturbance in sleep and appetite, and fear of getting the virus were the most common presentations to be found in the general population of children and adolescents.<sup>6</sup> A study by Saito et al. compared elementary and high school students between those who answered the questionnaire when schools were closed and those who answered when schools were opened and they reported significantly lower scores in interest, overall activity, and vigorousness.<sup>3</sup> The disruption to routine and education, as well as concern for family health, left many young people afraid, angry, and concerned for their future.<sup>6–9</sup>

Inclusion of parents and children as respondents in studies provides different perspectives on children's mental health problems during quarantine. A study by Khoury et al. revealed that parents were more concerned about their children's mental health during closure than

pre-closure. Children in this study reported that they felt lonely less often and had more positive peer relationships pre-closure than during closure.<sup>10</sup> A study on children with pre-existing mental health conditions from five countries by Stevanovic et al. showed that parents reported deterioration in main psychiatric symptoms for nearly half of the children, while more than 40% of children stated worsened emotions and behaviors compared to the pre-pandemic period.<sup>11</sup> Other studies based on parents information about themselves and their children showed increased mental health problems during the first year of the COVID-19 pandemic.<sup>12–14</sup> Information provided by children and parents is usually in agreement that the pandemic has a negative impact on children's mental health, but it is important to evaluate possible differences in their perspectives. In our study we intended to assess the impact of the pandemic and related social limitations on mental health of 11–17-year-old children in the middle of the second year of the pandemic as it is perceived by children and their parents/guardians.

## 2. Methods

Ethical approval for the study was obtained from the Bioethics Centre of the Lithuanian University of Health Sciences on March 9, 2021 (reference no. BEC-MF-157). Schools administrations had provided signed permissions to conduct the study. All parents/guardians of children involved in the study and the children themselves provided informed consent at recruitment.

Children aged 11–17 were chosen for this study due to quarantine measures in Lithuania, as children attending primary school (aged 7–10) and final year students (aged 18–19) were the first to return to in-contact learning at school. Therefore, the impacts of the quarantine could be altered.

Two questionnaires were used to collect data in this cross-sectional study – one for children and one for parents/guardians. Questionnaires were anonymous and completed online on the Google Forms platform. Design of the platform did not allow submission of the questionnaires if any answers remained unanswered so as to avoid missing or incomplete data. Information and direct links to the questionnaires were distributed using Moodle systems of participating schools. Anonymity and confidentiality of respondents and non-involvement of researchers in data collection were attempted to decrease the impact of response bias. The survey remained open for responses from March 9, 2021 to April 30, 2021.

During the time of the survey, nationwide quarantine restrictions were continued in Lithuania (in effect since November 2020), while restrictions on movement between municipalities were lifted. Children studied only remotely, although from March non-formal education activities were allowed outdoors and since the middle of April cultural events (limiting the area and number of people attending) were allowed. Adults were encouraged to work remotely, and all services (including health care) were provided with restrictions (monitoring direct contact time and using pre-registration).

Questionnaires were based on the European College of Neuropsychopharmacology COVID survey for children and adolescents (ECNP CAMHS COVID survey). The Lithuanian versions of questionnaires were translated, culturally adapted and used in the international study on COVID-19 pandemic consequences on mental health of children with pre-existing mental conditions.<sup>10</sup> The children's questionnaire consisted of three parts: 1) emotional state, behavior, and its changes; 2) influence of changes in emotional state and behavior on interpersonal relationships; and 3) impact of quarantine restrictions on daily life and learning. Parents/guardians questionnaire consisted of five parts: 1) encounter (isolation, illness) of parents and their children with COVID-19; 2) emotional state and behavior of children and changes thereof; 3) influence of changes in children's emotional state and behavior on their interpersonal relationships; 4) respondents' home environment; and 5) emotional state of parents/guardians and their partners. Likert scale was provided for each question with five possible answers: "I did not feel like it at all," "a little," "moderately," "very much," "especially"; or: "significantly deteriorated," "slightly deteriorated," "did not change," "slightly improved," "significantly improved"; or: "never," "rarely," "sometimes," "often," "almost always." Detailed description of the characteristics of the questionnaires was provided by Stevanovic et al.<sup>10</sup>

For the purpose of this publication statistical data analysis involved all 3 parts of children's and 2–3 parts of parents/guardians questionnaires. Descriptive statistics included raw counts (n) and percentages (%) for categorical variables. Qualitative variables were categorized (gender, age, respondents' children vs. parents/guardians). Responses to the questions considering children's emotional/behavioral condition and changes were also categorized ("less than average," "average," "more than average"; or "positive," "neutral," "negative") and differences were calculated. Chi-square ( $\chi^2$ ) criterion was used to determine differences in the distribution of non-parametric variables between the compared groups; difference was considered significant when  $p < 0.05$ .

### 3. Results

In this study, we assessed the impact of the COVID-19 pandemic and related social restrictions on children's mental health by inquiring of respondents about their mental health during the study and about the changes in their mental health condition compared to its pre-pandemic status. More than half of the respondents reported that their emotional state and behavior had not changed significantly during the pandemic. However a significant number of

respondents answered that they had experienced increased emotional and/or behavioral problems.

389 pupils from 4 schools agreed to participate in the study and completed the children's questionnaire. 62.0% of respondents were females and 38.0% males, and their average age was  $14.71 \pm 1.89$  years. There were no significant gender and age differences between the study sample and the total sample of 1443 pupils of participating schools. 392 parents/guardians agreed to participate in the study and completed the parents/guardians questionnaire. The majority of respondents were women (72.7%) and the majority of respondents belonged to the age group of 40–49.

Table 1 displays gender and age differences in children's responses about emotions during quarantine. The majority (81.5%) of children felt some anxiety, while 18.3% reported feeling severely anxious. Children aged 15–17 felt lonely significantly more often than 11–14-year-old children (30.7% vs. 14.9%,  $p < 0.001$ ,  $\chi^2 = 14,705$ ). Girls significantly more frequently than boys felt anxiety (21.6% vs. 12.8%  $p < 0.001$ ,  $\chi^2 = 16,466$ ), stress and tension (15.8% vs. 8.8%,  $p = 0.030$ ,  $\chi^2 = 7019$ ), while boys felt less irritation and anger (36.5% vs. 19.5%,  $p = 0.001$ ,  $\chi^2 = 13,761$ ). The majority of children (81.0%) reported a feeling of tiredness and 23.9% of respondents complained of severe fatigue. In this regard, quarantine had a more significant impact on girls, as 27.4% of the girls and 18.2% of the boys felt profound tiredness ( $p = 0.003$ ,  $\chi^2 = 11,480$ ).

Table 2 displays gender and age differences in children's responses concerning quarantine impact on their behavior. Nearly two-thirds (63.5%) of children reported that sleeping time had increased and 18.3% stated that they slept less than average. 33.2% of children reported impaired ability to participate in usual daily activities. In this regard, quarantine had a more significant impact on boys, as 39.2% of boys and 29.5% of girls were not able to engage in daily activities ( $p = 0.034$ ,  $\chi^2 = 6,747$ ). 15–17-year-old children were significantly more likely to complain about impaired concentration of attention than 11–14-year-old children (56.4% vs. 28.4%,  $p < 0.001$ ,  $\chi^2 = 29,253$ ). The majority of children (75.1%) never used physical aggression during quarantine. Children aged 15–17 used physical aggression significantly less frequently than children aged 11–14 (82.2% vs. 63.5%,  $p < 0.001$ ,  $\chi^2 = 17,356$ ).

Children were asked if there were changes in emotions (anxiety, mood) compared to pre-pandemic period. More than half of the children (52.7%) reported negative changes, while 18.5% stated positive changes. Girls were significantly more frequently negatively affected than boys (56.8% vs. 45.9%,  $p = 0.016$ ,  $\chi^2 = 8,218$ ). When asked about changes in their behavior (impatience, attentiveness, aggressiveness), 14.4% of children reported positive and 41.9% negative changes. Children aged 15–17 reported being significantly more frequently affected negatively than children aged from 11 to 14 (46.9% vs. 33.8%,  $p = 0.036$ ,  $\chi^2 = 6,634$ ).

Answering about the impact of emotional and behavioral changes on their interpersonal relationships, 14.1% of children reported that relationships with parents had deteriorated and 21.3% those with friends. Children's relationships with siblings were also negatively affected by quarantine as stated by 13.7% of respondents. Children aged 11–14 were significantly more likely to respond in this

**Table 1** Results of children's perception of the emotional effects of COVID-19 pandemic with regard to gender (boys vs. girls) and age (11–14 y/o vs. 15–17 y/o).

|                      | Response          | Boys n (%)               | Girls n (%) | p, $\chi^2$               | 11–14 y/o n (%)          | 15–17 y/o n (%) | p, $\chi^2$               | Total n (%) |
|----------------------|-------------------|--------------------------|-------------|---------------------------|--------------------------|-----------------|---------------------------|-------------|
| Anxiety              | Less than average | 35 (23.6) <sup>***</sup> | 23 (9.5)    | <b>&lt; 0.001, 16.466</b> | 20 (13.5)                | 38 (15.8)       | 0.826, 0.383              | 58 (14.9)   |
|                      | Average           | 94 (63.5)                | 166 (68.9)  |                           | 101 (68.2)               | 159 (66.0)      |                           | 260 (66.8)  |
|                      | More than average | 19 (12.8) <sup>*</sup>   | 52 (21.6)   |                           | 27 (18.2)                | 44 (18.3)       |                           | 71 (18.3)   |
| Sadness              | Less than average | 47 (31.8)                | 66 (27.4)   | 0.419, 1.738              | 45 (30.4)                | 68 (28.2)       | 0.080, 5.059              | 113 (29.0)  |
|                      | Average           | 51 (34.5)                | 78 (32.4)   |                           | 57 (38.5)                | 72 (29.9)       |                           | 129 (33.2)  |
|                      | More than average | 50 (33.8)                | 97 (40.2)   |                           | 46 (31.3)                | 101 (41.9)      |                           | 147 (37.8)  |
| Worry                | Less than average | 77 (52.0) <sup>**</sup>  | 92 (38.2)   | <b>0.009, 9.391</b>       | 70 (47.3)                | 99 (41.1)       | 0.302, 2.393              | 169 (43.4)  |
|                      | Average           | 34 (23.0)                | 55 (22.8)   |                           | 35 (23.6)                | 54 (22.4)       |                           | 89 (22.9)   |
|                      | More than average | 37 (25.0) <sup>**</sup>  | 94 (39.0)   |                           | 43 (29.1)                | 88 (36.5)       |                           | 131 (33.7)  |
| Tension              | Less than average | 45 (30.4) <sup>*</sup>   | 50 (20.7)   | <b>0.030, 7.019</b>       | 32 (21.6)                | 63 (26.1)       | 0.565, 1.141              | 95 (24.4)   |
|                      | Average           | 90 (60.8)                | 153 (63.5)  |                           | 97 (65.6)                | 146 (60.6)      |                           | 243 (62.5)  |
|                      | More than average | 13 (8.8) <sup>*</sup>    | 38 (15.8)   |                           | 19 (12.8)                | 32 (13.3)       |                           | 51 (13.1)   |
| Fatigue              | Less than average | 40 (27.0) <sup>**</sup>  | 34 (14.1)   | <b>0.003, 11.480</b>      | 35 (23.6)                | 39 (16.2)       | 0.095, 4.710              | 74 (19.0)   |
|                      | Average           | 81 (54.7)                | 141 (58.5)  |                           | 75 (50.7)                | 147 (61.0)      |                           | 222 (57.1)  |
|                      | More than average | 27 (18.2) <sup>*</sup>   | 66 (27.4)   |                           | 38 (25.7)                | 55 (22.8)       |                           | 93 (23.9)   |
| Irritation and anger | Less than average | 54 (36.5) <sup>***</sup> | 47 (19.5)   | <b>0.001, 13.761</b>      | 37 (25.0)                | 64 (26.6)       | 0.653, 0.852              | 101 (26.0)  |
|                      | Average           | 68 (45.9) <sup>*</sup>   | 140 (58.1)  |                           | 77 (52.0)                | 131 (54.4)      |                           | 208 (53.5)  |
|                      | More than average | 26 (17.6)                | 54 (22.4)   |                           | 34 (23.0)                | 46 (19.1)       |                           | 80 (20.6)   |
| Loneliness           | Less than average | 41 (27.7)                | 50 (20.7)   | 0.196, 3.260              | 45 (30.4) <sup>*</sup>   | 46 (19.1)       | <b>&lt; 0.001, 14.705</b> | 91 (23.4)   |
|                      | Average           | 76 (51.4)                | 126 (52.3)  |                           | 81 (54.7)                | 121 (50.2)      |                           | 202 (51.9)  |
|                      | More than average | 31 (20.9)                | 65 (27.0)   |                           | 22 (14.9) <sup>***</sup> | 74 (30.7)       |                           | 96 (24.7)   |
| Total                |                   | 148 (38.0)               | 241 (62.0)  |                           | 148 (38.0)               | 241 (62.0)      |                           | 389 (100.0) |

\*p &lt; 0.05, \*\*p &lt; 0.01, \*\*\*p &lt; 0.001.

**Table 2** Results of children's perception of the behavioral effects of the COVID-19 pandemic with regard to gender (boys vs. girls) and age (11–14 y/o vs. 15–17 y/o).

| Response                   | Boys n (%)        | Girls n (%) | p, $\chi^2$         | 11–14 y/o n (%) | 15–17 y/o n (%) | p, $\chi^2$    | Total n (%) |
|----------------------------|-------------------|-------------|---------------------|-----------------|-----------------|----------------|-------------|
| Daily activities           | More than average | 36 (24.3)*  | <b>0.034, 6.747</b> | 37 (25.0)       | 86 (35.7)       | 0.080, 5.055   | 123 (31.6)  |
|                            | Average           | 54 (36.5)   |                     | 59 (39.9)       | 78 (32.4)       |                | 137 (35.2)  |
| Sleep quality              | Less than average | 58 (39.2)*  | 0.242, 2.836        | 52 (35.1)       | 77 (32.0)       | 0.103, 4.536   | 129 (33.2)  |
|                            | More than average | 91 (61.5)   |                     | 85 (57.4)       | 162 (67.2)      |                | 247 (63.5)  |
| Concentration of attention | Average           | 33 (22.3)   | 0.713, 0.676        | 29 (19.6)       | 42 (17.4)       | <0.001, 29.253 | 71 (18.3)   |
|                            | Less than average | 24 (16.2)   |                     | 34 (23.0)       | 37 (15.4)       |                | 71 (18.3)   |
| Physical aggression        | More than average | 55 (37.2)   | 0.958, 0.086        | 74 (50.0)***    | 76 (31.5)       | <0.001, 17.356 | 150 (38.6)  |
|                            | Average           | 26 (17.6)   |                     | 32 (21.6)*      | 29 (12.0)       |                | 61 (15.7)   |
| Total                      | Less than average | 67 (45.3)   | 0.958, 0.086        | 42 (28.4)***    | 136 (56.4)      | <0.001, 17.356 | 178 (45.8)  |
|                            | More than average | 112 (75.7)  |                     | 94 (63.5)***    | 198 (82.2)      |                | 292 (75.1)  |
| Total                      | Average           | 34 (23.0)   | 0.958, 0.086        | 50 (33.8)***    | 41 (17.0)       | <0.001, 17.356 | 91 (23.4)   |
|                            | More than average | 2 (1.4)     |                     | 4 (2.7)         | 2 (0.8)         |                | 6 (1.5)     |
| Total                      | 148 (38.0)        | 241 (62.0)  |                     | 148 (38.0)      | 241 (62.0)      |                | 389 (100.0) |

\*p &lt; 0.05, \*\*p &lt; 0.01, \*\*\*p &lt; 0.001.

manner than children aged 15–17 (19.6% vs. 9.8%,  $p = 0.034$ ,  $\chi^2 = 6.735$ ).

Nearly two-thirds (60.9%) of the children reported that they felt worried about being infected by COVID-19. Boys were significantly less worried than girls (51.4% vs. 66.8%,  $p = 0.005$ ,  $\chi^2 = 10.595$ ). 80.7% of children reported being worried about family and friends being infected, and girls were significantly more frequently worried than boys (84.2% vs. 75.0%,  $p = 0.003$ ,  $\chi^2 = 7.018$ ).

In our study we compared parents' and children's responses about children's mental health and changes in emotions, behavior and interpersonal relationships during the second year of the COVID-19 pandemic and related social restrictions.

Children significantly more frequently reported severe loneliness (24.7% vs. 8.9%,  $p < 0.001$ ,  $\chi^2 = 36.733$ ), sadness (37.8% vs. 28.6%,  $p = 0.023$ ,  $\chi^2 = 7.578$ ), fatigue (23.9% vs. 13.3%,  $p < 0.001$ ,  $\chi^2 = 15.467$ ), impaired concentration (45.8% vs. 19.9%,  $p < 0.001$ ,  $\chi^2 = 66.660$ ) and increased sleeping time (63.5% vs. 39.5%,  $p < 0.001$ ,  $\chi^2 = 63.288$ ) than parents (Table 3). Parents significantly more frequently reported children's inability to participate in daily activities (42.1% vs. 33.2%,  $p < 0.001$ ,  $\chi^2 = 13.857$ ) than children.

Parents significantly more frequently reported improved relations between children and their parents (34.7% vs. 26.6%,  $p = 0.031$ ,  $\chi^2 = 6.929$ ) and impaired children and siblings relationships (26.9% vs. 13.7%,  $p < 0.001$ ,  $\chi^2 = 17.978$ ) (Table 4). Nearly one-third (29.6%) of the children and 17.3% of parents reported improved relationships between children and their friends ( $p < 0.001$ ,  $\chi^2 = 16.263$ ).

Table 5 displays perception of the severity for parents and children of children's anxiety about COVID-19 infection. Parents more often reported severe children's anxiety about getting infected than did children themselves (12.5% vs. 8.7%  $p < 0.001$ ,  $\chi^2 = 31.821$ ). Children, however, significantly more often reported being severely worried about their family members or friends being infected (24.4% vs. 12.5%,  $p < 0.001$ ,  $\chi^2 = 19.813$ ).

#### 4. Discussion

Multiple studies around the world had shown the negative impact of the COVID-19 pandemic in its initial phase on mental health of children, including increased symptoms of depression, anxiety, loneliness, as well as emotional and behavioral difficulties.<sup>12,15–17</sup> Our study aimed to assess further development of this impact as the pandemic was continuing into its second year. We considered that improvement or further deterioration of adaptation to pandemic changes was possible with the passage of time. Our results show that a significant number of children continued to experience increased emotional and/or behavioral problems at similar rates as in reports from the first year of the pandemic. High frequency of severe fatigue and decreased mood was congruous with the first-year reports on the increase in depressive symptoms.<sup>18,19–22</sup>

Different quarantine policies and school attendance restrictions were introduced in European countries and comparison of changes in mental health of children among those countries could shed light on the consequences of these policies. Lithuania introduced relatively heavy

**Table 3** Comparison of parents' and children's perception of the emotional and behavioral effects of COVID-19 pandemic on children's mental health.

|                            | Response          | Parents n (%) | Children n (%) | p, $\chi^2$               | Total n (%) |
|----------------------------|-------------------|---------------|----------------|---------------------------|-------------|
| Anxiety                    | Less than average | 74 (18.9)     | 58 (14.9)      | 0.137, 3.977              | 132 (16.9)  |
|                            | Average           | 263 (67.1)    | 260 (66.8)     |                           | 523 (67.0)  |
|                            | More than average | 55 (14.0)     | 71 (18.3)      |                           | 126 (16.1)  |
| Sadness                    | Less than average | 127 (32.4)    | 113 (29.0)     | <b>0.023, 7.578</b>       | 240 (30.7)  |
|                            | Average           | 153 (39.0)    | 129 (33.2)     |                           | 282 (36.1)  |
|                            | More than average | 112 (28.6)**  | 147 (37.8)     |                           | 259 (33.2)  |
| Daily activities           | More than average | 80 (20.4)***  | 123 (31.6)     | <b>&lt; 0.001, 13.857</b> | 203 (26.0)  |
|                            | Average           | 147 (37.5)    | 137 (35.2)     |                           | 284 (36.4)  |
|                            | Less than average | 165 (42.1)*** | 129 (33.2)     |                           | 294 (37.6)  |
| Worry                      | Less than average | 164 (41.8)    | 169 (43.4)     | <b>0.007, 10.041</b>      | 333 (42.6)  |
|                            | Average           | 126 (32.1)*** | 89 (22.9)      |                           | 215 (27.5)  |
|                            | More than average | 102 (26.0)*   | 131 (33.7)     |                           | 233 (29.8)  |
| Sleep quality              | More than average | 155 (39.5)*** | 247 (63.5)     | <b>&lt; 0.001, 63.288</b> | 402 (51.5)  |
|                            | Average           | 172 (43.9)*** | 71 (18.3)      |                           | 243 (31.1)  |
|                            | Less than average | 65 (16.6)     | 71 (18.3)      |                           | 136 (17.4)  |
| Tension/stress             | Less than average | 121 (30.9)    | 95 (24.4)      | 0.063, 5.515              | 216 (27.7)  |
|                            | Average           | 234 (59.7)    | 243 (62.5)     |                           | 477 (61.1)  |
|                            | More than average | 37 (9.4)      | 51 (13.1)      |                           | 88 (11.3)   |
| Fatigue                    | Less than average | 96 (24.5)     | 74 (19.0)      | <b>&lt; 0.001, 15.467</b> | 170 (21.8)  |
|                            | Average           | 244 (62.2)    | 222 (57.1)     |                           | 466 (59.7)  |
|                            | More than average | 52 (13.3)***  | 93 (23.9)      |                           | 145 (18.6)  |
| Concentration of attention | More than average | 186 (47.4)*   | 150 (38.6)     | <b>&lt; 0.001, 66.660</b> | 336 (43.0)  |
|                            | Average           | 128 (32.7)*** | 61 (15.7)      |                           | 189 (24.2)  |
|                            | Less than average | 78 (19.9)***  | 178 (45.8)     |                           | 256 (32.8)  |
| Irritation and anger       | Less than average | 87 (22.2)     | 101 (26.0)     | 0.104, 4.523              | 188 (24.1)  |
|                            | Average           | 239 (61.0)    | 208 (53.5)     |                           | 447 (57.2)  |
|                            | More than average | 66 (16.8)     | 80 (20.6)      |                           | 146 (18.7)  |
| Physical aggression        | Less than average | 269 (68.6)    | 292 (75.1)     | 0.102, 4.575              | 561 (71.8)  |
|                            | Average           | 112 (28.6)    | 91 (23.4)      |                           | 203 (26.0)  |
|                            | More than average | 11 (2.8)      | 6 (1.5)        |                           | 17 (2.2)    |
| Loneliness                 | Less than average | 130 (33.2)**  | 91 (23.4)      | <b>&lt; 0.001, 36.733</b> | 221 (28.3)  |
|                            | Average           | 227 (57.9)    | 202 (51.9)     |                           | 429 (54.9)  |
|                            | More than average | 35 (8.9)***   | 96 (24.7)      |                           | 131 (16.8)  |
| Total                      |                   | 392 (50.2)    | 389 (49.8)     |                           | 781 (100.0) |

\*p &lt; 0.05, \*\*p &lt; 0.01, \*\*\*p &lt; 0.001.

restrictions on school attendance while Estonia, Finland, Iceland and Sweden never closed preschools, and Iceland and Sweden never closed primary schools. Several studies on COVID-19 and children's mental health have been conducted in Scandinavian countries.<sup>23–26</sup> Follow-up studies on children's mental health in Sweden and Iceland reported increased stress, depressive symptoms and worsened overall mental wellbeing in all age groups compared to pre-pandemic levels.<sup>23,34</sup> The study from Iceland found significantly worse mental health outcomes in adolescent girls compared with boys, just as we reported in our study.<sup>24</sup> A study from Estonia identified that children's social needs, engagement in hobbies and emotional well-being were negatively affected by quarantine,<sup>25</sup> which correlates with the results of our study. On the contrary, research of parents from Finland mentioned very few children's emotional, conduct or peer relationship problems.<sup>26</sup> Although Scandinavian countries had less restrictive policies on school attendance, studies from Sweden, Iceland and Estonia reported an increase in children's mental

health problems as in Lithuania and other countries with more restrictive policies.

An international study by Stevanovic et al. used the same questionnaires and collected data in countries with similar socio-economic and health care conditions (including Lithuania).<sup>11</sup> Results of this study from the first year of pandemic are comparable with our second year data regarding worsening of emotions (43.9% and 52.7%, respectively) and behavior (40.6% and 41.9%, respectively). Similar results were found in different samples – children with pre-existing psychiatric conditions in the first study versus children from general population in our study. We can presume that long-lasting pandemic and related restrictions have comparable negative impact on mental health of children regardless of their mental condition before it.

Parents/guardians are a crucially important source of information and help considering children's mental health. Their resilience was found to influence impact of pandemic-related stress on children's emotional condition.<sup>27</sup> In our study, most parents reported noticing changes in emotions,

**Table 4** Results of comparison between parents' and children's perception of changes in children's relations during quarantine.

|           | Change   | Parents n (%) | Children n (%) | p, $\chi^2$               | Total n (%) |
|-----------|----------|---------------|----------------|---------------------------|-------------|
| Parents   | Positive | 136 (34.7)*   | 102 (26.2)     | <b>0.031, 6.929</b>       | 238 (30.5)  |
|           | Neutral  | 202 (51.5) *  | 232 (59.6)     |                           | 434 (55.6)  |
|           | Negative | 54 (13.8)     | 55 (14.1)      |                           | 109 (14.0)  |
| Siblings* | Positive | 81 (25.1)     | 100 (29.2)     | <b>&lt; 0.001, 17.978</b> | 181 (27.2)  |
|           | Neutral  | 155 (48.0)*   | 195 (57.0)     |                           | 350 (52.6)  |
|           | Negative | 87 (26.9)***  | 47 (13.7)      |                           | 134 (20.2)  |
| Friends   | Positive | 68 (17.3)***  | 115 (29.6)     | <b>&lt; 0.001, 16.263</b> | 183 (23.4)  |
|           | Neutral  | 224 (57.1)    | 191 (49.1)     |                           | 415 (53.1)  |
|           | Negative | 100 (25.5)    | 83 (21.3)      |                           | 183 (23.4)  |
| Total     |          | 392 (50.2)    | 389 (49.8)     |                           | 781 (100.0) |

\*p &lt; 0.05, \*\*p &lt; 0.01, \*\*\*p &lt; 0.001.

**Table 5** Results of comparison between parents' and children's perception of the severity of children's anxiety about COVID-19 infection.

|  | Response          | Parents n (%)  | Children n (%) | p, $\chi^2$               | Total n (%) |
|--|-------------------|----------------|----------------|---------------------------|-------------|
| Anxiety about getting infection with COVID-19                              | Less than average | 81 (20.7) ***  | 152 (39.1)     | <b>&lt; 0.001, 31.821</b> | 233 (29.8)  |
|  | Average           | 262 (66.8) *** | 203 (52.2)     |                           | 465 (59.5)  |
|  | More than average | 49 (12.5)      | 34 (8.7)       |                           | 83 (10.6)   |
| Anxiety about family and friends becoming infected with COVID-19 infection | Less than average | 74 (18.9)      | 75 (19.3)      | <b>&lt; 0.001, 19.813</b> | 149 (19.1)  |
|  | Average           | 269 (68.6)     | 219 (56.3)     |                           | 488 (62.5)  |
|  | More than average | 49 (12.5) ***  | 95 (24.4)      |                           | 144 (18.4)  |
| Total  |                   | 392 (50.2) *** | 389 (49.8)     |                           | 781 (100.0) |

\*p &lt; 0.05, \*\*p &lt; 0.01, \*\*\*p &lt; 0.001.

behavior and everyday functioning of their children. Most frequently they reported noticing children's severe difficulty concentrating (47.4%), feeling worried (41.8%), lonely (33.2%), feeling fatigued and restless (24.5%), and irritated (22.2%). Our results are comparable with the study by Orgilés et al., which found in the first year of the pandemic that 86% of parents noticed changes in their children's emotional state and behavior with similar rates of difficulties concentrating (77%), irritability (39%), restlessness (39%), feelings of loneliness (31%) and worry (30%).<sup>28</sup>

We found significant differences in the responses of children and parents/guardians, especially with regard to children's emotions and quality of relationships. Parents overestimated children's worries about COVID-19 infection – 66.8% reported children being "concerned" and 12.5% "having severe uneasiness" while only 8.7% of children reported "feeling higher than average stress about COVID-19 infection." These results are comparable to the findings of Carroll et al. and Janssen et al. in the first year of pandemic.<sup>29,30</sup> Parents in our study were more positive about the changes in their relationships with children than were children themselves (34.7% vs. 26.6% reporting positive changes, 13.8% vs. 14.1% reporting negative changes). Similarly positive parents' reports about improved relationships with children were found by Cusinato et al. during the first year of pandemic-related quarantine.<sup>31</sup>

More worrisome, we found parents' underestimation of such emotional difficulties of their children as severe loneliness (8.9% reported by parents vs. 24.7% reported by

children), sadness (28.6% vs. 37.8%), fatigue (13.3% vs. 23.9%) and increased sleeping time (39.5% vs. 63.5%), and impaired concentration (19.9% vs. 45.8%). Parents' inability to recognize serious signs of mental health problems in their children increases the risk that these problems can develop unnoticed into psychiatric disorders and continue untreated, causing severe psycho-social dysfunction. During quarantine restrictions and distance learning this risk is increased for children by limited access to other sources of psychological help like school community and mental health care services.

We consider that the advantage of current study is the follow-up of an impact on mental health of children in the second year of COVID-19 pandemic and related restrictions as it is seen from the perspective of children and their parents. One country- and age-specific group of included children limits generalization of our results. Using an internationally developed questionnaire, we hoped for the possibility of comparing our results with data from other countries. Taking into account the complexity of the problem and multiplicity of factors, we realize that further studies are needed to assess the influence of such important factors as vaccination or mental and physical fatigue on the consequences of COVID-19 pandemic on children.

## 5. Conclusions

The COVID-19 pandemic in the second year continues to have an extensive negative impact on children's mental

health by disturbing their daily activities, emotions and sleep rhythms. Significant discrepancies were found between children's and parents' perceptions of pandemic consequences on children's mental health, as parents underestimated increased feelings of severe loneliness, sadness, fatigue, concentration difficulties. Such underestimation can be an obstacle to get psychological support and mental health care services for children in need of it.

## Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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