

Effectiveness of different health delivery agents of parenting stimulation interventions on child development outcomes among children aged 0 to 36 months: a systematic review protocol

Katherine Solís-Cordero^{1,2} • Luciane Simões Duarte³ • Joshua Jeong⁴ • Elizabeth Fujimori¹

¹School of Nursing, University of São Paulo, São Paulo, Brazil, ²Costa Rican Evidence-Based Nursing Research Collaboration Program (CIEBE-CR): A JBI Affiliated Group, San José, Costa Rica, ³Chronic Noncommunicable Diseases Division, Disease Control Coordination, São Paulo State Health Department, São Paulo, Brazil, and ⁴Department of Global Health and Population, Harvard T.H. Chan School of Public Health, Harvard University, Boston, MA, USA

ABSTRACT

Objective: This review will evaluate the effectiveness of different health delivery agents of parenting stimulation interventions versus usual care, no intervention, or a different type of delivery agent on child development outcomes among children aged 0 to 36 months.

Introduction: Stimulation interventions vary in terms of implementation. While some interventions are delivered by professionals, most are delivered by non-professionals. Several prior systematic reviews on this topic have been conducted; however, no known study has evaluated the effectiveness of stimulation interventions on child development by type of delivery agent.

Inclusion criteria: This review will consider randomized controlled trials assessing parenting stimulation interventions delivered by different health delivery agents. These will be compared to usual care, no intervention, or a different delivery agent, targeted at caregiver-child dyads of children aged 0 to 36 months. The outcomes will include motor, language, cognitive, and socio-emotional development. The review will exclude studies including children with specific characteristics, interventions that do not focus on parenting, and protocols of randomized clinical trials.

Methods: The review will include both published and unpublished studies. The key information sources to be searched are: MEDLINE, APA (PsycNet), Embase, Scopus, Web of Science Core Collection, CINAHL, VHL Regional Portal, Google Scholar, Science Direct, Theses Canada Portal, and Library and Archives Canada. Studies in English, Spanish, and Portuguese will be included. Critical appraisal and data extraction will be conducted using standardized tools. Quantitative data, where possible, will be pooled in statistical meta-analysis, or if statistical pooling is not possible, the findings will be reported narratively.

Systematic review registration number: PROSPERO CRD42021245245

Keywords: child development; delivery agents; parent-child relations; parenting; stimulation

JBI Evid Synth 2022; 20(3):874–881.

Introduction

A large body of evidence has confirmed the importance of early experiences during the first three years of life in shaping the brain architecture, with lifelong consequences on health and development.^{1,2} In particular, the environment and the quality of the interactions between the child and their primary caregiver are primary factors affecting

child development.^{1,3–4} In this regard, stimulating interactions, through which the child has early opportunities to learn, play, talk, and observe what their caregivers do in daily routines of life, provide ideal environments for safe interactions, and promote healthy child development.⁵

However, 43% of children under five years in low- and middle-income countries (LMIC) are at risk of not achieving their developmental potential as a consequence of poverty, malnutrition, and inadequate stimulation.⁶ To address these risks and enrich the quality of home environments, parenting programs

Correspondence: Katherine Solís-Cordero, katherine.solis22@usp.br

The authors declare no conflict of interest.

DOI: 10.11124/JBIES-21-00147

including stimulation interventions have been successfully implemented with families of young children in LMICs.⁷ Stimulation interventions aim to increase caregiver engagement in learning and play activities with their children. These interventions have shown consistent evidence for improving caregiver-child interactions and various child development outcomes.⁸ Yet, substantial variation has been highlighted in terms of implementation features, such as content, mode of delivery, delivery agents, dosage, and duration.

Specifically, with regards to delivery agents, a prior review described how the majority of parenting interventions in LMICs have been delivered by health para-professionals (eg, community health workers) and non-professionals (eg, community volunteers).⁹ Stimulation interventions delivered by health para-professionals have demonstrated positive effects on early child development outcomes. For example, in Pakistan, a responsive stimulation intervention delivered by female community health workers through home visits and community group meetings benefited early child cognitive, language, and motor development at 12 and 24 months of age, and social-emotional development at 12 months of age.¹⁰ Several parenting stimulation interventions have been delivered by non-professionals. For example, in Colombia, home visitors selected from community mother leaders delivered a psychosocial stimulation program with positive impact on cognitive and language development.¹¹ Further, in Uganda, a 12-group session parenting intervention delivered by non-professional community members showed higher scores in cognitive and language development in children who received the intervention.¹²

Some interventions have been delivered by health professionals, with mixed findings on child development. In Brazil, a home visiting program delivered by nurses showed significant positive effects on child expressive language development.¹³ However, two other nurse-delivered home visiting programs in Australia and Germany resulted in no significant differences in child development.^{14,15}

Despite the numerous systematic reviews confirming the effectiveness of parenting stimulation interventions on child development,^{8,9,16,17} none have evaluated the effectiveness of parenting stimulation interventions on child development according to the delivery agent. Therefore, the proposed review will address the gaps in the knowledge about the effectiveness of using different types of health delivery

agents of parenting stimulation interventions compared with usual care, no intervention, or a different type of delivery agent. This evidence may be useful for stakeholders in scaling up parenting programs, mainly in LMICs, where there are limited resources for such programs, and para-professionals and non-professionals might represent a suitable option to deliver interventions.

A preliminary search of PROSPERO, MEDLINE, the Cochrane Database of Systematic Reviews, and *JBI Evidence Synthesis* was conducted, and no current or in-progress systematic reviews on the topic were identified. The objective of this review is to determine the effectiveness of different health delivery agents of parenting stimulation interventions versus usual care, no intervention, or a different type of delivery agent on child development outcomes among children aged 0 to 36 months.

Review questions

What is the effectiveness of different health delivery agents of parenting stimulation interventions on child development outcomes among children aged 0 to 36 months?

The review sub-questions will include:

- i) Are parenting stimulation interventions delivered by health professionals effective in improving child development outcomes among children aged 0 to 36 months, compared with usual care, no intervention, or a different type of delivery agent?
- ii) Are parenting stimulation interventions delivered by health para-professionals effective in improving child development outcomes among children aged 0 to 36 months, compared with usual care, no intervention, or a different type of delivery agent?
- iii) Are parenting stimulation interventions delivered by non-professionals effective in improving child development outcomes among children aged 0 to 36 months, compared with usual care, no intervention, or a different type of delivery agent?

Inclusion criteria

Participants

This review will consider studies that include populations targeting caregiver-child dyads. A caregiver is defined as any adult who is either biologically or not biologically related to the child; lives with the child on a daily basis; is responsible for caring, stimulating, loving, and educating the child; and

with whom the child forms the strongest emotional bonds in the first years of life.¹⁸ The review will focus on children under 36 months of age at the time of the intervention, as it is well-known that the first three years of life are a critical period for child development and long-term health.¹⁹

The review will exclude studies on children with specific characteristics, such as preterm birth (commonly defined as birth before 37 weeks of gestation); autism; victims of any type of violence; presence of illness at study time; behavioral problems (eg, aggressiveness); special needs; and chronic diseases.

Interventions

This review will consider studies that evaluate parenting stimulation interventions delivered by different health agents, namely, health professionals, health para-professionals, or non-professionals. Parenting stimulation interventions are defined as those that support developmentally appropriate learning and play activities between the caregiver and child to improve child development outcomes. There will be no restriction on mode of delivery, content, length, and/or frequency of the intervention. If a multicomponent program does not distinguish between stimulation and other components (eg, nutrition), we will nonetheless include the study to maximize the number of studies.

Health professionals are those delivery agents with a formal university degree (eg, nurses, social workers). Health para-professionals are generally members of the community who do not have formal professional educational training, but do have limited or specific training for the tasks they are expected to perform (eg, community health workers).²⁰ In this sense, health para-professionals have been trained in different topics, beyond the field of child development or stimulation intervention, to fulfill other existing tasks related to health care. Further, as para-professionals require less specialized professional training, their work can be supervised by professionals, such as nurses, psychologists, or doctors. Non-professionals are individuals selected from the community who received specific training on child development and/or stimulation intervention, and who deliver the intervention as volunteers. Their work can also be supervised by professionals.

This review will exclude studies on interventions that do not focus on parenting.

Comparators

This review will consider studies that compare the intervention with one of three possible comparison conditions: usual care, no intervention, or another intervention delivered by a different type of agent.

Outcomes

This review will consider studies that include child development as an outcome. We will consider four main domains of child development: motor, language, cognitive, and socio-emotional development. Outcome measures for child development will include well-known and validated tools such as Ages and Stages Questionnaires, Bayley Scales of Infant and Toddler Development, Battelle Developmental Inventory, and MacArthur Communicative Development Inventories, among others. Nonetheless, considering that there is a wide variety of instruments and tools to assess child development outcomes, we will determine whether authors report reliability and validity data for child development outcomes. Measures may be both self-report or direct observational assessments.

Motor development refers to fine motor skills (ie, the ability to coordinate small movements, usually with the hands) and gross motor skills (ie, the ability to coordinate large movements). Language development corresponds to the ability to understand language (receptive language) and the ability to express oneself using language (expressive language). Cognitive development refers to mental skills, such as thinking, memory, problem-solving, reasoning, learning, and executive functions. Finally, socio-emotional development is related to emotions, personality, and social relationships.

Types of studies

This review will consider randomized controlled trials because we are interested in obtaining the best study designs and including the most robust evidence. Studies published in English, Portuguese, and Spanish will be included. Studies published from database inception until September 2021 will be included. Study protocol papers will be excluded.

Methods

The proposed systematic review will be conducted in accordance with the JBI methodology for systematic reviews of effectiveness,²¹ and has been registered with PROSPERO (CRD42021245245).

Search strategy

The search strategy will aim to locate both published and unpublished studies. An initial limited search of MEDLINE (PubMed) and APA (PsycNet) was undertaken to identify articles on the topic. The text words contained in the titles and abstracts of relevant articles, and the index terms used to describe the articles, were used to develop a full search strategy for the relevant databases (see Appendix I). The search strategy, including all identified keywords and index terms, will be adapted for each included information source. The reference lists of all studies selected for critical appraisal will be screened for additional studies.

Studies published in English, Portuguese, and Spanish will be included as these are the languages understood by the authors. Studies published from database inception until September 2021 will be included.

Five other electronic bibliographic databases will be searched for peer-reviewed, published studies: Embase, Scopus, Web of Science Core Collection, CINAHL (EBSCO) and VHL Regional Portal. The search for unpublished studies will focus on Google Scholar, Science Direct and Theses Canada Portal, and Library and Archives Canada. We will use a combination of key terms related to five main concepts: childhood (infant/child/children/early childhood); intervention (intervention/training/program); parenting (parenting/positive parenting practices/parent-child relations/parent-child interaction); child development (cognitive development/language development/motor development/socio-emotional development); and randomized controlled trial. We will not include “delivery agents,” “professional,” “para-professional,” or “non-professional” in the search strategy because the characteristics of the delivery agent are usually presented in the description of the parenting program. Therefore, including these terms specifically may limit the results obtained. The English language will be used in the search strategy as well as singular and plural expressions. Truncation and proximity operators will be employed to increase the accuracy of the search.

Study selection

Following the search, all identified citations will be collated and uploaded into Mendeley (Mendeley Ltd, Elsevier, The Netherlands), and duplicates removed. Following a pilot test, titles and abstracts

will be screened by two independent reviewers for assessment against the inclusion criteria. Potentially relevant studies will be retrieved in full and their citation details imported into the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI; JBI, Adelaide, Australia).²² The full text of selected citations will be assessed in detail against the inclusion criteria by two independent reviewers. Reasons for exclusion of full-text studies that do not meet the inclusion criteria will be recorded and reported in the systematic review. Any disagreements that arise between the reviewers at each stage of the study selection process will be resolved through discussion or with a third reviewer. The results of the search will be reported in full in the final systematic review and presented in a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram.²³

Assessment of methodological quality

Eligible studies will be critically appraised by two independent reviewers at the study level for methodological quality using standardized JBI critical appraisal instruments for experimental studies.²¹ Authors of papers will be contacted to request missing or additional data for clarification, as needed. Any disagreements that arise will be resolved through discussion or with a third reviewer. The results of the critical appraisal will be reported in a table with an accompanying narrative. All studies, regardless of their methodological quality, will undergo data extraction and synthesis (where possible).

Data extraction

Data will be extracted from studies included in the review using the standardized data extraction tool available in JBI SUMARI²² by two independent reviewers. The extracted data will include specific details about the country, populations, study methods, interventions, control, and outcomes of significance to the review objective. Moreover, to better understand the parenting programs, specific information will be extracted, such as a brief description of the program, mode of delivery, delivery agent, duration, and frequency (Appendix II). Any disagreements that arise between the reviewers will be resolved through discussion or with a third reviewer. Authors of papers will be contacted to request missing or additional data, as needed.

Data synthesis

Studies will, where possible, be pooled in statistical meta-analysis using JBI SUMARI.²² Effect sizes will be expressed as either odds ratios (for dichotomous data) and standardized final post-intervention mean differences (for continuous data), and their 95% confidence intervals will be calculated for analysis. Heterogeneity will be assessed statistically using the standard χ^2 and I^2 tests. The choice of model (random or fixed effects) and method for meta-analysis will be based on the guidance of Tufanaru *et al.*²¹ Subgroup analyses for the outcome will be conducted to assess whether the effectiveness of parenting stimulation intervention varies by delivery agent. Where statistical pooling is not possible, the findings will be presented in narrative format, including tables and figures, to aid in data presentation. A funnel plot will be generated using Stata v.17 (Stata Corp LLC, Texas, USA) to assess publication bias if there are 10 or more studies included in a meta-analysis. Statistical tests for funnel plot asymmetry (Egger test, Begg test, Harbord test) will be performed where appropriate.

Assessing certainty in the findings

The Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach for grading the certainty of evidence will be followed,²⁴ and a Summary of Findings (SoF) will be created using GRADEpro (McMaster University, ON, Canada). The SoF will present the following information where appropriate: absolute risks for the treatment and control; estimates of relative risk; and a ranking of the quality of the evidence based on the risk of bias, directness, heterogeneity, precision, and risk of publication bias of the review results. The outcomes reported in the SoF will be motor, language, cognitive, and socio-emotional development.

References

- Shonkoff JP, Phillips DA. From neurons to neighborhoods: the science of early childhood development [internet]. Washington, DC; 2000 [cited 2020 Nov 16]. Available from: <https://www.nap.edu/catalog/9824/from-neurons-to-neighborhoods-the-science-of-early-childhood-development>.
- Walker SP, Chang SM, Vera-Hernández M, Grantham-McGregor S. Early childhood stimulation benefits adult competence and reduces violent behavior. *Pediatrics* 2011;127(5):849–57.
- Bick J, Nelson CA. Early experience and brain development. *Wiley Interdiscip Rev Cogn Sci* 2017;8:e1387.
- Fox SE, Levitt P, Nelson CA. How the timing and quality of early experiences influence the development of brain architecture. *Child Dev* 2010;81(1):28–40.
- Yogman M, Garner A, Hutchinson J, Hirsh-Pasek K, Golinkoff RM, Baum R, *et al.* The power of play: a pediatric role in enhancing development in young children. *Pediatrics* 2018;142(3):e20182058.
- Lu C, Black MM, Richter LM. Risk of poor development in young children in low-income and middle-income countries: an estimation and analysis at the global, regional, and country level. *Lancet Glob Health* 2016;4(12):e916–22.
- Jeong J, Pitchik HO, Yousafzai AK. Stimulation interventions and parenting in low- and middle-income countries: a meta-analysis. *Pediatrics* 2018;141(4):e20173510.
- Jeong J, Franchett EE, Ramos de Oliveira CV, Rehmani K, Yousafzai AK. Parenting interventions to promote early child development in the first three years of life: a global systematic review and meta-analysis. *PLoS Med* 2021;18(5):e1003602.
- Britto PR, Ponguta LA, Reyes C, Karnati, R. A systematic review of parenting programmes for young children [internet]. UNICEF; 2015 [cited 2020 Nov 16]. Available from: https://sites.unicef.org/earlychildhood/files/P_Shanker_final_Systematic_Review_of_Parenting_ECD_Dec_15_copy.pdf.
- Yousafzai AK, Rasheed MA, Rizvi A, Armstrong R, Bhutta ZA. Effect of integrated responsive stimulation and nutrition interventions in the Lady Health Worker programme in Pakistan on child development, growth, and health outcomes: a cluster-randomised factorial effectiveness trial. *Lancet* 2014;384(9950):1282–93.
- Attanasio O, Fernández C, Fitzsimons E, Grantham-McGregor S, Meghir C, Rubio-Codina M. Using the infrastructure of a conditional cash transfer program to deliver a scalable integrated early child development program in Colombia: cluster randomized controlled trial. *BMJ* 2014;349:g5785.
- Singla DR, Kumbakumba E, Aboud FE. Effects of a parenting intervention to address maternal psychological wellbeing and child development and growth in rural Uganda: a community-based, cluster randomised trial. *Lancet Glob Health* 2015;3(8):e458–69.
- Fatori D, Zuccolo P, Shephard E, Brentani H, Ferraro A, Fraccolli L, *et al.* A nurse home visiting program for pregnant adolescents: a randomized controlled trial. *Res Sq* 2020.
- Kemp L, Harris E, McMahon C, Matthey S, Vimpani G, Anderson T, *et al.* Child and family outcomes of a long-term nurse home visitation programme: a randomised controlled trial. *Arch Dis Child* 2011;96(6):533–40.
- Sierau S, Dahne V, Brand T, Kurtz V, von Klitzing K, Jungmann T. Effects of home visitation on maternal competencies, family environment, and child development: a randomized controlled trial. *Prev Sci* 2016;17(1):40–51.
- Eshel N, Daelmans B, Cabral De Mello M, Martinez J. Responsive parenting: interventions and outcomes. *Bull World Health Organ* 2006;84(12):992–8.

17. Shah R, Kennedy S, Clark MD, Bauer SC, Schwartz A. Primary care-based interventions to promote positive parenting behaviors: a meta-analysis. *Pediatrics* 2016; 137(5):e20153393.
18. Marino E, Pluciennik GA. [Very early childhood from pregnancy to 3 years of age: perceptions and practices of Brazilian society about the early stage of life.] [internet]. São Paulo; 2013 [cited 2020 Nov 29]. Available from: <https://www.fmcsv.org.br/pt-BR/biblioteca/primeirissima-infancia—da-gestacao-aos-3-anos/>. Portuguese.
19. Center on the Developing Child. The foundations of lifelong health are built in early childhood [internet]. 2010 [cited 2020 Nov 29]. Available from: www.developingchild.harvard.edu.
20. Perry HB, Zulliger R, Rogers MM. Community health workers in low-, middle-, and high-income countries: an overview of their history, recent evolution, and current effectiveness. *Ann Rev Public Health* 2014;35:399–421.
21. Tufanaru C, Munn Z, Aromataris E, Campbell J, Hopp L. Chapter 3: Systematic reviews of effectiveness [internet]. In: Aromataris E, Munn Z, editors. *JB I Manual for Evidence Synthesis*. Adelaide: JBI; 2020 [cited 2021 Jan 19]. Available from: <https://synthesismanual.jbi.global>.
22. Munn Z, Aromataris E, Tufanaru C, Stern C, Porritt K, Farrow J, et al. The development of software to support multiple systematic review types: the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI). *Int J Evid Based Healthc* 2019;17(1):36–43.
23. Moher D, Liberati A, Tetzlaff J, Altman DG; The PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med* 2009;6(7): e1000097.
24. Schünemann H, Brożek J, Oxman A, editors. *GRADE handbook for grading quality of evidence and strength of recommendation*. Version 3.2. The GRADE working group, 2009.

Appendix I: Search strategy

MEDLINE (PubMed)

Search conducted on August 10, 2021

Search	Query	Records retrieved
#1	"infant"[MeSH Terms] OR "infant"[All Fields] OR "infants"[All Fields] OR "infant s"[All Fields] OR ("infant"[MeSH Terms] OR "infant"[All Fields] OR "infants"[All Fields] OR "infant s"[All Fields]) OR ("child"[MeSH Terms] OR "child"[All Fields] OR "children"[All Fields] OR "child s"[All Fields] OR "children s"[All Fields] OR "childrens"[All Fields] OR "childs"[All Fields]) OR ("child"[MeSH Terms] OR "child"[All Fields] OR "children"[All Fields] OR "child s"[All Fields] OR "children s"[All Fields] OR "childrens"[All Fields] OR "childs"[All Fields]) OR ("child, preschool"[MeSH Terms] OR ("child"[All Fields] AND "preschool"[All Fields]) OR "preschool child"[All Fields] OR "preschooler"[All Fields] OR "preschoolers"[All Fields] OR "preschool"[All Fields] OR "preschooler s"[All Fields] OR "preschools"[All Fields]) OR ("infant, newborn"[MeSH Terms] OR ("infant"[All Fields] AND "newborn"[All Fields]) OR "newborn infant"[All Fields] OR "baby"[All Fields] OR "infant"[MeSH Terms] OR "infant"[All Fields] OR "baby s"[All Fields] OR "babys"[All Fields] OR "infant"[MeSH Terms] OR "infant"[All Fields] OR "babies"[All Fields]) OR ("toddler"[All Fields] OR "toddler s"[All Fields] OR "toddlers"[All Fields] OR "toddler"[All Fields] OR "toddler s"[All Fields] OR "toddlers"[All Fields]) OR "Early Childhood"[All Fields] OR "Young Children"[All Fields]	3,369,493
#2	"intervention*" [All Fields] OR "training*" [All Fields] OR "program*" [All Fields]	3,002,956
#3	"parent s"[All Fields] OR "parentally"[All Fields] OR "parentals"[All Fields] OR "parented"[All Fields] OR "parenting"[MeSH Terms] OR "parenting"[All Fields] OR "parents"[MeSH Terms] OR "parents"[All Fields] OR "parent"[All Fields] OR "parental"[All Fields] OR "Positive Parenting Practices"[All Fields] OR "Parent-Child Relations"[All Fields] OR "Parent-Child Interaction"[All Fields]	461,114
#4	"child development"[MeSH Terms] OR ("child"[All Fields] AND "development"[All Fields]) OR "child developmen-t"[All Fields] OR "Cognitive development"[All Fields] OR ("cognition"[MeSH Terms] OR "cognition"[All Fields] OR "cognitions"[All Fields] OR "cognitive"[All Fields] OR "cognitively"[All Fields] OR "cognitives"[All Fields]) OR "Executive Function"[All Fields] OR "Language Development"[All Fields] OR "Communication"[All Fields] OR "Motor Development"[All Fields] OR "Gross motor"[All Fields] OR "Fine motor"[All Fields] OR "Socioemotional Development"[All Fields] OR "Socio-emotional"[All Fields] OR ("emoting"[All Fields] OR "emotion s"[All Fields] OR "emotions"[MeSH Terms] OR "emotions"[All Fields] OR "emotion"[All Fields] OR "emotional"[All Fields] OR "emotive"[All Fields])	1,623,463
#5	"Randomized controlled trial"[Title/Abstract] OR "randomised controlled trial"[Title/Abstract] OR "random*" [Title/Abstract] OR "RCT"[Title/Abstract]	1,253,748
#6	#1 AND #2 AND #3 AND #4 AND #5	5500
Filters: English, Portuguese, Spanish		5429

Appendix II: Data extraction instrument

Name of the program	Description of the program	Mode of delivery	Responsible for delivery	Begins	Frequency	Ends/Duration