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Abstract*

We adapted a violence-prevention, parenting program (the Irie Homes Toolbox, or IHT) for integration into Jamaican preschool services. The adapted IHT was evaluated in a mixed-method feasibility trial in Kingston, Jamaica. Twenty-four preschools were randomly assigned to intervention (n=12) or wait-list control (n=12). Ten caregivers per school were recruited (n=240, n=120/group). The program consisted of eleven 1-hour parenting sessions delivered by a preschool teacher with groups of ten caregivers of children aged 2-6 years. In the impact evaluation, the primary outcome was caregivers' use of violence against their child (VAC). Secondary outcomes were caregivers' involvement with their child, attitude to VAC, preferences for harsh punishment, self-efficacy, and child conduct problems. All outcomes were measured by caregiver-report, and we test for and find no evidence of social desirability bias. We measured fidelity of implementation on an ongoing basis. We also conducted in-depth interviews with participating teachers and kept ongoing logs on intervention implementation. Participants attended a mean (SD)=4.0(3.1) sessions. The IHT intervention led to reductions in caregivers' use of VAC (ES=-0.22, p=0.04) and caregivers' favorable attitudes to VAC (ES=-0.36, p=0.01), and increases in caregivers' involvement with their child (ES=0.30, p=0.005) and parenting self-efficacy (ES=0.29, p=0.02). Reductions in caregiver preferences for harsh punishment were significant at p=0.07 (ES=-0.21). We found no benefits to child conduct problems. Through observations of session quality, interviews with preschool teachers, and research team logs, we identified enablers and barriers to intervention implementation and suggestions for improvement. The program has potential for large-scale dissemination to reduce VAC in Jamaica.

JEL classifications: I10, I20, J12, J13
Keywords: Violence prevention, Violence against children, Preschool, Parenting intervention

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1. Introduction

Violence against children (VAC) is a global public health problem with high prevalence across Latin America and the Caribbean (LAC), where two-thirds of children aged 2 to 14 years experience violent discipline at home (UNICEF, 2022). Jamaica ranks third highest across the LAC region in terms of VAC (Haiti and Suriname rank first and second) (UNICEF, 2022). Evidence from meta-analyses show that caregiver-training interventions in the early childhood years have potential to reduce child maltreatment (Chen and Chan, 2015; Vlahovicova et al., 2017), with some evidence of sustained effects over the short term, albeit with diminished effects (Backhaus et al., 2023). There is also growing evidence from low- and middle-income countries (LMIC) that caregiver training programs can be effective in reducing VAC (Wang and Zhang, 2024), including in the LAC region (Mejía et al., 2015; Santini and Williams, 2017; Skar et al., 2017; Altafim and Linhares, 2019). However, few evidence-based parenting programs have been implemented at scale (Britto et al., 2018; Sanders et al., 2022). To maximize scalability and sustainability, evidence-based interventions need to be integrated into existing government services and be delivered by existing staff.

We have previously developed an early childhood, violence prevention, parenting program in Jamaica, the Irie Homes Toolbox (IHT). The IHT targets caregivers of children aged 2 to 6 years and includes content on promoting child positive behavior, preventing child negative behavior, helping children understand their emotions, promoting caregiver emotional self-regulation, and managing child misbehavior. In previous trials, we have shown that the IHT is effective at reducing VAC by caregivers when delivered through in-person and through virtual modalities (Francis and Baker-Henningham, 2021; Dinarte-Díaz et al., 2023). The challenge now is to implement the program on a wider scale and to achieve this aim, we need to investigate how to integrate the IHT into the Jamaican early childhood educational network and how it can be delivered by preschool teachers as part of their routine duties (Baker-Henningham, Bowers, and Francis, 2023).

In this paper, we report on a mixed-method feasibility study of the IHT program when delivered by preschool teachers. The evaluation included an ongoing process evaluation, an impact evaluation, and a qualitative investigation of the IHT program. In the study, twenty-four community preschools were randomized to an intervention group (n=12 preschools) or a wait-list control group (n=12 preschools). We recruited 10 parents in each preschool to participate in the intervention (n=120 parents/group). Two teachers in each intervention preschool were trained to

deliver the IHT sessions. The program was delivered through eleven, weekly, 1-hour group sessions, with groups of ten caregivers. Participants were also sent materials, messages and short videos via WhatsApp between sessions (Francis, Bowers, and Baker-Henningham, 2025). In the process evaluation, we measured caregiver attendance, preschool teacher compliance, and the quality of implementation. In the impact evaluation, we examined the effectiveness of the IHT in reducing caregivers' use of VAC. We also measured impacts from the IHT to caregiver involvement, attitudes to VAC, preferences for harsh punishment, parenting self-efficacy, and child conduct problems. In the qualitative investigation, we investigated the enablers and barriers to implementation and suggestions for improvement from the perspective of the preschool teachers and the research team.

Caregivers attended a mean (SD) of 4.0 (3.8) sessions. Across the twelve schools allocated to intervention, teachers delivered a mean (SD) of 10.1 (1.2) sessions. Observations of session quality indicated that teachers adhered to the session scripts, formed positive relationships with participants, engaged participants well, used clear demonstrations and gave all participants the opportunity to practice. Weaknesses included inadequate preparation, not highlighting key points, and insufficient support and feedback to participants during practice activities. Intention to treat estimates indicate that the intervention reduced VAC by caregivers by 0.22 SD (p=0.04). Caregivers in the intervention group also increased their involvement with their child by 0.30 SD (p=0.005), reported less favorable attitudes to VAC by 0.36 SD (p=0.01) and increased parenting self-efficacy by 0.29 SD, (p=0.02). Caregiver reports of preferences for harsh punishment reduced by 0.21 SD (p=0.07). No reductions were identified for caregiver reports of child conduct problems (effect size=-0.06 SD, p=0.49). As the outcomes were measured through caregiver self-report, we addressed experimenter demand effects by examining the effect of treatment on a social desirability index (SDI) that measured participants' propensity to respond in a socially acceptable way. There was no difference in SDI across treatment groups. In addition, controlling for SDI in the multilevel regression analyses did not impact the magnitude or significance of the impacts. There was also no evidence of heterogeneous effects of SDI across treatment groups for any of the outcome measures.

Key enablers to implementation from the perspective of the teachers and the research team were that teachers were very positive about the IHT program, valued the materials used, were motivated to conduct the sessions and had good relationships with caregivers. Teachers reported

benefits to their professional and personal development, and to caregivers' knowledge and behavior. Key barriers to implementation were teachers' difficulties in using higher-order facilitator skills in session delivery and poor caregiver attendance. The skills that were difficult for teachers included reflective listening, dealing with resistance, engaging participants in collaborative problem-solving, and addressing caregivers' favorable attitudes toward VAC (especially as some teachers also had positive attitudes toward VAC). Teachers were also often insufficiently prepared to conduct the sessions. One suggestion for improvement was to give all teachers in the school a role in the IHT program to embed the intervention more effectively into the school culture. For example, other teachers could help with caregiver recruitment and engagement and with promoting the strategies with caregivers of children in their class during their regular interactions with caregivers. Some teachers suggested shortening the program and/or altering session frequency to make it more feasible to fit into the school termly timetable. The research team identified a need for more training for teachers to ensure that they believed in and were competent in using the strategies themselves, and to better equip them in addressing caregiver resistance and responding to queries. The overall objective of the study was to prepare the IHT for implementation at scale.

In this study, we found that the IHT was effective at reducing caregivers' use of VAC when delivered by preschool teachers and the teachers valued the program and showed high compliance in conducting sessions. This gives us confidence that the program has potential for wider dissemination within the early childhood educational network. Conducting a feasibility study has provided the opportunity to identify implementation problems prior to implementing the program on a larger scale. We will use the findings from this study to inform further revisions to the IHT program and to develop training, supervision, and monitoring tools to promote the fidelity of intervention implementation when implemented on a larger scale.

2. Literature Review

Globally, over one billion children are affected by violence each year (Hillis et al., 2016). Violence against children (VAC) is a violation of child rights, has high prevalence in low- and middle-income countries (LMICs), is associated with long-term negative effects on child functioning, and with high economic and social costs (McCoy et al., 2022; Cuartas et al., 2019; Hillis et al., 2017; Heilmann et al., 2021; Perenieto et al., 2014). In Jamaica, 84% of caregivers of children aged 2-4

years report using physical violence, and 71% report using psychological aggression demonstrating an urgent need for violence-prevention programming (Lansford and Deater-Deckard, 2012). This need has been recognized at the national level, as Jamaica is a pathfinder country in the Global Partnership to End Violence Against Children and the government has launched "The National Plan of Action for an Integrated Response to Children and Violence" (Government of Jamaica, 2018). To respond to the need for violence-prevention programming, we have developed and evaluated two complementary early childhood programs: i) to reduce teachers' use of VAC at school: the Irie Classroom Toolbox (Baker-Henningham, 2018; Baker-Henningham et al., 2019; Baker-Henningham et al., 2021; Bowers, Francis and Baker-Henningham, 2022), and ii) to reduce caregivers' use of VAC at home: the Irie Homes Toolbox (IHT) (Francis and Baker-Henningham, 2020; Francis and Baker-Henningham, 2021; Dinarte-Díaz et al., 2023; Francis et al., 2024). Irie is a Jamaican term that means "good" and "at peace with oneself and the world." The programs target caregivers of children aged two to eight years, and the aim is to reduce VAC at the population level by integrating these programs into the early childhood educational network.

We have been working with the Early Childhood Commission (ECC) in Jamaica to scale up the Irie Classroom Toolbox. The ECC is an agency of the Ministry of Education that has oversight for all early childhood institutions and coordinates all activities within the early childhood sector. The IHT was developed as a complementary program to the Irie Classroom Toolbox to promote consistent behavior management strategies by both teachers and parents. The next step is to also begin to scale up the IHT.

The IHT was specifically designed to be feasible, relevant, effective, and scalable in the Jamaican context (Francis and Baker-Henningham, 2020). The content of the IHT includes core components of evidence-based, violence-prevention parenting programs operationalized for the Jamaican context. These core components address the proximal drivers of VAC including caregivers' knowledge, attitudes, and skills relating to positive and non-violent parenting, caregiver emotional self-regulation, and caregiver self-efficacy. Violence is a complex, multidimensional problem with drivers at the level of individual (e.g., child age and behavior), caregiver (e.g., education, exposure to adversity), household (e.g., interpersonal violence, poverty, number of children), community (e.g., community violence), and societal (e.g., social norms) levels. However, these distal drivers require a multi-sectoral approach to violence prevention, as

advocated by the INSPIRE framework, of which parenting programs are one component (World Health Organization, 2016).

The IHT was originally designed as a face-to-face group parenting program delivered through eight 90-minute parenting sessions, held once a week for eight weeks, with groups of 6-8 parents of children aged two-to-six years enrolled in early childhood educational centers. The program consists of five modules: i) promoting children's positive behavior, ii) preventing children's misbehavior, iii) understanding emotions, iv) managing children's misbehavior, and v) supporting children's learning. In a small efficacy trial in 18 preschools in Kingston and St Andrew (with 223 caregiver-child dyads), the IHT was effective at reducing VAC by parents (effect size (ES)=-0.29, 95% confidence interval (CI): -0.05, 0.52), increasing parent involvement (ES=0.30, 95% CI: 0.03, 0.57) and reducing child conduct problems for children with heightened levels of conduct problems at baseline (ES=-0.36, 95% CI: -0.03, -0.68) (Francis and Baker-Henningham, 2021). In that trial, the parenting sessions were facilitated by the research team and co-facilitated by a preschool teacher. During the covid pandemic, we designed a virtual version of the IHT that was evaluated in a randomized controlled trial with 1,113 caregivers across Jamaica in collaboration with the ECC and the Early Learning Partnership, World Bank (Dinarte-Díaz et al., 2023; Francis et al., 2024). The virtual version lasted 10 weeks and consisted of weekly virtual parenting groups (led by an ECC field officer), three SMS messages per week, summaries of sessions sent via WhatsApp, and access to an App (Francis et al., 2024). This version also led to significant reductions in VAC by caregivers (ES=-0.12, 95% CI: -0.01, -0.24) and significant reductions to caregivers' positive attitudes to VAC (ES=-0.20, 95% CI: -0.10, -0.30), with benefits sustained at nine-month follow-up (ES=-0.13, 95% CI: -0.01, -0.25 and ES=-0.14, 95% CI: -0.02, -0.26 respectively) (Dinarte-Diaz et al., 2023). For wide-scale dissemination within the early childhood education network, the IHT needs to be delivered by preschool teachers. It is therefore important to test the feasibility, acceptability, and effectiveness of this model prior to large-scale implementation.

The aim of the study was to integrate the IHT into preschool services and to collect quantitative and qualitative data to inform future implementation. This included: i) measuring intervention implementation including caregiver attendance, preschool teacher compliance and intervention fidelity; ii) evaluating the effects of the program on the primary outcome of caregivers' use of VAC and on secondary outcomes of caregiver involvement with their child,

caregiver attitude to VAC, caregiver preferences for harsh punishment, caregiver self-efficacy and child conduct problems; and iii) documenting the enablers and barriers to intervention implementation and suggestions for improvement using in-depth interviews with preschool teachers and ongoing logs from the research team.

3. Methods

3.1 Study Design and Participants

We conducted a cluster randomized controlled trial with parallel assignment in 24 community preschools (12 intervention, 12 wait-list control) located in urban, disadvantaged areas of Kingston and St. Andrew, Jamaica. Community preschools were recruited from three neighboring educational zones within the larger Kingston and St Andrew region. Community preschools are run through community organizations, with government oversight for children aged 2-6 years. Parents pay a small fee and provide school supplies. Within each preschool, we recruited 10 caregiver/child dyads to participate in the study to give a total of 240 caregivers of children aged 2-6 years (120 intervention, 120 control). One child of each parent participating in the study was evaluated; if a parent had more than one eligible child, the youngest child was recruited. Preschool was the unit of randomization to prevent contamination among caregivers. In addition, although only ten caregivers per school were recruited into the study, there are school-wide elements included in the intervention which makes randomization at the level of the preschool necessary.

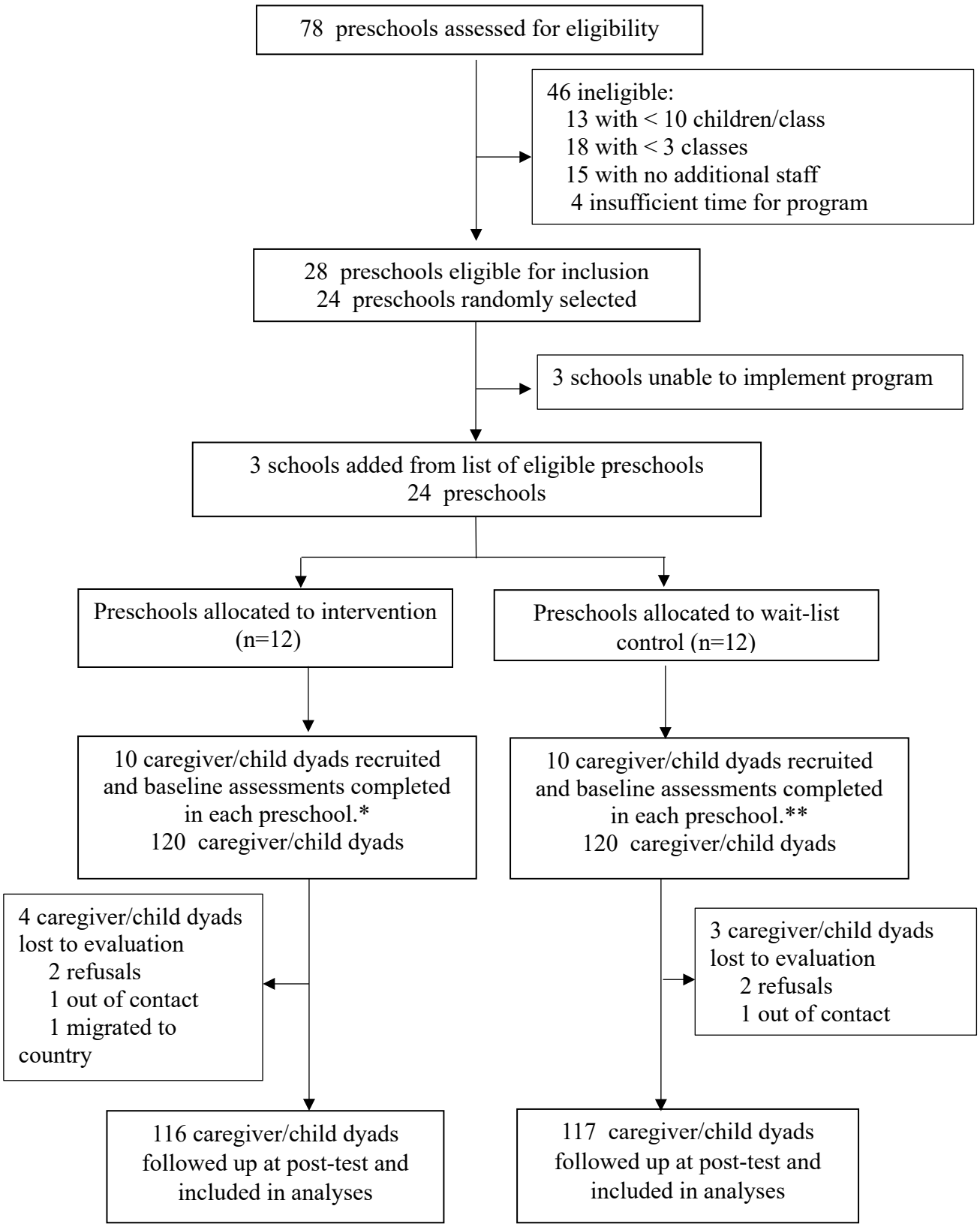
Inclusion criteria for preschools were the following: i) situated in a specified, disadvantaged, urban area of Kingston and St Andrew; ii) minimum of three classes of children; iii) sufficient staff to implement the program; iv) the preschool principal consents, and v) at least two preschool staff are willing to conduct the sessions. Inclusion criteria for caregivers were the following: i) lives with the child at least four days/week, ii) available and interested to participate in the parenting sessions, iii) has a child aged 2-6 years attending the preschool, and iv) caregiver consent to participate in the study. Exclusion criteria for preschools were the following: i) less than three classrooms, ii) insufficient staffing to implement the program, and iii) principal does not consent. Exclusion criteria for caregivers were the following: i) does not have a child in the target age range, iii) lives with the child for less than four days a week, iii) child has an identified disability, and/or iv) does not consent to participate in the study.

Figure 1 shows the trial profile. We surveyed all community preschools in a specified geographical location within educational zones 3, 4 and 6 of the Kingston and St Andrew metropolitan area. We assessed 78 preschools for eligibility and 28 preschools met the inclusion criteria. We randomly selected 24 preschools to participate in the study. Three of the selected schools were unable to commit to implementing the program and these schools were replaced. In all schools, we asked preschool staff to inform caregivers about the parenting program without disclosing whether the preschool was in the intervention or waitlist control arm of the trial. Preschool staff informed caregivers of the program using their existing communication channels (e.g., class meetings, WhatsApp messages, school information board, and/or during interactions with caregivers during daily drop-off and pick-up). The preschool staff then identified ten caregivers who were interested and available to participate in the program and who met the inclusion criteria. The research team was responsible for seeking informed consent. During the consenting process, caregivers were informed that their preschool would either implement the program during the current school term, or during the next school year. Treatment allocation was revealed after caregivers had given informed consent. Nine caregivers who were referred to the research team were ineligible for participation in the study: five from intervention preschools and four from control preschools (reasons for ineligibility are shown in Figure 1). These caregivers were replaced by asking school staff to identify replacement caregivers. In preschools allocated to the intervention group, two caregivers were ineligible as their child had a diagnosis of autism. Both caregivers were invited to attend the parenting sessions.

We recruited preschools and teachers from October-November 2023 and caregivers of children attending the selected community preschools from December 2023 to March 2024. The intervention was conducted between January and June 2024 with endline measurements conducted between May and July 2024. For the qualitative evaluation, we interviewed one-to-two preschool teachers who had conducted the IHT sessions from each school. Interviews were conducted in June and July 2024.

Ethical approval for the study was given by the University of the West Indies ethics committee, reference number: CREC-MN.0247, 2022/2023. The protocol for the mixed-method feasibility trial has been published (Francis, Bowers, and Baker-Henningham, 2025). Written, informed consent was obtained from preschool principals, preschool teachers, and from caregivers recruited into the study. The trial is registered with ISRCTN, number ISRCTN98317461.

Figure 1. Trial Profile



Notes: *5 caregiver/child dyads were excluded and replaced: 1 unavailable, 2 clinical diagnosis of autism, 1 left school, 1 refusal. ** 4 caregiver/child dyads were excluded and replaced: 1 unavailable, 2 refusals, 1 left school.

3.2 Randomization

All preschools and preschool teachers were recruited prior to randomization. Caregivers were recruited after randomization. Schools were randomized to intervention or wait-list control using a computer-generated simple-randomization sequence by an independent statistician who was masked to school identity.

3.3 Intervention

We adapted the original face-to-face version of IHT for integration in the preschool network, with preschool staff delivering the parenting sessions (Francis and Baker-Henningham 2020; Francis et al., 2025). We utilized our learnings from our previous impact, process, and qualitative evaluations of the face-to-face and virtual versions of the IHT to design this innovation (Francis and Baker-Henningham 2021; Francis, Packer, and Baker-Henningham, 2023; Francis et al., 2024; Dinarte-Díaz et al., 2023). Full details of the adaptations made have been described previously (Francis et al., 2025). In brief, the adaptations included splitting the content in the original eight-week program into eleven weeks, shortening each session from 90 minutes to 1 hour, and increasing the group size for the parenting sessions from 6-8 participants to ten participants. These adaptations were designed to make it more feasible for teachers to implement sessions during their school day and to increase the reach of the program. We also added asynchronous virtual components to complement the face-to-face parenting sessions that included messages, information, and videos sent via WhatsApp. We also included school-wide elements to sensitize all caregivers about the core strategies introduced through the program. Finally, we placed additional emphasis on content that was identified as important in a previous qualitative evaluation of the IHT, including caregivers' emotional self-regulation and problem-solving skills and their understanding of child behavior (Francis et al., 2023).

Full details of the IHT intervention are given in Panel 1 using items from the TIDieR (Template for Intervention Description and Replication) checklist (Hoffman et al., 2014). Staff in preschools allocated to the wait-list control arm of the trial continued with educational services as usual and did not receive training in the IHT program or the materials required to implement the program. The preschools are being given a full kit and are invited to attend a two-day training in how to implement the program from January 2025.

Panel 1. Description of the Irie Homes Toolbox (IHT) Intervention

Content: The content of the IHT parenting sessions was divided into four modules: i) promoting children's positive behavior (e.g., use of praise, child-led play Irie Time), ii) preventing misbehavior (e.g., understanding child behavior, teaching household rules and routines, giving clear instructions), iii) understanding emotions (e.g., emotional self-regulation, labelling children's emotions), iv) managing misbehavior (e.g., use of redirect, withdrawing attention, consequences, time-out (chillax)). The school-wide element comprised a weekly theme focusing on one strategy a week. The weekly themes were: praise, Irie-Time, praise yourself, involve your child in everyday activities, give independence, give choices, teach household rules, give clear instructions, name emotions, be a good role model, and how to calm down when angry.

Process of Delivery: Participants enrolled in the IHT parenting sessions attended up to eleven weekly group parenting sessions in groups of ten participants and received asynchronous virtual messages via WhatsApp. Sessions were delivered using evidence-based behavior change techniques including demonstrations, practice and rehearsal, group discussions, positive feedback, goal setting, and homework. The asynchronous components included materials, messages, and short video clips sent via WhatsApp. This included: i) a session summary sent after each session, ii) two messages a week: one reminder of the day and time of the next session and one reminder of the homework (Irie Challenge), and iii) a short video (2-3 minutes) with a narrator explaining the strategy of the week and showing Jamaican parents using the strategy with their child. Additional WhatsApp messages were sent to all caregivers of children in the school (including participants in the group sessions) and included two messages a week: the first giving information on the strategy of the week and why it is important, and the second providing guidance on how to implement the strategy. The school-wide element also included guidance for teachers on how to engage parents with the strategy of the week in their face-to-face interactions with caregivers (e.g., during daily pick-up and drop-off).

Structure: The intervention lasted up to 11 weeks in each school. Each group parenting session included: i) a game or song, ii) participant feedback from the previous session and discussion of homework assignment, iii) introduction of a new topic using demonstration, discussion, and practice, iv) introduction of a child-led play or book activity using demonstration and practice, and v) review and allocating homework assignment.

Materials: Each preschool received a facilitator kit that included all materials required to implement the program. This included: i) materials for facilitators, and ii) materials for caregivers enrolled in the parenting sessions.

Panel 1 (continued)

Intervention Materials for Facilitators: Materials to conduct the parenting sessions included: i) a fully-scripted manual containing a script for each session, ii) visual aids used to introduce and practice strategies and to help participants understand child misbehaviors, iii) hand-held charts with key points to reinforce the strategies introduced, iv) a picture of the Irie Tower: a pictorial representation of the strategies introduced in the program, v) picture books and low-cost, shop-bought toys to practice Irie Time, and vi) phone cards with US$3.50 credit per week to facilitate teachers' communication with caregivers. Materials for the school-wide element included: i) a weekly poster to be placed on the school information board with details of the Irie strategy of the week, and ii) a weekly guide for all teachers in the school on how to engage caregivers in the Irie strategy of the week

Intervention Materials for Caregivers Enrolled in Parenting Sessions: included: i) a homework record form (Irie Challenge) for each session to encourage participants to use the strategies at home, ii) three small picture books for parents to use with their child during Irie Time, and iii) an Irie Parent Oath that each participant signs on completion of the program to commit to continued use of the strategies. Caregivers were also provided with a small snack (juice and peanuts) after each session.

Who provided: Two preschool teachers within each school were trained to deliver the IHT sessions. The teachers were given autonomy in how to organize the sessions, with some teachers choosing to have a "lead" teacher taking primary responsibility for the sessions, some teachers taking it in turns to deliver sessions and some delivering the sessions together. Preschool teachers were trained and supervised by two members of the Irie Toolbox team (TF and MB).

Where: The parent training sessions were held on the preschool compound. Teacher-training workshops were conducted in a centrally located community preschool.

When and How Much: Parenting sessions were held either at the beginning of the school day (when caregivers were dropping off their child at school) or after school (when caregivers came to pick up their child). The sessions were held once a week, for up to 11 weeks, and each session lasted approximately one hour. Teachers were to be trained in a 2-day initial workshop facilitated by two members of the Irie Toolbox Team (TF and MB) in groups of 12 teachers, and to receive fortnightly support from the two members of the Irie Toolbox team with six schools allocated to each team member.

Tailoring and Modifications: Each session was fully scripted and implemented in a similar way across all preschools. However, there was flexibility in the number of practice activities completed based on parent interest and the time available. Seven schools did not complete all eleven sessions due to delays in starting the intervention (see deviations from protocol section for more details).

3.4 Measures

In this mixed-method study, we collected three main categories of data: i) implementation outcomes, ii) the impact of the IHT program on caregiver and child outcomes, and iii) a qualitative investigation of the perceptions of preschool teachers and the research team. Details of these measures are given in **Panel 2**.

Implementation Outcomes. Implementation outcomes included caregiver attendance, preschool teacher compliance and the quality of the parenting sessions implemented by the preschool teacher.

Impact Evaluation. The primary outcome in the impact evaluation was caregivers' use of VAC measured through caregiver report. Secondary outcomes were caregiver involvement with their child, caregivers' attitudes to VAC, caregivers' preference for harsh punishment, caregiver self-efficacy, and child conduct problems, all by caregiver report. All primary and secondary outcomes were measured at baseline (December 2023 to March 2024) and post-intervention (May to July 2024), with the exception of caregiver self-efficacy, which was measured at post-intervention only. All outcome measures, except for caregiver preferences for harsh punishment, have been used previously with this population in Jamaica and show good psychometric properties (see Panel 2). The measure of caregiver preferences for harsh punishment was designed for this study using an adapted version of a questionnaire used in Uganda (Satinsky et al., 2024).

As these outcomes are all measured through caregiver-report, we included a social desirability index (SDI) in post-test measurements. The aim was to measure respondent's propensity to report in a socially desirable way on their own behavior and attitudes. We used the Marlowe-Crowne Social Desirability Scale – short form (Crowne and Marlowe, 1960; Reynolds, 1982) which consists of 13 questions with a response scale of "True" or "False" (for example, "I sometimes feel resentful when I don't get my way," "I have never deliberately said something that hurt someone's feelings," "I'm always willing to admit it when I make a mistake."). Previous studies have demonstrated significant correlations between SDI and self-reports of physical and psychological violence (Bell and Naugle, 2007; Fernández-González et al., 2013). We piloted the SDI prior to collecting baseline measurements and test-retest over 2 weeks was ICC=0.60 and internal reliability was α=0.65 (n=31).

Qualitative Data. We also collected qualitative data including the perceptions of the implementing teachers and the perspectives of the research team on the enablers and barriers to implementation and suggestions for improvement.

During our studies on the prevention of VAC, we follow the reporting requirements of the Jamaican Child Protection Act that mandates reporting of severe corporal punishment. The limits of confidentiality based on this reporting mandate are included in the informed consent process. The measure of caregivers' use of VAC used in this study is a measure that was designed for use in prevention studies with community samples, and as such, we do not ask caregivers to report on severe corporal punishment. We follow a structured research protocol to collect data on caregivers' use of VAC that includes guidelines for training interviewers on how to conduct interviews in a sensitive way (including how to respond to participant distress and how to respond to disclosure of severe VAC), interviews conducted out of listening range of other persons, and referral mechanisms to additional services if required.

Panel 2. Description of Implementation, Primary, and Secondary Outcomes and Qualitative Evaluation

Outcome Variables	Measures Used
Implementation Outcomes	
Caregiver attendance	Measured weekly through attendance logs
Preschool teacher compliance	Teacher compliance with conducting sessions was measured weekly using project logs. Compliance with sending out WhatsApp messages to participating parents was documented through mobile phone records.
Session quality	Measured through observation by a member of the research team using a structured questionnaire that includes rating teacher preparation, skills in session delivery, skills in building positive relationships with caregivers, and skills in helping participants learn. Ratings were conducted on a five-point scale: 1=poor, 2=pass, 3=average, 4=good, 5=excellent.

Primary Outcome	
Caregivers use of violence against their child (VAC)	Measured using items from the corporal punishment and psychological aggression subscales of the Conflict Tactics Scale Parent Child (Strauss et al., 1998). The scale had ten questions, five questions measure physical violence and five measure psychological aggression: 1) shake, 2) hit on the bottom with bare hand, 3) pinch, 4) hit on the bottom with something hard (e.g., belt, stick), 5) slap on the arms, hand or leg, 6) shout, yell or scream, 7) threaten to hit, 8) call names like idiot, dummy, 9) threaten to send the child away, 10) swear at child. Caregivers report on the last two weeks and responses are given on a seven-point frequency scale from 1=never to 7=more than once a day. Higher scores indicate higher caregiver use of VAC. Test retest over two weeks (n=20) was intra-correlation coefficient (ICC)=0.88. Internal reliability using Cronbach's alpha (α)=0.71.
Secondary Outcomes	
Caregiver involvement with their child	The scale consists of twelve questions answered on a seven-point frequency scale (from 1=never to 7=more than once a day): 1) reading storybooks, 2) helping with homework, 3) playing games inside the home, 4) playing outside, 5) play with toys, 6) sit with child as they write, draw or color, 7) chat with child about school and/or friends, 8) involve child in chores, 9) chat with child during daily routines (e.g., dressing, bathing), 10) teach child household rules, 11) praise child, 12) spend 10-15 minutes with child doing something fun. Higher scores indicate higher caregiver involvement. Test retest over two weeks (n=20): ICC=0.96. Internal reliability: α=0.76.
Caregiver attitude to VAC	Measured using an adapted version of the UNICEF Multiple Indicator Cluster Survey (MICS) questionnaire used previously in Jamaica (Dinarte-Diaz et al., 2023). The scale consisted of five questions answered on a four-point scale from 1=disagree completely to 4=agree completely: three questions measured attitudes to physical violence and two measured attitudes to psychological aggression. Higher scores indicate more favorable attitudes to VAC. Test retest over two weeks (n=21): ICC=0.71. Internal reliability: α=0.63.
Caregiver preferences for harsh punishment	The scale consists of nine pictorial scenarios of children misbehaving: four scenarios in a public place (bank, market, supermarket, school) and five scenarios at home. The child misbehaviors include non-compliance, giving attitude, temper tantrum, hitting a younger child, doing something dangerous, being overly active, and making a mess. We selected these behaviors as in previous qualitative research, caregivers reported that they often responded to these behaviors with physical violence (Francis et al., 2023). For five of the questions, if the caregivers' response(s) do not include physical punishment, we ask what they would do if the behavior continued. A pictorial response scale is provided, and multiple responses are accepted. The score includes the number of responses that include VAC (e.g., hit, shout or yell, threaten to hit). Higher scores indicate higher preferences for harsh punishment. Test retest over two weeks (n=30): ICC=0.80. Internal reliability: α=0.57.

Secondary Outcomes (continued)	
Child conduct problems	Measured using the Eyberg Child Behavior Inventory (ECBI) frequency scale (Eyberg and Ross, 1978). The ECBI consists of 36 questions and caregivers report on their child's behavior using a 7-point scale from 1=never to 7=Always. Higher scores indicate higher levels of conduct problems. Test retest over two weeks (n=20): ICC=0.99. Internal reliability: α=0.81
Parenting self-efficacy	Measured using the Brief Parenting Self-Efficacy Scale (Woolgar et al., 2023). The scale consists of five questions and caregivers answered on a four-point scale from 1=disagree completely to 4=agree completely. Higher scores indicate higher parenting self-efficacy. Test retest over two weeks (n=30): ICC=0.58. Internal reliability: α=0.69.
Qualitative data	
Teacher perceptions	After teachers had completed all IHT sessions, we conducted in-depth interviews with teachers who conducted the sessions within each school. Interviewers used a topic guide to explore teachers' perceptions of the enablers and barriers to intervention implementation (relating to the content, process, structure, and materials used in the program) and teachers' suggestions for improvement and to promote sustainment within the preschool system.
Research team perceptions	The research team kept an ongoing log of the enablers and barriers to intervention implementation and suggestions for improvement based on their interactions with the preschool teachers and parents and their observations of the sessions.

3.5 Procedure for Measures

Implementation Outcomes. Implementation outcomes were collected throughout intervention implementation by two members of the Irie Toolbox Team (TF and MB). Each team member was responsible for collecting implementation data in six preschools.

Impact Evaluation. The questionnaires related to caregivers' use of VAC, caregiver involvement with their child, attitudes to VAC, preferences for harsh punishment, self-efficacy, and child conduct problems were administered in face-to-face interviews by two research assistants, masked to study design and group allocation. Interviews were usually conducted at the study preschools with a minority of interviews conducted at the participants' homes. All participating caregivers (in both intervention and control schools) received a small gift for their child (e.g., coloring book and crayons) and US$2.50 phone credit after baseline and again after post-test measurements. Research

assistants were rotated across schools and interviewed equal numbers of caregivers in each group at both time points. Research assistants were trained over a two-week period including 0.5 weeks in office and 1.5 weeks of field training. Ongoing quality control was maintained by the trainer accompanying each research assistant once a week throughout data collection. Completed questionnaires were checked on a weekly basis for completeness by the project manager.

Qualitative Data. Teacher interviews were conducted within two months after the end of the intervention. Teachers were contacted by phone and a convenient time arranged for interview. Interviews were conducted at the preschool by the Irie Team member who was responsible for supporting the teachers. Interviewers used a structured topic guide, and the interview lasted approximately one hour.

3.6 Deviations from Protocol

In the protocol, the intervention was described as a twelve-week intervention. We found that when integrating into the existing preschool system, we had to follow the pace of the schools. Teachers had responsibility for identifying the participant parents and setting up their parenting groups (including setting the date and time and creating a WhatsApp group of participants). These activities took more time than we anticipated. Hence the intervention was shortened to a maximum of eleven weeks. We added a measure of caregiver self-efficacy to the measurements at post-test. This measure was added after feedback from the advisory board overseeing the research.

3.7 Analysis

This is a feasibility pilot study, and its power is limited by the small number of clusters. With a cluster size of 10 (10 parent/child dyads per school), and assuming an intracluster correlation coefficient of 0.02 on our primary outcome of caregivers' use of VAC, (based on our previous data), 120 participants per group are sufficient to detect an effect of 0.35 SD with 80% power at a significance of $p<0.1$.

All analyses were prespecified with details given in a previously published protocol (Francis et al., 2025). Outcome variables were assessed for normality and transformed where necessary. Caregivers' use of VAC, caregivers' attitude to VAC, and caregiver preferences for harsh punishment were negatively skewed, and were normalized with a square root transformation.

The effect of intervention was analyzed using MLWin v 3.04 (Rasbash et al., 2009), on an intention to treat basis, using multilevel linear regression models to take into account the hierarchical nature of the data (caregivers nested in schools). Fixed effects in the model included a constant, baseline score (where available), interviewer, child age and sex, intervention status and variables that were different between the groups at baseline, or that were different between those lost to analysis and those who continued, at a significance level of $p<0.1$. Preschool was entered as a random effect. As there was only one primary outcome (caregiver-reported frequency of violence against their child), we did not control for multiple hypothesis testing. Secondary outcomes are considered exploratory. Effect sizes were calculated by dividing the regression co-efficient by the standard deviation of the control group at post-test for each outcome.

As the outcome measures are assessed through caregiver self-report, they are susceptible to experimenter demand effects especially for outcomes related to caregivers' use of and attitudes to VAC. We assessed experimenter demand effects using three sets of multilevel regression analyses. In all analyses, child age, sex, interviewer, caregiver age, and baseline caregiver involvement were entered as fixed effects and preschool as a random effect. First, we investigated the effect of the intervention on a social desirability index using multilevel regression analysis. Second, we repeated all the multilevel regression analyses on primary and secondary outcomes described above, with the social desirability index added as a covariate in the model. Finally, we investigated heterogeneity of experimenter demand effects by re-running the multilevel regression analyses for each primary and secondary outcome with the social desirability index (SDI) and an interaction term (SDI x study group) as fixed effects in the model.

For all multilevel regression analyses, we used the restricted maximum likelihood estimator available in MLWin to take into account the small number of clusters (Elff et al., 2021).

The in-depth interviews with teachers were audio-recorded. Due to resource constraints, we made notes from the audio-recording of each teacher interview rather than transcribe the interviews in full. The qualitative data, including the notes from the teachers interviews and the ongoing logs from the research team during the IHT implementation, were analyzed manually using thematic analysis (Braun and Clarke, 2006). We developed a list of key themes using a deductive approach separately for each set of qualitative data (teacher interviews and researcher logs). One of the Irie Team members (TF) created a thematic matrix linking each theme and

subtheme with corresponding extracts from the qualitative data. The analyses were conducted with ongoing input and consultation with HBH.

4. Results

4.1 Sample Characteristics

Sample characteristics are shown in **Table 1**. Children had a mean (SD) age of 4.1 (1.1) years, 118 (49.2%) were boys, and 49 (20.4%) were in the clinical range for conduct problems by caregiver-report, with no significant differences by study group. In terms of caregivers and household characteristics, 172 (71.7%) had completed high school, 176 (73.3%) were employed, 227 (94.6%) were female, 205 (85.4%) were mothers, 91 (37.9%) fathers lived with their child and there was a mean (SD) of 2.2 (0.98) children per household. The only significant differences between the groups, (at $p<0.1$), were for caregiver age ($p=0.07$) and caregiver involvement with their child ($p=0.07$). Seven caregiver/child dyads were lost to follow up: four from the intervention group and three from the control group: reasons for loss are shown in Figure 1. There were no differences between those lost and followed up, (at a significance of $p<0.1$), for any primary or secondary outcome or for any caregiver characteristics (**See Appendix**). However, children lost to follow-up were significantly older than those who continued (Mean (SD): 5.0 (1.2) versus 4.1 (1.1) respectively, $p=0.03$). Caregiver age, caregiver involvement and child age were entered as fixed effects in all multi-level regression analyses.

Table 1 Child, Caregiver and Household Characteristics by Study Group

	Intervention (n= 120)	Control (n= 120)	p value
Child age (in years)	4.07 (1.12)	4.08 (1.08)	0.91
Child sex (n (%) boys))	56 (46.7)	62 (51.7)	0.44
Clinical range for conduct problems by parent report[1] n (%)	23 (19.3)	26 (22.0)	0.61
Caregiver age (in years)	33.92 (9.99)	31.79 (8.13)	0.07
Caregiver sex (n (%) female)	115 (95.8)	112 (93.3)	0.39
High school completed n (%)	86 (71.7)	86 (71.7)	1.00
Caregiver currently employed n (%)	89 (74.2)	87 (72.5)	0.77
Mother lives with child n (%)	108 (90.0)	113 (94.2)	0.69
Father lives with child n (%)	41 (34.2)	50 (41.7)	0.31
Number of children < 18 years in household	2.13 (1.18)	2.33 (1.18)	0.19
Household possessions [2]	9.44 (2.22)	9.30 (2.42)	0.64
Household sanitation (median (IQR)) [3]	12.00 (8-12)	12.00 (8-12)	0.98
Crowding median (range)[4]	1.33 (0-5)	1.50 (0-8)	0.64

Notes: Scores are mean (SD) unless otherwise stated. [1]Above cut off (>130) on Eyberg Child Behavior Inventory by parent report. [2]Number of possessions from a list of 16 items. [3]Water supply and toilet. [4]Number of people per room.

4.2 Characteristics of Intervention Teachers

Twenty-four preschool teachers (n=2 from each preschool) participated in program implementation. Teacher characteristics are shown **in Table 2**. All teachers were female, 6 (25%) were also the school principal, in addition to being a classroom teacher, and 11 (45.8%) had a formal teacher-training qualification (Diploma or B.Ed.).

Table 2. Characteristics of Teachers Implementing the Irie Homes Toolbox Program

	n=24
Teacher sex: n (%) female	24 (100%)
Teacher age:	
• 25-34	8 (33.3%)
• 35-44	8 (33.3%)
• 45-54	4 (16.7%)
• 55-64	4 (16.7%)
Teacher role: n (%)	
• Teacher	18 (75%)
• Teacher & Principal	6 (25%)
Number of years teaching: median (IQR)	8 (5-16)
Number of years teaching at this school: median (IQR)	5 (1.5-10)
Received training in early childhood education: n (%)	22 (95.7%)
Have a Diploma in Education: n (%)	1 (4.2%)
Have a Bachelor's in Education: n (%)	10 (41.7%)

4.3 Intervention Implementation

Teacher Participation in Training. Teachers were trained in two rounds of implementation: one group (n=12 teachers) was trained in early January 2024, and one group (n=12 teachers) was trained in the February half term. In the January cohort, 8/12 teachers (66.7%) attended two days of training, 4/12 (33.3%) attended one day. In the February cohort, teachers were only available for one day of training: 10/12 teachers (83.3%) attended the training. So, overall, (8/24 (33.3%) attended two days, 14/24 attended 1 day (58.3%) and 2/24 (8.3%) attended no training. Schools were visited by an Irie Toolbox team member the day before each session for approximately 30 minutes to review the script and over 90% of sessions were attended by a member of the team.

Number of Sessions Delivered and Teacher Compliance. Five schools completed all 11 sessions, five schools completed 10 sessions, one school completed 9 sessions, and one school only completed 7 sessions. The reason why some schools completed fewer than 11 sessions was due to a delay in setting up the program. This occurred because of delays in participant recruitment and/or in organizing the time and date of the first session. Teacher compliance with implementing the sessions was high and sessions were only missed due to poor weather, the session falling on a

public holiday/election day, school events such as sports day, and teacher illness. Teachers also consistently sent the WhatsApp messages to caregivers and displayed the weekly bulletins on the school message board.

Participant Attendance. Mean (SD) participant attendance was 4.0 (3.8). Twenty-two (18.3%) participants attended 0 sessions. Fifty-one participants (42.5%) attended 5 or more sessions.

Session Quality. Quality of implementation was monitored at least fortnightly using a structured observation tool by a member of the Irie Toolbox research team during the scheduled supervisory visits. Out of 121 sessions implemented across all preschools, the Irie Toolbox Team conducted a total of 74 observations (61.2% of sessions), with a mean (SD) of 6.2 (1.9) observations in each school. Sessions lasted a mean (SD) of 70.9 minutes and the mean (SD) participant attendance was 4.5 (1.3). Observer ratings of session quality are shown in **Table 3**. The relative strengths (defined as more than 50% scoring good or excellent) were that teachers followed the script, engaged all participants, allowed parents to openly share issues, did not criticize parents, clearly demonstrated the strategies, and gave all parents the opportunity to practice. The main weaknesses (defined as more than 50% scoring poor or pass) were related to preparation, repeating participants' responses, highlighting key points, and ensuring participants were successful in practice activities. Two skills were not observed in a large number of sessions. These skills were i) being responsive to questions from participants, and ii) facilitating collaborative problem-solving. This indicates that limited opportunities were given for parents to ask questions and to problem-solve together.

Table 3. Observer Ratings of the Implementation Quality of 74 IHT Parenting Sessions across Twelve Preschools

	N/A	Poor	Pass	Average	Good	Excellent
Checklist Items	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Preparation						
Has correct materials and venue is set up		18 (24.3%)	20 (27.0%)	11 (14.9%)	16 (21.6%)	9 (12.2%)
Familiar with the script		9 (12.2%)	30 (40.5%)	29 (39.2%)	6 (8.1%)	0 (0.0%)
Skills in session delivery						
Followed the script		0 (0.0%)	8 (10.8%)	26 (35.1%)	38 (51.4%)	2 (2.7%)
Delivered session at an appropriate pace		13 (17.6%)	16 (21.6%)	26 (35.1%)	19 (25.7%)	0 (0.0%)
Delivered session with interest and enthusiasm		10 (13.5%)	20 (27.0%)	20 (27.0%)	20 (27.0%)	4 (5.4%)
Participants are engaged throughout the session		1 (1.4%)	7 (9.5%)	31 (41.9%)	33 (44.6%)	2 (2.7%)
Building positive relationships with participants						
Repeated participants' responses		29 (39.2%)	22 (29.7%)	15 (20.3%)	6 (8.1%)	2 (2.7%)
Showed interest in what participants said		5 (6.8%)	11 (14.9%)	30 (40.5%)	23 (31.1%)	5 (6.8%)
Engaged all participants		5 (6.8%)	11 (14.9%)	19 (25.7%)	26 (35.1%)	13 (17.6%)
Gave positive feedback every time participants participated		10 (13.5%)	19 (25.7%)	31 (41.9%)	7 (9.5%)	7 (9.5%)
Responsive to questions from participants	36 (48.6%)	4 (5.4%)	5 (6.8%)	10 (13.5%)	15 (20.3%)	4 (5.4%)
Allowed parents to openly share issues and perspectives	20 (27.0%)	0 (0.0%)	2 (2.7%)	4 (5.4%)	30 (40.5%)	18 (24.3%)
Facilitated collaborative problem-solving	44 (59.5%)	12 (16.2%)	9 (12.2%)	2 (2.7%)	7 (9.5%)	0 (0.0%)
Did not criticize parents or tell them they were incorrect		0 (0.0%)	5 (6.8%)	3 (4.1%)	35 (47.3%)	31 (41.9%)
Helping participants learn						
Clearly demonstrated the use of the strategies		2 (2.7%)	14 (18.9%)	19 (25.7%)	31 (41.9%)	8 (10.8%)
Highlighted key points as participants practiced		28 (37.8%)	28 (37.8%)	12 (16.2%)	6 (8.1%)	0 (0.0%)
Ensured all participants were successful in practice activities		20 (27.0%)	26 (35.1%)	15 (20.3%)	12 (16.2%)	1 (1.4%)
Gave opportunities for all parents to practice		3 (4.1%)	16 (21.6%)	7 (9.5%)	24 (32.4%)	24 (32.4%)

4.4 Impact Evaluation

Effect of Intervention on Primary and Secondary Outcomes. Raw scores of all outcomes at baseline and post-test are given in **Table 4**. We conducted intention-to-treat multi-level, regression analyses, controlling for child age and sex, interviewer, baseline score (where available), and variables significantly different between the groups at baseline at a significance of $p<0.1$ for each primary and secondary outcome. As attrition was low (2.9%) and similar levels of attrition were found across study groups, we did not impute scores for participants lost to follow-up (Schulz and Grimes, 2002). Significant benefits of intervention were found for the primary outcome of caregivers' use of VAC (effect size=-0.22, 95% CI: -0.44, -0.02, p=0.04) (see **Table 5**). For the secondary outcomes, significant benefits of intervention were found for caregiver involvement with their child (effect size=0.30, 95% CI: 0.09, 0.52, p=0.005), caregivers' attitude to VAC (effect size=-0.36, 95% CI: -0.64, -0.08, p=0.01), and caregiver self-efficacy (effect size=0.29, 95% CI: 0.05, 0.53, p=0.02). Benefits to caregiver preferences for harsh punishment were significant at $p<0.1$ (effect size=-0.21, 95% CI: -0.25, 0.02, p=0.07). No benefits were found for child conduct problems (effect size=-0.06, 95% CI: -0.23, 0.11, p=0.49).

Assessing Bias due to Experimenter Demand Effects. We assessed bias due to experimenter demand effects using a social desirability index (SDI). The SDI had an internal reliability (Cronbach's alpha) of 0.61 in this sample. We conducted three sets of analyses. Firstly, we investigated if there were significant impacts to the social desirability index (SDI) using multilevel regression analyses and found no effect of intervention on the SDI (B (SE)=-0.5 (0.12), p=0.87). Secondly, we investigated if the SDI altered the benefits of intervention when entered as a covariate in the multi-level regression analyses on primary and secondary outcomes. The estimated effects remain similar in magnitude and statistical significance (**Table 6**). Thirdly, we investigated if there were heterogeneous treatment impacts by SDI. When the SDI x group interaction term was added to the multilevel regression models, the interaction term was not significant for all the primary and secondary outcomes (**Table 6**).

Table 4. Raw Scores of Parent and Child Outcomes and the Social Desirability Index at Baseline and Post-Test by Study Group

	Baseline		Post-test	
	Intervention n=120	Control n=120	Intervention n=116	Control n=1172
Caregivers' use of violence against their child (median (IQR))	12.00 (6-17)	12.00 (7-17)	9.00 (5-16)	13.00 (6-19)
Caregiver involvement	34.83 (10.98)	37.40 (11.04)	36.13 (10.63)	34.36 (11.12)
Caregiver attitude to violence against children (median (IQR))	5.00 (3-7)	5.00 (3-7)	4.00 (2-7.75)	5.00 (3-7)
Caregiver preferences for harsh punishment (median (IQR))	4.50 (3-7)	5.00 (3-6)	4.00 (2-6)	4 (2-6)
Caregiver self-efficacy	-	-	14.00 (1.41)	13.64 (1.62)
Child behavior difficulties by caregiver report	112.75 (24.06)	115.15 (21.27)	109.26 (24.60)	112.56 (22.29)

Notes: Values are mean (SD) unless stated otherwise. Caregivers' use of violence against their child: minimum=0, maximum= 60. Caregiver involvement: minimum= 0, maximum=72. Attitude toward use of violence against children: minimum=0, maximum=15. Caregiver preferences for harsh punishment: 9 questions with parents allowed to give multiple responses for each question. Caregiver self-efficacy: minimum=0, maximum=15 (at post-test: n= 116 intervention, n= 114 control. Child behavior difficulties by caregiver report: minimum=35, maximum=245.

Table 5. Effect of Intervention on Primary and Secondary Outcomes [1,2]

Measure	Regression coefficient B (95% CI)	ICC[3]	Effect Size[4] (95% CI)	p-Value
Primary Outcomes				
Parents' use of violence against their child[5]	-0.28 (-0.54, -0.02)	0.00	-0.22 (-0.44, -0.02)	0.04
Secondary Outcomes				
Caregiver involvement	3.39 (1.05, 5.73)	0.01	0.30 (0.09, 0.52)	0.005
Caregiver attitude to violence against children[5]	-0.21 (-0.38, -0.05)	0.06	-0.36 (-0.64, -0.08)	0.01
Caregiver preferences for harsh punishment[5]	-0.12 (-0.44, 0.01)	0.00	-0.21 (-0.25, 0.02)	0.07
Caregiver self-efficacy[6]	0.47 (0.08, 0.86)	0.00	0.29 (0.05, 0.53)	0.02
Child behavior difficulties	-1.79 (-6.85, 3.26)	0.04	-0.06 (-0.23, 0.11)	0.49

Notes: [1]Analyses adjusting for child age and sex, interviewer, baseline scores (where available), caregiver age and caregiver involvement at baseline as fixed effects, and preschool as random effects. [2]Intervention group= 1, control =0. [3]Intra-cluster correlation coefficient. [4]Effect size is the regression coefficient divided by the standard deviation of the control group at post-test. [5]Transformed using square root transformation, [6]Measured at post-test only.

Table 6. Social Desirability Bias Analysis

	Caregivers' use of violence against their child[3] B (SE)	Caregiver involvement B (SE)	Caregiver attitude to violence against children[3] B (SE)	Caregiver preferences for harsh punishment[3] B (SE)	Caregiver self-efficacy[4] B (SE)	Child behavior difficulties by caregiver report B (SE)
Intervention group	-0.28 (0.14)*	3.35 (1.25)**	-0.21 (0.08)*	-0.12 (0.07)[a]	0.47 (0.20)*	-1.66 (2.51)
Social desirability index (SDI)	-0.00 (0.03)	0.20 (0.24)	0.01 (0.01)	0.01 (0.01)	0.03 (0.04)	-0.15 (0.47)
Intervention group	-0.28 (0.14)*	3.33 (1.25)**	-0.21 (0.09)*	-0.12 (0.07)[a]	0.45 (0.20)*	-1.69 (2.61)
SDI	-0.01 (0.03)	0.17 (0.24)	0.01 (0.01)	0.02 (0.01)	0.04 (0.04)	-0.19 (0.47)
Treatment x SDI interaction	0.02 (0.06)	0.48 (0.48)	0.03 (0.03)	-0.04 (0.03)	-0.07 (0.08)	0.63 (0.94)

Notes: [a]p<0.1, *p<0.05, **p<0.01 [1]Analyses adjusting for child age and sex, interviewer, baseline scores (where available), caregiver age and caregiver involvement at baseline as fixed effects and preschool as random effects. [2]Intervention group= 1, control =0. [3]Transformed using square root transformation, [4]Measured at post-test only.

4.5 Qualitative Investigation

For the qualitative investigation, we selected teachers who had been actively involved in conducting the IHT session to participate in the in-depth interview. In six schools, both teachers implemented the sessions, while in six schools one teacher took primary responsibility for conducting the sessions. Hence we invited two teachers from six schools and one teacher from the other six schools to participate. Interviews were conducted during the time that Hurricane Beryl impacted Jamaica in July 2024, and one teacher was unavailable for interview. We therefore interviewed seventeen teachers from eleven preschools.

Teachers' Perspectives of the Enablers to Implementation. Teachers reported benefits to themselves from their involvement in the IHT delivery including building better relationships with parents, understanding parents more, increased skills in managing children's behavior in the classroom, and increased job satisfaction (**Table 7**). Enablers at the level of the caregivers included caregivers' participating in the sessions, seeing benefits to participants parenting skills and their involvement in school, and caregivers supporting each other with their parenting. In terms of enablers related to materials, most teachers liked using the scripts for each session and reported that it made the session easier to deliver. They reported that the bulletins and WhatsApp messages generated interest among caregivers who were not enrolled in the group sessions and that the videos were easy to understand and interesting. Teachers highly valued the training and the ongoing support.

Teachers' Perspectives of the Barriers to Implementation. Teachers reported some difficulties in facilitating the sessions including difficulty in doing the roleplays due to shyness and feeling uncomfortable or because it was difficult to play the role required (**Table 8**). A minority of teachers would have preferred for the sessions to be less scripted. Other difficulties included poor attendance of caregivers and some caregivers being unwilling to participate in the sessions and/or finding it difficult to understand and practice the strategies. Several teachers felt that there were too many practice activities within each session which led to disengagement of caregivers.

Teachers' Suggestions for Improvement. Teachers gave suggestions for caregiver recruitment that included the following: i) informing the caregivers about the program in face-to-face meetings,

either in groups during parent orientation, or individually to allow teachers to address individual caregivers' needs; ii) using WhatsApp messages and videos; iii) advertising the program using posters around the school, and iv) asking caregivers who have participated in the program to encourage other caregivers to join the groups by sharing their experiences and how they have benefitted (**Table 9**). To promote attendance, they suggested ongoing encouragement during face-to-face meetings, phone calls, and WhatsApp messages. Some teachers recommended using incentives to motivate caregivers. The majority of teachers wanted more support from other teachers in the school in running the program. This support could involve all teachers being trained to conduct the sessions and/or support with other aspects of the program such as with preparation and with recruiting, mobilizing, and engaging caregivers. Some teachers reported that fortnightly or monthly sessions would be more feasible for teachers and/or caregivers and that the program should be shortened to fit better into the school term. They also gave suggestions for engaging caregivers with the videos, messages and bulletins by, for example, making them more interactive and more salient.

Table 7. Preschool Teachers' Perceptions of the Enablers to Implementation of the Irie Homes Toolbox Program

Theme	Quote
Enablers at the level of the teachers	
Teachers build better relationships with parents	• *"It brings us closer together, we interact more, they will ask certain questions." T16* • *"The parents are communicating more." T3* • *"We are closer. We have chit chats, talk about their child's development when they drop off or pick up their child." T4*
Teachers understand parents more	• *"I got to understand them more. They were willing to open up and confide in me, and that was a benefit to me." T5* • *"There was one mommy who I thought was avoiding me, but I learnt that she is shy. So, I know how to interact with her now." T3* • *"I get to see them in a different light and how they interact with their child." T15*
Participating in the IHT program helped teachers to manage child behavior in the classroom	• *"Going through this program, I've learned many different ways of how to deal with children rather than hitting and shouting at them." T3* • *"It helped me to know how to deal with the children better and how to manage my anger." T2* • *"It helps me a lot, I am calmer with the children ... during the sessions you learn strategies that you can use."T15*
Teachers report increased job satisfaction	• *"I think she (the parent) looks to me more. When she comes, she asks for me, it makes me feel good that I was able to impact someone's life, other than a child." T1* • *"It makes me feel accomplished because they can trust me to come and talk. ...They now know that they can talk to me." T3*
Enablers at the level of the participants	
Caregivers participated in the sessions	• *"It was easy because the parents were receptive. I loved that the parents encouraged each other. We also cheered on the parents." T11* • *"Supporting them as they practiced was comfortable because they listened and responded accordingly." T10* • *"It was easy, because parents were willing to participate." T12*
Caregivers benefit from the IHT: (e.g., understand child behavior, skills in positive discipline strategies)	• *"It helped ... parents to be able to manage the behavior of their children." T2* • *"They (the parents) expressed that the sessions helped them in their everyday life, dealing with their children, managing behavior." T4* • *"They get to understand more about children's behavior and what causes them to behave a certain way, and how to deal with it." T1*
Caregivers were more involved in school	• *"They are a bit more attached to the institution. You are seeing those parents more often." T17*
Caregivers supported each other	• *"...they spoke about personal triumphs and issues in their personal lives. In the WhatsApp group, parents were praising each other; they sent videos in the groups, and the parents would comment on those because it was about them, their lives, and their accomplishments." T4*

Table 7 (continued)

Theme	Quote
Enablers relating to materials	
Having a script to follow helped	• *"The script tells you what to do, gives the possible answers. It makes it less stressful and easier." T1* • *"So, when you have a structured thing, you are able to do it the right way and don't spoil it." T11* • *"The experience of using a script is exciting. I prefer to use a script because it is a guideline of the session, so nothing is left out." T6*
Bulletins sparked caregivers' interest in program	• *" When the bulletins are up, ..we had parents who were not in the workshop come and say, 'Miss, me try some of these things you know.'" T9* • *"Parents asked what is was about. The parents asked me to let them know when it was going to happen again." T2* • *"I saw them take pictures of it, they stopped, and they read it, and they asked us about it." T12*
WhatsApp messages sparked interest from caregivers who are not participating in sessions	• *"Other parents wanted to be a part of the group, they asked 'When is the other one going to start?'" T4* • *"A parent asked about the message that encourages parents to praise children. So even though she wasn't aware of the group, the message made her wonder, so she asked me about it." T8*
Videos were interesting/relatable, useful and easy to understand	• *"I liked that the videos showed real parents interacting with their real children. I also liked that fathers were in the videos." T5* • *"The videos clarify everything a little more. They were interesting and helpful." T9* • *"I got feedback from parents saying how it has helped them, and they are better able to connect with their children." T1*
Enablers related to training	
Training and practice prepared teachers to deliver the sessions	• *"The practice the day before helped because you knew what to do, where to stand, and how to approach the parent." T4* • *"I was comfortable enough because I did the training already. I had the understanding of what to do. I was aware of what to say and the reaction I would probably get." T3* • *"The fact that I went through it before, it wasn't new. So, when it was time to do it in the workshop, it was clearer and good." T5*
Support from the research team was valued by teachers	• *"The fact that a person from the research team was there as a guide, in case the key points were not being highlighted, or it was not being done as it should be done." T5* • *"The support was very helpful. If we made a mistake or if we weren't clear about something, a member of the research team would help us. I felt more comfortable having her there." T12*

Table 8. Preschool Teachers' Perceptions of the Barriers to Implementation of the Irie Homes Toolbox Program

Theme	Quotes
Barriers at the level of the facilitator	
Teachers report discomfort in doing roleplays	• *"For the first two sessions it was difficult but as time went on it became easy, and more comfortable. You feel silly sometimes because most of the actions are of a child, and I wondered how they would see me, but they saw me as what it was intended to do: a child." T4* • *"Some things I had to check myself on. So, if the child is doing something that you don't want them to do, you have to really restrain yourself from saying 'Stop do that' or 'Don't do that'. Because it has to be positive, so that part was difficult." T9* • *"I remember the first training where I had to play the role of a 'bad mommy' I felt a way because it is something that I don't do. It was hard for me to play the bad mommy." T11*
Teachers prefer more autonomy with delivery	• *"…if teachers were allowed to adlib, maybe it would be a bit more interesting. Not changing the script but say it in my own way." T9* • *" I would rather use my own words. I feel more comfortable using my own words." T12*
Barriers at the level of the participants	
Poor attendance of caregivers	• *"Sometimes it was hard because they didn't show up." T3*
Caregivers' lack of participation in sessions	• *"It made it difficult when the parents didn't want to participate." T3* • *"Sometimes some persons didn't want to talk because they are very shy, so that might be a little difficulty." T6* • *"Some parents are timid, so they don't want to speak out, so you have to … encourage them along the way." T14*
Caregivers find aspects of the IHT program difficult	• *"Sometimes you are not getting what you want from the parents, so you have to work more to get the information." T5* • *"Some of them cannot read, that's why some of them don't fill out the home assignment." T2*
Barriers relating to materials	
Few teachers watched all the videos	• *"I watched a few. I think I watched the one about withdrawing attention." T14* • *"I didn't pay any in-depth attention because I just figured the videos were for parents who were not at the sessions or for those who don't understand." T15*
Barriers related to intervention	
Teachers reported that there were too many practice activities	• *"I think that we can minimize the amount of practice in each session ... We don't need so many activities on the paper." T12* • *"Only thing is most of the demonstrations if we did two or three it is enough rather than doing all the examples." T13*

Table 9. Preschool Teachers' Suggestions Relating to Implementation of the Irie Homes Toolbox Program

Theme	Quotes
Suggestions relating to promoting participant recruitment and attendance	
Teachers can recruit participants face-to-face	• *"Talk about it during orientation in September. We can also tell them about it in parents' month (November)." T5* • *"Face to face because you would have a more meaningful conversation rather than on WhatsApp. Face to face they know that you really care." T4* • *"For the parents who really need it, I would recruit them face-to-face because then I can get their feedback and know which approach to take." T3* • *"I would approach them about the sessions individually, we want them to feel important." T15*
Teachers can recruit participants virtually	• *"I could also tell them about it via the WhatsApp group (the school group). Whoever indicates interest is told to come in and sign up." T9* • *"Flyer, video advertisement, something lively. The video ads could be sent to the school, and it could be posted in the WhatsApp group or the school's social media page, or website." T5* • *"Highlight it more. Have a billboard in the schoolyard. Advertisement video sent in the group." T7*
Teachers can engage past participants in recruiting new caregivers for the IHT	• *"Let the other parents who have been through the program tell them how they benefitted." T10* • *"Have past parents speak about their experience and how it helps them and their children." T16*
Teachers' suggestions for promoting caregiver attendance	• *"Encourage them when we see them in the mornings, or WhatsApp message, or phone call. We could say, 'remember we are having the Irie meeting this afternoon. This will help you to be an Irie parent." T8* • *"You have to give incentives." T13* • *"Continue sending out the bulletins, messages on the phone." T14*
Suggestions relating to the school	
Train all teachers in the school to conduct the parenting sessions	• *"We want them to come on board to help us to do the sessions. We have 5 teachers so we could all take a turn in doing the sessions." T14* • *"Firstly, I want to introduce the program to the teachers at the school during the holiday so they can do sessions. Then all hands would be on deck for engaging new parents and to get everybody on board with Irie parenting." T12* • *"Do a roster where each teacher does a session, so it is not burdensome on one teacher." T13*
Ask other teachers in the school to provide support for the teachers conducting the parenting sessions	• *"Helping to set up the room, getting refreshments prepared, helping to do a week, not leaving it on one person." T5* • *"Be engaged and communicate the information sent out to parents so that there is a wider audience range, because we can't have more than 10 parents in a session." T4*

4.6 Ongoing Researcher Logs

The two members of the Irie Toolbox team who were training and supporting the teachers to implement the intervention kept an ongoing log of the enablers and barriers to implementation and suggestions for improvement. These logs included notes kept after each session they visited, combined with notes related to ongoing interactions with teachers.

Research Team's Perspectives of the Enablers to Implementation. All teachers were reported to be highly compliant with intervention protocols, enjoyed delivering the sessions, and utilized the strategies from the IHT in their personal and professional lives (**Table 10**). The majority of teachers had good relationships with the caregivers in their parenting groups, engaged caregivers well, and shared personal experiences of how they used the strategies themselves and the difficulties they faced. Some teachers showed good understanding of the content, demonstrated the skills well, were competent at using the script, and delivered the sessions enthusiastically and with a lively pace.

Research Team's Perspectives of the Barriers to Implementation. Key barriers to the quality of session delivery, included lack of preparation and insufficient support for caregivers during practice activities (**Table 11**). Some teachers found it difficult to maintain a lively demeanor, and their sessions were not engaging for caregivers. An important barrier was that many teachers found it difficult to address caregivers' questions and concerns relating to their child's misbehavior and lacked skills in dealing with resistance from caregivers. Furthermore, some teachers had positive attitudes to using harsh punishment. We faced ongoing challenges with caregiver attendance. In some instances, these challenges were due to caregivers' work schedules and other responsibilities. However, it was also evident that in many schools, teachers had not checked caregivers' willingness and availability prior to recruitment.

Research Teams' Suggestions for Improvement. The research team identified a need for more initial training to prepare teachers to facilitate the sessions. Optimally, the training would include the teachers participating in the training as though they are caregivers, prior to being trained to conduct the sessions (**Table 12**). This would ensure they are fully conversant with the strategies and have a thorough knowledge and understanding of the core content of the program.

Experiencing the IHT program as a participant would also help teachers to understand the rationale for the behavior change techniques used. For the school-wide element to be effective, we need to orient all teachers in the school to the IHT and provide guidelines for how schools can allocate tasks so that all teachers are invested and involved in the program. Another recommendation was to develop a school readiness index to identify schools that are ready to implement the program versus schools that may need to be strengthened prior to implementation.

Table 10. Research Team Perspectives of Preschool Teachers' Strengths in Implementing the Irie Homes Toolbox Program

Theme	Extract from Research Logs
Notes from Observations of Sessions	
Clear and Engaging Script Delivery: Teachers read the script enthusiastically, naturally, with clarity and at a good pace.	• *"Clear and engaging delivery, with appropriate emphasis on key points."* • *"Reads the script as if having a conversation, very natural and kept a good pace."*
Good Relationship with Caregivers: Teachers show warmth and foster open communication and caregivers share openly	• *"She has a good relationship with the parents – they share personal experiences, and she makes them laugh."* • *"It is clear that she has a good relationship with the parents and that they like talking to her."*
Understand Content: Teachers have a solid grasp of session content which helps them effectively guide discussions and clarify concepts.	• *"Understood the content regarding reason for child misbehavior."* • *"Understands the importance of praise and can effectively demonstrate it."* • *"Understood the steps to teach the skill and could recognize it when the parents did it."*
Relatability and Personal Experience: Teachers share personal stories or acknowledge their own learning journey that tend to build trust and rapport with parents.	• *"Shared personal experiences with her 1- and 3-year-old children."* • *"Shared how the program has helped her in her classroom, particularly managing emotions."* • *"Shared personal instances where she almost lost her cool and exploded."*
Engagement and Liveliness: Teachers interact with parents warmly and maintain an engaging session atmosphere through eye contact, smiling, humor, or liveliness.	• *"Was enthusiastic and encouraged parent participation."* • *"Demonstrated the strategies well and kept it fun."* • *"Encouraged quieter parents to share their perspectives."*
Clear Demonstration: Teachers demonstrate the use of the strategies clearly	• *"Good job demonstrating how to praise."* • *"Good job helping them to use many concept words in Irie Time."*
Notes from Ongoing Logs	
Teacher compliance was high	• *"The teachers were willing to deliver the sessions each week. They made time to meet with us to go through the script and then actually held the sessions. They sent out the messages to the parents and put up the bulletins. They even called parents to ask where they were if the session is about to start, and they were not yet present."*
Teachers enjoyed conducting sessions	• *"Most teachers seemed to enjoy doing the sessions and getting to know the parents. They laughed and shared their personal stories; After sessions were finished, they sometimes hung around chatting with the parents."*
Teachers used the program in their professional and personal life	• *"Some teachers were learning alongside the parents. They learnt strategies that they would then use in their classrooms as well as with their own children at home. They shared the videos on their personal social media pages, sent videos to family members and encouraged them to try the strategies. One teacher inquired about running sessions at her church."*

Table 11. Research Team Perspectives of Facilitators' Needs in Implementing the Irie Homes Toolbox Program

Theme	Extract from Researcher Logs
Notes from Observations of Sessions	
Lack of Preparedness & Organization: Teachers were often unprepared with materials and didn't set up the room in advance.	• *"Did not take out materials beforehand."* • *"Chairs set up but still needed a bit of rearranging and materials not set out."*
Managing and Organizing Session Materials: Teachers struggle with organizing and handling materials, including charts and scripts simultaneously, and ensuring materials are visible for parents.	• *"Needs to work out how to hold the script and charts at the same time."* • *"Turned body away from the group."* • *"Needs to handle charts so parents can see the picture and/or text."*
Lack of Script Familiarity and Engagement: Teachers had issues with sticking to the script, often attempting to deliver from memory or in their own words. This led to them changing the meaning at times or led to them missing certain sections/points.	• "*Needs to read with more enthusiasm and keep her head up from the script."* • *"Tried to do it from memory instead of following the script."* • *"Tried to put the script in her own words, which changed the meaning."*
Poor Pacing, Low Energy and Engagement: Teachers spoke in a slow or monotonous tone, were low-energy and lacked enthusiasm which affected the pacing of the session and led to caregivers disengaging.	• *"Read in a flat tone, which made the session feel longer."* • *"Is too laid back. Reads very flat, monotone and all in one. Not vibrant."* • *"…struggles with pacing and energy."*
Does not Prompt, Scaffold or Support Caregivers: Teachers don't always recognize when parents need help and don't support caregivers when they practice the strategies.	• *"Often missed opportunities to prompt parents and to give specific feedback when parents needed encouragement."* • "*Overall, she has difficulty or is uncomfortable with supporting parents to make sure they get it right."*
Dealing with Sensitive Topics and Misconceptions: Teachers sometimes struggle to guide caregivers in understanding and addressing common misconceptions about child behavior and discipline. They also need help with dealing with resistance from participants.	• *"Parents and teachers believe that hitting works and sometimes the children need a good slap."* • *"The teacher did not believe in changing negative thoughts to positive, and she said she would still be angry."*
Notes from Ongoing Logs	
Poor and Inconsistent Parent Attendance: Attendance at the sessions was low in some schools. In others the attendance was inconsistent with different parents attending each week.	• *"Only three parents attend consistently, the majority of the parents in the group work."* • *"Attendance was low this week at the school due a water issue in the community"* • *"Multiple parents were busy this week taking their children to register at the primary school."*
Unavailable Parents Recruited and Enrolled: In multiple schools the parents enrolled in the study were unavailable to attend the sessions	• *" In some schools, the teachers do not know the parents well, so they recruited parents who did not have time to attend*." • *"Preschool teachers recruited caregivers who they thought needed the program rather than caregivers who were willing and able to attend."*

Table 12. Research Team Suggestions for Improving the Implementation of the Irie Homes Toolbox Program

Theme	Extract from Researcher Log
Notes from Observations of Sessions	
Additional Training Needed: Teachers need more training to fully understand the content and to use the strategies themselves to deliver it well.	• *"The teachers are learning the content on the hop."* • *"The facilitator seems to be learning the content at the same time as the parents. She even took an Irie Activity because she said she's going to do it with her child."*
Address Teachers' Views about VAC: Teachers need to believe in the content to deliver it effectively.	• *"Some teachers are unable to deliver the content for the sessions on managing child misbehavior as they have favorable attitudes to violence. It is important to ensure teachers are fully conversant with the strategies and believe in their effectiveness."* • *"Prior to conducting sessions themselves, teachers need to be trained in the program as though they are caregivers."*
Train Teachers to Address Resistance: Teachers need to be trained in how to deal with resistance to strategies and other nuanced discussions.	• *"Caregivers commented that taking away the tablet for one hour is not long enough and that children don't want to stay in chillax. The teacher could not address these concerns."* • *"Parents kept coming back with rebuttals when problem-solving how to manage child misbehavior using positive discipline strategies."*
Notes from Ongoing Logs	
Orient All Staff Members in the School to the Irie Homes Toolbox: Introduce all the teachers in the school to the program so they can help with promoting the strategies, engaging with parents and sharing the work of making the school an Irie School.	• *"We need a meeting or short session with all staff members to inform them of the program and explain our aims. All staff need to see themselves as part of the program."* • *"To help ease the pressure off the main teacher facilitating the sessions delegate different tasks to different members of staff, two teachers trained to deliver sessions, one responsible for changing bulletins, one responsible for schoolwide messages, all responsible for encouraging parents they come in contact with."*
School Readiness to Implement Program: Schools need certain attributes to deliver the program well	• *"Schools where the program was implemented seamlessly had a motivated and dedicated principal or teacher. This teacher/principal believed that encouraging parents was an important task for the school."* • *"A good working relationship between the staff members is important"* • *"Parents having an existing good and respectful relationship with the teachers is also desirable, or at the very least they should not be negative relationships between parents and teachers."*

5. Discussion

In this study, preschool teachers were trained and supported to implement a violence prevention, parenting program, (the Irie Homes Toolbox (IHT)), with caregivers of children attending their school as part of their routine duties. Caregivers assigned to the IHT intervention group reported significant reductions in their use of VAC (Effect size (ES)=-0.22) and their attitude to VAC (with ES=-0.36), and significant increases in involvement with their child in play and learning activities (ES=0.30) and in parenting self-efficacy (ES=0.29), compared to caregivers assigned to the control group. Benefits to caregiver preferences for harsh punishment were significant at p=0.07 (with ES=-0.21). No benefits were reported for child behavior difficulties. There was high compliance by teachers in conducting both the face-to-face and virtual components of the intervention. The observed quality of sessions was variable. Although teachers were observed to have good relationships with caregivers and engaged them well in group sessions, they faced difficulties in using some of the higher order facilitator skills such as reflective listening, prompting and coaching caregivers during practice activities, addressing caregivers' resistance, and problem-solving. One of the main barriers faced was the poor attendance of caregivers at the group sessions. The mean (SD) number of sessions attended was 4.0 (3.8), with 18.3% of caregivers attending zero sessions. We also learnt lessons that will inform future implementation of the IHT. This includes the need for more initial training for teachers to increase their understanding of the content and the skills required for session delivery, sensitizing all teachers in the school to the IHT intervention, identifying effective strategies for caregiver recruitment and engagement, and testing shorter and/or less frequent versions of IHT to make the program more suitable for integration into teachers' existing duties and caregivers' competing commitments.

The reductions in caregivers' use of VAC in this study are of a similar order of magnitude as found in our previous trial in which sessions were facilitated by the research team and co-facilitated by a preschool teacher (ES=-0.22 versus ES=-0.29, respectively) (Francis and Baker-Henningham, 2021). Benefits to caregiver involvement with their child were the same as in the previous trial of the face-to-face IHT program (ES=0.30 in both). The magnitude of the benefits is also comparable to those reported in a meta-analysis of parenting interventions to prevent child maltreatment in which the mean effect size for reductions in parents' use of VAC was -0.20 SD and the mean effect size for benefits to positive parenting behaviors was 0.34 SD (Chen and Chan, 2015). The magnitude of the benefits is perhaps surprising given the low caregiver attendance at

sessions and the quality limitations demonstrated through the session observations. For example, in this study, the caregiver attendance rate was 40% compared to 68% in our previous implementation of the face-to-face IHT (Francis & Baker-Henningham, 2021). We have previously shown that virtual delivery of the IHT was effective at reducing caregivers' use of VAC with an effect size of 0.12SD (Dinarte-Díaz, 2023). It is possible that the blended format of the intervention, that included face-to-face combined with asynchronous virtual components, contributed to benefits to caregivers despite the low attendance at the sessions. It is also possible that preschool teachers were a credible source of information for participants and hence despite the quality limitations, caregivers gave credence to the messages within the IHT (Carey et al., 2019).

The reasons for the low attendance are unclear and may be partially due to unavailability of caregivers due to work (in this study 74.2% of participants were employed versus 53.9% in the previous trial of the program (Francis and Baker-Henningham, 2021). Also, preschool staff recruited some caregivers with minimal involvement with the school due to a belief that the program would promote caregiver engagement. For future implementation, we need to identify strategies to promote caregiver engagement with the program. For cost and logistical reasons, we only provided in-depth training for two teachers in each preschool who were then responsible for conducting the IHT parenting sessions. We included a school-wide component that included provision of resources; however, we did not provide any training to the wider school staff. One potential strategy to increase caregiver engagement is to implement a short training to orient all teachers to the IHT program including how to use the resources to promote caregiver recruitment, engagement and participation in the program and how to disseminate program messages through their ongoing interactions with caregivers.

In this study, we report no benefits to child conduct problems. The lack of benefits to child behavior may be because this was a universal intervention and did not target caregivers of children with higher levels of initial behavior problems. Children with higher levels of initial behavior problems benefit more from parenting interventions (Leijten et al., 2020; Menting et al., 2013). It is also possible that supporting caregivers to manage child conduct problems requires higher-level facilitator skills to effectively engage participants in collaborative problem-solving, and to address resistance. Teachers' skills in these areas were underdeveloped. Finally, in the theory of change for the IHT program, changes in parenting behavior are on the pathway of change to improved

behavior (Francis and Baker-Henningham, 2020; Francis et al., 2025). It is possible that benefits to child behavior may be evident over time as caregivers continue to use the positive discipline practices introduced through the program.

While some violence prevention parenting programs in LMIC include content that targets less proximal drivers of violence such as family dynamics, economic management, and keeping safe in the community (Wang and Zhang, 2024), the IHT focuses on using positive parenting practices, non-violent discipline strategies, emotional self-regulation, and understanding child behavior. The rationale for targeting the most proximal drivers of VAC is because the IHT was designed to be suitable for all caregivers of children aged 2-6 years, regardless of exposure to adversity. Due to the high prevalence of caregivers' use of VAC in Jamaica, it is important to have violence prevention programs available at the wider population level and less complex programs are easier to scale (Gericke et al., 2005). It was encouraging that caregivers' attitude to VAC reduced significantly in this study (ES=-0.36), and there was some evidence that caregivers' preferences for harsh punishment also reduced (ES=-0.21, p=0.07), indicating that if implemented on a wide-scale, the program has potential to change attitudes and preferences relating to VAC. However, a challenge was that a minority of teachers shared caregivers' beliefs that corporal punishment is necessary at times. The IHT needs to be complemented with strategies to change social norms relating to VAC at the population level (WHO, 2016). A scalable strategy may be to use school-wide elements, including messages and videos sent via WhatsApp, bulletins on the school information board, and discussions at PTA meetings to spread messages widely throughout the preschool. We did not have resources to evaluate the effect of the school-wide elements used in the current study on the wider school population and this is an important question for future studies. Messages about the benefits of using positive discipline skills could also be disseminated through health centers, and via social and broadcast media. These strategies have been successfully used to promote child development and health practices in previous studies (Chang et al., 2015; Kasteng et al., 2018; Sarrassat et al., 2018).

For caregivers and families with additional risk factors, a targeted module could be embedded within the universal intervention. For example, the association between physical VAC and intimate partner violence (IPV) is well established (Gershoff, 2010) and a meta-analysis found that for community samples, there was a 9% co-occurrence rate of child maltreatment and IPV and a 39% rate for clinical samples. In addition, there was more than three times the risk (OR=3.64)

of child maltreatment occurring in the future within a family that has reported IPV (Chan, Chen, and Chen, 2019). A targeted module focusing on family dynamics and conflict resolution could be embedded in the universal IHT program for families experiencing IPV. Other targeted modules would include a module on managing more severe child behavior difficulties, and a module for caregivers of children with disabilities to allow for more tailored support.

An important challenge for scale is to maintain implementation quality. The quality of implementation of parenting programs has been shown to predict caregiver attendance and caregiver and child outcomes (Bernal et al., 2023). Hence, an important issue for scaling evidence-based interventions is to ensure high quality initial training and ongoing support for the program facilitators (Caron, Bernard, and Metz, 2021; Pacchiano et al., 2021). The IHT was designed to be delivered by preschool teachers trained in the Irie Classroom Toolbox (ICT), the complementary, evidence-based violence-prevention, teacher-training program (Baker-Henningham et al., 2021; Francis and Baker-Henningham, 2020). The advantage of this is that the teachers would have the knowledge and expertise in using the strategies with children at school and would have seen benefits of the program to themselves and the children in their class, leading to less favorable attitudes to VAC (Bowers et al, 2022). Unfortunately, in this study, due to time and resource constraints, we were unable to ensure teachers had been trained in the ICT. Furthermore, the timing of the trial was driven by funding timelines, and we trained teachers in the second term of the school year, rather than over the summer holidays which is the preferred time for teacher-training workshops (Baker-Henningham et al., 2021). This limited the time available for training. To compensate for the limited initial training, we provided additional support during ongoing implementation. However, we faced challenges in upskilling teachers sufficiently, as demonstrated through the observational and qualitative data. It is important that facilitators are fully conversant with and believe in the program, prior to conducting sessions with participants. This is especially important for programs that address behaviors supported through social norms, as facilitators share the same social norms as the participants. In future, we recommend training teachers in the Irie Classroom Toolbox prior to introducing the IHT and conducting the IHT facilitator workshops before the start of the school year. We are also making short training videos that can be used both in initial training and during program implementation (for teachers to refresh their knowledge and skills).

The IHT was designed from the outset for use at scale (Francis and Baker-Henningham, 2020). The intervention was designed to be low-cost, requiring few resources and to be integrated into the early childhood educational system, and be delivered by existing staff. Cost-effectiveness analyses of previous implementations of the IHT showed that the face-to-face program was more cost effective than the virtual program (costing USD 55.56 for a 0.13SD reduction of caregivers' use of VAC in the face-to-face program versus USD 62.40-73.75 for a 0.13 reduction in the virtual program) (Dinarte-Díaz et al., 2023). In this current feasibility study of integrating the IHT into the preschool network, we did not include a cost-effective analysis. However, we reduced the costs of implementation of the face-to-face IHT in several ways including: i) training preschool teachers to implement the intervention rather than the research team, ii) increasing the size of the parenting group from 6-8 to 10 participants per group, iii) sending caregivers information via WhatsApp rather than giving printed materials, iv) reducing the use of incentives for participants (e.g., not giving phone credit and giving lower-cost snacks), and v) encouraging caregivers to purchase low-cost toys rather than providing the toys (Francis et al., 2025). For wider-scale dissemination, the plan is continue working in partnership with the Early Childhood Commission (ECC). The ECC has a clearly defined organizational structure with field officers who have responsibility for training and supervising pre-school teachers. Hence, training in the IHT could fit within their existing duties. As the IHT program is relatively low-cost and was designed to be integrated into an existing government service with an existing method for providing training and support, it has potential to be cost-effective at scale. As part of this study, we have developed training manuals and monitoring and tools to promote quality implementation based on our prior experience developing technical tools for the Irie Classroom Toolbox (Baker-Henningham et al., 2021, Bowers et al, 2022), and for the virtual IHT (Baker-Henningham et al., 2023).

Despite the facilitating environment, and the potential to scale through the preschool network, it is important to identify additional modes of delivery to maximize reach. For example, the current model does not attract male caregivers, with only 5.4% of male study participants. In addition, work commitments make it difficult for caregivers to give time during the school day, and some schools are unable to implement the program due to insufficient staffing and/or competing commitments. Providing alternatives such as virtual delivery may increase uptake. We also need to test shorter versions of the IHT program and identify what content and dosage is most cost-effective. Another lesson learnt through this research was that although the IHT was designed

from the outset for integration into the existing early childhood education system, ongoing adaptation and flexibility is required as government systems are not static (Herlitz et al., 2020).

5.1 Strengths and Limitations

The strengths of the study are the use of a cluster-randomized design, outcome measures with good psychometric properties, assessors masked to the study design, hypothesis, and group allocation, low levels of attrition with only 2.9% lost to follow-up, and the mixed-method approach including qualitative data from the preschool teachers who are implementing the program. The limitations of the study are that all outcome measures are by caregiver self-report and parents are aware of their group allocation, so this may result in biased responses. Using a social desirability index (SDI), we found no evidence that caregivers assigned to the intervention were more likely to respond in a socially desirable way than caregivers assigned to the wait-list control and controlling for SDI in the analyses did not alter the magnitude or significance of the effects on caregiver outcomes. The use of parent questionnaires to measure use of harsh punishment, involvement and child behavior has the advantage of assessing parent and child behavior across all contexts. Another limitation is that this is a feasibility study, and the sample size was small. We had insufficient power for heterogeneity analyses and hence we did not examine heterogeneity by child age and sex, or by caregiver age, education, and socio-economic status. We were unable to recruit all caregivers prior to randomization, due to the need to conduct teacher training workshops in the school holidays. As preschool staff led the recruitment of caregivers into the study, this could lead to teachers in intervention schools inviting higher-risk parents to attend the parenting sessions (Francis and Baker-Henningham, 2023). However, the groups were balanced on the primary outcome of caregivers' use of violence against their child and on other secondary outcomes of caregiver attitudes to violence, preferences for harsh punishment, and child behavior difficulties. We found a significant difference between the groups in caregiver involvement with their child and caregiver age and we controlled for these differences in all analyses. Caregivers were recruited into this study based on their interest and willingness to participate, while preschools were selected based on their willingness and feasibility to implement the program. Hence, the participants are not representative of the wider population of caregivers and preschools. The decision to recruit by interest and willingness was based on the diffusion of innovation theory which describes how innovations are spread through a population, starting with the early adopters, then spreading to the

early majority, then the late majority, and finally the laggards (Rogers, 2003). Implementing the program with interested participants maximizes the likelihood that the program will be successful, leading to the program gaining momentum, thus attracting other preschools and other caregivers (the early majority).

5.2 Summary

This study demonstrated that the IHT can maintain effectiveness when delivered by preschool teachers as part of their routine duties. The next steps are to further adapt the IHT program based on lessons learnt. There is a need to test a shorter version of the IHT that may be more acceptable to teachers and caregivers. We also need to test the effect of school-wide messaging on caregivers' attitude to and use of VAC. To maintain the quality of the IHT implementation as the program scales, it is important to devise strategies for adequate training and supervision of preschool teachers. Finally, it is important to increase the availability of evidence-based programs to reduce caregivers' use of VAC. This involves designing flexible programs that are delivered through different modalities, and that cater to caregivers with different needs.

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Table A. Child, Caregiver, Household Characteristics and Baseline Outcomes by Lost and Found

	Lost (n= 7)	Found (n= 233)	P-value
Child age (in years)	5.0 (1.2)	4.1 (1.1)	0.03
Child sex (n (%) boys))	5 (71.4%)	113 (48.5%)	0.23
Caregiver age (in years)	30.4 (6.7)	32.9 (9.2)	0.48
Caregiver sex (n (%) female)	7 (100%)	220 (94.4%)	0.52
High school completed n (%)	3 (42.9%)	65 (27.9%)	0.39
Caregiver currently employed n (%)	3 (42.9%)	61 (26.2%)	0.33
Mother lives with child n (%)	7 (100%)	214 (91.8%)	0.96
Father lives with child n (%)	4 (57.1%)	87 (37.3%)	0.29
Number of children < 18 years in household	1.9 (0.9)	2.2 (1.0)	0.42
Household possessions	8.0 (2.4)	9.4 (2.3)	0.11
Household sanitation (median (IQR))	12.0 (8.0-12.0)	12.0 (8.0-12.0)	0.68
Crowding median (range)	1.3 (0.8-2.5)	1.4 (1.0-2.0)	0.91
Caregivers' use of violence against their child (median (IQR))	11.0 (4.0-17.0)	12.0 (7.0-17.0)	0.63
Caregiver involvement	31.3 (14.7)	35.3 (11.0)	0.12
Caregiver attitude to violence against children (median (IQR))	6.0 (2.0-10.0)	5.0 (3.0-7.0)	0.67
Caregiver preferences for harsh punishment (median (IQR))	4.0 (4.0-7.0)	5.0 (3.0-6.0)	0.89
Child conduct problems	106.3 (11.3)	114.2 (22.9)	0.37

Notes: Scores are mean (SD) unless otherwise stated.