Reporting guidelines for implementation research on nurturing care interventions designed to promote early childhood development

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Meta-analyses of interventions such as parenting, stimulation, and early childhood education have reported consistent medium-to-high effect sizes on early childhood development (ECD) and early learning outcomes. However, few effective interventions promoting ECD have achieved scale. In order to increase the access to effective or high-quality services, greater focus on implementation research of interventions promoting ECD is necessary. In this paper, we describe the development of reporting guidelines for implementation research of nurturing care interventions designed to promote ECD following an expert consensus-building process. The goal of these guidelines is to support a transparent and standard reporting of implementation evidence on nurturing care interventions designed to promote early childhood development.

Keywords: reporting guidelines; implementation; nurturing care; early childhood development

Introduction

More than 250 million children fail to meet their cognitive developmental potential in the first 5 years of life.1 Meta-analyses of interventions such as parenting, stimulation, and early childhood education have reported consistent medium-to-high effect sizes on early childhood development (ECD) and children’s schooling outcomes.2,3 Despite consistent evidence about the types of interventions that are effective in promoting ECD, few interventions have gone to scale and access to early childhood interventions remains poor especially among the most disadvantaged children living in low- and middle-income countries (LMICs). The current state of knowledge is that evidence exists on proof-of-concept for programs on home-visiting, center-based care, stimulation, and other approaches;3 however, there is less information on implementation. In order to advance access to effective or high-quality services, greater focus on implementation research of interventions promoting ECD is required. The urgency of these data is especially important in the era of the Sustainable Development Goals (SDGs), particularly SDGs 3 and 4, in health and education, respectively, which are intrinsically linked for young children. Insufficient implementation research is an impediment to monitoring progress to achieving impact and sustainability of services at scale to reach all young children and their caregivers.

Implementation research has been widely used in advancing health and education interventions to scale. Peters and colleagues describe a framework for implementation research principles, outcomes, and processes.4 A modified definition of implementation research is the scientific inquiry into questions concerning activities undertaken as planned with the intention of producing an effect, which when applied to ECD can be on policies, programs, or individual practices (interventions) that promote child development. Implementation research can
consider any aspect of implementation, including the factors affecting implementation, the processes of implementation, and the results of implementation, including how to introduce potential solutions into health, education or social protection, and welfare systems, or how to promote their large-scale use and sustainability. The intent is to understand what, why, and how interventions work in real-world settings and to test approaches to improve them. Implementation variables often include acceptability, adoption, appropriateness, feasibility, fidelity, implementation cost, coverage, and sustainability—all can serve as indicators of the success of implementation. Assessing implementation processes is mainly descriptive, but evaluating implementation allows researchers and program implementers to understand whether activities took place as planned, for example, fidelity, dosage, quality of delivery, as well as receptiveness of participants, and to record changes made to a program. Within a logic model, this entails an evaluation of the actual inputs and outputs relative to what was planned, in quality as well as quantity. A fundamental principle for conducting implementation research is acknowledging the audience and end-users not as recipients of research, but as partners to engage in the process. A second principle is to recognize that programs will likely require information to inform evidence-based adaptations as well as improvements during the course of implementation.

A number of researchers have argued that it is critical to report on fidelity of interventions in order to understand whether interventions were implemented as intended. Moving beyond fidelity, an implementation evaluation can help program developers determine what features of implementation make interventions more or less effective. Several reviews of ECD interventions implemented in LMIC and high-income countries have explored implementation and attempted to identify the effectiveness features of interventions by qualitatively comparing more or less successful programs with the number and types of features that distinguish them. These features include program inputs such as a theory of change, a structured curriculum, and training and supervision strategies. While the list of features identified from these reviews provides a useful starting point to plan inputs for programs, the current evidence is too sparse to identify critical features with any confidence. We need more information on the quantity and quality of implementation features to determine how they moderate or mediate the size of impact.

The broad question on what features of implementation make programs effective is premature to answer because current reporting about implementation is piecemeal with not much data available. To address the question requires standardized reporting of program implementation and fidelity. The creation of guidelines has proven useful in improving the standardization and reporting of research studies. For example, the Consolidated Statement for Reporting Trials (CONSORT) and the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statements have improved the reporting of randomized controlled trials and observational studies, respectively, and similarly, the Consolidated Criteria for Reporting Qualitative research (COREQ) guidelines were developed to improve the reporting of qualitative research. Following these guidelines is now required by many journals in many fields.

With respect to implementation research, guidance to improve the reporting of implementation of interventions in operational research and behavioral research is available. However, there are limitations with respect to reporting the intervention theory of change, implementation process, fidelity, and program adaptation. Building on existing implementation reporting guidelines, and in light of the recent Lancet series “Advancing Early Childhood Development: From Science to Scale,” we considered it timely to develop and disseminate global reporting guidelines for the implementation of nurturing care interventions promoting ECD that capture factors affecting implementation, processes, description of how interventions are introduced into systems, and implications for scale and sustainability.

Methods

The protocol to develop the reporting guidelines was approved by the Institutional Review Boards of Harvard University, Rutgers University, and McGill University. The protocol was implemented from August 1, 2017 to October 15, 2017.

Scope of interventions

The definition for nurturing care adopted for these reporting guidelines was: a stable environment that
is sensitive to children’s health and nutritional needs, with protection from threats, opportunities for early learning, and interactions that are responsive, emotionally supportive, and developmentally stimulating. The inclusion criteria for interventions were (1) targeting the period of pregnancy through age 6 years; (2) implemented anywhere; (3) enabling nurturing care; (4) and including children’s development as an outcome. The exclusion criteria for interventions were (1) targeting only the caregiver’s health (including health and nutrition for pregnant women) and not integrated in a caregiving program; (2) targeting only the child’s health and nutrition (e.g., immunization and nutrition supplements) and not integrated in a caregiving program; (3) unconditional cash transfer programs; and (4) national, state, and local policies on parental leave, health care, child care, and preschool education.

The e-Delphi protocol for expert consensus

The development of the reporting guidelines employed an e-Delphi process to achieve expert consensus, first used by the RAND Cooperation. The technique has been widely used for consensus building in a number of health fields to develop guidelines or to establish research priorities, for example, reporting complex intervention studies, developing research priorities in nursing practice, and developing clinical guidelines in medicine. The e-Delphi process is iterative and requires an expert panel to complete approximately two or three rounds of survey questionnaires. The items for the first round of the survey are typically developed from a review of the scientific literature to identify current evidence and gaps in the field of interest. The items for the subsequent survey rounds are based on an analysis of the expert panel’s responses in each round of the e-Delphi survey. The e-Delphi technique facilitates consensus building in a non-adversarial manner due to expert anonymity and confidentiality. Other advantages of the e-Delphi process include reduced costs and time efficiency because the process eliminates the need for international travel for in-person expert consultations. However, careful planning is required to ensure representation in the expert panel to mitigate potential bias in expert selection and potential conflicts of interest.

For the development of the present reporting guidelines, the expert panel was purposely identified through a review of the literature on nurturing care interventions that promoted ECD and a search for researchers who had developed similar guidelines on reporting implementation research. The intervention researchers all had experience designing interventions and working with implementing partners. The authors then supplemented the list with additional names of implementers and program evaluators who would not be captured by the search of the peer-reviewed literature, but would represent likely end-users of the guidelines in addition to the research community. The expert group was then short listed to ensure representation by region, types of interventions targeting children less than 3 years of age (e.g., parenting interventions) and children aged 3–6 years (e.g., preschool interventions), range of nurturing care expertise (e.g., maternal and child health and nutrition, maternal mental health), and evaluation expertise (e.g., implementation evaluations). An e-invitation with an information letter and consent form was sent to 22 international experts to participate in the e-Delphi process. Of the 22 invited experts, 17 experts agreed to participate. The first round of the e-Delphi survey was completed by 14 experts and the second round was completed by 13 experts.

To inform the preliminary set of items for the present reporting guidelines, a literature search was conducted to identify (1) existing guidelines on reporting implementation of interventions. Two reporting guidelines were identified, the Standards for Reporting Implementation Studies (StaRI) Statement was developed to report both implementation strategy and intervention effectiveness and the Reporting Guidelines for Operational and Implementation Research; (2) systematic reviews of interventions and discussion papers on effective implementation features of interventions to promote ECD (e.g., the Lancet series “Advancing Early Childhood Development: From Science to Scale” and the Early Childhood Research Quarterly series on implementation research in early childhood education); and (3) articles outlining important implementation information for health behavior change research. The preliminary guidelines comprised 32 items and were piloted on previously implemented studies conducted by the authors (A.K.Y., F.E.A., and M.N.). The purpose of the pilot was to check item relevance, redundancies, gaps, and to refine wording, definitions, and...
sequencing of content. Items were revised following the pilot.

The reporting guidelines were then reviewed by the international expert panel over two e-Delphi surveys using Qualtrics software (version 2017). In the first survey round (August 2017), experts were asked to assess 32 items for (1) importance with respect to providing information about the intervention implementation (items were ranked as “not important,” “neutral,” “important, but not necessary,” or “important and essential”); (2) clarity of the items (rated as: “item is clear” or “item is not clear and requires further clarification”); and (3) open-ended recommendations on gaps, sequencing, and feasibility. Following analysis of responses to the first survey round, items were revised and reduced to 23 items. In the second survey round of the e-Delphi process (September 2017), experts were asked to review the 23 revised set of items and provide feedback on further item modifications. Following analysis of responses to the second survey round, items were revised and reduced to 21 items. In the second survey round of the e-Delphi process (September 2017), experts were asked to review the 23 revised set of items and provide feedback on further item modifications. Following analysis of responses to the second survey round, items were revised and reduced to 21 items. In the second survey round of the e-Delphi process (September 2017), experts were asked to review the 23 revised set of items and provide feedback on further item modifications. Following analysis of responses to the second survey round, items were revised and reduced to 21 items.

**Figure 1.** Number of item modifications made to the reporting guidelines in the e-Delphi process.

Analysis of expert responses in the e-Delphi process

Quantitative analysis was undertaken of the responses from the first e-Delphi survey to measure the means and frequencies for ratings of item importance and clarity. The levels of convergence and dispersion for each item were described to establish the level of consensus. The following criteria were used to interpret importance and clarity:

- **Importance:** If 75% or more of the experts rated an item as “important and essential,” the item was considered important and remained in the reporting guidelines. If these criteria were not met, we first examined whether the item received a combined rating of “important and essential” and “important, but not essential” of at least 80% before removing the item.

- **Clarity:** If 90% or more of the experts rated an item as clear, the item was either not modified or minimal modifications were made based on qualitative analysis of responses. If less than 90% of the experts rated the item unclear, the item was modified.

Qualitative analysis was undertaken to guide modifications on the wording, sequencing, redundancies, and gaps. Revisions were reviewed, discussed at length, and agreed by all four authors. The qualitative analysis was important to take into account the range of reviews, including outliers and contrarian perspectives, that gathers in the e-Delphi process.

The responses from the second e-Delphi survey were quantitatively reviewed for consensus. For each item, if 70% or more experts rated the item to be included in the guidelines without any modifications, the item was retained (sometimes with minimal modifications guided by specific recommendations). The remaining items were modified based on a qualitative review of specific suggestions provided by the experts and authors, and agreed by all four authors.

**Finalization of the reporting guidelines**

Constructive feedback on the fourth draft of the guidelines was gathered first at a two-day workshop sponsored by and held at the New York Academy of Sciences December 4 and 5, 2017 in New York City, which brought together several members of the expert panel and authors of the 2018 *Ann. N.Y. Acad. Sci.* special issue “Implementation Research and Practice for Early Childhood Development.” The goal of the discussions was to inform relevance and clarity of the items and use of the reporting guidelines. The name for the reporting guidelines...
was brainstormed after this workshop. Second, two peer reviewers who were implementation research experts with experience in nurturing care interventions provided independent feedback external to the consensus-building platforms. The guidelines will be registered with Equator (https://www.equator-network.org/reporting-guidelines/).

Results

The final guidelines comprise 21 items (Table 1). The guidelines are referred as the “C.A.R.E.” (consolidated advice on reporting ECD implementation research) guidelines. To facilitate reporting of implementation research using these guidelines, a panel of conceptual definitions for key-terms is shared (Table 2). The following overarching principles support the utilization of the reporting guidelines that were informed by feedback from the experts participating in the e-Delphi process and in the workshop:

- **Implementation reporting across the continuum of research and program evaluations.** In order to transition from proof-of-concept studies or pilot projects (e.g., efficacy studies) to scale (e.g., effectiveness trials and large-scale trials), evidence from implementation research is useful. Therefore, these guidelines are intended to support reporting of implementation evidence across a range of intervention and program evaluations. The reporting guidelines maybe used as standalone guidelines or with other standards for reporting interventions (e.g., the CONSORT Statement).

- **Planning data collection of implementation processes.** Good implementation is a planned endeavor and decisions about implementation-related data collection tools and processes should be considered from the outset. These reporting guidelines provide suggestions for the implementation features that should be documented during the course of implementation.

- **Quantitative and qualitative data reporting.** These implementation reporting guidelines are intended to be relevant for quantitative and qualitative sources of data on implementation features.

- **Flexibility in reporting sequence.** The 21 items in these reporting guidelines are recommendations for reporting with a suggested sequence. However, researchers and program evaluators may choose to report items in a sequence suitable for their reporting format. If data are not collected on a particular item, it is recommended that explanations are provided (e.g., providing an explanation for why data collection for a specific item was not feasible or not appropriate).

- **Fidelity and intervention adaptation.** Fidelity is a core construct in implementation research (i.e., how much of the program was delivered as intended), but it is also recognized that during implementation, adaptations may be desirable or necessary in response to real-world contexts such as overcoming barriers to delivery, responding to a changing policy environment during the course of implementation, or modifications made as a result of continuous program quality improvement strategies. Transparency in the documentation of these intentional intervention modifications is essential to understand processes associated with more or less successful program outcomes. These reporting guidelines encourage describing changes made to the content and delivery during the course of the intervention as well as the reasons for these changes.

- **Reporting implementation research for interventions with successful and less successful outcomes.** Irrespective of whether an intervention achieves nonsignificant impacts, or low, medium, or high significant impacts on the intended outcomes, reporting of evidence from the implementation research is essential in contributing to informed actions on what works or what does not work, for whom and how. Therefore, we recommend implementation research be reported whether an intervention achieves strong impacts or not. Implementation and outcome results can be reported in the same paper.

- **Dissemination of evidence and learning from implementation research.** The Fogarty International Center at the National Institutes of Health in the United States describes implementation science as “the study of methods to promote the integration of research...
### Table 1. Reporting guidelines for implementation research of nurturing care interventions designed to promote early child development

| Section of report | Item number | Item label | Description |
|-------------------|-------------|------------|-------------|
| **Introduction**  | 1           | Previous evidence about the intervention | (1) Briefly describe the nature and severity of the problem(s) being addressed, explaining why the intervention is needed. (2) Briefly describe what is already known about the effectiveness of similar interventions previously implemented or interventions that target similar outcomes. |
|                   | 2           | Effectiveness of the present intervention (if known) | If the effectiveness of the specific intervention has been evaluated, please include: (1) Summary of the research design (e.g., randomized controlled design and quasiexperimental design). (2) Summary of the findings pertaining to the primary and secondary outcomes (e.g., child outcomes, caregiver behavior changes, and caregiver outcomes). |
|                   | 3           | Rationale for the implementation research | Explain why the implementation research is needed for the specific intervention. |
|                   | 4           | Aims and objectives of the implementation research | List the aims and objectives of the implementation research. |
| **Methods**       | 5           | Context of implementation for the intervention | Briefly describe the setting for the implementation research and state the following: (1) The location and the social, economic, and policy context. (2) Dates for when the implementation research was conducted. (3) Information about ethical approvals and consenting procedures. |
|                   | 6           | Implementation strategy for the intervention | Describe the implementation strategy for the intervention. A logic model organizing the inputs and expected outputs is recommended. |
|                   | 7           | Implementation recipients for the intervention | Include a summary about the recipients of the intervention. |
|                   | 8           | Intended intervention content | Describe the intervention in the intervention condition and the comparison condition. Include: (1) Summary of any formative research or piloting to design or adapt the intervention. (2) Information about the curriculum used (i.e., adaptations, translations, manuals, and job aids) and content. (3) Describe the theory of change, conceptual model, or framework on which the intervention is based (e.g., behavior change theory). (4) List any behavior change techniques employed (e.g., information sharing, problem solving, performance, social support, distribution of materials, and visual aids). |
|                   | 9           | Changes to intervention content | Provide information about, and explain, the reasons for changes made to the intervention in the intervention condition and in the comparison condition after the intervention was initiated. |
|                   | 10          | Intended intensity/total exposure to the intervention | Provide information for the intervention condition and the comparison condition broken down by: (1) Length of contact sessions or length of day (e.g., in a group care intervention or in a home visitation intervention). (2) Number of contact sessions. (3) Duration of contact over time. (4) Frequency of contacts (e.g., daily, weekly, fortnightly, and monthly). |
| Section of report | Item number | Item label | Description |
|-------------------|-------------|------------|-------------|
| 11                | 11          | Personnel involved in supporting the implementation of the intervention (e.g., coordinators, trainers, supervisors, and ancillary staff) | Briefly describe information about personnel who may have been involved in supporting the implementation of the intervention. This may include implementing organizations and/or government structures. For example, in the health sector, personnel may include managers of health facilities or trainers of community health worker, in the education sector personnel may include head teachers or monitors of schools. |
| 12                | 12          | Personnel delivering the intervention (e.g., mother leaders, community health workers, and teachers) | (1) Describe the delivery agent for the intervention (e.g., who they are, background, credentials, recruitment process, roles and responsibilities, time spent in service, and any previous training received). (2) Describe how the delivery agents were trained and supervised to deliver the intervention. Include any information about standardization of training (e.g., training manual), who were the trainers, duration, and training techniques. (3) Describe how skills of the delivery agent were maintained over time (e.g., coaching, refreshers, and by whom). (4) Describe how the acquisition of skills of the delivery agents post-training was measured. (5) Provide information about the workload of the integrated intervention in the existing workload (e.g., hours of work, remuneration, incentives, compensation, and client ratio). For example, in the health sector, personnel may include community health workers, nurses, and doctors, in the education sector personnel may include teachers, and in social protection sector personnel may include social workers. |
| 13                | 13          | Methods to assess fidelity regarding delivery of intervention | Describe the methods and tools used to assess fidelity of intervention delivery and receipt of intervention by recipients (e.g., self-report, observation, competency tests, checklists, and monitoring records on recipient participation), sources of data, and at which stage of the project implementation was fidelity assessed. If relevant, describe whether these data were collected in the comparison conditions. |
| 14                | 14          | Methods to assess understanding and enactment of intervention skills by recipients | Describe the methods and tools used to assess the understanding of intervention content (e.g., knowledge about child development milestones) and the enactment (include any intended or planned actions) of intervention skills by the recipients (e.g., qualitative focus group discussions or in-depth interviews, observations of the care and learning environment of the child, caregiver–child interactions) during the course of the intervention. If relevant, describe whether these data were collected in the comparison conditions. |
| 15                | 15          | Implementation research data collection team | Describe the data collection team with respect to credentials (specify if the team was internal or external to the intervention), training, and quality assurance (e.g., reliability). |
Table 1. Continued

C.A.R.E. (consolidated advice for reporting ECD implementation research) guidelines

| Section of report | Item number | Item label | Description |
|-------------------|-------------|------------|-------------|
|                   | 16          | Sampling and data management procedures | (1) Describe the sample size, sampling strategy, recruitment, timing, and incentives. (2) Data management and cleaning, and for any qualitative data include information on translations and transcriptions. |
|                   | 17          | Plan of analysis for implementation data | Describe the plan of analysis. For quantitative methods, this may include a description of the statistical tests employed to compare outcomes between groups, any adjustments, subgroup analyses, and methods to handle missing data. For qualitative methods, this may include a description of the process to derive themes/codes and subthemes/codes, charting or mapping of linkages between themes, and triangulation of themes/codes. |
| Results           | 18          | Results of the implementation evaluation | Present the results for all variables and where needed include figures, tables, and quotes for qualitative findings. |
| Discussion        | 19          | Interpretation of findings of the implementation evaluation | Provide interpretation of the findings of the implementation evaluation. (1) Describe influencing factors in the implementation context that may have influenced the implementation and how these were utilized/addressed during the intervention implementation; consider any benefits, harms, unexpected results, unintended consequences, barriers and enablers, problems, and failures. Include a description about the generalizability of the intervention implementation in different settings. (2) How do these data compare with similar interventions or interventions intended to target similar outcomes, and how can these data inform future intervention work? |
|                   | 20          | Strengths and limitations of the implementation research | Describe the strengths and limitations of the implementation evaluation. |
|                   | 21          | Scalability and sustainability of the intervention and implementation strategy | Consider any implications of the findings for implementing at a larger scale (e.g., delivery agents, training, and monitoring) and sustainability. |

findings and evidence into healthcare policy and practice . . .”11 Therefore, it is critical that dissemination of evidence from the implementation research is shared with practice audiences through appropriate channels. To further the science of implementation, it is useful to report strengths and limitations of the methods used.

These reporting guidelines are not exhaustive of all implementation issues. First, over time, we recommend they be supplemented with emerging data from implementation evaluations to distinguish reporting of nurturing care interventions based on the stage of program implementation (e.g., formative research to design the intervention, proof-of-concept, or implementation at-scale). Established guidelines such as the CONSORT Statement have also been enhanced with supplementation guidance to enable more accurate reporting based on trial design (e.g., individual randomized controlled trials and cluster randomized controlled trials). Second, while we include several items on context description in the guidelines, we recognize that a very different approach will likely be adopted in humanitarian response settings due to ethical considerations and time and resource constraints. Specific guidance on key features of implementation for humanitarian
Table 2. Operational definitions used in the reporting guidelines for implementation research of nurturing care interventions designed to promote early child development

| Term                          | Operational definition                                                                                                                                                                                                 |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| **Evaluation**                | Evaluation is a periodic, in-depth analysis of program performance. It relies on data generated through monitoring activities, as well as information obtained from other sources (e.g., studies, research, in-depth interviews, focus group discussions, surveys). Evaluations are often (but not always) conducted with the assistance of external evaluators.

| **Fidelity**                  | Fidelity in programs refers to how much of the program was delivered as intended, or more broadly what was the delivery quality, delivery intensity, content, training and supervision, and the recipients’ enactment of practices.

| **Implementation research**   | A scientific inquiry into questions concerning activities undertaken with the intention of producing an effect, which when applied to research promoting ECD can be on policies, programs, or individual practices (collectively called interventions). Implementation research includes the factors affecting implementation, the processes of implementation, and the results of implementation (process), including how to introduce potential solutions into health, education or social protection, and welfare systems, or how to promote their large-scale use and sustainability. There are two aspects to implementation research: (1) assessing implementation processes is mainly descriptive; and (2) evaluating the implementation goes beyond description by allowing one to note the extent to which activities took place as planned. Within a logic model, it entails an evaluation of the actual inputs (e.g., curriculum, visual aids, and training manual) and outputs (e.g., activities and services) in quality as well as quantity (modified from Ref. 4).

| **Nurturing care**            | A core set of interconnected behaviors, attitudes, and knowledge that support caregiving pertaining to health, hygiene, nutrition and feeding, stimulation and early learning opportunities, responsiveness, stability, safety, and protection from harm in order to optimally promote early child development.

| **Monitoring**                | Regular, routine, and systematic collection of information about a program, and tracking activities to make sure they are on-track to reaching the objectives. The purpose is to make sure the program is being implemented as planned and outputs are occurring as expected.

| **Scale**                    | The scaling-up of services refers to the process by which effective, evidence-based, affordable interventions reach more people, equitably and in a manner that can be sustained. In addition to increased coverage, the scope and quality of scaling-up can encompass new interventions and innovations, new beneficiaries, and depth of services in the existing portfolio. The process of scaling-up is underpinned by a multisectoral approach and may occur in deliberate phases to improve coverage and scope by testing interventions under conditions that inform scale in a range of contexts, creating enabling environments, advocacy to promote political will, increasing financing, building capacity, and strengthening diverse partnerships. Sustainable scale is underpinned by the inclusion of tested ECD interventions in government plans and budgets with a competent workforce implementing them.

| **Sustainability**           | Sustainability in programs refers to: (1) extent to which the core elements (the elements most closely associated with desired health benefits) are maintained; (2) extent to which desired benefits are maintained or improved upon, over time after initial funding or supports have been withdrawn; (3) and extent to adequate capacity for core elements is maintained (modified from Ref. 34).

| **Quality improvements**     | Systematic and continuous actions that lead to measurable improvements in services and desired outcomes of targeted beneficiaries (modified from Ref. 35).

response settings is reported by Murphy and colleagues (see Ref. 25).

Finally, we acknowledge that costing is an important element of implementation that is not represented in the present guidelines. As Gustafsson-Wright and Boggild-Jones report,\textsuperscript{26} costing of ECD interventions is complex and requires careful attention to a tremendous number of variables, such as types of services provided, how they are bundled, the settings, the ages of the
population served, transportation and materials involved, vulnerability of children, capital costs, volunteers and donations, intensity, duration, and training. The underlying framework is one that pays close attention to all the ingredients that make up the ECD program and that these are accounted for over the time period for which services are provided to the children and their caregivers (or both), depending on the type of service.\textsuperscript{27,28} Consequently, costing can easily require its own checklist and set of standards. While discussed in the guidelines, the paper by Gustafsson-Wright and Boggild-Jones\textsuperscript{26} also provides one potential look at better alignment by showcasing the application of a standardized costing tool.

Discussion

The C.A.R.E. guidelines we have developed from the e-Delphi process are an important step toward promoting transparent reporting of implementation research on nurturing care interventions. The evaluation of process for the implementation of interventions is one component of implementation research that the data generated from these evaluations can support. Analysis of pathways of process will enable researchers to identify how implementation features such as dosage and uptake affect outcomes. When employed in at-scale programs, routine monitoring data can be used to report some of the items in the guidelines; however, guidance and investment in assessments and tools to measure implementation features of nurturing care interventions are needed (see Ref. 29). It is also important that the evaluation of implementation is designed from the outset of program implementation building on formative research (see Ref. 30) and is supported by a plausible theory of change.\textsuperscript{31}

There are several challenges to applying these guidelines. First, the present guidelines are intended to be applied to a broad range of nurturing care programs (e.g., nutrition and early learning) and to a broad range of research and program designs. Second, articles on implementation research are rare in the peer-reviewed journals that publish outcome research on nurturing care interventions. Third, research and evaluation funding often limit the amount of implementation data one can collect and disseminate. Fourth, the guidelines will need to be disseminated, reviewed, and modified for use by program monitoring and evaluation personnel involved in scaling-up programs, so that data on implementation of nurturing care interventions are also systematically gathered in programs more generally. These challenges will need to be addressed by the global ECD community if implementation research is to be advanced.

High-quality implementation research is needed and the C.A.R.E guidelines are intended to foster transparency and standardization in implementation evaluation reporting, advance implementation evidence to support a broad range of nurturing care programs, and enable greater partnership and shared learning between the research and practice communities. Similar to the experience of other reporting guidelines (e.g., CONSORT Statement), these guidelines are likely to be further refined or supplemented following reviews of their utilization in the evaluation of interventions fostering great specificity for different types of interventions where needed.

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Competing interests

The authors declare no competing interests.

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