

## **Scaling-Up an Early childhood Parenting Intervention by Integrating into Government Health Care Services in Rural Bangladesh: A Cluster-Randomised Controlled Trial**

Mehrin, Syeda Fardina; Salveen, Nur-E; Kawsir, Masuma; Grantham-McGregor, Sally; Hamadani, Jena Derakshani; Baker-Henningham, Helen

**Child: Care Health and Development**

DOI:

[10.1111/cch.13089](https://doi.org/10.1111/cch.13089)

Published: 01/07/2023

Peer reviewed version

[Cyswllt i'r cyhoeddiad / Link to publication](#)

*Dyfyniad o'r fersiwn a gyhoeddwyd / Citation for published version (APA):*

Mehrin, S. F., Salveen, N.-E., Kawsir, M., Grantham-McGregor, S., Hamadani, J. D., & Baker-Henningham, H. (2023). Scaling-Up an Early childhood Parenting Intervention by Integrating into Government Health Care Services in Rural Bangladesh: A Cluster-Randomised Controlled Trial. *Child: Care Health and Development*, 49(4), 750-759. <https://doi.org/10.1111/cch.13089>

### **Hawliau Cyffredinol / General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

### **Take down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

# **Scaling-Up an Early childhood Parenting Intervention by Integrating into Government Health Care Services in Rural Bangladesh: A Cluster-Randomised Controlled Trial**

Authors: Syeda Fardina Mehrin,<sup>1</sup> Nur-E Salveen,<sup>1</sup> Masuma Kawsir,<sup>1</sup> Sally Grantham-McGregor,<sup>2</sup> Jena D Hamadani,<sup>1</sup> Helen Baker-Henningham<sup>3</sup>

<sup>1</sup>International Centre for Diarrhoeal Disease Research, Bangladesh, Dhaka, Bangladesh

<sup>2</sup>UCL Great Ormond Street Institute of Child Health, London, UK

<sup>3</sup>School of Human and Behavioural Sciences, Bangor University, Bangor, Gwynedd, UK

**Corresponding author:** Helen Baker-Henningham

**Funding:** This research was funded by British Academy Early Childhood Development Programme, Grant number: EC170101.

**Conflicts of Interest:** The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript or the decision to publish the results.

**Ethics Approval:** The proposal was approved by the Institutional review board of the International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b). Written informed consent was obtained from government health staff and all mothers who participated in the study.

**Data Availability Statement:** The data is available on request from the corresponding author.

**Acknowledgments:** The work was conducted at icddr,b. We thank the Government of Bangladesh for allowing us to conduct this project using their health infrastructure. We are also grateful to personnel of Directorate General Health Service (DGHS) and Directorate General of Family Planning (DGFP) under the Ministry of Health and Family Welfare of the Government of Bangladesh for their kind cooperation, all government health staff, parents and children who participated in this study and community leaders for their support. This work was supported by the the British Academy. icddr,b is also grateful to the Governments of Bangladesh, Canada, Sweden and the UK for providing core/unrestricted support.

## ABSTRACT

**Aims:** We evaluated the feasibility and effectiveness of utilising government health supervisors to train and supervise primary health care workers (HWs) in community clinics to deliver parenting sessions as part of their usual duties.

**Methods:** We randomly allocated 16 unions in the Mymensing district of Bangladesh 1:1 to an intervention or control group. HWs in clinics in the eight intervention unions (n=59 health workers, n=24 clinics) were trained to deliver a group-based parenting intervention, with training and supervision provided by government supervisors. In each of the twenty-four intervention clinics, we recruited twenty-four mothers of children aged 6-24 months to participate in the parenting sessions (n=576 mother/child dyads). Mother/child dyads attended fortnightly parenting sessions at the clinic in groups of four-to-five participants for six months (13 sessions). We collected data on supervisor and HW compliance in implementing the intervention, mothers' attendance and the observed quality of parenting sessions in all intervention clinics and HW burnout at endline in all clinics. We randomly selected 32 clinics (16 intervention, 16 control), and 384 mothers (192 intervention, 192 control) to participate in the evaluation on mother-reported home stimulation, measured at baseline and endline.

**Results:** Supervisors and HWs attended all training, 46/59 health workers (78%) conducted the majority of parenting sessions, (only two HWs (3.4%) refused), and mothers' attendance rate was 86%. However, supervision levels were low: only 32/57 (56.1%) of HWs received at least one supervisory visit. Intervention HWs delivered the parenting sessions with acceptable levels of quality on most items. The intervention significantly benefitted home stimulation (effect size=0.53SD, 95% confidence interval: 0.50, 0.56,  $p<0.001$ ). HW burnout was low in both groups.

**Conclusion:** Integration into the primary health care service is a promising approach for scaling early childhood development programmes in Bangladesh, although further research is required to identify feasible methods for facilitator supervision.

### **Keywords**

Parenting, stimulation in the home, integrated services, low- and middle-income country, psychosocial stimulation, health worker burnout

### **Key Messages:**

- Efficacy trials have shown that early childhood development parenting interventions benefit child development in low- and middle-income countries although scaling-up is a challenge.
- We evaluated the feasibility and effectiveness of integrating a parenting program into the primary health care system in rural Bangladesh with parenting sessions implemented by government health workers in community clinics and training and supervision provided by government health supervisors.
- Government supervisors were able to train the clinic health workers as shown by acceptable levels of health worker compliance in implementing the programme and the observed quality of parenting sessions.
- Mother attendance was high and the intervention led to significant benefits to the quality and quantity of home stimulation, measured as a proxy for child development.
- Integrating a parenting intervention into health workers' existing duties did not lead to increased burnout.

## 1. INTRODUCTION

Globally over 250 million children younger than age five years are at risk for poor development, leading to life-long negative consequences to their educational and economic attainment (Black et al., 2017). Although there is compelling evidence from low- and middle-income countries (LMIC) that early childhood parenting interventions benefit young children's development (Jeong et al., 2021), few interventions have been implemented at scale (Yousafzai et al., 2014; Araujo et al., 2021; Heckman et al., 2022). Integrating into government health services is a promising approach to going to scale, with some evidence of effectiveness (Yousafzai et al., 2014; Chang et al., 2015). However, there are also barriers to integration including limited capacity to reach large numbers of disadvantaged children (Gladstone et al., 2018), increased workload for frontline staff (Walker, Baker-Henningham et al., 2018; Brentani et al., 2021; Smith et al., 2018), staff turnover and/or non-compliance (Brentani et al., 2021; Smith et al., 2018), and the potential for staff burnout which has high prevalence among primary health care workers in LMIC (Dugani et al., 2018).

In Bangladesh, primary health care is delivered through a network of community clinics across the country. We previously integrated a parenting intervention into clinic services and government health workers (HWs) delivered parenting sessions with pairs or small groups of mother/child dyads as part of their routine duties. In two effectiveness trials of this approach, we found benefits to child development (Effect Sizes (ES) ranged from 0.52-1.3SD) and behaviour (ES=0.36-1.1SD), and to mothers' child-rearing knowledge (ES=1.3-1.7SD) and practices (ES=0.77-0.80SD) (Hamadani et al., 2019; Mehrin et al., 2022). These benefits were larger than those found for individual home-visiting in Bangladesh (Hamadani et al., 2006; Hossain et al., 2021; Tofail et al., 2013), possibly because groups provided social support and the HWs were better educated and more credible than previous home visitors. However, in these trials, the

research team trained and supervised the clinic HWs. For the intervention to be implemented at scale, training and supervision of the HWs needs to be conducted by government staff.

In this study, we assessed whether government inspectors were able to train and supervise HWs to run a high-quality programme. We assessed quality through: 1) data on intervention implementation including the observed quality of the parenting sessions, and 2) the effect of the intervention on mothers' reports of stimulation in the home. We also measured HW burnout.

## **2. METHOD**

### **2.1. Study Design and Participants**

The health service in Bangladesh is organized in districts divided into subdistricts, then unions. Each union consists of 2-3 community clinics. Clinics are staffed by three cadres of health workers: Community Health Care Providers (CHCPs), Health Assistants (HAs) and Family Welfare Assistants (FWAs). CHCPs work full time in the clinic; HAs and FWAs spend 2-3 days per week in the clinic and 3-4 days in the community. Inspectors based at the union-level supervise clinic HWs. Health Inspectors and Assistant Health Inspectors supervise CHCPs and HAs, Family Planning Inspectors supervise FWAs (**Figure 1**).

From July 2018 to March 2019, we conducted a cluster randomized controlled trial in two subdistricts of the Mymensing district, located 116 km West of Dhaka city. Within each subdistrict, eight unions were randomly selected to participate in the study. Each union had three community clinics giving a total of forty-eight clinics. Unions (n=16) were stratified by subdistrict and then randomized 1:1 to an intervention or control group by an independent statistician using a computer-generated code. Union was the unit of randomization as supervision is provided at the union-level. HWs in clinics located in intervention unions (n=24 clinics) conducted parenting sessions in addition to their regular duties; HWs in clinics located in unions

assigned to the control arm (n=24) continued with regular clinic services only. Clinics were randomized after recruiting HWs and before recruiting mother/child dyads. In the twenty-four clinics assigned to intervention, FWAs prepared a list of thirty young children aged 6-24 months old living within 30-minutes walking distance from the clinic. The FWAs then invited the mothers of the children serially until twenty-four mothers in each of the twenty-four intervention clinics were recruited (n=576 in total). When a mother was unavailable or refused, the mother of the next child from the list was invited to participate.

We randomly selected two community clinics from each union (16 intervention, 16 control) to participate in an evaluation of the effect of intervention on home stimulation. Within selected intervention clinics, twelve mother/child dyads were randomly selected to participate in the evaluation (n=192). Inclusion criteria for children were singleton birth and aged 6-24 months. Children with chronic illness or a disability were eligible to participate in the parenting sessions, but excluded from the evaluation sample. Within selected control clinics, FWAs prepared a list of twenty-four children living within a thirty-minute walk of the clinic and twelve mother/child dyads were randomly selected (n=192) using the same inclusion criteria as for the intervention group. We did not track recruitment in the full sample of twenty-four intervention clinics. However, in the evaluation sample, sixteen mothers in the sixteen intervention clinics and fifteen mothers in sixteen control clinics were replaced mostly due to mothers being absent from home and/or having migrated prior to recruitment (**Figure 2**).

Written informed consent was obtained from government health staff and all mothers who participated in the study. The proposal was approved by the Institutional review board of the International Centre for Diarrhoeal Disease Research, Bangladesh (iccdr,b). The trial is registered at the American Economic Association Registry for Randomized Controlled Trials, number: AEARCTR-0006536.

## **2.2. Intervention**

Mothers in intervention clinics attended fortnightly parenting sessions with their child in groups of 4-5 mother/child dyads for six months. The Group Reach-Up and Learn curriculum was used (Mehrin et al., 2021). Clinic HWs facilitated the parenting sessions: CHCPs conducted 1-2 parenting sessions per week, HAs and FWAs conducted one session per week. The research team trained government inspectors in the intervention unions to train and supervise HWs to facilitate the parenting sessions. See **Table 1** for details on the intervention content, process of delivery, structure, materials, and training and supervision of staff. Inspectors and clinic HWs in unions assigned to the control arm continued to provide regular health services with no additional activities.

## **2.3. Measurements**

We collected data on: 1) intervention implementation in intervention unions only, 2) burn-out of HWs in all forty-eight study clinics, 3) stimulation in the home in the subsample of thirty-two clinics. Data on HW burn-out and stimulation in the home were collected through interviewer-administered questionnaires by two female research assistants who were masked to group assignment.

### **2.3.1. Intervention Implementation**

We collected data on HWs' and inspectors' attendance at training, number of parenting sessions conducted, number of supervisory visits, and mothers' attendance at parenting sessions in all twenty-four clinics assigned to the intervention group. We also assessed the quality of the parenting groups through structured observations. Observations were conducted in the final



month of the intervention period by one of four observers. Each HW was observed conducting one parenting session. A structured observation checklist was used to rate HW's skills in conducting the activities, HWs' use of praise and encouragement, and the session atmosphere. Items were scored on a three-point scale, with descriptors on each point of the scale. Definitions of each item were given in a manual. Interobserver reliabilities between the master coder and the observers were calculated for each item prior to data collection. Intraclass correlations coefficients were mean: 0.70 (range: 0.55-0.96).

### **2.3.2. Staff burnout**

We measured HW burnout using the Maslach Burnout Inventory (MBI) (Maslach & Jackson, 1981) at post-test only. The MBI includes three subscales: emotional exhaustion, depersonalization and personal achievement and consists of 22 questions on a 7-point scale (0=never to 6=everyday). The measure was translated, independently back-translated and piloted with ten health staff who were not involved in the study. We reverse coded the personal achievement items and summed all items to create a total burnout score. Internal reliability using Cronbach's alpha ( $\alpha$ ) was 0.79. Test-retest over ten days with twenty participants was ICC=0.89.

### **2.3.3. Stimulation in the home**

Stimulation in the home was measured for mothers only in the evaluation clinics at baseline and post-test using an extended version of the Family Care Indicators (FCI) (Kariger et al., 2012). The FCI has been previously validated in Bangladesh and correlates highly with the HOME ( $r=0.72$  to  $0.73$ ), children' language skills ( $r=0.37$  to  $0.48$ ) and Bayley test scores ( $r=0.19$  to  $0.29$ ) (Hamadani et al., 2010). Data was collected at the mothers' homes. The extended FCI consisted of twenty-two yes/no questions about availability of a variety of play materials and the frequency

with which caregivers in the home conducted various play activities with the child (e.g. looking at books, singing with child, playing with child) . Internal reliability was  $\alpha=0.79$  at baseline and  $\alpha=0.86$  at endline; test-retest over 10-14 days with twenty mothers was ICC=0.75.

## **2.4. Analysis**

The study was powered based on the outcome of stimulation in the home. With twelve mothers evaluated in each clinic and using an intraclass correlation coefficient of 0.05, we required a sample size of 177 per group to detect an effect size of 0.4SD on home stimulation at 85% power at 0.05 level of significance. We recruited 192 mother/child dyads per group allowing for 8% loss.

Multilevel regression analyses, using MLWin v3.05 (Charlton et al., 2020), were used to examine the effect of intervention on home stimulation and HW burnout. The residuals were tested for normality. Normality was rejected for HW burnout and the raw scores were log-transformed. For stimulation in the home, we controlled for child age and sex, interviewer, baseline score and any differences between the groups at baseline as fixed effects and union and clinic as random effects. For staff burnout, we controlled for interviewer as a fixed effect and union and clinic as random effects. Effect sizes were calculated by dividing the regression coefficient with the SD of the control group at endline.

## **3. RESULTS**

### **3.1. Intervention Implementation**

All nineteen inspectors in intervention unions attended all training. Sixteen out of the nineteen inspectors trained were responsible for supervising clinic staff and all except one provided some supervision in the field. However, supervision levels were low (**Table 2**).

All fifty-nine HWs in intervention clinics attended the full complement of training. HWs conducted a mean (SD) of 11.1 (2.9) sessions (out of 13) (Table 2). The main reasons for missed sessions were leave, sickness and competing work duties although two HWs refused to conduct any sessions. The majority of missed sessions were covered by the CHCP in the respective clinic.

For the 576 mother/child dyads recruited in the intervention unions, the attendance rate was 86% (Table 2). Seventy-four mothers (12.8%) dropped out of the programme (53 no longer wanted to participate, 8 migrated, 13 as provider did not deliver the sessions).

Forty-seven (79.7%) HWs were observed conducting one parenting session. We were unable to observe twelve HWs (Figure 1). The majority of HWs reached acceptable levels of quality on items related to using the correct materials, explaining and demonstrating the activities to the mothers, encouraging caregiver participation, praising the children, allowing the children to explore the materials, supporting mothers as they practice the activities with their child, and creating a positive atmosphere (**Table 3**). However, there was no item for which >50% of the HWs were rated as very good. The aspects of the sessions conducted less well (>50% scoring poorly) were praising the mothers, asking mothers for feedback on last session's activities, conducting the language activities and reviewing the activities at the end of the session.

### **3.2. Staff burn-out**

All HWs reported on burnout (59 intervention, 60 control). Scores were low in both groups (**Table 4**), and there was no significant difference between HWs assigned to intervention or control (Effect size (ES)= 0.10 (-0.14, 0.36),  $p=0.68$ ) (**Table 5**).

### 3.3. Stimulation in the Home

384 mothers were recruited into the evaluation (192 intervention, 192 control). At post-test, ten (2.6%) mothers were lost (4/192 (2.1%) intervention, 6/192 (3.1%) control) (Figure 1). The only significant difference between the groups at baseline was for maternal education (**Table 4**).

In the evaluation subsample, mother attendance was similar to the full sample: 115/192 (60%) mother/child dyads in intervention clinics attended all thirteen sessions and the mean (SD) attendance was 11.4 (2.9). Twenty-six mothers (13.5%) dropped out of the programme: four migrated, twenty-two no longer wanted to participate.

We found significant benefits of intervention for home stimulation measured using the FCI (ES=0.53 (0.50, 0.56),  $p<0.0001$ ) (**Table 5**)

## 4. DISCUSSION

In this study, we report on an early childhood parenting programme that is fully integrated into primary health care services in rural Bangladesh with parenting sessions conducted by government health workers and training and supervision provided by government supervisory staff. We tested this model in a small cluster-randomised trial and found that it was feasible and effective. For example, government health staff attended all training sessions, most HWs conducted their allocated parenting sessions with acceptable levels of quality, mothers' engagement was good, and the intervention led to significant benefits to mothers' reports of stimulation in the home. Furthermore, the additional duties involved in implementing parenting sessions did not lead to higher burnout among HWs in intervention clinics compared to control clinics. Some challenges were also identified. Government inspectors provided limited field supervision and we identified a need to strengthen the quality of the parenting sessions.

This study extends the results from our two previous trials of integrating this parenting intervention into government health services in Bangladesh in which the researchers did the training and supervision. We report the same high HW compliance with training (100% compliance across all trials), similar HW compliance with delivering the sessions (78% of HWs conducted the majority of sessions versus 84-92% in previous trials), and similar levels of mother engagement (attendance rate of 86% versus 76-89% in previous trials) (Hamadani et al., 2019; Mehrin et al., 2022). We also found moderate benefits of intervention to stimulation in the home ( $ES=0.53SD$ ), but less than reported in the previous trials ( $ES=0.77-0.80SD$ ). However, this intervention was six months shorter (thirteen sessions) than twelve months (twenty-five sessions) in the previous studies (Hamadani et al., 2019; Mehrin et al., 2022). In a recent meta-analysis, the effect size for parenting practices from early childhood parenting interventions in LMIC was  $0.47SD$  (Jeong et al., 2021), similar to the effect size in this study. Home stimulation was measured as a proxy for child development as the intervention benefits child development by increasing the quality, frequency and variety of playful parenting practices (Walker, Chang et al., 2018). In addition, HW burnout was low among the clinic staff and there was no evidence of increased burnout among intervention HWs. These results are encouraging as they indicate that the intervention maintains its feasibility, acceptability and effectiveness when training and supervision of the HWs is integrated into the routine duties of government health inspectors.

Although government inspectors attended all the train-the-trainer workshops and delivered all training sessions to the clinic staff, field supervision was limited. Inspectors are required to visit each community clinic monthly and we encouraged inspectors to plan these visits to coincide with the schedule of the clinic parenting sessions. However, we found that these monthly visits were not conducted routinely. It is possible that alternative supervisory arrangements are necessary for wide-scale implementation. For example, it may be possible to utilize peer support

mechanisms in which CHCPs, who work full-time in the clinic, provide mentoring to FWAs and HAs. Alternatively, a new cadre of supervisory staff may be necessary. This would need to be tested in future studies.

High quality implementation of early childhood parenting interventions is associated with increased parent engagement and better caregiver and/or child outcomes (Luoto et al., 2021; Araujo et al., 2018; Bernal et al., submitted manuscript). Through the observations of the quality of the parenting sessions, we found that the majority of HWs reached an acceptable level of quality in using the participatory, interactive training methods (e.g. encouraging caregiver participation, creating a positive atmosphere) and using the behaviour change techniques (e.g. demonstration and practice) required for intervention delivery. However, there is room for improvement as only a minority of HWs were rated as very good. Some aspects of intervention delivery were weak, including praising the caregiver, conducting the language activities, conducting feedback from the previous two weeks activities and reviewing activities to be done at home in the following two weeks. These relative strengths and weaknesses of the HWs in delivering the sessions were similar to those reported from home-visiting early childhood parenting programmes (Rubio-Codina et al., 2019; Leer & Lopez-Boo, 2019). With ongoing training and supervision, implementation quality of parenting programmes increases over time (Luoto et al., 2021; Yousafzai et al., 2019). Hence, it will be important to ensure HWs receive ongoing support.

The strengths of the study are the use of a cluster-randomised design, good psychometric properties of the assessments used, outcomes measured by masked interviewers and the quality of the parenting sessions measured through structured observation. As clinic HWs delivered the parenting sessions with training and supervision from government inspectors, the model should be feasible at scale. Clinics were randomly selected from all clinics in the subdistricts to

participate in the study and the results should be generalizable to other clinics in rural Bangladesh. The study also had limitations. We had insufficient resources to include measurements of child development; however, the FCI has been shown to predict child cognition and language in rural Bangladeshi children (Hamadani et al., 2010). In addition, the burnout questionnaire has not been validated for use in Bangladesh and although interviewers were masked to group assignment, it is possible that respondents talked about the intervention during the interview. To maintain quality at scale, further attention needs to be given to ensuring HWs receive ongoing supervision and support.

In conclusion, we found that utilizing government health inspectors to train primary health care workers to conduct parenting sessions as part of their usual duties is a promising approach for scaling early childhood development programmes in Bangladesh. Health worker compliance in conducting sessions and mothers' attendance at sessions were good, health workers conducted sessions with adequate levels of quality and the intervention led to significant benefits to stimulation in the home. Furthermore, conducting the parenting sessions did not lead to increased burn-out among frontline health workers. However, government health inspectors provided inadequate levels of supervision and it may be necessary to use alternative staff to provide ongoing supervision by either hiring new supervisors for child development and/or using peer support mechanisms.

## REFERENCES

- Araujo CM, Dormal M, Grantham-McGregor S, Lazarte F, Rubio-Codina M and Schady N. (2021). Home visiting at scale and child development. *Journal of Public Economics Plus*, **2**, 100003. <https://doi.org/10.1016/j.pubecp.2021.100003>
- Araujo, M. C., Dormal, M., & Rubio-Codina, M. (2018). *Quality of Parenting Programs and*

*Child Development Outcomes: The Case of Peru's Cuna Mas*. IDB Working Paper Series No IDB-WP-951. Washington DC: Inter-American Development Bank.

Bernal, R., Gomez, M.L., Perez-Cardona., Baker-Henningham, H. (submitted). Implementation Quality of an Early Childhood Parenting Program in Colombia and Child Development. *Pediatrics*.

Black, M. M., Walker, S. P., Fernald, L. C. H., Andersen, C. T., DiGirolamo, A. M., Lu, C., McKoy, D. C., Fink, G., Shawar, Y. R., Shiffman, J., Devercelli, A. E., Wodon, Q. T., Vargas-Baron, E., & Grantham- McGregor, S. (2017). Early childhood development coming of age: science through the life course. *The Lancet*, **389**, 77–90.  
[https://doi.org/10.1016/S0140-6736\(16\)31389-7](https://doi.org/10.1016/S0140-6736(16)31389-7)

Brentani A, Walker S, Chang-Lopez S, Grisi S, Powell C, Fink G. A home-visit based early childhood stimulation programme in Brazil – a randomized controlled trial. *Health Policy Plan*, 2021;36:288-97. <https://doi.org/10.1093/heapol/czaa195>

Chang, S. M., Grantham-McGregor, S. M., Powell, C. A., Vera-Hernández, M., Lopez-Boo, F., Baker-Henningham, H., & Walker, S. P. (2015). Integrating a parenting intervention with routine primary health care: a cluster randomized trial. *Pediatrics*, *136*(2), 272-280.  
<https://doi.org/10.1542/peds.2015-0119>

Charlton, C., Rasbash, J., Browne, W. J., Healy, M., Cameron, B. (2020). *MLwiN Version 3.05*. Centre for Multilevel Modelling, University of Bristol.

Dugani, S., Afari, H., Hirschorn, L. R., Ratcliffe, H., Veillard, J., Martin, G., Lagomarsino, G., Basu, L., Bitton, A. (2018). Prevalence and factors associated with burnout among frontline primary health care providers in low- and middle-income countries: A systematic review. *Gates Open Research*, **2**, 4. <https://doi.org/10.12688/gatesopenres.12779.3>



Gladstone, M., Phuka, J., Thindwa, R., Chitimbe, F., Chidzalo, K., Chandna, J., Ware, S.G., & Maleta, K. (2018) Care for Child Development in rural Malawi: a model feasibility and pilot study. *Annals of the New York Academy of Sciences*, **1419**, 102–119.

<https://doi.org/10.1111/nyas.13725>

Hamadani, J. D., Huda, S. N., Khatun, F., Grantham-McGregor, S. M. (2006). Psychosocial stimulation improves the development of undernourished children in rural Bangladesh. *Journal of Nutrition*, **136**, 2645-2652. <https://doi.org/10.1093/jn/136.10.2645>

Hamadani, J. D., Mehrin, S. F., Tofail, F., Hasan, M. I., Huda, S. N., Baker-Henningham, H., Ridout, D., & Grantham-McGregor, S. (2019). Integrating an early childhood development programme into Bangladeshi primary health-care services: an open-label, cluster-randomised controlled trial. *The Lancet Global Health*, **7**, e366–e375.

[https://doi.org/10.1016/S2214-109X\(18\)30535-7](https://doi.org/10.1016/S2214-109X(18)30535-7)

Hamadani, J. D., Tofail, F., Hilaly, A., Huda, S. N., Engle, P., Grantham-McGregor, S. M. (2010). Use of family care indicators and their relationship with child development in Bangladesh. *Journal of Health and Population Nutrition*, **28**, 23-33.

<https://doi.org/10.3329/jhpn.v28i1.4520>

Heckman J, Liu B, Lu M, and Zhou J. The impacts of a prototypical home visiting program on child skills. *National Bureau of Economic Research Working Paper 27356*, 2022; <http://www.nber.org/papers/w27356>.

Hossain, S. J., Roy, B. R., Sujon, H. M., Tran, T., Fisher, J., Tofail, F., El Arifeen, S., Hamadani, J. D. (2021) Effects of integrated psychosocial stimulation and unconditional cash transfer (UCT) on Children's development in rural Bangladesh: A cluster randomized controlled trial. *Social Science and Medicine*, **293**, 114657.

<https://doi.org/10.1016/j.socscimed.2021.114657>

Jeong, J., Franchett, E. E., Ramos de Oliveira, C. V., Rehmani, K., & Yousafzai, A. K. (2021).

Parenting interventions to promote early child development in the first three years of life:

A global systematic review and meta-analysis. *PLoS medicine*, 18(5), e1003602.

<https://doi.org/10.1371/journal.pmed.1003602>

Kariger, P., Frongillo, E. A., Engle, P., Britto, P. M. R., Sywulka, S. M., Menon, P. (2012).

Indicators of family care for development for use in multicountry surveys. *Journal of Health*

*and Population Nutrition*, 30, 472-486. <https://doi.org/10.3329/jhpn.v30i4.13417>

Leer, J., & Lopez-Boo, F. (2019). Assessing the quality of home visit parenting programs in

Latin America and the Caribbean. *Early Child Development and Care*, 189(13), 2183–2196.

<https://doi.org/10.1080/03004430.2018.1443922>

Luoto, J. E., Lopez-Garcia, I., Aboud, F. E., Singla, D. R., Zhu, R., Otieno, R., & Alu, E. (2021).

An Implementation Evaluation of A Group-Based Parenting Intervention to Promote Early

Childhood Development. *Frontiers in Public Health*, 9(May), 1–17.

<https://doi.org/10.3389/fpubh.2021.653106>

Maslach C, Jackson SE. (1981). *Maslach Burnout inventory – Human Service Survey*. Mind Garden Inc:

Menlo Park, California.

Mehrin, S. F., Hamadani, J. D., Salveen, N., Hasan, M. I., Hossain, S. J., Baker-Henningham, H. (2021).

Adapting an evidence based early childhood parenting programme for integration into government

health care services in rural Bangladesh. *Frontiers in Public Health*, 8, 608173.

<https://doi.org/10.3389/fpubh.2020.608173>

Mehrin, S. F., Hasan, M. I., Tofail, F., Shiraji, S., Ridout, D., Grantham-McGregor, S., Hamdani,

J., D., Baker-Henningham, H. (2022). Integrating a group-based, early childhood parenting

intervention into primary health care services in rural Bangladesh: A cluster-randomised

controlled trial. *Frontiers in Pediatrics*, **10**, 886542.

<https://doi.org/10.3389/fped.2022.886542>

Rubio-Codina, M., Dormal, M., Araujo, M. C. (2019). Observing home-visiting quality at scale with the home visit rating scales and a supervisor checklist in Peru. *Infant Ment Health Journal*, **40**, 343–346.  
<https://doi.org/10.1002/imhj.21775>

Smith, J. A., Baker-Henningham, H., Brentani, A., Mugweni, R., & Walker, S. P. (2018). Implementation of Reach Up early childhood parenting program: acceptability, appropriateness, and feasibility in Brazil and Zimbabwe. *Annals of the New York Academy of Sciences*, **1419**, 120–140. <https://doi.org/10.1111/nyas.13678>

Tofail, F., Hamadani, J. D/, Mehrin, F., Ridout, D., Huda, S. N., Grantham-McGregor, S. M. (2013). Psychosocial stimulation benefits development in nonanemic children but not in anemic, iron-deficient children. *Journal of Nutrition*, **143**, 885-893.  
<https://doi.org/10.3945/jn.112.160473>

Walker, S. P., Baker-Henningham, H., Chang, S. M., Powell, C. A., Lopez-Boo, F., & Grantham-Mcgregor, S. (2018). Implementation of parenting interventions through health services in Jamaica. *Vulnerable Children and Youth Studies*, **13**, 127–141.  
<https://doi.org/10.1080/17450128.2017.1395100>

Walker, S.P., Chang SM, Smith, J.A., Baker-Henningham, H. (2018). The Reach up Early Childhood Parenting Program: Origins, Content, and Implementation. *Zero to Three* **38**, 37-43.

Yousafzai, A. K., Rasheed, M. A., Rizvi, A., Armstrong, R., & Bhutta, Z. A. (2014). 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. *The Lancet*, **384**, 1282–1293. [https://doi.org/10.1016/S0140-6736\(14\)60455-4](https://doi.org/10.1016/S0140-6736(14)60455-4)

Yousafzai, A.K., Rasheed, M.A., & Siyal, S. (2018) Integration of parenting and nutrition interventions in a community health program in Pakistan: an implementation evaluation. *Annals of the New York Academy of Sciences*, **1419**, 160-178. <https://doi.org/10.1111/nyas.1364>

**Table 1.** Group Reach Up and Learn Parenting Intervention

<b>Content</b>	The Group Reach Up and Learn interventions aims to promote responsive parenting and the quality of home stimulation, increase mothers' self-confidence and enjoyment in parenting, and promote young children's cognitive, language, motor and behavioural development. Mothers are introduced to developmentally appropriate play activities using low-cost play materials, books, and materials available in the home and are encouraged to chat and play with their child during everyday caregiving routines.
<b>Process of Delivery</b>	Demonstrations, practice activities, group discussions, positive feedback, and home activities are used in the delivery of the intervention. <i>Session Structure</i> 1) Feedback from the previous session, 2) Song, 3) Demonstration and practice of a toy, book and language activity (in four age bands: 6-11 months, 12-18 months, 19-30 months, 31-36 months), 4) Review and reminder of home activities.
<b>Structure</b>	<i>Location:</i> Community clinic <i>Frequency:</i> Fortnightly <i>Duration of each parenting session:</i> 40-50 minutes <i>Duration of intervention:</i> 6 months (13 sessions) <i>Participants:</i> 4-5 mother/child dyads in each group <i>Delivered by:</i> Three cadres of health staff in community clinics (Community Health Care Provider (CHCP), Health Assistant (HA), Family Planning Assistant (FWA))
<b>Materials</b>	<i>Facilitator Resources</i> • Facilitator manual giving full details for each parenting session (used to prepare for the session) • Laminated summary card for each session (used during the session) <i>Mother / Child Resources</i> • Play materials from recycled materials (e.g. shakers, stacking toys, push-a-long toys, nesting toys, pegboard) • Wooden blocks • Soft toys (e.g. doll, bean bag, ball) • Puzzle boards • Matching games • Crayon and paper • Picture books Mothers were given one toy and one book at each session and these were swapped for a different toy and book at the next fortnightly session.
<b>Training of Inspectors</b>	The research team trained 19 inspectors (12 Health Inspectors and 7 Family Planning Inspectors) from the eight intervention unions to train and supervise clinic staff to conduct the parenting sessions. Inspectors attended eight days of training and were trained in two separate groups of 9-10 persons. Inspectors also participated in 2-day refresher training halfway through the intervention.
<b>Training of Clinic Staff</b>	The government inspectors trained 59 clinic health staff (24 CHCPs, 17 HAs, 18 FWAs). Clinic staff received seven days of initial training, in groups of 13-15 participants, and a two-day refresher training midway through the intervention period (after 3 months). Sixteen inspectors provided supervision to the clinic staff. Each inspector was responsible for 2-3 community clinics and they were asked to attend a parenting session conducted by each health worker once a month during their regular clinic visits. Inspectors used a checklist to monitor the quality of the sessions and to guide them in providing appropriate support and feedback to the health worker. Health Inspectors provided supervision to CHCPs and HAs. Family Planning Inspectors provided supervision to FWAs.

**Table 2. Implementation Data**

	<b>N (%)</b>
<b>Number of parenting sessions conducted by health workers</b>	
• Number of health workers who conducted all 13 sessions	34/59 (57.6%)
• Number of health workers who conducted 10-12 sessions	12/59 (20.3%)
• Number of health workers who conducted 7-9 sessions	10/59 (17.0%)
• Number of health workers who conducted 4-6 sessions	1/59 (1.7%)
• Number of health workers who conducted 1-3 sessions	0/59 (0%)
• Number of health workers who conducted 0 sessions	2/59 (3.4%)
<b>Frequency of Supervision</b>	
• Number of health workers who received no supervisory visits	25/57 (43.9%)
• Number of health workers who received at least one supervisory visit	32/57 (56.1%)
• Number of health workers who were visited more than once	13/57 (22.8%)
• Number of health workers who were visited three or more times	4/57 (7.0%)
<b>Mother Attendance</b>	
• Mean (SD) number of sessions attended	11.2 (3.0)
• Number of mothers attending all 13 sessions	342/576 (59.4%)

CHCP-Community Health Care Provider, HA-Health Assistant, FWA-Family Welfare Assistant

\*Two health workers (1 HA and 1 FWA) refused to conduct sessions and hence the supervision data is given for the remaining 57 health workers.

**Table 3.** Quality of Parenting Sessions Conducted by Clinic Health Staff by Observation

<b>Items</b>	<b>Very good</b>	<b>Acceptable</b>	<b>Poor</b>
<b>Use of materials</b>	<b>All correct n (%)</b>	<b>Some correct n (%)</b>	<b>Few correct n (%)</b>
Use of correct materials and activities as in curriculum	21 (44.7)	23 (48.9)	3 (6.4)
<b>Methods used to introduce activities</b>	<b>Very well</b>	<b>Adequately</b>	<b>A little</b>
Explaining of the activities and objectives of the curriculum	8 (17.0)	31 (66.0)	8 (17.0)
Demonstration of the activities to the caregivers and children	18 (38.3)	21 (44.7)	8 (17.0)
Talked about the activities while demonstrating with the children	12 (25.5)	23 (48.9)	12 (25.5)
<b>Praise and Encouragement of Caregivers &amp; Children</b>	<b>Most of the time</b>	<b>Some of the time</b>	<b>Rarely or not at all</b>
Praised the caregivers	1 (21.1)	12 (25.5)	34 (72.3)
Caregivers actively participated in the session	21 (44.7)	21 (44.7)	5 (10.6)
Praised the children when they attempted / completed an activity	6 (12.8)	24 (51.1)	17 (36.2)
Gave children enough time to explore the materials	19 (40.4)	19 (40.4)	9 (19.1)
<b>Providing appropriate support to mothers</b>	<b>All mothers</b>	<b>Some mothers</b>	<b>Few or no mothers</b>
Helped mothers when they practice the play activities	12 (25.5)	22 (46.8)	13 (27.7)
<b>Session atmosphere</b>	<b>Very happy</b>	<b>Happy</b>	<b>Neutral</b>
Atmosphere of the session	6 (12.8)	31 (66.0)	10 (21.3)
<b>Session Activities</b>	<b>Done very well n (%)</b>	<b>Done Adequately n (%)</b>	<b>Done poorly n (%)</b>
Feedback from last week	5 (10.6)	8 (17.0)	34 (72.3)
Book activity	8 (17.0)	28 (59.6)	11 (23.4)
Language activity	7 (14.9)	10 (21.3)	30 (63.8)
Toy activity	14 (29.8)	25 (53.2)	8 (17.0)
Review of home activities	1 (2.1)	8 (17.0)	38 (80.9)

n= 47 clinic staff observed through independent observations using a checklist with clear definitions on each point of the scale.

**Table 4.** Baseline Characteristics and Endline Scores for Stimulation in the Home and Staff Burn-Out by Study Group

<b>Baseline characteristics</b>	<b>Control n=192</b>	<b>Intervention n=192</b>	<b>P-Value</b>
Gender: female, n (%)	99 (51.3%)	101 (52.6%)	0.80
Child's age (months)	18.33 (6.24)	17.18 (6.24)	0.07
Mothers' Education ( $\geq$ grade 5), n (%)	119 (61.7%)	140 (72.9%)	0.02
Fathers' Education ( $\geq$ grade 5), n (%)	108 (56.0%)	114 (51.4%)	0.50
Housewife mothers, n (%)	176 (91.2%)	180 (93.8%)	0.34
Fathers' Occupation (semi-skilled), n (%)	103 (50%)	103 (50%)	0.99
Total assets	6.44 (1.93)	6.44 (1.68)	0.99
Housing	5.27 (1.20)	5.26 (1.17)	0.98
Crowding	2.94 (1.35)	3.01 (1.33)	0.60
Stimulation in the home (Family care indicators (FCI))	4.98 (3.46)	5.42 (3.80)	0.24
<b>Endline Scores</b>	<b>n=186</b>	<b>n=188</b>	
Stimulation in the home (FCI)	7.02 (4.05)	9.42 (4.72)	<0.001
Burnout (median (interquartile range))	5 (3-9)	6 (3-11)	0.79

Data are mean and SD unless otherwise indicated. Total assets are the number of different items owned from the following: dressing table, television, computer, mobile phone, fan, clothes stand, refrigerator, duck or hen, cow or buffalo. Housing index is the sum of ratings the quality of wall, roof and floor condition and the absence or presence of electricity. Crowding is the number of persons/room. FCI=12 questions, potential range of scores 0-12; higher scores indicate higher levels of stimulation in the home. Burnout=22 questions, potential range of scores 0-132; higher scores indicate higher burnout.



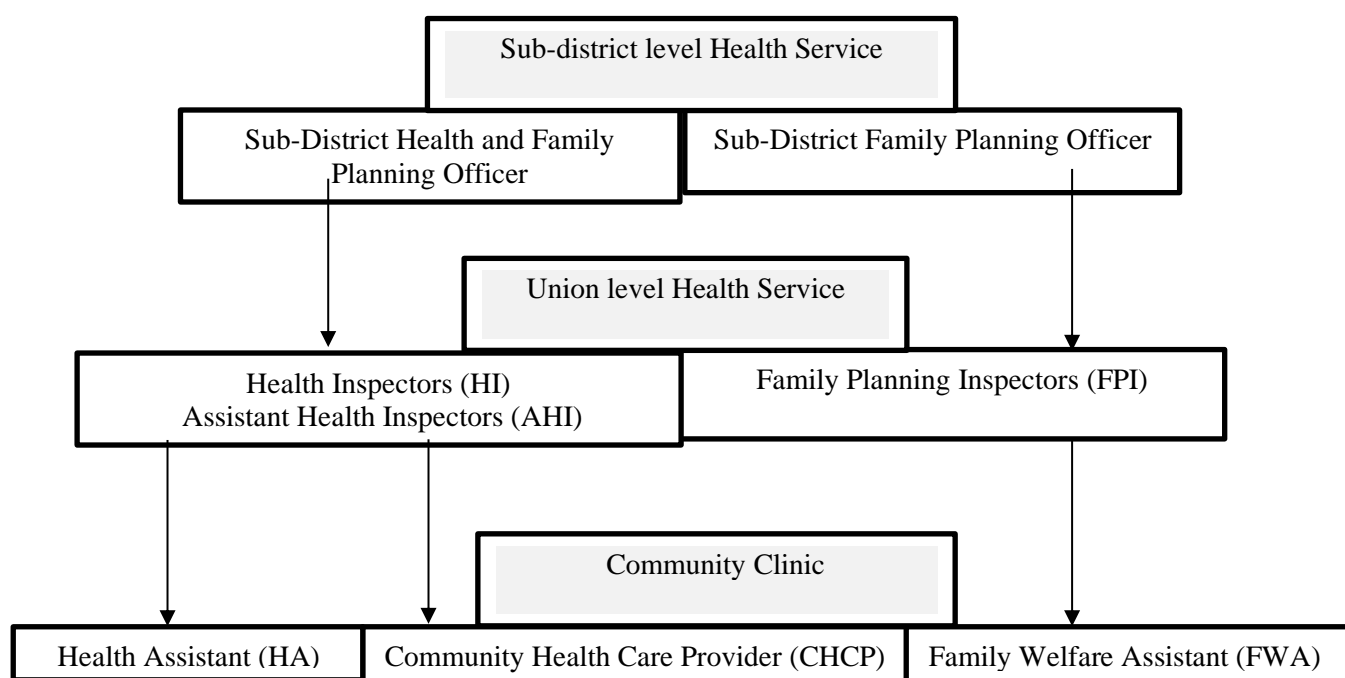
**Table 5.** Effect of Intervention on Stimulation in the Home and Health Worker Burn-Out

	<b>Regression Coefficient B (95% CI)</b>	<b>ICC union- level</b>	<b>ICC clinic- level</b>	<b>Effect size (95% CI)</b>	<b>P value</b>
Stimulation in the home <sup>1</sup>	2.13 (2.02, 2.25)	0.01	0.05	0.53 (0.50, 0.56)	<0.0001
Health worker burn-out <sup>2</sup>	0.04 (-0.05, 0.13)	0.00	0.16	0.10 (-0.14, 0.36)	0.68

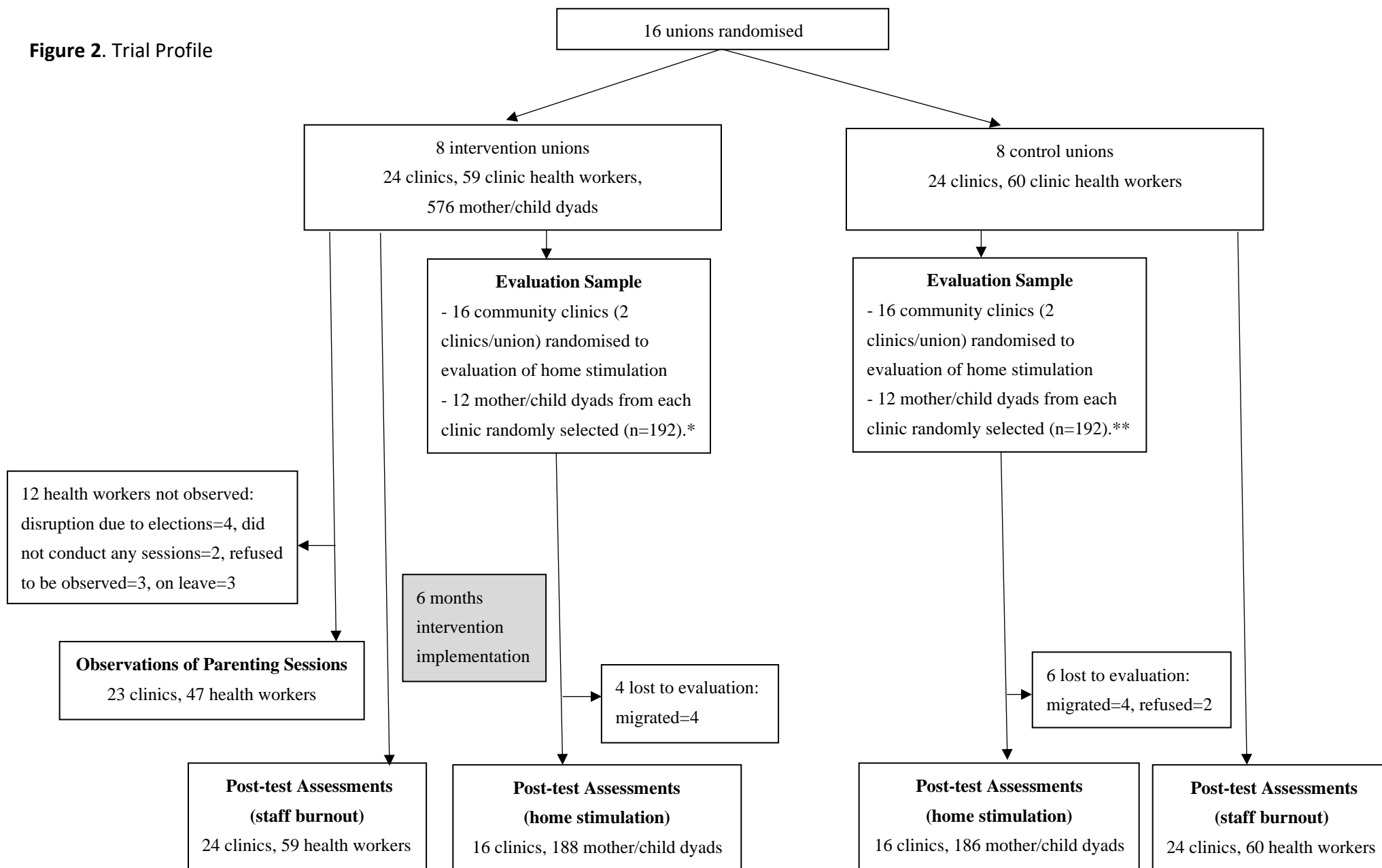
ICC=intraclass correlation coefficient. 1=control, 2=intervention. <sup>1</sup>Measured using the Family Care Indicators.

Analysis was adjusted for child age and sex, interviewer, maternal education, and baseline score as fixed effects and community clinic and union as random effects. <sup>2</sup>Measured using the Maslach Burnout Inventory. Scores were normalized with a log transformation and analysis was adjusted for interviewer as a fixed effect and community clinic and union as random effects. Effect sizes were calculated by dividing the regression coefficient with the standard deviation of the control group at baseline.

**Figure 1.** Primary Health Care Service Infrastructure



**Figure 2. Trial Profile**



\*16 mother/child dyads from the 16 evaluation intervention clinics were replaced with the next child on the list (1 overage, 1 refusal, 1 child with disability, 15 unable to be contacted). \*\*15 mother child dyads in the 16 evaluation control clinics were replaced (1 overage, 14 unable to be contacted).