Effects of institutional rearing and foster care on psychopathology at age 12 years in Romania: follow-up of an open, randomised controlled trial

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Summary

Background Early social deprivation can negatively affect domains of functioning. We examined psychopathology at age 12 years in a cohort of Romanian children who had been abandoned at birth and placed into institutional care, then assigned either to be placed in foster care or to care as usual.

Methods We used follow-up data from the Bucharest Early Intervention Project (BEIP), a randomised controlled trial of abandoned children in all six institutions for young children in Bucharest, Romania. In the initial trial, 136 children, enrolled at ages 6–31 months, were randomly assigned to either care as usual or placement in foster care. In this study we followed up these children at age 12 years to assess psychiatric symptoms using the Diagnostic Interview Schedule for Children (4th edition; DISC-IV). We also recruited Romanian children who had never been placed in an institution from paediatric clinics and schools in Bucharest as a comparator group who had never been in an institution. The primary outcome measure was symptom counts assessed through DISC-IV scores for three domains of psychopathology: internalising symptoms, externalising symptoms, and attention-deficit hyperactivity disorder (ADHD). We compared mean DISC-IV scores between trial participants and comparators who had never been placed in an institution, and those assigned to care as usual or foster care. Analyses were done by modified intention to treat. This trial is registered with ClinicalTrials.gov, number NCT00747396.

Findings We followed up 110 children from the BEIP trial between Jan 27, 2011, and April 11, 2014, and 49 children as comparators who had never been placed in an institution. The 110 children who had ever been placed in an institution had higher symptom counts for internalising disorders (mean 0·93 [SD 1·68] vs 0·45 [0·84], difference 0·48 [95% CI 0·14–0·82]; p=0·0127), externalising disorders (2·31 [2·86] vs 0·65 [1·33], difference 1·66 [1·06–2·25]; p<0·0001), and ADHD (4·00 [5·01] vs 0·71 [1·85], difference 3·29 [95% CI 2·39–4·18]; p<0·0001) than did children who had never been placed in an institution. Compared with 55 children randomly assigned to receive care as usual, the 55 children in the foster-care group had fewer externalising symptoms (mean 2·89 [SD 3·00] for care as usual vs 1·73 [2·61] for foster care, difference 1·16 [95% CI 0·11 to 2·22]; p=0·0255), but symptom counts for internalising disorders (mean 1·00 [1·59] for care as usual vs 0·85 [1·78] for foster care, difference 0·15 [–0·35 to 0·65]; p=0·5681) and ADHD (mean 3·76 [4·61] for care as usual vs 4·24 [5·41] for foster care, difference –0·47 [–2·15 to 1·20]; p=0·5790) did not differ. In further analyses, symptom scores substantially differed by stability of foster-care placement.

Interpretation Early foster care slightly reduced the risk of psychopathology in children who had been living in institutions, but long-term stability of foster-care placements is an important predictor of psychopathology in early adolescence.

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Introduction

Institutional rearing of children is associated with negative long-term sequelae across several domains of functioning (panel 1). In particular, heightened rates of psychopathology have been shown years after children are removed from institutional care, including increased internalising disorders, externalising disorders, and attention-deficit hyperactivity disorder (ADHD). These findings underline that early social deprivation affects several psychiatric domains. Yet, although studies of children after they leave institutions exist, most have had little ability to distinguish between the effects of institutional care and potential selection bias for placement into family care.

Results at the conclusion of the Bucharest Early Intervention Project (BEIP), a randomised controlled trial,4 at age 54 months showed that children never exposed to institutional care had significantly fewer symptoms, disorders, and impairments than did children with a history of institutional rearing.6 Children, especially girls, who were randomly assigned to foster care were significantly less likely to meet criteria for an internalising disorder at age 54 months than were children assigned to care as usual; however, no intervention effect was detected for externalising symptoms or disorders, or ADHD symptoms or disorders. This study reassesses psychopathology in the
The first aim of this study was to assess psychopathology in children who had experienced institutional rearing compared with children who had never been placed in an institution. We expected, as with our previous work and other research, that children who had lived in an institution would have greater symptoms of psychopathology. Our second aim was to assess the effectiveness of foster-care intervention on psychopathology in early adolescence. Although previous research comparing children who had lived in institutions with children in family placements is limited by selection bias (ie, the children’s placements were not randomly determined), we predicted reduced psychiatric symptoms in children who were removed from institutions and received foster care compared with those who received care as usual. In particular, we predicted fewer psychiatric disorders and symptoms in children randomly assigned to foster care, with the strongest expected effects on internalising disorders in girls, as we previously noted at 54 months. Finally, because some children had experienced changes in foster-care placements, our third aim was to examine the potential association of placement stability with psychopathology. This assessment was especially relevant because placement changes in foster care have been linked to differences in intelligence quotient (IQ). We predicted that in the foster-care group, stable placements would be associated with lower levels of psychopathology than disrupted placement.

**Methods**

**Study design and participants**

The original trial was a randomised controlled trial of abandoned children from all six institutions for young children in Bucharest, Romania (age range 6–31 months, mean age 22 months [SD 7·0]). We followed up original trial participants 8 years after the trial ended, when they were aged roughly 12 years. Details about the original sample are available elsewhere. A third group of Romanian children of similar age who had never been placed in an institution were recruited from paediatric clinics and schools in Bucharest, to act as a typically developing comparison group.

After approval by the institutional review boards of the three principal investigators (CHZ, NAF, and CAN), and by the local Commissions on Child Protection in Bucharest, the study started in collaboration with the Institute of Maternal and Child Health of the Romanian Ministry of Health. We obtained signed consent from each child’s legal guardian as per Romanian law, and written assent from each child for each procedure (unless the child had intellectual disabilities, in which case they gave verbal assent). The children who had never been placed in an institution also gave written assent and their legal guardians (parents) completed signed consents. Studies of vulnerable populations (especially young children raised in institutions) need special ethical consideration, which are discussed in detail elsewhere.

**Randomisation and masking**

In the original trial, after baseline assessment children were randomly assigned to care as usual or foster care by drawing names from a hat. The nature of our study meant that masking of group assignments to children, their carers, or study investigators was not possible. KLH completed the data analysis and was aware of the study variable meanings. In the follow-up assessment in this analysis, diagnostic interviewers were not informed of group assignment.

**Procedures**

Trial participants received either care as usual or foster care. Because Bucharest had a shortage of foster care at the outset of the trial, the BEIP investigators created a foster-care network with Romanian collaborators. The foster parents were supported by social workers in Bucharest who received regular consultation from US clinicians. After advertising and subsequent screening, 56 foster families were selected to care for 68 children. Described more fully elsewhere, the foster-care intervention was designed to be affordable, replicable, and grounded in findings from developmental research on enhancing caregiving quality.
We followed up the children when they were approximately 12 years in age and an interviewer administered the structured, computerised Diagnostic Interview Schedule for Children, 4th edition (DISC-IV)\(^2\) to each caregiver to ascertain DSM-IV\(^2\) diagnostic criteria for ADHD, anorexia nervosa, bipolar disorder, bulimia nervosa, conduct disorder, dysthymia, generalised anxiety disorder, major depressive disorder, obsessive-compulsive disorder, oppositional defiant disorder, panic disorder, post-traumatic stress disorder, separation anxiety disorder, social phobia, specific phobia, and tic disorder within the past year. The interviewer had not had previous contact with the children and was not informed about group status. DISC probes symptom levels, duration or persistence, age of onset, and functional impairment. It was first translated into Romanian, then back into English, and assessed for meaning at each step by bilingual research staff, although this instrument has not been specifically validated in Romanian populations. For children living with biological parents or foster parents, the mother reported on the child’s behaviour. If the mother was not available, fathers provided the report. For children living in institutions, an institutional caregiver who worked with the child regularly and knew them well.

Figure 1: Trial profile
Three children who were placed in foster care were moved from one placement to another and therefore were placed in the disrupted foster-care group.
Table 1: Baseline characteristics of study population

<table>
<thead>
<tr>
<th>Gender</th>
<th>Care as usual (n=55)</th>
<th>Foster care (n=55)</th>
<th>Never placed in institution (n=49)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All foster care</td>
<td>Disrupted*</td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td>(n=55)</td>
<td>(n=28)</td>
<td>(n=26)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>26 (47%)</td>
<td>26 (47%)</td>
<td>12 (46%)</td>
</tr>
<tr>
<td>Boys</td>
<td>29 (53%)</td>
<td>29 (53%)</td>
<td>14 (54%)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>13.03 (0.84)</td>
<td>12.99 (0.58)</td>
<td>12.90 (0.55)</td>
</tr>
<tr>
<td>Ethnic origin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Romanian</td>
<td>24 (44%)</td>
<td>33 (60%)</td>
<td>32 (60%)</td>
</tr>
<tr>
<td>Other/unknown</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data are n (%) or mean (SD). *One child excluded because she was reintegrated into her biological family before placement in foster care.

Table 2: Rates of psychiatric disorders by domain

<table>
<thead>
<tr>
<th>All children (n=159)</th>
<th>Care as usual (n=55)</th>
<th>Disrupted foster care (n=28)*</th>
<th>Stable foster care (n=26)</th>
<th>Ever placed in institution (n=110)</th>
<th>Never placed in institution (n=49)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychiatric disorder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any psychiatric disorder</td>
<td>24 (44%)</td>
<td>12 (43%)</td>
<td>7 (27%)</td>
<td>43 (39%)</td>
<td>8 (16%)</td>
</tr>
<tr>
<td>Internalising disorders</td>
<td>8 (15%)</td>
<td>6 (21%)</td>
<td>2 (8%)</td>
<td>16 (15%)</td>
<td>6 (12%)</td>
</tr>
<tr>
<td>Externalising disorders</td>
<td>17 (31%)</td>
<td>6 (21%)</td>
<td>4 (15%)</td>
<td>27 (25%)</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>ADHD</td>
<td>8 (15%)</td>
<td>8 (29%)</td>
<td>5 (18%)</td>
<td>21 (19%)</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

Girls (n=80)

| Any psychiatric disorder | 8/26 (31%) | 6/13 (46%) | 3/12 (25%) | 17/52 (33%) | 5/28 (18%) |
| Internalising disorders | 4/26 (15%) | 4/13 (31%) | 2/12 (17%) | 10/52 (19%) | 4/28 (14%) |
| Externalising disorders | 6/26 (23%) | 4/13 (31%) | 0/12 (0%)  | 10/52 (19%) | 1/28 (4%)  |
| ADHD | 3/26 (12%) | 3/13 (23%) | 1/12 (8%)  | 7/52 (14%)  | 1/28 (4%)  |

Boys (n=79)

| Any psychiatric disorder | 16/29 (55%) | 6/15 (40%) | 4/14 (29%) | 26/58 (45%) | 3/21 (14%) |
| Internalising disorders | 4/29 (14%)  | 2/15 (13%) | 0/14 (0%)  | 6/58 (10%)  | 2/21 (10%) |
| Externalising disorders | 11/29 (38%) | 2/15 (13%) | 4/14 (29%) | 17/58 (29%) | 1/21 (5%)  |
| ADHD | 5/29 (17%)  | 4/14 (29%) | 5/15 (33%) | 14/58 (24%) | 0/21 (0%)  |

Data are n (%) or n/N (%). *One child excluded because she was reintegrated into her biological family before placement in foster care.

Statistical analysis

We screened all 187 children younger than 2.5 years who were being raised in institutions in Bucharest, Romania, in February, 2001. We eliminated 51 potential participants because they had genetic syndromes, microcephaly, or obvious signs of fetal alcohol syndrome. The remaining 136 children were randomised. There was no power calculation because we studied all available children.

For the analysis of children who had ever been placed in an institution versus children who had never been placed in an institution, we used intention to treat. For the analysis of psychopathology in care-as-usual versus foster-care groups, we used a modified intention-to-treat analysis including all children randomly assigned to foster care or care as usual who were still in follow-up and who had DISC-IV data available. For the further analysis of the effect of foster-care stability on psychopathology, we assessed children in the foster-care group who were still participating in the trial at follow-up, had DISC-IV data available, and who were still living with their original foster carers at follow-up (if children moved from one study-supported foster-care placement to another, they were treated as disrupted in this study).

We obtained symptom count estimates and disorder prevalence estimates (appendix) for each group, with 95% CIs of group differences, using generalised linear models. Symptom counts provide more sensitive measures of psychopathology than do disorder-level analyses, which are reported in the appendix. Generalised linear models provide an alternative to the general linear model that allows for the outcome measures to have non-normal distributions (eg, count data). For disorders, we specified a binary logistic outcome because all disorder-level variables were coded as 0 (no disorder) or 1 (disorder). For symptom-level outcomes, we used a negative binomial model, which allows for overdispersion in the data.
Abbreviations

ADHD = attention-deficit/hyperactivity disorder
DISC = Developmental,IE, and Social Competence

Results

Between Jan 27, 2011, and April 11, 2014, we followed up 110 (81%) of the 136 children in the original randomised trial (55 assigned to foster care and 55 to care as usual; figure 1). Mean age of trial participants at follow-up was 12.95 years (SD 1.10). We also assessed 49 Romanian children recruited from paediatric clinics and schools in Bucharest (21 boys and 28 girls) who had never been placed in an institution. For 11 children who had ever been placed in an institution and 6 children who had never been placed in an institution, the father served as the reporter for DISC. Baseline characteristics for the two randomised groups and the comparator group who had never been placed in an institution are shown in table 1. When we followed up the children assigned to foster care, we noted that 26 had stable foster-care placements and 28 had disrupted placements (table 1). One child originally assigned to foster care was excluded from the analysis of foster-care stability because she was reunited with her biological family before placement into foster care. All placement decisions were made by the local commissions for child protection in Romania, thus we do not have information about why disruptions to foster care occurred. Prevalence of psychiatric disorders at follow-up is provided in table 2.

When results from all 110 children who had ever been placed in an institution were compared with those from 49 children who had never been placed in an institution, group status significantly affected all symptom domains (table 3). Children who had ever been placed in an institution had more internalising symptoms (mean DISC-IV score 0.93 [SD 1.68] vs 0.45 [0.84]; p<0.0001), externalising symptoms (2.31 [2.86] vs 0.65 [1.33]; p<0.0001), and ADHD symptoms (4.00 [5.01] vs 0.48 [0.82]; p<0.0001) than did children who had never been placed in an institution.

When girls and boys were analysed separately, girls (n=52) who had ever been placed in an institution had significantly more internalising symptoms than did girls (n=28) who had never lived in an institution (p=0.0006). However, group status did not affect internalising symptoms for boys (p=0.4801). Both girls and boys who had ever been placed in an institution had significantly more externalising symptoms than did those who had never been placed in an institution (p<0.0001 for girls; p=0.0016 for boys). Similarly, both girls and boys who had ever been placed in an institution
had significantly more ADHD symptoms than those who had never lived in an institution (p<0·0001 for both).

Internalising symptoms did not differ between the care-as-usual and foster-care groups (mean DISC-IV score 1·00 [SD 1·59] vs 0·85 [1·78], difference 0·15 [95% CI –0·35 to 0·65], p=0·5681; table 3). Analyses for girls and boys separately showed no effect of randomised group on internalising symptoms (p=0·7944 for girls and p=0·1874 for boys; table 3). Children in the care-as-usual group had significantly more externalising symptoms than children in the foster-care group (mean DISC-IV score 2·89 [SD 3·00] vs 1·73 [2·61], difference 1·16 [95% CI 0·11 to 2·22], p=0·0255). Among girls, group status did not affect counts of externalising symptoms; however, group status significantly affected externalising symptom count in boys (p=0·0271). ADHD symptoms did not differ between the care-as-usual and foster-care groups (p=0·5790). We noted no differences between groups even after ADHD results were analysed separately for girls and boys.

In a further analysis, we divided children who were randomly assigned to foster care into those with stable foster care and those with disrupted foster care. Children in stable placements did not significantly differ from those in disrupted placements for total psychiatric symptoms assessed at age 54 months (mean 9·17 [SD 20·36] for stable foster care vs 13·19 [10·04] for disrupted foster care, difference 4·01 [95% CI –9·32 to 1·30], full-scale IQ at age 54 months (mean 82·83 [20·22] for stable foster care vs 80·48 [17·69] for disrupted foster care, difference 2·35 [–8·43 to 13·12]), or percentage of time spent living in institutions through age 54 months (36% for stable foster care vs 37% for disrupted foster care, difference –0·22 [95% CI –7·60 to 7·16]; appendix).

We repeated the analysis of psychopathology as assessed by mean DISC-IV scores using the new foster-care groups of stable and disrupted placements. Figure 2 shows symptom counts by psychopathology domain, and figure 3 shows symptom counts by psychopathology domain and gender, using the new groupings. The full list of mean DISC-IV scores, differences with 95% CIs for pairwise comparisons, and p values of all comparisons are provided in the appendix.

Children in the care-as-usual group and disrupted foster-care groups had more internalising symptoms than children in the stable foster-care group and the group of children who had never been placed in an institution. This effect was also shown for girls (overall effect of group status among girls on internalising symptoms, p=0·0026; figure 3). The difference for internalising symptoms for girls in care as usual versus stable foster care was not significant. Among boys, the overall effect of group for internalising symptoms was also not significant (p=0·1711; figure 3).

For externalising symptoms, we noted a stepwise effect with symptoms decreasing across the care-as-usual group, followed by disrupted foster care, stable foster care, and never been placed in an institution (figure 2), with a significant effect of group status (p<0·0001). Group status also significantly affected externalising symptoms for girls (p<0·0001) and boys (p=0·0019; figure 3) separately. Girls in the care-as-usual and disrupted foster-care groups had significantly more externalising symptoms than those in the stable foster-care group or in the group who had never been placed in an institution; for boys, care as usual was associated with more externalising symptoms than disrupted foster care or no institutionalisation, but no differences were noted in externalising symptoms for boys in the stable foster-care group versus disrupted foster care.

Similarly, group status significantly affected ADHD symptom count (p<0·0001). Children in the care-as-
usual, disrupted foster-care, and stable foster-care groups had more ADHD symptoms than did those in the never-institutionalised group. Among both girls and boys, we noted a significant group effect for ADHD symptoms \( (p<0.0001 \text{ for girls}; p<0.0001 \text{ for boys}; \text{figure } 3) \). The pattern of ADHD symptom count for both genders was similar to the distribution for all children.

To address potential issues of non-independence, all analyses were rerun omitting one child from each pair (chosen at random). The results obtained from the reduced sample (data not shown) showed the same pattern of significant group differences as those obtained with the full sample.

**Discussion**

In this 8-year follow-up after the end of a randomised controlled trial, we examined psychiatric symptoms and disorders in Romanian children placed in institutional care who were assigned to foster care or care as usual, and in children who had never been placed in an institution. In our cohort, we noted that a history of institutional rearing was associated with higher levels of psychiatric morbidity, internalising psychopathology, externalising psychopathology, and ADHD at 12 years of age compared with a cohort of typically developing children who had never been placed in an institution. In our main analysis, we noted that a history of institutional rearing was associated with higher levels of psychiatric morbidity, internalising psychopathology, externalising psychopathology, and ADHD at 12 years of age compared with a cohort of typically developing children who had never been placed in an institution. In our main analysis, we noted that a history of institutional rearing was associated with higher levels of psychiatric morbidity, internalising psychopathology, externalising psychopathology, and ADHD at 12 years of age compared with a cohort of typically developing children who had never been placed in an institution.

Our findings here contrast with the results of the trial at 54 months,\(^8\) in which an intervention effect was shown for girls in internalising disorders, but at 12 years, no effect was noted in internalising disorders for girls or boys. Although no group differences were apparent at this timepoint for internalising disorders, reductions
were noted in internalising disorders for children with a history of institutional care. At 54 months, 44% of the care-as-usual group and 22% of the foster-care group had internalising disorders, whereas at age 12, 15% of both groups had an internalising disorder (appendix). Thus, internalising symptoms seem to be reduced across all groups by age 12 years.

The children in our sample experienced many disruptions between age 4 and 12 years (figure 1). When we undertook analyses using stable and disrupted foster care as separate groups, we noted important differences in psychopathology at age 12 years in children who had experienced early psychosocial deprivation but remained in stable, high-quality foster care following initial placement into the study compared with children whose placements into foster care were disrupted. We are mindful of the drawbacks of breaking the intention-to-treat statistical plan; in doing so, we risked potential sample bias. However, without this further analysis, we were unable to examine the intervention effects directly because we could not distinguish the outcomes resulting from the intervention versus those resulting from other factors. Additionally, this approach might provide a more realistic perspective on child outcomes after foster-care interventions in view of the high levels of placement disruption experienced by children in foster care. One possibility—that children no longer in their foster-care placement might differ from those who remained in their placement—was examined to establish whether child characteristics could predict disruptions. Our analyses showed no evidence to support this explanation, because the children whose placements were disrupted were similar to those whose placements remained stable for institutional-care history, IQ, and total psychiatric symptoms at age 54 months. Thus, our results are at least compatible with the notion that disruptions lead to psychopathology, rather than the other way around.

Clear policy implications exist for studying the effect of the stability of placements on the long-term outcomes of family-placement interventions after institutional rearing. These could be done in conjunction with other research documenting the harmful effect of placement disruptions in foster care, and could lend support to the belief that stable placements are crucial for positive child development. Our approach to following the placement...
paths of children after initial foster-care placements might better track real-life outcomes of young people with a history of institutional care who obtain foster placements. Externalising symptoms were affected by the instability of the foster-care placement. Symptoms for children with stable placements did not significantly differ from those for children who had never been placed in an institution, but both groups had significantly lower levels of externalising symptoms than children whose placements were disrupted, or those from the care-as-usual group. For internalising symptoms, stability of the foster-care placement was especially important, such that children who remained in their foster-care placement had significantly lower levels of internalising symptoms than children from the foster-care group who were no longer in their original placements, and children from the care-as-usual group. In fact, children displaced from their foster-care placement had similar amounts of internalising symptoms as did those in the care-as-usual group, emphasising the adverse effects of placement disruptions on vulnerable children.

By contrast with the externalising and internalising domains, for which the effects of placement stability were related to lower levels of psychopathology, ADHD was unrelated to placement stability. The persisting rise of ADHD for both boys and girls across all groups who had ever been placed in an institution is similar to results from other research that shows increased inattention and hyperactivity symptoms after institutional rearing, and also the persistence of these symptoms even after adoption. Other studies of young people who have lived in institutions have found that ADHD symptoms were fewer in children who remained with their original foster families. In our modiﬁed intention-to-treat analysis, the effects were slight; however, several reasons exist why a randomised trial done in early childhood might produce ﬁndings that attenuate over time, including the effects of subsequent life events after the initial foster-care placement. Thus, this study provides support for policies promoting early intervention for children living in institutions, and emphasises the need for maintaining high-quality foster-care placements across childhood and into early adolescence.

Our study had several limitations, including the use of only caregiver reports to establish psychopathology; however, a substantial number of children had sufﬁciently low IQs that the data obtained regarding their own symptom reports were unreliable. Additionally, because this study consists of a follow-up to a randomised trial, we were limited by the number of available participants within each group, thus the power to detect differences in the planned analyses was low. Although many of the group comparisons were signiﬁcantly different, the wide CIs suggest that uncertainty remains about the precision of effect sizes. An additional limitation relates to the potential role of disruptions within the care-as-usual group, because all children in this group had experienced placement disruptions by age 12 years: at this age, about one-third were in institutional care (although all changed institutions at least once), one-third were in non-related family-care placements, and one-third were reintegrated with their biological families.

In conclusion, stable, high-quality foster care emerged as an important predictor of reduced psychopathology in early adolescence for children who had experienced severe deprivation in their early life. Although ADHD was impervious to foster-care intervention and placement stability, internalising and externalising psychopathological symptoms were fewer in children who remained with their original foster families. In our modiﬁed intention-to-treat analysis, the effects were slight; however, several reasons exist why a randomised trial done in early childhood might produce ﬁndings that attenuate over time, including the effects of subsequent life events after the initial foster-care placement. Thus, this study provides support for policies promoting early intervention for children living in institutions, and emphasises the need for maintaining high-quality foster-care placements across childhood and into early adolescence.

Contributors KLH and CHZ did the literature search. KLH constructed the ﬁgures. CAN, NAF, and CHZ designed the study. CAN, NAF, and CHZ supervised the data collection. KLH did the data analysis. KLH, MMG, SSD, CAN, NAF, and CHZ interpreted the data. KLH, MMG, SSD, DM, CAN, NAF, and CHZ wrote the manuscript.

Declaration of interests We declare no competing interests.

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References