

REFLECTION

Impact of online learning and the full return to face-to-face classes on the mental health of pediatric population during and after the COVID-19 pandemic

Impacto de la educación virtual y del retorno total a clases presenciales en la salud mental de población pediátrica en pandemia y postpandemia por COVID-19

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Abstract

In March 2020, in an attempt to slow the spread of SARS-CoV-2, several countries closed their schools and switched to online learning. This, together with social distancing, posed a threat to the mental health of children and adolescents attending schools. In this context, access to information technologies was a determining factor for countering social isolation and allowing the continuity of the role of schools in this population.

Several studies have reported that the suspension of face-to-face classes and the use of online learning as a result of the COVID-19 pandemic had positive and negative effects on the mental health of the pediatric population, which were conditioned by individual, family, and socioeconomic factors. On the other hand, the reopening of educational institutions after a prolonged period of social distancing and restrictions on human mobility represented, in terms of development and mental health, both an opportunity and a challenge for children and adolescents and their families.

Taking this into account, the objective of this paper is to reflect on the differential impact that the closure of schools and the implementation of online learning during the COVID-19 pandemic had on the development and mental health of school-aged children and adolescents, as well as the potential effects of their return to face-to-face education on these same aspects. We hope that the contents of this reflection will be useful to guide the execution of educational and child mental healthcare actions in future pandemics.

Resumen

En marzo de 2020 se ordenó el cierre de colegios y la implementación de la educación virtual en muchos países como una medida de control para desacelerar la propagación del SARS-CoV-2, lo que, junto con el distanciamiento social, representó una amenaza para la salud mental de la población infantil y adolescente en edad escolar. En este contexto, el acceso a las tecnologías de la información fue un factor determinante para contrarrestar el aislamiento social y permitir la continuidad del rol escolar en esta población.

Varios estudios han reportado que la suspensión de clases presenciales y el uso de la educación virtual a causa de la pandemia por COVID-19 tuvieron efectos positivos y negativos en la salud mental de la población pediátrica, condicionados por factores individuales, familiares y socioeconómicos. Por otra parte, la reapertura de las instituciones educativas después de un periodo prolongado de distanciamiento social y restricciones de la movilidad humana representó, en términos de desarrollo y salud mental, tanto una oportunidad como un desafío para los niños y adolescentes y sus familias.

Teniendo en cuenta lo anterior, el objetivo de este artículo fue reflexionar sobre, por un lado, el impacto diferencial que el cierre de escuelas y la implementación de la educación virtual durante la pandemia por COVID-19 tuvieron en el desarrollo y la salud mental de la población infantil y adolescente en edad escolar, y, por el otro, los potenciales efectos del retorno a la educación presencial en estos mismos aspectos. Esperamos que los contenidos de esta reflexión sean útiles para orientar la implementación de acciones educativas y de cuidados en salud mental infantil en futuras pandemias.



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Introduction

According to estimates by the United Nations Educational, Scientific and Cultural Organization (UNESCO) (cited by Tang *et al.*¹), by the end of March 2020, the closure of schools and the implementation of distance education based on information and communication technologies (ICT) as a measure to reduce the rapid spread of SARS-CoV-2 (the virus causing COVID-19) had affected 87% of primary and secondary school students worldwide, or more than 1.5 million children and young people in 165 countries. This decision, along with other measures restricting human mobility and social distancing, posed a threat to the development and mental health of most children and adolescents, but also posed an additional stress factor for their caregivers, who were already exposed to the multiple stressors related to the COVID-19 pandemic.¹

Although it is unfortunately not possible to state that the entire child and adolescent population can easily access ICTs, it can be said that during the COVID-19 pandemic, access to these technologies and training in the use of technological resources in the school environment made it possible to implement online learning as a measure to mitigate the mental and social risks of social isolation and the interruption of school activities in this population.^{2,3}

The disruption of social and environmental factors involved in early childhood development due to pandemic control measures (illness or death of caregivers, limited opportunity for face-to-face interaction with peers, messy routines, among others) also contributed to the increased risk of developing mental health problems in the pediatric population.^{4,5}

In this regard, several studies have shown a differential impact of such measures on the mental health of children and adolescents.^{6,7} Thus, an association has been reported between favorable and unfavorable changes in this population, as well as sociodemographic variables, their own and their parents' health conditions, family socioeconomic conditions and other social determinants such as prolonged school closures. It is important to keep in mind that this situation increased the financial and responsibility burden (e.g., teaching) of many parents and caused disconnection from the daily reality of children and adolescents due to the forced distancing from their classmates and friends.^{6,7}

Even though, as mentioned above, the measures of social distancing and restriction of human mobility, particularly the closure of schools and the cessation of on-site classes, had a negative impact on the mental health of children and adolescents, the decision taken by the governments of several countries, including Colombia, to reopen educational institutions and begin a gradual return to on-site classes until 100% attendance was achieved was questioned due to the fear of an increase in the number of contagions.^{8,9} In this sense, understanding both the differential effects of closing schools and other social distancing measures on the mental health of children and adolescents, as well as the potential risks of a full return to schools and face-to-face classes, is critical for the education and health sectors to implement actions to protect the mental wellbeing of children and adolescents and their caregivers.¹⁰

In view of the above, the objective of this article was to reflect on the differential impact that the closure of schools and the implementation of online learning had during the COVID-19 pandemic on the development and mental health of the child and adolescent population, as well as the potential effects of a full return to face-to-face education on these same aspects, in order to guide the most appropriate preventive actions in future pandemics.

To achieve the proposed objective, on March 31, 2022, a literature search was performed in the PubMed/MEDLINE, Embase, and Scopus databases, and in the Google Scholar search engine up to page 5 of results, with no restriction on publication date. Free

terms were used (“COVID-19 Pandemic”, “school closure”, “lockdown”, “mental health”, “children and adolescents”) and articles in English and Spanish were selected. For greater sensitivity, articles whose title or abstract matched the free terms used in the search were screened. A total of 156 publications were found and 40 whose objectives were in line with those of the present study were selected.

The previous search was expanded on February 12, 2023, in the Google Scholar search engine until page 5 with the terms “*COVID-19 y salud mental en niños en Colombia*” and “*retorno a la educación presencial y salud mental en niños en Colombia*”, considering only documents published since 2022. With this last search, 47 and 48 references were obtained, respectively, of which 2 were selected since their objectives coincided with those of the present work.

Online learning in the context of the COVID-19 pandemic: positive and negative impacts on child and adolescent mental health and development

While the different domains of human development are addressed individually for didactic purposes, it has been established that cognitive development is closely linked to socioemotional development since the satisfaction of basic needs, opportunities for stimulation, the establishment of secure affective bonds, and interaction with peers outside the family nucleus are fundamental aspects for healthy cognitive and socioemotional development throughout the life cycle, particularly in early childhood.¹¹

Likewise, the cultural and social circumstances in which an individual is immersed during childhood and adolescence, as well as the upbringing patterns of their caregivers and their primary social networks (family, neighborhood), can act as promoting, protective or risk factors in relation to their development.¹¹ Thus, the complex interaction of these factors and the genetic vulnerability of children have a differential impact on their development and schooling needs.¹¹⁻¹³

The use of online learning in the context of the pandemic and after the pandemic made it easier to resume and continue with classes for children and adolescents who had access to the necessary electronic devices in their family environment, as well as an adequate Internet connection.¹⁴ In fact, it has been reported that the use of technological devices (e.g., smartphones, tablets, laptops, etc.) by schoolchildren and adolescents promoted learning and mitigated the negative psychological effects of social distancing during the pandemic, such as feelings of loneliness and boredom.¹⁵

Notwithstanding the above, it is important to keep in mind that the coverage of online learning in the context of primary and secondary education has been limited or non-existent for a large proportion of children and adolescents in countries with social inequalities and inequities such as Colombia, which became evident during the pandemic in the unavailability not only of such technological devices, but also of a stable and fast internet connection and, therefore, affecting access to education.¹⁶ In this regard, Martínez-Tessore¹⁷ states that although there is internet access for children and adolescents in Latin America, the digital divide is reflected in access to quality internet and the devices necessary for its use, with this problem being exacerbated in the most socioeconomically vulnerable population living in rural areas.

Other social determinants involved in the differential impact of the closure of schools on the development and mental health of children and adolescents are those related to the educational level and working conditions of their parents and/or caregivers, access to health services, location and type of housing, type of family, family dynamics, characteristics of

the primary social networks, and belonging to ethnic groups and/or vulnerable groups such as migrant population or victims of the armed conflict.¹⁸⁻²⁰ In addition to the role of these social determinants in such differential impact, it has been suggested to include in the analysis of this impact the presence or history of medical conditions such as sensory deficits, neurodevelopmental disorders (NDD) (developmental language disorder, autism spectrum disorder, specific learning disorders, attention deficit hyperactivity disorder (ADHD), intellectual disability, etc.) and other types of mental disorders (MD), and psychological disorders such as anxiety, social phobia (SP), and depression.⁶

Regardless of the presence or history of NNDs and/or MDs, the risks of online learning with regard to child and adolescent development and mental health in the context of school closures and confinement due to the COVID-19 pandemic were related to the limitation of physical activity; the reorganization of habits and routines; and the restriction of face-to-face interaction with the peer group, this interaction being fundamental to promote the development of language and social cognition.²¹ However, it should be noted that these risks were attenuated and even disappeared in homes that had the necessary resources to promote recreational activities and physical activity, as well as social interaction with peers outdoors or in biosecure areas out of the school environment.²¹

Other risks of online learning are associated with increased exposure to technological devices. On this subject, Gjoneska *et al.*²² reported an increase in the prevalence of excessive use of internet and video games during the years of the COVID-19 pandemic among children and adolescents and emphasized that the populations most vulnerable to this problem are those in low- and middle-income countries, where difficulties in social support and family relationships were more pronounced during the pandemic. At this point it is necessary to highlight that it has been established that in the absence of adequate supervision, inappropriate use of the internet and screens leads to alterations in eating habits, sleep and physical activity, and in self-care, both in the healthy population and in those with NDDs and/or MDs.^{21,23} Similarly, in a study conducted in a population with video game addiction in countries with experience in rehabilitation of this type of problem, King *et al.*²⁴ reported that the symptoms in adolescents with this condition worsened during confinement due to the COVID-19 pandemic.

Other problems that affected the child and adolescent population during the pandemic, which also increased in frequency due to social distancing and the implementation of online learning, included the use of psychoactive substances, intra-family violence, and forms of violence other than school violence, such as child sexual abuse. Moreover, it is worth mentioning that the reporting of these situations to the relevant authorities (police and social services) decreased during the confinement.^{25,26} These issues highlighted the risks of some social control measures adopted to slow the spread of SARS-CoV-2, such as the closure of schools and the establishment of online learning, as they exposed children and adolescents to increased coexistence with the perpetrators of domestic violence. Here it is important to clarify that the consequences of such problems are much more serious than the possible intrinsic shortcomings of online learning in this population.

Research on the impact of online learning on language development and other cognitive skills is still sparse. Accordingly, Deoni *et al.*,²⁷ in a longitudinal study analyzing 1 247 cognitive assessments of 700 healthy, cognitively normal children aged 3 months to 3 years conducted between January 2011 and November 2021 in a hospital in Rhode Island, United States, found lower measures of verbal, nonverbal, and general cognition development in children aged 0-16 months born during the pandemic compared with children of the same age born before the pandemic. Likewise, in the analyses carried out

in this study, it was found that better socioeconomic conditions, estimated based on the mother's level of education, were protective of low results or measures in the neurocognitive skills tests applied.²⁷

Furthermore, Engzell *et al.*,²⁸ in a study conducted with a dataset that included the biannual national test scores of about 350 000 students aged 8 to 11 years conducted in the Netherlands between 2017 and 2020, as well as their sociodemographic characteristics and the characteristics of the schools they attended, reported that during the school closure, which lasted 8 weeks (starting March 16) and was equivalent to one fifth of a school year, there were losses in learning progress. These losses were up to 60% larger in students from less-educated homes, a finding that confirms the role played by social inequalities in the effects of the pandemic.

Concerning the positive effects of implementing online learning in times of pandemic, Larsen *et al.*,²⁹ in a study using data from 442 children (mean age=11.43 years; SD=2.59) from vulnerable families (defined as families in which parents had attended family welfare centers for mediation, counseling, or family therapy) included in the Dynamics of Family Conflict Study (FamilieForSK), indicate that participants reported improvements in terms of well-being and life satisfaction as a result of the implementation of online learning during the closure of their schools. They also described greater family cohesion (greater availability of time to share with the family and more free time for personal activities other than academic ones), and not having to travel to educational institutions was also considered an improvement.

However, Larsen *et al.*²⁹ also established that the severity of anxiety and/or depression symptoms reported by participants during school closures was associated with their perception of the presence of instability and stress in their families. In this regard, it is important to mention that the differences in the approach to a pandemic (in this case the one caused by COVID-19) between high-income and low- or middle-income countries cannot be ignored and that morbidity and mortality due to COVID-19 in children and adolescents varied from one country to another depending on social determinants mediated by the economic situation of each country.³⁰

These findings demonstrate the various positive and negative effects of the closure of schools and the implementation of online learning during the pandemic on school and cognitive well-being, mental health, and child and adolescent development. These effects, rather than stemming from direct exposure to online learning, were mediated by individual and family factors.

With respect to children and adolescents with NDDs, MDs and/or psychological disorders, or with a history of these conditions, a trend toward worsening of symptoms was reported following the implementation of measures restricting human mobility and social distancing (including strict confinement and school closures). However, some of these children and adolescents also reported an improvement in terms of subjective and emotional well-being with respect to their disorder.

For example, Tombeau *et al.*⁷ conducted a cross-sectional study with data obtained through questionnaires completed by parents of children and adolescents aged 2-18 years (n=1 013; 62% with pre-existing psychiatric diagnosis prior to school closure) and self-report questionnaires completed by participants aged 10-18 years (n=347). They found that depending on the age group, 67-70% of children/adolescents experienced deterioration in at least one of the 6 domains, but 19-31% experienced improvement in at least one domain.⁷

In their study, Tombeau *et al.*⁷ also found that the impact of pre-existing psychiatric diagnosis was heterogeneous, as in some children it was associated with deterioration in the domains of irritability, hyperactivity, and obsessions/compulsions (ORs 1.96-2.23), but in others it was associated with improvement in the domains of depression, anxiety, and irritability (ORs 2.13-3.12). These authors further reported that in the combined prevalence of improvement in any of the 6 domains, 19.5% (n=181/927) of children and adolescents aged 6 to 18 years did better in at least one domain, while 31.5% of children aged 2 to 5 years (n=17/54) did better in at least one of the three domains assessed in this subgroup (anxiety, irritability, and hyperactivity).

Finally, Tombeau *et al.*⁷ found that the stress of social isolation was related to deterioration in the mental health domains analyzed (ORs=11.12-55.24) and a significant proportion of children and adolescents experienced deterioration in their mental health in at least one domain regardless of the age range (6-18 years: 70.2%; 2-5 years: 66.1%).

Based on the findings of Tombeau *et al.*,⁷ it is possible to conclude that the closure of schools and the implementation of online learning to replace face-to-face classes in the context of the COVID-19 pandemic had more negative effects on the mental health of children and adolescents with NNDs and/or MDs than on that of those without these conditions. This greater impact has been attributed to several factors such as the overburdening of parents and caregivers; the interruption of treatments; the impossibility of accessing face-to-face mental health services and interventions; and the loss of the adaptations that had been made in schools to guarantee the learning process of these patients depending on the characteristics of their disorder.³¹

Thus, it is clear that the negative effects to which children with NNDs and/or MDs were exposed during the COVID-19 pandemic in terms of mental health cannot be attributed solely to the closure of schools and the establishment of online learning to replace face-to-face classes. This also included barriers to access to mental health and recreational services, which increased even more during this emergency; the difficulties inherent to the implementation of online learning and its adaptation to guarantee appropriate learning for this population; and the interruption of pedagogical support at home due to the measures taken to restrict human mobility and social distancing.

On the other hand, several studies have reported that some human mobility restriction and social distancing measures adopted to prevent the spread of SARS-CoV-2, such as strict lockdown, the closure of schools, and the replacement of face-to-face classes with online learning, had positive effects on the well-being and mental health of children with ADHD, anxiety, and behavioral problems. For example, Bobo *et al.*,³² in a study conducted in France in the early stages of the COVID-19 pandemic and analyzing the responses of 533 parents of children and adolescents with ADHD to a questionnaire about their children's symptoms and coping mechanisms during confinement, found that, according to their parents, during confinement and school closure the children showed improvements in self-esteem and school-related anxiety. These authors found that the parents of those children associated the favorable changes with relief from the school and social pressures that their children were under before the suspension of face-to-face classes, pressures related to the stigma and discrimination to which they were exposed in schools because of their learning and behavioral problems.³²

However, it should be noted that the studies cited here on the negative effects of social distancing measures in response to the COVID-19 pandemic, such as the closure of schools and the implementation of online learning to ensure cognitive development, mental health and learning processes of children and adolescents, were carried out in

countries with cultural and economic characteristics that are very different from those of Colombia. In other words, data came from first-world countries since, unfortunately, at the time of writing, there was no published research comparing cognitive and socioemotional development and school performance in children and adolescents before and after the implementation of such measures in Colombia.

Return to face-to-face classes in the COVID-19 pandemic: positive and negative aspects on child and adolescent mental health and development

In some low- and middle-income countries, such as Colombia, the return to on-site classes was highly questioned due to the perception of an increased risk of COVID-19 infection, since not all educational institutions could guarantee full compliance with the recommended biosecurity measures. This, in turn, was associated with significant concern and fear about the possible spread of the virus among individuals in the school community and their families.^{33,34} It should be noted that the announcement of the full reopening of schools in the absence of other mitigation measures in high-income countries, such as England, also raised concerns about the likelihood of increased infections, the emergence of new variants, and uncertainty about the reported cases of long COVID in children.^{33,35} This perception of danger was especially high for those who, for various reasons, were not yet vaccinated or who, even if vaccinated, had chronic diseases or underlying conditions associated with increased morbidity and mortality from COVID-19.³⁶

Furthermore, it is also necessary to take into account that some children and adolescents developed a fear of catching SARS-CoV-2 and transmitting the virus to their loved ones upon returning to the classroom.³⁷ Thus, in cases of death by COVID-19 of a family member or close person, this population generated feelings of guilt associated with the belief of having been the source of contagion of their loved ones, making it more difficult for them to grieve.³⁷

In this regard, Alvarado-Socarrás *et al.*,³⁸ in a cross-sectional analytical study conducted in Colombia, which analyzed 1 443 surveys answered between August and September 2020 by parents or caregivers of children treated in pediatric clinics in different cities of the country, found that 81.06% of parents did not agree with the return of their children to face-to-face classes and that the main factor associated with this decision was that the parent had some comorbidity, mainly high blood pressure, ischemic heart disease, and obesity ($p < 0.0001$). Other factors that were associated with this decision were having children older than 10 years (PR=2.64; 95%CI: 1.48-4.72), living with people older than 70 years (PR=2.2; 95%CI: 1.46-3.29), and knowing someone who died from COVID-19 (PR=1.86; 95%CI: 1.42-2.44). Alvarado-Socarrás *et al.*³⁸ concluded that families from middle and high socioeconomic segments tended to maintain online learning instead of face-to-face classes as a form of family protection, but further studies are needed in families from lower socioeconomic groups, where it was assumed that, due to their vulnerability, more negative effects would arise from not returning to face-to-face classes.³⁸

Finally, it is worth mentioning that online learning during the COVID-19 pandemic was a protective factor for some forms of bullying, except cyberbullying.³⁹ Some children felt insecure about returning to face-to-face classes because they were afraid of being exposed again to the bullying they had always experienced and because the emotional suffering caused by their schoolmates could be temporarily alleviated thanks to online learning and increased family cohesion resulting from more time at home.⁴⁰

Due to the lack of adequate preparation and specialized intervention for their problems, many children with NDDs and MDs and their parents had difficulty readjusting upon return to face-to-face education, as the risk of recurrence of emotional and behavioral disorders increased as a consequence of the social dynamics in schools (e.g., re-exposure to bullying) and the likely increased academic demands.⁴¹

In Colombia, there is no scientific evidence of an increase in the incidence of affective and behavioral disorders in the pediatric population after the full return to face-to-face education. However, the Instituto Nacional de Medicina Legal y Ciencias Forenses (National Institute of Legal Medicine and Forensic Sciences) found that between January and October 2022, there were 34 more suicides reported compared to the same period in 2021 in the population under 18 years of age. This demonstrates an alarming increase in this practice that must be analyzed to establish its causes, among which the return to face-to-face classes must have played a fundamental role, considering that full return to classes in the country was ordered in July 2021 and, unlike the suicide figures for 2022 in children and adolescents, in 2020, when education was almost entirely delivered virtually, they reported 9 fewer suicides with respect to 2019 in the same age group.^{42,43}

Conclusions

Based on the evidence found, it can be stated that both children and adolescents from precarious homes and family environments subjected to neglect in their care, as well as those exposed to different forms of domestic and community violence could benefit from an early return to face-to-face education in future pandemics, as this would allow them to somewhat distance themselves from such environments, as long as their rights are protected in the school. The pediatric population with internet addiction problems, cognitive disabilities and learning disorders, and ICT access problems will also benefit from the return to face-to-face classes.

It is worth bearing in mind that teachers must be well trained to meet the educational needs of children and adolescents upon their return to classes after a pandemic, especially those who live in vulnerable conditions or have some kind of disorder and must also ensure their inclusion in the classroom and establish clear rules in the school coexistence manuals that protect them from negative situations such as discrimination, stigmatization, and bullying.

Nevertheless, just as it is evident that the return to face-to-face classes implied benefits for some children and adolescents, it is also possible to assume that this return led to an increase in the frequency of anxiety symptoms and greater adaptation difficulties in a significant proportion of schoolchildren. This was a situation for which parents, educators, psychologists, child psychiatrists and other professionals involved in the care of children and adolescents were not prepared.

Lastly, it is clear that the implementation of measures of mandatory and full return to face-to-face education when there is no clarity about the control of pandemics similar to that of COVID-19 can be counterproductive. Therefore, a flexible and individualized educational model should be proposed to meet the mental health and sociocultural conditions of students and their families, including remote online learning (if the necessary technological tools are available), guides to be developed at home, and alternation of face-to-face and remote education.

Given the evidence presented above, it is important to note that some children and adolescents with MDs who are experiencing crisis periods may benefit from continued

online learning or distance learning in early post-pandemic periods while their clinical stabilization is achieved and their access to professional care is ensured, which will allow them to recover their mental conditions. Likewise, it is clear that students with a history of bullying prior to the pandemics can benefit from these teaching modalities while appropriate preventive actions are taken in the school setting to avoid the recurrence of these practices in the future.

Conflicts of interest

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