

The impact of the COVID-19 pandemic on children's occupations

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Abstract

Background: The COVID-19 pandemic changed the daily lives and limited everyday activities of children worldwide. **Objectives:** To document the impact of the COVID-19 pandemic on children's occupations, the associated factors, and the impact on children's health, wellbeing, and development. **Methods:** A narrative review was conducted by searching four databases (Scopus, MEDLINE, EMBASE, and Cochrane Database of Systematic Reviews). **Results:** A total of 35 articles met the inclusion criteria. Out of the 34 articles, 23 were relevant to the impact of the COVID-19 pandemic on occupations related to leisure ($n = 17$), productivity ($n = 11$), and self-care ($n = 9$). Ten articles highlighted specific factors that had been linked to changes in occupational engagement and child behavior. Ten articles focused on the impact of occupational disruption during COVID-19 on health, wellbeing, and general development. **Conclusion:** The COVID-19 pandemic seems to have had a negative impact on children's occupations, while the restrictions were still in effect. Further research is needed to establish reliable conclusions.

Keywords

Occupational disruption, children's occupations, child wellbeing, child development

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Introduction

Coronavirus Disease-2019 (COVID-19) is an infectious disease caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) (John Hopkins Medicine, 2022). It was first observed in the town of Wuhan in Central China in late 2019, when cases of pneumonia of unknown cause were reported. SARS-CoV-2 was identified as the cause of the epidemic in early 2020 (WHO-World Health Organization Regional Office for Europe, 2022). The disease spread worldwide, leading the World Health Organization to declare it a pandemic on March 11, 2020 (Cucinotta & Vanelli, 2020). Up until August 11, 2022, over 580 million confirmed cases and over 6.4 million deaths were reported to WHO globally (WHO, 2022). As far as children are concerned, they represent 17.9% of all confirmed cases (American Academy of Pediatrics, 2023).

To contain the spread of the COVID-19 pandemic, governments worldwide had to take universal measures. These measures included social distancing, staying at home

recommendations, closing schools and non-essential workplaces, using masks, and personal hygiene. These response measures and limitations significantly affected the daily occupations of all age groups (Engels et al., 2021).

Childhood, however, is an overly sensitive and important developmental stage, that can have lasting effects across a life span (CAOT, 2009). Engaging in meaningful occupations is important for a child's health and well-being and for developing skills (AOTA, 2020). Occupational engagement is defined by the American Occupational Therapy

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Association as the “*performance of occupations as a result of choice, motivation, and meaning within a supportive context*” (AOTA, 2020). Children engage to occupations that according to the Canadian Association of Occupational Therapists (CAOT, 2009) are categorized in three areas: 1. Self-care, which includes occupations that are crucial to survival, personal hygiene, and mobility around the house; 2. Productivity, which includes education and employment; and 3. Leisure, which includes occupations held during free time and social activities. On the other hand, momentous events may affect a person’s pattern of occupational engagement, leading to occupational disruption (Brown & Hollis, 2013). During the COVID-19 pandemic, children’s mental and physical health deteriorated significantly (Amorós-Reche et al., 2022; Chung & Rhie, 2021). Furthermore, Engzell et al. (2021) found that the closing of schools and online education were associated with minimum academic progress, leading to a learning delay equivalent to the duration of the lockdown. Learning delay was positively associated with low socioeconomic status, parental involvement, and technology skills (Engzell et al., 2021; van de Werfhorst, 2021).

The aim of this study is to conduct a review of the literature regarding the impact of the COVID-19 pandemic on children’s and adolescents’ occupations, highlighting the factors associated with the aforementioned changes, as well as the effects on health, wellbeing, and development.

Method

Study design

A narrative review methodology was used to explore evidence in the literature on the impact regarding the COVID-19 pandemic on children’s occupations. Narrative reviews summarize, analyze, and organize evidence in a non-systematic way, and identify gaps in the literature (Gregory & Denniss, 2018; Snyder, 2019). A qualitative analysis was selected to promote a thorough understanding of the existing evidence (Denney & Tewksbury, 2013). The basic research question was “How did the COVID-19 pandemic impact children’s and adolescents’ occupations?”. Subsequently, keywords were selected to be used during the search procedure. The keywords used were “child*”, “COVID-19”, “occupation*”, “child wellbeing”, and “child development”.

Data collection

Articles were retrieved on June 1 and 2, 2022, and August 4 and 5, 2022, from the following databases: 1. Scopus, 2. MEDLINE, 3. EMBASE, and 4. Cochrane Database of Systematic Review. The articles that were included in this study met the following inclusion criteria: 1. were published after 01.01.2020 in a scientific journal; 2. study designs were original studies, literature reviews, or meta-analyses; 3. were published

in English; 4. subjects were under 18 years old; 5. emphasized the consequences of the COVID-19 pandemic on subjects’ occupations. Articles were excluded based on the following exclusion criteria: 1. were published prior to 01.01.2020; 2. were published on an online page, as part of conference abstracts, or in book chapters; 3. subjects were 18 years of age or older; and 4. did not mention the consequences of the COVID-19 pandemic on subjects’ occupations. We utilized a two-stage screening process, to examine each study’s title and abstract, and then the full text to identify the eligible articles, provided that the study met the inclusion criteria. [Figure 1](#)

Data analysis

This study is qualitative research. Data was thoroughly read, coded, and categorized (Wong, 2008). The selected articles were placed in three thematic categories: 1. articles that mentioned changes in children’s and adolescents’ occupational engagement and behaviours during the COVID-19 pandemic; 2. articles that mentioned the factors associated with the aforementioned changes; and 3. articles that mentioned the possible effects of the aforementioned changes on children’s and adolescents’ health, wellbeing, and development. For articles that were in more than one thematic category, they were included in all the related thematic categories. Following a general thematic analysis, information about the study characteristics was extracted. This included, occupations affected by the COVID-19 pandemic, and the consequences they had on health, wellbeing, and development. [Table 1](#)

Results

Search results

A total of 6375 articles were identified across the selected databases. Out of them, 3912 articles were removed before the screening process after the removal of duplicates. The screening process included 2463 articles, out of which 1715 were removed during the first stage, according to the inclusion criteria. Out of the 20 articles sought for retrieval, 16 were not retrieved and hence excluded from this study. Of the remaining 732 articles assessed for eligibility, 516 were excluded because their focus or purpose was not related to the objective of this study, 76 were excluded because they did not focus on children, 3 were found to be additional duplicates, 1 was not retrieved, and 102 were found not to be accessible. Thirty-four articles were included in this study.

Changes in occupational engagement and behaviours

In this study, 22 articles concern the changes in children’s and adolescents’ occupational engagement and behaviours

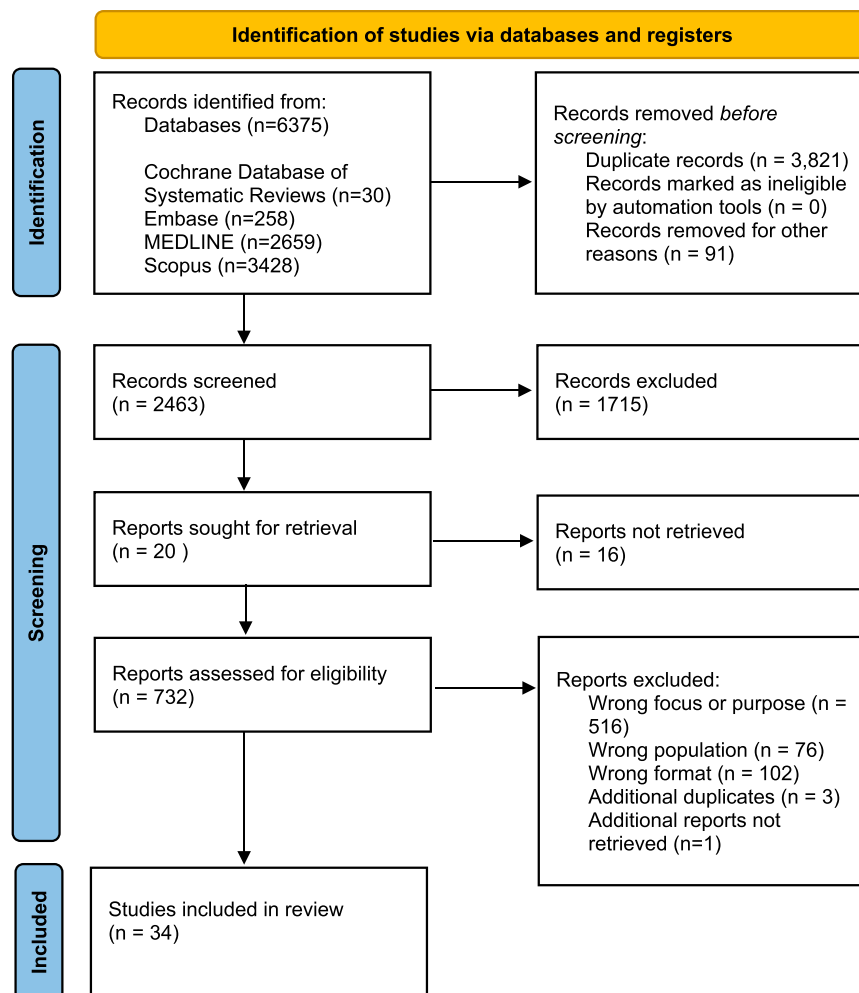


Figure 1. From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021; 372:n71. doi: 10.1136/bmj.n71.

during the COVID-19 pandemic, in the areas of leisure, productivity, and self-care.

Leisure. Seventeen articles (Barron et al., 2021; Brown & Lynch, 2022; Cartanyà-Hueso et al., 2021; Güney et al., 2022; Kara et al., 2021; Kourti et al., 2021; Lourenco et al., 2021; Moore et al., 2020; Nathan et al., 2021; Nithya et al., 2021; Okely et al., 2021; Ostermeier et al., 2021; Park et al., 2022; Pelletier et al., 2021; Picca et al., 2021; Riazi et al., 2021; Tulchin-Francis et al., 2021) regarded the changes in occupations related to leisure and play. More specifically, due to the restriction measures, outdoor play and activities were limited (Kourti et al., 2021; Okely et al., 2021). As a consequence, physical activity was decreased significantly after the pandemic (Nithya et al., 2021; Ostermeier et al., 2021; Park et al., 2022), especially moderate-to-vigorous physical activity (Tulchin-Francis et al., 2021) as well as structured and organized activities (Nathan et al., 2021;

Riazi et al., 2021). According to Moore et al. (2020), during the COVID-19 pandemic in Canada, less than 5% of children were meeting the movement behaviour guidelines. Adolescents were meeting the guidelines six times less often than younger children (Moore et al., 2020). Children and adolescents spent more time at home, engaging in various types of play and activities, including active play, board games, video games, and playing with toys (Kourti et al., 2021). Both children and adolescents spent more time doing arts and crafts, watching TV or other online platforms, and playing video games, than before the pandemic (Barron et al., 2021). A significant increase in screen time usage was observed, both for educational and for recreational reasons (Brown & Lynch, 2022; Park et al., 2022). The duration of screen time use was higher during the pandemic, on weekdays as well as on weekends (Ostermeier et al., 2021). According to Okely et al. (2021), the average increase in screen time use was 55 minutes per week. Regardless of the

Table 1. Studies included in this review.

#	Researchers	Country (-ies)	Objective	Research design	Target population	Measures/tools	Main findings
1	Aguilar-Farías et al. (2020)	Chile	To examine the physical activity of toddlers and preschoolers during the COVID-19 pandemic and the factors associated with change	Qualitative study	Children 1–5 years old	Online survey	<ul style="list-style-type: none"> Decreased time spent in physical activity Increased recreational screen time Increased sleep duration and decreased sleep quality The internet provided opportunities for families to adapt activities to engage their children Online education
2	Anakwe et al. (2021)	USA	To explore the use of technology by african american families to engage children during the COVID-19 pandemic	Exploratory, descriptive, contextual, qualitative study	African american children 5–17 years old	Semi-structured interviews	<ul style="list-style-type: none"> Children 4–14 years old spent more time in the following activities: Arts and crafts, toys, video and computer games, online platforms, watching television Children 10–18 years old spent more time in the following activities: Arts and crafts, television, music, watching television, online platforms, video and computer games Childrens' routines and occupations used to be more diverse, organized, interesting, and experiential before the COVID-19 pandemic Remote education Sleep pattern disruptions Increased sleep time Increased sleep latency Increased daytime sleepiness
3	Barron et al. (2021)	England Ireland Italy USA	To understand the impact of the COVID-19 restrictions on children's play and friendship groups	Qualitative study	Children 4–18 years old	Online survey, with closed- and open-ended questions (30 questions for children, and 36 questions for their caregivers)	<ul style="list-style-type: none"> Children 10–18 years old spent more time in the following activities: Arts and crafts, television, music, watching television, online platforms, video and computer games Childrens' routines and occupations used to be more diverse, organized, interesting, and experiential before the COVID-19 pandemic Remote education Sleep pattern disruptions Increased sleep time Increased sleep latency Increased daytime sleepiness
4	Brown and Lynch (2022)	Worldwide	To explore the changed of children's occupational repertoires and routines because of the COVID-19 pandemic	Review	Children (not further specified)	Not specified	<ul style="list-style-type: none"> Children 10–18 years old spent more time in the following activities: Arts and crafts, television, music, watching television, online platforms, video and computer games Childrens' routines and occupations used to be more diverse, organized, interesting, and experiential before the COVID-19 pandemic Remote education Sleep pattern disruptions Increased sleep time Increased sleep latency Increased daytime sleepiness
5	Camacho-Montaño et al. (2022)	Worldwide	To understand the impact of COVID-19 on children's sleep	Systematic review	Children 0–12 years old	Newcastle-Ottawa Quality assessment Scale National Institutes of Health Quality assessment Tool	<ul style="list-style-type: none"> Children 10–18 years old spent more time in the following activities: Arts and crafts, television, music, watching television, online platforms, video and computer games Childrens' routines and occupations used to be more diverse, organized, interesting, and experiential before the COVID-19 pandemic Remote education Sleep pattern disruptions Increased sleep time Increased sleep latency Increased daytime sleepiness
6	Cartayá-Hueso et al. (2021)	Spain	To understand screen time, use in children under 48 months old	Cross-sectional study	Children 0–48 months old	Online questionnaire	67.5% of children were being daily exposed to smartphones and tablets

(continued)

Table 1. (continued)

#	Researchers	Country (-ies)	Objective	Research design	Target population	Measures/tools	Main findings
7	Deoni et al. (2021)	Not specified (Italy)	To examine the impact of the COVID-19 pandemic on children's cognitive development	Cohort study	Children 0–3 years old	Mullen Scales of early Learning	Cognitive performance for children born during the pandemic was significantly lower in comparison to children born before the pandemic <ul style="list-style-type: none"> Increased screen time during the COVID-19 pandemic Associations between screen time and mental health symptoms and behaviours Remote education and missing school activities was associated with mental health symptoms
8	Eirich et al. (2022)	Worldwide	To examine the potential association between screen time and behavior problems among children 12 years or younger	Systematic review and Meta-analysis	Children 0–12 years old	PRISMA guideline	
9	Gademmann et al. (2022)	Canada	To examine the experiences of adolescents regarding social interactions, and COVID-19 transmission at school, and their association with changes in wellbeing	Cohort study	Adolescents 12–14 years old	Self-report survey	
10	Geilir & Duzen (2021)	Turkey	To examine the impact of the COVID-19 pandemic on parents and preschool children	Qualitative study	Children 4–5 years old	Open-ended online questionnaire	<ul style="list-style-type: none"> Lack of knowledge and expertise set challenges in online education and remote learning Social and emotional behaviours of children changed during the COVID-19 pandemic
11	Güney et al. (2022)	Turkey	To examine the impact of the COVID-19 pandemic on the occupational performance and participation of children with cancer	Not specified	Children 6–12 years old, diagnosed with cancer	Canadian Occupational Performance Measure (COPM) Child and Adolescent Scale of Participation	<ul style="list-style-type: none"> Decreased occupational performance Greater decrease in community participation than in home participation
12	Imboden et al. (2021)	USA	To examine the impact of the COVID-19 pandemic on infant and toddler development	Not specified	Children 3–36 months old	ASQ-3	Younger children were negatively affected by the pandemic, whereas older children were positively affected
13	Kara et al. (2021)	Turkey	To detect changes in home participation, support, and barriers for children with ADHD during the COVID-19 pandemic	Not specified	Children 6–11 years old, diagnosed with ADHD	Participation and environment Measure for Children and youth (PEM-CY)	Increased participation during the COVID-19 pandemic in the following activities: Computer and video games; household chores; socializing; arts, crafts, music; hobbies; personal care; home participation

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Table 1. (continued)

#	Researchers	Country (-ies)	Objective	Research design	Target population	Measures/tools	Main findings
14	Kirsch et al. (2021)	Luxembourg Germany Switzerland	To explore children's experiences with remote education, learning, and school satisfaction	Mixed-method study	Children 6–16 years old	Online questionnaire and online survey	<ul style="list-style-type: none"> Distance education Parental engagement in distance education Lower school satisfaction Decreased outdoor play Increased indoor play Increased screen time and video game engagement COVID-19 was present in children's pretend play
15	Kourti et al. (2021)	Europe and North America	To explore changes in children's play because of the COVID-19 pandemic	Literature review	Children (not further specified)	Newcastle-Ottawa scale for Cross-sectional studies Newcastle-Ottawa Scale for Cohort Studies	<ul style="list-style-type: none"> alternating attendance at school, and reduced class size Mask wearing, cleaning, handwashing, testing, and isolation Physical distancing, modification of school activities
16	Krishnaratne et al. (2022)	Worldwide	To assess the effectiveness of COVID-19 measures related to education	Literature review	Children (not further specified)	ROBINS-I tool for quasi-experimental and observational studies QUADRAS-2 tool for observational screening studies	<ul style="list-style-type: none"> Increased screen time Higher screen use was associated with significantly higher levels of mental health symptoms in children and adolescents
17	Li et al. (2021)	Canada	To examine the association of screen use and mental health symptoms in children and youth during the COVID-19 pandemic	Longitudinal cohort study	Children 6–18 years old	SDQ Generalized Anxiety Disorder Subscale of the SCARED 6-Item subscale of TIDES 18-Item total score subscale, 9-item inattentive subscale, and the hyperactive/impulsive subscale of SWAN	<ul style="list-style-type: none"> Limitations on play Limitations on social interaction with peers Impact on health-related quality of life, especially in emotional functioning
18	Loureiro et al. (2021)	Portugal	To explore children's activities, education, and social interactions during the COVID-19 pandemic	Exploratory study	Portuguese children 0–14 years old	PedsQL Children's Health-Related Quality of Life Inventory	

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Table 1. (continued)

#	Researchers	Country (-ies)	Objective	Research design	Target population	Measures/tools	Main findings
19	Moore et al. (2020)	Canada	To examine the impact of the COVID-19 related restrictions on physical activity and play	Secondary data analysis	Children and youth 5–17 years old	Online survey	<ul style="list-style-type: none"> Only 4.8% of children and .6% of youth met the physical activity guidelines Reduced outside time Increased screen time Increased sleep duration New hobbies and resources Weekly minutes of total physical activity did not change during the COVID-19 pandemic Increased frequency and duration of unstructured physical activity (street, house, park, playground) Decreased frequency and duration of structured physical activity (due to physical distancing)
20	Nathan et al. (2021)	Australia	To explore the impact of the COVID-19 pandemic on physical activity and screen time	Retrospective cohort study	Children (median age: 6.9 years old)	Online survey	<ul style="list-style-type: none"> Inconsistency in daily routines Inconsistency in sleep routines 83% of children spent more time on screens than on interactive play Decreased physical activity Increased social withdrawal Children from low- and middle-income countries were more likely to meet physical activity guidelines Parental stress adversely affected children's physical activity behaviours Decreased Quality of Life and satisfaction Decreased occupational performance scores
21	Nithya et al. (2021)	India	To assess the impact of the COVID-19 pandemic on activities of daily living, play, and sensory behaviors of children with Autism Spectrum Disorder	Cross-sectional study	Children with Autism Spectrum Disorder	Structured questionnaire	<ul style="list-style-type: none"> Children from low- and middle-income countries were more likely to meet physical activity guidelines Parental stress adversely affected children's physical activity behaviours Decreased Quality of Life and satisfaction Decreased occupational performance scores
22	Okely et al. (2021)	14 countries ¹	To explore the impact of the COVID-19 pandemic on children's physical activity	Longitudinal study	Children 3–5 years old	Questionnaire	<ul style="list-style-type: none"> Children from low- and middle-income countries were more likely to meet physical activity guidelines Parental stress adversely affected children's physical activity behaviours Decreased Quality of Life and satisfaction Decreased occupational performance scores
23	Önal et al. (2021)	Turkey	To explore the impact of the COVID-19 pandemic on the quality of life and occupational performance of children with cancer	Mixed-method study	Children with cancer	COPM PedsQOL-3	<ul style="list-style-type: none"> Children from low- and middle-income countries were more likely to meet physical activity guidelines Parental stress adversely affected children's physical activity behaviours Decreased Quality of Life and satisfaction Decreased occupational performance scores

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Table 1. (continued)

#	Researchers	Country (-ies)	Objective	Research design	Target population	Measures/tools	Main findings
24	Ostermeier et al. (2021)	Canada	To examine the impact of the COVID-19 pandemic on children's physical activity and screen time, as well as the associated sociodemographic factors	Longitudinal study	Children 10–12 years old	Online survey	<ul style="list-style-type: none"> Increased screen time Changes in physical activity
25	Palomo-Carrion et al. (2022)	Spain	To explore the impact of distance education on the family quality of life	Observational, cross-sectional study	Children 3–6 years old, with infantile hemiplegia, obstetrical brachial palsy, or typical development	Peds-QOL	<ul style="list-style-type: none"> Deprivation of schooling Home confinement Greater impact for children with disabilities than on typically developing children
26	Park et al. (2022)	Korea	To explore the impact of the COVID-19 pandemic on Korean families' daily lives and stress levels	Not specified	Children 1–12 years old	Online questionnaire	<ul style="list-style-type: none"> Increased screen time Increased online interactions Increased childcare time for caregivers Decreased face-to-face interaction Decreased time spent learning Increased unstructured activity Increased time spent with family Decreased structured physical activity Decreased time spent with peers
27	Pelletier et al. (2021)	Canada	To explore children's engagement in physical activity and independent mobility during the COVID-19 pandemic	Qualitative study	Children 7–12 years old	Semi-structured interview	<ul style="list-style-type: none"> Increased screen time, for leisure, play, and distance learning
28	Picca et al. (2021)	Italy	To investigate the effects of the COVID-19 lockdown on behaviours, daily life, screen time, and education of pre- and school-aged children	Cross-sectional study	Children 1–10 years old	Online survey	<ul style="list-style-type: none"> Loss of structured activities Restricted opportunities for outdoor play Decreased childhood independent mobility
29	Riazi et al. (2021)	Canada	To explore the experiences of parents regarding the pandemic-related restrictions, and their impact on their children's physical activity	Qualitative study	Children 5–11 years old	Semi-structured interview	<ul style="list-style-type: none"> Changes in sleep, diet, weight Increased screen time Difficulty in social interactions
30	Sama et al. (2021)	India	To understand the impact of the lockdown on children's mental health	Questionnaire-based study	Children (not further specified)	Online questionnaire	

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Table 1. (continued)

#	Researchers	Country (-ies)	Objective	Research design	Target population	Measures/tools	Main findings
31	Stienwandt et al. (2022)	Canada	To examine the factors related to more diverse child activities during the COVID-19 pandemic	Not specified	Children 2–8 years old	AMHDC CMHDC GAD-7 PSI	<ul style="list-style-type: none"> Increased screen time Increased hands-on play
32	Szpunar et al. (2021)	Canada	To examine the perceived impact of COVID-19 on children's physical activity, play, and sports, as well as facilitators and barriers regarding physical activity	Cross-sectional study	Children 0–12 years old	Online questionnaire	<ul style="list-style-type: none"> Loss of social interaction Increased screen time Decreased outdoor play, due to closure of outdoor spaces Lack of activities to do at home
33	Tulchin-Francis et al. (2021)	USA	To examine the impact of the COVID-19 pandemic on children's physical activity and play	Cross-sectional study	Children 3–18 years old	Modified Godin Leisure Time Exercise Questionnaire	<ul style="list-style-type: none"> Decreased physical activity The impact of the COVID-19 pandemic was greater on pre-schoolers than on high-schoolers
34	Werling et al. (2021)	Switzerland	To explore the use of screen media in children and adolescents with ADHD, because of the COVID-19 pandemic	Mixed-methods study	Children 10–18 years old with ADHD	PUI Screening Questionnaire for Children and Adolescents	<ul style="list-style-type: none"> Increased screen time by 46% Media time did not return to pre-pandemic levels Increased screen time was associated with higher ADHD symptoms severity

ADHD: Attention Deficit/Hyperactivity Disorder; **AMHDC:** Adult Mental Health Disorder Checklist; **ASQ-3;** ; **CMHDC:** Child Mental Health Disorder Checklist; **COPM:** Canadian Occupational Performance Measure; **GAD-7:** Generalized Anxiety Disorder 7-item Scale; **PedsQL:** Paediatric Quality of Life Inventory; **PedsQOL-3:** Paediatric Quality of Life Inventory – parent proxy report; **PSI:** Parenting Stress Index; **SCARED:** Screen for Child Anxiety Related Disorders; **SDQ:** Strengths and Difficulties Questionnaire; **SWAN:** Strengths and Weaknesses of Attention Deficit/Hyperactivity Disorder Symptoms and Normal Behavior Scale).

¹Australia, Bangladesh, China, Denmark, India, Indonesia, Malaysia, Pakistan, South Africa, Spain, Sri Lanka, Sweden, Vietnam, USA.

guidelines for screen time among infants and toddlers, 65% of children younger than 48 months were exposed to smartphones and tablets on a daily basis during the pandemic in Spain, including during meals and before bedtime (Cartanyà-Hueso et al., 2021). Screen time, alone or with friends, was the preferred leisure activity during the lockdown for children 6–10 years old in Lombardy, as Picca et al. (2021) suggest, with only 15.8% of the participants reporting playing with toys or educational games.

Productivity. Ten articles (Anakwe et al., 2021; Brown & Lynch, 2022; Gadermann et al., 2022; Güney et al., 2022; Kara et al., 2021; Kirsch et al., 2021; Krishnaratne et al., 2022; Park et al., 2022; Tulchin-Francis et al., 2021; Önal et al., 2021) regarded the changes in occupations related to the productivity, especially education, of children during the COVID-19 pandemic. In order to contain the COVID-19 pandemic, several measures had to be taken by governments worldwide, including remote education, reduced attendance in school classes, testing, use of masks, thorough cleaning and handwashing, ventilation etc. (Brown & Lynch, 2022; Krishnaratne et al., 2022). Remote education was implemented via emails, post, or online platforms (Kirsch et al., 2021). Despite the reduced transmission and hospitalization that these measures resulted in, they had a serious impact on children. Children spent less time learning and doing homework than pre-pandemic, their performance deteriorated, and they asked family for help more often (Güney et al., 2022; Kara et al., 2021; Park et al., 2022). Remote education led to an increase in screen time use, and a decrease in physical activity, and access to organized sports and activities (Brown & Lynch, 2022). In a study by Gadermann et al. (2022), adolescents regarded social distancing as the most difficult measure to follow at school, while extracurricular and organized activities were greatly missed. For low-income families, virtual education was challenging, since they did not own electronic devices or have access to the internet (Anakwe et al., 2021).

Self-care. Eight articles (Camacho-Montaño et al., 2022; Gelir & Duzen, 2021; Güney et al., 2022; Kara et al., 2021; Nithya et al., 2021; Okely et al., 2021; Picca et al., 2021; Önal et al., 2021) regarded the changes in occupation related to self-care. Sleep-related difficulties were mentioned in five articles (Camacho-Montaño et al., 2022; Gelir & Duzen, 2021; Nithya et al., 2021; Okely et al., 2021; Picca et al., 2021). Sleep disturbances were reported by almost one in two children (Picca et al., 2021). Inconsistent sleep routines included longer duration of sleep, later bedtime and wake-up time, sleep latency, and daytime sleepiness (Camacho-Montaño et al., 2022; Gelir & Duzen, 2021; Nithya et al., 2021). In a longitudinal study in 14 countries, Okely et al. (2021) estimated that bedtime and wake-up time were delayed by 34 and 60 minutes respectively during the

pandemic. Children with cancer demonstrated a deterioration of overall occupational performance on self-care activities was observed during the COVID-19 pandemic (Güney et al., 2022; Önal et al., 2021). On the contrary, children with Attention Deficit/Hyperactivity Disorder (ADHD) participated more in activities regarding personal care and household chores (Kara et al., 2021).

Factors associated with change in occupational engagement and behaviours

In this study, ten articles (Aguilar-Farias et al., 2020; Cartanyà-Hueso et al., 2021; Kara et al., 2021; Moore et al., 2020; Nathan et al., 2021; Sama et al., 2021; Szpunar et al., 2021; Stienwandt et al., 2022; Tulchin-Francis et al., 2021; and Werling et al., 2021) highlighted specific factors that had an impact of occupational engagement and behaviours of children and adolescents during the COVID-19 pandemic. Age was a critical factor, as older children's occupations were more highly affected by the COVID-19 pandemic than younger children's occupations (Aguilar-Farias et al., 2020; Moore et al., 2020; Tulchin-Francis et al., 2021). The level of parental education was associated with changes in physical activity and screen time use (Aguilar-Farias et al., 2020). However, data on this area are contradictory, as Cartanyà-Hueso et al. (2021) suggested that a lower level of education is associated with an increase in screen media use, whereas Stienwandt et al. (2022) linked an increase in screen media use with a higher level of education. A higher socioeconomic status of the family was related to a smaller decrease in physical activity and sleep quality (Aguilar-Farias et al., 2020; Sama et al., 2021). Parental engagement, mental and physical health, support, and relationships with the other members of the family have been associated with better movement and play behaviours of children during the COVID-19 pandemic (Moore et al., 2020; Nathan et al., 2021; Stienwandt et al., 2022). Lastly, family structure and relationships with other families were found to be positively associated with healthy physical activity habits (Moore et al., 2020; Szpunar et al., 2021). According to Werling et al. (2021), adolescents with ADHD and greater difficulties concentrating, ADHD symptoms, and high irritability, were found to spend more time with screen media during the COVID-19 pandemic.

Effects of changes in occupational engagement on health, development, and wellbeing of children and adolescents

Ten articles in this study (Deoni et al., 2021; Eirich et al., 2022; Gadermann et al., 2022; Imboden et al., 2021; Li et al., 2021; Nithya et al., 2021; Palomo-Carrion et al., 2022; Sama et al., 2021; Smimi et al., 2021; Werling et al., 2021)

focused on the impact of changes in occupational engagement due to the COVID-19 pandemic on health, development, and wellbeing of children and adolescents.

The disturbances that occurred in normal daily activities and routines, resulted in deterioration of children's and adolescents' mental health, and an increase in aggressiveness, depression and anxiety (Gadermann et al., 2022; Sama et al., 2021; Werling et al., 2021). Changes in screen media use impacted family life, social activities, academic achievements, physical and mental health and wellbeing (Werling et al., 2021). Specifically, the increased screen media use was associated with more social and emotional regulation problems in children adolescents (Eirich et al., 2022; Li et al., 2021). Conversely, playing video games during the COVID-19 pandemic significantly improved certain cognitive functions, such as attention, executive functions, dexterity, processing, and working memory, as well as prosocial behaviours and school functioning (Smirni et al., 2021). On the other hand, the deprivation of in-person education had greater effects on the quality of life of families with children with disabilities than on families with typically developing children (Palomo-Carrion et al., 2022). In children with autism, the inconsistency of routines increased the parent-reported intensity of vestibular and proprioceptive seeking (Nithya et al., 2021).

Two studies (Deoni et al., 2021; Imboden et al., 2021) emphasized the impact of the COVID-19 pandemic on the development of infants and toddlers, suggesting that COVID-19 may have indirect impact on their development. In a longitudinal observational study, Deoni et al. (2021) compared the development of infants born during COVID-19 and infants born before the pandemic and found lower early verbal and non-verbal development and performance for infants born during the pandemic. It is presumed that changes in socio-economic status of the parents during the pandemic could possibly affect infant brain development (Deoni et al., 2021). Similarly, in a non-experimental correlational study, Imboden et al. (2021) investigated infant and toddler development pre- and post-pandemic, utilizing the ASQ-3 screening tool. They found that 6-month-old infants presented higher scores on the Problem-Solving Skills Domain pre-pandemic ($p = .04$), whereas 24-month-olds presented higher scores on the Problem-Solving Skills Domain post-pandemic ($p = .03$) (Imboden et al., 2021).

Discussion

This narrative review explored the most recent evidence about the impact of the COVID-19 pandemic on children's and adolescents' occupations, the factors associated with it, and its consequences on health, wellbeing, and development. Specifically, a large part of the existing literature emphasized the impact of the

COVID-19 pandemic on leisure and play. Leisure includes non-obligatory activities to which a person engages during free time, while play includes "intrinsically motivated, internally controlled, and freely chosen" activities (AOTA, 2020). Engaging in play and leisure activities is particularly important for a child's development and well-being, since it eases physical, cognitive, language, and social development (Lai et al., 2018; Nestor & Moser, 2018). During times of adversity, including pandemic, play has been used as a means of expression, coping, skill development, and social interaction (Graber et al., 2021). In a study included in this review, play was identified as a coping mechanism during the COVID-19 pandemic, because it was important for children to deal with mental health problems (Barron et al., 2021).

A significant increase in screen media use and duration of screen time during the COVID-19 pandemic has been highlighted in the studies included in this review. Electronic devices enabled remote education, facilitated social interaction and leisure. Digital educational environments were found by children to be interesting, fascinating, and interactive, which resulted in greater skill development and creativity (Panagouli et al., 2021). Nevertheless, excessive use of electronic devices, especially during early childhood, has been linked to negative effects on brain function, language development, cognitive skills, and sleep quality (Cartanya-Hueso et al., 2021; Limone & Toto, 2021; López-Bueno et al., 2021).

Regarding the factors associated with the changes in children's and adolescents' occupational engagement and behaviours, the role of parents is highlighted. School closure led to an increase in parental burden (Park et al., 2022). Parental practices, lifestyle, and health were related to child positive or negative outcomes. This evidence aligns to the existing literature about the importance of the role of parents during the COVID-19 pandemic (Donati et al., 2021; Romero et al., 2020). Moreover, parents are essential to physical, cognitive, emotional, and social development of a child (APA, 2009). Hence, it is indicated that parents ought to be educated, encouraged and supported to address the changes related to potential times of adversity, and adapt, in order to maintain healthy family behaviours (Donati et al., 2021; Romero et al., 2020).

Finally, yet importantly, the changes in occupational engagement during the COVID-19 pandemic, had a negative impact on children's and adolescents' mental health and infant development. A systematic review by Theberath et al. (2022), as well as in this study (Eirich et al., 2022; Gadermann et al., 2022; Li et al., 2021; Nithya et al., 2021; Palomo-Carrion et al., 2022; Sama et al., 2021; Smirni et al., 2021; Werling et al., 2021), the COVID-19 pandemic has been linked with an increase in child and adolescent anxiety, depression, and loneliness. Also, it seems that infants and

toddlers born during the pandemic experience neuro-developmental delays (Deoni et al., 2021; Imboden et al., 2021; Shuffrey et al., 2022).

Limitations and implications for future research

This study has several limitations. There is a considerable number of studies about the impact of the COVID-19 pandemic on children's occupations, however, further research is needed about children's occupations in the post-COVID-19 era. The aim of this study was to document the impact of the COVID-19 pandemic on children's occupations, rather than conducting an in-depth analysis of the included studies. The available studies are of varied quality, and differ in research designs, methodologies, population and context. This heterogeneity of the included studies could impact data synthesis and conclusions. Also, being published in English was a prerequisite for an article to be included in this study. This criterion should be taken into consideration since it could affect the generalizability and effectiveness of this study's findings. Time constraints during the conduction of this study could affect our ability to capture all relevant studies and analyze them in depth. The ongoing nature of the COVID-19 pandemic may affect the relevance of the studies included. Last, despite efforts to minimize bias, this study required subjective decision-making, during the data selection and extraction.

Future research is needed to determine the long-term impact of the COVID-19 pandemic on children's occupational engagement, development, and health, as well as on family wellbeing. Also, future study could address children's occupations in the post-COVID-19 era. Furthermore, it is important to understand the impact of the COVID-19 pandemic on infants and toddlers, to detect any possible signs of developmental delay, and design proper early intervention programs. Similarly, thorough cognizance and insight on the effects of the pandemic on children's and adolescents' mental health, and the possible consequences on occupational performance, could aid occupational therapists develop proper intervention practices.

Conclusions

The COVID-19 pandemic primarily had negative impacts on children's and adolescents' occupation since engagement was limited and different to what was considered the norm. During the COVID-19 pandemic, outdoor play and physical activity were reduced, while screen time increased. Furthermore, the transition to remote education was associated with lower academic performance and loss of social interactions and structured school activities. Also, sleep-related difficulties and changes in self-care occupations were observed. However, there have been identified specific factors, such as sociodemographic factors and social

interactions during the COVID-19 pandemic, that had influenced children's and adolescents' occupational engagement and behaviours in several ways. It is evident that the occupational disruption that occurred during the COVID-19 pandemic affected health, wellbeing, and development of children and adolescents.

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Author contributions

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