Review

Impact of COVID-19 on Child Development: A Systematic Review

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Abstract: Background: As a result of the pandemic, families and children have faced physical, emotional, and mental challenges. However, there has been little attention given to the relationship between the COVID-19 pandemic and child development. This systematic review aims to identify the impact of the pandemic on child development, globally. Methods: The study uses the PRISMA guidelines for the systematic review of 16 quantitative and qualitative studies performed between 2020-2023. Results: This systematic review suggest that the coronavirus pandemic played a major part in hindering child development in early childhood. Conclusion: Therefore, it is important to encourage and carry out the use of policies and strategies to overcome these obstacles.

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1. Introduction

In the United States, children and families have been significantly impacted by the COVID-19 pandemic [1]. As a result of the pandemic, families and children have faced physical, emotional, and mental challenges [2,3]. However, researchers have focused more on the impact of COVID-19 on adults and adolescent mental health [4,5]. There has been little attention given to the relationship between the COVID-19 pandemic and child development [6].

The impact of the COVID-19 pandemic on child development should be a focal point in education research due to the importance of normal child development, which leads to socially, emotionally, and educationally developed children, and adults [7,8]. Poor child development in early childhood can result in learning challenges and difficulty with social interactions, and dependency and nonproductive behaviors in adulthood. [9,10]. All of these outcomes are not needed in a world that is permeated with both physical and mental health challenges for all ages. Due to the negative impact that the pandemic has had, it is imperative to review the impact of COVID-19 on child development to understand the relationship and to provide strategies that can be implemented to address poor developmental outcomes in children.

The aim of the systematic review was to assess the impact of the COVID-19 pandemic on child development. Specifically, the objectives of this review are: (1) To identify the impact of the pandemic on child development, globally, (2) To provide quality research that will inform parents, early childhood educators, and education policy makers about developmental challenges associated with the pandemic to overcome any obstacles to positive developmental outcomes.

2. Materials and Methods

The review involved studies following the PRISMA criterion [11]. The study focuses on published initial articles dealing with the impact of COVID-19 on child development. Table 1 depicts the inclusions and exclusions from the review.

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Table 1. Inclusion and Exclusion Criteria.

Inclusion Criteria	Exclusion Criteria
Quantitative Studies	
Qualitative Studies	Studies that were not in English
Human Studies	Studies that only involved ages 9 and older
Scholarly Papers	Review articles
Age group: 0-8 years	Not human studies
COVID-19	
Child Development	

2.1. Search Guidelines

The primary search engines used to identify articles included EBSCOhost, Google Scholar, CINAHL, Consumer Health Complete, Education Research Complete, Educational Administration Abstracts, Health Source: Nursing/Academic, APA PsychArticles, Psychology and Behavioral Sciences Collection, APA PsychInfo, and Teacher Reference Center. The studies were chosen for the review based on inclusion criteria, such as (1) articles being written in English; (2) being quantitative studies; (3) being qualitative studies (4) scholarly papers; (5) including humans between 0-8 years old; (5) associated with COVID-19; and (6) associated with child development. The search was executed on 24 April 2023. The time limit for the studies included in the review was between 2020–2023. Table 2 shows the search string.

Table 2. Research Thread for all Databases.

Search Strategy	No. of Studies Available
Search terms used: 'COVID-19' OR 'COVID-19 pandemic' OR 'SARS-CoV-2 ' OR 'child development	345,000
Total number of excluded studies based on eligibility criteria	332,500
Total number of excluded studies due to duplications	12,000
Total number of studies excluded because either they were review articles	484
Total number of studies accepted and reviewed	16

2.2. Screening Guidelines

The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (2009) were used as a guide to evaluate the review process [11]. Selected abstracts were reviewed to ensure eligibility. Full-text articles of eligible abstracts were retrieved and selected based on the research questions and the inclusion criteria. Studies were selected for the review if a consensus was reached by the researchers.

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Research Information System (RIS) formed references were exported from journal databases, where articles were automatically assessed based on the inclusion criteria and then imported into CADIMA. CADIMA screened 500 imported studies based on title and abstracts. Each researcher screened the studies twice before conferring about if studies should be chosen for full-text review. Conflicts were controlled by group discussions between the study's researchers. After the first discussion, the researchers decided that 500 studies should be screened using the inclusion criteria. During the second stage of screening for the exclusion of review articles, the researchers independently assessed the 500 articles two times for the second time. Conflicts were handled by group discussions. After the final discussion, 484 more articles were not selected because they were review articles, and 16 articles were chosen to be put in the systematic review. The PRISMA flow chart (Figure 1) depicts the search and inclusion process for the systematic review.

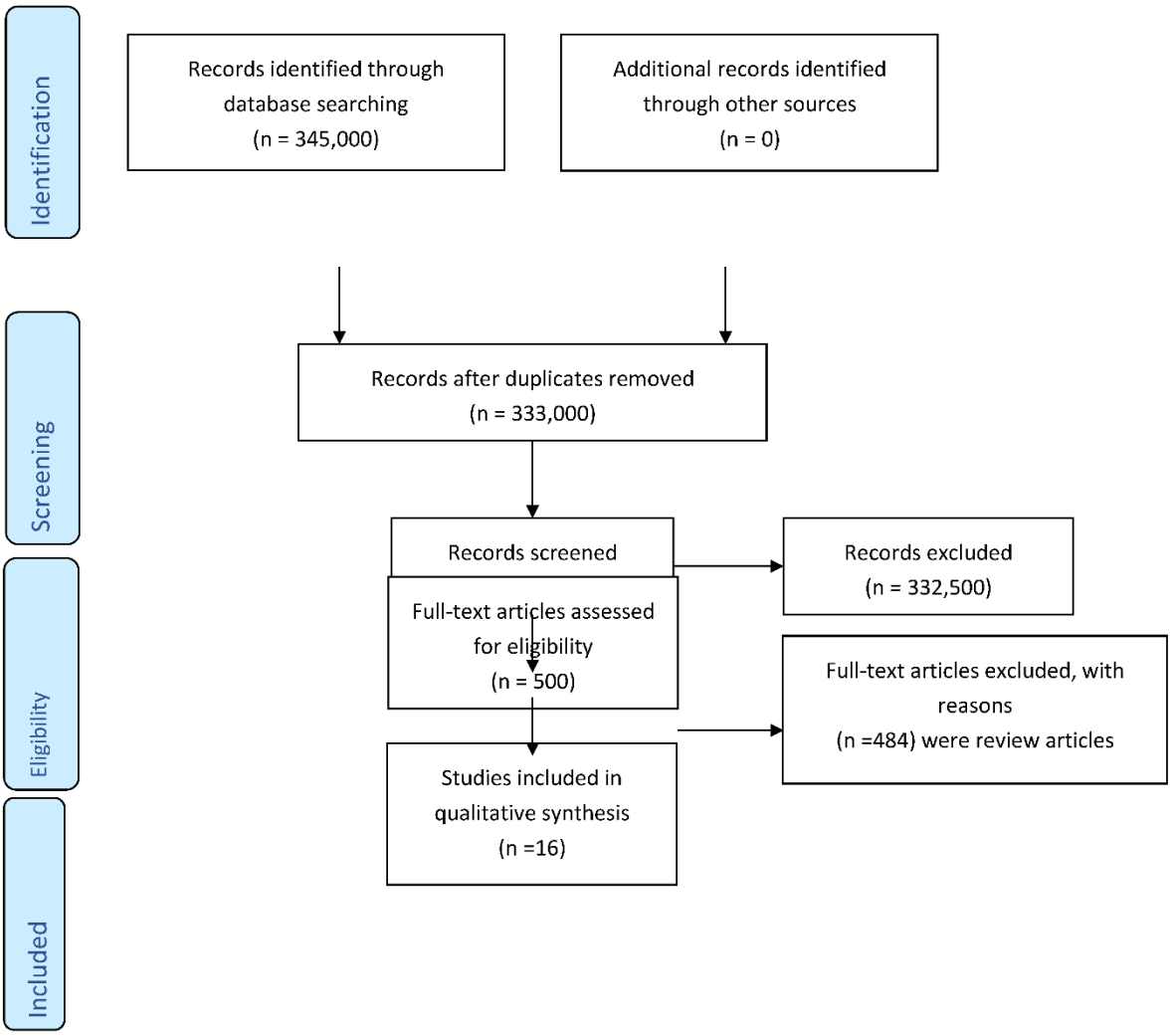

Figure 1. PRISMA flow chart.

2.3. Quality Appraisal

CADIMA was used to appraise studies for quality. CADIMA was also used to establish standards for critical appraisal and defined the rating scale. The critical appraisal tools for systematic reviews developed by the University of Adelaide, South Australia was followed to critically appraise the studies [12]. A rating scale from 0 to 3 was based on the following criteria: (1) Study design—studies defined as cross-sectional, case–control, or cohort study were scored as 1, otherwise the studies were scored as 0; (2) Sample size—studies were defined as large and were scored as a 1, while small studies were scored as 0; (3) Selection of participants—studies that implemented random

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selection or lacked bias were scored as 1, while studies that implemented non-random sample or convenience sample or reflected bias were scored with 0 points. Based on the above-mentioned criteria, each researcher rated each of the 16 studies independently from a range of 0 to 3. Due to having no major inter-observer variations in the evaluation of the quality of the studies, an average of the three scores was presented in Table 3 under the quality appraisal section.

3. Results

A synopsis of the methods, attribute/characteristic of findings, the impact of COVID-19 on child development, quality appraisal, and the countries of the studies are presented in Table 3. Of the 16 studies reviewed, 4 were conducted in the United States, 3 were conducted in Indonesia, 2 were conducted in Germany and 1 each in Australia, Canada, China, Africa, United Kingdom, and globally. 15 studies were quantitative and 1 study was qualitative. All the studies chosen in the review involved children, ranging from infancy to eight years old.

The sample size used in studies ranged from 12 to 2,000,000, having a median sample size of 762 (Quartile-1 = 12 and Quartile-3 = 36,000); 7 out of 16 (44%) had sample sizes of more than 1000. All studies (100%) used standardized assessment tools.

An average score of 3 out of 3, meant excellent in 13 studies (81%), 2 meant moderate/good in 3 studies (19%), and no study scored 0-1, which meant poor.

3.1. Benefits of COVID-19 on Child Development

Of the 16 studies, 1 (6%) showed the benefits of COVID-19 on child development. One study found that the COVID-19 pandemic benefited child development [13]. The study established that child development was benefited in 4 areas- allowing children to learn new skills, getting children indulged in indoor physical activities, personality development, and self-confidence build up [13]. The benefits to child development by allowing children to learn new skills gave children an advantage of learning new educational methods that would benefit them later in life [13]. Being indulged in indoor physical activities benefited child development by allowing children to get involved physically, and creatively by learning new ways to be physically active indoors [13]. Personality development and self-confidence build up also benefited child development by establishing social-emotional strengths that will benefit children as they progress into adulthood [13].

3.2. Lack of Benefits of COVID-19 on Child Development

Of the 16 studies, 15 (94%) supported the notion that child development was negatively impacted by COVID-19. Several studies constituted that child development, explicitly social and emotional development, was negatively affected by the pandemic. One study emphasized that COVID-19 related stress on the family leads to negative impacts on child development, specifically, social, and emotional development [14]. The study also concluded that the social and emotional developmental challenges are expressed in children as conduct problems and callous unemotional disruptions. Another study also revealed that the pandemic resulted in detrimental effects on child development, specifically social and emotional development [15]. The study also found that less independent children had more issues with their social behavior than independent children, who were left to "clean-up the mess [fallout]" [15]. Another study also determined that COVID-19 negatively impacted child development, explicitly social development [16]. The study also found that social isolation from stay at home polices resulted in challenges with social development in early childhood [16]. Another study also acknowledged that child development, specifically social development was impaired by the pandemic [17]. Another study also confirmed that child development, distinctly social development, was negatively impacted by the COVID-19 pandemic [18]. The study recognized that the increased use of technology and lack of social interaction hindered social and emotional development. The study also found that the pandemic resulted in social delays in early childhood.

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Several other studies attributed the negative effects of the pandemic to hindering learning skills associated with child development. A study found that the learning loss from not physically attending in-person school would be difficult to overcome and that it would greatly impact those in stages of early childhood as they may lack foundational learning skills [19]. A different study also identified learning challenges associated with child development due to the pandemic [20]. The study found that the pandemic resulted in significant decreases in mathematics and language skills. Another study also found that school closures, physical distancing, and the lack of community-based services resulted in a negative impact on learning development that is significantly important in child development [21]. A different study also noted that the pandemic delayed the development of fine motor skills, and community skills in early childhood [22]. A study also identified that the pandemic affected learning skills involved in child development, such as vocabulary, language, and executive functions [23]. A study also found that parental unemployment and stress due to the pandemic caused impairments in learning skills that resulted in the loss of academic achievement and the lack of appropriate development [24].

Several other studies found that the pandemic negatively impacted child development by causing delays and challenges. Two studies noted that children faced child development delays due to school closures associated with the pandemic [25,26]. Another study also noted that children encountered developmental challenges caused by the COVID-19 pandemic [27]. A study also concluded that the pandemic caused developmental challenges to child development for children, who were enrolled in/attended early childhood education centers and for children, who were not enrolled in/did not attend early childhood education centers [28].

Table 3. Impact of COVID-19 on Child Development.

Author [REF]	Major Findings	Impact of COVID-19 on Child Development	Quality Appraisal (Out of 3)	Country of Study
Brown et al. [19]	n=121; Majority of the children in the study faced developmental challenges that affected learning, social, and wellbeing outcomes	Yes-negative	3-excellent	Australia
Quenzer-Alfred et al. [20]	n= 49; Children, who were unable to attend preschool due to the pandemic faced developmental challenges that resulted in significant decreases in language and mathematical skills compared to children, who were able to attend preschool prior to the pandemic	Yes-negative	3-excellent	Germany
Whitley et al. [21]	n= 6000; The COVID-19 pandemic negatively affected children's ability to learn and develop due to physical distancing, school closures, and the lack of community-based services	Yes-negative	3-excellent	Canada
Waller [14]	n= 303; Surveyed parents felt that the pandemic resulted in challenges in social and emotional development based on the high rate and frequency of child conduct problems, and callous-unemotional traits.	Yes-negative	3-excellent	United States
Ekyana et al. [15]	n=150; Surveyed parents revealed that children faced social development delays	Yes-negative	3-excellent	Indonesia
Huang et al. [22]	n= 6,054; Neurodevelopment assessments were conducted on 6-month and 1 year old children, which resulted in an increased risk of delays in	Yes-negative	3-excellent	China

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	fine motor skills, and communication skills for children, who experienced the COVID-19 pandemic			
Spaull et al. [25]	n=19,741; Children faced developmental delays during the pandemic due to preschool and school closures, which resulted in challenges with mental health, nutrition, and physical health	Yes-negative	2-good	Africa
Davies et al. [23]	n= 189; Parent-report data from families revealed that children, ages 8 to 36 months, who continued to receive early childhood education and care during the pandemic had more growth in vocabulary, and language and executive functions than children that did not receive early childhood education and care during the pandemic	Yes-negative	3-excellent	United Kingdom
Najamuddin et al. [16]	Qualitative; COVID-19 negatively affected social development among children in stages of early childhood	Yes-negative	2-good	Indonesia
Gupta et al. [13]	n= 2,000,000; COVID-19 positively impacted child development in children by allowing them to learn new skills, getting indulged in indoor physical activities, self-confidence build, and personality development	Yes-positive	2-good	Global
Dillman et al. [17]	n=90; Parental perceived stress resulted in delays in social-emotional child development	Yes-negative	3-excellent	Germany
Deoni et al. [27]	n=762; The environmental changes associated with the COVID-19 pandemic negatively impacted child development	Yes-negative	3-excellent	United States
Wijaya et al. [18]	n= 12 mothers; Increased use of technology and lack of social interaction resulted in poor social and emotional development in children, ages 0-8 years	Yes-negative	3-excellent	Indonesia
Lee et al. [26]	n= 85, 328; Two-thirds of childcare centers closed in the sample of U.S. counties resulted in delays in child development	Yes-negative	3-excellent	United States
Cascio et al. [28]	n= 60,000; Children, who enrolled in/attended early childhood education centers and children, who were not enrolled in/did not attend early childhood education centers faced the same developmental challenges during the pandemic	Yes-negative	3-excellent	United States
Parolin et al. [24]	n=36,000; Unemployment and stress directly affected child development (i.e., academic achievement and behavior)	Yes-negative	3-excellent	United States

4. Discussion

4.1. Negative Effects of the COVID-19 Pandemic on Child Development

In this systematic review, there was strong evidence to support that the COVID-19 pandemic detrimentally affected child development. The pandemic resulted in social and emotional developmental challenges within the child development process. The pandemic also negatively impacted learning milestones within child development stages, resulted in developmental delays, and resulted in classroom disruptions, lower levels of academic success, and mental health issues in adulthood. Understanding the role of the pandemic in effecting child development can allow parents, early childhood educators, and educational policy makers to implement actions that will assist with helping young children adapt as they manage dealing with the effects of the pandemic. This includes recognizing and addressing fear and stress, keeping children healthy, and helping children stay socially connected. This finding has been supported by two other studies [29,30]. These authors found significant negative relationships between the COVID-19 pandemic and child developmental outcomes in early childhood.

4.2. Child Developmental Benefits from the COVID-19 Pandemic

While most of the studies in the review revealed the negative impacts of the COVID-19 pandemic on child development in stages of early childhood, there was still one study that found benefits to child developmental outcomes. In this review, 1 study found benefits to child developmental progressions for young children during the current pandemic. The study found that the pandemic improved child developmental outcomes by providing an opportunity for young children to become more familiar with technology that can be used as the grow and mature, by providing a means to engage in physical indoor activities, and by improving esteem and resiliency, which fosters confidence and benevolent and strong personalities. These findings might differ from most studies due to the sample of participants screened within the study being more aware of strategies to support their children during periods of crisis, such as the COVID-19 pandemic.

5. Conclusions

Globally, the COVID-19 pandemic has played a significant role in negatively impacting child development. The pandemic has caused poor child development outcomes that have resulted in delays, social and emotional challenges, and difficulty mastering learning milestones within early childhood. Revealing that young children could benefit from the implementation of policies and strategies that could assist parents in providing support for young children, such as promoting CDC parental resources for early childhood, innovative, and accessible virtual learning tools, ensuring the provision of community-based services, and alleviating economic strain on parents and families. Further research is needed to study the impact of the COVID-19 pandemic on child development after and before the pandemic to gauge a true measurement of the possible strain.

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