

Dear Editor

Bellow, we provide the responses made by the reviewer.

### **REVIEWER 1**

- 1) The selection criteria of studies are not clear, since reviews and meta-analyses were also included alongside original studies, with the concurrent risk of duplication of studies (also in light of the short time period considered)

Dear Editor,

The papers were only included in our sample if the study exclusively examined the mental health impacts of COVID-19 on children and adolescents from 2021 to 2022. Detailed inclusion and exclusion criteria are shown in Table 1. Using Covidence, a web-based tool that helps identify studies and engage data extraction processes, two reviewers (MLRN and JPP) independently examined all potential articles. In case of disagreement, both reviewers read the article and discussed it until reaching a consensus.

In this context, we do not understand the question about meta-analyses reviews being included, as the likelihood that a treatment effect reported in systematic reviews with or without meta-analyses resemblance to the truth depends on the validity of the studies included in the analysis because certain methodological features may be associated with effect sizes. Therefore, it was important to determine in the systematic reviews whether the sample of studies obtained was representative of the totality of research carried out on depression in childhood and adolescence in times of covid-19. The possibility of bias resulting from a trend of only positive findings being published - known as the "file drawer effect" - was addressed using two methods: calculating the failsafe N and the p-curve approach. (as shown in item "2.7 Risk of publication bias"). If the reviewer observes that there was no concomitant risk of duplication of studies, since the chosen period allowed a thorough reading of the articles through the filtering and eligibility of the data, as well as a detailed review by two researchers, as explained in the article itself.

- 2) The exclusion of 90 articles during the selection process is not detailed (unless it is summarized in the Figure which I could not find in the manuscript)

Dear reviewer, in the Table 1 there was the details of the exclusion process are explained.

- 3) There is a mere description of study results with no attempt at summarizing them to the reader's interest: e.g., by identifying a limited number of age ranges and, then, weighting the pertaining data, in order to get estimates of different disorders with CIs;

Dear reviewer, our aim was to carry out a systematic review and not a meta-analysis. We emphasize that, as this is not a meta-analysis, but a systematic review, measures such as CI cannot be established here. We summarize, as below, our data and analyze them in a grouped way. (As listed below - *subitem 3.1.2 and 3.1.3 of the Results session*):

### **3.1.2. Psychiatric impact on children and adolescents in times of Covid-19**

Among the studies, 14 have examined the psychiatric impact on children and adolescents in times of Covid-19 (Demaria and Vicari, 2021; Sayed et al., 2021; Bentenuto et al., 2021; Burnett et al., 2021; Minozzi et al., 2021; ; Backer et al., 2021; Qin et al., 2021; Lu et al., 2021; Ma et al., 2021; Barros et al., 2021; Han and Song, 2021; Giannakopoulos et al., 2021; Jones, Mitra and Bhuiyan, 2021; Almhizai et al., 2021).

The research by Demaria and Vicari (2021) has shown that quarantine is a psychologically stressful experience. For children, missing school and interruptions in daily routines can have a negative impact on their physical and mental health. In this perspective, they pointed out that parents could also pass their psychological suffering on to children and practice inappropriate parenting, contributing to the development of post-traumatic stress symptoms. For Sayded et al., (2021) quarantine can create intense psychological problems, including post-traumatic stress disorder (PTSD), especially for vulnerable critically developing children/adolescents. Bentenuto et al. (2021) showed a significant increase in parental stress and child externalizing behaviors, but not in co-parenting. Parental stress is predicted by externalizing behaviors, and co-parenting acted as a moderator in the relationship between the change in the amount of time spent with children before and during confinement and parental stress. Burnett et al., (2021), observed that parents of children with a neurodevelopmental disorder (NDD) report higher levels of distress compared to typically developing children. Stress levels may be heightened by the restrictions associated with the COVID-19 pandemic.

Minozzi et al., (2021) highlight the prevalence of anxiety among adolescents ranging between 19% and 64%, depression between 22.3% and 43.7%. Among children aged 5 to 12 years, the prevalence of anxiety varied between 19% and 78%, while depression was between 6.3% and 22.6%. Among preschool children, they found aggravation of behavioral and emotional problems, while others did not. They found a significant worsening of psychological well-being, especially among adolescents. Backer et al., (2021), demonstrate that the reduction in the number of contacts associated with rigid measures of physical distance collaborates for the insertion of pain and psychic suffering in children and adolescents. Compared with elementary school students, high school students had a higher risk of psychological distress (OR, 1.19 [95% CI, 1.15-1.23]). Compared with students who used a mask frequently, students who never wore a mask had an increased risk of psychological distress (OR, 2.59 [95% CI, 2.41-2.79]). In addition, students who spent less than 0.5 hour exercising were more likely to have self-reported psychological distress compared with students who spent more than 1 hour exercising (OR, 1.64 [95% CI, 1.61- 1.67]) (Qin et al., 2021).

Among the studies analyzed, 23 (21 cross-sectional studies and 2 longitudinal studies) from two countries (China and Turkey) with 57,927 children and adolescents were identified in the study by Ma et al, (2021). Depression, anxiety, sleep disturbances, and post-traumatic stress symptoms were assessed. The meta-analysis of the results of these studies showed that the combined prevalence of depression, anxiety, sleep disorders and post-traumatic stress symptoms was 29% (95% CI: 17%, 40%), 26% (95% CI: 16%, 35%), 44% (95% CI: 21%, 68%) and 48% (95% CI: -0.25, 1.21), respectively. Subgroup meta-analysis revealed that adolescents and women had a higher prevalence of depression and anxiety compared to children and men, respectively.

Barros et al., (2021) show that Brazilian adolescents often felt sad (32.4%) and nervous (48.7%). The highest prevalence of these feelings was related to: being female; aged between 15-17 years; families with financial difficulties; having learned little or nothing from distance education; lost friends; having few friends; family disagreements; having regular/poor health before the pandemic, and worsened health and sleep during the pandemic. A higher prevalence of nervousness was also found in adolescents who worked before the pandemic and who reported a lack of concentration and not knowing if they had COVID-19. In the study by Han and Song, (2021) participants who perceived that their family economic status had declined because of COVID-19 were more likely to have depression and suicidal ideation. Concerning their emotions, adolescents recognized anxiety about self-harm and harm to their loved ones, as well as mood swings in the family nucleus (Giannakopoulos et al., 2021).

Globally, teens from varied backgrounds experience higher rates of anxiety, depression, and stress due to the pandemic. Second, teens also have a higher frequency of alcohol and marijuana use during the COVID-19 pandemic (Jones, Mitra and Bhuiyan, 2021). The results of the study by Almhizai et al., (2021), showed that the older age of the children was associated with a smaller increase in concern, restlessness, and a higher increase in sadness. Older age was associated with a greater increase in the frequency of waking up, little sleep, malaise, and nervousness. Having relatives infected with COVID-19 was associated with greater increases in most negative behaviors, such as anxiety, sadness, poor sleep, indecision, and irritability. Threats of punishment, yelling, and hitting were associated with a higher increase in negative behavior during the pandemic compared to before the pandemic.

### **3.1.3. Impact of control measures to contain the effect on the mental health of children and adolescents**

It was reported in 11 studies the possibilities of interventions used in children and adolescents to improve mental health (Okuyama et al., 2021; Meherali et al., 2021; Bussieres et al., 2021; Raffagnato et al., 2021; Kerr et al., 2021; Sesso et al., 2021; Li and Zhou, 2021; Bate, Pham and Borreli, 2021; Spencer et al., 2021; Maunula et al., 2021; Kim et al., 2021).

Physical activity was correlated with psychological health and may improve psychological status. It was recommended for a better support in the psychological health of children and adolescents under the influence of COVID-19 (Okuyama et al., 2021). Bussieres et al., (2021) revealed that having a neurodevelopmental disorder or chronic health condition did not put these children at greater risk of developing mental

health symptoms with COVID-19 pandemic lockdown measures. Raffagnato et al, (2021) highlight that patients, especially those with internalizing disorders, generally demonstrated a good adaptation to the pandemic context. In addition, patients with behavioral disorders experienced higher psychological distress compared to patients with internalizing disorders. Over time, patients showed improvement on the emotional side, as evidenced by a significant decrease in internalizing and post-traumatic stress problems.

Parents' perceptions of how the COVID-19 pandemic has affected their mental health have implications for the well-being of parents and children, with stronger associations for low-income families. Given the potential for side effects between parents and children, it is crucial to promote family well-being through political practices and initiatives, including providing financial and care assistance to parents and supporting the mental and behavioral health of families (Kerr et al., 2021). While parenting is essential for positive development, increased parental distress has interfered with children's well-being. Internalizing problems in children with neuropsychiatric disorders were among the strongest predictors of parental stress during the lockdown, mediating the indirect effects of quarantine-related factors, thus suggesting the importance of their detection during and after emergency situations to provide assistance and reduce parental pressure. It is important to pay attention to the role of socialization with peers as a protective factor against parental stress (Sesso et al., 2021).

Data from Li and Zhou, (2021) suggest that parents of elementary school children and adolescents should avoid showing excessive concern in front of their children during the pandemic to help reduce their children's internalizing and externalizing problems. Effective family-based disaster education can mitigate the emotional distress and behavioral problems of elementary school children, the effect of which can be maximized if parents can avoid becoming overly worried. In addition to focusing on symptom management, families can benefit from support aimed at the parent-child relationship. Insights and implications for practitioners are discussed (Bate, Pham and Borrelli, 2021).

The COVID-19 pandemic has therefore led to a dramatic increase in depression/anxiety problems and social risks among urban, racial, and ethnic minority school-age children compared to before the pandemic. More research is needed to understand whether these changes will persist (Spencer et al., 2021). By promoting resilience through school- and community-based strategies, school-aged children can benefit from coping with pandemics or natural disasters and thriving despite challenging life circumstances (Maunula et al., 2021).

For Kim et al., (2021) during the closure of schools related to COVID-19, many parents and children had several difficulties related to mental health. Ongoing mental health monitoring of high-risk groups and various support systems may need to be expanded to cover parents who have difficulty caring for their children. Physical activities can help reduce mental health issues among Japanese children and teens affected by school restrictions due to the COVID-19 pandemic. Thus, stakeholders in the mental health of children and adolescents worldwide should recommend physical activity because it is a viable and useful form of long-term psychological support (Okuyama et al., 2021).

- 4) Weighting data provided by different studies would allow to apply one of the formulas to estimate the file drawer effect and the resulting publication bias.

Thank you very much for your posts. We added item “2.7 Risk of publication bias” to be able to respond adequately to the demands of the reviewer:

The likelihood of a treatment effect reported in systematic reviews resembling the truth depends on the validity of the studies included in the analysis because certain methodological characteristics may be associated with effect sizes. Therefore, it was important to determine in the systematic reviews whether the sample of studies obtained was representative of all the research carried out on depression in childhood and adolescence in times of COVID-19. The possibility of bias resulting from a trend of only positive findings being published - known as the "file drawer effect" - was addressed using two methods: calculating the failsafe N and the p-curve approach.

The failsafe N is determined by calculating the number of studies with a mean null result needed to make the overall results insignificant. The p-curve was introduced to account for “p-hacking”, a theory stating that researchers may be able to get most studies to find positive results across different reviews. The p-curve assesses the slope of the reported p-values to determine whether p-hacking has occurred.

The most significant findings of depression in children and adolescents impacted by COVID-19 were found in 25 studies, requiring bringing the p-value to  $> 0.05$ . In addition, quarantine, sleep disturbances, post-traumatic stress symptoms, and the prevalence of anxiety were findings that validated the results. The p-curve was applied to explain p-hacking - to guarantee positive results. When calculating the p curve, only 14 studies were included that examined the psychiatric impact on children and adolescents in times of COVID-19 (Demaria and Vicari, 2021; Sayed et al., 2021; Bentenuto et al., 2021; Burnett et al., 2021; Burnett et al., 2021; Minozzi et al., 2021; Backer et al., 2021; Qin et al., 2021; Lu et al., 2021; Ma et al., 2021; Barros et al., 2021; Han and Song, 2021; Giannakopoulos et al., 2021; Jones, Mitra and Bhuiyan, 2021; Almhizai et al., 2021). The results indicated that depression among children and adolescents existing in the literature ( $p = 0.5328$ ) have sufficient evidence in their findings, particularly when there were 11 studies on the possibilities of interventions used in children and adolescents to improve mental health (Okuyama et al., 2021; Meherali et al., 2021; Bussieres et al., 2021; Raffagnato et al., 2021; Kerr et al., 2021; Sesso et al., 2021; Li and Zhou, 2021; Bate, Pham and Borrelli, 2021; Spencer et al., 2021; Maunula et al., 2021; Kim et al., 2021).

Clearly, solutions to the file drawer problem present an irritating and challenging issue for meta-analytic research and it will likely take a paradigm shift to truly address this problem, as authors who only submit their review of literature and methods, abandoning statistics conventional inferential in favor of Bayesian Approaches, or registration of studies and protocols online before conducting a study.

**REVIWER 2:**

Thank you very much for the honorable and generous review.