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The Virtual Irie Homes Toolbox: Adaptation and Remote Delivery of an Early Childhood, Violence Prevention, Parenting Program in Jamaica

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ABSTRACT

In response to the global pandemic, we adapted a Jamaican early childhood, violence prevention, parenting program (the Irie Homes Toolbox (IHT)) for virtual delivery. The resultant virtual IHT (vIHT) is a 10-week program that consists of weekly, one-hour, virtual group parenting sessions and e-summary sent via WhatsApp, three SMS messages/week, and access to a data-free app. The vIHT was implemented with 557 Jamaican caregivers of 2- to 6-year-olds with virtual groups conducted by government officers. We conducted an ongoing process evaluation to identify enablers and barriers to implementation. Key enablers included high compliance by government officers in conducting virtual sessions, sessions were implemented with adequate levels of quality, 90% participants read the SMS/WhatsApp messages, and 79% attended at least one virtual group with 52% attending five or more. Barriers included poor internet connectivity, difficulty navigating the online environment, low usage of the app, and inconsistent caregiver attendance at virtual sessions.

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COVID-19; early childhood; parenting program; violence prevention; virtual intervention

Approximately 300 million children worldwide experience physical punishment and/or psychological aggression perpetrated by caregivers (World Health Organization [WHO], 2020). Violence against children (VAC) is a violation of children's rights and is associated with negative short- and long-term consequences on children's behavior, physical and mental well-being, and their academic achievement (Heilmann et al., 2021; Hillis et al., 2016). Parenting programs are a key strategy to ending VAC (World Health Organization [WHO], 2016) and there is an emerging evidence base regarding the effectiveness of these programs in low- and middle-income countries (LMICs) (e.g., Lachman et al., 2021; Puffer et al., 2015).

In Jamaica, VAC by caregivers is common, with 84% of caregivers of children age 2 to 4 years reporting using physical violence and 71% reporting use of psychological aggression (Lansford & Deater-Deckard, 2012). Despite the high prevalence of VAC, parents in previous qualitative research reported that they found physical punishment to be ineffective and to have negative consequences on children's well-being and they expressed a need for training in positive discipline skills (Baker-Henningham, 2011; Burke & Sutherland, 2014). Eliminating VAC is also a national strategic priority. For example, Jamaica is a pathfinder country in the Global Partnership to End Violence Against Children (https://www.end-violence.org/impact/countries/jamaica) and there is a National Plan of Action for an Integrated Response to Children and Violence that provides an official road map for ending VAC (Government of Jamaica, 2018).

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This article has been corrected with minor changes. These changes do not impact the academic content of the article.

The Irie Homes Toolbox: A violence prevention parenting program in Jamaica

To respond to the need for violence prevention programming in Jamaica, we previously developed an early childhood, violence prevention, parenting program (the Irie Homes Toolbox [IHT]) (Francis & Baker-Henningham, 2020). Irie is a Jamaican word that means "happy," "pleasant," and "at peace and in harmony with oneself and the world." The IHT was designed by identifying evidence-based content and behavior-change techniques used in interventions to prevent VAC, and combining this with formative research and extensive piloting in the context (Francis & Baker-Henningham, 2020). The IHT thus incorporates the core components of evidence-based programs to reduce child maltreatment, operationalized for the Jamaican context.

The content of the IHT is divided into five modules: Module 1 - Promoting children's positive behavior (e.g., praise, child-led play, modeling appropriate behavior); Module 2 - Preventing children's misbehavior (e.g., understanding reasons for child behavior, giving clear instructions, teaching household rules); Module 3 - Understanding emotions (e.g., emotional self-regulation, labeling children's emotions); Module 4 - Dealing with children's misbehavior (e.g., redirecting child behavior, withdrawing attention from attention-seeking behavior, consequences, chillax (time-out)); and Module 5 - Supporting homework. The core behavior change techniques used to deliver the content include demonstration, rehearsal and practice, positive feedback, goal-setting, homework, giving materials (e.g., take-home summary cards), and an emphasis on building positive relationships. Sessions are designed to be fun, interactive, and participatory and opportunities are provided for problem-solving, group support, and individualizing content according to participants' needs. Each facilitator has a kit of reusable resources that includes a fully scripted facilitator manual, visual aids (to promote discussion), hand-held charts with key points, and an Irie Tower (a visual representation of the program). Resources for participants include a weekly take-home summary card, a weekly homework assignment sheet, and materials to use for child-led play and book reading (e.g., picture books, building blocks).

The IHT was designed to be delivered through eight 90-minute parenting sessions, held once a week for eight weeks, with groups of 6–8 parents of children aged 2 to 6 years enrolled in community preschools. In a small cluster randomized controlled trial in 18 preschools in Kingston, Jamaica, the IHT was shown to reduce parent-reported use of VAC (effect size (ES) = −0.29), increase parent-reported involvement with their child (ES = 0.30), and reduce parents' reports of child conduct problems among children with high levels of conduct problems at baseline (ES = −0.36) (Francis & Baker-Henningham, 2021).

Virtual parenting interventions

The COVID-19 pandemic and the subsequent lockdowns, social isolation, and economic uncertainty led to an increased risk of VAC, creating an urgent need for virtual parenting support at the global level (Marmor et al., 2021). However, interest in technological innovations for remote delivery of early childhood parenting programs predated the global pandemic, given the need for flexible delivery formats to extend the reach of evidence-based programs (Sanders et al., 2021). Modalities used to deliver these virtual interventions include self-guided internet programs, online discussion groups, SMS and WhatsApp messages, phone calls, and virtual facilitator-led meetings with individual or small groups of caregivers, with many programs using multiple modalities and/or blending virtual delivery with face-to-face programming (Hall & Bierman, 2015). Virtual interventions can overcome some of the key challenges of in-person programs. For example, the reach and impact of in-person programs are limited by a lack of appropriate infrastructure, lack of trained facilitators, inability to reach remote locations, parents' caregiving and work commitments, difficulty in maintaining quality of implementation at scale, and caregiver preferences (Breitenstein et al., 2014; Hall & Bierman, 2015; MacDonell & Prinz, 2017). However, remotely delivered early childhood parenting programs also present implementation challenges, including high attrition and a lack of accessibility, familiarity, and

acceptability for caregivers with limited access to mobile phones, phone service, and internet, and/or with low literacy levels (Hall & Bierman, 2015).

Systematic reviews have shown virtual programs can be effective in improving parenting and child outcomes (Breitenstein et al., 2014; Corralejo & Rodríguez, 2018; McAloon & de la Poer Beresford, 2023), although there is limited evidence for their effectiveness in reducing VAC. There is a growing literature describing the implementation and impact of virtual early childhood parenting interventions in LMIC, largely due to the need to adapt programming during the pandemic. In Nicaragua, daily SMS sent to caregivers for one year led to improved self-reported parenting practices, although no benefits were found for child development (Barrera et al., 2020). The SMS were personalized (by using the name of the child) and age appropriate (by sending different SMS according to the child's age). Shorter programs have also shown positive effects although these successful programs have included facilitator involvement, individualized support, and supplementary resources for parents and children to use at home.

For example, in Serbia, an 8-week intervention was evaluated that included weekly facilitator-led virtual groups, 5 SMS and 3 audio messages a week, and follow-up phone calls as needed, combined with a program guide and complementary resources for caregivers and children. Benefits were reported for child development but not for parenting practices (Arnold Urzua et al., 2022). In Lebanon, a virtual preschool intervention involved virtual group parenting sessions, held 2–3 times a week for 11 weeks, combined with links to additional resources sent via WhatsApp, individual phone calls as needed, and a learning kit for each child. Benefits were reported for child development and for caregiver-child early learning interactions (Global TIES for Children, 2023a). In Jamaica, caregivers received weekly SMS messages and fortnightly phone calls from a community health aide, combined with a parenting manual with activities and a selection of play materials. After 7–9 months of intervention, benefits were reported for parents' involvement in play activities with their child and their use of praise; child development was not measured (Smith et al., 2023). In contrast, a phone-based parenting intervention with refugee and host families in Jordan that consisted only of three audio phone calls per month for 6 months showed no benefit to caregiver practices or child development (Global TIES for Children, 2023b). However, families did not receive complementary resources, such as parenting manuals or play kits, and the time spent on child development content was minimal, averaging 8.5 minutes per call.

Other examples of innovations during the global pandemic that have not as yet been rigorously evaluated include a virtual intervention implemented with Rohingya families in Bangladesh that included weekly audio messages and weekly phone calls combined with play materials (Wilton et al., 2023), and an automated chatbot with personalized content based on children's age, developmental level, and caregiver preferences (tracked through AI on the platform) for use with caregivers in Peru (Jaggi et al., 2023). In addition, the Inter-American Development Bank (IDB) supported the design and implementation of virtual delivery strategies for existing early childhood development programs across nine interventions in six countries in Latin America and the Caribbean (LAC) (Rubio-Codina & López-Boo, 2022). Delivery modalities differed across contexts and included WhatsApp and SMS messages, phone calls, video calls, radio, sending links to websites and giving activity guides, manuals, and play materials to families. In some programs, these modalities were combined with in-person home visits to maximize access, especially for families living in geographically remote contexts with limited connectivity.

We identified only two evaluations of virtual early childhood, parenting interventions with an explicit focus on reducing VAC in LMIC. In El Salvador, a self-guided intervention that comprised four SMS/WhatsApp messages per week for eight weeks with links to videos, audio messages, written messages, and a blog showed no main effects of caregivers' use of and attitudes to VAC (Amaral et al., 2021). In Brazil, a 6-week, blended intervention that comprised one in-person group session followed by personalized video feedback sent via smartphone and support from a facilitator showed no benefits in the intention to treat analysis; however, reductions in coercive parenting practices were found for caregivers who participated in the program (Linhares et al., 2022).

The above studies also highlighted key enablers and barriers faced in the implementation of virtual interventions in LMIC. Strategies used to promote the success of virtual interventions included giving phones to participants (Barrera et al., 2020), giving data bundles (Global TIES for children, 2023a), use of incentive schemes to promote ongoing engagement (Barrera et al., 2020), offering individualized support and flexible delivery times (Global TIES for Children, 2023a; Rubio-Codina & López-Boo, 2022; Smith et al., 2023), building and maintaining positive relationships between facilitators and caregivers (Global TIES for Children, 2023a; Smith et al., 2023), customizing content to children's age and developmental level (Barrera et al., 2020; Jaggi et al., 2023; Rubio-Codina & López-Boo, 2022; Smith et al., 2023; Wilton et al., 2023), adapting existing evidence-based interventions and evidence-based approaches for virtual delivery (Global TIES for Children, 2023a; Rubio-Codina & López-Boo, 2022; Smith et al., 2023; Wilton et al., 2023) and providing adequate training and ongoing supervision and support for facilitators (Arnold Urzua et al., 2022; Global TIES for Children, 2023a). Virtual interventions were generally acceptable to caregivers (e.g., Jaggi et al., 2023; Smith et al., 2023; Wilton et al., 2023) although interventions without a facilitator-led component have faced declining engagement over time (Barrera et al., 2020; Jaggi et al., 2023; Wilton et al., 2023). Important barriers included caregiver lack of time (Jaggi et al., 2023; Rubio-Codina & López-Boo, 2022; Smith et al., 2023), lost phones or lost access to a borrowed phone (Jaggi et al., 2023), lack of phone service and/or poor internet connectivity (Barrera et al., 2020; Rubio-Codina & López-Boo, 2022; Smith et al., 2023), difficulty navigating the technology (Jaggi et al., 2023), and low literacy among caregivers (Smith et al., 2023).

In Jamaica, facilitators also reported difficulties in delivering the program content virtually, as they were unable to coach caregivers through the activities and provide appropriate feedback (Smith et al., 2023). The inability to use demonstration, practice, and feedback to introduce play activities to caregivers was also considered to be a key factor in the lack of impact of the audio-only intervention implemented in Jordan (Global TIES for Children, 2023b). Across several countries, facilitators reported the importance of in-person visits for building positive relationships with families and they expressed a preference for a blended delivery model (combining in-person and virtual components) post-pandemic (Rubio-Codina & López-Boo, 2022; Smith et al., 2023; Wilton et al., 2023).

In summary, although the literature on virtual delivery of early childhood interventions in LMIC is growing, there is still a need for evidence on the effectiveness of these interventions for improving caregiver and child outcomes and a need for information on how to design and/or adapt existing programs for virtual delivery and the enablers and barriers to implementation. Furthermore, the literature on virtual delivery of parenting interventions aimed specifically at reducing caregivers' use of VAC in LMIC is sparse. During the COVID-19 pandemic, we adapted the IHT for virtual delivery and designed the virtual Irie Homes Toolbox (vIHT). The vIHT was evaluated in a randomized trial and led to significant reductions in VAC by caregivers (ES = −0.12) and to caregivers' positive attitudes to VAC (ES = −0.20), with benefits sustained at nine-month follow-up (ES = −0.13 and ES = −0.14, respectively) (Dinarte-Diaz et al., 2023). In this article, we report on: 1) the development of the vIHT and how the IHT was adapted for virtual delivery, while retaining the core components and 2) results from an ongoing process evaluation during program implementation to investigate the enablers and barriers to implementation and suggestions for improvement. The article thus contributes to the literature on the adaptation and implementation of virtual, early childhood parenting interventions in LMIC.

Methods and results

The study involved a partnership between: 1) the Early Learning Partnership of the World Bank, who conducted the impact evaluation of the program and was responsible for liaison between all partners; 2) the Irie Toolbox research team, who adapted the IHT for virtual delivery and provided training and ongoing support for implementation; 2) the Early Childhood Commission (ECC), Jamaica, who implemented the program; and 4) Trend Media, who provided a datafree

app and sent SMS messages and data to participants' mobile phones to allow them to join virtual parenting groups. Ethical consent for the study was given by the University of the West Indies ethics committee (No. CREC-MN.86, 20–21). Informed consent to participate in the study was obtained from participating caregivers and from the ECC staff involved in program implementation.

Phase 1: Adaptation of the Irie Homes Toolbox

To adapt the IHT to the virtual environment, we examined the content, structure, materials, and process of delivery of the face-to-face program and made changes for the virtual environment. Throughout this process, we aimed to retain the core components of the IHT program to maximize the likelihood that the adapted intervention would achieve the desired effects (Chorpita & Daleiden, 2009). This included adapting the facilitator-led parenting groups to the virtual environment and adding other technological components in the form of SMS and WhatsApp messages and access to an app.

Content

During the adaptation process, the content was largely unchanged. We retained all content in modules one to four of the face-to-face version. We omitted the module on supporting children's homework as the children were not attending school during the pandemic. See Table 1 for a summary of the content of the vIHT.

Table 1. Content of the Virtual Irie Homes Toolbox.

Session	TOPICS COVERED EACH SESSION
Session 1	PRAISE YOUR CHILD: Importance of praising your child, how to praise your child, and what to praise your child for. PRAISE YOURSELF: Importance of praising yourself for being an Irie (good) parent.
Session 2	IRIE TIME (Child-Led Play): The importance of Irie Time, how to follow your child's lead in play, using 3 steps when playing with your child: (1) Describe; (2) Watch, Listen, and Respond; and (3) Praise. Ideas for Irie Time activities.
Session 3	GIVE YOUR CHILD POSITIVE ATTENTION THROUGHOUT THE DAY: Pay attention to positive behavior during daily routines, involve your child in household chores, and useg the 3 steps during daily activities: (1) Describe, (2) Watch, Listen, and Respond, and (3) Praise. MODELING: Model the behavior you want. IRIE TIME: Playing with toys with your child during Irie Time.
Session 4	GIVE CLEAR INSTRUCTIONS: How to give clear instructions and praise your child when they follow an instruction. KNOW YOUR CHILD: Understand your child and the factors that affect his/her behavior. IRIE TIME: Looking at books with your child during Irie time.
Session 5	TEACH YOUR CHILD NEW SKILLS: Teach your child the rules and expectations in the household. GIVE YOUR CHILD SOME AUTONOMY: Give your child some independence and choice. IRIE TIME: Playing outside with your child during Irie Time.
Session 6	REASONS FOR CHILD BEHAVIOR: Identify reasons for young children's behavior. ME-TIME: The importance of taking time to do something that you like to do. IRIE TIME: Coloring with your child during Irie Time.
Session 7	MANAGE YOUR EMOTIONS & HELP YOUR CHILD UNDERSTAND THEIR OWN EMOTIONS: How we feel affects the way we behave, how to recognize our own emotions, how to calm down when feeling angry, the importance of understanding the reasons for your child's behavior for emotional self-regulation, and labeling your child's emotions and teaching your child how to calm down when angry. IRIE TIME: Looking at books with your child during Irie time.
Session 8	WITHDRAW ATTENTION AND REDIRECT: When and how to redirect your child's attention and behavior and when and how to withdraw attention from attention-seeking behaviors. IRIE TIME: Ideas for singing and dancing with your child during Irie Time.
Session 9	CONSEQUENCES AND CHILLAX (Time-Out): When and how to use chillax, when and how to give your child consequences, and problem solving how to deal with different child behaviors using the Irie Tower. IRIE TIME: Pretend play with your child during Irie Time.
Session 10	REVIEW: Review of praise, Irie Time, giving positive attention throughout the day, giving clear instructions, teaching skills, giving choice and independence, and labeling child's emotions. I AM AN IRIE PARENT: Make a commitment to be an Irie Parent and to make an Irie Home. GOAL SETTING: Set individual goals to promote ongoing use of positive parenting strategies.

Structure

We made changes to the structure of the group parenting sessions that included shortening the length of the sessions from 90 minutes to one hour to make them more suitable for the virtual environment and extending the length of the program (from eight to ten weeks) to compensate for the shortened sessions. We maintained a small group size of eight to nine parents to ensure participants had sufficient opportunity to contribute during the sessions.

Materials

We adapted the materials for facilitators and participants. The facilitator resources used in the face-to-face sessions were converted to a PowerPoint presentation for use in the virtual sessions. These resources included: 1) visual aids, 2) charts, 3) pictures of the Irie Tower, and 4) home assignments (Irie Challenge). In addition, we converted the weekly take-home summary cards used in the face-to-face IHT to e-summaries that could be sent via WhatsApp. We also developed a facilitator manual that included a fully scripted guide for each session. For participants, we introduced two new sets of materials that included access to a data-free App with new content uploaded weekly and three SMS messages per week (see Table 2 for details). Previous studies have demonstrated that three SMS messages per week are the optimal number for improving parenting practices (Cortes et al., 2018), and that including information and encouragement in addition to actionable advice leads to higher engagement than sending advice alone (Fricke et al., 2018).

Process of delivery

We integrated the behavior change techniques used in the face-to-face IHT into the three different modes of delivery used in the vIHT—the virtual parenting groups, the app, and the SMS messages (Table 2). In addition, facilitators created a WhatsApp group with the participants in each virtual group, which they used to send reminders to attend the virtual sessions and to send e-summary cards after each session. There was no explicit plan to promote interaction between participants within the WhatsApp group, although this did occur in some groups, led by individual participants. To increase redundancy within the program, we included multiple modalities where possible. For example, information was delivered through narrated videos on the app, through SMS messages, by the facilitator in the virtual groups, and through the weekly e-summary card. In addition, we built repetition and redundancy into the virtual sessions to allow for imperfect attendance. For example, all sessions started with a review of the previous session and participant feedback on their progress with last week's Irie Challenge, core content such as praise and Irie Time were included in every session, and the final session was designated as a review session (Table 1).

Piloting the virtual parenting groups

We piloted the virtual parenting groups with two groups of eight parents. The parents invited to be in the pilot were recruited by an ECC officer from an existing parenting group. The virtual groups were held every work day for two weeks. After each session, we recorded the length of the session and made notes related to participants' engagement and understanding as well as enablers and barriers to session implementation. These notes were used to make any necessary changes to the facilitator manual and to prepare a training guide, prior to training others to implement the groups.

The vIHT designed through this adaptation process is a 10-week program, consisting of: 1) weekly virtual parenting groups with groups of 8–9 parents and an e-summary card sent via WhatsApp after each weekly session, 2) access to a data free app with new content uploaded weekly, and 3) three SMS messages per week. Figure 1 shows the materials used in week one. These three different modalities were designed to reinforce each other and maintain participant engagement in the program.

Phase 2: Implementation with ongoing process evaluation

Methods

Intervention implementation. 557 caregivers of children age 2–6 years participated in the 10-week vIHT parenting program. Caregivers were recruited through SMS messages sent through the mobile

Table 2. Adapting the Irie Homes Toolbox for virtual delivery.

	Virtual Groups and WhatsApp Messages	The App	SMS Messages
Structure and Materials	Weekly 1-hour virtual sessions for 10 weeks. Sessions were facilitated by government early childhood officers, with groups of 8–9 caregivers. Each session included: 1) Feedback on last week's homework (Irie Challenge) 2) Introduction of new positive parenting skills 3) Introduction of a child-led play (Irie Time) activity 4) Review of session and setting of new Irie Challenge 5) 1–2 e-summaries sent via WhatsApp after each session.	Ten weekly sessions uploaded on a datafree app. Each session included: 1) 1–2 videos of Jamaican parents using the strategies with their child(ren) 2) The Irie Challenge (homework) for the week with voice over 3) The Irie Tower showing parents' progress through the program, with voice over An e-picture book was uploaded in sessions 4 and 7.	Three SMS messages per week for 10 weeks. Messages included: 1) What to do (Information) 2) How to do it (Actionable Advice) 3) Praise and encouragement and a reminder to do the Irie Challenge.
Behavior Change Techniques Used			
Giving Information	– Facilitator introduced each new strategy with a visual aid and explained what the strategy is, how to use it, and why it is important.	– Each video has a narrator who introduced each strategy and explained how to use it and why it is important.	– SMS messages provide information on each strategy and how to use it.
Role Identification	– Participants are encouraged to self-identify as an Irie Parent during each session and make a commitment to being an Irie Parent on program completion.	– The narrator on the videos used the label "Irie Parent" to describe parents using the strategies.	– SMS messages encouraged participants to identify as an Irie Parent.
Homework	– Participants are given an Irie Challenge at the end of each virtual session.	– The Irie Challenge was uploaded on the app each week.	– SMS messages reminded participants of the weekly Irie Challenge.
Positive feedback and encouragement	– Facilitator provided specific positive feedback to individual participants and encourages participants to identify benefits of using the strategies to themselves and to their child.	– Videos show parents praising themselves and stating the benefits of using the strategies for themselves and their child.	– SMS messages included praise and encouragement (e.g., "Good job for being an Irie Parent").
Demonstration	– Facilitator demonstrated how to use each strategy using a visual aid as a prompt.	– Video demonstration with Jamaican parents using the strategies with their child(ren).	
Encouraging generalization	– Facilitator used visual aids depicting parents utilizing the positive discipline strategies in a broad range of different situations to promote discussion and practice.	– Videos showed caregivers of children of different ages (from 2 to 9 years), using the strategies across different situations throughout the day.	
Practice and rehearsal	– Participants role played how they will use each strategy with their child using a visual aid as a prompt.		
Goal setting	– Facilitators asked each participant to identify how they will use each strategy with their child.		
Building positive relationships	– Facilitators used reflective listening skills, used participants' and children's names, avoided criticism, and gave positive feedback.		

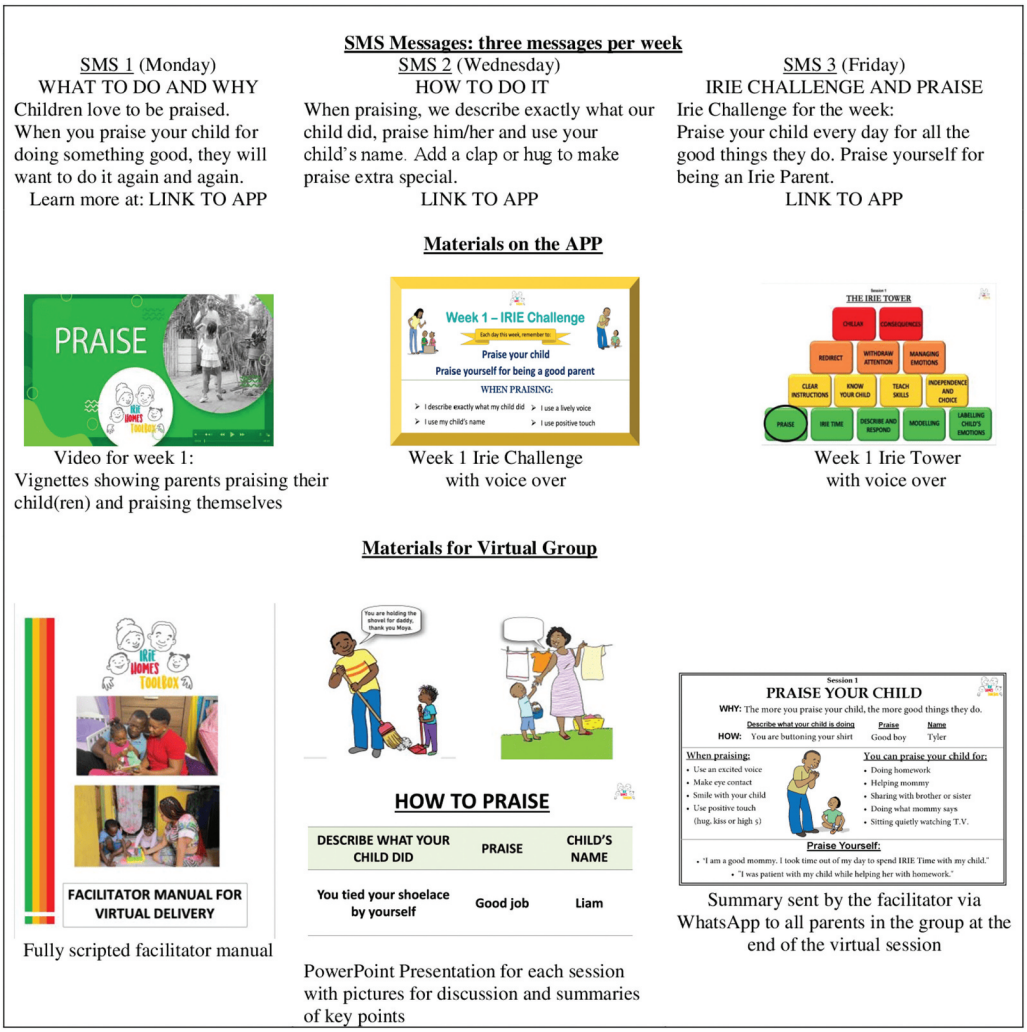

Figure 1. Examples of resources from Session 1 of the Virtual Irie Homes Toolbox.

phone network in Jamaica. Inclusion criteria for caregivers were: 1) live in a household with a child age 2–6 years, 2) have access to a smartphone or tablet, and 3) consent to participate in the study. Participating caregivers had an average of 14 years of education and 79% were employed. Caregivers received instructions on how to access the datafree app via text (with content uploaded weekly), three SMS messages per week (30 SMS messages in total), and 10 virtual parenting groups held once a week for 10 weeks. Trend Media sent phone credit to participants each week to enable them to purchase data to attend the virtual session. The vIHT parenting groups were implemented from September to November 2021 by 28 ECC officers. Within the ECC, there are six community relations officers (CROs) responsible for conducting parenting programs within their educational region and approximately 100 field officers (FOs) with responsibility for supporting early childhood practitioners, and assessing the quality of early childhood educational institutions. In this study, all six CROs and 22 FOs were involved in intervention implementation. FOs were selected to participate by the ECC executive team, based on their availability during the timeframe of the study. CROs were responsible for four groups of parents (conducting four groups per week for 10 weeks) and FOs were responsible for two groups of parents (conducting two parent groups per week for 10 weeks). In total, the 28 ECC officers conducted 68 parenting groups per week for 10 weeks with groups of 8–9 parents. Trend Media

provided each officer with a SIM card with a pre-loaded data plan for three months to allow them to conduct the virtual sessions and send WhatsApp messages.

The CROs and FOs were trained to conduct virtual sessions by two members of the Irie Toolbox research team through three four-hour initial training workshops in groups of up to 15 participants. In these workshops, the team gave an overview of the content of the program and provided skills-training in the use of the behavior change techniques used in program delivery. This was followed by weekly three-hour training sessions for the duration of the intervention. Each week, the team first met with all 28 officers for 90 minutes. The first 30 minutes was spent debriefing on the previous week's session and included discussions of facilitators' experiences implementing the sessions, provision of clarification and feedback, and collaborative problem-solving as necessary. The following 60 minutes was used to demonstrate the session to be implemented in the following week. In the second 90 minutes of the weekly training, facilitators were divided into two groups of no more than 15 participants and the ECC officers practiced facilitating the next week's session with support and feedback from the Irie Toolbox Team. All training sessions were conducted virtually on the Googlemeet platform.

Measurements. We collected information from the facilitators (ECC CROs and FOs), from the Irie Toolbox team, from Trend Media records, and directly from parents. This included quantitative data (e.g., caregiver attendance, structured questionnaires, observational checklists) and qualitative data (e.g., facilitator record forms, discussion groups). See Table 3 for full details of measurements. Data on intervention

Table 3. Measurements used in the process evaluation of the Virtual Irie Homes Toolbox.

Measurement	Description
From Facilitators	
Caregiver attendance	Recorded by facilitators at each weekly group.
Weeklyrecord form	All 28 ECC field officers were asked to complete a weekly record form for 10 weeks giving the number of participants present at each parenting group, duration of each session and documenting what went well, what was difficult, and suggestions for improvement. A total of 234/280 (84%) record forms were completed.
Final record form	After the 10-week intervention, the 28 ECC officers were asked to complete a final record form documenting their overall perspective of the virtual groups. This included what went well, what was difficult, perceived benefits to parents and children, strategies used to promote participant engagement in the program, and suggestions for improvement. 16/28 (57%) of the ECC officers returned this form.
Discussion groups	Four virtual discussion groups were held with groups of 4–6 ECC officers (18 ECC officers in total). Each discussion group lasted one hour and were held on the Googlemeet platform. One group consisted of all six Community Relations Officers (CROs), the other three groups consisted of groups of four field officers (FOs). FOs were selected to represent those with higher (>50%), medium (40–50%), and low (<40%) levels of caregiver attendance. The discussion groups covered similar topics to the final record form. Groups were facilitated by a member of the Irie Toolbox team and a research assistant kept detailed notes throughout the discussion.
Researcher-administered questionnaire	A structured questionnaire was administered through a telephone interview with all 28 ECC officers by an independent firm. This interview measured officers' confidence in conducting the groups and their opinions on participant engagement.
From the Irie Toolbox Team	
Structured observationsof virtual sessions	A member of the Irie Toolbox research team observed 3–4 parenting sessions each week for 10 weeks (34 sessions in total) using an observation checklist to measure implementation quality on a 3-point scale (0 = poor, 1 = OK, 2 = good). Priority was given to observing sessions conducted by the six CROs, as they are most likely to be responsible for program implementation in future.
ECCofficer attendance and compliance	The research team documented ECC officer attendance at virtual training sessions and officer compliance in conducting sessions based on ECC records.
From Trend Media	
App usage	Trend media provided information on the number of caregivers who downloaded the app.
From Parents	
Researcher administered questionnaire	As part of the posttest structured questionnaire administered for the impact evaluation by an independent firm, caregivers were asked whether they received any SMS and/or WhatsApp parenting messages over the past month (yes/no) and, if so, if they read them (yes/no).

take-up has been reported in the impact evaluation (Dinarte-Diaz et al., 2023) and is included here for completeness.

Analysis. The quantitative data were entered into SPSS and analyzed using descriptive statistics. The qualitative data were analyzed manually using thematic analysis (Braun & Clarke, 2006). This involved first adopting a deductive approach by collating the data from all sources (weekly facilitator record forms, final facilitator record forms, and discussion groups) into three predetermined themes: 1) enablers to implementation, 2) barriers to implementation, and 3) suggestions for improvement. The data in each category were read by TF and HBH and an index of codes was created using inductive methods; that is, codes were added as new subthemes were identified in the data. We then used the index of codes to code the data within each theme (i.e., enablers, barriers, and suggestions for improvement). TF applied the coding index to the data with ongoing input and discussions with HBH.

Results

Engagement

Officer attendance at trainings and compliance in conducting groups was high with >95% attendance and >99% of groups delivered. Caregivers attended a mean (SD) of 4.6 (3.4) sessions; 79.4% of caregivers attended at least one session, 52.4% attended five or more sessions, and 37.2% attended seven or more. Weekly average attendance at group sessions remained relatively stable across the 10-week intervention (47.2% in week 1, 47.3% in week 10). Only 39.9% of caregivers downloaded the app, although 90.0% of caregivers reported reading the SMS/WhatsApp messages.

Facilitator perspectives of enablers to the implementation of vIHT sessions

Facilitators reported that the weekly trainings increased their confidence and competence in delivering the sessions and they found the sessions were easy to facilitate, enjoyable, and led to increased job satisfaction (Table 4). Enablers at the level of the caregivers included caregivers' engagement and understanding, the relevance of the content, and perceived benefits to caregivers themselves and to their children (Table 4).

Facilitator perspectives of barriers to intervention implementation of vIHT sessions

The main barriers identified were technical issues (including poor internet connectivity and difficulty working in the virtual space), caregivers being unable to fully participate (including being unable to unmute and to use their camera due to their surroundings), poor caregiver attendance at sessions, and facilitators needing additional time to become fully comfortable using the script (Table 5). Less commonly mentioned barriers included implementation features (e.g., too much content introduced in each session), and reports of caregivers' difficulties in applying the strategies learned to their everyday life. Some facilitators stated that they would have liked more opportunities to practice the sessions in the weekly training sessions and they suggested that training in smaller groups (e.g., groups of five participants rather than 15 participants) would have provided a more comfortable and effective training environment and led to increased facilitator competence.

Facilitators' suggestions

Facilitators shared strategies that they used to promote caregiver attendance and participation, including contacting caregivers between the scheduled groups, sending reminders, and using caregivers' and children's names (Table 6). Other suggestions related to making revisions to the vIHT, such as reducing the content in some of the sessions to ensure the session could be delivered in 1 hour and/

Table 4. Facilitators' perceptions of the enablers to implementation of the virtual parenting sessions.

Theme	Quote
Enablers at the level of the facilitator	
Sessions are easy to facilitate	*"The material was written in simple language and easy to follow. The prompts in the script were very useful."* [2]
	"I like the guidance the script provided. It made it easy to conduct the sessions and keeps you on track." [3]
Facilitators enjoy conducting the sessions	*"It was fun to facilitate and highlighting simple things they do daily yet are often taken for granted."* [1]
	"The session was lively, fun and interactive." [1]
	"I enjoy working with these parents each week." [1]
Facilitators' job satisfaction	*"I felt accomplished after each session, I am happy that I was able to help with making my parents Irie parents."* [3]
	"I loved being able to positively impact the parents. It was priceless being able to respond confidently to the parents' questions."[2]
Enablers at the level of the participants	
Participants are engaged in the sessions	*"All the parents were very engaging and co-operative. I was surprised at their level of involvement and the responses they made."* [1]
	"I like that the parents were eager to learn and apply what they were taught in order to improve and strengthen their parenting skills." [2]
Participants understand the material	*"The parents were able to identify things that could make the praise more effective."* [1]
	"Parents understood exactly what Irie Time is all about. They also understood exactly what to say and what do during Irie Time." [1]
	"The parents were able to understand their children's individual behaviors and provided alternatives to help the behaviors." [1]
	"It was obvious that persons remembered what was taught weeks before and were able to apply that knowledge to the present topic." [1]
Content is relevant to participants	*"Everyone has a skill they wanted to teach their child and they were very enthused to learn how."* [1]
	"The parents found this session very helpful as they all have had behavioral issues to deal with." [1]
Participants report benefits to themselves	*"Parents are now better able to deal with their children, using praises and doing Irie time with their children."* [2]
	"They have learnt to manage their emotions in situations where they would normally get angry and shout at their children or hit them." [2]
	"They never usually thought about reason for child misbehavior, now they calm down and try to understand the reason." [3]
	"They have better relationship with their child." [3]
	"It helped her to reframe her mind-set. The emphasis on praise shifts parents from a punitive approach to a more rewarding approach." [3]
Participants report benefits to their child(ren)	*"Almost all parents have seen an improvement in their child's behavior since praising them."* [1]
	"The children's behaviors have also improved week by week as they apply the new strategies." [2]
	"Parents realize that praise improves child behavior, children want to do new things so they can be praised." [3]
Enablers related to training	
Training sessions were useful	*"Though a script was provided, the trainings and practice sessions created opportunity for me to become familiar with the material and the delivery."* [2]
	"Trainings were preparation and practice and helped to get familiar with the script." [2]
	"I liked the fact that it was weekly instead of all at once as that prevented information overload. We get a nice outline of what to do for the upcoming week instead of all at once at the beginning." [3]
	"The training sessions gives you more confidence when delivering because you can remember what was done and how it was done." [3]

[1]from weekly record form, [2]from final record form, [3]from discussion group.

or extending the duration of the sessions to give more time for the content to be delivered, enhancing program materials (e.g., use of audio rather than text messages), and conducting booster sessions after program completion.

Facilitator reports on the structured questionnaire

All 28 ECC officers were confident or very confident in their ability to conduct the vIHT sessions. They reported that in 91% of the groups, the caregivers were engaged or very engaged, and that the

Table 5. Facilitators' perceptions of the barriers to implementation of the virtual parenting sessions.

Theme	Quotes
Barriers at the level of the facilitator	
Technical issues (e.g., internet access, using PPT presentation)	*"The parents had internet challenges and kept going in and out of the meeting so I had to be doing a lot of repeating to ensure everyone understood."* [1] *"Sharing the PowerPoint and following the session simultaneously was a challenge. I had to use a second device to make it easier to follow and recognise which participant was speaking."* [1]
Needed more practice	*"I need to practice to do it well. I didn't practice enough in the Friday trainings because I was shy to practice in the larger group."* [3] *"I need to go through the script more. After I have done my first session, I get better."* [2]
Barriers at the level of the participants	
Participants unable to participate (e.g., cannot unmute microphone at work)	*"Some parents were unable to participate because they were at work. . . . being unable to unmute or turn on their camera."* [1] *"It was difficult to get the parents to be actively engaged as they all multitasking (driving home, activities at work etc.)."* [1] *"It was difficult at times to speak with much interaction as some parents were at work and unable to speak or type in the chat."* [2]
Participant attendance (e.g., low attendance, parents log on later)	*"Not all parents were able to be a part of the session due to work or other commitments."* [1] *"I had to wait almost 25 minutes before I could start the session as no one was in attendance. Even after I reminded them on numerous occasions, even twice on the day of the session."* [1] *"It was difficult to facilitate the parents during the regular working hours due to their availability."* [2]
Participants' difficulty using the strategies	*"The parents were able to identify what is a complete praise but they had problems putting it all together."* [1] *"Parents had to be reminded that during IRIE Time we follow the child's lead as they would be suggesting where the child should put the blocks instead of following the child as he/she builds the tower."* [1] *"The parents had a bit of difficulty sharing how they would come back down to the base of tower, and I had to review the Irie Tower."* [1] *"Parents found it a challenge initially to select a strategy without first using physical punishment. It was hard for them to use the blocks as an alternative."* [1]
Barriers related to intervention	
Implementation features (e.g., session length)	*"The session was longer than the previous ones, and parents became unresponsive."* [1] *"Some sessions the content was too much, so I went over the designated time."* [2]
Prefer different training methods	*"I would rather have a smaller group for training."* [3] *"Face-to-face training without distractions would be better."* [2] *"It is difficult to stay focused in virtual training as there are a lot of other demands on our time."* [3]

[1]from weekly record form, [2]from final record form, [3]from discussion group.

intervention was very beneficial or somewhat beneficial to participants in 97.5% of the groups (Table 7). The main difficulties faced were with poor internet connectivity and unresponsive caregivers leading to low levels of attendance.

Quality of implementation

vIHT sessions were attended by a mean (SD) of 3.8 (1.6) participants per group and lasted a mean (SD) of 66 (17) minutes. The majority of field officers reached acceptable levels of quality in terms of their preparation and using appropriate behavior change techniques to build positive relationships and promote learning (Table 8). However, two facilitator skills were rated "poor" in more than 40% of sessions: 1) prompting participants when necessary (44% rated poor), and 2) highlighting good things that participants said or did (62% rated poor). Furthermore, two important skills were not observed—being responsive to questions and encouraging collaborative problem-solving—indicating that participants did not ask questions or openly express difficulties in the virtual groups.

Table 6. Facilitators' suggestions relating to implementation of the virtual parenting sessions.

Theme	Quotes
Suggestions relating to participants	
Suggestions for promoting participant attendance	*"Send reminders a few days before the session that include the date, time, and meeting link. On the day of the session, another reminder is sent."* [1]
	"Making a group call in WhatsApp just before the sessions begins to remind the parents." [1]
	"Give parents responsibilities during the session so each week a parent is responsible for taking attendance." [1]
	"On days when there is no session, I interact with them in the WhatsApp group, just to say hello and ask how the children are doing." [1]
	"Greet in morning even on non-session days." [3]
	"Compensate trainers to work outside of regular working hours to ensure sessions are held at a time that parents can come (weekends, after hours etc.)." [3]
Promoting participant participation	*"Throughout the sessions I call the name of the participant if they are not responding so they answer. I encouraged those that were at work to write in the chat."* [2]
	"I use their children's names to replace the names of the children in the script. They felt valued because I remembered their child's name." [1]
Suggestions related to the intervention	
Alter session length	*"An additional 30 minutes could be allotted for each session."* [1]
	"Maybe just a little more time. The parents wanted to share more." [1]
	The content for week three was a bit lengthy. I would suggest keeping the topics for the sessions separate/short so as not to risk the participants loosing focus." [1]
	"The script is long – you could use less pictures and examples in each section." [1]
Suggestions for enhancing program materials	*"The summary that we shared after the session is good; however, voice recording would be good as we find that persons do not love to read."* [2]
	"The topics are very helpful and the initiative can be made in small adverts for television and radio." [1]
	"We could keep the groups going after the program has ended. We could send a weekly tip example summary sheet that can help motivate and empower the parent." [1]
	"Use videos in addition to visual aids in the powerpoint presentations as parents did not watch all the videos on the app." [3]
	"Include follow-up sessions for parents and have public awareness campaigns about the program." [3]

[1]from weekly record form, [2]from final record form, [3]from discussion group.

Discussion

We adapted an early childhood, violence prevention, parenting program, with proven effectiveness in reducing VAC in Jamaica, for virtual delivery. The original program (the IHT) was an 8-week, facilitator-led, face-to-face, group parenting program implemented within preschools. The adapted program (the vIHT) is a 10-week parenting program that incorporates weekly, facilitator-led, virtual parenting groups and e-summaries sent via WhatsApp, supplemented with SMS messages sent three times a week and access to an app with demonstration videos uploaded weekly. The virtual parenting groups were conducted by 28 government early childhood field officers, who were trained by the Irie Toolbox team, the developers of the program. Facilitators reported that the key enablers to implementation were the feasibility, relevance, acceptability, and perceived effectiveness of the intervention from the perspectives of both the facilitators themselves and from participating caregivers. Other enablers were that facilitators implemented the virtual groups with acceptable levels of quality and participants reported reading the SMS and WhatsApp messages. Facilitator-reported barriers included poor internet connectivity, difficulty navigating the virtual environment, poor attendance and low participation by some participants, and facilitators reporting a need for more practice in order to conduct sessions well. Another important barrier was low usage of the app by participants. Facilitators gave several suggestions to inform future delivery of the program including strategies to promote parent attendance and participation and suggestions to improve program materials and program delivery.

The IHT incorporates the core components of effective violence prevention parenting programs and we retained these core components in the virtual program as they are essential for maintaining the effectiveness of the intervention (Craig et al., 2008). These techniques (including the use of

Table 7. Facilitators' opinions on the program.

Questionnaire Items	
Confidence in conducting the virtual sessions	*n* = 28
• Very confident	17 (61%)
• Confident	11 (39%)
How engaged were the caregivers in each group	*n* = 67
• Very engaged	45 (67%)
• Engaged	16 (24%)
• Neutral	4 (6%)
• Not engaged	1 (1.5%)
• Don't know	1 (1.5%)
Had issues with groups	*n* = 67
• Had issues	34 (51%)
• No issues	33 (49%)
Main issues	*n* = 34
• Uninterested caregivers	8 (23.5%)
• Unresponsive caregivers	12 (35%)
• Internet connection	17 (50%)
• Clash with other duties	1 (3%)
Ability to engage over the internet	*n* = 67
• Very good	44 (66%)
• Good	17 (25%)
• Neutral	5 (7.5%)
• Not good	1 (1.5%)
How beneficial was the intervention for participants	*n* = 67
• Very beneficial	60 (90%)
• Somewhat beneficial	5 (7.5%)
• Neutral	2 (3%)

n = 28 officers reporting on *n* = 67 parenting groups.

Table 8. Observer ratings of the implementation quality of the virtual parenting sessions.

Checklist Items	Poor *n* (%)	Ok *n* (%)	Good *n* (%)
Preparation			
Familiar with content and process of delivery of session	3 (8.8)	15 (44.1)	16 (47.1)
Had all materials ready and checked	0 (.0)	4 (11.8)	30 (88.2)
Good internet connection	0 (.0)	5 (14.7)	29 (85.3)
Quiet and undisturbed environment	0 (.0)	6 (17.6)	28 (82.4)
Smooth transition sharing/un-sharing screen	3 (8.8)	7 (20.6)	24 (70.6)
Building positive relationships with participants			
Used participants' and children's names	1 (2.9)	8 (23.5)	25 (73.5)
Repeated participants' responses	9 (26.5)	12 (35.3)	13 (38.2)
Engaged all participants	3 (8.8)	11 (32.4)	20 (58.8)
Gave positive feedback every time participants participated	2 (5.9)	7 (20.6)	25 (73.5)
Accepted participants' responses and ideas	1 (2.9)	5 (14.7)	28 (82.4)
Responsive to questions from participants	N/A	N/A	N/A
Showed interest throughout the session	0 (.0)	4 (11.8)	30 (88.2)
Helping participants learn			
Clearly demonstrated the use of the strategies	3 (8.8)	15 (44.1)	16 (47.1)
All participants practiced using the strategies	2 (5.9)	10 (29.4)	22 (64.7)
Each participant gave feedback about the Irie Challenge	2 (6.5)	9 (29.0)	20 (64.5)
Prompted participants when necessary	15 (44.1)	14 (41.2)	5 (14.7)
Highlighted good things participants said and did	21 (61.8)	10 (29.4)	3 (8.8)
Did not criticize participants or say they were incorrect	0 (.0)	10 (29.4)	24 (70.6)
Encouraged collaborative problem-solving as necessary	N/A	N/A	N/A

N = 34 observations from 20 officers (6 community relations officers with 2–4 observations each, 14 field officers with 1 observation each).

demonstration, rehearsal and practice, and positive feedback) have been reported to be valued by participants and facilitators in other early childhood interventions in LMIC (Bowers et al., 2022; Gomez et al., 2022; Smith et al., 2018) and have been shown to predict parent and/or child outcomes (Araujo et al., 2018; Bernal et al., 2023; Luoto et al., 2021). Facilitator-reported enablers to implementing the virtual groups also shared commonalities with other successful early childhood, in-person interventions in LMIC. For example, facilitators appreciated the scripted training manual and the participatory and interactive training in how to use it (Gomez et al., 2022; Singla & Kumbakumba, 2015; Yousafzai & Aboud, 2014). They also recognized benefits of the intervention to participants and to their children (Gomez et al., 2022; Singla & Kumbakumba, 2015; Smith et al., 2018), enjoyed conducting the sessions (Baker-Henningham, 2018; Gomez et al., 2022), and reported increased job satisfaction (Walker et al., 2018). We provided a short initial training followed by weekly training throughout intervention implementation, rather than providing in-depth initial training. Facilitators reported that this approach prevented cognitive overload and increased their confidence in delivering the sessions. The observational measures also showed that facilitators delivered the sessions with adequate levels of quality. Ongoing training and support for intervention facilitators is recommended and has been shown to lead to improvements in implementation quality over time (Luoto et al., 2021; Yousafzai et al., 2018). The vIHT was developed in partnership with the ECC and the virtual groups were integrated into the ECC officers' workload, resulting in high officer compliance in attending training and conducting groups. Several early childhood interventions integrated into government services report high staff turnover and/or low levels of compliance (Brentani et al., 2021; Walker et al., 2018), and the close partnership with the implementing government agency from program inception helped to prevent this. These enabling factors show that successful virtual parenting interventions share many of the same underlying principles as face-to-face interventions.

There was also several barriers to effective implementation. First, only a minority of participants downloaded the app. The link to install the app was sent via SMS and it is possible that caregivers needed personal assistance to install and use the app at the start of the intervention period (Jaggi et al., 2023). Similar to other virtual interventions in LMIC, another important barrier was technological problems and internet connectivity for both facilitators and participants that restricted optimal participation (Barrera et al., 2020; Smith et al., 2023). In addition, although virtual interventions can overcome some of the logistical and resource barriers that may reduce participant engagement in face-to-face interventions (e.g., travel, child care), barriers to participation remain. Work and family commitments affected attendance and participation in virtual groups and more flexibility around the timing of these groups may be necessary to increase engagement (Global TIES for Children, 2023a). However, this would also have cost implications, as facilitators would require renumeration for conducting groups in the evenings and/or on weekends. In the implementation of the face-to-face version of the IHT, the mean (SD) caregiver attendance was 5.5 (2.6) out of eight sessions, a 68.8% attendance rate, and there was a dose-response relationship between attendance and caregivers' use of VAC with greater reductions in VAC with increased attendance (Francis & Baker-Henningham, 2021). In this study, we report a 46% attendance rate at virtual sessions (Dinarte-Diaz et al., 2023). However, the virtual sessions were supplemented with SMS and WhatsApp messages and with access to an app and we cannot causally disentangle the effect of the different modalities. Further experimental research is required to identify the optimal dosage required to impact caregiver behavior and the relative benefits of the different delivery modes. In addition, the participants in the previous implementation of face-to-face IHT were more disadvantaged than the participants in the current study, with an average of 10 years education (vs 14 years in the vIHT) and 58% in employment (versus 79%). Although the studies are not comparable, due to difference in targeting and recruitment strategies, these differences reflect findings from previous reviews showing that virtual interventions are less accessible to more disadvantaged families (Hall & Bierman, 2015; MacDonell & Prinz, 2017). The observations of implementation quality showed no opportunity for participants to ask questions and engage in collaborative problem-solving in the vIHT sessions, suggesting that virtual groups may provide less individualized support for participants than face-to-face programs. Some facilitators

reported that caregivers had difficulty applying the strategies to their everyday life, possibly reflecting the lack of in-person coaching and feedback used in face-to-face programming. Previous reports have recommended incorporating some in-person contact in virtual early childhood parenting interventions to build positive and supportive relationships between facilitators and families and to promote caregivers' engagement and/or competence (Global TIES for Children, 2023b; Rubio-Codina & López-Boo, 2022; Smith et al., 2023; Wilton et al., 2023). In future studies, we need to investigate who benefits most from face-to-face, blended, and virtual interventions to ensure participants are receiving the appropriate amount of support. Although facilitators valued the structured facilitator manual, they also reported that using a script required practice and there was an initial adjustment period. This has been reported in previous studies and facilitators gain confidence and competence over time with ongoing training and support (Gomez et al., 2022; Yousafzai et al., 2018).

The data gathered through the process evaluation help inform further revisions to the program. For example, use of WhatsApp and SMS messages is promising and could be used in future interventions. A link to short video clips demonstrating Jamaican parents using the strategies and audio clips describing the Irie Challenge for the week could be sent via WhatsApp rather than uploading them on an app. WhatsApp messaging was identified as the most popular delivery mode across the early childhood virtual parenting programs supported by the IDB during the pandemic (Rubio-Codina & López-Boo, 2022). This was due to the versatility of the approach, as WhatsApp accommodates audio messages, videos, texts, photos, and links to websites and is widely available across many LAC countries. Text, audio, and video messaging may be useful as a complement to face-to-face programming, either through blended delivery or as an extension program to provide ongoing support to parents over time. Text and audio messaging has been shown to promote the sustainability of gains from a face-to-face parenting program in Uruguay (Bloomfield et al., 2022), to increase the acceptability of a home-visiting intervention in India (Kumar et al., 2021), and we have previously reported a need for ongoing support after program completion (Francis et al., 2022). The demonstration videos also could be used in community settings, such as schools and health centers, and through social and broadcast media to promote awareness of positive discipline strategies. There is some evidence that these approaches can be successful. For example, demonstration videos have been used successfully to promote young children's development in health centers in Jamaica (Chang et al., 2015), while radio campaigns have been effective in promoting health-related behavior change in Burkino Faso (Kasteng et al., 2018; Sarrassat et al., 2018). Although virtual interventions show promise, there is also evidence of negative effects on parenting behavior and/or mental health and child outcomes (Amaral et al., 2021; Barrera et al., 2020) and it is important that these approaches are rigorously tested in future studies. It is also important to continue to offer flexible delivery modes to respond to participants' different preferences and levels of need and to promote equity, as virtual interventions may be less accessible to more disadvantaged caregivers.

The study had several strengths. We carefully adapted an evidence-based, culturally and contextually relevant, early childhood, violence prevention, parenting program for virtual delivery and the virtual intervention included multiple modalities: videos available on a datafree app, SMS and WhatsApp messages, and virtual parenting groups. Through our process evaluation, we used a multimethod approach and multi-informant approach that included information from independent observations, facilitator records, structured questionnaires, and program records. There was also high compliance of ECC officers in intervention implementation and data collection, with more than 98% of groups conducted, 85% of weekly record forms submitted, 100% participation in the phone interview, and no refusals among the 18 officers selected to participate in the discussion groups.

An important limitation is that we did not have sufficient resources at the time this data was collected to include caregivers' perspectives of the enablers and barriers to participation. Social desirability bias may have influenced the qualitative data, as facilitators submitted record forms to the Irie Toolbox team and the discussion groups were also facilitated by the same team. In addition, most of the data reported in this article were collected and analyzed by two members of the Irie Toolbox Team, who were also the developers of the program and who trained the ECC officers to

conduct the virtual groups. Another limitation is that to accommodate online schooling (when household devices were in use by older siblings), the majority of virtual parenting sessions were held in the afternoon; due to scheduling conflicts, we were unable to observe a virtual group conducted by all 28 officers involved in intervention delivery. Hence, the observational data may not be representative of quality across all virtual groups, although the data is useful for highlighting facilitator strengths and needs to inform future training. In addition, although we collected detailed data on app usage (from Trend Media records) and on delivery and attendance at virtual groups (from ECC program records), we only have binary data (Yes/No) related to whether participants read the SMS/WhatsApp messages and hence we do not know how many of these messages were read. Finally, we did not have the resources to track participant engagement with and contributions to the WhatsApp groups.

Conclusion

The vIHT was designed as a scalable, early childhood, violence prevention program with potential as a stand-alone intervention and as a complement to face-to-face programming, either through blended delivery or as an extension program to provide ongoing support to parents over time. The availability of evidence-based programs to reduce VAC that can be implemented flexibly and using different modalities, and that are suitable for integration into existing government services and can be implemented by existing staff, may extend the reach of these programs across Jamaica and will contribute to the Jamaican government's national plan of action to end VAC. A key challenge moving forward will be to ensure that the growth of virtual interventions does not contribute to inequity, given that more disadvantaged families may face barriers of limited mobile phone access, poor service, limited internet connectivity, and low literacy levels. Future research needs to examine who benefits from virtual, blended, and in-person intervention and under what circumstances, and to explore how to maximize the gains of virtual interventions while balancing issues related to reach, access, equity, scalability, cost, and effectiveness.

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References

Amaral, S., Dinarte Diaz, L., Dominguez, P., & Perez-Vincent, S. M. (2021). *Helping families help themselves? Heterogeneous effects of a digital parenting program* (Policy Research Working Paper; No. 9850). World Bank. https://openknowledge.worldbank.org/handle/10986/36603

Araujo, M. C., Dormal, M., & Rubio-Codina, M. (2018). *Quality of parenting programs and child development outcomes: The case of Peru's cuna mas* (IDB Working Paper Series No IDB-WP-951). Inter-American Development Bank. https://doi.org/10.18235/0001366

Arnold Urzua, T. A., Amaro Da Costa, L., Carneiro, P. M., Herrera Sosa, L. L., Lebedinski, L., Munoz Boudet, A. M., & Perng, J. T. T. (2022). *Can a (virtual) parenting program in Serbia support early childhood education and care?* World Bank Group. http://documents.worldbank.org/curated/en/099235004272230809/P1696130a09f8b0108b4d0ee3e60b4ca74

Baker-Henningham, H. (2011). Transporting evidence-based interventions across cultures: Using focus groups with teachers and parents of pre-school children to inform the implementation of the incredible years teacher training program in Jamaica. *Child: Care, Health and Development*, *37*(5), 649–661. https://doi.org/10.1111/j.1365-2214.2011.01208.x

Baker-Henningham, H. (2018). The irie classroom toolbox: Developing a violence-prevention, preschool teacher-training programme using theory, evidence, and practice. *Annals of the New York Academy of Sciences*, *1419*, 179–200. https://doi.org/10.1111/nyas.1373

Barrera, O., Macours, K., Permand, P., & Vakis, R. (2020). *Texting parents about early child development*. Policy Research Working Paper 9492. World Bank Group. https://documents1.worldbank.org/curated/en/605381607538581261/pdf/Texting-Parents-about-Early-Child-Development-Behavioral-Changes-and-Unintended-Social-Effects.pdf

Bernal, R., Gomez, M. L., Perez-Cardona, S., & Baker-Henningham, H. (2023). Quality of implementation of a parenting program in Colombia and its effect on child development and parental investment. *Pediatrics*, *151*(S2), e2023060221J. https://doi.org/10.1542/peds.2023-060221J

Bloomfield, J., Balsa, A., & Cid, A. (2022). Using behavioral insights in early childhood interventions: The effects of crianza positiva e-messaging program on parental investment. *Review of Economics of the Household*, *21*(1), 95–130. https://doi.org/10.1007/s11150-021-09593-4

Bowers, M., Francis, T., & Baker-Henningham, H. (2022). The irie classroom toolbox: Mixed method evaluation to inform future implementation and scale up of an early childhood, teacher-training, violence prevention program. *Frontiers in Public Health*, *10*, 1040952. https://doi.org/10.3389/fpubh.2022.1040952

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Breitenstein, S., Gross, D., & Christophersen, R. (2014). Digital delivery methods of parenting training interventions: A systematic review. *Worldviews on Evidence-Based Nursing*, *11*(3), 168–176. https://doi.org/10.1111/wvn.12040

Brentani, A., Walker, S., Chang-Lopez, S., Grisi, S., Powell, C., & Fink, G. (2021). A home visit-based early childhood stimulation program in Brazil—A randomized controlled trial. *Health Policy and Planning*, *36*(3), 288–297. https://doi.org/10.1093/heapol/czaa195

Burke, T., & Sutherland, O. (2014). The meanings Jamaicans associate with corporal punishment. *Psychology and Developing Societies*, *26*(1), 59–89. https://doi.org/10.1177/0971333613516229

Chang, S. M., Grantham McGregor, S. M., Powell, C. A., Vera-Hernández, M., Lopez-Boo, F., Baker-Henningham, H., & Walker, S. P. (2015). Integrating a parenting intervention with routine primary health care: A cluster randomized trial. *Pediatrics*, *136*(2), 272–280. https://doi.org/10.1542/peds.2015-0119

Chorpita, B. F., & Daleiden, E. L. (2009). Mapping evidence-based treatments for children and adolescents: Application of the distillation and matching model to 615 treatments from 322 randomized trials. *Journal of Consulting and Clinical Psychology*, *77*(3), 566–579. https://doi.org/10.1037/a0014565

Corralejo, S. M., & Rodriguez, M. M. D. (2018). Technology in parenting programs: A systematic review of existing interventions. *Journal of Child & Family Studies*, *27*, 2717–2731. https://doi.org/10.1007/s10826-018-1117-1

Cortes, K., Fricke, H., Loeb, S., & Song, D. S. (2018). *Too little or too much? Actionable advice in early childhood text messaging experiment* (Working Paper 24827). National Bureau of Economic Research. http://www.nber.org/papers/w24827

Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., & Petticrew, M. (2008). Developing and evaluating complex interventions: The new medical research council guidance. *BMJ*, *337*, a1655. https://doi.org/10.1136/bmj.a1655

Dinarte-Diaz, D., Ravindran, S., Shah, M., Powers, S., & Baker-Henningham, H. (2023). *Violent discipline and child behavior. Short- and medium-term effects of parenting support to caregivers in Jamaica* (Working Paper 31338). National Bureau of Economic Research. https://www.nber.org/papers/w31338

Francis, T., & Baker-Henningham, H. (2020). Design and implementation of the irie homes toolbox. *Frontiers in Public Health*, *8*, 282961. https://doi.org/10.3389/fpubh.2020.582961

Francis, T., & Baker-Henningham, H. (2021). The irie homes toolbox: A cluster-randomized controlled trial of an early childhood parenting program to prevent violence against children in Jamaica. *Children and Youth Services Review*, *126*, 106060. https://doi.org/10.1016/j.childyouth.2021.106060

Francis, T., Packer, D., & Baker-Henningham, H. (2022). A qualitative evaluation of the mechanisms of action in an early childhood parenting programme to prevent violence against children in Jamaica. *Child: Care, Health and Development*, *49*(3), 579–590. https://doi.org/10.1111/cch.13074

Fricke, H., Kalogrides, D., & Loeb, S. (2018). It's too annoying: Who drops out of educational text messaging programs and why. *Economics Letters*, *173*, 39–43. https://doi.org/10.1016/j.econlet.2018.08.029

Global TIES for Children. (2023a). *Lessons and impacts of a remote early childhood education program in hard-to-access settings in Lebanon: A randomized controlled trial*. Sesame Workshop, New York. Retrieved July 10, 2023, from https://figshare.com/articles/preprint/Lessons_and_Impacts_of_a_Remote_Early_Childhood_Education_Program_in_Hard-To-Access_Settings_in_Lebanon_A_Randomized_Controlled_Trial/22770629

Global TIES for Children. (2023b). *Lessons and impacts of a phone-based parenting program for Syrian and Jordanian families with young children*. Sesame Workshop, New York. Retrieved July 20, 2023, from https://figshare.com/articles/preprint/Lessons_and_Impacts_of_a_Phone-Based_Parenting_Program_for_Syrian_and_Jordanian_Families_with_Young_Children/22700314

Gomez, M. L., Bernal, R., & Baker-Henningham, H. (2022). Qualitative evaluation of an early childhood parenting program integrated into government services in rural Colombia. *Child: Care, Health and Development*, *48*(2), 225–238. https://doi.org/10.1111/cch.12921

Government of Jamaica. (2018). *National plan of action for an integrated response to children and violence (NPACV) 2018–2023*. Author.

Hall, C. M., & Bierman, K. L. (2015). Technology-assisted interventions for parents of young children: Emerging practices, current research, and future directions. *Early Childhood Research Quarterly*, *33*, 21–32. https://doi.org/10.1016/j.ecresq.2015.05.003

Heilmann, A., Mehay, A., Watt, R., Kelly, Y., Durrant, J. E., van Turnhout, J., & Gershoff, E. (2021). Physical punishment and child outcomes: A narrative review of prospective studies. *The Lancet*, *398*(10297), 355–364. https://doi.org/10.1016/s0140-6736(21)00582-1

Hillis, S., Mercy, J., Amobi, A., & Kress, H. (2016). Global prevalence of past-year violence against children: A systematic review and minimum estimates. *Pediatrics*, *137*(3), e20154079. https://doi.org/10.1542/peds.2015-4079

Jaggi, L., Melgar, L. A., Llatance, M. A., Castellanos, A., Funk, G., Hinckley, K., Bustamante, M. H., McCoy, D. C., Verastegui, H., Mäusezahl, D., & Hartinger-Pena, S. M. (2023). Digital tools to improve parenting behavior in low-income settings: A mixed-method feasibility study. *Archives of Disease in Childhood*, *108*(6), 433–439. https://doi.org/10.1136/archdischild-2022-324964

Kasteng, F., Murray, J., Cousens, S., Sarrassat, S., Steel, J., Meda, N., Ouedraogo, M., Head, R., & Borghi, J. (2018). Cost-effectiveness and economies of scale of a mass radio campaign to promote household life-saving practices in Burkina Faso. *BMJ Global Health*, *3*(4), e000809. https://doi.org/10.1136/bmjgh-2018-000809

Kumar, V., Mohanty, P., & Sharma, M. (2021). Promotion of early childhood development using mHealth: Learnings from an implementation experience in Haryana. *Indian Pediatrics*, *58*(S1), S37–S41. PMID: 34687187. https://doi.org/10.1007/s13312-021-2354-8

Lachman, J. M., Alampay, L., Jocson, R. M., Alinea, C., Madrid, B., Ward, C., Hutchings, J., Mamaug, B. L., Garilao, M. A. V. F. V., & Gardner, F. (2021). Effectiveness of a parenting program to reduce violence in a cash transfer system in the Philippines: RCT with follow-up. *The Lancet Regional Health - Western Pacific*, *17*, 100279. https://doi.org/10.1016/j.lanwpc.2021.100279

Lansford, J., & Deater-Deckard, K. (2012). Childrearing discipline and violence in developing countries. *Child Development*, *83*(1), 62–75. https://doi.org/10.1111/j.1467-8624.2011.01676.x

Linhares, M., Altafim, E., Gaspardo, C., & Oliveira, R. (2022). A personalized remote video-feedback universal parenting program: A randomized controlled trial. *Psychosocial Intervention*, *31*(1), 21–32. https://doi.org/10.5093/pi2021a9

Luoto, J. E., Lopez-Garcia, I., Aboud, F. E., Singla, D. R., Zhu, R., Otieno, R., & Alu, E. (2021). An implementation evaluation of a group-based parenting intervention to promote early childhood development in rural kenya. *Frontiers in Public Health*, *9*, 653106. https://doi.org/10.3389/fpubh.2021.653106

MacDonell, K. W., & Prinz, R. J. (2017). A review of technology-based youth and family-focused interventions. *Clinical Child and Family Psychology Review*, *20*(2), 185–200. https://doi.org/10.1007/s10567-016-0218-x

Marmor, A., Cohen, N., & Katz, C. (2021). Child maltreatment during COVID-19: Key conclusions and future directions based on a systematic literature review. *Trauma, Violence, & Abuse*, *24*(2), 760–775. https://doi.org/10.1177/15248380211043818

McAloon, J., & de la Poer Beresford, K. (2023). Online behavioral parenting interventions for disruptive behavioral disorders: A PRISMA based systematic review of clinical trials. *Child Psychiatry & Human Development*, *54*(2), 379–396. https://doi.org/10.1007/s10578-021-01253-z

Puffer, E., Green, E., Chase, R., Sim, A., Zayzay, J., Friis, E., Garcia-Rolland, E., & Boone, L. (2015). Parents make the difference: A randomized-controlled trial of a parenting intervention in Liberia. *Global Mental Health*, *2*, E15. https://doi.org/10.1017/gmh.2015.12

Rubio-Codina, M., & López-Boo, F. (2022). *What have we learned from the design and delivery of remote and hybrid early childhood development services during the pandemic* (IDB Discussion paper No IDB-DP-00963). Social Protection and Health Division, Inter-American Development Bank. https://doi.org/10.18235/0004409

Sanders, M., Divan, G., Singhal, M., Turner, K., Velleman, R., Michelson, D., & Patel, V. (2021). Scaling up parenting interventions is critical for attaining the sustainable development goals. *Child Psychiatry & Human Development*, *53*(5), 941–952. https://doi.org/10.1007/s10578-021-01171-0

Sarrassat, S., Meda, N., Badolo, H., Ouedraogo, M., Some, H., Bambara, R., Murray, J., Remes, P., Lavoie, M., Cousens, S., & Head, R. (2018). Effect of a mass radio campaign on family behaviors and child survival in Burkina Faso: A repeated

cross-sectional, cluster-randomized trial. *The Lancet Global Health*, *6*(3), e330–341. https://doi.org/10.1016/S2214-109X(18)30004-4

Singla, D. R., & Kumbakumba, E. (2015). The development and implementation of a theory-informed, integrated mother-child intervention in rural Uganda. *Social Science and Medicine*, *147*, 242–251. https://doi.org/10.1016/j.socscimed.2015.10.069

Smith, J. A., Baker-Henningham, H., Brentani, A., Mugweni, R., & Walker, S. P. (2018). Implementation of reach up early childhood parenting program: Acceptability, appropriateness, and feasibility in Brazil and Zimbabwe. *Annals of the New York Academy of Sciences*, *1419*(1), 120–140. https://doi.org/10.1111/nyas.13678

Smith, J. A., Chang, S. M., Brentani, A., Fink, G., Lopez-Boo, F., Torino, B. M., Rubio-Codina, M., & Walker, S. P. (2023). A remote parenting program and parent and staff perspectives: A randomized trial. *Pediatrics*, *151*(S2), e2023060221F. https://doi.org/10.1542/peds.2023-060221F

Walker, S. P., Baker-Henningham, H., Chang, S. M., Powell, C. A., Lopez-Boo, F., & Grantham-Mcgregor, S. (2018). Implementation of parenting interventions through health services in Jamaica. *Vulnerable Children and Youth Studies*, *13*(2), 127–141. https://doi.org/10.1080/17450128.2017.1395100

Wilton, K. S., Murphy, K. M., Mahmud, A., Azam, S., Habib, A., Ibrahim, I., Neve, E. N., Pena, G., Mehrin, S. F., Shiraji, S., & Hamadani, J. D. (2023). Adapting reach up and learn in crisis and conflict settings: An exploratory multiple case study. *Pediatrics*, *151*(S2), e2023060221K. https://doi.org/10.1542/peds.2023-060221K

World Health Organization. (2016). *INSPIRE: Seven strategies for ending violence against children*. Author.

World Health Organization. (2020). *Global status report on preventing violence against children*. Author.

Yousafzai, A. K., & Aboud, F. (2014). Review of implementation processes for integrated nutrition and psychosocial stimulation interventions. *Annals of the New York Academy of Sciences*, *1308*, 33–45. https://doi.org/10.1111/nyas.12313

Yousafzai, A. K., Rasheed, M. A., & Siyal, S. (2018). Integration of parenting and nutrition interventions in a community health program in Pakistan: An implementation evaluation. *Annals of the New York Academy of Sciences*, *1419*(1), 160–178. https://doi.org/10.1111/nyas.13649