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Parenting interventions during the COVID-19 pandemic: A systematic review of the rationales, process, feasibility, acceptability, and impacts of adaptation

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Parenting interventions during the COVID-19 pandemic: A systematic review of the rationales, process, feasibility, acceptability, and impacts of adaptation. *Trauma, Violence, & Abuse.*

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Author contributions: YS proposed the study. ZF, YS, and RE conceptualized and designed the study. ZF and YS searched and screened the studies. MM and LC extracted the data. ZF conducted data analysis. ZF and MM wrote the manuscript with support from YS and RE. ZF and MM revised the manuscript. All authors contributed to the final version of the manuscript.

Abstract

Evidence shows that parenting interventions are an effective method of reducing caregiver-perpetrated child maltreatment. The recent COVID-19 pandemic has changed the provision of parenting interventions worldwide, with many interventions adapting to continue providing services during the crisis. This global systematic review examined how parenting interventions targeting child maltreatment and its risk and protective factors, were adapted during the COVID-19 pandemic. We searched for studies published between 2020 and 2022, and identified 31 eligible studies. The data on the rationale, process, feasibility, acceptability, and impacts of adaptations were narratively synthesized in accordance with the Framework for Reporting Adaptations and Modifications to Evidence-Based Interventions. Results showed that most adaptations were proactive and focused on delivery methods, predominantly digitalization. While feasibility and acceptability were generally observed, the impacts of adapted programs were inconclusive. Inadequate reporting, especially regarding rationale, fidelity, facilitator capacity building, stakeholder involvement, and decision-making processes, was noted. The review recommends enhanced planning, documentation, and reporting of program adaptations using established guidelines, as well as process and impact evaluations.

Keywords: Parenting Intervention; Child Maltreatment; Adaptation; Digital Delivery

Parenting interventions during the COVID-19 pandemic: A systematic review of the rationales, process, feasibility, acceptability, and impacts of adaptation

Child maltreatment is an urgent public health and human rights issue. WHO (2022) defines child maltreatment as “all forms of violence against young people under 18 years old, whether perpetrated by parents or other caregivers” (p. 1). It is estimated that worldwide, more than 50% of children aged 0 to 19 experienced violence in the past year, with child maltreatment perpetrated by household members being the most common form (Devries et al., 2018). Ninety-three percent of the disability-adjusted life years lost due to violence against children, including child maltreatment, occur in low- and middle-income countries (LMICs) (WHO, 2019). Child maltreatment is a known risk factor for a range of negative individual and societal outcomes, including death and injuries, mental and physical health problems, cognitive impairments, lower educational attainment, lower employment status, and substantial economic burden associated with human capital loss and remediation of the impacts of child maltreatment (X. Fang et al., 2015; Hughes et al., 2017; Teicher, Samson, Anderson, & Ohashi, 2016). It also leads to persistent involvement and intergenerational transmission of violence (Widom, Czaja, & DuMont, 2015).

Parenting programs are a key strategy for reducing child maltreatment perpetrated by parents/caregivers (WHO, 2016, 2023). They are often grounded in social learning and attachment theories (Bandura, 1971; Bowlby, 1969) and can be delivered as universal, selective, or indicated interventions depending on the risk levels (O’Connell, Boat, Warner, & National Research Council, 2009). Evidence shows that parenting interventions can modify

risk (e.g., parental stress, harsh discipline and child disruptive behaviors) and protective factors (e.g., positive parenting practices and positive parent-child interactions) related to child maltreatment, as well as reduce the actual incidence of child maltreatment (Barlow, Johnston, Kendrick, Polnay, & Stewart-Brown, 2006; Chen & Chan, 2016; Lundahl, Nimer, & Parsons, 2006; Vlahovicova, Melendez-Torres, Leijten, Knerr, & Gardner, 2017) across a range of global contexts (Knerr, Gardner, & Cluver, 2013). Such programs are also effective among families of children with disabilities (Z. Fang, Barlow, & Zhang, 2022; Z. Fang, Liu, Zhang, & Qiao, 2023).

COVID-19 has heightened children's risk of experiencing child maltreatment.

Stressors, such as social isolation, economic difficulties, increase in family violence, and limited access to supportive services, have accumulated during COVID-19 to threaten child safety and well-being (Cappa & Jijon, 2021). For instance, a study examining data from 48 child helplines across 45 countries revealed a global increase in helpline contacts during the pandemic, with certain countries experiencing a notable rise in reports of violence (Petrowski et al., 2021). Despite the growing need for parenting interventions during the pandemic, restrictions on movement and social gathering hindered the traditional provision of in-person parenting support. Consequently, there emerged an unprecedented need for in-person programs to swiftly transition to digital platforms for continued delivery. The swift paradigm shift necessitated considerable endeavors from program designers, implementation agencies, and dedicated staff. Various resources, exemplified by initiatives like the Rapid Response Virtual Home Visiting project in the United States, have also been expeditiously established

to guide and support the adaptation process.

Implementation science is a multidisciplinary field dedicated to bridging the gap between research and practical application. It focuses on identifying effective strategies for fostering the adoption and sustainability of evidence-based interventions. Implementation outcomes, distinct from effectiveness outcomes, act as crucial prerequisites for achieving desired impacts. Key implementation outcomes include acceptability, feasibility, adaptation, and fidelity. Acceptability pertains to stakeholders' perception that a given program is agreeable and satisfactory, and feasibility assesses the program's successful delivery within a specific setting (Proctor et al., 2011). Adaptation involves modifying an intervention to better align with a new context (Moore et al., 2021), while fidelity refers to the degree to which an intervention adheres to the original protocol (Dusenbury et al. 2003), ensuring effective program functioning (Martin, Steele, Lachman, & Gardner, 2021). Evaluation of implementation outcomes not only advances understanding of the implementation process but also facilitates the replication and transfer of interventions across diverse settings.

Notwithstanding the commendable efforts to address the unforeseen challenges posed by a global emergency, the move towards digital delivery has raised concern about the potential consequences on user experience and program impacts. The digitalization of interventions is an example of the tension between program adaptation and fidelity. For example, in the pandemic an in-person parenting program may be adapted to be delivered through video-conferencing platforms for parents, an approach more feasible than meeting in-person to have discussions. However, this could make the program less effective by reducing

the social learning, which is a part of intervention theory of change.

A range of frameworks and guidance, such as ADAPT (Moore et al., 2021) and FRAME (Framework for Reporting Adaptations to Evidence-Based Interventions, Stirman, Baumann, & Miller, 2019), have emerged to mitigate these challenges by promoting context-intervention fit. However, these frameworks are still gaining traction in the field of adaptation, and it remains unclear how they are being used in the context of parenting research.

There have been reviews on the adaptation of various health programs affected by the COVID-19 pandemic. For instance, Khurshid et al. (2020) conducted a rapid narrative review to identify adaptations made in healthcare quality improvement training and education in response to the pandemic. Similarly, Raphael, Winter, and Berry (2021) conducted a systematic review to synthesize service adaptations in mental health services during COVID-19 and other public health crises. Despite these efforts, there is a notable absence of systematic reviews examining the adaptations of parenting interventions during the pandemic.

In the field of parenting interventions, Breitenstein et al. (2014) carried out a systematic review to summarize the use of technology and digital delivery methods in parenting programs. Their review investigated the digital methods used, program completion rates, and reported outcomes, but it was conducted a decade ago and is in need of an update. More recently, Solís-Cordero, Duarte, and Fujimori (2022) conducted a systematic review on the effectiveness of remotely delivered parenting programs on parent-child interaction and child development.

However, their emphasis was primarily on quantitative studies and program effects, with limited reporting on implementation aspects. In addition, Klapow et al. (2024) undertook a systematic review examining the implementation feasibility and acceptability of parenting programs with a focus on those delivered via chatbot. Xie et al. (2023) also conducted a narrative systematic review on the modality and user experience of digital parenting interventions, specifically focusing on fathers of infants. Overall, there is a lack of comprehensive reviews synthesizing all parenting interventions adapted during the pandemic.

Given the impracticality and ethical concerns associated with conducting research during such a crisis, much of the research on these adaptations is underway. This evolving landscape presents a ripe opportunity for synthesis that offers insights into how and why these adaptations were undertaken, and to inform ongoing and future research on whether the adaptations made in response to COVID-19 are compromising the integrity of interventions or, conversely, contributing to their implementation and effectiveness.

This review focuses on parenting programs aiming to reduce physical and emotional child maltreatment perpetrated by primary caregivers, or relevant risk and protective factors. It aims to investigate how parenting interventions have been adapted to the COVID-19 pandemic and its sequelae. The review is guided by the FRAME framework (Stirman et al., 2019), which is recognized as one of the most comprehensive and up-to-date adaptation classification frameworks. This framework is designed to systematically document and report all essential facets of intervention adaptations. It aims to support all stakeholders involved in adaption to structure and systematically report the process. FRAME provides valuable

insights into the rationale, nature, process, and impacts of intervention adaptations. Its application facilitates the understanding and advancement of intervention implementation and scale-up processes. Informed by FRAME, this review sought to answer the following research questions:

- 1) What was the rationale for adapting parenting interventions?
- 2) What types of adaptations were made?
- 3) What was the feasibility and acceptability of adaptation?
- 4) What were the intervention outcomes in child maltreatment and its risk and protective factors, assessed in experimental and descriptive studies, as well as reported qualitatively?

By examining the feasibility, acceptability, and potential impacts of programs adapted during the pandemic, this review can inform future adaptation of parenting interventions for digital delivery, as well as the design and delivery of digital or hybrid (combining in-person and digital) parenting interventions to reach families remotely.

Methods

This review was guided by the Cochrane guidance for conducting systematic reviews (Higgins & Green, 2011) and followed the PRISMA guidelines, a set of evidence-based minimum items for reporting systematic reviews (Page et al., 2021). The results-based convergent synthesis design also was used to inform the review process (Noyes et al., 2019). To enhance transparency and minimize reporting bias, the review was pre-registered with

PROSPERO (ID CRD42022330732), an international database aiming to provide a comprehensive register of systematic review protocols before they are conducted.

Inclusion and Exclusion Criteria

Studies were included if they reported on parenting programs for parents or primary caregivers of children aged under 18. The interventions were included if they were designed based on social learning and attachment theories to increase parenting knowledge, change parental attitudes, and improve parenting skills, aiming to reduce emotional or physical child maltreatment or alter factors associated with child maltreatment (such as child behaviors, parental mental health, positive parenting, and parent-child relationships). Studies on interventions that focused on specific child safety issues (e.g., accident and injury) were excluded. To be included, interventions must have been developed prior to COVID-19 and been adapted for delivery during the pandemic and its sequelae. Studies utilizing any methodological approach and conducted in any context were eligible.

Search and Screening

Seven international databases, three Chinese regional databases, and six grey literature repositories (see Appendix 4 List of Databases and Grey Literature Repositories) were searched for studies published in English and Chinese between 1st January 2020 and 1st December 2022. Only articles published in English and Chinese were included due to the languages spoken by the reviewers. Reference lists of included studies were hand-searched for relevant reviews and articles, and any reviews identified during the search were examined for additional articles. The search strategy included terms related to parenting interventions,

program adaptations, and the COVID-19 pandemic (see Appendix 5 Sample Search Strategies). The screening of titles and abstracts was conducted using Rayyan. ZF, proficient in both English and Chinese, screened all titles and abstracts, and an additional quality check was performed by YS, who double-screened a randomly selected 10% of all English references. The results were highly consistent. Conflicts were resolved through discussion. ZF subsequently retrieved and assessed full texts of all potentially eligible studies. The final list of included studies was confirmed with YS and RE.

Data Extraction

Data extraction was informed by FRAME and the Template for Intervention Description and Replication (TIDierR) Checklist and extracted items were: study information, study design, context, program features (program model, level of prevention, delivery modality, delivery method, intensity, location, and facilitator qualification), and participant characteristics; timing and rationale for adaptation, actors, types of adaptation, adaptations occurred at what level of delivery, nature of content modification, fidelity to core components, user experience, and impact of the adapted version; and for quantitative studies: measures and outcomes. We extracted both direct quotes and author reflections, presented in narrative or visualized forms. MM and LC each extracted 50% of included studies, with all extractions verified by the third reviewer, ZF. Issues were resolved through discussion.

Quality Appraisal

Quality assessment was conducted based on the Mixed Methods Appraisal Tool (MMAT) (Hong et al., 2018), which allows for the assessment of studies with different

methods using one appraisal tool. The MMAT consists of two screening questions to determine whether a paper is an empirical study, followed by five criteria for each type of design (i.e., qualitative study; randomized controlled trial; non-randomized controlled trial, in which people are allocated to different conditions using methods that are not random; quantitative descriptive study; and mixed-methods study). Criteria were rated ‘Yes’, ‘No’, or ‘Can’t Tell’. MM and LC each quality-appraised 50% of the included studies, with the third reviewer, ZF, verifying all decisions. Uncertainties were resolved through discussion with YS.

Data Analysis and Synthesis

We drew on principles of the results-based convergent design, where qualitative and quantitative data are analyzed separately and then combined to address a research question (Noyes et al., 2019). First, we synthesized quantitative and qualitative aspects separately per research question. For the quantitative synthesis, given the limited number of quantitative studies and the diversity of study designs and outcome measures, we conducted a synthesis without meta-analysis using the SWiM guidelines, specifically designed to facilitate transparent reporting in reviews of interventions employing synthesis methods other than the meta-analysis of effect estimates (Campbell et al., 2020). For the qualitative synthesis, we performed framework syntheses of direct quotes and author reflections using ATLAS.ti, a specialized software developed for qualitative data analysis and designed to enhance the rigor and efficiency of the data analysis process (Carroll, Booth, & Cooper, 2011). A preliminary coding framework was developed using a subset of data. The remaining data were then coded

and mapped against this framework. For data that did not fit into pre-existing themes, inductive thematic analysis (Braun & Clarke, 2006) was applied to generate new themes or revise existing themes. The process was iterated to ensure that the framework allowed for a comprehensive representation of the data. Second, where applicable, results from both syntheses were combined to answer specific research questions. Third, we cross-referenced adaptations with feasibility and outcomes by mapping research design and key findings against program modifications. All data can be made available upon request.

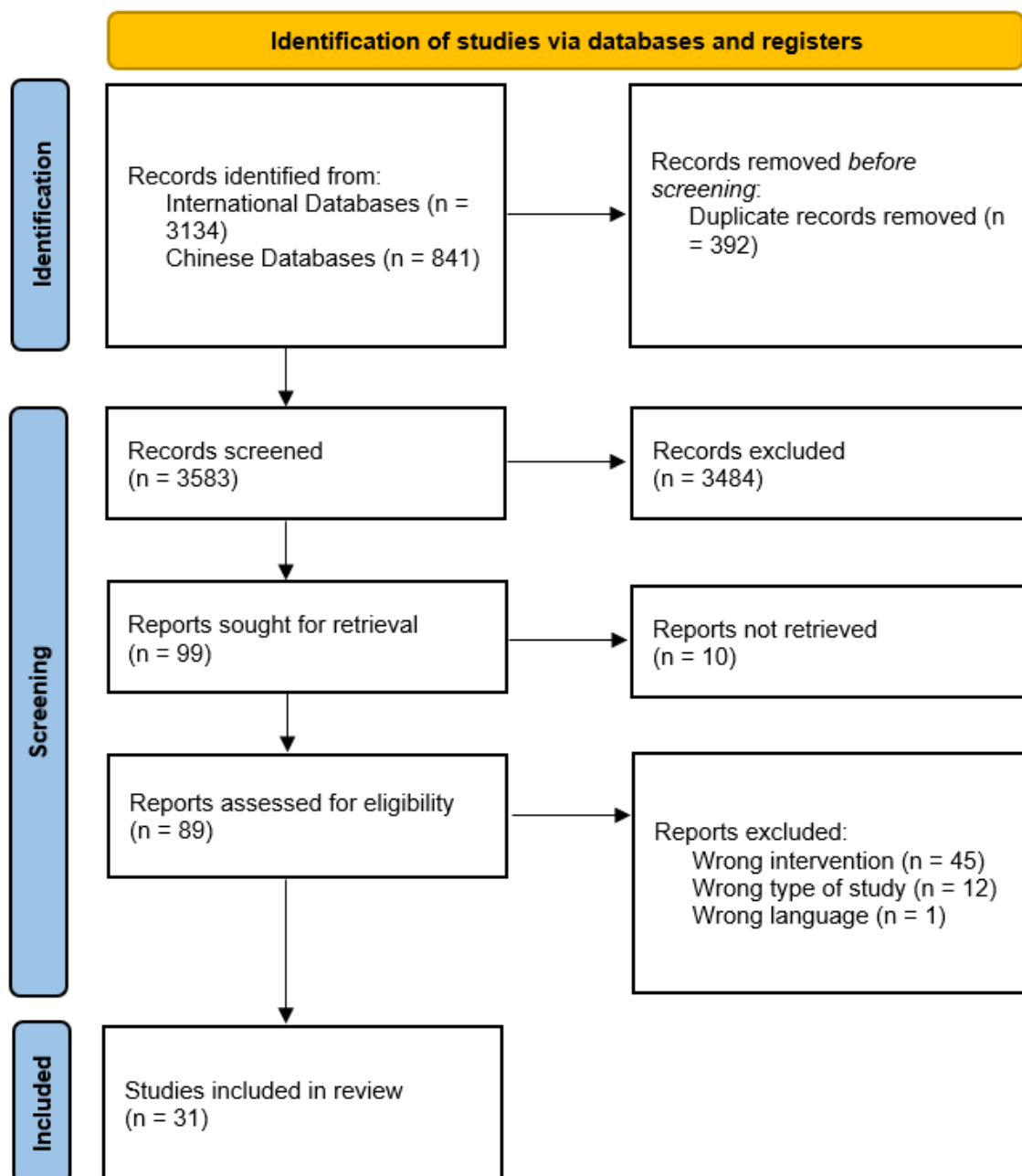
Results

Search Results

We screened the titles and abstracts of 3,583 studies. Eighty-nine full texts were retrieved. Of these, 31 studies met the inclusion criteria (see Figure 1).

Figure 1

Flow Chart



Study Characteristics

Study Year and Country

Characteristics of the included studies are presented in Appendix 1. The included studies were published between 2020 and 2022. Studies were conducted in six WHO regions:

America (n=20), Europe (n=4), Southeast Asia (n=4), Africa (n=3), Eastern Mediterranean (n=1), and West Pacific (n=1). Twenty-four studies were conducted in high-income countries, with five in upper-middle-income countries, two in lower-middle-income countries, and three in low-income countries. Out of the 31 studies, 18 were conducted in the United States and three in China. One study was conducted in each of the following countries: Australia, El Salvador, France, Portugal, South Africa, the United Kingdom, and the United Arab Emirates. Three studies were conducted in multiple countries: du Toit et al. (2021) in Zambia, Tanzania, and Uganda; Franz et al. (2022) in the United States and South Africa; and Sherr et al. (2022) in the United Kingdom, USA, South Africa, Zimbabwe, Israel, Sri Lanka, Pakistan, and India.

Intervention and Participants

We used the TIDieR checklist for reporting of program features (Hoffmann et al., 2014). Twenty-four models of parenting programs were identified (Appendix 1), such as Parent-Child Interaction Therapy (n=4), Parenting for Lifelong Health (n=3), Attachment and Biobehavioral Catchup (n=2), and Developing Our Children's Skills (n=2). Each study involved different populations and settings, even when using the same program model. Hence, we considered them as distinct programs. All programs sought to prevent child maltreatment, as classified using the US National Research Council classification of prevention program types (O'Connell et al., 2009). Five studies provided universal services in respect to child maltreatment prevention; eight were selective for at-risk families; 17 were indicated focusing on families of children with substantial behavioral concerns, such as

children diagnosed with ADHD, autism, and intellectual disabilities; and one provided both indicated and selective services to families at different risk levels.

Program facilitators were professionals in 18 studies, semi-professionals in four, and laypersons in two; the remaining studies provided no relevant information. Fifteen programs were group-based, 11 were individual-based, five offered both formats, and the remaining studies did not specify. Few studies reported program locations, with two in urban settings, one in rural areas, and one in both rural and urban contexts. Program length varied from six weeks to 22 months, with six to 24 sessions. The frequency with which program sessions were delivered ranged considerably, with 13 interventions intended to be weekly, two daily, and one twice per week. Twenty-seven studies involved male and female caregivers and three included only female caregivers. All studies involved a mixture of male and female children, except for one study focusing on a single girl. One study involved grandparents (Canário et al., 2021), and another involved teachers (McDevitt, 2021).

Study Design

Twenty studies were quantitative, including four randomized controlled trials (RCTs); four non-randomized controlled trials, and 12 descriptive studies. Fourteen studies used a qualitative approach, of which ten conducted individual interviews, focus group discussions, or open-ended survey questions; three utilized case studies; and one coded field notes. Six studies adopted a mixed-methods approach. Three studies were non-empirical author reflections.

Quantitative Outcomes Targeted by the Included Interventions

Seven outcome domains were assessed in the 20 quantitative studies. They were the incidence of child maltreatment (n=1) and risk or protective factors for child maltreatment, including child behaviors (n=8), child development (n=2), parental belief in harsh parenting (n=1), parental mental health (n=8), parenting practice (n=8), and parent-child interaction (n=3). The outcomes were measured using a wide range of scales, which are presented in Appendix 1.

Quality Assessment

The methodological quality of the 28 empirical studies was assessed. Out of these, 23 studies had a clear research question and appropriate data collection methods. In 13 out of the 14 qualitative studies, the qualitative approaches and data collection methods were deemed suitable for answering the research question. In these 13 qualitative studies, findings were assessed as being adequately derived from the data, and the interpretation of results was sufficiently substantiated by the data. Maurice (2021) was potentially deemed inadequate due to the inclusion of only one brief case study. Additionally, there was coherence between qualitative data sources, collection, analysis, and interpretation in the 13 qualitative studies.

Regarding the four randomized controlled trials, three (Amaral, Dinarte, Domínguez, & Perez-Vincent, 2022; du Toit et al., 2021; Macam, Mack, Palinkas, Kipke, & Javier, 2022) reported an appropriate randomization process. Two studies (Amaral et al., 2022; du Toit et al., 2021) demonstrated adequate baseline group comparability and participant adherence to the intervention, and they also reported complete outcome data. However, only one study

(Amaral et al., 2022) reported blinding of outcome assessors.

In the case of the four non-randomized controlled trials, there was a lack of information on the selection process into the non-randomized treatment groups in two studies (Agazzi et al., 2022; Agazzi, Hayford, Thomas, Ortiz, & Salinas-Miranda, 2021). All of them used appropriate outcome measures and accounted for confounders in their analysis. Two studies (Agazzi et al., 2021; Schein, Roben, Costello, & Dozier, 2022) reported complete outcome data. Schein (2022) also indicated that the intervention was administered as intended.

As for the 12 quantitative descriptive studies, all of them utilized appropriate outcome measures with standardized tools and employed suitable statistical analysis to address the research questions. Out of these, 11 studies had a sampling strategy relevant to their research questions. The study by Gerow et al. (2021), which aimed to evaluate the efficacy of the intervention, was rated as having a low-quality sampling strategy as it included only four families thereby limiting the power to detect intervention effects. Among the 12 studies, nine were rated as having low non-response bias, while three studies did not provide sufficient information to assess non-response bias.

Regarding the six mixed-methods studies, three (Baggett et al., 2021; Canário et al., 2021; Caron et al., 2021) demonstrated a well-justified rationale for the mixed-methods design. These three studies were rated as high-quality on this dimension as they effectively integrated and interpreted the quantitative and qualitative components to address their research questions. The qualitative and quantitative components in these three studies also adhered to the quality criteria of each design, and any divergences or inconsistencies between

quantitative and qualitative results were adequately addressed.

Adaptations

Our reporting of adaptations was structured using FRAME (Stirman et al., 2019).

Rationale, Timing, and Decision-Maker

All included studies reported a rationale and timing for the adaptations made in response to the pandemic. The most common reason for adaptations were COVID-19 restrictions and health risks. Study authors indicated that the adaptations made were in response to the need to increase program feasibility and engage participants during the pandemic. The majority (94%) of the included studies had the opportunity to strategize and plan for adaptations before initiating a new round of delivery, with the exception of the studies by Al Sehli et al. (2021) and Shenderovich et al. (2022) which were compelled to make changes during the delivery process, without prior planning.

Overall, studies did not make explicit who was responsible for decision-making regarding adaptations. Based on the description of the adaptation process and author information, researchers were likely involved in adaptations in seven (23%) studies (Agarwal, Rodriguez Delgado, & Tapia-Fuselier Jr., 2022; du Toit et al., 2021; Macam et al., 2022; McIntyre, Neece, Sanner, Rodriguez, & Safer-Lichtenstein, 2022; Roben, Kipp, Schein, Costello, & Dozier, 2022; Schein et al., 2022; Sherr et al., 2022) and facilitators were likely involved in four (13%) studies (Amaral et al., 2022; Maurice, Didillon, Purper-Ouakil, & Kerbage, 2021; Shenderovich et al., 2018; Sherr et al., 2022).

Types of Adaptations

There were four types of adaptation reported in the 31 studies made to suit program delivery during the pandemic; there were changes to program content, delivery modalities, facilitator training, and fidelity measurements (Table 1).

Table 1

Adaptations Made during COVID19

Theme	Subtheme
<i>Content</i>	
1. Added content	Added COVID19 content
	Added behavioral management content
	Added individual support
2. Removed content	Only focused on more advanced child abilities
<i>Delivery/Context</i>	
1. Changed delivery modalities	Transitioned to remote delivery
	Used spacious offline venues
	Combined in-person and digital delivery
	Sent materials via mail and email
2. Created new engagement strategies	Promoted online self-referral
	Offered technical and internet support
	Used new facilitation methods
	Changed group activities
3. Changed session format	Changed session length
	Changed the total number of sessions
	Changed session frequency
	Changed group size

<i>Training and Evaluation</i>	
1. Changed capacity building methods	Changed training modality and tools
	Provided ongoing support
2. Promoted and measured fidelity	Provided supervisors monitoring
	Completed fidelity checklists
	Created a detailed action plan

Content. Six (19%) studies reported adding or removing content. Ferrara et al. (2022), Liu et al. (2021), and McDevitt (2021) added mental health support in response to COVID-19 whereas Ferrara et al. (2022) and Shenderovich et al. (2022) provided general COVID-19 guidance, such as recommendations for social distancing and handwashing. Corvin et al. (2021) enhanced individual case management. Franz et al. (2022), reporting on a program supporting autistic families, added a session on behavioral management and also reduced program content to focus only on improving abilities in older and more developmentally advanced children with autism.

Delivery. All studies reported adaptations to delivery methods. These adaptations were: 1) changing delivery modalities, 2) creating new engagement strategies, and 3) modifying session formats.

All studies, except Baggett et al. (2021), (97%) reported converting to digital delivery to reach families remotely, such as videoconferencing, live-streamlining, pre-recorded videos, text messages, voice notes, emails, online self-learning materials, phone calls, radio programs, and social media posts (Appendix 1). Parenting for Lifelong Health programs also

used printed handouts, which condensed core program content into simple tip sheets (du Toit et al., 2021; Shenderovich et al., 2022; Sherr et al., 2022). The intervention team in Shenderovich et al. (2022) continued to conduct in-person sessions in spacious venues. Five studies used a hybrid approach, offering both in-person and digital support (Caron et al., 2021; Garcia et al., 2021; Lo, Ma, Wong, & Yau-Ng, 2022; Shenderovich et al., 2022; Sherr et al., 2022).

Fourteen (45%) studies reported using new engagement strategies. For example, Baggett et al. (2021) increased online self-referrals. Six studies offered technical assistance, supporting families in installing and navigating software (Agarwal et al., 2022; Agazzi et al., 2022, 2021; Corvin et al., 2021; Lewis et al., 2022; McIntyre et al., 2022), and two provided digital devices and internet access (Corvin et al., 2021; du Toit et al., 2021). Flexible scheduling was used by Corvin et al. (2021) and Lewis et al. (2022) to accommodate competing family priorities. Two studies introduced new group facilitation techniques (e.g., regularly looking at the camera and scanning participant facial expressions) to promote caregiver engagement (Ferrara et al., 2022; Fogler et al., 2020). Seven studies adapted session activities, involving procedures to set up the virtual environment, alternations in discussion formats, and more online conversations with families following each session (Agazzi et al., 2021; Canário et al., 2021; Cook, Bragg, & Reay, 2021; du Toit et al., 2021; Fogler et al., 2020; Franz et al., 2022; Gerow et al., 2021).

Eight (26%) studies reported four strategies to adapt session formats—changing session lengths, reducing the number of sessions, using longer gaps between sessions, and adjusting

group size. To give a few examples, Lewis et al. (2022) increased session lengths to reduce the total number of sessions, whereas Fogler et al. (2020) and Lo et al. (2022) shortened session length without changing the total number of sessions. Fogler et al. (2020) emphasized key messages during the shortened sessions, while Lo et al. (2022) did not report the impact of shorter sessions on the amount of caregiver support. Franz et al. (2022) reduced the total number of sessions to focus on a portion of the program's content. Al Sehli et al. (2021) introduced longer gaps between sessions. Agarwal et al. (2022) and Shenderovich et al. (2022) shifted to smaller parent groups conducted either online or in-person, whereas du Toit et al. (2021) reported larger online groups .

Facilitator training. Four (13%) studies adapted facilitator training and support. For instance, Shenderovich et al. (2022) transitioned from in-person to digital training whereas Garcia et al. (2021) combined virtual group training with pre-recorded training videos and one-on-one consultation. Garcia et al. (2021) also developed a facilitator manual for virtual delivery. Three of the studies reported offering ongoing support for online delivery, including regular and on-demand supervision (Garcia et al., 2021), a co-therapy mode to pair new facilitators with experienced ones (Garcia et al., 2021), periodical team debriefs (Corvin et al., 2021; Garcia et al., 2021), and informal mutual support among facilitators (Ferrara et al., 2022).

Fidelity measurement. Two (6%) studies developed new strategies to maintain or measure fidelity. McIntyre et al. (2022) had supervisors either observe all live sessions or watch recordings, and research staff attended each session to complete a fidelity checklist.

Corvin et al. (2021) developed a new implementation protocol to promote adherence and conducted regular supervisor check-ins.

Feasibility and Acceptability

In this section, we present a summary of themes and subthemes from the synthesis of qualitative data, organized under three categories—perceived benefits of digital delivery, challenges of providing parenting support during COVID19, and stakeholder suggestions for improvement. Example quotes and references can be found in Appendix 2.

Perceived benefits of digital delivery. Seven (23%) studies reported on the benefits of digital delivery perceived by caregivers and program facilitators. Studies indicated that caregiver engagement had increased during and following COVID-19, which was thought to be due to fewer logistical barriers (e.g., COVID-19 restrictions, travel distance, and childcare), more opportunities to reinforce key messages, and greater comfort with participating online. Digital home visits were perceived to allow facilitators to reach more fathers and potentially improve caregiver learning by providing opportunities for learning in a natural environment, solving problems independently, and receiving flexible support. Facilitators also viewed digital delivery as promoting their professional growth by prompting them to rethink the program. Moreover, facilitators highlighted that digital delivery helped parenting programs adjust to the "new normal," with technology referred to as central to program sustainability during and post-COVID-19.

Perceived challenges of digital delivery. Six (23%) studies reported challenges according to facilitator perspectives regarding the provision of regular services. Technical and

resource issues—such as the lack of devices, unreliable internet access, and lack of technological readiness—were commonly mentioned as the biggest challenge in providing remote support. Facilitators also mentioned privacy and online safety as major concerns. Digital delivery was also perceived to hinder the identification of child maltreatment, since facilitators might only see what caregivers preferred to present. Additionally, some facilitators found it difficult to track behavioral changes in parents, as it took additional time for caregivers to complete questionnaire remotely.

These six studies also reported facilitator perspectives on barriers to engaging participants via digital delivery. Such barriers included difficulties in remote communication, lack of a structured setting, more distractions, and limited acceptability of remote programs. Difficulties in explaining concepts remotely, building strong relationships with families, and observing caregivers and their surroundings were perceived to contribute to ineffective communication. Facilitators also felt that they were unable to create an appropriate learning environment at times, as they had limited control of the space, and caregivers were reluctant to rearrange the home settings. Moreover, facilitators observed that caregivers had more distractions when attending remotely, such as due to the presence of children and pets at home, shifting family priorities, and an overload of stress and responsibilities (e.g., financial crisis). Facilitators also articulated that caregivers tended to view digital programs as less formal and were therefore less committed.

Stakeholder suggestions for improvement. Four (13%) studies reported on caregiver and facilitator suggestions for improvement on future adaptations. Caregivers highlighted the

need for smaller group sizes and add-on in-person elements. Facilitators expressed the need for setting up boundaries with caregivers and receiving support from other facilitators, organizational leadership, and the wider network of family service providers.

Potential Impacts

This section summarizes the quantitative and qualitative information on program impacts. Appendix 1 presents the quantitative measures of program effect and process. Appendix 2 presents the themes on stakeholder-perceived intervention impacts.

Child maltreatment. Only one (3%) quantitative study (Amaral et al., 2022) found no significant difference between the digitalized program and the control in reducing the incidence of physical child maltreatment at post-intervention. The control group appear to have received treatment-as-usual (no additional services). Based on caregiver gender, the study found that among female caregivers there was a reduction in reported physical violence.

Child-level associated factors. Seven (23%) studies reported on child behavior problems. Among them, three quantitative descriptive studies reported fewer child behavior problems at post-test compared to baseline (Canário et al., 2021; Garcia et al., 2021; Gerow et al., 2021). Four studies with randomized or quasi-experimental control groups identified similar effects of the digitalized programs delivered using video-conferencing on reducing child behavior problems compared to an in-person program (Agazzi et al., 2022, 2021), waitlist control with treatment-as-usual until the follow-up data collection (du Toit et al., 2021) , and treatment-as-usual (Amaral et al., 2022). Three (10%) studies reported on child

development, with one quantitative descriptive study showing reduced body mass index (Canário et al., 2021), and an RCT finding no effects of the digitalized program delivered using video-conferencing in promoting child social, emotional, or language development, compared to waitlist control (du Toit et al., 2021). However, caregivers in the qualitative study of Lo et al. (2022) perceived that children had better social communication skills after the program.

Parent-level factors. Eight (26%) studies reported on parental mental health and eight (26%) reported on parenting practices. An RCT with waitlist control (du Toit et al., 2021), a non-randomized controlled trial with treatment-as-usual (Liu et al., 2021), and two quantitative descriptive studies (Garcia et al., 2021; Traube, Gozalians, & Duan, 2022) reported improved parental psychological functioning. In the qualitative interviews, caregivers also described improved parental mental health due to enhanced stress management and self-care skills, as well as increased social support (du Toit et al., 2021; Sherr et al., 2022). Two non-randomized controlled studies found no difference between the digitalized programs, compared to in-person programs, in terms of parental psychological functioning, with both online and in-person participants reporting decreases in stress, compared to baseline (Agazzi et al., 2022, 2021). In these two studies, there was no group who did not receive a parenting intervention. One RCT found that the digitalized program exacerbated mental health distress, particularly stress among male caregivers, compared to treatment-as-usual (Amaral et al., 2022).

As to parenting practices, an RCT comparing a digitalized program with waitlist

control (du Toit et al., 2021) reported the intervention group had better responsive parenting at post-test. Three quantitative descriptive studies (Canário et al., 2021; Garcia et al., 2021; Lewis et al., 2022) reported higher levels of responsive and positive parenting at post-test, compared to baseline for the same group. Yet, treatment effects were not detected in an RCT comparing delivery via videoconferencing to treatment-as-usual that involved no intervention (Amaral et al., 2022). One quasi-experiment compared videoconferencing to hybrid delivery, finding that both had similar outcomes (Schein et al., 2022). Specifically, the quasi-experiment found that, using observational measures of parental sensitivity, both videoconferencing and hybrid delivery of the program, which was initially solely delivered in person, demonstrated moderate effect sizes in improving parenting practices from pre- to post-intervention (Schein et al., 2022).

Caregivers in qualitative interviews also referenced increased parental self-efficacy, characterized by being more sensitive to child needs, having better understanding of child development, using less harsh discipline, and employing more positive parenting practices (Cook et al., 2021; du Toit et al., 2021; Sherr et al., 2022). As to parental attitude towards harsh parenting, du Toit et al. (2021) found no significant difference between the online parent groups and waitlist control in parental beliefs about physical punishment. Male engagement in caregiving were perceived to have improved in Ferrara et al. (2022).

Parent-child interaction. Five (16%) studies reported on parent-child interaction. Amaral et al. (2022) found that, compared to treatment-as-usual, the online parenting program did not significantly impact mother-child interactions, yet it had a significant

negative impact on father-child interactions. In one case study (Melo, Zaccariello, Girard, Croarkin, & Romanowicz, 2021) and several qualitative interviews with parents (du Toit et al., 2021; Lo et al., 2022; Sherr et al., 2022), caregivers perceived improvements in parent-child relationships.

Cross-referencing

Due to the diversity of research designs and adaptations, the limited number of studies, and the varying quality of the included studies, the cross-referencing did not identify clear patterns regarding which adaptations might correlate with greater feasibility or more favorable outcomes. Appendix 3 Cross-Referencing Tables present the mapping results.

Discussion

This global systematic review provides an overview of studies examining adaptations to parenting programs made during the COVID-19 pandemic. It aims to investigate why and how the programs have been adapted, as well as the feasibility, acceptability, and potential impacts of the adapted programs. It is hoped that the information and insights provided by this review will facilitate dialogue about digital adaptations to parenting programs.

Findings

We identified 31 studies of parenting programs adapted due to COVID-19, involving both male and female caregivers and children with different clinical conditions. We found that the adaptations were predominantly proactive and aimed to both reduce the health risks and increase program feasibility and participant engagement. Adaptations were made to program content, delivery, facilitator training, and fidelity measurements, with most

adaptations made to delivery methods and transitions from in-person programs to digital or hybrid delivery. Unlike previous findings that indicated digital parenting interventions were primarily delivered via websites or web-based portals (Xie et al., 2023), our review identified over ten types of delivery modalities, such as videoconferencing, text messages, phone calls, and radio broadcasting. This demonstrates that the pandemic has expedited the diversification of parenting service provision (Cluver et al., 2020). A range of new engagement strategies were therefore created, such as offering technical support and using online group facilitation techniques and new session formats to improve the implementation of the digital programs. A few studies reported making changes to the program content while several studies reported shifting formats of facilitator capacity building and fidelity monitoring.

Similar to a review finding that chatbot-led parenting interventions primarily delivered in high-income countries exhibited high retention rates and good acceptability (Klapow et al., 2024), our review also showed that the adapted programs demonstrated general feasibility and acceptability. We found that digital delivery could alleviate common logistic barriers to participation, a trend consistent with previous research indicating higher participation rates in digital programs compared to in-person versions (Perrino et al., 2018). This also aligns with findings from a previous review of home visiting programs transitioned to virtual delivery during the pandemic, which reported comparable service indicators, such as caseloads and completion rates, to pre-pandemic levels in some programs (Roben & Costello, 2022). The review also found that digital delivery promoted caregiver learning and interaction and increased reach of male caregivers. This echoes findings from a previous review of digital

parenting interventions for fathers of infants, which found that these interventions were deemed to increase support between partners in childcare and improve paternal confidence in parenting (Xie et al., 2023). A review on virtual adaptation of healthcare quality improvement training during COVID-19 also found that online training programs increases program reach and promoted participant learning by enhancing flexibility and participant control.

Furthermore, our review highlighted that the use of digital technology was deemed as key to program sustainability post-pandemic. However, digitalization is not a straightforward undertaking. Despite the reported benefits, participant engagement remained an ongoing challenge (Butler, Gregg, Calam, & Wittkowski, 2020). Similar to other studies (O'Neill, Korfmacher, Zagaja, & Duggan, 2020; Sanders, Baker, & Turner, 2012; Racine, Hartwick, Collin-Vézina, & Medigan, 2020), our findings showed that the benefits of promoting participation might be compromised by technical problems, resource constraints, facilitator inexperience in digital delivery, difficulties in remote teaching, and less caregiver commitment which all could result in high attrition and inequitable participation, excluding families with least digital resources. Overall, our results align with a previous review on digital parenting interventions for fathers of infants, which found mixed findings regarding program feasibility and acceptability (Xie et al., 2023).

To improve participant experiences within the digital programs, the review findings suggest that caregivers need more personalized experience and interactions with facilitators, which is in line with previous studies showing the importance of individualized parenting support (Z. Fang, Lachman, Zhang, Qiao, & Barlow, 2022) and human elements in digital

health programs to tackle individual challenges (Harris, Andrews, Gonzalez, Prime, & Atkinson, 2020). Facilitators also reported the need for wider support from peers and organizations and clear boundaries with participants.

Previous reviews have shown that digital programs have comparable effectiveness to in-person programs and, compared to no treatment, can help improve child behaviors, parenting style, parental mental health, and parent-child interactions (Baumel, Pawar, Kane, & Correll, 2016; Florean, Dobrea, Păsărelu, Georgescu, & Milea, 2020; Spencer, Topham, & King, 2020). However, this review found mixed results, with some quantitative studies finding positive impacts for the digital adaptations, some studies, including the RCTs, finding null effects, and one study suggesting some potential negative impacts. These findings align with a systematic review that investigated the effectiveness of remotely delivered parenting programs in enhancing parent-child interaction and child development. The review similarly encountered mixed results and insufficient evidence to draw conclusions (Solís-Cordero et al., 2022). It should be noted that we also included a range of study designs with a limited number of studies using a controlled trial, making it difficult to draw a definite conclusion. Several controlled studies lacked clear information on the control conditions. We identified only one RCT that reported positive impacts compared to a waitlist control, and one RCT with negative impacts. One possible explanation for the lack of effects in other RCTs could be difficulties with participant engagement, as reported in the qualitative synthesis.

Evidence Gaps

Regardless of the challenges of the pandemic, a number of parenting programs were

adapted and delivered, and we identified a range of studies examining these adaptations. However, there were several evidence gaps. Six studies reported content adaptations, but there was a general lack of explicit justification for altering program content. Despite the modifications to program content and delivery, only four studies reported corresponding responses made to facilitator capacity building so as to equip facilitators with the skills necessary to deliver interventions in new contexts. Furthermore, we found it challenging to code the degree to which programs were delivered with fidelity to their original models as only a few studies described strategies to measure implementation fidelity. The adaptations were made proactively in all but two studies, which might have reduced the risk of adaptations undermining program mechanisms of change. However, proactive adaptations do not guarantee adherence nor do they represent what actually occurred in the field where facilitators consistently face new challenges and complex family needs that make comprehensive proactive planning difficult and put fidelity at risk (Shenderovich et al., 2022). To understand the process of adaptation, FRAME suggests recording the level at which adaptations occur—for instance, for whom (i.e., an individual recipient, a specific intervention cohort, or a particular population) the adaptations were made and by whom (i.e., a facilitator, a unit within an organization, the entire organization, or the entire service network) (Stirman et al., 2019). However, such information was not often explicit in the included studies. This inhibited our understanding of the power dynamics between different stakeholders during the adaptations and their potential relationships with program impacts. In the impact evaluations, information on study design was sometimes missing. Finally, the

evidence we gathered was largely from high-income countries which limits our understanding of parenting program adaptation in LMICs.

Strengths

This review provides an important contribution to the literature by synthesizing how parenting programs were adapted to suit the demands presented by the COVID-19 pandemic. The included studies involved a diverse group of male and female caregivers encompassing various ethnicities (such as White, Asian, African, Hispanic, and Arabic, as well as those of mixed heritage). The studies also reflected parenting interventions delivered in all six WHO regions, covering a mixture of high-, middle-, and low-income countries. The participating families involved families of children with and without disabilities

Limitations

A limitation of this review is that many studies were not able to keep records of all of the adaptations made to programs during the pandemic due to limited resources and heightened pressures. As a result, the present review cannot provide a full picture of the adaptations made by parenting programs during the pandemic. Along these lines, studies reporting on adaptations may have reported on programs that were well-resourced and better implemented than other programs, leading to publication bias. As a result, the findings may have limited generalizability to low-resource settings wherein other adaptations may have been required to suit these contexts. Additionally, many studies did not report on the socioeconomic status of parent participants so the extent to which programs reached these groups is not known. Limited process evaluation information on quality of delivery was

available. The review was also limited to studies published in English and Chinese languages, resulting in the omission of relevant studies published in other languages. We only conducted double screening on 10% of the English references, deviating from the Cochrane guidelines and potentially introducing selection bias. It was also not possible to conduct double screening for Chinese references because only one author was proficient in Chinese.

Conclusion

This review provides insights into the adaptations of parenting interventions during the COVID-19 pandemic and its aftermath. By synthesizing a diverse range of studies, we have shed light on the strategies employed to maintain the delivery of parenting programs when in-person sessions were inhibited and to reach families remotely using digital methods.

Our findings underscore the critical need to adapt evidence-based interventions in response to unprecedented situations. The shift to digitalization presented both benefits and challenges. Overall, the adaptations implemented during the pandemic were found to be feasible and acceptable, as reported in various studies. Additionally, fidelity to the original program designs could be maintained through online training. This suggests that the adaptations made during the pandemic can be both practical and acceptable across different types of parenting programs. However, while the adapted digital programs generally demonstrated feasibility and acceptability based on stakeholder perspectives, the varied outcomes in terms of their potential impacts highlight the complex interplay between adaptation and fidelity.

We also identified a comprehensive list of adaptations reported for studies focusing on

parenting interventions aimed at improving parenting practices and addressing child maltreatment. This mapping provides valuable guidance on program options for mitigating child maltreatment and addressing its risk and protective factors during crises or transitions to digital formats.

Implications

The findings of this review may have implications for practice, policy, and research. For practitioners, the review suggests that it is important to align interventions with the evolving context as well as to document their experiences to inform future practices. Resources, such as support with digital access, are necessary for high-quality and equitable digital delivery. Collaborative efforts between practitioners and researchers may prove to be valuable in formulating adaptation plans and documenting implementation strategies. Furthermore, the review suggests that facilitators should be adequately supported by peers, organizations, and the wider service network in implementing adapted and digital programs. From a policy perspective, this review suggests that policies supporting the adaptation, evaluation, and scaling of evidence-based parenting interventions with context-aligned digital or hybrid delivery methods hold promise. The pandemic has unveiled the potential of digital interventions, providing an opportunity to leverage this momentum to further enable the adoption of technology-enhanced parenting interventions that are tailored to local needs.

However, further impact and process evaluation is needed to establish the processes and effects of digital delivery of programs. Future adaptation studies should use established frameworks such as ADAPT (Moore et al., 2021) for conducting adaptations along with

FRAME (Stirman et al., 2019) or FRAME-IS (Miller, Barnett, Baumann, Gutner, & Wiltsey-stirman, 2021) for comprehensive documentation of adaptations. Research should delve deeper into the rationale behind adaptations, stakeholder engagement, decision-making processes, facilitator capacity building, and the maintenance of implementation fidelity. Additionally, more research specifically focusing on adaptations in LMICs is needed.

Table 2

Summary of Critical Findings

- Adaptations made to parenting programs delivered during the COVID-19 pandemic primarily focused on changing delivery modalities, participant engagement strategies, and session formats. Adjustments to program content, fidelity measure, and facilitator training were less frequently reported.
- Adapted parenting programs demonstrated feasibility and acceptability, revealing both opportunities and challenges in participant engagement with digital delivery.
- The evaluations of impacts of the adapted programs yielded mixed results.
- Insufficient reporting of adaptations is evident, particularly concerning aspects such as the rationale behind adaptations, fidelity consistency, capacity building, stakeholder involvement, and the decision-making process.

Table 3

Implications for Practice, Policy, and Research

Practice	<ul style="list-style-type: none"> • Practitioners should tailor interventions to align with the new context and document these adaptations for future reference.
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	<ul style="list-style-type: none">• Collaborative efforts between practitioners and researchers are encouraged to create adaptation plans and document program implementation.• Enhanced support should be provided to facilitators to ensure their proficiency in implementing adapted programs.
Policy	<ul style="list-style-type: none">• Policies should support adaptation of evidence-based parenting interventions with local context-aligned digital or hybrid delivery methods, which appear to be feasible and offer potential advantages, such as wider reach.
Research	<ul style="list-style-type: none">• Future research should adhere to established guidelines for conducting and reporting adaptations, such as ADAPT, FRAME, and FRAME-IS.• Future research should also delve beyond describing what is adapted to include more explicit information on the rationale, stakeholder involvement, decision-making processes, capacity building, and considerations of implementation fidelity.• More research on the implementation and impact of adapted programs and on adaptations undertaken in LMICs is needed.

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Appendix 1 Characteristics of Included Studies Table

Study ID	Country	Design & Data Types	Program	Type	Target Population
Agarwal 2022	USA	non-empirical (author reflections)	Child–Parent Relationship Therapy	selective	children with specific mental health or behavioural issues
Agazzi 2022	USA	quantitative: non-randomized controlled trial (control: in-person version)	Developing Our Children’s Skills K-5 (i-DOCS K-5)	selective	children who were perceived to have disruptive behaviours, no severity score or diagnosis required
Agazzi 2021	USA	quantitative: non-randomized controlled trial (control: in-person version)	internet-Helping Our Toddlers, Developing Our Children’s Skills (i-HOT DOCS)	selective	children who have challenging behaviours
Al Sehli 2021	United Arab Emirates	qualitative: case study	Parent-Child Interaction Therapy	selective	children with ADHD or epilepsy
Amaral 2022	El	quantitative: RCT (control: treatment-	a stress management and positive	universal	all families

	Salvador	as-usual)	parenting techniques program		
Baggett 2021	USA	quantitative: descriptive (number of referrals)	Mom and Baby Net & Depression and Developmental Awareness	indicated	infants who were at elevated risk for poor social emotional and communication development as a function of maternal depression and adverse mother-infant interactions that exacerbate the detrimental effects of poverty
Barnett 2021	USA	quantitative: descriptive (post-test) qualitative: open-ended questions	Internet-Delivered Parent-Child Interaction Therapy	universal	all families
Canário 2021	Portugal	quantitative: descriptive (pre-post) qualitative: semi-structured interviews	Group Triple P	selective	overweight or obese children
Caron 2021	USA	quantitative: descriptive (fidelity scores)	Attachment and Biobehavioural Catchup - Infant and Toddler versions	indicated	infants and toddlers who have experienced early adversity
Cook 2021	Australia	qualitative: semi-structured interviews	Circle of Security-Parenting	indicated	women and their families experiencing moderate to severe mental illness during pregnancy and up to 12 months postpartum
Corvin 2021	USA	non-empirical (author reflections)	Positive Parenting Partnership	indicated and selective	families at risk of CAN and families involved in CAN services
du Toit 2021	Zambia, Tanzania, Uganda	quantitative: RCT (control: waitlist) qualitative: semi-structured interviews	Parenting for Lifelong Health - Sharing Stories	universal	all families
Ferrara 2022	USA	qualitative: focus group discussions	Army New Parent Support Program	indicated	military families who face unique challenges such as geographic relocations and potential physical and mental health problems due to combat exposure.
Fogler 2020	USA	qualitative: open-ended survey questions and focus group discussions,	Bootcamp for Attention-Deficit/Hyperactivity Disorder	selective	children who were recently diagnosed with ADHD
Franz 2022	USA,	non-empirical (author reflections)	Early Start Denver Model-Informed	selective	children with autism

	South Africa		Caregiver Coaching		
Garcia 2021	USA	quantitative: descriptive (pre-post)	Internet-Delivered Parent-Child Interaction Therapy	selective	children with elevated child disruptive behavior
Gerow 2021	USA	quantitative: descriptive (concurrent multiple-baseline)	a mixture of self-directed and on-one-one parent coaching	selective	children with autism
Lewis 2022	UK	quantitative: descriptive (pre-post)	Enfys Nurturing Attachments Groups	selective	children and young people who had been exposed to developmental trauma, most of whom were looked after.
Liu 2021	China	quantitative: non-randomized controlled trial (control: treatment-as-usual)	WeChat-Based Parenting Training	selective	children with autism
Lo 2022	China	quantitative: descriptive (post-test) qualitative: focus group discussions	Multi-Family Group model	selective	children with ID
Macam 2022	USA	quantitative: RCT (control: waitlist) qualitative: field notes	Incredible Years Basic Parent Training Program	universal	all families
Maurice 2021	France	qualitative: case study	Behavioral Parent Training	selective	children with ADHD
McDevitt 2021	China	qualitative: semi-structured interviews	Parent Education and Training Program	selective	children with autism
McIntyre 2022	USA	quantitative: descriptive (post-test)	Behavioral Parent Training	selective	children with developmental delay
Melo 2021	USA	quantitative: descriptive (pre-post) qualitative: case study	Parent-Child Interaction Therapy	selective	children with ADHD
Roben 2022	USA	quantitative: descriptive (process measures)	Attachment and Biobehavioral Catchup	indicated	infants and toddlers who have experienced early adversity
Schein 2022	USA	quantitative: non-randomized controlled trial (control: hybrid delivery)	Attachment and Biobehavioral Catchup	indicated	infants and toddlers who have experienced early adversity
Shenderovich 2022	South Africa	qualitative: semi-structured interviews	Parenting for Lifelong Health for Young Children and for Parents and Teens	indicated	disadvantaged families

Sherr 2022	UK, USA, South Africa, Zimbabwe, Israel, Sri Lanka, Pakistan, and India	qualitative: semi-structured interviews & open-ended questions	Parenting for Lifelong Health COVID-19 Resources	universal	all families
Traube 2022	USA	quantitative: descriptive (cross-sectional survey)	virtual early childhood home visitation services	indicated	families covered by safety net
Yi 2021	USA	quantitative: RCT (the same intervention but with modifications during the onboarding meeting and progress monitoring)	Telehealth Applied Behavior Analysis Parent Training	selective	children with autism

(continued)

Study ID	Facilitator	Format	Duration	Session Number	Modality	Outcomes and Measures
Agarwal 2022	professional	group	10 weeks	10	videoconferencing, pre-recorded videos	
Agazzi 2022	professional	group		6	videoconferencing	child behavior: SDQ, ECBI parental mental health: PHQ-9, DOCS Parenting Stress Measure
Agazzi 2021	professional	group		6	videoconferencing	child behavior: ECBI parental mental health: DOCS Parenting Stress Measure
Al Sehli 2021	professional	individual	8-14 months	17 to 25	virtual delivery	
Amaral 2022		individual	2 months	weekly texts	text messages/voice	child behavior: World Bank Survey

					notes/emails	parental mental health: DASS-21 parenting practice: Barratt Impulsiveness Scale violence against children: Prevention of Child Abuse and Neglect Screening Tool, Parent Version parent-child interaction: Family Care Indicators instrument
Baggett 2021		group	32 months	14		descriptive mapping of referrals before and during covid
Barnett 2021	professional	individual			videoconferencing	facilitator work status
Canário 2021		mixed	17 weeks	14 group sessions; 4 individual sessions	videoconferencing	child behavior: SDQ, Lifestyle Behaviour Checklist child development: BMI z-score parenting practice: Parenting Scale
Caron 2021	professional	group			a hybrid of in-person and digital delivery	
Cook 2021	professional	group	8 weeks		videoconferencing	
Corvin 2021		mixed				
du Toit 2021	layperson	group	6 weeks		pre-recorded videos, text messages/voice notes/emails, online self-learning materials	child behaviors: SDQ, CBCL child development: Caregiver Reported Early Development Instrument parental attitude: Parent-Child Conflict Tactics scales parental mental health: PHQ-9, GAD-7, PSS parenting practice: Family Care Index
Ferrara 2022	professional	individual			videoconferencing, text messages/voice notes/emails, phone calls	
Fogler 2020		group			videoconferencing	
Franz 2022		group	8 weeks in US;	8 or 12	videoconferencing, pre-recorded videos,	

			weeks in SA		text messages/voice notes/emails, phone calls	
Garcia 2021	professional	individual	18 weeks		videoconferencing, pre-recorded videos, in-person delivery	child behaviors: ECBI, Child Compliance, BASC-3 Internalizing Problems Composite Scores parental mental health: PSI-SF parenting practice: Positive “Do” Skills, Negative “Don’t” Skills parent-child interaction: DPCICS-IV
Gerow 2021	professional	individual	6 or more weeks		videoconferencing	
Lewis 2022	professional	group	12 hours	varies	videoconferencing, pre-recorded videos	parental self-efficacy: brief parental self-efficacy scale, carer questionnaire, parental reflective functioning questionnaire
Liu 2021	professional	group	12 weeks	24	live streamlining	parental mental health: self-rating anxiety and depression scales, PSI-SF, Herth Hope Index
Lo 2022	professional	group	30 hours	10	videoconferencing, in-person delivery	satisfaction: Client Satisfaction Questionnaire
Macam 2022	professional	group	12 weeks	12	videoconferencing	child behavior: CBCL parental mental health: PSI-SF, Epidemic–Pandemic Impacts Inventory parenting practice: Parenting Practices Inventory
Maurice 2021	professional	group	10 days		videoconferencing	
McDevitt 2021	semi-professional	mixed	12 weeks		videoconferencing	
McIntyre 2022	professional	mixed	16 week	16	videoconferencing	
Melo 2021		individual			videoconferencing	child behavior: ECBI parent-child interaction: DPCICSC26
Roben 2022	semi-professional	individual	10 sessions	10	videoconferencing	

Schein 2022	semi-professional	individual	10 sessions	10	videoconferencing	parenting practice: National Institute of Child Health and Development Observational Recording of the Caregiving Environment
Shenderovich 2022	semi-professional or layperson	group	2-3 months	10 to 12	videoconferencing, printed handouts, in-person sessions	
Sherr 2022		individual			pre-recorded videos, text messages/voice notes/emails, online self-learning materials, phone calls, radio, social media posts, in-person delivery	
Traube 2022	professional	individual				parental mental health: PHQ-9, GAD
Yi 2021	professional	mixed	60 days	12		

Note: SDQ-Strengths and Difficulties Questionnaire; ECBI-Eyberg Child Behavior Inventory; CBCL-Child Behavior Checklist; PHQ-9-Patient Health Questionnaire-9; DASS-21-Depression, Anxiety, and Stress Scale; GAD-7-Generalized Anxiety Disorder-7; PSS-Parental Stress Scale; DPCICS-IV-Dyadic Parent-Child Interaction Coding System, Fourth Edition; PSI-SF-Parenting Stress Index-Short Form.

Appendix 2 Framework Synthesis of Qualitative Data: Themes and Example Quotes

Theme	Subtheme	Example Quote
Perceived Changes Related to Individual and Familial Outcomes After the Programs Studies that contribute to this theme: (Cook, Bragg, & Reay, 2021; du Toit et al., 2021; Ferrara, Kaye, Abram-Erby, Gernon, & Perkins, 2022; Lo, Ma, Wong, & Yau-Ng, 2022; Sherr et al., 2022)		
Better child development	\	“My daughter was able to give a presentation about herself in front of so many people for 10 minutes. That was remarkable. I think my daughter was encouraged to try because she saw that someone of the same age as her had done it.” (Lo et al., 2022)
Increased parental self-efficacy	being more sensitive to child needs	“I can meet that need. It is quite simple. He just needs a cuddle.” (Cook et al., 2021)
	better understanding of child development	“I have learnt that my child loves to see me which I didn’t observe at first and also that children are wise even if they can’t talk but they know many things” “The child is also a human and understands everything that is going on, although we as caregivers often feel that the child does not understand what is going on around them, so I think as parents we should not take business as usual thinking that children have static schedules such as bath, eat, sleep, and change diapers. But also, the child needs to do other activities like have fun, play and learn things as it nurtures their mind.” (du Toit et al., 2021)
	less harsh discipline	“No more stress, hitting and spanking my children because of use of the tips.” (Sherr et al., 2022)
	more positive parenting	“I now enjoy my children and plan activities with them.” “All tips for positive parenting were welcome. In times of crisis, somehow it is easier to get out of control and forget even those good parenting skills that we already have. What was new I certainly

		tried to change. Many tools calmed the domestic situation.”(Sherr et al., 2022)
Improved parental mental health	more stress management and self-care skills	<p>“It has helped me a lot, to overcome my stress and to be kind to myself and to my loved ones, people around me, my child as well as other children. I have also learnt to be patient with a lot of children not only my child.”</p> <p>“I’m now feeling better and I know how to manage and control my thoughts when I feel worried or stressed out, because I know it normal and sometimes when I feel that I opt to relax and sometimes seek for help from people who are very close to me and trustworthy” (du Toit et al., 2021)</p>
	more social support	<p>“The programme has really helped me, especially with stress for example sometimes I would be upset for no reason and be moody but every time I would join the group chat and hear the stories of other parents how to be with children, how to cope with other people in the surrounding. Even if I was upset, I would cheer up.”</p> <p>“I really liked this project especially when I met with other parents in the WhatsApp group it became like my other family, because we were sharing out our experiences in the upbringing of our children as we are learning from each other.” (du Toit et al., 2021)</p>
Improved parent-child interactions	\	“I spend a lot of time with them. I listen to them carefully. We discuss anything in a deep and subtle way.” (Sherr et al., 2022)
More male engagement in caregiving	\	“My child is now free and happy to be with me, she doesn’t fear me anymore...she is no longer afraid of me, she feels happy when

		she sees me and prefer to ask me to show her digital books and asks me questions from that. Yes. I'm now better, I'm kind to my child, treating them well, politely and with love.” (male caregiver) “There were some challenges because she could not accept me to carry her, I also tried to ignore her but when the project started I started carrying her, telling her stories and showing her the picture books you were sending. So this time the relationship is good, she’s responding very well” (male caregiver) (du Toit et al., 2021)
Benefits of Digital Delivery		
Studies that contribute to this theme: (Barnett et al., 2021; Cook et al., 2021; du Toit et al., 2021; Ferrara et al., 2022; Lo et al., 2022; McDevitt, 2021; Sherr et al., 2022)		
Increased caregiver engagement	fewer logistic barriers to attendance	“able to overcome barriers like childcare/transportation to the office.” (Barnett et al., 2021)
	more opportunities to reinforce key messages	“I liked this structure and it was much understandable for me. I liked it when you sent something let’s say a picture and later on you sent also a voice note which had an additional explanation of the same thing, in fact, I was very happy because you were making us understand the lessons more, and also after that you were asking some questions to the participants and allow us to share our experiences, I really liked it, it was the best structure.” (du Toit et al., 2021)
	more caregiver interaction	“I’m a very shy person and I wouldn’t normally talk in a group. I was able to say things to the (online) group.” (Cook et al., 2021)
	more male engagement	“I feel the families are more open to—especially the moms—to communicating, but I think dads even. That’s a big success that we’re engaging more dads in the home visits.” (Ferrara et al.,

		2022)
Improving caregiver learning	learning in a natural environment	“Transfer of the parents’ skills learned in treatment is better than if they were in the clinic because they are learning/practicing learned skills in their natural environment.” (Barnett et al., 2021)
	opportunities of independent problem-solving	“It was easier for the facilitator to encourage parents to wrestle with questions and work out for themselves where the child was on the circle, what the child needs from the parent in the moment, and most importantly to see that meeting that need is not only possible but rewarding for both parent and child.” (Cook et al., 2021)
	flexibility in receiving individualized and extra support	“This way, I get to see a small picture of their daily life and ask more nuanced questions such as ‘He’s moving his hands but is he really not listening to the story?’ ‘What do you think you need the most help with in order to get him to interact with you?’” (McDevitt, 2021)
Promoting facilitator professional growth	re-thinking about the program, group facilitation, and participants	“During this time where we’ve been at home, we’ve been able to grow so much professionally.” Succinctly put, “so, I’ve been doing a lot of learning.” (Ferrara et al., 2022)
Adjusting to the ‘new normal’	Promoting program sustainability during and post-COVID19	“this whole experience is going to change how we go forward.’ One home visitor stated, ‘We’re going to have to adjust to a new normal. We have some of the tools right now, but we need training to be able to, like I said before about innovation, you have to be ready to change and willing to change.’” (Ferrara et al., 2022)
Perceived Challenges of Digital Delivery		
Studies that contribute to this theme: (Barnett et al., 2021; Cook et al., 2021; du Toit et al., 2021; Ferrara et al., 2022; McDevitt, 2021; Sherr et al., 2022; Shenderovich et al., 2022)		
Technical and resource issues	lack of devices, reliable internet access, and	“Hard to see the child consistently during session as they wander

	technology readiness	off screen; hard to hear what is happening in the room and child's statements as clearly as in-office; disruptions to technology (clients getting disconnected, headphones running out of battery, etc.)." (Barnett et al., 2021)
	Privacy and online safety	"We did not have security because you're using your personal laptop, so you do not have security features and that was a challenge." (Ferrara et al., 2022)
Difficulty in providing full services	Difficulty in identifying violence against children	"And again, when it comes to the abuse or domestic violence piece of things, not having those real eyes on." (Ferrara et al., 2022)
Difficulty in program evaluation	\	"getting parents to fill out electronic ECBI before sessions has been very difficult and it takes up a lot of time to fill out the questions with them at the beginning of session." (Barnett et al., 2021)
Barriers to engaging participants	difficulties in remote communication	"I didn't realize it was hard to sort of explain, for me, things over the phone." (Ferrara et al., 2022)
	lack of structured setting	"Home environment (setup) is difficult for parents to manage and many parents are resistant to adapting their setups for a more efficient therapy session." (Barnett et al., 2021)
	more distractions	"Keeping parents engaged when they are distracted by siblings, taking calls, other service providers (e.g., exterminator) arriving." (Barnett et al., 2021)
	limited acceptance of remote programs	"'If they can't have face-to-face, they don't want visits.' One aspect discussed was the number of clients lost during COVID-19 shutdowns: 'Some of us lost probably half of our clients, some of us lost more, some of us lost a third. I mean, we had a large chunk of people just not engaging.' Explanations for why they

		saw this trailing off were noted: ‘As time went on, those [responses] start slowing down as well. And a lot of them, they would tell me, if I need anything, I will reach out to you.’” (Ferrara et al., 2022)
Stakeholder Suggestions for Improvement		
Studies that contribute to this theme: (Cook et al., 2021; du Toit et al., 2021; Ferrara et al., 2022; Sherr et al., 2022)		
New program structures	smaller group size	“A large proportion of caregivers suggested that smaller groups (less than 20 caregivers) would work better and would be more conducive for participation. Nearly every caregiver who was interviewed asked if the programme could continue for longer than the initial six weeks.” (du Toit et al., 2021)
	add-on in-person elements	“Caregivers noted that meeting face-to-face would be beneficial as an add-on to the digital programme, suggesting an initial meeting at the beginning of the programme before receiving the digital programme to meet the facilitators and other members of the groups.” (du Toit et al., 2021)
Boundaries with caregivers	\	“‘Sometimes they will call at 10 o’clock at night and stuff like that. So, I’ve had to kind of create boundaries.’ Another home visitor said, ‘For whatever reason, my clients thought, oh, well, she’s from home now. She said I could text whenever, so it loosens the boundaries.’” (Ferrara et al., 2022)
Organizational and wider support	\	“When I have gone to management, I feel like they’re backed up so much that I’m left hanging...and, it becomes, kind of feeling a little frustrated.” “Just more guidance and direction on what we’re supposed to do. I mean, that was just lacking” (Ferrara et al., 2022) “I think one positive thing that I appreciated was allowing people

		<p>to speak into your process to say here could you try this out. And then that feedback is included into the process that I appreciated that.” (Sherr et al., 2022)</p> <p>““families that are still needing outside services like therapy or help with enrollment for [other services].’ Not only providing referrals to these services, but also connecting with those service providers was needed: ‘I have had a couple of cases where I’ve connected with another program. For instance, reaching out to the [Exceptional Family Members Program] after I’ve had a conversation with one of my clients who needed connection there and help[ed] to close that loop.’” (Ferrara et al., 2022)</p>
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Appendix 3 Cross-Referencing Tables

STUDY	DESIGN	OUTCOME	ADAPTATION
1. Violence against children			
Amaral 2022	quantitative: RCT (control: treatment-as-usual)	No significant group differences	The 27 intervention topics were delivered as messages via SMS or WhatsApp weekly.
2. Child behaviors			
Canário 2021	quantitative: descriptive (pre-post) qualitative: semi-structured interviews	improvement in 3 children	moved online; changes to exercises and activities (breakdown of changes in each session in supplementary materials), use of breakout rooms; summary of supplementary material - list each exercise and the adjustments made to the way the program is delivered to suit online format (e.g., breakout rooms, process for doing introductions, paper/pencil activity in small groups changed to big group, etc.)
Garcia	quantitative: descriptive (pre-post)	Reduced child and internalizing problems Improved child compliance	both virtual and in-person delivery; Therapists coach caregivers on their parenting skills from behind a one-way mirror via a wireless headset (for in-person services) or via videoconferencing (for virtual services).; table 2 summarizes virtual implementation strategies - web conference training from outside agencies; recorded trainings developed by PCIT team; one-on-one consultation; skills practice; shadowing cases; reviewing cases; FAQ document; online community of practice; live observation and feedback; virtual training materials (I-PCIT guide); in-session co-therapist support

STUDY	DESIGN	OUTCOME	ADAPTATION
Gerow	quantitative: descriptive (concurrent multiple-baseline)	Reduced child externalizing and internalizing problems	move to telehealth coaching, also self-directed components; new equipment and procedures to deliver sessions; mailed supplies to family homes; used Vsee to run sessions;
Melo 2021	quantitative: descriptive (pre-post) qualitative: case study	Improved child behaviour	home-based internet-PCIT (I-PCIT) using nothing more than a cell phone with video capabilities that was connected to a videotelephony software program and set-up n the child's home by the parent
Amaral 2022	quantitative: RCT (control: treatment-as-usual)	No significant group difference	The 27 intervention topics were delivered as messages via SMS or WhatsApp weekly
du Toit 2021	quantitative: RCT (control: waitlist) qualitative: semi-structured interviews	No significant group difference	adapted program material to be delivered via text messages, voice notes, infographics, animation videos, video clips, online Book Dash repository; increased number of participants reached per group (5-8 in person to then 30-40 online); content in-person groups to online via aforementioned mediums; changed to text message support group discussions from previously one to one practice sessions; change to receive two digital picture books a week over WhatsApp from in-person received a picture book to take home each week; online received recap of messages via text but in-person was take home card with key messages; received data bundles to support participation
Agazzi	quantitative: non-randomized		With the onset of COVID-19, in-person DOCS K-5 sessions were

STUDY	DESIGN	OUTCOME	ADAPTATION
2022	controlled trial (control: in-person version)		<p>suspended in favor of a telehealth version administered Microsoft Teams. Each i-DOCS K-5 group consisted of 10–15 caregivers and involved the same content as the in-person program as previously described.</p> <p>Participant materials were mailed to caregivers' homes, and additional handouts were emailed in PDF format. Caregivers also were provided with technology support as needed, such as helping them install and navigate the functions of Microsoft Teams.</p>
Agazzi 2021	quantitative: non-randomized controlled trial (control: in-person version)	No significant group differences	<p>Due to COVID-19, in-person HOT DOCS was temporarily suspended in March 2020, and only i-HOT DOCS was delivered through a HIPAA compliant online meeting platform (Microsoft Teams).</p> <p>Most activities were unchanged, with participants watching videos and engaging in group discussion through Microsoft Teams. When completing worksheets, participants were given a set amount of time to independently respond to items on the handout, before reviewing responses as a group with the instructor(s), whereas in in-person sessions, participants were paired with a partner to complete worksheets. Participant manuals were mailed to homes, and any additional handouts or materials were converted to PDF format and shared via e-mail or text message. Participants were offered technology support sessions prior to sessions if they were struggling to log in to the class. Telephone support included walking the participant through how to download Microsoft Teams...</p>

STUDY	DESIGN	OUTCOME	ADAPTATION
3. Child development			
Canário 2021	quantitative: descriptive (pre-post) qualitative: semi-structured interviews	Reduced BMI in 1 child	moved online; changes to exercises and activities (breakdown of changes in each session in supplementary materials), use of breakout rooms; summary of supplementary material - list each exercise and the adjustments made to the way the program is delivered to suit online format (e.g., breakout rooms, process for doing introductions, paper/pencil activity in small groups changed to big group, etc.)
du Toit 2021	quantitative: RCT (control: waitlist) qualitative: semi-structured interviews	Group difference in child social and emotional development is not significant.	adapted program material to be delivered via text messages, voice notes, infographics, animation videos, video clips, online Book Dash repository; increased number of participants reached per group (5-8 in person to then 30-40 online); content in-person groups to online via aforementioned mediums; changed to text message support group discussions from previously one to one practice sessions; change to receive two digital picture books a week over WhatsApp from in-person received a picture book to take home each week; online received recap of messages via text but in-person was take home card with key messages; received data bundles to support participation
4. Belief in harsh parenting			
du Toit 2021	quantitative: RCT (control: waitlist) qualitative: semi-structured	No significant group difference	adapted program material to be delivered via text messages, voice notes, infographics, animation videos, video clips, online Book Dash repository; increased number of participants reached per group (5-8 in

STUDY	DESIGN	OUTCOME	ADAPTATION
	interviews		person to then 30-40 online); content in-person groups to online via aforementioned mediums; changed to text message support group discussions from previously one to one practice sessions; change to receive two digital picture books a week over WhatsApp from in-person received a picture book to take home each week; online received recap of messages via text but in-person was take home card with key messages; received data bundles to support participation
5. Parental mental health			
du Toit 2021	quantitative: RCT (control: waitlist) qualitative: semi-structured interviews	Improved in Zambia but not in Tanzania	adapted program material to be delivered via text messages, voice notes, infographics, animation videos, video clips, online Book Dash repository; increased number of participants reached per group (5-8 in person to then 30-40 online); content in-person groups to online via aforementioned mediums; changed to text message support group discussions from previously one to one practice sessions; change to receive two digital picture books a week over WhatsApp from in-person received a picture book to take home each week; online received recap of messages via text but in-person was take home card with key messages; received data bundles to support participation
Liu 2021	quantitative: non-randomized controlled trial (control: treatment-as-usual)	Reduced parental anxiety, depression, and stress; Increased parental sense	The Joint Attention, Symbolic Play, Engagement, and Regulation (JASPER) online course delivered via WeChat [13]. The JASPER course focused on targeted social communication strategies in the format of parent-child coaching sessions that went on for 45-60

STUDY	DESIGN	OUTCOME	ADAPTATION
		of hope	<p>minutes per session, with two sessions each week for 12 weeks. Specific strategies for high-quality responses to children ' s communication and behaviors were provided by one special training teacher with more than five years of special training work experience. Another teacher was responsible for demonstrating any scenario simulations.</p> <p>An online question-and-answer session. A question-and-answer session (30-40 minutes) was conducted each week for 12 weeks.</p> <p>An online parental psychological intervention course based on pandemic situations. The course was conducted by team researchers with second-level psychological counseling qualifications. The contents included home protection strategies, emotional management, parental stress coping strategies, and psychological counseling strategies to cope with the pandemic situation (e.g., mindfulness breathing training, muscle relaxation training, and the traditional Chinese Qigong exercise "Ba Duan Jin") and lasted 45-60 minutes per session, with one session every two weeks and 6 sessions in total. For all online courses, live links were generated by the class assistant software Little Goose (Shenzhen Xiao'e Network Technology Co) and then sent to the WeChat group.</p>
Garcia	quantitative: descriptive (pre-post)	Reduced parenting stress	both virtual and in-person delivery; Therapists coach caregivers on their parenting skills from behind a one-way mirror via a wireless headset (for in-person services) or via videoconferencing (for virtual services).; table 2 summarizes virtual implementation strategies - web

STUDY	DESIGN	OUTCOME	ADAPTATION
			conference training from outside agencies; recorded trainings developed by PCIT team; one-on-one consultation; skills practice; shadowing cases; reviewing cases; FAQ document; online community of practice; live observation and feedback; virtual training materials (I-PCIT guide); in-session co-therapist support
Traube 2022	quantitative: descriptive (cross-sectional survey)	Reduced parental depression and anxiety	virtual home visitation" (VHV) service delivery
Agazzi 2022	quantitative: non-randomized controlled trial (control: in-person version)	No significant group difference	<p>With the onset of COVID-19, in-person DOCS K-5 sessions were suspended in favor of a telehealth version administered Microsoft Teams. Each i-DOCS K-5 group consisted of 10–15 caregivers and involved the same content as the in-person program as previously described.</p> <p>Participant materials were mailed to caregivers' homes, and additional handouts were emailed in PDF format. Caregivers also were provided with technology support as needed, such as helping them install and navigate the functions of Microsoft Teams.</p>
Agazzi 2021	quantitative: non-randomized controlled trial (control: in-person version)	No significant group difference	<p>Due to COVID-19, in-person HOT DOCS was temporarily suspended in March 2020, and only i-HOT DOCS was delivered through a HIPAA compliant online meeting platform (Microsoft Teams).</p> <p>Most activities were unchanged, with participants watching videos and</p>

STUDY	DESIGN	OUTCOME	ADAPTATION
			engaging in group discussion through Microsoft Teams. When completing worksheets, participants were given a set amount of time to independently respond to items on the handout, before reviewing responses as a group with the instructor(s), whereas in in-person sessions, participants were paired with a partner to complete worksheets. Participant manuals were mailed to homes, and any additional handouts or materials were converted to PDF format and shared via e-mail or text message. Participants were offered technology support sessions prior to sessions if they were struggling to log in to the class. Telephone support included walking the participant through how to download Microsoft Teams...
Amaral 2022	quantitative: RCT (control: treatment-as-usual)	Increased parental mental distress, especially among male caregivers. No significant group difference in anxiety and depression.	The 27 intervention topics were delivered as messages via SMS or WhatsApp weekly
6. Parenting style			
du Toit 2021	quantitative: RCT (control: waitlist) qualitative: semi-structured	Increased responsive caregiving Increased time in reading,	adapted program material to be delivered via text messages, voice notes, infographics, animation videos, video clips, online Book Dash repository; increased number of participants reached per group (5-8 in person to then 30-40 online); content in-person groups to online via

STUDY	DESIGN	OUTCOME	ADAPTATION
	interviews	looking at picture books and/telling their child stories	aforementioned mediums; changed to text message support group discussions from previously one to one practice sessions; change to receive two digital picture books a week over WhatsApp from in-person received a picture book to take home each week; online received recap of messages via text but in-person was take home card with key messages; received data bundles to support participation
Canário 2021	quantitative: descriptive (pre-post) qualitative: semi-structured interviews	Improved overall parenting style, feeding practices, and physical activity encourage time.	moved online; changes to exercises and activities (breakdown of changes in each session in supplementary materials), use of breakout rooms; summary of supplementary material - list each exercise and the adjustments made to the way the program is delivered to suit online format (e.g., breakout rooms, process for doing introductions, paper/pencil activity in small groups changed to big group, etc.)
Garcia	quantitative: descriptive (pre-post)	Increased positive parenting	both virtual and in-person delivery; Therapists coach caregivers on their parenting skills from behind a one-way mirror via a wireless headset (for in-person services) or via videoconferencing (for virtual services).; table 2 summarizes virtual implementation strategies - web conference training from outside agencies; recorded trainings developed by PCIT team; one-on-one consultation; skills practice; shadowing cases; reviewing cases; FAQ document; online community of practice; live observation and feedback; virtual training materials (I-PCIT guide); in-session co-therapist support
Gerow	quantitative: descriptive	Increased positive	move to telehealth coaching, also self-directed components; new

STUDY	DESIGN	OUTCOME	ADAPTATION
	(concurrent multiple-baseline)	parenting skills	equipment and procedures to deliver sessions; mailed supplies to family homes; used Vsee to run sessions;
Lewis 2022	quantitative: descriptive (pre-post)	Improved parental reflective functioning Increased parental self-efficacy	The group content was delivered in several bespoke formats to meet the needs of those attending. For example, some groups followed a six two-hour session plan (based upon Kim Golding's group), whilst others the content was delivered in two six-hour sessions. Adaptations were made to account for meeting virtually. These included: more frequent breaks; offering additional technical support for those requiring it; using virtual breakout rooms for small group discussions; using a range of modalities to deliver group content such as YouTube video clips and Canva slides
Amaral 2022	quantitative: RCT (control: treatment-as-usual)	No significant group differences	The 27 intervention topics were delivered as messages via SMS or WhatsApp weekly
Schein 2022	quantitative: non-randomized controlled trial (control: hybrid delivery)	No significant group differences	Using video conferencing to provide observations of live parent-child interactions.
7. Parent-child interaction			

STUDY	DESIGN	OUTCOME	ADAPTATION
Amaral 2022	quantitative: RCT (control: treatment-as-usual)	No significant group difference among female caregivers, but negative impact among male caregivers	The 27 intervention topics were delivered as messages via SMS or WhatsApp weekly
Melo 2021	quantitative: descriptive (pre-post) qualitative: case study	Improved parent-child interaction	home-based internet-PCIT (I-PCIT) using nothing more than a cell phone with video capabilities that was connected to a videotelephony software program and set-up in the child's home by the parent
8. Participant engagement			
Amaral 2022	quantitative: RCT (control: treatment-as-usual)	Attendance rate: 72%	The 27 intervention topics were delivered as messages via SMS or WhatsApp weekly
Baggett	quant descriptive mapping of referrals before and during covid	Prior to the pandemic, 97% of study participants successfully progressed from consent to intervention, as compared to significant fewer (86%) during the	how referrals took place; pre-pandemic was a mix of staff and self-referrals; pandemic transitioned to online self-referrals only

STUDY	DESIGN	OUTCOME	ADAPTATION
		pandemic.	
Canário 2021	quantitative: descriptive (pre-post) qualitative: semi-structured interviews	Retention rate: 87.5% Attendance rate: 92.86%	moved online; changes to exercises and activities (breakdown of changes in each session in supplementary materials), use of breakout rooms; summary of supplementary material - list each exercise and the adjustments made to the way the program is delivered to suit online format (e.g., breakout rooms, process for doing introductions, paper/pencil activity in small groups changed to big group, etc.)
du Toit 2021	quantitative: RCT (control: waitlist) qualitative: semi-structured interviews	In Week 1 of the intervention, between 60-81% of caregivers in each group across all three countries had opened content within 24 hours of it being sent. By Week 6 of the intervention, this reduced to 30-76%. In Tanzania and Zambia, percentages did not drop below 50%, while in Uganda, percentages dropped to 30% in Week 6. Figure 5 (page 46)	adapted program material to be delivered via text messages, voice notes, infographics, animation videos, video clips, online Book Dash repository; increased number of participants reached per group (5-8 in person to then 30-40 online); content in-person groups to online via aforementioned mediums; changed to text message support group discussions from previously one to one practice sessions; change to receive two digital picture books a week over WhatsApp from in-person received a picture book to take home each week; online received recap of messages via text but in-person was take home card with key messages; received data bundles to support participation

STUDY	DESIGN	OUTCOME	ADAPTATION
		<p>illustrates the percentage of caregivers in each WhatsApp group who opened the message with the second digital book, sent on a Friday, within 24 hours. In the first week of the intervention, between 31-66% of caregivers across groups opened the Friday digital book within 24 hours, and by Week 6 of the intervention this increased to 44-86%.</p>	
Yi 2021	<p>quantitative: RCT (the same intervention but with modifications during the onboarding meeting and progress monitoring)</p>	<p>Higher retention and completion rates. For families in the ACT group, on average, they completed 64.29% of the online</p>	<p>online consultations</p>

STUDY	DESIGN	OUTCOME	ADAPTATION
9. Participant satisfaction			
Agazzi 2021	quantitative: non-randomized controlled trial (control: in-person version)	No significant difference between online and in-person versions in treatment satisfaction measure.	<p>Due to COVID-19, in-person HOT DOCS was temporarily suspended in March 2020, and only i-HOT DOCS was delivered through a HIPAA compliant online meeting platform (Microsoft Teams).</p> <p>Most activities were unchanged, with participants watching videos and engaging in group discussion through Microsoft Teams. When completing worksheets, participants were given a set amount of time to independently respond to items on the handout, before reviewing responses as a group with the instructor(s), whereas in in-person sessions, participants were paired with a partner to complete worksheets. Participant manuals were mailed to homes, and any additional handouts or materials were converted to PDF format and shared via e-mail or text message. Participants were offered technology support sessions prior to sessions if they were struggling to log in to the class. Telephone support included walking the participant through how to download Microsoft Teams...</p>
Lo 2022	quantitative: descriptive (post-test) qualitative: focus group discussions	High level of participant satisfaction (4/5)	changed from all delivery on site to hybrid or some onsite and some online sessions. Reduced the number of contact hours from 40 to 30. breakout rooms used and different strategies were adopted during the group sessions to maintain the attention of the participants, including doing stretching exercises to energize the group, using multisensory

STUDY	DESIGN	OUTCOME	ADAPTATION
			stimuli available on the internet (e.g., music and cartoons)
Agazzi 2022	quantitative: non-randomized controlled trial (control: in-person version)	No significant difference between online and in-person versions in treatment satisfaction measure.	<p>With the onset of COVID-19, in-person DOCS K-5 sessions were suspended in favor of a telehealth version administered Microsoft Teams. Each i-DOCS K-5 group consisted of 10–15 caregivers and involved the same content as the in-person program as previously described.</p> <p>Participant materials were mailed to caregivers' homes, and additional handouts were emailed in PDF format. Caregivers also were provided with technology support as needed, such as helping them install and navigate the functions of Microsoft Teams.</p>
McIntyre 2022	quantitative: descriptive (post-test)	<p>75% consider the online programme acceptable</p> <p>91% think it is good to have online programme</p> <p>66% reported easy to learn the information online</p>	<p>Each session was conducted using Zoom Video Communications, a cloud-based peer to peer software platform used for videotelephony and online chat services. All sessions were facilitated in Spanish by two group leaders. Two bilingual research assistants were also present in order to provide technology support and assess intervention fidelity. A bilingual BPT supervisor also attended sessions or watched recorded sessions every week. Each session was structured around videotape vignettes (using Webster-Stratton's original content with Spanish subtitles and translated material; see Webster-Stratton, 2001) and used discussion, modeling, and feedback techniques to foster mastery of the presented materials</p>

STUDY	DESIGN	OUTCOME	ADAPTATION
10. Program fidelity			
Caron	quantitative: descriptive (fidelity scores)	<p>Providers demonstrated improved fidelity over the course of training.</p> <p>When in-person and telehealth-delivered sessions were compared, providers' fidelity in telehealth-delivered ABC sessions was not significantly different from their fidelity in in-person sessions.</p> <p>Providers demonstrated improved fidelity over time in telehealth-delivered sessions.</p>	moved to telehealth sessions during pandemic, and then did a mix of in-person and telehealth afterwards
Gerow	quantitative: descriptive (concurrent multiple-baseline)	Parent implementation fidelity and therapist coaching fidelity were both high.	move to telehealth coaching, also self-directed components; new equipment and procedures to deliver sessions; mailed supplies to family homes; used Vsee to run sessions;

STUDY	DESIGN	OUTCOME	ADAPTATION
Roben 2022	quantitative: descriptive (process measures)	High fidelity rate of 83.33%	Using video conferencing to provide observations of live parent-child interactions.
du Toit 2021	quantitative: RCT (control: waitlist) qualitative: semi-structured interviews	High fidelity	adapted program material to be delivered via text messages, voice notes, infographics, animation videos, video clips, online Book Dash repository; increased number of participants reached per group (5-8 in person to then 30-40 online); content in-person groups to online via aforementioned mediums; changed to text message support group discussions from previously one to one practice sessions; change to receive two digital picture books a week over WhatsApp from in-person received a picture book to take home each week; online received recap of messages via text but in-person was take home card with key messages; received data bundles to support participation
McIntyre 2022	quantitative: descriptive (post-test)	Overall, the treatment adherence was high. In the BPT-M condition, all of the 120 BPT intervention elements were implemented (100% adherence). In the BPT-E condition, 117 BPT intervention elements	Each session was conducted using Zoom Video Communications, a cloud-based peer to peer software platform used for videotelephony and online chat services. All sessions were facilitated in Spanish by two group leaders. Two bilingual research assistants were also present in order to provide technology support and assess intervention fidelity. A bilingual BPT supervisor also attended sessions or watched recorded sessions every week. Each session was structured around videotape vignettes (using Webster-Stratton's original content with Spanish subtitles and translated material; see Webster-Stratton, 2001) and used

STUDY	DESIGN	OUTCOME	ADAPTATION
		<p>were implemented (97.5% adherence). The difference in treatment adherence scores was not significantly different between conditions ($t [18] = -0.24, p > .05$), 95% CI [-2.92, 2.32], $d = .11$. Average contact time, or dosage, for telehealth groups in the BPT-M condition was 88.10minutes (SD=4.07) and 87.80minutes (SD=4.42) for the BPT-E group. The difference in dosage between conditions was not significantly different ($t [18] = -0.16, p > .05$), 95% CI [-4.29, 3.69], $d = .07$</p>	<p>discussion, modeling, and feedback techniques to foster mastery of the presented materials</p>

Appendix 4 List of Databases and Grey Literature Repositories

English databases:

1. MEDLINE
2. Embase
3. PsycINFO
4. Cochrane library
5. CINAHL
6. Applied Social Sciences Index and Abstracts
5. Education Resources Information Center
6. International Bibliography of the Social Sciences
7. Social Science Premium Collection

Chinese databases:

1. China National Knowledge Infrastructure (CNKI)
2. China Science and Technology Journal Database (CSTJ)
3. Wanfang Database

Grey literature repositories:

1. ProQuest Dissertations & Theses Global
2. Clinical Trials.gov
3. World Health Organization clinical trials
4. UNICEF Office of Research – Innocenti
5. WHO Global Health Library--The Western Pacific Region Index Medicus (WPRIM)
6. International Development Research Centre (IDRC)

Appendix 5 Sample Search Strategies

Embase, PsycINFO, Medline:

1. ((parent\$ or famil\$ or caregiver\$ or caretaker\$) adj2 (program\$ or intervention\$ or training or education or group\$ or coach\$)).ti,ab,kw.
2. (behavio#r adj3 (train\$ or intervention\$ or therap\$ or program\$)).ti,ab,kw.
3. (cbt or cognitive behavio#ral therapy).ti,ab,kw.

4. (cognitive adj3 (therap\$ or intervention\$ or train\$ or program\$)).ti,ab,kw.
5. (triple p or positive parenting program\$).ti,ab,kw.
6. incredible years.ti,ab,kw.
7. (pcit or ipcit or i-pcit or (parent-child interaction adj therap\$) or (Parent-Child Interaction adj Therap\$)).ti,ab,kw.
8. (pmt or (parent adj management adj training)).ti,ab,kw.
9. (family adj check-up).ti,ab,kw.
10. exp parenting/
11. (adapt\$ or modif\$ or optimi\$ or adjust\$ or tailor\$ or alterat\$ or develop\$ or deliver\$ or implement\$ or remote\$ or digital\$ or internet\$ or online\$ or virtual\$).ti,ab,kw.
12. (COVID* or corona* or SARS-COV* or pandemic or lockdown or epidemic).af
13. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10
14. 11 and 12 and 13
15. limit 14 to yr="2020 -Current"