Comparing the impact of the first and second wave of COVID-19 lockdown on Slovak families with typically developing children and children with autism spectrum disorder

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Abstract
The aim of this research was to compare the mental health of families with children diagnosed with autism spectrum disorder or typically developing children, during the first and the second wave of COVID-19 outbreak in Slovakia. The study is mainly focused on the prevalence of depression, anxiety, and stress among the parents and maladaptive behavior or sleep disturbances of their children. Our research sample consisted of 332 caregivers, 155 of which have children with autism spectrum disorder; 179 surveyed during the first wave and 153 during the second wave. Extensive online parent questionnaire was created, including demographic and specific topic–related questions; Depression, Anxiety, and Stress Scale–42 questionnaire; and two subscales of Vineland Adaptive Behavior Scales—internalizing and externalizing maladaptive behavior. During the first wave, high levels of anxiety were found in parents of autism spectrum disorder children. During the second wave, all parents experienced increased levels of anxiety, stress, and depression, but especially severe for parents of children with autism spectrum disorder. Internalizing maladaptive behavior of children with autism spectrum disorder grew significantly between the waves. Parental depression, anxiety, and stress positively correlated with maladaptive behavior of both autism spectrum disorder and neurotypical children, suggesting a need for therapy options for whole families.

Lay abstract
A global pandemic caused by a new coronavirus (severe acute respiratory syndrome coronavirus 2) affected everyday lives of all people, including individuals with special needs, such as autism spectrum disorder. The aim of this research was to compare the mental health of families with children with autism spectrum disorder to families with typically developing children, and between the first and the second wave of COVID-19 outbreak in Slovakia. This mainly included symptoms of depression, anxiety, and stress of parents and problem behavior or sleeping difficulties of their children. The research sample consisted of 332 parents (155 of which have children with autism spectrum disorder), 179 surveyed during the first wave and 153 during the second wave. Online parent questionnaire was created, including demographic and specific topic questions, Depression Anxiety and Stress Scale–42 questionnaire, and internalizing and externalizing maladaptive behavior subscales from Vineland Adaptive Behavior Scales. Our results show that during the first wave, parents of autism spectrum disorder children suffered high levels of anxiety. During the second wave, both groups of parents suffered increased anxiety, stress, and depression, but especially severe for parents of children with autism spectrum disorder. Internalizing maladaptive behavior of autistic children grew significantly between the waves. Parental depression, anxiety, and stress positively correlated with maladaptive behavior of both autism spectrum disorder and typically developing children, suggesting the importance of the therapy options for whole families.

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Introduction

The outbreak of a new coronavirus (severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)) and the global pandemic it caused (World Health Organization, 2020) came as a sudden shock for the whole world and neither ordinary people nor professionals were prepared to react with enough flexibility. We are yet to see the full consequences of the pandemic and related lockdowns on mental health of individuals (Pellicano & Stears, 2020). This is especially true in the long run, as at the moment, there is not enough scientific evidence describing possible changes in severity of people’s struggles or their coping skills throughout past months since the coronavirus pandemic started.

Previous research provided first evidence of the negative effects of a prolonged lockdown on lives of children, such as difficulty concentrating, boredom, irritability, restlessness, nervousness, and loneliness. Screen time of children prolonged at the expense of spending time with their friends, and they slept more hours (Francisco et al., 2020; Orgilés et al., 2020). Some children reported having mixed feelings about lockdown and also being happy and relaxed, spending good time with their families (Mondragon et al., 2020).

Stress (Adams et al., 2020) and negative affect (Janssen et al., 2020) of parents also increased during lockdown. Parents experienced significant parenting-related exhaustion and mothers, as well as parents with fewer social connections, those with several children, or with younger children were more severely affected (Marchetti et al., 2020). This is important to note, as impact of quarantine on behavioral and emotional problems of children seems to also be mediated by individual and dyadic stress of parents. It increases among children of caregivers with moderate and severe mental distress compared with those with no mental distress (Horiuchi et al., 2020; Spinelli et al., 2020).

In times of natural disasters or pandemics, vulnerable populations, such as patients with previous mental health conditions, are known to be significantly more affected (Esterwood & Saeed, 2020). Autism spectrum disorder (ASD) is a pervasive neurodevelopmental disorder characterized by deficits in communication, reciprocal social interaction as well as restricted and repetitive behaviors or interests (World Health Organization, 2016). There are other ASD typical symptoms which could affect the passage through this pandemic in a unique way. Sensory issues could result in repulsion toward the alcohol smell and texture of disinfection or obligatory mask-wearing and sudden lockdown could disrupt their rituals and daily routines. Children with ASD of which previous routines were disrupted during lockdown had higher levels of anxiety than children that maintained their routines (Amorim et al., 2020). In addition, an intellectual disability and difficulty understanding, often accompanying ASD, could result in lacking comprehension and adherence to necessary safety measures (Mutluer et al., 2020). On the other hand, ASD is often also characterized by disinterest in other people or inability to cultivate meaningful relationships with peers (Cotugno, 2009), which could actually result in less stress and anxiety from lowered socializing expectations during lockdown.

Caring for children with ASD is generally demanding, due to the disorder symptoms, stigma connected to autism and also common comorbidities such as gastrointestinal and sleep problems, attention deficit hyperactive disorder, anxiety, and depression, which can affect mental health and strain of their caregivers. A meta-analysis by Hayes and Watson (2013) reports that families of children with ASD experience more parenting stress than families of typically developing children or even those diagnosed with other disabilities like Down syndrome, cerebral palsy, or intellectual disability.

During COVID-19 pandemic, the prevalence of depression, anxiety, and stress symptoms of caregivers with special needs children increased (Dhiman et al., 2020), as well as their difficulties managing daily activities, free time, and structured activities (Colizzi et al., 2020). Higher levels of stress were reported in caregivers of younger individuals with ASD and those with greater severity of ASD symptoms. Stress around therapeutic service disruption, finances, and illness predominated and greater stress was reported for caregivers of individuals receiving more services and support pre-COVID-19 pandemic (Manning et al., 2020).

Behavior problems worsened in more than one third of ASD children, and those with behavior problems predating the COVID-19 outbreak were twice as likely to experience them more frequently or with higher severity (Colizzi et al., 2020). Parents reported that their child got more aggressive, had appetite changes, tics increased or new tics emerged, communication skills, and sleep deteriorated. Parents also pointed out an increase in autistic typical symptoms like mannerisms, motor or vocal stereotypes, and also restlessness, agitation, fears induced by new situations, greater irritability and mood dysregulation of their ASD children (Mutluer et al., 2020). On the contrary, no changes were found in personal self-care autonomies, in taste/smell sensitivity, and in auto or other-directed aggression. When comparing families with ASD children to the neurotypical, the behavior of children with ASD...
predominantly changed for the worse, while children from the control group mostly showed no changes. The majority of parents of ASD children reported that lockdown had a negative impact on their own emotion management against those in the control group reporting mostly positive or no impact. ASD children and their parents had significantly higher levels of anxiety than healthy ones (Amorim et al., 2020). Contrastingly, a prospective study (Guidotti et al., 2020) which included families receiving psychological help and support during the pandemic, revealed that autistic children with or without intellectual disability showed no significant changes between clinical scores collected at the beginning and at the end of home-confinement. These conclusions open a debate about accessibility of therapy.

Previous publications report that children with ASD have higher prevalence of sleep disorders than typically developing children or those with other neurodevelopmental disorders (Singh & Zimmerman, 2015). Children with ASD exhibited significantly greater sleep problems and change to eveningness chronotype during the home-confinement period than during the normal state (Türköğlu et al., 2020). During lockdown, parents of the ASD children noticed their children had more sleep disturbances and sleep regulation problems, such as difficulty falling asleep, nocturnal awakenings, and difficulty waking up (Amorim et al., 2020; Di Renzo et al., 2020; Mutluer et al., 2020). Each of the mentioned research studies focused on a different aspect of mental health struggles of individuals with ASD and their families, and it is therefore necessary to test these hypotheses on one research sample, to get a more complex view.

Our research aimed to explore how the first and second wave of COVID-19 outbreak affected the mental health of families in Slovakia, with the focus on comparison of families with autistic children to a general sample. We focused on the prevalence of depression, anxiety, and stress symptoms among the parents and maladaptive behavior or sleep disturbances of their children as well as their correlations.

### Methods

#### Design of the study

Google Forms was used to create an online parent survey which was later shared on the Internet and also sent to the parents whose children were recently diagnosed in the Academic Research Center for Autism at the Institute of Physiology of The Faculty of Medicine, Comenius University in Bratislava. The questionnaire contained several sections, including demographic questions (as seen in Table 1), whether they or someone they know were infected by SARS-CoV-2, changes in work/financial situation of parents, and the most prominent stressors they experienced during pandemic. To measure symptoms of depression, anxiety, stress and overall psychological distress of caregivers, Depression Anxiety and Stress Scale (DASS-42; Lovibond & Lovibond, 1995) questionnaire was included. DASS-42 is a self-report questionnaire consisting of 42 statements which participants rate on a scale of 0–3 points from “Did not apply to me at all” (0) to “Applied to me very much, or most of the time” (3). Higher scores represent higher symptoms severity. Depression, Anxiety, and Stress scales are each calculated by the sum

### Table 1. Demographic characteristics of our sample considering parents and their children, recruited during the first and second COVID-19 pandemic wave.

| Sample | The first wave | The second wave |
|--------|---------------|----------------|
| **Children** Group | ASD | Control | ASD | Control |
| n | 84 | 95 | 71 | 82 |
| gender | Boys | Girls | Boys | Girls | Boys | Girls |
| n | 69 | 15 | 53 | 42 | 53 | 18 | 44 | 38 |
| Percent | 39% | 8% | 30% | 23% | 35% | 12% | 29% | 25% |
| Mean age (SD) | 7.73 (3.51) | 7.7 (2.45) | 8.37 (4.3) | 9.3 (4.1) | 8.62 (3.87) | 10.83 (5.09) | 9.48 (4.83) | 8.95 (4.94) |
| **Parents** | | | | |
| Age | 39.01 (6.77) | 40.96 (5.91) | 39.75 (6.94) | 38.23 (7.65) |
| Education | | | | |
| Basic | 0 | 0 | 1 | 1 |
| Apprenticeship | 2 | 0 | 3 | 5 |
| General or specialized secondary education | 36 | 14 | 23 | 29 |
| Higher 1. level | 4 | 6 | 3 | 4 |
| Higher 2. level | 34 | 59 | 38 | 37 |
| Higher 3. level | 8 | 16 | 3 | 6 |

ASD: autism spectrum disorder.
of 14 corresponding items and their sums combined are considered the overall psychological distress. In the section about their children, we asked about sleep problems, how the schooling situation changed and a set of questions specific for the autistic children. Two subscales of Vineland-3 questionnaire were selected (Sparrow et al., 2016), describing the internalizing (such as anxiety, fear, sadness, apathy, and social withdrawal) and externalizing maladaptive behavior (troubles with attention, self-regulation, aggression, or disrespect to rules) of children. Vineland Adaptive Behavior Scales–Third Edition is a questionnaire used for evaluating the adaptive functioning of a child and its three broad domains: communication, daily living skills, and socialization. The internalizing and externalizing maladaptive behavior subscales consist of 13 and 11 items, respectively, rated on a scale of 0–2 meaning the behavior “Does not occur at all” (0), “Sometimes” (1) or “Often” (2). The final score of each scale is the sum of all items.

The study design was in accordance with the Ethics Committee of the Faculty of Medicine, Comenius University in Bratislava. Participation in the research was voluntary, unpaid, and participants were included into the research study after agreeing with the informed consent form at the beginning of our questionnaire.

Participants

Our research sample consisted of 332 parents and caregivers, 155 of which have children with ASD. A total of 179 participants were surveyed during the first wave (84 having children with ASD) and 153 participants during the second wave (71 having children with ASD). Data were collected from June to July of 2020, asking participants to retrospectively evaluate the time period between March and June 2020 which is considered a first wave of coronavirus outbreak in Slovakia and then from November to December 2020, reporting the time from October to December (representing the second wave).

Statistical analysis

The statistical analysis was realized in the SPSS statistical program version 25 (IBM Corp. released 2017, Armonk, NY, USA). Chi-square with Yates continuity correction was used to compute the change in representation of parental stressors during lockdown and therapy availability for ASD children. T-test was used to determinate differences in sleep quality of children. We used analysis of covariance to calculate potential differences between the pandemic waves and ASD or control group in parental depression, anxiety, stress, and maladaptive behavior of children. Finally, correlation analysis shown relationships between depression, anxiety, stress of parents and maladaptive behavior, and sleep quality of children.

Community involvement: there is no community involved in this study.

Results

Due to the escalating pandemic situation in Slovakia, during the second wave, we also asked participants if someone from their family and friends were diagnosed with SARS-CoV-2. Overall, 31.10% of our respondents knew someone infected. However, this did not significantly affect other examined variables. For 69.4% of participants, the work situation did not change much during the first wave, 20.4% of participants were forced to work with changed conditions (e.g. salary reduction), and 10.2% lost their jobs and were unable to find a new job during lockdown. During the second wave, for 75.0% of participants working conditions remained unchanged when compared to the first wave, 14.8% participants worked with some kind of restrictions, and 10.2% lost their jobs and were unable to find a new one.

Parental stressors

We also asked parents about the most prominent stressors they experienced during pandemic, with a list inspired by Brooks et al. (2020). During the first wave, more demanding child care was the most prevalent stressor for parents in the control group (52.44%) as well as for parents with ASD children (78.87%). The prevalence decreased during the second wave, to 57.75% for parents with children with ASD (χ²=28.643, p < 0.001) and to 37.80% (χ²=19.366, p < 0.001) parents of children in the control group.

Fears of the infection decreased in time for parents in the control group, from 45.12% to 29.27% (χ²=4.826, p = 0.028) with no difference for parents of ASD children (χ²=2.157, p = 0.142). Frustration and boredom levels remained unchanged between waves neither for parents of ASD children (χ²=2.157, p = 0.142) nor for parents in the control group (χ²=2.696, p = 0.101). Unavailability of goods and services was stable for parents of ASD children (19.72%), but decreased for parents in the control group from 19.51% to 7.32% (χ²=6.166, p = 0.013).

During the first wave, insufficient or unclear information were a stressor for 42.25% of parents of ASD children and 54.88% of parents in the control group, but this number grew to 61.97%, for parents of ASD children (χ²=8.241, p = 0.004), and 74.39% for parents in the control group respectively during the second wave (χ²=12.540, p < 0.001). Complete information is included in Table 2.

Therapy availability

We also focused on monitoring changes in therapy accessibility for children with ASD, including mainly applied behavior analysis (ABA) therapy, logopedic therapy, early
intervention, art therapy, music therapy, or relaxation training. We asked whether the child received some form of interventions before the outbreak, during the first wave and the second wave as seen in Table 3.

During the first (χ² = 46.085, p < 0.001) and second wave (χ² = 38.911, p < 0.001), we recorded an overall decrease in therapy attendance, compared to the situation pre-COVID-19. During the second wave, the availability has improved partially, but when compared to the period before the introduction of safety measures, the difference was still significant (χ² = 12.426, p < 0.001). We also monitored the proportion of online interventions. While before the lockdown, the ratio of online interventions was 7.36%, during the first wave, the number increased to 26.90%, mainly as a substitute for physical encounters. During the second wave, the number of online meetings decreased to 10.27%. Even pre-COVID-19, only 31 autistic children (18.7%) attended ABA therapy, which is the most-researched and evidence-based intervention for ASD. On the contrary, logopedic therapy was the most frequently reported by parents, with 75 autistic children (45.2%) attending.

Sleep quality

During the first wave, we noted later bedtime in all children, but the change was more recognizable in ASD children (t(177) = 2.124, p = 0.035, d = 0.031). Waking up late was also reported, but with no difference between ASD children and controls (t(177) = 0.614, p = 0.540, d = 0.088). During the second wave, we observed partial stabilization in sleep routines back to the pre-COVID-19 state.

Changes in parental mental health and maladaptive behavior of children between the first and second wave

We conducted two-way repeated measures ANCOVA with the main factors: diagnosis (ASD, Control) and data collection phase (first wave/second wave), as stated in the Table 4 and illustrated in Figure 1. We detected significant interaction effect for overall distress (F(1, 328) = 8.171, p = 0.005, η² = 0.024) and two subscales, depression (F(1, 328) = 8.722, p = 0.003, η² = 0.026) and stress (F(1, 328) = 9.722, p = 0.003, η² = 0.027). There was no significant evidence of interaction effect in subscale anxiety. For total score and subscale scores, the main effects were statistically significant. More detailed analyses of the main effects using independent samples t-test showed that during the first wave there was statistically significant difference between the parents of ASD children and control group only for the anxiety subscale (t(177) = 2.610, p = 0.010, d = 0.38). In the second wave, all of the scores increased compared to the first wave, and increased even more for parents with ASD children.

### Table 2. Parental stressors during the first and second wave.

|                      | The first wave |          | The second wave |          |
|----------------------|---------------|----------|-----------------|----------|
|                      | ASD (CI 95%)  | Control (CI 95%) | ASD (CI 95%) | Control (CI 95%) |
| Lockdown duration    | 47.89: 35.8–60.08 | 42.68: 31.8–54.1 | 43.66: 31.91–55.95 | 50.00: 38.75–61.25 |
| Fears of the infection | 47.89: 35.8–60.08 | 45.12: 34.1–56.51 | 42.25: 30.61–54.56 | 30.99: 20.54–43.08 |
| Frustration and boredom | 42.50: 30.61–54.56 | 40.24: 29.56–51.66 | 36.62: 25.5–48.9 | 29.27: 19.74–40.35 |
| Unavailability of goods and services | 19.72: 11.22–30.86 | 19.51: 11.58–29.74 | 17.2: 11.22–30.86 | 19.72: 11.22–30.86 |
| Insufficient or unclear information | 42.50: 30.61–54.56 | 54.88: 43.49–65.9 | 61.97: 49.67–73.24 | 74.39: 63.55–83.4 |
| Work insecurity/finances | 35.21: 24.24–47.46 | 34.15: 24.03–45.45 | 24.62: 25.5–48.9 | 29.27: 19.74–40.35 |
| More demanding child care | 78.87: 67.56–87.56 | 52.44: 41.11–63.59 | 57.75: 45.44–69.39 | 37.80: 27.32–49.19 |

ASD: autism spectrum disorder; CI: confidence interval.

### Table 3. Interventions for children with ASD during lockdown.

| Data collection | COVID-19 outbreak | n | % (CI95%) | χ² | p |
|-----------------|------------------|---|----------|----|---|
| First           | Before            | 63 | 75.0     | 64.4–83.8 | 46.085 | <.001 |
|                 | The first wave    | 22 | 26.2     | 17.2–36.9 | 46.085 | <.001 |
| Second          | Before            | 54 | 76.1     | 45.5–85.4 | 38.911 | <.001 |
|                 | The first wave    | 22 | 31.0     | 20.5–43.1 | 38.911 | <.001 |
|                 | The second wave   | 36 | 50.7     | 38.6–62.8 | 12.426 | <.001 |

ASD: autism spectrum disorder; CI: confidence interval; χ²: Pearson’s chi-square tests (with Yates continuity correction).
The results of ANCOVA showed no significant interaction effect for maladaptive internalizing behavior ($F(1, 328)=3.167$, $p=0.076$, $\eta^2=0.010$). However, both main effects were significant, the wave ($F(1, 328)=4.194$, $p=0.041$, $\eta^2=0.013$) and diagnosis ($F(1, 328)=109.990$, $p<0.001$, $\eta^2=0.164$). Externalizing maladaptive behavior had a significant interaction effect ($F(1, 328)=5.100$, $p=0.025$, $\eta^2=0.015$), with diagnosis as significant main effect ($F(1, 328)=64.381$, $p<0.001$, $\eta^2=0.164$).

In more detailed analysis of the main effects using independent samples $t$-test, a decrease in maladaptive externalizing behavior was found exclusively for children in the control group ($t(175)=2.594$, $p=0.010$, $d=0.39$) and no change for ASD children ($t(153)=2.594$, $p=0.434$, $d=0.13$).

### Table 4. Analysis of covariance between the pandemic waves and sample groups in depression, anxiety, stress of parents and maladaptive behavior of children.

|                          | ASD              | Control          | t    | p      | d    |
|--------------------------|------------------|------------------|------|-------|------|
| **First data collection**|                  |                  |      |       |      |
| Stress                   | 10.87 (8.95)     | 10.09 (7.97)     | 0.61 | 0.541 | 0.09 |
| Anxiety                  | 5.00 (7.14)      | 2.80 (3.80)      | 2.61 | 0.010 | 0.38 |
| Depression               | 7.98 (9.20)      | 6.07 (8.30)      | 1.45 | 0.148 | 0.22 |
| Overall distress         | 23.85 (23.70)    | 18.97 (18.23)    | 1.55 | 0.123 | 0.23 |
| Maladaptive Internalizing behavior BEFORE | 10.24 (5.54) | 5.06 (4.58) | 6.84 | <0.001 | 1.02 |
| Maladaptive Externalizing behavior BEFORE | 6.20 (3.55) | 4.17 (3.51) | 3.85 | <0.001 | 0.58 |
| Maladaptive Internalizing behavior 1.wave | 9.40 (5.73) | 4.56 (4.73) | 6.19 | <0.001 | 0.92 |
| Maladaptive Externalizing behavior 1.wave | 5.75 (3.38) | 3.66 (3.26) | 4.20 | <0.001 | 0.63 |
| **Second data collection**|                  |                  |      |       |      |
| Stress                   | 17.94 (11.19)    | 11.10 (8.66)     | 4.26 | <0.001 | 0.68 |
| Anxiety                  | 10.08 (10.14)    | 4.87 (7.91)      | 3.57 | <0.001 | 0.57 |
| Depression               | 15.69 (12.61)    | 7.43 (9.03)      | 4.70 | <0.001 | 0.75 |
| Overall distress         | 43.71 (32.21)    | 23.39 (23.82)    | 4.48 | <0.001 | 0.71 |
| Maladaptive Internalizing behavior 2.wave | 11.54 (5.63) | 4.71 (4.00) | 8.74 | <0.001 | 1.40 |
| Maladaptive Externalizing behavior 2.wave | 6.20 (3.72) | 2.48 (2.75) | 7.09 | <0.001 | 1.14 |

ASD: autism spectrum disorder.

**Figure 1.** Bar chart comparing control and ASD group in mean scores of depression, anxiety, and stress of parents and maladaptive behavior of children before the COVID-19 pandemic, during the first and second wave.
In contrast, internalizing maladaptive behavior increased for ASD children ($t(153) = –2.324, p = 0.021, d = 1.45$) with no difference for control group ($t(175) = –0.225, p = 0.822, d = 0.03$).

Relationships between mental health of parents, maladaptive behavior, and sleep problems of children

Parental depression, anxiety, and stress correlated with each other in the range of $r = 0.771–0.959$ ($p < 0.001$), while they also significantly correlated with maladaptive behavior of children in the range of $r = 0.311–0.434$ ($p < 0.001$). The size of the relationships was consistent even after splitting the sample according to the diagnosis of a child, except for the non-significant relationship between maladaptive externalizing behavior and depression in parents from the control group ($r(175) = -0.225, p = 0.822, d = 0.03$).

In ASD children, late bedtime positively correlated with both internalizing and externalizing maladaptive behavior and parental depression and stress. In the control group, both late waking up and late bedtime positively correlated with their maladaptive behavior. Full correlation tables can be found in Table 5.

Discussion

To our knowledge, up to this date, there is not enough scientific evidence describing possible changes in severity of people’s struggles throughout past months of the coronavirus pandemic. Our findings bring important information about how the situation progressed in Slovakia and also provide an impulse for other researchers to adopt a more longitudinal approach when studying the impact that COVID-19 lockdowns had on the mental health of all individuals.

Our research shows that mental health of individuals was not significantly affected during the first wave in Slovakia. The prevalence of depression, anxiety, or stress symptoms was generally low in both parent groups of our sample, with the exception of higher anxiety in parents of autistic children. Other research studies during the first wave in Slovakia (Tomšík et al., 2020) or neighboring Czech Republic (Brom et al., 2020) focused more on coping with the homeschooling during lockdown but also concluded that families coped well with the situation. During the second wave, both groups of parents experienced higher levels of anxiety, stress, and depression. This change was even more significant for parents with children with ASD, more in line with foreign research (Colizzi et al., 2020; Dhiman et al., 2020; Manning et al., 2020).

However, when interpreting our results we must also consider that the pandemic situation in Slovakia was also very different during the first and the second wave. In March 2020, despite having very low numbers of infected and no deaths yet (Ministry of Investments, Regional Development and Informatization of the Slovak Republic, 2020), Slovakia adopted very strict measures to limit the spread of the virus. Compulsory face mask-wearing and social distancing were mandated, as well as a mandatory 14-day quarantine for all those who have returned from abroad and finally closing all services except grocery stores and pharmacies. On March 16, 2020, all kindergartens, primary and

Table 5. Correlations between parental mental health and maladaptive behavior or sleep problems of children.

|        | 1    | 2    | 3    | 4    | 5    | 6    | 7    |
|--------|------|------|------|------|------|------|------|
| ASD    |      |      |      |      |      |      |      |
| Overall psychological distress (1) | 1.00 |      |      |      |      |      |      |
| Stress (2) | .956 | .819 | .841 |      |      |      |      |
| Anxiety (3) | .925 |      |      |      |      |      |      |
| Depression (4) | .966 |      |      |      |      |      |      |
| Maladaptive internalizing behavior (5) | .401 | .382 | .401 |      |      |      |      |
| Maladaptive externalizing behavior (6) | .314 | .331 | .305 | .441 |      |      |      |
| Late bedtime (7) | .220 | .155 | .220 | .162 | .255 |      |      |
| Late waking up (8) | .023 | .033 | -.010 | .000 | .003 |      |      |
| Control |      |      |      |      |      |      |      |
| Overall psychological distress (1) | 1.00 |      |      |      |      |      |      |
| Stress (2) | .914 |      |      |      |      |      |      |
| Anxiety (3) | .868 | .764 | .672 |      |      |      |      |
| Depression (4) | .943 |      |      |      |      |      |      |
| Maladaptive internalizing behavior (5) | .345 | .270 | .295 |      |      |      |      |
| Maladaptive externalizing behavior (6) | .254 | .126 | .208 | .607 |      |      |      |
| Late bedtime (7) | .139 | .117 | .125 | .094 | .195 |      |      |
| Late waking up (8) | .048 | .023 | .043 | .140 | .234 | .514 |      |

ASD: autism spectrum disorder, *p < 0.05, **p < 0.01, ***p < 0.001.
secondary schools, and universities were closed (Ministry of Health of the Slovak Republic, 2020), as well as all therapeutic institutions offering ABA therapy, psychotherapy, or logopedic intervention crucial for individuals with ASD. People showed low confidence in institutions and their preparedness for the pandemic (Kanovsky & Halamová, 2020), but ultimately Slovakia was considered one of the countries that managed to handle the first wave very well.

Slovakia has been significantly more affected during the second wave of pandemic, regarding numbers of infected, deaths, and burden on the healthcare system or the economy. As numbers of infected and deaths started rising after summer 2020, marking the start of a second wave, on October 1, 2020, the state of emergency was declared again (Ministry of Interior of the Slovak Republic, 2020). The safeguards were not as strict as in the spring months and also changed several times during the months of October till December 2020. This could explain why insufficient or unclear information became the most prominent stressor for all the parents in our sample during the second wave.

When considering the consequences of COVID-19-related lockdown on children, we evaluated their problem behavior and sleep problems. Interestingly, externalizing maladaptive behavior (described as troubles with attention, self-regulation, or disobedience) did not change between the first and second wave for ASD children but decreased for children in the control group, which possibly adapted to the situation better over time. On the contrary, internalizing maladaptive behavior (which includes sadness, social withdrawal, anxiety, or hypersensitivity) did not change in the control group, but grew significantly for the autistic children. In contrast to other studies (Di Renzo et al., 2020; Mutluer et al., 2020; Singh & Zimmerman, 2015; Türkoğlu et al., 2020), sleep problems did not prove to be a substantial problem in our sample. During the first wave, we noted later bedtime in all children, but accompanied with waking up later as well. This could be just a change to eveningness chronotype as a result of a more relaxed daily schedule of staying at home (Türkoğlu et al., 2020). During the second wave, from October till December, we observed partial stabilization in sleep routines back to the pre-COVID-19 state. Sleep problems like anxiety before sleeping, nightmares or nocturnal awakenings were not reported often either.

We found connections between the mental health of parents and their children. Parental depression, anxiety, and stress were positively related to maladaptive behavior of children, which was true for both autistic and typically developing kids. In the ASD children, late bedtime correlated with both internalizing and externalizing maladaptive behavior and parental depression and stress. In the control group, both late waking up and late bedtime correlated with their maladaptive behavior.

Since families with ASD individual have been our main interest, we would like to summarize our findings. Even if generally the mental health of Slovak parents was not so significantly affected by the first wave, parents of autistic children already experienced more anxiety. During the second wave, all parents experienced higher levels of anxiety, stress, and depression and overall distress, but this change was even more significant for parents of children with ASD.

During the first wave, more demanding child care was the most prevalent stressor for all parents in our sample, but especially for those with autistic children. This could be also related to sudden closures of schools and therapy providing organizations, also reported in our data. As parents of typically developing children mainly worried about their child not acquiring sufficient knowledge and missing friends during homeschooling, parents of special needs children felt more pressure and additional concerns associated with the lack of support from specialists (Tomšík et al., 2020).

Sudden lack of necessary therapy and disruption in familiar daily routines could also have an effect on increase in autistic maladaptive behavior of children, which was significantly more intense when compared to the control group, as expected (Colizzi et al., 2020; Di Renzo et al., 2020; Mutluer et al., 2020). Another closely related problem is inaccessibility of diagnostics for ASD, which were postponed, too, creating an even longer list of children waiting for a confirmation of their diagnosis and a beginning of necessary interventions.

Even though relatively low numbers of autistic children in our sample experienced sleep problems, in those who did, late bedtime was linked to both internalizing and externalizing maladaptive behavior and parental depression and stress. Furthermore, connections between parental depression, anxiety, and stress and maladaptive behavior of children indicate that not only autistic children but their whole families need more support and access to therapy, since their struggles are interconnected (Tokatly Latzer et al., 2021).

As also reported in our research, the first wave came as a surprise and neither ordinary people nor experts were prepared, but during the second wave, there was a significant effort of therapy providers to offer their service online, whenever possible. Extended availability of online therapy substitutes could be one of the permanent positive consequences of the COVID-19 pandemic (Moreno et al., 2020). On the contrary, online data collection can be considered one of the limitations of our study, because this way, we lacked objective information about the autism symptoms severity or speech abilities of the autistic children in our sample. Even though specifically asked, the majority of parents evaluated that their child is verbal without any difficulties, which is highly improbable. Another limitation of our study is focusing only on the presence of negative
symptoms and effects of the pandemic, without asking about possible positive changes some individuals could experience. In our future research, we could also include measures of some salutoprotective factors like resilience, sense of coherence, or locus of control, which could have helped some people cope with the pandemic better (Amcis et al., 2020; Veer et al., 2021).

In conclusion, families in Slovakia were negatively affected by COVID-19 pandemic, but the impact on families with autistic children, whose lives were already challenging beforehand, was much more severe. It is therefore crucial to continue researching how mental therapies for not only autistic children but for their parents too. It is also crucial to continue researching how mental health of individuals and coping with this unprecedented pandemic situation will evolve in the near future.

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