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The development and implementation of a theory-informed, integrated mother-child intervention in rural Uganda

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ABSTRACT

Rationale: A randomised cluster effectiveness trial of a parenting intervention in rural Uganda found benefits to child development among children 12–36 months, relevant parenting practices related to stimulation, hygiene and diet, and prevented the worsening of mothers' depressive symptoms. An examination of underlying implementation processes allows researchers and program developers to determine whether the program was implemented as intended and highlight barriers and facilitators that may influence replication and scale-up.
Objectives: The objectives of this study were to describe and critically examine a) perceived barriers and facilitators related to implementation processes of intervention content, training and supervision and delivery from the perspectives of delivery agents and supervisors; b) perceived barriers and facilitators related to enactment of practices from the perspective of intervention mothers participating in the parenting program; and c) whether the program was implemented as intended.
Methods: Semi-structured interviews were conducted at midline with peer delivery agents ($n = 12$) and intervention mothers ($n = 31$) and at endline with supervisors ($n = 4$). Content analysis was used to analyze qualitative data in terms of barriers and facilitators of intervention content, training and supervision, delivery and enactment. Additionally, mothers' recall and enactment of practices were coded and analyzed statistically. Monitoring of group sessions and home visits were examined to reveal whether the program was implemented as intended.
Results: Among the program's five key messages, 'love and respect' targeting maternal psychological well-being was the most practiced by mothers, easiest to implement by delivery agents, and mothers reported the most internal facilitators for this message. A detailed manual and structured monitoring forms were perceived to facilitate training, intervention delivery, and supervision. Interactive and active strategies based on social-cognitive learning theory were reported as facilitators to intervention delivery. Only program attendance, but not barriers, facilitators or message recall, was significantly positively related to message enactment. Monitoring of group sessions and home visits showed that the program was largely implemented as intended.
Conclusions: This implementation assessment revealed a number of important barriers and facilitators from the perspectives of delivery agents, supervisors and program participants. The methods and results are useful to examining and informing the content, delivery, and scaling up of the current program as well as future mother-child interventions in LMIC settings.

1. Introduction

In the last decade, parenting programs have been effectively implemented in low- and middle-income countries (LMIC) to improve child nutrition and stimulation, two primary contributors to poor child development (Walker et al., 2007). Given the reliable relationship identified between parenting difficulties and maternal depression (Murray et al., 2014), existing strategies promoting relevant parenting ultimately depend on the mother's psychological well-being. An examination of underlying *implementation processes*—activities used in a given program or intervention—allows researchers and program developers to assess

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how the program was implemented (outputs) compared to how it was intended (inputs) and can provide a clearer understanding of the program's barriers and facilitators that may influence replication and scale-up, particularly if the intervention has many components (Saunders et al., 2005). The current study examined implementation processes of one integrated parenting intervention (Singla et al., 2015) that was shown to be effective in addressing child development, maternal depressive symptoms and relevant parenting practices in rural Uganda.

1.1. The logic model and Bellg's framework

The logic model is one organizational framework often used to help conceptualize, monitor, and evaluate implementation processes (Kaplan and Garrett, 2005). Specifically, it outlines a program's intended inputs as well as its actual outputs and outcomes. Elaborating further on inputs and outputs, Bellg et al. (2004) highlighted five key implementation processes that are intended to change health behaviours. These include: treatment design, training and supervision of delivery agents, treatment delivery, receipt of treatment and enactment of targeted practices. Relatedly, we define *inputs* in terms of the treatment design of the program, as provided in a manual along with visual aids, and a training schedule for supervisors and delivery agents. We define *outputs* in terms of the delivery agents' and supervisors' commentary on intervention content, training, supervision and delivery, as well as how the program was received and enacted by program recipients (parents). Given the benefits of qualitative methods to assess intervention processes and contextual factors (Lewin et al., 2009), data were collected using focus group discussions as well as individual in-depth interviews and observations. *Outcomes* of the program evaluation are described elsewhere (Singla et al., 2015).

1.2. Theoretical constructs for facilitating behaviour change

One major limitation of the logic model, but emphasized by Bellg et al. (2004) as an important feature of treatment design, is a specific theory to explain how the activities of a given intervention change behaviour (Glanz and Bishop, 2010; Michie et al., 2013). Bandura's (1986) social-cognitive learning theory outlines several sources of behaviour change including receiving verbal instructions on how to perform the behaviour, but more importantly direct experiences (practicing the targeted behaviour yourself), vicarious experiences (observing models perform the action), and receiving feedback on one's performance. We call these four strategies *active and interactive learning strategies*, which are different from the more commonly-used passive strategies derived from adult education theory (Holford, 1995).

The use of these specific active and interactive learning techniques has been empirically supported by an analysis of behaviour change techniques in LMIC parenting interventions (Aboud and Yousafzai, 2015), including visual aids, demonstrating and practicing parenting skills with the child, and problem solving. Effective maternal mental health interventions in LMIC that are based on cognitive, behavioural and interpersonal therapeutic techniques likewise encourage shaping knowledge, problem solving, practicing new behaviours, and eliciting social support from family members (Chowdhary et al., 2014; Zafar et al., 2014). Furthermore, interactive group sessions are thought to enhance social support between peers to reduce maternal depressive symptoms (Bolton et al., 2007; Gao et al., 2010; Rojas et al., 2007) and facilitate peer learning (Aboud and Yousafzai, 2015). Despite similar strategies, few programs have explicitly targeted both child development and maternal mental health with success.

In the current intervention, however, active-interactive strategies that were shared by both child stimulation and maternal depression interventions provided a consistent method to integrate mother- and child-care messages. They were adopted here to train both delivery agents and caregivers of children. For example, both mothers and fathers were demonstrated and requested to practice new behaviours related to feeding (diet), washing (hygiene), talking with their child and providing play materials (stimulation), and showing love and respect for your child, spouse and oneself (maternal well-being). Vicarious experience occurred when mothers observed the delivery agent and their peers during group sessions. Direct experiences entailed mothers engaging in role-plays or direct interaction with a child or spouse followed by feedback from the delivery agent in the form of praise and coaching. Similarly, delivery agents received instructions on how to implement the manual, observed their peers, practiced delivering sessions during training, and received feedback from supervisors.

Social-cognitive learning theory also emphasizes barriers and facilitators to behaviour change (Bandura, 1986; McAlister et al., 2008; Michie et al., 2013). In this theory, barriers are defined as individual, interpersonal or structural obstacles to enacting desired behaviours, whereas facilitators are defined as internal qualities or external events or people that enable them. Others have explored barriers and facilitators after program implementation including sexual health practices among youth (Larke et al., 2010) and a handwashing intervention in rural India (Rajaraman et al., 2014). To identify and resolve problems associated with these barriers, the current parenting program had problem-solving question-and-answer discussions in each group session and resolved family-specific barriers during home visits. During training and supervision of delivery agents, the same process was used to resolve barriers and facilitators related to delivering the sessions.

1.3. Framework for implementation assessment

This study examines the multiple perspectives of peer delivery agents, supervisors and program recipients (mothers) who participated in an effective, integrated, community-based, parenting intervention in rural Uganda (Singla et al., 2015). Using Bellg's (2004) framework, the objectives of this study were to describe and critically examine (a) perceived barriers and facilitators related to implementation processes of intervention content, training and supervision and delivery from the perspectives of delivery agents and supervisors; (b) perceived barriers and facilitators related to enactment of practices from the perspective of mothers participating in a parenting program; and (c) observations of some group sessions and home visits in order to examine whether the program was implemented as intended.

2. Methods

2.1. Setting

The program was implemented in rural Ugandan communities in a district named Lira, located 352 km north of Kampala. The majority of the population resides in rural villages and relies mainly on subsistence farming and manual labour (Uganda Bureau of Statistics (2010)). The current study took place within the context of a community-based effectiveness trial (Singla et al., 2015) that evaluated the effects of a 12-session integrated intervention on child development among children 12–36 months and their mothers' psychological well-being. In collaboration with a local non-governmental organization (NGO), Plan Uganda, the program was delivered to groups of 25–35 mothers and fathers within their communities by local peers who were supervised by NGO staff. All

mothers and fathers of the selected community were invited to attend biweekly group sessions, irrespective of whether they participated in the study so long as they had a child aged 6–36 months. In addition, 1 to 2 home visits were conducted with each individual household to address household-specific issues. They were implemented in the latter half of the program once the group sessions were underway and all five messages were introduced. Using the logic model as a foundational framework, we first describe the inputs of the researchers and NGO staff, including the development of the program and its materials that were used for training and supervision (see Fig. 1).

2.2. Inputs related to intervention design

2.2.1. Program development

In October 2012, we introduced the first draft of the parenting manual, which included eight sessions. At this time, 20 NGO staff responsible for early child development from multiple districts attended and were asked to be in the roles of program participant and delivery agent. They provided extensive feedback on program content throughout the sessions along with some general suggestions for format changes including more sessions and activities dealing with the 'love and respect' message, more role plays and illustrations, and minimizing written material (e.g., flipcharts and written homework). Separate mother and father sessions were added to encourage fathers' involvement and allow women the privacy to express sensitive experiences.

2.2.2. Program manual and visual aids

The intervention comprised five main messages: (a) diversify the child's diet with animal-source foods and provide three to four meals daily; (b) hand-wash with soap, and use latrines; (c) engage in two-way talk with the child using pictures; (d) provide home-available play materials; and (e) love and respect yourself, your child and your spouse. Content of mother and child-care sessions are detailed elsewhere (see Supplementary Material). Each session focused on one particular message related to child-care (diet, hygiene, play, talk) or mother-care (love and respect), with approximately two sessions per message; however, related messages were often combined in later sessions (e.g., play with talk, hygiene with feeding, and talk with love and respect). Each delivery agent had a manual in Luo and visual aids consisting of large posters and small cards to illustrate the five main messages. In addition, we explicitly targeted maternal psychological well-being by integrating cognitive and interpersonal psychotherapeutic strategies that have been effective in other depression trials (e.g., Bolton et al., 2003; Gao et al., 2010; Rahman et al., 2008) such as fostering communication skills with spouse and child, emotional regulation and mood monitoring, and assigning homework including behavioural experiments to ensure continuity between messages.

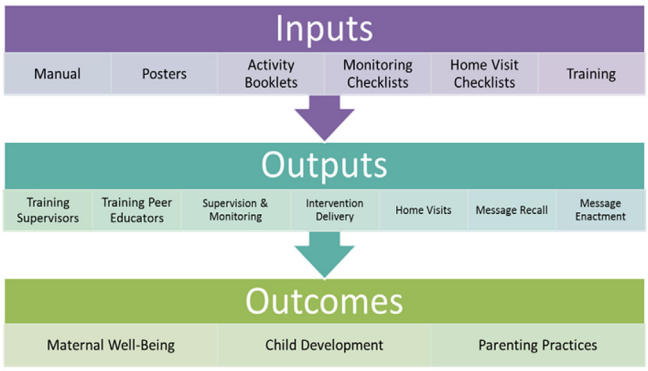


Fig. 1. Logic model for parenting intervention.

The manual was organized by session where each session had a lesson plan with three to four activities. Delivery agents were told what to say in boldface and what to do in regular font, with some flexibility. Learning objectives and required materials were listed at the beginning of the session while assigned homework was included at the end and reviewed in the following session. The manual also provided extra information on the session topic to supplement delivery agents' background knowledge and was used only if parents asked for more justification of the practice. Visual aids were used extensively during sessions to facilitate group discussion and elicit message recall. They were also given to parents in a small 10-page Activity Booklet to take home.

2.2.3. Program strategy

The intended frequency of group sessions and supervisory contacts was bimonthly. The group contacts included introductory and concluding sessions covering all messages, six sessions on child care, and four sessions for each parent on mother care. Supervisors were expected to meet with their delivery agents during and after sessions to monitor and provide feedback, and sometimes before to help in the preparation. The program was designed to maximize opportunities for observing and practicing the desired behaviours, and generating solutions to barriers (Bandura, 1986). Based on previous parenting interventions (Aboud et al., 2013) and cognitive and interpersonal psychotherapeutic strategies for depression (e.g., Bolton et al., 2003; Gao et al., 2010; Rahman et al., 2008), we emphasized active and interactive learning of new practices through specific activities rather than didactic instructions. These included skill-building related to the particular message (e.g., role play), feedback and monitoring, social support and social comparison, and problem-solving and engaging in behavioural experiments during homework (Michie et al., 2013). One or two activities in each session were devoted to the rehearsal of the desired practices, with one's child, spouse or peers. Demonstrations of the practices by the delivery agent sometimes took place, followed by participants rehearsing the practice or role-playing with another parent. Some coaching and feedback was given by the delivery agent. The question-and-answer activity involved the delivery agent raising a specific problem and solutions were offered by the parents, shaping participants' knowledge about the particular message. Some of the better solutions were repeated by the delivery agent. Thus, central components of social-cognitive learning theory related to vicarious and direct experiences were operationalized to facilitate behaviour change.

2.3. Inputs related to training delivery agents and supervisors

In January 2013, the four NGO staff from Lira were trained over several days on the finalized manual. Delivery agents were then trained in the local language, with the assistance of NGO staff, over two, one-week sessions in January and April 2013. Given their previous experience implementing and supervising programs, no formal training on supervisory skills was provided to supervisors. The training for both NGO staff and delivery agents entailed learning session content, how to deliver sessions following the manual, and how to resolve expected problems. Again, using active and interactive learning techniques, each session was discussed in detail and delivery agents took turns to practice the implementation of sessions while their peers took the role of program participants and provided feedback. In addition to learning the content of each session and the purpose of each new practice, a specific emphasis was placed on group communication skills and motivational interviewing whereby delivery agents learned to facilitate group discussion by using supportive, open-ended statements and

empathy (see Singla et al., 2015 for more details). Some sessions also required home-based materials such as play materials, pictures to encourage parent-child talk, and soap.

2.3.1. Monitoring checklists

Supervisors were provided a one-page group-session monitoring checklist with 15 items to assess the delivery agent's quality of delivery during group sessions. This included items (marked '*yes*' or '*no*') about whether delivery agents followed the content laid out in the manual, used the correct materials, had parents practice the behaviour, allowed for discussion of barriers and solutions, engaged the audience, and answered questions appropriately. Providing feedback to delivery agents was also noted.

2.3.2. Home visits checklist

Supervisors and delivery agents were also asked to record their observations of individual caregivers during their home visits. This two-page form emphasized that the visit was not an evaluation of the caregiver, but rather an opportunity to resolve problems related to enacting the five messages within the family environment. It inquired about parents' experiences related to the five main messages, observations of parents' enactment of practices (e.g., the provision of home-made toys or coloured pictures in the home) and resolving problems related to enactment. Implementers (delivery agents and supervisors) were trained to follow the form by praising caregivers for what they had enacted.

2.4. Participants and data collection

In order to examine program outputs, data were collected from delivery agents (focus group discussion; FGD) and mothers (in-depth interviews, IDIs) two months after the start of the program (midline) and from supervisors using IDIs at endline. Monitoring and home visit checklists were completed throughout the trial. Participants and data collection are summarized in Table 1 and described below. All interviews were audio-recorded, transcribed by the interviewer and then cross-checked by another interviewer independent of data collection for accuracy. Informed consent was obtained from each participant before the interview. Ethical approval was received from McGill and Mbarara universities.

2.4.1. Program delivery agents

Twelve peer educators were trained to deliver the parenting program. They were selected by their communities and the NGO staff based on their reputation in their community, communication and language skills, and a minimum of sixth grade education. Six male and six female peers were selected, with an average age and education level of 36 years and eighth grade respectively. All delivery agents ($n = 12$) were interviewed by both authors, mainly in Luo. They were asked about their positive and challenging experiences related to intervention content, training and supervision, and intervention delivery, as well as their perceptions about participant attendance and engagement.

2.4.2. Program supervisors

Bilingual NGO staff ($n = 4$) provided weekly or bi-weekly supervision to three or four delivery agents throughout the intervention. These supervisors had at minimum a bachelor-level education, with several years' experience running NGO-based early childhood programs in Uganda. They were interviewed by one author in English. Similar to delivery agents, supervisors were asked open-ended questions about their experiences related to intervention content, training, supervision, and delivery as well as participant attendance and engagement.

2.4.3. Program recipients

Mothers ($n = 31$) were randomly selected from the twelve intervention villages and individually interviewed at midline. Mothers, rather than fathers, were interviewed because mothers are considered the primary caregiver in this setting and fathers were unlikely to be available during the day due to work commitments. Four local, bilingual research assistants with bachelor-level degrees were trained over two days by one of the authors with a particular emphasis on using probes and open-ended questions. Prior to data collection, interview guides were translated and back-translated to ensure usability in the local context. Mothers were asked first to recall program messages and then to describe if and how they enacted each of the five practices; they were probed regarding how it was practiced. Facilitators and barriers were elicited for each practice by asking, '*what makes it easy and what makes it difficult to do these things*?' Each interview was translated verbatim into English by local research assistants and then cross-checked by a second research assistant via the original audio recording.

One or two researchers were present on site to ensure the quality of the data being collected. Both authors spent time in the field, the primary author of this study attended six group sessions and neither attended home visits.

2.5. Data analysis

All qualitative data were coded using directed content analysis (Hsieh and Shannon, 2005), in which the constructs of barriers and facilitators from social-cognitive learning theory (Bandura, 1986) guided the analysis. Specifically, we analyzed barriers and facilitators as they pertained to the broad themes of intervention content, training and supervision, delivery, and recipient receipt and enactment (Bellg et al., 2004). The coding schemes for delivery agents and supervisors were established through an iterative process by two researchers, one with strong interests in maternal well-being and verified by a second with interests in child development. Revisions to the coding scheme were made after comparing interviews. Majority responses for supervisor and delivery agent data were determined by calculating the frequency of a particular code relative to others under themes of intervention content, training and supervision, and intervention delivery.

Data collected from mothers used a mixed-methods approach whereby qualitative data were coded according to a quantitative scheme that was largely based on a previous publication (Affleck and Pelto, 2012) and established by two researchers who were independent of data collection. Data from five interviews were coded independently and then discussed between researchers to

Table 1
Participants, sources of data and data collection procedures.

Participant	*N*	Sources of data	Timeline	Duration (minutes)
Mothers (program recipients)	31	Individual, in-depth interviews	Midline	30 to 40
Peer Educators (program delivery agents)	12	Focus group discussion	Midline	75
NGO Staff (program supervisors)	4	Individual, in-depth interviews	Endline	40 to 50

clarify codes. The remainder of the interviews was coded by one author and a research assistant. We numerically scored variables of session attendance (0 or 1), message recall (0–5), and message enactment (0–5 per message), and calculated the frequency of barriers and facilitators (internal and external) for each of the five practices (kappa = .83). Participant information from baseline was added, such as her age, education, family assets and child's age. Using SAS 9.3, means of each message were statistically compared and we examined correlations between session attendance, message recall, message enactment, barriers and facilitators. Finally, an analysis of variance (ANOVA) was used to determine whether there were differences in reported barriers and facilitators across and within the five practices.

Data from delivery agents and supervisors (together referred to as 'program implementers') were compared to determine similarities and differences in perspectives, and then wherever relevant between program implementers and mothers. Because mothers and delivery agents were interviewed at midline and supervisors were interviewed at endline, we were able to compare findings between these two time-points.

3. Results

3.1. Monitoring the implementation of group sessions and individual home visits

3.1.1. Group sessions

Monitoring forms were completed by the appropriate supervisor for the first half of the twelve sessions. Results showed that common challenges included poor use of materials such as visual aids, a lack of preparation resulting in delivery agents reading the manual, difficulty maintaining the two-hour session time limit and reliance on supervisors to assist them during sessions. All delivery agents were noted to improve over time, the majority by sessions 2 or 3 (10 out of 12 or 83%) and two others by sessions 4 and 5. Improvements included following the Manual and session-specific content, encouraging discussions about barriers and multiple solutions, providing the correct response in question-and-answer discussions, and asking about assigned homework. Each group session hosted an average of 28.6 mothers and fathers ($SD = 6.54$; range 21–37) in which more mothers (18.1) than fathers (10.5) were reported to attend; however attendance was inconsistently recorded. The current study also found that fathers were more likely to attend parent- and father-only sessions where between 18 and 26 attended father-only sessions. Furthermore, many parents were reported to bring their children consistently to relevant child-based sessions. All supervisors reported discussing the form with the implementing delivery agent.

3.1.2. Individual home visits

While home visit forms were completed by both delivery agents and their supervisors, we examined those completed by the supervisor while he/she accompanied their delivery agent. Results showed that mothers remembered most of the messages and were able to enact several but not all. Most reported difficulties providing animal-source foods due to a lack of money. Similarly, pictures or a minimum of four play materials were not commonly observed. In contrast, practices related to love and respect were most frequently reported as helpful for the recipient and his/her family. Feasible strategies, such as having chickens at home to provide eggs or making play materials, were reported among those who enacted the practices. Common observations across all villages included the mother speaking to her child and parents speaking to each other in a loving way, the provision of soap and ash and, less frequently, a latrine. In addition, home visits served as an important opportunity to problem solve with recipients about barriers and to clarify the message content.

3.2. Perspectives of delivery agents and supervisors

Table 2 summarizes barriers and facilitators related to intervention content, training and supervision, and delivery from interviews with implementers. Some themes are described below.

3.2.1. Intervention content

Delivery agents and supervisors reported that all five program messages were important and none should be omitted. At midline, however, the majority response among delivery agents showed that parents had difficulty with the practice of providing their children with animal-source foods. Two out of four supervisors' reported that animal-source foods posed a significant challenge at the beginning of the intervention and these issues were addressed namely through problem-solving with parents during group sessions and individual home visits.

> "*Parents have difficulty with animal foods. We resolve this during group sessions by reminding parents that children can eat the same foods [as parents] or have eggs*." (Delivery Agent, FGD)

> "*The main challenge that I saw was animal source foods—the issue of bringing fish and not being able to afford it on a daily basis. We encouraged them during home visits to give eggs which they managed to do. We also informed them that they could buy smaller fish and not on a daily basis*." (Supervisor 01, IDI)

In contrast, all delivery agents and supervisors reported that the message of 'love and respect' was most endorsed by parents during group sessions and noted during home visits. Both informants said this message was engaging because parents felt it was new but valuable, were taught how to practice the message through role plays, and understood the long-term impact on the child's well-being.

> "*Previously, the husband didn't have much respect for the wife but after attending [the group sessions], they confessed that this was an issue and they worked together to resolve this problem. When we did home visits, fathers said they were happier at home because their child wasn't as sick or fussing*." (Supervisor 03, IDI)

> "*Because [love and respect] is related to the child's health and brain, parents are more encouraged to do it. Also, by practicing [during sessions] through the role plays, they are better able to handle difficult situations*." (Delivery Agent, FGD)

3.3. Training and supervision

3.3.1. Training

Delivery agents and supervisors both reported barriers including too few training sessions, suggesting training be conducted over three to four interspersed weeks rather than two weeks at the beginning and middle of the program. Facilitators to skill acquisition during training included the use of a Manual where detailed lesson plans and activities were provided, as well as the frequent repetition of the five messages and visual aids. In addition, supervisors reported that '*it was helpful to feel like participants*' during training in order to understand parents' perspectives. The training had prepared supervisors to monitor future sessions, namely by being aware of what to observe.

Table 2
Reported barriers and facilitators among delivery agents and supervisors.

Theme	Barriers	Facilitators
Intervention content	• Lack animal source foods • Lack play materials	• Participants enjoy and practice love and respect • See the benefits of participating
Training & supervision	• Too few training sessions • New material and new format of delivery	• Participating as a parent audience during training • Manual outlined exactly what to say and do • Preparing for sessions with supervisor • Systematic supervision with monitoring forms • Discussing issues with peers
Intervention delivery	• Inadequate preparation led to Reading from the manual • Using the right materials for the right sessions • Managing 20–30 members of the group • Organizing activities for a large group	• Provided job aids (e.g., posters, activity booklets) • Role play enhanced enjoyment and practice • Group format enhanced peer interaction • Home visits gave chance to show care and attention to individual families
Perceived participant engagement	• Community events (e.g., funerals) and interruptions • Poor male attendance	• Presence of community leaders • Presence of NGO • Feeling of pride and contribution

"*The Manual was good because it told us exactly what to do in session*." (Delivery Agent, FGD)

3.3.2. Supervision

Supervision was the most frequently reported facilitator across program implementers, and considered essential to help delivery agents learn the intervention content and improve delivery skills. Both groups reported that supervision entailed supervisors attending parenting sessions, providing delivery agents with feedback after the session, and assisting them to prepare for the next one. The monitoring form, in particular, was reported as useful for supervisors to provide session-specific feedback and prevent recurring mistakes. Delivery agents valued practicing the next session in front of their supervisor and clarifying issues about delivery and content.

"*The monitoring form was helpful because it was specific. We could understand the problems in session [delivery] and the supervisors explained how it could be improved. For example, the use of the appropriate materials.*" (Delivery Agent, FGD)

"*The monitoring form reminded us what to look out for during the session*." (Supervisor 02, IDI)

3.3.3. Peer support

Although this was neither a formal nor structured component, discussion among peers was also reported by the majority of delivery agents and all supervisors as an important facilitator in their own skill acquisition. Delivery agents enjoyed talking with each other if they met as a group with their supervisor but generally distances were too far for this to happen often. In contrast, supervisors saw each other regularly and shared an office and previous work history; so it was practical for them to resolve relevant issues together.

"It was useful to meet other peers … attending sessions of other peer educators and getting good peer support." (Delivery Agent, FGD)

"*We discussed tips on how it was going and how to handle challenges … J and I both had problems with the men so we decided to have a community meeting with all of them.*" (Supervisor 03, IDI)

3.3.4. Intervention delivery

Based on program implementers' responses, several primary themes related to intervention delivery emerged including practical barriers, active and interactive learning during group sessions and the perceived benefits of home visits.

3.3.5. Active learning and group processes

All supervisors and delivery agents reported that delivering the intervention was challenging at the beginning. The main barriers here were incorporating the appropriate posters during activities, and being insufficiently prepared to conduct the session without reading the manual. However, by the second or third session, implementers reported that delivery agents were '*increasingly comfortable*' as demonstrated by their ability to deliver the sessions without reading from the manual and by interacting with the entire group of parents. One supervisor noted that two delivery agents (17%) were noted to have continued problems until session 4 and 5. Over time, delivery agents were reinforced by their own experiences in implementing the sessions, emphasizing the importance of self-efficacy among delivery agents.

"*We became comfortable over more sessions but also by preparing for the session in advance*." (Delivery Agent, FGD)

"*They improved in their engagement with the parents, use of manual, using the materials appropriately and planning and timing the session. They observed themselves improving and this was motivating for them*." (Supervisor 04, IDI).

Among the different methods used during the sessions, program implementers attributed importance to role playing with peers and practice with children. Role plays were facilitated by the group format whereby participants could observe, interact and share experiences with each other.

"*Role play was the most effective because people could participate actively and learn from others' suggestions*." (Supervisor 01, IDI)

"*They are stronger as a group, it's not just an educational activity. Parents appreciate that they get to practice the messages with the child. They especially enjoy the role plays. Some women report they enjoy the role plays because it teaches the men indirectly how to act in the home*." (Delivery Agent, FGD)

3.3.6. Home visits

The majority response among implementers suggested that home visits were important because they showed that implementers cared about participating families and wanted to help them resolve problems. Delivery agents expressed that parents '*felt*

special' and appreciated their efforts to resolve issues. Supervisors, who accompanied their delivery agents on several home visits, said they derived useful information concerning parents' interest and enactment of the new practices. All supervisors noticed tangible efforts among parents, such as loving interactions between spouses, soap near the latrine and the provision of home-made play materials for the child. The number of home visits, however, varied between program recipients and ranged from two to four visits over the last four months of the program.

"*Parents appreciate that we care about them and their families … that can assist them to resolve problems such as husbands drinking in the home, animal source foods or providing play materials*." (Delivery Agent, FGD)

"*Home visits gave parents a chance to ask questions that applied specifically to them. A parent also feels that they are taken seriously when they are visited and this added to the credibility of the facilitator*" (Supervisor 02, IDI)

3.3.7. Perceived participant engagement

Another theme related to intervention delivery was implementers' perceived engagement among program recipients. The main barrier was low or irregular father attendance at child-focused sessions in some villages but not all. Male attendance at father- and parent-only sessions, however, was reliable as confirmed by monitoring checklists. Reasons for poor attendance among men included expected incentives such as food or money or because it was assumed that this was a program for mothers only. A community meeting with village leaders took place to overcome male perceptions of the parenting intervention and where men were explained the program's objectives as well as its benefits. Community leaders were also useful in notifying parents about the upcoming session during community meetings.

"*It was difficult to recruit the men at first but eventually they came once they understood the program*." (Delivery Agent, FGD)

"*We saw improved attendance, especially among men by managing their expectations. By putting an emphasis on the family, they understood what they would get from the program and that the skills they learned would help them and their family members*" (Supervisor 04, IDI)

According to delivery agents and supervisors, the presence of NGO staff enhanced the credibility of both the program and delivery agent in the eyes of the community.

"*The presence of the supervisor was very important in the beginning sessions, to keep parents coming to the next session and for parents to have confidence in us*" (Delivery Agent, FGD).

Finally, participant engagement was important for delivery agents because it reportedly motivated the effort they put into delivering the intervention.

"*We feel good to help out communities*." (Delivery Agent, FGD).

3.4. Receipt and enactment by program recipients

The thirty-one mothers were evenly distributed across intervention clusters. On average, they were 28.19 years ($SD = 7.1$) with 4.0 years of education ($SD = 2.9$) and 5.2 mean family assets out of 11($SD = 1.3$). Their target child was 21.51 months ($SD = 6.6$) at baseline. These numbers are similar to the overall sample of the larger trial (Singla et al., 2015). Mothers reported attending an average of 3.39 sessions ($SD = 1.7$) at this point, out of a maximum 5.

Mothers' recall, enactment, barriers and facilitators per practice are summarized in Table 3. Mothers spontaneously remembered an average of 3.87 out of 5 messages (range 0–5). They were most likely to remember practices related to food (93.3% or 29 of 31 mothers) and least likely to remember talk to child (54.8% or 17 participants). Mothers reported to enact a mean of 12.03 component practices out of 25 at midline, with a range of 7–19. Enactment across the five practices showed significant differences, $F(4, 116) = 12.61$, Greenhouse-Geisser, $p < .0001$. Of the five major practices, and similar to perspectives of delivery agents and supervisors, mothers reported greatest enactment of "love and respect" ($M = 3.39$ out of 5). In contrast to delivery agents' and supervisors' reports, mothers were least likely to enact practices related to talk ($M = 1.55$ out of 5), followed by the provision of animal-source foods. However these messages were enacted at endline (Singla et al., 2015).

"*I respect my child by not showing bad examples such as quarrelling between me and my spouse. I also show him love always by spending time with my child*." (Mother)

"*I show respect to myself and love to myself first, and by doing, I'm able to show the same love and respect to others*." (Mother)

We also asked mothers about the barriers and facilitators they encountered to enact each practice. Mothers reported an average of 5.13 barriers (range 0–10) and 6.78 facilitators (range 2–14). Similar to responses from program implementers, the most number of barriers were reported for messages related to diet the provision of animal-source foods and the most number of facilitators related to the message of love and respect. The number of barriers and facilitators, combined, across practices was not significant, $F(4, 116) = 2.40$, Greenhouse-Geisser $p = .07$. There was a significantly higher number of facilitators than barriers reported, $F(1, 29) = 9.58$, $p = .004$. However, the difference was qualified by a significant interaction between practices and barriers/facilitators, $F(4, 116) = 4.11$, Greenhouse-Geisser $p = .007$; there was higher number of facilitators over barriers reported for love and respect, and the opposite for feeding.

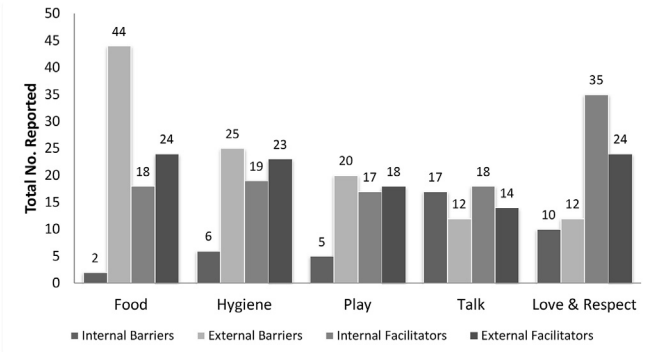
Unlike program implementers, we also examined mothers' reported internal and external barriers and facilitators (Fig. 2). External barriers (e.g., money, time) were higher than internal barriers concerning feeding, hygiene and play, whereas internal barriers were higher for talk and love (e.g., the inability to talk while working) than external barriers. Internal facilitators for love and respect (e.g., the willingness and motivation to show love towards the child) were highest of all five practices, while external facilitators (e.g., other family members) were reported similarly across all five practices.

Pearson correlations (r) examined whether greater enactment was associated with message recall, program attendance, barriers and facilitators (Table 4). Message enactment was not significantly related to message recall but was positively related to program attendance ($r = .367$, $p = .042$). Second, facilitators, but not barriers, were related to program attendance ($r = .407$, $p = .023$). There was a positive correlation between the enactment and number of facilitators of talk ($r = .426$, $p = .02$), and the enactment and facilitators of play ($r = .338$, $p = .06$). Barriers were not correlated positively or negatively with the enactment of specific practices (data not shown).

Table 3
Message recall, enactment, barriers and facilitators per practice ($N = 31$).

	Message recall, *n* (%)	Message enactment	Barriers[a]	Facilitators[a]
Practice				
Diet	29 (93.5%)	2.32 (1.1)	1.48 (.9)	1.35 (1.2)
Hygiene	24 (77.4%)	2.52 (1.2)	1.19 (1.0)	1.35 (1.2)
Play	23 (74.2%)	2.26 (1.0)	.81 (.7)	1.13 (.9)
Talk	17 (54.8%)	1.55 (1.1)	.94 (.9)	1.03 (1.1)
Love & respect	27 (87.1%)	3.39 (1.1)	.71 (.9)	1.90 (1.6)
Total, *M* (*SD*)	3.87 (1.1)	12.03 (2.8)	5.12 (2.4)	6.78 (3.0)

Note. Table entries are raw means (*SD*) unless otherwise indicated.
[a] Barriers and facilitators related to message enactment, as reported by program recipients.



†Internal and external barriers and facilitators per practice related to message enactment.

Fig. 2. Total number of reported internal and external barriers and facilitators per practice by program recipients.

4. Discussion

The current study examined the implementation strategies of an effective, integrated community-based parenting program in rural Uganda. The findings are presented using both the logic model and Bellg's (2004) framework, covering five important components of the implementation: intervention content, training and supervision, intervention delivery, and mothers' recall and enactment of practices. Primary findings demonstrated benefits of combining maternal and child-focused messages; role playing different perspectives (e.g., delivery agent and recipient) during training; the added value of structured supervision by monitoring and receiving feedback about essential components of the manual; and delivering both group and individual sessions with the help of role plays, practice, and problem solving. Barriers were reported for some messages, in initially managing a large group, and father attendance. Observations of group sessions and home visits corroborated with reports from program recipients, and highlighted that the program was largely implemented as intended. The implications of several key findings are discussed next.

4.1. Benefits of incorporating maternal mental health into parenting programs

All five messages were perceived as important; however, love and respect was reported by implementers to be most appealing and by mothers to be most frequently enacted. Implementers noticed that this message was more popular and practiced because it was easy to enact by mothers and fathers and led to immediate and positive changes at home. For example, husbands reportedly learned to communicate verbally with their wives and mothers reported experiencing 'less tension' in their home. These results are important in settings with high rates of maternal depressive symptoms (Fisher et al., 2012) and confirm that integrated programs can address the interwoven needs of both mother and child. This message also encouraged fathers to become involved in child care, improved communication between partners, and enhanced support within families, as noted elsewhere (Britto et al., 2013; Rahman et al., 2008). Similarly, the mothers' data showed that message enactment and facilitators were highest for love and respect. Few parenting programs have explicitly targeted maternal psychological well-being. However, given the popularity of messages and practices related to interpersonal relationships, the introduction of maternal mental health at the beginning of a parenting program may be a good entry point.

4.2. Benefits of an implementation manual and structured feedback

Both supervisors and delivery agents reported benefits of a manual specifying intervention content and instruction on what to say and do. The manual differed from other parenting programs, claiming to be active and participatory (e.g., Aboud, 2007), by ensuring that all parents participated simultaneously during practice and role-play activities; recognizing that barriers to enactment inhibit change; allowing accurate information to overrule inaccurate beliefs; and specific lesson plans. In addition, provision of structured feedback on a 15-item monitoring form and assistance in the preparation for the following session added value beyond basic training by improving intervention delivery. Similar to other studies, we found that supervision and monitoring forms improved fidelity to the program (Michie et al., 2013; Moran et al., 2014), and acted as a means of continued training and support (Dynes et al., 2011). Despite the commonly-reported request for more training by program delivery agents, our results showed that it was on-the-job training and supervision that probably made a difference. In sum, the detailed manual and structured monitoring forms were important training features for our inexperienced peer delivery

Table 4
Correlation coefficients between message recall, enactment, program attendance, barriers and facilitators among program recipients (N = 31).

	Message recall	Message enactment	Program Attendance	Barriers[a]
Message enactment	.217 (.242)			
Program attendance	.164 (.377)	.367 (.042)		
Barriers[a]	−.151 (.418)	.185 (.319)	.004 (.984)	
Facilitators[a]	−.214 (.248)	.021 (.912)	.407 (.023)	.424 (.018)

[a] Barriers and facilitators related to message enactment, as reported by program recipients.

agents who lacked knowledge about program topics.

4.3. Benefits of active and interactive techniques

Role plays of spousal communication, practice with a child, and problem solving were new to program implementers and recipients. They have been used successfully before to change feeding and stimulating care (Aboud and Akhter, 2011) and to strengthen interpersonal relationships (Bolton et al., 2007; Gao et al., 2010), but were extended here through the message on love and respect. Implementers remarked on how parents appreciated these forms of social learning because it was memorable and entertaining. Without overtly discussing domestic violence or child protection in the home, parents were gaining practice in how to resolve their own conflicts and they saw immediate benefits. There were advantages to both group sessions and individual home visits. Home visits made parents feel like they were receiving special attention, that someone sincerely wanted to help them improve their situation. Groups provided the opportunity for social learning and support, by observing others' practice, exploring solutions and receiving feedback from peers. Finally, only program attendance was related to message enactment, and also to total facilitators—highlighting the importance of social learning to facilitate behaviour change. Barriers were less important, given despite a practice being reported as difficult to enact, the larger trial demonstrated that the intervention had significant effects on all five practices.

4.4. Strengths and limitations

The research design of the current study has several strengths. First, perspectives of three important participants were included, namely delivery agents, their supervisors and mothers, to create a broad picture of program implementation. Similar majority responses between delivery agents and supervisors highlighted the consistency across program implementers' responses and there was added value of interviewing mothers alongside program implementers to determine parents' experiences with specific internal and external barriers and facilitators. Second, we used both quantitative methods and qualitative methods. Third, we applied the logic model and Bellg's (2004) five-component fidelity framework to organize the data and the constructs of barriers and facilitators from Bandura's (1986) social-cognitive learning theory were used to inform to analyze the data. Use of these theoretical frameworks improves the generalisability of the findings (Bonetti et al., 2005). Fourth, while formative research would be required to assess generalisablity to other contexts, certain components of the current program such as feedback and monitoring, problem-solving, skill-building and peer support, are common and likely generalisable. Finally, the use of social-cognitive learning theory (Bandura, 1986) to inform program development allowed seamless integration of parenting and maternal mental health messages by using similar active-interactive techniques for behaviour change.

Despite these strengths, the current study has its limitations. First, we did not measure how recipients (mothers and fathers) perceived delivery agents. For example, male and female delivery agents may have been perceived differently, especially with respect to qualities such as empathy and credibility. These common skills affect the therapeutic alliance between the program recipient and delivery agent, a well-known determinant of psychological treatment success (Klein et al., 2003). Second, we assessed each group of participants at only one time point, did not interview fathers or community leaders, or monitor parental responses during sessions. Interviewing fathers may have provided further insight into the popularity of 'love and respect' and may have indicated a specific role for strengthening family relationships and the actual extent of father involvement in the intervention. Third, with the exception of asking implementers perspectives', we did not evaluate the impact of training and supervision, mothers' reasons for participation or delivery agents' motivations to implement the intervention. This would help to understand whether the demand and supply side of the program is sustainable or whether participation and implementation occurred because parents and delivery agents were mobilized by the NGO and community leaders. Finally, there are mixed views about using volunteers to deliver health services within communities, including concerns about exploiting community members (Maes, 2012). Future studies may wish consider these questions from multiple stakeholder perspectives in order to inform the sustainable delivery of integrative mother-child interventions.

In conclusion, our study adds to the current literature on implementation science of one effective integrated intervention that targeted both child development and maternal psychological well-being. We applied a systematic process examining barriers and facilitators to understanding underlying implementation processes to help understand why this program was successful and found room for improvement. Specifically, we highlight the benefits of incorporating factors of maternal psychological well-being into a child psychosocial stimulation program and as well as the role of social-cognitive learning theory to inform and examine key processes related to intervention content, training and supervision as well as intervention delivery.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.socscimed.2015.10.069.

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