

BEHAVIORAL REFLECTIONS OF COVID-19 IN CHILDREN WITH AUTISM: A SYSTEMATIC REVIEW

REFLEXOS COMPORTAMENTAIS DA COVID-19 EM CRIANÇAS COM AUTISMO: REVISÃO SISTEMÁTICA

REFLEJOS CONDUCTUALES DEL COVID-19 EN NIÑOS CON AUTISMO: UNA REVISIÓN SISTEMÁTICA

Mayra Helena Bonifácio GAIATO¹
Rodrigo da Rosa SILVEIRA²
Marina Cristina ZOTESSO³

ABSTRACT: In historical times when the COVID-19 pandemic broke out, children with autism indicated themselves to be impaired in terms of development and learning. The present work aimed, from a systematic review, to evaluate the impact and the main changes in behavior in children diagnosed with ASD during such a pandemic context. The research was operationalized from the search for articles in the PubMed database, with keywords related to autism and the COVID-19 pandemic in the period from 2020 to 2021. The results indicated changes in the behavior patterns of children with ASD, especially with regard to the increase in crises, stereotypies, aggression, hyperactivity, as well as notes on the harm caused by social isolation and reduced stimulation aimed at social skills. Further studies are extremely important to reverse this scenario and achieve a better quality of life for such children and caregivers.

KEYWORDS: Autism. COVID-19 pandemic. Behavior change.

RESUMO: Em tempos históricos a qual a pandemia da COVID-19 eclodiu, crianças com autismo indicavam-se prejudicadas quanto ao desenvolvimento e aprendizagem. O presente trabalho teve por objetivo a partir de uma revisão sistemática avaliar o impacto e as principais mudanças de comportamento em crianças diagnosticadas com TEA durante tal contexto pandêmico. A pesquisa foi operacionalizada a partir da busca de artigos na base de dados PubMed, com palavras-chave relacionadas ao autismo e à pandemia da COVID-19 no período de 2020 à 2021. Os resultados indicaram alterações nos padrões de comportamento de crianças com TEA, especialmente no que se refere ao aumento de crises, estereotípias, agressões, hiperatividade, além de apontamentos sobre os prejuízos do isolamento social e redução das estimulações voltadas às habilidades sociais. Maiores estudos se fazem de extrema

¹ Singular Institute (IS), São Paulo – SP – Brazil. Founder. Master's degree in Experimental Psychology: Behavior Analysis (PUC/SP). ORCID: <https://orcid.org/0000-0002-9783-2131>. E-mail: mayragaiato@institutosingular.org

² Singular Institute (IS), São Paulo – SP – Brazil. CEO. Professional Master's degree in Public Health (UNESC). ORCID: <https://orcid.org/0000-0002-1798-6780>. E-mail: rsilveira@institutosingular.org

³ University of São Paulo (USP), Bauru – SP – Brazil. Professor of psychology in the Department of Speech Therapy (FOB/USP). PhD in Developmental Psychology and Learning (UNESP). ORCID: <https://orcid.org/0000-0003-3180-1575>. E-mail: marina.zotesso@gmail.com

importância para reverter tal panorama e alcançar maior qualidade de vida a tais crianças e responsáveis.

PALAVRAS-CHAVE: *Autismo. Pandemia COVID-19. Mudança de comportamento.*

RESUMEN: *En tiempos históricos cuando estalló la pandemia de COVID-19, los niños con autismo se vieron afectados en términos de desarrollo y aprendizaje. El presente estudio tuvo como objetivo, a partir de una revisión sistemática, evaluar el impacto y los principales cambios de comportamiento en niños diagnosticados con TEA. La investigación se operacionalizó a partir de artículos en la base de datos PubMed, con palabras clave relacionadas con el autismo y la pandemia de COVID-19 en el periodo de 2020 a 2021. Los resultados indicaron cambios en los patrones de conducta de los niños con TEA, especialmente el aumento de las crisis, estereotipias, agresividad, hiperactividad, así como apuntes sobre los daños causados por el aislamiento social y la reducción de la estimulación dirigida a las habilidades sociales. Los estudios adicionales son de suma importancia para revertir este escenario y lograr una mejor calidad de vida para estos niños y cuidadores.*

PALABRAS CLAVE: *Autismo. Pandemia COVID-19. Cambio de comportamiento.*

Introduction

In uncertain times, when the world population was probed by fear and insecurity, the coronavirus pandemic (COVID-19) brought different repercussions to all humanity, both in economic, social, behavioral or health aspects (BAWEJA *et al.*, 2022; CASSIDY *et al.*, 2020). With regard to mental health, specifically, the pandemic reached worrying levels, resulting in psychological responses and adverse behaviors such as increased anxiety, depression, posttraumatic stress, insomnia, among others (BROOKS *et al.*, 2020; MORGANSTEIN *et al.*, 2017). In addition to a deregulation of routine and reduction of social skills, caused in particular by isolation and reduction of stimulation, whether social, affective or educational (PELLICANO *et al.*, 2021; GIALLONARDO *et al.*, 2020).

In this sense, a particular portion of the population was under unfavorable contingencies during the pandemic, with behavioral changes and developmental delays, such as people diagnosed with Autism Spectrum Disorder (ASD), with a special focus on this work for children within the spectrum, which present patterns of specific behaviors, such as changes in communication and difficulties in social interaction (APA, 2013; NICHOLAS *et al.*, 2008). Thus, the dysregulation in the routine, forced by the isolation of the pandemic, culminated in changes in behavior patterns and setback in clinical evolutions and treatments that are the basis for social and behavioral stimulation, in addition to changes in which typical or atypical subjects

were subject in such historical moment, such as increased levels of anxiety, depression and stress (BRUNI *et al.*, 2022; HALSTEAD *et al.*, 2021; PANDA *et al.*, 2020; NARZISI, 2020).

One of the interventions that, according to the literature, indicates better results for this neurodevelopmental condition, is based on the theoretical assumptions of Applied Behavior Analysis (ABA) (MAKRYGIANNI *et al.*, 2018; PETERS- SCHEFFER *et al.*, 2011), which points out that, for satisfactory results, it should be applied in a systematic and continuous format, thus ensuring higher rates of changes in inappropriate behavioral patterns or in lag in the child's repertoire (ALVES *et al.*, 2020; ANDERSON; CARR, 2021; BODY; MCDONOUGH; BODFISH, 2012; PETERS-SCHEFFER *et al.*, 2011; VERSCHUUR *et al.*, 2014). However, the other types of interventions with children on the spectrum are not annulled, which also produce results regarding the evolution of the patient. Based on this assumption, the safety guidelines for the pandemic context walked in opposite directions regarding the continuity of ABA interventions for autism, indicating difficulties to maintain treatment and challenges for the sequence of this in remote and/or hybrid formats.

In this sense, we highlight the importance of expanding the scientific view on the reflexes of COVID-19 and the pandemic context on the behavioral variations of children diagnosed with autism, as well as the possible long-term consequences of such historical change, which directly had repercussions on human behavior. Based on a systematic review of the literature, we sought an understanding of the main behavioral reflexes of the pandemic for children with ASD.

Hypothesis

It is believed, as a central hypothesis, that children diagnosed with ASD presented alterations in the behavioral pattern during the COVID-19 pandemic, especially associated with social isolation, which restricted social contact and systematization of interventions.

Goal

Based on a systematic review of the literature, the objective was to evaluate the impact and the main changes in behavior in children diagnosed with ASD during the context of outbreak of the COVID-19 pandemic.

Method

The bibliographic research, of a systematic nature, was operationalized through the electronic search of articles indexed in PUBmed databases, based on keywords related to autism and the pandemic of COVID-19. Consultations included the period 2020 to 2021.

The selected publications followed the following inclusion criteria: 1) publication vehicle –materials selected only in the indexed journals, for greater reliability of the results, as well as ease of access to researchers; 2) language of publication - articles published in full in English; 3) year of publication - selected articles with publication between 2020 and 2021; 4) modality of scientific production - selected original works related to psychology and medicine in formats of research report, theoretical study, report of professional experience; 5) references that contemplated the objective of the research and the relevance to the theme of autism and COVID-19. Thus, it was had as a prerequisite for analysis, that is, with inclusion criteria of the research, publications that answered the research questions and that involved the themes of autism associated with the pandemic moment of COVID-19. As exclusion factors, studies that indicated an empirical bias focused on themes of the pandemic context to autism focused on: 1) Attention and care to parents/and guardians of children with ASD; 2) Vaccine; 3) Neurological analyses; 4) School context; 5) Technology; 6) Oral health; 7) Adults and adolescents with ASD.

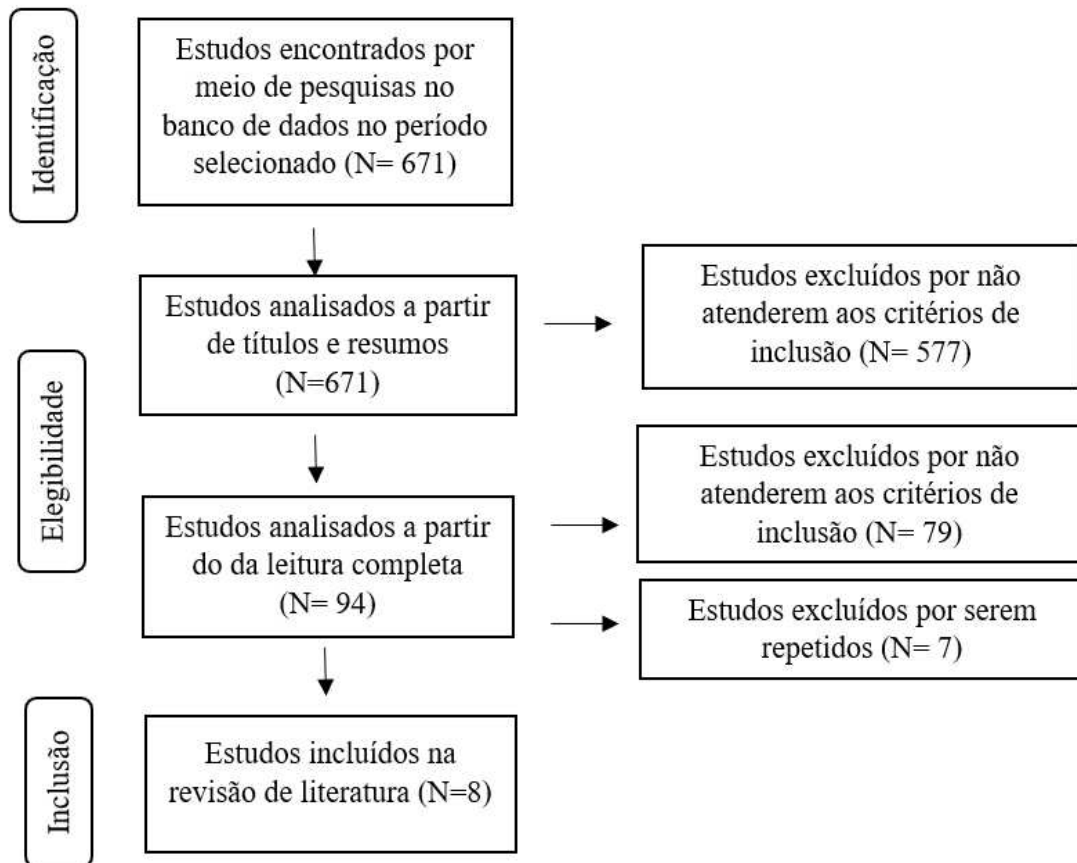
First, the objective was to verify the incidence of articles published between 2020 and 2021, in journals indexed in different databases, limiting the research only to PUBmed. The year 2022 was excluded from the analysis so that the replication and verification of the selected materials is reliable in their quantity. Thus, the following descriptors were used: "autism pandemic covid"; "autism covid-19".

Based on the selection criteria pre-established in the present study, a preliminary survey was conducted through selective reading of the abstracts found. In order to obtain greater organization of the results, these were tabulated, thus delimiting the number of papers, reading and selection through the I) Titles; II) Abstracts; III) Work in full, respectively, thus selecting the materials that were within the inclusion and exclusion criteria of the present research.

From the searches in the given period, the following results were obtained: for the descriptor "autism pandemic covid", 279 results, 253 of which were delimited only in the abstract. For "autism covid-19", 392 articles were obtained, with 344 indicating the descriptor in the abstract. Thus, a total of 671 materials were read, and all titles and abstracts were read for the research bottleneck, and the results of the materials that included 94 articles were

included within the inclusion and exclusion criteria, which were completed and finally selected for analysis eight publications.

Figure 1 – Bibliographic search process



Source: Prepared by the authors

Findings

Following the inclusion and exclusion criteria of the research, eight articles were selected for analysis and final discussion. They are initially exposed below in Table 1:

Table 1 - Articles selected in the period 2020 and 2021 in the Pubmed database

Article	Authors/Year	Title
1	Sergi, L. <i>et al.</i> , 2021	Autism, Therapy and COVID-19
2	Amorim, R. <i>et al.</i> , 2020	The impact of COVID-19 on children with autism spectrum disorder
3	Colizzi, M. <i>et al.</i> , 2020	Psychosocial and Behavioral Impact of COVID-19 in autism spectrum disorder: An Online Parent Survey
4	Bellomo, T. R. <i>et al.</i> , 2020	The impact of the COVID-19 pandemic on children with autism spectrum disorders
5	Mutluer, T.; Doenyas, C.; Genc, 2020 H. A.	Behavioral Implications of the Covid-19 Process for Autism Spectrum Disorder, and Individuals' Comprehension of and Reactions to the Pandemic Conditions
6	Vasa, R. A. <i>et al.</i> , 2021	Psychiatric problems during the COVID-19 pandemic in children with autism spectrum disorder
7	Panjwani, A. A., Bailey, R. L., Kelleher, B., 2021	COVID-19 and behaviors in children with autism spectrum disorder: Disparities by income and food security status
8	Syracusano, M. <i>et al.</i> , 2021	The Impact of COVID-19 on the Adaptive Functioning, Behavioral Problems, and Repetitive Behaviors of Italian Children with Autism Spectrum Disorder: An Observational Study

Source: Data extracted from Pubmed and selected by authors

Because it is a specific period of history, the COVID-19 pandemic, which broke out in Brazil in 2020, the systematic review covered the period 2020 and 2021, enabling reliable replication of the results found. From the selection of the eight materials exposed above, the results include exclusively children with ASD during the pandemic period, meeting the inclusion and exclusion criteria of the present study.

Table 2 gathers the main records of behavioral changes (positive and negative), pointed out by the selected studies, in children diagnosed with ASD, during the pandemic period of COVID-19, specifically in the years 2020 and 2021.

Table 2 - Record of the main behavioral changes in children with ASD during the covid-19 isolation period

Article	Negative behavioral impacts	Positive behavioral impacts
Sergi. <i>et al.</i> , 2021	There was an increase in stereotyped behaviors and ritualization, as well as hyperactivity and inattention in the behavioral pattern of children with ASD.	In the lockdown period there was an increase and better behavior of "sharing and searching for the other". Greater development of autonomy, socialization, communication and functional adaptive development, due to greater exposure to environmental stimulation in the family context.
Amorim <i>et al.</i> , 2020	Increased anxiety behaviors, irritability, routine obsession, hostility and impulsivity in children with autism.	
Colizzi <i>et al.</i> , 2020	Higher intensity of the emission of dysfunctional and problematic (negative) behaviors, both in typical (35.5%) and atypical children (41.5%). In addition to the identification of emotional changes and increased levels of non-adaptive behaviors.	
Bellomo <i>et al.</i> , 2020	Children with ASD are more prone and vulnerable to the negative impacts of the COVID-19 pandemic. Reduction of ABA therapy, caused impacts of clinical evolutions for development, learning and social exposure.	
Mutluer; Doenyas; Genc, 2020	Increased stereotyping, aggression, hypersensitivity, behavior problems, and sleep and appetite changes. In addition to the increase in tics, changes in the eating pattern and self-mutilation. By the perception and observation of the parents, they indicated greater deterioration in communication; increased stereotypes, hypersensitivity and aggression; changes in appetite; and the emergence of new tics or an increase in existing tics during the Covid-19 period.	

Vasa <i>et al.</i> , 2021	Worsening of pre-pandemic psychiatric diagnoses and/or the development of new psychiatric symptoms during the pandemic, especially observed 2 months after the onset of COVID-19. Pre-existing depression is more prone to exacerbate, followed by disruptive behavior and anxiety disorders. New symptoms arose, such as irritability, sleep changes and anxiety in children with ASD.	
Panjwani; Bailey; Kelleher, 2021	Increased distraction and discussion, hyperactivity, seizures, and disrupted sleep patterns. In addition to higher rates of change in self-harming behaviors and nightmares, as well as crying, repetitive behaviors or interests, attachment, aggressiveness and compulsiveness (eating and routine).	Decreased seizures, hyperactivity, and aggressive behaviors in about 10% of the children analyzed.
Siracusano <i>et al.</i> , 2021	After compulsory home confinement, there was a significant worsening in adaptive functioning and problematic and repetitive behaviors.	Improvement in adaptive skills, being the result of digital intervention (online) provided during the confinement and continuity of the parents' work in the home environment.

Source: Selected articles

From the exposure of the data in Table 2, it is evident the records and unfavorable occurrences to the behavioral change of children with autism during COVID-19. Works such as Bellomo *et al.* (2020), point out the efficacy of continued treatment by ABA-based intervention and how the rupture, somewhat abrupt, of treatment causes damage to the development and learning of children. In addition to isolation and routine breakage, which are factors that directly contribute to the behavioral and emotional dysregulation of children who present patterns of systematic and repetitive behaviors.

Other important results were also scored, such as the challenge for *parents and educators in the lockdown period*, because with the mandatory movement to close schools indefinitely, children with autism lost their routines, in addition to development activities that culminated in the evolution and behavioral modification, requiring parents to develop for the application of interventions in the home environment, with the supervision and online guidance of teachers (AMORIM *et al.*, 2020; BELLOMO *et al.*, 2020; COLIZZI *et al.*, 2020;

MUTLUER; DOENYAS; GENC, 2020; SIRACUSANO *et al.*, 2021). The unexpected performance of parents in the evolutionary process, that is, the application of ABA interventions, with requirements similar to those of professionals specialized in the area (in order to obtain good results and continuation of treatment) culminated in the illness of these individuals, indicating higher rates of stress and anxiety, in addition to emotional and psychological overload (AMORIM *et al.*, 2020; BELLOMO *et al.*, 2020; MUTLUER; DOENYAS; GENC, 2020).

Although online care during this period indicated certain limitations, especially for internet access and costs to which not everyone has and have, at the apex of the pandemic, access, it was still evident how much the continued process of intervention by digital means contributed to the development of children with autism, thus not causing, in this way, total damage to all clinical evolution obtained up to the historical moment of the pandemic that had been carried out in face-to-face format (BELLOMO *et al.*, 2020; SIRACUSANO *et al.*, 2021). In addition to contributing to the reduction of psychological damage of children with ASD within the atypical and irregular context of social isolation, however unfortunately such access has not been done nor will make it accessible to everyone for reasons of socioeconomic inequality.

Discussion

This article, which aimed to evaluate the impact and the main changes in behavior in children diagnosed with ASD during the context of outbreak of the COVID-19 pandemic, based on a systematic review, obtained results relevant both to the scientific community and professionals working in the area of autism, as well as to parents and educators. The results of the selected studies indicated changes in the behavioral pattern of children diagnosed with ASD during the compulsory social isolation of COVID-19, attracting attention to actors involved in this theme for studies that move towards harm reduction, as well as the easing of alterations that have already been established in the repertoire of people with autism.

Based on the results, it was observed the identification of behavioral changes in children with ASD, such as anxiety and tantrum behaviors, hyperactivity, aggressiveness, increased stereotypes, sleep and eating dysregulation and routine in general, in addition to the increase in self-harming behaviors (self-mutilation) (AMORIM *et al.*, 2020; MUTLUER; DOENYAS; GENC, 2020; PANJWANI; BAILEY; KELLEHER, 2021; SERGI *et al.*, 2021; SIRACUSANO *et al.*, 2021; VASA *et al.*, 2021), these data corroborate the literature, which indicates such

negative behavioral changes in children with autism, and highlight the concern about a possible evolution of such long-term clinical conditions and setbacks (ALVES *et al.*, 2020; BRUNI *et al.*, 2022; PANDA *et al.*, 2020). Other alterations that also corroborate the literature are identified and observed specifically by the works of Colizzi *et al.* (2020) and Vasa *et al.* (2021) regarding the emotional aspects of children in this period of isolation, regarding changes in levels of depression, anxiety and stress (BRUNI *et al.*, 2022; HALSTEAD *et al.*, 2021; PANDA *et al.*, 2020; NARZISI, 2020), and behavioral alterations of aba reduction and/or rupture therapy (BELLOMO *et al.*, 2020) data that were also indicated by Body, McDonough and Bodfish, (2012) and Peters-Scheffer *et al.* (2011).

The authors Bellomo *et al.* (2020) also highlight pertinent information regarding treatment rupture, indicating that *isolation and lockdown decreased* and/or interrupted access to quality therapy (face-to-face), harming the evolution of children and increasing the stress placed on parents/caregivers. Although Siracusano *et al.*, 2021 indicated excellent fruits regarding the online continuity of therapies, avoiding greater losses in a comparison to an abrupt withdrawal from therapy, Bellomo *et al.*, 2020 point out that such services have a high cost, which not everyone has access to, as well as access to the means for such care, such as computers and the Internet, which made it difficult to access and spread, as well as effectiveness of this service to all, making it a privilege for some.

Final considerations

The period of compulsory isolation during COVID-19 brought general repercussions to the population, culminating in changes in behavior patterns and drastic changes in routine. In this scenario, children diagnosed with ASD suffered intensely the negative impacts of this historical moment, because with the breakdown of the routine and, concomitantly, of care and therapeutic interventions, many children ended up deregulating and having a setback in their behavioral development.

Attention to such changes in the behavior patterns of children with autism is extremely important, not only for parents and caregivers, but also educators and health professionals, in order to reverse and/or minimally mitigate, providing again quality of life and emotional stability to autistic people. Further studies in the area are of central need, because, with such a scenario of instability, changes can still arise, in addition to the fact that new research and studies from this perspective will be important to understand the behavioral and emotional impacts in the post-pandemic context.

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