

# Consequences of the COVID-19 Pandemic on Child Development: An Integrative Literature Review

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✉ **Ana María Quezada-Ugalde**

<https://orcid.org/0000-0003-1855-6894>  
Universidad de La Laguna, Spain  
ana.quezada.ugalde.16@ull.edu.es

**Alfonso Miguel García-Hernández**

<https://orcid.org/0000-0002-2838-8735>  
Universidad de La Laguna, Spain  
almigar@ull.edu.es

**José Alfonso Maya-Barrios**

<https://orcid.org/0000-0003-0474-4165>  
Hospital General Dr. Manuel Gea González, Mexico  
jamayab@hotmail.com

**Alejandra Auza-Benavides**

<https://orcid.org/0000-0002-7592-4625>  
Hospital General Dr. Manuel Gea González, Mexico  
alejandra.auza@yahoo.com

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**Theme:** Health, well-being, and quality of life promotion

**Contribution to the subject:** This review offers an overview of the effects on child development in children aged less than 5 years old that were living with their parents during the COVID-19 pandemic years, allowing evidencing the need to prioritize care for timely detection and assistance of neurodevelopmental changes. These tasks are action spaces where pediatric nursing and other disciplines linked to childcare should work jointly, as part of a surveillance system.

## Abstract

**Introduction:** The COVID-19 pandemic reduced the possibilities of generating stimulating spaces for children's development, as all the systems with which a child interacts during this phase were affected. **Objective:** To identify the existing scientific evidence about the effects on child development in children aged less than 5 years old that were living with their parents while the social distancing measures adopted due to COVID-19 were in force. **Method:** An integrative review guided by the framework proposed by Whitemore and Knafl and the PRISMA statement, to consult the following databases: Medline, ScienceDirect, Scopus and SciELO, with a search performed in English using these descriptors: "child development," "growth and development," "parenting," "teleworking," "infant care," "home nursing," "social isolation," "coronavirus infections," and "COVID-19." The eligibility criteria were as follows: quantitative or qualitative studies that addressed the direct effects of the pandemic on children aged less than 5 years old; in turn, the exclusion criteria corresponded to articles with a population comprised of children with diagnosed developmental disorders or disabilities. **Results:** A total of 17 articles were included, whose findings were classified into the following categories: *Exposure to risk stimuli*, *Deprivation of stimuli*, and *Exposure to protective stimuli*. It is revealed that parental stress, absence of games and lower exposure to interactions that promote development are connected to changes in cognitive, emotional, and learning processing, in addition to exerting a negative impact on motor and language development. **Conclusion:** The evidence suggests that social distancing can be the main cause for the onset of delays in child development, in its motor, language, cognitive, and socioemotional areas.

### Keywords (Source: DeCS)

Child development; COVID-19; pediatric nursing; caregivers; environment; family.

## 4 Consecuencias en el desarrollo infantil derivadas de la pandemia por covid-19: revisión integrativa de literatura

### Resumen

**Introducción:** la pandemia por la covid-19 disminuyó las posibilidades de generar espacios estimulantes para el desarrollo de los niños, puesto que todos los sistemas con los que interactúa un niño en desarrollo se vieron impactados. **Objetivo:** identificar la evidencia científica que hay sobre los efectos en el desarrollo infantil en menores de 5 años que convivieron con sus padres y madres durante las medidas de distanciamiento social tomadas por causa de la covid-19. **Método:** revisión integrativa guiada por el marco propuesto por Whitemore y Knafl, y *The Prisma Statement*, para consultar las bases de datos: Medline, ScienceDirect, Scopus y Scielo, con una búsqueda realizada en inglés, utilizando los descriptores: “child development”, “growth and development”, “parenting”, “teleworking”, “infant care”, “home nursing”, “social isolation”, “coronavirus infections”, “COVID-19”. Los criterios de elegibilidad: estudios cuantitativos o cualitativos que abordaran los efectos directos de la pandemia en niños menores de 5 años; y de exclusión: artículos con población de niñez con trastornos del desarrollo diagnosticados o discapacidad. **Resultados:** fueron incluidos 17 artículos, cuyos hallazgos se clasifican en las categorías: *exposición a estímulos de riesgo*, *privación de estímulos* y *exposición a estímulos protectores*. Se revela que el estrés parental, la ausencia de juego y una menor exposición a interacciones promotoras del desarrollo se vinculan con alteraciones en el procesamiento cognitivo, emocional y de aprendizaje, y tuvieron un impacto negativo en el desarrollo motriz y del lenguaje. **Conclusión:** la evidencia sugiere que el distanciamiento social puede ser la causa principal en la aparición de retrasos en el desarrollo infantil, en sus áreas: motriz, de lenguaje, cognitivo y socioemocional.

#### Palabras clave (Fuente DeCS)

Desarrollo infantil; COVID-19; enfermería pediátrica; cuidadores; ambiente; familia.

# Consequências no desenvolvimento infantil derivadas da pandemia de COVID-19: revisão integrativa da literatura

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## Resumo

**Introdução:** a pandemia de COVID-19 diminuiu as possibilidades de criar espaços estimulantes para o desenvolvimento das crianças, uma vez que todos os sistemas com os quais uma criança em desenvolvimento interage foram afetados. **Objetivo:** identificar a evidência científica sobre os efeitos no desenvolvimento infantil das crianças com menos de 5 anos que viveram com os pais durante as medidas de distanciamento social adotadas devido à pandemia de COVID-19. **Método:** revisão integrativa orientada pelo quadro proposto por Whittmore e Knafl, e *The PRISMA Statement*, para consultar as seguintes bases de dados: Medline, ScienceDirect, Scopus e SciELO, com uma pesquisa efetuada em inglês, utilizando os descritores: “child development”, “growth and development”, “parenting”, “teleworking”, “infant care”, “home nursing”, “social isolation”, “coronavirus infections”, “COVID-19”. Critérios de elegibilidade: estudos quantitativos ou qualitativos que abordem os efeitos diretos da pandemia em crianças com menos de 5 anos de idade; e critérios de exclusão: artigos com uma população de crianças com distúrbios de desenvolvimento diagnosticados ou deficiência. **Resultados:** foram incluídos 17 artigos, cujos resultados se enquadram nas categorias: *exposição a estímulos de risco*, *privação de estímulos* e *exposição a estímulos protetores*. Verificou-se que o stress parental, a ausência de brincadeiras e a menor exposição a interações de apoio ao desenvolvimento estavam associados a alterações no processamento cognitivo, emocional e de aprendizagem, e tinham um impacto negativo no desenvolvimento motor e da linguagem. **Conclusão:** os dados sugerem que o distanciamento social pode ser a principal causa de atrasos no desenvolvimento da criança nas áreas motora, linguística, cognitiva e socioemocional.

### Palavras-chave (Fuente: DeCS)

Desenvolvimento infantil; COVID-19; enfermagem pediátrica; cuidadores; meio ambiente; família.

## Introduction

Child development encompasses a series of biological, physiological, and behavioral changes in children from the moment they are born, when they are fully dependent, until their adolescence, when they achieve certain autonomy (1, 2). The first five years of life, characterized by high brain plasticity (3, 4), are especially important for children to have timely promotion experiences and to interact with their environment, aiming to reach optimum levels of physical, cognitive, language, and social development (5, 6).

Ecological Theory (7) confirms how the interactions between a person and their environment can significantly affect human development, it describes the ecological environment as a set of nested structures that extend beyond the immediate situation faced by an individual and which is comprised of four levels: a) micro-system, defined as the inter-relations within the developing person's closest environment (e.g., school, community, group of peers); b) meso-system, which is the interconnection between the micro-systems; c) exo-system, which includes the elements with which the developing person has no contact but that produce events affecting their immediate environment (e.g., parents' workplaces, communication media); and d) macro-system, which represents the culture and its subcultures, the social institutions, the health policy and the values (7, 8).

In this regard, brain development results from the interaction between biological and environmental influences. In the first years of life, those interactions should be generated by the caregivers, who should motivate children to move and turn around, providing them objects to explore, reach, and play with; in addition, during this stage, children need love and affection and that their hunger, tiredness, sleep, sadness, or happiness signals are acknowledged (6, 9).

In this sense, the father-/mother-child relationship becomes the center of the environment for children. The interactions between mothers and their newborns were carefully observed in a longitudinal study, finding that, when the caregiver intervenes confidently with the infant and constantly generates social interactions, the child's functionality is protected and premature maturation of structures such as the amygdala and hippocampus is prevented (which intervene in the memory and socioemotional relationships processes) (10). In opposition, the absence of a bond with a caregiver due to abandonment situations, for example in institutionalized children (11), severely impairs neuronal circuits, which generates future developmental delays and behavioral deficits (12).

During the years of the COVID-19 pandemic, families faced demanding childcare situations. Their routines were disrupted, as the parents had to work from their homes, take care of household chores, assist their children's education and simultaneously meet the rest of their demands. All this produced an increase in the onset of parental

anxiety, depression, and stress, which in turn triggered negligent or punitive parenting situations and unfavorable environments for the progression of children's cognitive, socioemotional, and communication skills (13-15).

It can be asserted that the pandemic did not only cause physical ailments in people or communities (16); this phenomenon also reduced the possibilities of generating stimulating spaces for children's development (17). In terms of the Ecological Theory, all systems with which developing children interact were affected (7).

It is also known that experiencing adverse events in childhood (such as natural disasters, wars, confinement, or chronic stress) can impair children's neurodevelopment (18, 19). In this sense, the COVID-19 pandemic equals a natural disaster (20), and it is possible the impact generated on the child population is not yet tangible.

However, this integrative review will allow conducting a search, critical assessment, and synthesis of the diverse available evidence (21), to know the effects on child development in children aged less than 5 years old that were living with their parents while the social distancing measures adopted were in force. The topic is of utmost importance for all health areas, especially for the Nursing discipline, as there is an urgent need to devise care actions around young children, putting into practice continuous programs to evaluate development and instruct families on the care to be provided for optimum child development (1, 9).

## Methodology

An integrative review was conducted following the five-phase design proposed by Whittemore and Knafl: 1) Identification of the problem; 2) Search in the literature; 3) Assessment of the information; 4) Analysis of the information, and 5) Presentation (22). In addition, to improve quality and transparency, the PRISMA statement guide extension was adopted as a reference (23).

In the first phase, Identification of the problem, it was determined that the review purpose would be to know the effects on child development in children aged less than 5 years old that were living with their parents while the social distancing measures adopted due to COVID-19 were in force. For this reason, the research question was formulated according to the PICo strategy (Population, Phenomenon of Interest, and Context) (24), where P: children aged less than 5 years old, I: effects on child development due to social distancing and the parents' remote work; and Co: during the COVID-19 pandemic. This strategy allowed the formulation of the question: What were the effects of social distancing and the parents' remote work during the COVID-19 pandemic on the development of children aged less than 5 years old?

For the second stage, Search in the literature, the following databases were chosen: Medical Literature Analysis and Retrieval System Online (Medline), Elsevier ScienceDirect, Elsevier Scopus and Scientific Electronic Library Online (SciELO). The search was independently and simultaneously conducted by two of the researchers in January and February 2022. Given the novelty of the theme, the research was only carried out in English, using DeCS and MeSH to select the descriptors: “child development,” “growth and development,” “parenting,” “teleworking,” “infant care,” “home nursing,” “social isolation,” “coronavirus infections,” and “COVID-19.” These terms were combined one-to-one using the AND and OR Boolean operators to generate algorithms (presented in Table 1), and thus reach the maximum variability possible. Likewise, organization, selection and identification of duplicates regarding the information was managed in the Mendeley tool (25).

**Table 1.** Search Algorithms

Concept	Boolean operator	Concept	Boolean operator	Concept
Child development	<b>AND /OR</b>	Parenting Teleworking Infant care Home nursing Social isolation	<b>AND /OR</b>	Coronavirus infections
Child development		Parenting Teleworking Infant care Home nursing Social isolation		COVID-19
Growth and development		Parenting Teleworking Infant care Home nursing Social isolation		Coronavirus infections
Growth and development		Parenting Teleworking Infant care Home nursing Social isolation		COVID-19

Source: Prepared by the authors.

Additionally, the eligibility criteria included quantitative studies (observational, correlational, experimental, and cohort) and qualitative studies (descriptive, phenomenological, case, and ethnographic studies) published in scientific journals and addressing the direct effects of the pandemic on the child population aged from 0 to 5 years old, even if the manuscripts included other age groups. The exclusion criterion was applied to articles corresponding to dissertations, monographs, editorials or letters to the editor, as well as to publications whose populations were comprised of children with diagnosed developmental disorders or disabilities.



Employing this strategy, the two researchers who conducted the search initially identified 4486 documents. In addition, another researcher manually sought research studies in the references from those included. However, no publications were added with this strategy. The detailed information flow is presented in Figure 1.

The third phase, Information assessment, was performed independently by three researchers. One of them assessed eligibility and discarded the documents that failed to meet the requirements established, whereas the other two researchers read the studies, evaluating their quality and pertinence regarding the phenomenon under study. Any discrepancies were solved by consensus, with a fourth reviewer available in case no agreement was reached.

For each study, the critical assessment tools proposed by the JBI (26) were considered, which include a checklist with the following answer options: Yes, No, Unclear, and Does not apply. The level of evidence was established according to the recommendations set forth by the Oxford University Centre for Evidence-based Medicine (27).

The data were extracted by two independent researchers who resorted to the data extraction tool proposed by the JBI (26) to summarize and organize them, materials with which an emptying matrix was prepared where the year, title, objective, design, population, main results, discussion, conclusions, limitations, and recommendations from each of the publications were detailed. Consequently, visualization was eased, which served as the starting point for data interpretation.

The next step consisted of coding, categorizing and summarizing the data to produce answers to the research question. This practice corresponds to the fourth phase: Analysis of the information. A second matrix was designed to present the relevant information from each article included in the analysis (Table 2), which was grouped according to the effects found in the child population.

Iteratively, the research team made comparisons between the groupings to identify patterns in common that allowed defining the categories organized for their presentation. In the fifth and last stage, the emerging categories are presented, and the results of this document are described.

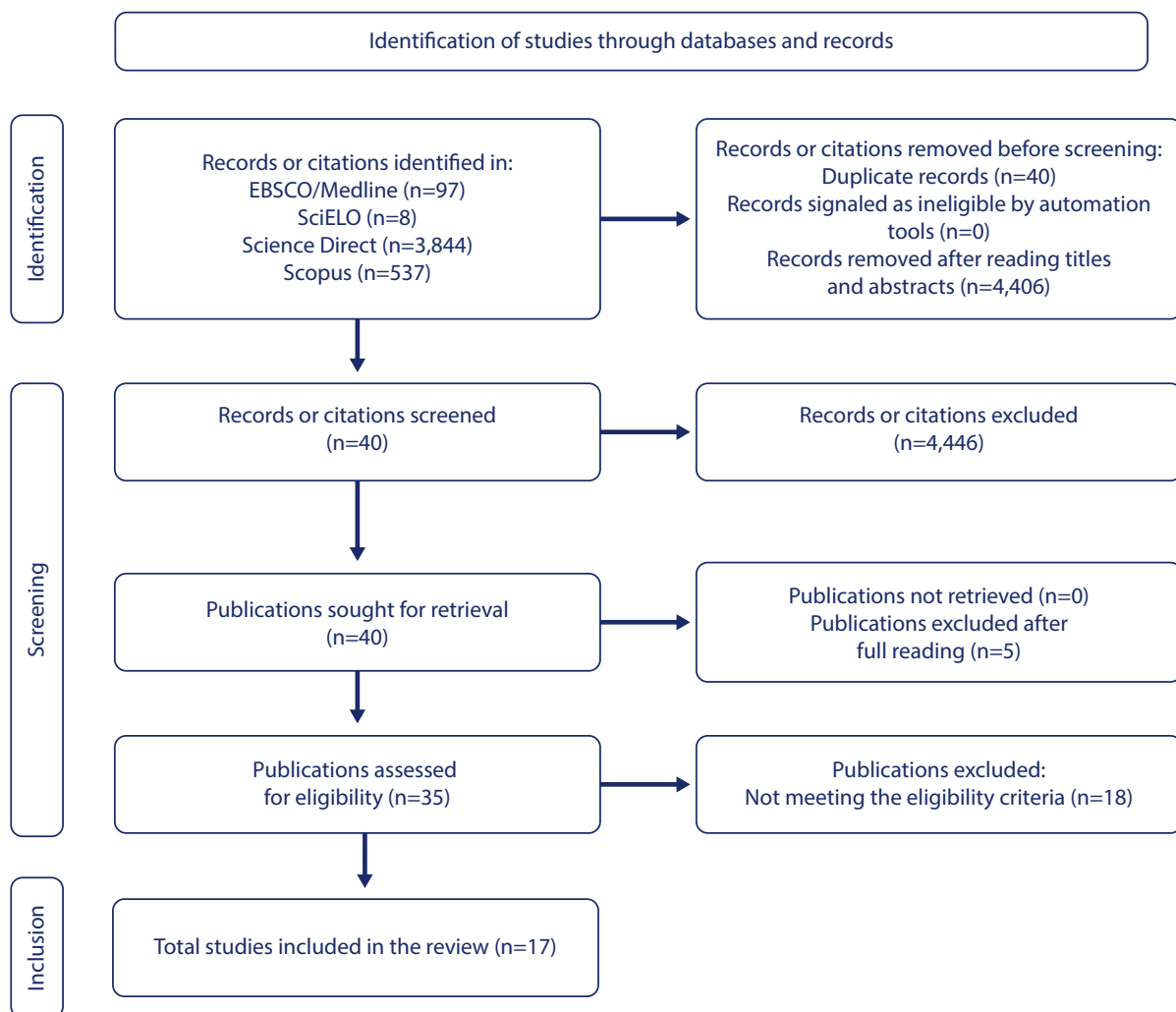
The bioethical principles applied to the context of an integrative review were met. Authorship of the studies and publications included was respected at all times, and the materials acquired from indexed scientific journals. This paper has academic purposes, with the intention of knowing the current situation around child development and the actions that health professionals should take.

## Results

The search process yielded a total of 4,486 documents; however, 4,451 articles were removed after applying the inclusion and exclusion criteria. The main reasons for this were document duplicity, not being research studies, not belonging to the knowledge area of interest or not answering the research question.

Once this stage was concluded, 35 productions were analyzed in their entirety and 18 of them were discarded because they were not connected to child development and, thus, failed to answer the research question; therefore, 17 scientific productions were included in this integrative review. Figure 1 shows the flow to select the studies.

**Figure 1.** Flowchart Corresponding to the Articles Included in the Study



Source: Adapted from the PRISMA statement (23).

When characterizing the studies according to their origin, most of them (n=8) were developed in North American countries (United States, Mexico and Canada), followed by Asia (n=5) (Indonesia, Japan, Korea and China), the European continent (n=3) (Spain, United Kingdom and Portugal) and, finally, South America (n=1) (Brazil).

According to the knowledge areas, most of the studies are grounded on Psychology, Psychiatry or Neuropsychology (n=7), followed by Human Development (n=3), Children’s Health (n=2) and Parenthood and Family Support (n=1), as well as on academic disciplines such as Nursing (n=1), Public Health (n=1), Social Work (n=1) and Education Sciences (n=1). In addition, according to the methodology implemented, 15 articles following quantitative methods and 2 qualitative studies were included. Table 2 presents a synthesis of the main elements from the studies that comprise the final sample of this review.

**Table 2.** Characteristics of Included Studies According to the Effects on the Child Population

Authors / Year	Objective/Problem	Design	Participants	Main results	LE*
Torres-González C, Galindo-Aldana G, García-León IA, Padilla-López LA, Álvarez-Núñez DN, Espinoza-Gutiérrez YI. / 2020 (18)	To characterize the effects of voluntary social isolation due to COVID-19 on socio-family behaviors at the personal level and on the children’s activities in the house. To determine the vulnerability predictors to undergo a negative isolation experience.	Descriptive and cross-sectional	365 participants, adult parents of children aged between 1 and 12 years old.	Family well-being during isolation is a complex and multifactorial phenomenon, which also exerts specific effects on socio-family behaviors. In the child population, correlations were found between personal experience regarding isolation and changes in sleep quality, irritability, emotional control, hopes about the future, motivation, attention capability and problem-solving.	2c
Hails KA, Petts RA, Hostutler CA, Simoni M, Greene R, Snider TC, et al. / 2021 (13)	To determine whether the families’ COVID-19-related anguish is associated with young children’s emotional/behavioral functioning through negative parenting and whether these relationships vary according to events undergone by parents who have faced adverse child experiences (ACEs) <sup>†</sup> .	Descriptive and cross-sectional	267 parents of children aged from 1.5 to 5 years old.	Family anguish related to the pandemic was significantly associated with the increase in children’s emotional/behavioral problems. The parents that reported higher anguish levels were more prone to resorting to negative parenting practices (hostility, physical control and lax control), which in turn were associated with more emotional/behavioral problems in the children.	2c
Riany YE, Morawska A. / 2021 (16)	To develop and examine a model to explain how the factors identified in the literature are associated with children’s non-adaptation and skills during the pandemic.	Descriptive and cross-sectional	354 mothers/fathers with at least one child showing atypical development and aged from 2 to 10 years old.	The families with psychosocial functioning problems perceived fewer positive family interactions and more non-adaptation in the children during the pandemic. Therefore, the parents’ mental health problems derived from the pandemic affected everyday care activities, resulting in significant problems among the children (such as aggressiveness, conduct problems, and emotional/behavioral problems).	2c
Mochida S, Sanada M, Shao Q, Lee J, Takaoka J, Ando S, et al. / 2021 (20)	Research question: Were there changes in children’s psychological and physical stress during the COVID-19 pandemic and, if any, how did they manifest in children’s behaviors?	Descriptive and cross-sectional	1,030 main caregivers of children aged between 1 and 6 years old (mean of 3.8).	It was possible to identify that the mothers’ (main caregivers) schooling level and family income were related to lower stress signs in the children. There were also lower stress signs in the children that continued to attend daycare centers or kindergarten. Warm or permissive parenting protects children from presenting more stress signs, whereas punitive parenting increases them in children.	2c
Waller R, Powell T, Rodriguez Y, Corbett N, Perlstein S, White LK, et al. / 2021 (28)	To examine the associations between exposure to COVID-19, the parents’ concerns about the pandemic, strict and warm parenting practices and the children’s behavioral problems (CPs) <sup>§</sup> and insensitive-unemotional (CU) traits <sup>  </sup> .	Descriptive and cross-sectional	303 children aged between 3 and 10 years old.	Afro-American and Hispanic parents, as well as those earning lower monthly family incomes, reported greater exposure and concern in relation to COVID-19. High levels of strict parenting were related to higher CP <sup>§</sup> and CU <sup>  </sup> traits in children, whereas lower levels of warm parenting are only linked to high CU <sup>  </sup> traits.	2c

Authors / Year	Objective/Problem	Design	Participants	Main results	LE*
Huang P, Zhou F, Guo Y, Yuan S, Lin S, Lu J, et al. / 2021 (29)	To investigate the association between the coronavirus pandemic experience and neurodevelopment in children aged 6 months and 1 year old and to explore the differences in this association by birth order.	Cohort study	831 children (exposed group) and 5,223 children (unexposed group).	In 2020, the pandemic experience was associated with a higher risk of delays in the Fine Motor Skills and Communication domains during the first year of life. The association between the pandemic experience and communication delays at one year of age was only found in first-born children, not in those born afterward. No associations were observed in any domain among the 6-month-old children.	2b
Diniz E, Brandão T, Monteiro L, Veríssimo M. / 2021 (30)	To examine the direct effects of marital adjustment on children's behavior and to test if the parents' self-efficacy mediated this association during home confinement due to COVID-19.	Descriptive and cross-sectional	163 children aged between 2 and 12 years old (mean of 6.09) and their caregivers (mothers and fathers).	Greater marital adjustment (the mutual process by which gratification is developed in a couple for achieving common objectives) was related to lesser aggressive behaviors in the children. The parents' self-efficacy played a key role in explaining the association between marital adjustment and child development, contributing to increasing social competence and to reducing children's aggressiveness and emotional withdrawal during this challenging situation.	2c
Fitriahadi E, Priskila Y, Suryaningsih EK, Satriyandari Y, Intarti WD. / 2021 (31)	To perform a sociodemographic analysis of young children's growth and development during the COVID-19 pandemic in Yogyakarta, Indonesia.	Descriptive and cross-sectional	30 young children and their parents.	The sociodemographic data significantly linked to growth and development in children aged less than 5 years old were maternal schooling (**p=0.001) and family income (**p=0.000). It was determined that having Higher Education allows people to be more rational when handling life problems, resorting to more effective coping strategies. In addition, young children's development is negatively affected when their parents fail to participate directly or stimulate them. The higher the maternal schooling level, the better the knowledge about the need to stimulate child development.	3
Cardoso de Sá CS, Pombo A, Luz C, Rodrigues LP, Cordovil R. / 2021 (32)	To identify how Brazilian families with children aged less than 13 years old faced social distancing during the COVID-19 pandemic, mainly concerning the time devoted to physical and intellectual activities, games, activities in the open air and screen time.	Descriptive and cross-sectional	Families of 816 children aged from 0 to 12 years old.	The parents consider that the time children devote to practicing physical activities was reduced and that the time spent behind screens and in family activities was increased. Differences between the genders were found for screen time (boys ††> girls) and for games with no physical activity (girls ††> boys); there were effects in all the categories analyzed according to the children's age, with a trend towards an increase in the total time of sedentary lifestyle and a reduction in the time devoted to physical activity as age advanced. The increase in these activities favors the early onset of chronic diseases and changes in young children's behaviors.	2c
Gibson LY, Lockyer B, Dickerson J, Endacott C, Bridges S, McEachan RRC, et al. / 2021 (33)	To understand the experience and impact of the initial lockdown due to COVID-19 in young families with children aged less than 4 years old.	Qualitative	903 participants, Origins (n=400, Australia) and Born in Bradford (n=503, United Kingdom) cohorts.	The most common concerns were as follows: a) financial and employment insecurity; b) health anxiety due to COVID-19; c) children's education and care; d) current and future impacts of COVID-19 on society; e) child development and well-being; f) mental health; and g) not seeing friends and family members. "Positive" or enjoyable aspects were also reported, such as spending more time with the family, leading a calmer life and practicing more physical exercises.	3
Jáuregui A, Argumedo G, Medina C, Bonvecchio-Arenas A, Romero-Martínez M, Okely AD. / 2021 (34)	To investigate the correlations of the changes in the movement-related behaviors before and after the first stages of the confinement period due to COVID-19 in a nationwide sample of infants and preschool children from Mexico.	Descriptive and cross-sectional	631 caregivers or parents of children aged from 1 to 5 years old.	During the confinement period, only one out of three preschool children and infants met the physical activity recommendations and less than 4% <sup>III</sup> complied with the screen time guidelines. The data showed that only 1.3% <sup>III</sup> of the children included in this study met the movement recommendations during this period.	2c

Authors / Year	Objective/Problem	Design	Participants	Main results	LE*
Baiden Ph, LaBrenz CA, Findley E. / 2021 (35)	To examine the association between adherence to the social distancing measures and the feeling of concern/anxiety in female caregivers of children aged from 0 to 5 years old.	Descriptive and cross-sectional	358 mothers of children aged between 0 and 5 years old.	The caregivers that strictly complied with social distancing were 1.86 times more likely to feel concerned/anxious (OR <sub>a</sub> <sup>§</sup> =1.86, 95% <sup>   </sup> CI <sup>***</sup> =1.07–3.24). The caregivers that were upset for having to distance themselves from their activities of interest were 4.11 times more likely to feel concerned/anxious (OR <sub>a</sub> <sup>§</sup> =4.11, 95 % <sup>   </sup> CI <sup>***</sup> =2.32–7.24). The stress, concern and anxiety experienced imposed problems in childcare.	2c
Lozano-Blasco R, Quilez-Robres A, Delgado-Bujedo D, Latorre-Martinez MP. / 2021 (36)	Research questions: Has the consumption of YouTube channels targeted at early childhood increased during the COVID-19 pandemic? What types of resources have been most used? Has the consumption of educational content increased or, to the contrary, has playful content prevailed?	Longitudinal	Analysis of diverse social networks.	The results not only indicate an increase in the use of YouTube channels by children. Social distancing increased the consumption of visual recreational content as a behavioral containment measure and reduced the promotion of traditional games. Use and consumption of content through screens implies possible risks (with changes in the learning system among them), which may not only generate addiction but also subsequent problems with attention and memory.	2c
Russell BS, Tomkunus AJ, Hutchison M, Tambling RR, Horton AL. / 2022 (15)	To examine the longitudinal impacts on the relationships between parents and children and the caregivers' burden in the context of the parents' reports on resilience, stress (both general and COVID-19-specific), depression and anxiety, as well as closeness and conflicts with their children.	Descriptive and cross-sectional	271 parents, over 18 years old and with children aged less than 18 years old (between 0 and 5, n <sup>†</sup> =103).	The parents' depression symptoms are producing more challenging effects on their parenting experiences. The parents also reported higher perceived stress rates in the children. The unemployment rates affected the female gender more than the male gender during COVID-19, and women reported worse mental health symptoms and care burdens at the beginning of the pandemic.	2c
Stienwandt S, Cameron EE, Soderstrom M, Casar M, Le C, Roos LE / 2022 (17)	To examine how the home factors and the changes related to COVID-19 increased or reduced the chances to take part in didactic activities to support development ("hands-on play") and other similar ones (non-educational screen time) between parents and children.	Descriptive and cross-sectional	708 parents, over 18 years old and with at least one child aged between 2 and 8 years old.	The parents that meet the childcare needs and present lower parental stress levels reported more time devoted to hands-on play in all children's age groups. The parents that meet the childcare needs and experienced higher parental stress levels reported more screen time among preschool children.	2c
Park J-H, Park J-Y, Jin K-S / 2022 (37)	To explore the effects of the COVID-19 pandemic and the social distancing practices related to family life, the childcare burden on the parents and the children's everyday life, during the initial stage of the pandemic in South Korea. To evaluate the negative impact of the pandemic on parents' and children's stress levels.	Descriptive and cross-sectional	288 adults, parents of at least one child aged between 1 and 12 years old.	The time devoted to childcare by the main caregivers significantly increased during the pandemic. For children, the time devoted to screens (h <sup>¶</sup> =1.76) and to online interactions (h <sup>¶</sup> =0.95) was significantly increased, whereas the in-person interaction time (h <sup>¶</sup> =4.17) and the time devoted to learning (h <sup>¶</sup> =2.16) were significantly reduced. In addition, the parents' and children's stress levels were significantly increased during the pandemic.	2c
Snyder K, Chaudhary P, Pereira A, Masuda K, Niski J, Dinkel D. / 2022 (38)	To explore the perceptions of health workers, parents and childcare providers about the influence exerted by the pandemic on how they interacted with infants to promote physical activity, muscle strength and communication.	Qualitative	37 participants: parents (n <sup>†</sup> =12), caregivers of children (n <sup>†</sup> =12), health professionals (n <sup>†</sup> =13).	The caregivers identified concerns related to the following: limitations in social interactions (especially mask use, which affects communication), lack of access to peer modeling, fewer opportunities for physical exploration and the need for creative activities in various environments (e.g., <sup>§§</sup> home/daycare centers), to promote child development during and after the pandemic.	3

\*LE = Level of Evidence from the Oxford Centre for Evidence-based Medicine; †ACEs = Adverse Child Experiences; ‡n = Absolute number; §CPs = Conduct Problems; ||CU = Callous Unemotional; ¶h = Hours; \*\*p = Non-arbitrary minimum significance level (p-value); ††> = Greater than; §§e.g. = For example; ||||% = Percentage; §§OR<sub>a</sub> = Adjusted Odds Ratio; \*\*\*CI = Confidence Interval.

Source: Prepared by the authors.

The analysis of the studies allows classifying the findings into three categories that present the effects suffered by the child population aged less than 5 years old and their caregivers throughout the pandemic, as well as the connection of such consequences with child development.

The first category is *Exposure to risk stimuli*, which responds to the increase in parental stress during the pandemic and to excessive screen use by children. The second category is called *Deprivation of stimuli* and is related to the change in the families' habits and to the absence of games, accompanied by increased sedentary lifestyles and even with parents resorting to punitive parenting practices. The last category, *Exposure to protective stimuli*, alludes to the existence of opportunities during social distancing to preserve positive coexistence and closely track developmental milestones.

## Discussion

Based on the question set out, it might be stated that the effects of social distancing and the parents' remote work during the pandemic on the development of children aged less than 5 years old are related to the deprivation of stimuli that protect development and also to the continuous exposure to risk stimuli, to the detriment of opportunities to implement protective stimuli.

In this sense, the findings of this integrative review would make it clear that the parents are a key component in children's micro-systems (7, 39), especially in the age group between 0 and 5 years old. Therefore, when the environment is so abruptly modified as it was during the pandemic, the bond between caregivers and their children can be impaired and, consequently, exert an impact on child development. The main effects will be presented according to the emerging categories.

### Exposure to risk stimuli

Compellingly, the findings indicate how the pandemic years (2020 and 2021) have represented a major challenge for families around the world, especially for those that raise very young children, as parents are expected to look after their safety, health, nutrition, leisure and rest. Added to these responsibilities, they experienced circumstances such as increased workloads, job loss, lower social interaction and increased house chores (16, 29).

All these changes in everyday life favor the onset of risk stimuli for children in full development. One of these risks would be high parental stress levels, which in turn hinders understanding the children's needs and conditions and the possibility of positively responding to them. Stress in caregivers is accompanied by other changes in mental health, such as anxiety, depression, frustration and irritability (16, 35). The studies describe that, in this panorama,

parenting practices are usually negative (punitive) and associated with emotional/behavioral problems in children, such as difficulties externalizing emotions (12, 13, 37). For example, one of the studies sets forth that fewer experiences of gratifying interactions with parents (demonstrations of warmth and affection) imply fewer opportunities to imitate, practice or develop behaviors related to social connections, cooperation and affiliation with others (28).

As a last element for this category, we should mention an important number of publications indicating the increased exposure to screens among children aged less than 5 years old (29, 32, 36, 37, 40, 41). According to the World Health Organization (40), children should not be exposed to electronic devices before the age of 2, whereas screens may be used for a maximum of one hour a day after that age. During the pandemic, parents resorted to electronic devices to mitigate the childcare burden (37), the reason why these gadgets became the primary entertainment or distraction resource, even for more than 2.5 hours a day (29, 32, 36). Use and consumption of contents through screens carries with it possible physical and intellectual risks, such as changes in cognitive processing and in learning the primarily expressive language, in addition to a reduction in some executive functions such as attention and memory (37, 41, 42).

In a longitudinal study, it was verified that screen use during the pandemic was due to the need to mitigate the lack of activities in the open air and, consequently, the consumption of audiovisual materials was mainly focused on leisure and not on academic purposes (36).

## Deprivation of stimuli

During the pandemic years, it has been understood that parents were stressed and focused on meeting the household and work demands, the reason why they have found it difficult to generate interactive playful intervals (use of blocks, puzzles and imaginary role play, among others) with their children (17). In addition, the evidence highlights that most of the population lives in apartments, which generally lack suitable spaces to practice physical activity. They live in overcrowded places in some cases and, given the restrictions imposed by the pandemic, it was not possible to access recreational parks (32, 34).

Regarding play, it is of vital importance to note that they are normal and expected behaviors for childhood, and it is indispensable that children enjoy constant playful periods (18). Added to this, modeling is crucial for children's learning; however, given the restrictions imposed by the pandemic, their recreational interaction was reduced, either with their parents or with other family members, and they had no contact with other children in most cases (31, 36).

Therefore, increased sedentary lifestyles and the limited opportunities for games and physical exploration, as well as lack of access to modeling by groups of peers, suggest lesser participation in muscle strength and learning activities and scarce bonding (29, 32, 34, 37, 38). In terms of child development, we might be facing a negative impact on the motor, cognitive, language and socioemotional areas (42-44).

In parallel, children's everyday routines changed, as some of them ceased to attend educational centers and had their recreational activities suspended, which resulted in an increase in boredom and irritability levels. Finally, until the usual balance of routines is resumed, the changes in the eating, sleep and rest habits may continue to be a reality in most homes (16, 34, 45, 46).

To close this category, we again mention punitive parenting practices, as the evidence indicates that the combination of parental stress and children's irritability sometimes results in the use of aggressive measures as a control resource. On the contrary, to ensure healthy emotional development, acceptance and negotiation in the face of children's behaviors are recommended, with no severe punishments (1, 2, 13, 20, 30, 46-48).

## Exposure to protective stimuli

An aspect that has been highlighted by the research studies is the families' socioeconomic level and how it influenced each household's dynamics during social distancing. For example, the families with no financial difficulties reported "staying home" as a positive experience through which they spent quality time among all its members, devoted time to stimulate and/or educate their children, and carried out collaborative activities such as playing, eating, and doing the house chores (16).

Likewise, other positive elements were reported, such as the opportunity to lead a calmer life and, consequently, paying more attention to the developmental milestones gradually reached by young children (33, 48, 49). The importance of maintaining good quality interpersonal relationships to favor well-being and socioemotional skills in children stood out (30, 50).

To conclude, it is to be mentioned that, between birth and the age of 5, children go through a critical time window to establish increasingly complex functions in the different developmental domains. Finally, as already mentioned, optimum development depends on the stability of the interconnected systems that comprise the environment. Consequently, the COVID-19 pandemic years represented a drastic change for very young children's micro-, meso-, exo- and macro-systems, in addition to exerting negative impacts in at least one area of their development.

This review has its limitations. Despite the rigorous search strategy and the selection of articles, there is a prevalence of cross-sectional



surveys, which, due to their design characteristics, restrict extrapolation of the results and making causal inferences; however, the phenomenon under study forces research studies to follow such design. In addition, the studies were developed during the pandemic months, reason why access to the participants was via digital means, which reduced and exerted an impact on the possibility to recruit families that lacked electronic devices or Internet connections.

As a strength, it is noted that the review is focused on child development. Although children's physical and mental health is important for the Nursing discipline, it becomes necessary to turn to look at the new generations' development skills, as the nations' potential and future productivity depend on them, as well as the elaboration and effective implementation of policies for child development.

Among the implications for Nursing, as well as for those involved in child development would be the creation of family monitoring programs during the first years of the children's life since, according to their training and due to the ability to implement care actions around growth, development and childcare, the professionals from the Pediatric field are the ones with the ideal competencies for their implementation. These programs should be included in the development of surveillance systems that include the participation of different health professionals in all existing levels of healthcare, with Pediatric Nursing among them and in a central position.

The findings of this study allow for generating hypotheses for future primary research studies that include broad sociodemographic diversity and assess child development through standardized instruments; in addition, from there, it becomes necessary to develop new secondary research studies that investigate the new family dynamics, the parenthood experiences and parental-child attachment, among other topics.

## Conclusion

The studies reveal the following as the main effects caused by the COVID-19 pandemic: increased parental stress, changes in family habits, absence of games, and increased sedentary lifestyles, which in turn reduce the interactions that promote development in children aged less than 5 years old. Therefore, social distancing may be one of the main causes for the onset of delays in child development, in its motor, language, cognitive and socio-emotional areas.

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