

The BEM Program: An innovative online parenting program for socioeconomically disadvantaged caregiver–child dyads in Brazil

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Katherine Solís-Cordero¹ , Patricia Marinho², Patricia Camargo²,
Silvia Takey², Rogério Lerner³ and Elizabeth Fujimori¹

Abstract

Objective: To describe the BEM Program, an innovative online parenting program for socioeconomically disadvantaged caregiver–child dyads in Brazil.

Methods: The Template for Intervention Description and Replication checklist was used to describe the BEM Program in detail.

Results: The BEM Program (an acronym for *Brincar Ensina Mudar* in Portuguese, “Play Teaches Change” in English) refers to the change in adult, child, and dyad outcomes that can be observed through incorporating playful interactions between the caregiver and their child into their daily household chores. Content consisting of 8 videos and 40 text and audio messages was sent entirely online through WhatsApp®. Thus, the Program could be accessed wherever caregivers wanted, if they had their smartphone and Internet access.

Conclusions: The detailed description of an innovative online parenting program focused on caregiver–child interaction and child development contributes to the scarce evidence on this type of programs. Adherence to the program continues to represent one of the main challenges to overcome.

Keywords

Child development, digital health, Internet-based intervention, parent–child interactions, TIDieR

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Introduction

Healthy development is a fundamental right of every child. However, one-third of all preschool-aged children in low- and middle-income countries are at risk of not meeting the basic cognitive and socioemotional skills.¹ Poverty-related risk factors such as poor caregiver–child interactions and inadequate stimulation in the home are associated with deficient early childhood development outcomes.²

Nonetheless, a large body of evidence has shown that, despite the adverse conditions in which a child may live, responsive caregiving and nurturing environments with good-quality caregiver–child interactions and adequate stimulation are crucial protective factors for promoting

optimal early childhood development.^{3,4} Parenting programs increase parents and caregiver’s ability to better care for their children with a positive impact on children’s wellbeing and in the acquisition of language, cognitive skills, and socioemotional competencies.⁵ Consequently,

¹School of Nursing, University of São Paulo, São Paulo, Brazil

²Tempo Junto, São Paulo, Brazil

³Psychology Institute, University of São Paulo, São Paulo, Brazil

Corresponding author:

Katherine Solís-Cordero, School of Nursing School, University of São Paulo, Avenida Doutor Ernêas de Carvalho Aguiar, 419, 05403-000 São Paulo, Brazil.

Email: katherine.soliscordero@ucr.ac.cr



over the past decades, there has been significant growth in parenting programs in low- and middle-income countries.⁶

Specifically, parenting programs involving early developmentally appropriate play or stimulation activities between the caregivers and their young children are suitable opportunities to improve early childhood development outcomes by enhancing the caregiver–child interaction.^{7,8} Meta-analyses of parenting programs that promoted direct opportunities for caregivers to interact with their children revealed a moderate effect size on mother–child interactions.^{9,10} Likewise, other meta-analyses have shown consistent evidence that parenting programs focused on strengthening caregiver–child interaction through play had a small-to-medium effect size on the children’s cognitive, language, motor, and socioemotional development.^{9,11}

Despite the large body of research on parenting program outcomes, there are still important gaps related to the implementation features of the programs that will lead to the best outcomes for adults, children, and caregiver–child dyads.^{9,12} Substantial diversity has been highlighted in terms of implementation characteristics of parenting programs such as content, mode of delivery, delivery agents, dosage, and duration. These implementation characteristics of a program significantly influence its potential results.⁵

Regarding the mode of delivery, parenting programs have traditionally been delivered through face-to-face strategies such as home visits, group of parents, and clinic appointments.⁹ Technology-based parenting interventions have improved parenting outcomes such as parent knowledge, behavior, and self-efficacy.¹³ Nonetheless, online interventions focusing on caregiver–child interaction and child development outcomes are scarce.^{9,14} Although parenting programs delivered using technology such as computer programs, cell phones, or websites are a viable option to overcome the challenges of face-to-face interventions, especially those related to attrition,¹³ availability of the programs alone does not guarantee positive results, as these depend directly on the participation of the target population.¹⁵

The BEM Program (*Brincar Ensina Mudar* in Portuguese, “Play Teaches Change” in English) was created as an online innovative intervention delivered through WhatsApp, which teaches socioeconomically disadvantaged caregivers to incorporate playful activities into their daily household chores, in order to address the gap toward the limited knowledge about the effect of online parenting programs on caregiver–child interaction and child development. A randomized controlled trial conducted to assess the effects of the BEM Program showed that it improved language development and the quality of caregiver–child interaction in socioeconomically disadvantaged caregiver–child dyads.¹⁶ Therefore, the objective of this article is to describe the BEM Program, an innovative online parenting program for socioeconomically disadvantaged caregiver–child dyads in Brazil.

Methods

We used the Template for Intervention Description and Replication (TIDieR) checklist¹⁷ to describe the BEM Program. We chose the TIDieR checklist because it provides a clear structure for describing important aspects of interventions such as why, how, when, and where; therefore, it was considered the most appropriate way to meet the objective of this article.

The TIDieR checklist and guide were created by an international group of experts in response to the poor-quality description of interventions in publications due to the researchers’ lack of awareness to report interventions in detail and to the little guidance from journals about how to report interventions.¹⁷ The TIDieR checklist is an extension of item 5 from the Consolidated Standards of Reporting Trials (CONSORT) 2010 that request a description of the intervention with sufficient details.¹⁷ The checklist includes 12 items that allow the intervention to be described in terms of its name, justification to develop the intervention and theoretical framework, content of the intervention, how it was delivered, who the intervention provider was, when, and where it was delivered, the number of sessions the intervention was delivered in, if the intervention was personalized, if any modifications were made, if adherence was assessed, and the extent to which the intervention was delivered as planned. These items are described in Table 1.

Results

Brief name (item 1)

The name of the intervention is BEM Program. BEM is an acronym for *Brincar Ensina Mudar* in Portuguese, which in English is “Play Teaches Change.” This name of the intervention refers to the change in adult, child, and dyad outcomes that can be observed through incorporating playful interactions between the caregivers and their children into their daily household chores.

Why (item 2)

In São Paulo, Brazil, a significant number of socioeconomically disadvantaged children under the age of 3 stay at home with a female caregiver due to lack of sufficient day-care centers to care for the entire child population of the state.¹⁸ A qualitative study conducted by some of the authors of this manuscript that collected data through home visits and interviews with the participants showed that, although the caregivers were attentive to health and hygiene aspects, they did not provide an environment that promoted early childhood development. The caregivers had little or no information about child development and the importance of playing in early childhood and were

Table 1. Items included in the Template for Intervention Description and Replication (TIDieR) checklist.¹⁷

Item number	Item
Brief name	
1	Provide the name or a phrase that describes the intervention
Why	
2	Describe any rationale, theory, or goal of the elements essential to the intervention
What	
3	Materials: Describe any physical or informational materials used in the intervention, including those provided to the participants or used in intervention delivery or in training of intervention providers. Provide information on where the materials can be accessed (such as online appendix, URL)
4	Procedures: Describe each of the procedures, activities and/or processes used in the intervention, including any enabling or support activities
Who provided	
5	For each category of intervention provider (such as psychologist or nursing assistant), describe their expertise, background and any specific training given
How	
6	Describe the modes of delivery (such as face-to-face or by means of some other mechanism, such as Internet or telephone) of the intervention and whether it was provided individually or in a group
Where	
7	Describe the type(s) of location(s) where the intervention occurred, including any necessary infrastructure or relevant features
When and how much	
8	Describe the number of times the intervention was delivered and over what period of time including number of sessions, their schedule and their duration, intensity or dose
Tailoring	
9	If the intervention was planned to be personalized, titrated, or adapted, then describe what, why, when, and how
Modifications	
10	If the intervention was modified during the course of the study, describe the changes (what, why, when, and how)
How well	
11	Planned: If intervention adherence or fidelity was assessed, describe how and by whom, and if any strategies were used to maintain or improve fidelity, describe them
12	Actual: If intervention adherence or fidelity was assessed, describe the extent to which the intervention was delivered as planned

tired of taking care of children while doing household chores. Thus, a topic in which the caregivers agreed in their answers was their interest in learning about child development and how to stimulate it. Finally, another important characteristic that was observed was that this group of caregivers had access to a smartphone and the Internet, and enjoy using their smartphones, despite their socioeconomic situation. As a consequence, we created the BEM Program to respond to a need of the caregivers, under the hypothesis that an innovative online parenting program that enhances caregiver–child interaction through playful activities can improve child development.

Additionally, creation of the BEM Program aligns with the Nurturing Care for Early Childhood Development Framework of the World Health Organization.¹⁹ This framework encourages the creation and implementation of interventions that promote early childhood through opportunities for early learning and responsive caregiving, the two components of nurturing care that can be addressed by a parenting program such as the BEM Program. More details about the Nurturing Care for Early Childhood Development Framework and the BEM Program can be found elsewhere.¹⁶

What (items 3 and 4)

Materials. The BEM Program consisted of eight videos sent through WhatsApp®, which taught socioeconomically disadvantaged female caregivers how to play with their children during the daily household chores, using resources available at home. The videos are divided into four modules, each one focused on a prominent and frequent household chore of the caregiver's daily routine: (1) while she cooks or washes the dishes, (2) while she washes clothes, (3) while she cleans the house, and (4) while she takes care of the child. Moreover, 40 text and audio messages complemented the content of the video lessons by providing additional information on child development and caregiver–child interaction improvement.

The content of the BEM Program was adapted to the children's age group (from 12–23 months old), and considered four premises: (1) all the information, activities, and tips had to be based on scientific evidence; (2) use of simple language, adapted to the schooling level; (3) use of colloquial tone with emojis; (4) every message should have an audio version for those who had difficulty reading (Supplemental materials 1 and 2 describe the content of the BEM Program videos and messages).

The program was delivered online through WhatsApp® and was developed for use on smartphones. WhatsApp® is an instant messaging mobile app that allows sending and receiving messages, calls, photographs, videos, documents, and voice messages. It is free, with no subscription fees; it is only necessary to use an Internet connection on the cell phone.²⁰ We chose to deliver the intervention via WhatsApp® because it is widely used in Brazil: the application is installed on 99% of smartphones in operation in Brazil.²¹

As the participants needed Internet access and a smartphone to receive the intervention, this was part of the inclusion criteria to participate. According to a study carried out by the Inter-American Development Bank (IDB), Brazilian mobile Internet access via cell phones reached 95% of the population in 2021.²² In addition, another study showed that smartphones and other mobile devices are the most common means to access the Internet (99%); specifically, 90% of people from the most disadvantaged groups access the Internet exclusively via cell phones, while in the most privileged group, only 11%.²³

In addition, we used Wistia®, a video hosting platform that allowed us to measure the participants' adherence to the program through two main indicators: which videos were watched by each user and how many minutes were watched per video. Every user had to provide their name and email address in order to access the videos. Although there were few cases, if the participant did not have an email account, we provided one for her.

Procedures. It is worth noting that the implementation of the BEM Program occurred during the development of the randomized controlled trial to evaluate its effect.¹⁶ Thus, the caregiver–child dyads who participated in the study were recruited at 14 day-care centers located in a socioeconomically disadvantaged district from the city of São Paulo, Brazil. All female caregivers of children aged between 11 and 23 months old at recruitment were invited to participate during a face-to-face meeting at each day-care center. Recruitment materials were also sent home with the children and delivered to the parents via mobile messaging. Once a caregiver showed interest in participating in the research, data was collected to confirm the inclusion criteria and their participation in the study. Subsequently, the week before the program was officially initiated, the participants received a message and a video informing that the program would start the following week and the directions to access the videos through the Wistia® platform.

Who provided (item 5)

The BEM Program team consisted of two social communicators, two psychologists, two nurses, and a specialist in technology. One psychologist was responsible for sending the messages and, with the support of one of the nurses, was in charge of keeping contact with the families from recruitment to the end of the intervention.

How (item 6)

The program was delivered entirely online via WhatsApp® for the caregivers. Regarding the videos, once a week we sent a message that included a link to watch the video hosted on the Wistia® platform, where after including

their email address, the caregivers could access the video of the week. Daily audios and messages were directly listened to and read on WhatsApp®. Telephone support or WhatsApp® messages were available for technical problems, such as difficulties accessing the videos through Wistia®, or any other concern that the caregivers had.

Where (item 7)

As the program was online, it could be accessed wherever the caregivers wanted, if they had their smartphone and Internet access. The BEM Program team was based in São Paulo and provided support to the participants via telephone or WhatsApp®. Thus, they could be anywhere if they had Internet access.

When and how much (item 8)

To conduct the research to assess the effects of the BEM Program on child development, the complete program was delivered in two cohorts. The first one received the 8-week program between October and November 2019 and the second, in April and May 2020, during the COVID-19 pandemic.²⁴

The eight weekly videos were sent out on Saturday morning and the 40 daily messages and audios were sent every day at 9:00pm. The videos were approximately 5 min long and the audios, 1 min. After the 8 weeks of the program were completed, the videos were available on Wistia® for another 2 weeks. During this period, the caregivers could access the content of the program whenever they preferred. Our data showed that more than 50% of the participants watched the video within 72 h of receiving it.

Tailoring (item 9)

Originally, the content of the BEM Program was sent according to a schedule without considering specific characteristics of the participants or their adherence profile. In the next item (Modifications), we better explain how personalization was necessary to improve the caregivers' adherence to the intervention.

Modifications (item 10)

The changes made to the intervention were necessary to improve the caregivers' adherence to the program. After interviewing 12 caregivers who withdrew from the program by telephone, we classified the most common reasons for dropping out the intervention, based on the literature, on three particular issues of remote delivery characteristics that could lead to nonadherence to the program: (1) lack of relationship-building between those who delivered the intervention and the participants, (2) sending content

according to schedule, without considering feedback from the participants or customizing messages based on their adherence profile, and (3) lack of incentives to encourage participation.

In relation to the first issue, the lack of relationship-building between those who delivered the intervention and the participants, it is well-documented that participants with better relationships with those who delivered the intervention were more likely to have higher rates of program involvement and to complete the program. Hence, we recognized that, for successfully implementing the BEM Program, it was necessary to implement two-way communication between the BEM Program team and the participants and that, even though the program was online, it was possible to build a relationship with the caregivers. To achieve this goal, we created two flowcharts to guide the psychologist of the BEM Program team responsible for the contacts with the families on how to interact with the caregivers.

One flowchart aimed at recovering the participants who did not watch the first or second video or who stopped watching the videos for a week. This flowchart also included a script with answers to the main reasons given by the caregivers for why they stopped watching the videos or dropped out of the program, including lack of time, having deleted the link to access the video, forgetting to watch the video or loss of interest, among others. The second flowchart aimed at improving interaction with the adhered participants. It addressed aspects such as how the children and family were, difficulties accessing the videos, preferred playful activities, experiences on incorporating the playful activities during daily household chores and request for photographs of caregivers interacting with their child, among others.

Along with the importance of building a relationship, we recognized the relevance of the interaction with the participants to determine their adherence profiles for customizing the frequency of the messages. Caregivers who adhered to the program may be more likely to watch the videos, listen to the audios and read the messages as soon as they received them, while nonadhered caregivers may have difficulty accessing the information in a timely manner. Consequently, the messages accumulated to the point that it was no longer possible to follow the intervention, then the caregivers dropped out of the program.

To customize delivery of the messages, we first determined the adherence profiles according to the subjects' participation and specific needs and then we created a flowchart to be followed depending on each adherence profile. For those caregivers who adhered to the program, delivery of the messages continued as originally planned. On the other hand, caregivers who did not adhere to the program received specific messages that would let the BEM Program team know the difficulties the caregivers had in adhering to the program, as well as messages

reinforcing their participation. Therefore, for a new implementation of the BEM Program, it is necessary to monitor the participants' adherence to the program in order to send the messages according to their needs.

In terms of incentives to encourage participation, we identified that the caregivers needed another motivation in addition to the potential effects that the program might have on their children's development. In Brazil, according to the guidelines of the ethical boards, it is prohibited to grant any monetary incentive to research participants. Thus, we encouraged caregivers' participation by making the interaction more fun through gaming aspects such as a reward "badge" system. Furthermore, we created the "Mom who plays Diploma" for those caregivers who watched 50% or more of the videos by the end of the program. Finally, as already mentioned, those caregivers who adhered to the program and were interested in receiving more videos received the other eight bonus videos that were not officially delivered as part of the BEM Program.

How well (items 11 and 12)

Adherence to the program was assessed through the number of videos that were watched by each caregiver and how many minutes were watched per video. Using this information, we classified the caregivers' adherence as follows: (1) adhered caregivers who watched four or more videos, and (2) nonadhered caregivers who watched fewer than four videos. We obtained this data through the Wistia® Platform database. Additionally, it was possible to determine the time that the caregivers spent watching the video.

As reported elsewhere, our findings show low adherence to the program among the caregivers.¹⁶ On average, they watched 3.4 out of 8 videos. However, the time that the caregivers spent watching each video was high: it ranged from 70% to 92% per video. Caregivers with a higher mean of years of study were more likely to adhere to the program.¹⁶

Regarding the messages, 89% of the caregivers received and saw the messages. We determined this data by confirming the two blue ticks that appear on a WhatsApp® message if it is delivered and seen by a caregiver. Nonetheless, we cannot guarantee that the message was effectively read due to lack of indicators that could measure this. In this sense, if we wanted to evaluate the effect of the messages specifically, we should define a better way to measure whether the caregivers read the messages or not, or separate the intervention to send only messages and no videos. Finally, it is worth noting that, when interviewing the caregivers to assess the quality of the program, 83% of them recognized that both the messages and the videos were important and should be maintained in the program, as both are complementary.

In relation to fidelity, we included BEM Program team members into the cohorts who received the intervention, in order to confirm that the participants were receiving the

videos, audios, and messages according to the planned schedule.

Discussion

There is absence of detailed descriptions of interventions; only 39% of nonpharmacological randomized clinical trials adequately describe the interventions assessed.²⁵ Therefore, this article aims at describing the BEM Program, an innovative online parenting program for socioeconomically disadvantaged caregiver-child dyads in Brazil. The TIDieR checklist was a useful tool that provided us with a clear guide and structure to better describe the BEM Program in detail.

Descriptions of interventions are important because they allow researchers to replicate and build upon existing knowledge.¹⁷ Thus, the comprehensive description of an innovative completely online parenting program using WhatsApp® addresses some of the gaps in the literature regarding the characteristics of online interventions, as well as the main aspects that should be considered when delivering remotely programs in order to overcome the major challenge of keeping caregivers adhered to the program.

The BEM Program contributes to the scarce evidence about online parenting programs focused on caregiver-child interaction and child development outcomes. The Program could be incorporated into childcare public policies to reach a larger number of families, either as an alternative or to complement face-to-face interventions. Parenting programs delivered using technology are a viable option to overcome the challenges inherent to face-to-face interventions, especially those related to attrition.¹³ In our case, the implementation of the BEM Program, an entirely remote intervention using the Internet, allowed the participants to access the information whenever and wherever it was convenient for them. This situation allowed us not only to overcome the challenges of face-to-face interventions, but also to maintain continuity of the Program, even during the home confinement and social distancing measures due to the COVID-19 pandemic. Nonetheless, we faced specific remote delivery issues that were directly affecting adherence to the program.

Diverse evidence shows that the longer participants adhere to interventions, the better the results.^{26,27} However, it has been well-documented that adherence to interventions is the most common challenge throughout parenting programs,²⁷⁻³⁰ and that socioeconomically disadvantaged participants are less likely to adhere to such programs.^{29,31}

We identified the importance of building a relationship with the participants and to customize delivery of the messages according to their specific characteristics and needs as a fundamental issue that might improve adherence to the program. In fact, the provider's ability to respond to the participants' needs and to build a relationship with them was previously highlighted as fundamental to positively influence adherence to the program.^{27,31-33} In this sense, for a

future implementation of the BEM Program it is essential that, in addition to using the flowcharts and scripts created to interact with caregivers, providers should be well trained in the importance of and on how to build a relationship with the participants. In an online format, such as the BEM Program, the incorporation of tutors responsible for monitoring a specific number of families and maintaining two-way communication between the BEM Program and the participants would be a viable option, which should be investigated in future research studies.

It is worth highlighting that the participants who recognize the importance of the program and the potential benefits it could have for their children and family are more likely to watch the videos and read the messages. Socioeconomically disadvantaged caregivers are less likely to recognize the benefits of participating in parenting programs³⁴; therefore, they may need some extrinsic motivation to encourage their participation and adherence to the program.

Mytton et al. (2014) identified that providing additional incentives to participants such as money and transportation was a facilitator for adherence and to retain the participants in the program.²⁸ As we were not allowed to provide such kind of incentives, gamification, and awards were the feasible option to motivate the caregivers. A previous study assessing an intervention that incorporated gaming features showed that parents found it useful to enhance their motivation.³⁵ The “Mom who plays Diploma” for adhered caregivers to the BEM Program was a source of pride for them because, in addition to representing that they achieved a goal, the diploma reflected their interest in taking better care of their children. Nonetheless, we recognize that gamification and awards might not strengthen engagement in cases when very disadvantaged families struggle to engage because they first need to meet their family’s basic needs (e.g. food, shelter, and security).

Even though our objective was to detail the intervention as much as possible, one limitation is that we were not able to include the complete content due to copyright issues.

Conclusions

The detailed description of an innovative online parenting program focused on caregiver–child interaction and child development contributes to the scarce evidence on this type of programs, and allows researchers, practitioners, and stakeholders to learn from previous implementation experiences and replicate them. Adherence to the program continues to represent one of the main challenges to overcome.

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approval, patient recruitment, and data analysis. KSC, PC, and EF wrote the first draft of the manuscript. All authors reviewed and edited the manuscript and approved its final version.

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ORCID iD: Katherine Solís-Cordero  <https://orcid.org/0000-0002-6012-0245>

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