Preventing maltreatment in institutional care: A cluster-randomized controlled trial in East Africa

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ABSTRACT

An increasing number of orphans in low- and middle-income countries are living in institutional care facilities where they experience poor quality of care and ongoing maltreatment. To prevent maltreatment, we tested the effectiveness and feasibility of the intervention *Interaction Competencies with Children – for Caregivers (ICC-C)*. In a two-arm cluster-randomized controlled trial, 203 caregivers (65.5% female, $M_{age} = 36.63$ years, $SD_{age} = 12.26$) and 356 children (46.1% female, $M_{age} = 9.43$ years, $SD_{age} = 1.93$) from 24 orphanages in Dar es salaam (Tanzania) participated from August to October 2018 (Baseline) and March to April 2019 (Follow-Up). Orphanages were assigned to the intervention or waitlist-group. Caregivers in the intervention group received the *ICC-C* intervention to prevent maltreatment through focusing on non-violent caregiving strategies. The primary outcome was the change in self-reported maltreatment by caregivers (Conflict Tactics Scale). Trial registration: ClinicalTrials.gov, NCT03594617, 20 July 2018. Participation in the intervention resulted in a significant reduction in reported maltreatment ($f^2 = 0.153$), a decrease of positive attitudes toward violent discipline ($f^2 = 0.248$), and an increased level of childcare knowledge ($f^2 = 0.220$) in the caregiver sample, each indicating a moderate effect. Caregivers' training participation did not predict reduced maltreatment reported by children. Aspects of feasibility, including motivation to participate, acceptability, and integration of the new strategies were evaluated positively. The study promises initial effectiveness and feasibility of efforts to improve the situation of children in institutional care settings in resource-poor countries by offering training to care providers.

1. Introduction

Globally, the prevalence of violent child discipline is very high, and this is especially the case on the African continent (Akmatov, 2010). Violent discipline is defined as any physical or psychological force which aims at correcting or controlling children's behaviour by causing emotional or physical pain (Antonowicz, 2010). There is an abundance of evidence that violent discipline has negative long-term effects (Altschul et al., 2016; Ferguson, 2013). Orphaned youth are at particular risk of experiencing violence in different care settings (Hermenau et al., 2015a).

In Tanzania, HIV/AIDS and other parental illnesses, poverty, and abandonment have led to an increasing number of orphans (Hecker et al., 2017). For example, an estimated 1,300,000 children are orphaned due to HIV/AIDS (Makuu, 2019). Despite research indicating that family care settings offer better alternatives (van IJzendoorn et al., 2020), many orphans are still placed in institutional care. Due to limited resources and infrastructure, care settings in developing countries are overburdened (Li et al., 2008), and often lack quality caregiving. This includes nurturing and stable caregiver-child relationships, and stimulating, secure environments (Crosnoe et al., 2010). Due to sociocultural norms and poor working conditions, like no official registration and monitoring of the orphanages, like low caregiver-child rations, work-long shifts with almost no contracts, high staff-turnover, low salaries,

and lack of childcare specific education, caregivers experience difficulties meeting the socio-emotional needs of children and frequently resort to violent discipline (Carr et al., 2018; Hermenau et al., 2015b). In addition, children's mental health problems exacerbate exposure to repeated violence and neglect (Hermenau et al., 2014; Sherr et al., 2017), and high staff turnover and instability in child placements contribute to structural neglect (Hermenau et al., 2017). Taken together, ongoing maltreatment and lack of quality caregiving can have detrimental effects on children's psychological and physical development (Gray et al., 2015; Whetten et al., 2011).

Though family-based care generally promotes the best outcomes for children (van IJzendoorn et al., 2020), current challenges in developing countries, such as the lack of financial resources, governmental support, and professional social-work infrastructure, make it impossible to provide family-based care to all orphaned youth within a short period of time (McCall, 2013). This necessitates approaches which emphasize the improvement of institutional care even as the field continues to advocate for family-based care (McCall and Groark, 2015). Recent research has shown that interventions in institutional care settings, even short-term caregiver trainings, can improve children's living conditions and development (Hermenau et al., 2017; Werner et al., 2016). However, existing intervention approaches focus mainly on the improvement of caregiving quality by reducing structural neglect. Yet, children's exposure to violence by caregivers must also be considered an integral target of training (Hermenau et al., 2017).

To comprehensively improve the quality of caregiving provided in institutional settings, approaches emphasizing the improvement of care and the prevention of maltreatment are required (Hermenau et al., 2017). To address this, the preventative approach 'Interaction Competencies with Children – for Caregivers (ICC-C)' was developed (Hecker et al., 2017). ICC-C aims to improve the necessary skills to interact with children in institutional care settings and addresses high needs in orphanages facing limited resources. In a pilot study, ICC-C demonstrated good feasibility in an orphanage in Tanzania (Hermenau et al., 2015b). However, the effectiveness of ICC-C has not yet been demonstrated in a controlled study. To test the *effectiveness*, we hypothesized a significantly greater change in caregiver-reported maltreatment of children from baseline to follow-up in the intervention condition compared to the waitlist condition. We also included children's reports expecting to replicate the findings of the caregivers' reports. In addition, we hypothesized a significantly greater change in positive attitudes toward violent discipline in the intervention condition. Reducing positive attitudes toward violent discipline is an important outcome as interventions which targeted attitudes have been effective in changing parental disciplinary behavior (Holland and Holden, 2016). As the training provides basic knowledge in childcare, we further hypothesized that participation in the intervention would lead to a significantly greater change in childcare knowledge from baseline to follow-up relative to the waitlist condition. Furthermore, we hypothesized good *feasibility* of ICC-C. Specifically, we expected high acceptability and an easy integration of the training's skills and principles into the caregivers' work.

2. Methods

2.1. Study design and setting

The study was a parallel group cluster-randomized controlled trial (CRCT) involving all orphanages in Dar es Salaam city, Tanzania. The 25 orphanages were randomly assigned to the intervention or to the waitlist condition. A true random number service, http://www.random.org, was used for randomization and allocation. Caregivers working in orphanages in the intervention condition received the training after baseline assessment, whereas caregivers working in orphanages in the waitlist condition received the training after follow-up.

2.2. Participants

2.2.1. Orphanages

Out of the 24 institutions five orphanages were fully registered, 10 were in the process of registration and 9 orphanages were not registered. Between 13 and 121 children and adolescents (*Mdn* = 46), ranging from 0 to 28 years of age (note that some young adults are supported for studies at university) were living in the orphanages. The average *caregiver-child ratio* was 1:10, *range* 1:5–1:23. Excepting one orphanage, no primary caregiver concepts were applied in the orphanages. Therefore, we did not consider clustering within the orphanages.

2.2.2. Caregivers

In total, 203 caregivers (65.5% female) with a mean age of 36.63 years (*SD* = 12.26, *range* = 18–77) participated in the study. Further details can be found in Table 1. Fig. 1 shows the caregivers' flow of participation.

2.2.3. Children

In total, 356 children (46.1% female) with a mean age of 9.43 (*SD* = 1.93, *range* = 6–12) participated in the study. Children were 6.33 years old (*SD* = 2.60, *n* = 252) when they were placed outside of their family of origin and had been living for a mean of 4.31 years (*SD* = 3.20, *n* = 304) in the institutions. All children were currently enrolled in a school (Supplementary Material (SM) 1 and Fig. 1).

Table 1

Descriptive statistics of demographics of caregivers separated by intervention and waitlist condition.

	Intervention condition		Waitlist condition	
	N	n (%)	N	n (%)
Gender (male)	130	52 (40.0)	73	18 (24.7)
Own children (yes)	130	91 (70.0)	73	50 (68.5)
Specialized training in childcare (yes)	130	45 (34.6)	71	35 (47.9)
Work hours				
Living at the orphanage	126	50 (39.7)	70	32 (45.7)
Fulltime (>40 h per week)	126	51 (40.5)	70	21 (30.0)
Part time	126	9 (7.1)	70	12 (17.1)
Voluntary work	126	16 (12.7)	70	5 (7.1)
Other sources of income (yes)	130	53 (40.8)	72	26 (36.1)
Salary (yes)	123	91 (75.4)	70	53 (76.7)
Monthly income 100 USD or higher	123	24 (19.5)	70	21 (30.0)
Formal contract (yes)	128	32 (25.0)	70	18 (25.7)
	N	M (SD)	N	M (SD)
Age	130	36.18 (12.56)	73	37.44 (12.30)
Years of education	130	9.72 (2.83)	72	10.03 (3.09)
Years worked as a caregiver	128	6.49 (5.92)	71	7.52 (8.43)
Duration of childcare-related education, in weeks	32	13.01 (14.28)	25	15.15 (15.76)
Interaction time with children (hours per day)	106	2.39 (2.56)	62	2.58 (2.96)
Time for housekeeping activities (hours per day)	109	1.58 (1.10)	58	1.42 (1.38)
Household income/ month (in USD)	123	65.00 (95.53)	70	80.91 (84.52)
Days of holiday per year	101	16.69 (19.49)	58	14.78 (15.50)
Work satisfaction [a]	130	2.41 (0.85)	72	1.93 (1.17)
Self-rating child-care knowledge [a]	129	1.91 (0.90)	73	1.79 (0.97)

Note. N = number of participants who answered the item, *n* = absolute number of participants who answered with yes, *M* = mean, *SD* = Standard Deviation. Because of cluster effects no inference statistical analysis is made.

[a] Items 'work satisfaction' and 'self-rating child-care knowledge': ratings on a 4-point Likert Scale with a possible range from 0 to 3.
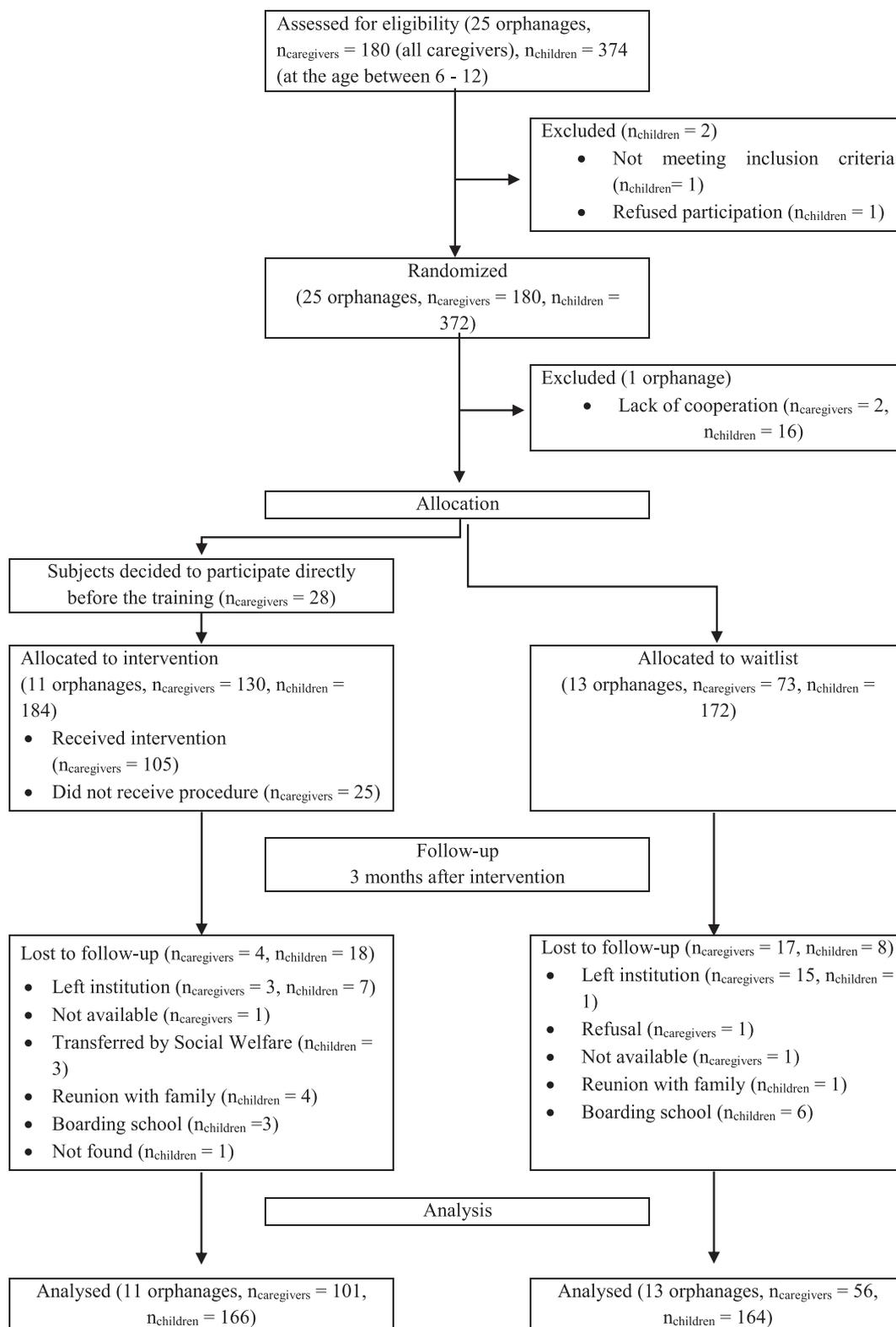
Assessed for eligibility (25 orphanages, $n_{caregivers}$ = 180 (all caregivers), $n_{children}$ = 374 (at the age between 6 - 12)

Excluded ($n_{children}$ = 2)
- Not meeting inclusion criteria ($n_{children}$ = 1)
- Refused participation ($n_{children}$ = 1)

Randomized
(25 orphanages, $n_{caregivers}$ = 180, $n_{children}$ = 372)

Excluded (1 orphanage)
- Lack of cooperation ($n_{caregivers}$ = 2, $n_{children}$ = 16)

Allocation

Subjects decided to participate directly before the training ($n_{caregivers}$ = 28)

Allocated to intervention
(11 orphanages, $n_{caregivers}$ = 130, $n_{children}$ = 184)
- Received intervention ($n_{caregivers}$ = 105)
- Did not receive procedure ($n_{caregivers}$ = 25)

Allocated to waitlist
(13 orphanages, $n_{caregivers}$ = 73, $n_{children}$ = 172)

Follow-up
3 months after intervention

Lost to follow-up ($n_{caregivers}$ = 4, $n_{children}$ = 18)
- Left institution ($n_{caregivers}$ = 3, $n_{children}$ = 7)
- Not available ($n_{caregivers}$ = 1)
- Transferred by Social Welfare ($n_{children}$ = 3)
- Reunion with family ($n_{children}$ = 4)
- Boarding school ($n_{children}$ = 3)
- Not found ($n_{children}$ = 1)

Lost to follow-up ($n_{caregivers}$ = 17, $n_{children}$ = 8)
- Left institution ($n_{caregivers}$ = 15, $n_{children}$ = 1)
- Refusal ($n_{caregivers}$ = 1)
- Not available ($n_{caregivers}$ = 1)
- Reunion with family ($n_{children}$ = 1)
- Boarding school ($n_{children}$ = 6)

Analysis

Analysed (11 orphanages, $n_{caregivers}$ = 101, $n_{children}$ = 166)

Analysed (13 orphanages, $n_{caregivers}$ = 56, $n_{children}$ = 164)

Fig. 1. Participant flow chart. Modified from CONSORT 2010.

2.3. Procedure

We contacted every welfare office in all five municipal councils to get access to all registered orphanages. Additionally, every orphanage and every sponsor were asked for further unregistered orphanages. All caregivers employed at these orphanages were eligible if they were of legal age (18 years) and signed the written informed consent (response rate: 94%). Depending on the size of the orphanage, 15 to 20 children between 6 and 12 years of age were randomly selected. Children were eligible if the legal guardian (i.e. heads of institutions) signed the informed consent and they themselves provided oral assent prior to the assessment (response rate: 99%).

Prior to the baseline assessment, the research team visited partici-pating institutions and explained the procedure and aims of the study to

the heads and caregivers. Six research assistants were trained for five days to support data collection at baseline. A two-day refresher training was conducted before the follow-up assessment and two additional assistants were selected for support. Data collection took place at the institutions from August to October 2018 (baseline), followed by a two-month intervention period and a follow-up period from March to April 2019. Feasibility data were collected in the intervention group directly before and after the intervention at the training location, and at the institutions at follow-up. Assessors were blinded to the orphanages' research condition. Study instruments were either available in Swahili or translated from English to Kiswahili according to recommended procedures in transcultural research (Brislin et al., 1973). The assessments were conducted individually via face-to-face structured interviews. In the event that children or caregivers experienced emotional distress or the severe abuse of children was disclosed, a counselling psychologist provided support. Interviews took, on average, 30 min for caregivers and 45 min for children. The Institutional Review Board of the University of Konstanz, Germany approved the trial. A research permit was approved by the University of Dar es Salaam on behalf of the Tanzanian Commission for Science and Technology. The trial was registered with ClinicalTrials.gov, number *NCT03594617*. There were deviations from the study protocol (see SM2). The supporting *CONSORT* checklist is displayed in SM3.

2.4. Intervention

The intervention *Interaction Competencies with Children – for Caregivers (ICC-C)* is described in detail in Table 2.

2.4.1. Intervention procedure

Before participating in the intervention, participants signed an informed consent form. Each caregiver was allocated to one of three

Table 2
Description of the **intervention** (adapted from the TIDieR checklist).

Brief name	Interaction Competencies with Children – for Caregivers (ICC-C)
Rationale, theory, and goals	Aim: Maltreatment prevention and improvement of caregiver-child relationship; based on attachment, behavioral, and social learning theories and the guidelines set forth by the American Academy of Pediatrics (1999); inspired by the *FairstartGlobal* training concept (Rygaard, 2010); maltreatment prevention components were grounded in the work of Dreikurs et al. (2004)
Materials	ICC-C manual (with facilitator instructions, handouts, theoretical inputs, instructions for discussions and roleplays), materials can be assessed upon request
Procedure	ICC-C begins with a welcome session in which the expectations, wishes, and concerns of the trainees are explored. Seven core components form the content of ICC-C: child development (3 sessions at 90 min, caregiver-child relationship (4 sessions at 90 min), effective caregiving strategies (8 sessions at 90 min), maltreatment prevention (7 sessions at 90 min), supporting burdened children (7 sessions at 90 min), child-centered institutional care (7 sessions at 90 min), teamwork and supervision (2 sessions at 90 min). At the end of the first and second week, one session of 90 min should be used to repeat and highlight what the caregivers have learned and for an open discussion of questions.
Provider	Three trainers with background in psychological training
Location	At Dar es salaam University College of education
Duration	2x 5.5 days (8 h per day)
Tailoring	Tailoring is one of the key principles of ICC-C: Trainees are invited to actively participate, tailor the program, and develop their own strategies for implementing the training content in their daily work with flexibility and fidelity.
Modifications	There were no modifications of the intervention
Fidelity	To increase fidelity comprehensive materials were provided. Trainers applied all the required materials.

Note. For a detailed description see SM4 and Hecker et al. (2017).

training groups with a size of 31-43 caregivers per training. The training was implemented in Swahili by three trainers with a background in psychological training. There was no charge, and participants received free beverages, food, and transport cost compensation of approx. 2.17 USD per day.

2.4.2. Waitlist procedure

After completion of the follow-up assessments, institutions assigned to the waitlist group received the *ICC-C* intervention from July to August 2019.

2.5. Primary outcome measure

2.5.1. Maltreatment by caregivers

The Conflict Tactics Scale Parent-Child version (CTSPC) was used to measure maltreatment by caregivers both from caregivers' and children's perspectives (Straus and Mattingly, 2007). We adapted the instrument language for caregivers working in orphanages. The sum score of the three subscales functioned as the primary outcome measure (*maltreatment*) – *emotional violence* (five items), *physical violence* (13 items), and *neglect* (eight items). Items were rated on a seven-point Likert scale with $0 = never$ to $6 = more$ $than$ 20 $times$ per $month$. Items were recoded so that every item reflected the average number of occurrences of a specific method of maltreatment employed in the past month. The Cronbach's alpha coefficient was $\alpha = 0.73$ for the caregiver's report and $\alpha = 0.77$ for the children's report. For more details see SM5.

2.6. Secondary outcome measures

2.6.1. Attitudes toward violent discipline

To investigate caregivers' attitudes toward violent discipline, the CTSPC was adapted according to the process used in previous studies in East-Africa (Nkuba et al., 2018). The sum score consisted of the scales for *emotional* and *physical violence*. Items were rated on a four-point Likert scale from *never OK* (0) to *always OK* (3). Cronbach's alpha for the sum score was $\alpha = 0.66$.

2.6.2. Childcare knowledge

A tool was developed for the present study to measure the change in childcare knowledge. The 11 items directly relate to basic knowledge in childcare and interaction competencies in the work with children (e.g., *how children learn* and *what caregiving strategies should be used*). The tool was constructed as a multiple-choice test (for details see SM6). Each item consisted of three to four possible answers. Every answer was coded as correct or incorrect. A score for correct answers was computed with a possible maximum score of 42.

2.7. Assessment of feasibility

Purpose-built measures were used to evaluate the feasibility of the *ICC-C*. Measures were adapted from Hermenau et al. (2015b), and followed common guidelines for feasibility research (Bowen et al., 2009). The *motivation to participate* was assessed directly before the start of training, and the *acceptability* and *integration* of the training contents were examined directly after the training and at three-month follow-up. For a detailed description see SM7.

2.8. Statistical analysis

Data analyses were conducted with IBM SPSS Statistics Version 25. Only caregivers who completed the baseline and follow-up assessment and participated in the intervention (intervention-group only, regardless of duration of participation) were included in the analysis. We calculated an *a priori* power analysis (see SM8) but the analysis of data structure showed that the interclass correlation coefficient was 0.227 for

the primary outcome, indicating that potential cluster effects needed to be considered. A multi-level power analysis revealed a power of 0.85 for a medium to large effect size for the multi-level model.

Using multilevel modelling, we investigated variance at different levels of effect (level 1: caregivers; level 2: orphanages). Multilevel modelling is robust to different sample sizes on level 1. Studies could prove unbiased parameter estimation even with ten clusters (Huang, 2018). The focus of interest was laid on the level 2 predictor *intervention*. To control for different scores at baseline, we inserted the predictor outcome at baseline. The model fit was examined with a chi-square test and the difference in the log likelihood to the previous model. Directional hypotheses led to one-tailed analyses with an alpha level of $\alpha = 0.05$. The effect size f^2 for the fixed effect of the predictor *intervention* and for the overall model was computed and was considered small at 0.02, moderate at 0.15 and large at 0.35. To investigate whether the ratio of trained caregivers among the sample would influence the program's effectiveness, we ran additional analyses (see SM9). However, no significant influence was found.

3. Results

3.1. Effectiveness

3.1.1. Maltreatment – caregivers' report

By including the predictors *intervention (yes)* at level 2 and *maltreatment at baseline* to control for different levels of maltreatment at baseline at level 1 as fixed effects, the model fit ($-2LL$) significantly improved compared to the null model, $\Delta\chi^2 = 22.64$, $df = 2$, $p < .001$. Both predictors were significant (Table 3/Fig. 2). The effect size of the predictor *intervention* was moderate with $f^2 = 0.153$. Controlling for differences at baseline and differences between groups, participation in the *ICC-C* training led to 11.80 fewer points in reported maltreatment scores at follow-up. Inserting both predictors explained 98.2% of the difference of maltreatment between the orphanages at follow-up. The overall explained variance was $R = 0.243$. With $f^2 = 0.320$ the effect size was moderate. The conditional intraclass correlation declined to 0.5%.

3.1.2. Maltreatment – children's report

The model fit ($-2LL$) improved significantly, $\Delta\chi^2 = 18.26$, $df = 2$, $p < .001$, by adding the two predictors to the model. However, the caregiver's participation in the *intervention* did not predict reduced *maltreatment at follow-up*.

3.1.3. Attitudes toward violence

Compared to null model, the model fit ($-2LL$) improved significantly, $\Delta\chi^2 = 29.88$, $df = 2$, $p < .001$, after adding the two predictors. *Intervention* predicted a significant decrease in *positive attitudes toward violence* with a moderate effect size of $f^2 = 0.248$ (Table 3/Fig. 2). The explained variance in the overall model was $R^2 = 0.282$, with a large overall effect size of $f^2 = 0.393$.

3.1.4. Childcare knowledge

Adding the two predictors as fixed effects, the model fit ($-2LL$) improved significantly, $\Delta\chi^2 = 37.87$, $df = 2$, $p < .001$. The predictor *intervention* significantly predicted an increase in *childcare knowledge at follow-up* (Table 3/Fig. 2) with $f^2 = 0.220$ indicating a moderate effect size. The explained variance in the overall model was $R^2 = 0.269$, with a large overall effect size of $f^2 = 0.368$.

3.2. Feasibility

3.2.1. Acceptability

Before the training, the caregivers reported that their *motivation to participate* was very high, $M = 1.83$, $SD = 0.41$ (possible *range*: 0–2). The scores for the caregivers' *overall satisfaction* with the training directly following the training $M = 15.11$, $SD = 1.46$, and at follow-up $M = $

Table 3

Fixed effects estimates (top) and variance–covariance estimates (bottom) for multilevel models of the predictors of maltreatment by caregivers, positive attitudes toward violence, and childcare knowledge at follow-up for the fixed effects models.

	Maltreatment caregivers' report	Maltreatment children's report	Positive attitudes toward violence	Childcare knowledge
	fixed parameters			
Intercept	4.12 (1.74)	13.51 (6.38)	0.66 (0.33)	23.31 (2.07)
Level 1 (caregiver/ child specific)				
Outcome at baseline	0.09* (0.04)	0.19*** (0.04)	0.16** (0.05)	0.33*** (0.07)
Level 2 (orphanage)				
ICC-C intervention (yes)	−11.80*** (2.65)	3.08 (3.95)	−2.24*** (0.42)	3.33*** (0.58)
	random parameters			
Level 2 (between orphanage variance)				
Intercept/ intercept	1.07 (11.06)	35.86 (24.88)	0.12 (0.35)	<0.01 (<0.01)
Level 1 (within orphanage variance)				
Intercept/ intercept	202.21*** (25.16)	755.27*** (60.68)	5.06*** (0.64)	12.16*** (1.37)
−2* log likelihood	1279.92	3135.29	703.52	837.81

Note. Standard errors are in parentheses; ICC-C intervention (yes) = participation in the *ICC-C* intervention; Outcome at baseline = maltreatment by caregivers, positive attitudes toward violent discipline, childcare knowledge at baseline, and children's exposure to maltreatment. In the upper part of the tables the fixed effects are presented for level 1 and level 2. In the bottom of the tables the random parameters are displayed. *$p < .05$; ** $p < .01$; ***$p < .001$.

15.05, $SD = 1.55$ (possible *range* 0–16), indicated a high rate of acceptance (see SM7 for details). The training contents were rated as being very understandable and useful for daily work with mean ratings between *very good* and *excellent* both directly after the training and at follow-up (see SM7). Further, all caregivers stated that they would recommend the intervention to other caregivers.

3.2.2. Integration of the training into daily work

Caregivers stated that the training would influence their strategies for interacting with children's misbehavior very much, $M = 3.20$, $SD = 0.48$, (possible *range*: 0–4), which persisted at follow-up, $M = 3.70$, $SD = 0.58$ (see SM7).

4. Discussion

Participation in the intervention resulted in a significant reduction in maltreatment reported by caregivers, a decrease of positive attitudes toward violent discipline, and an increase in childcare knowledge. With moderate effects, we consider our findings as promising indicators for the effectiveness of *ICC-C*. The models were corrected for baseline values to account for the heterogeneity of the orphanages, and still the intervention participation led to an increase in the explained variance of the overall model.

Multilevel modelling showed that orphanages differed in the levels of reported maltreatment at baseline. It reflects the naturalistic setting of
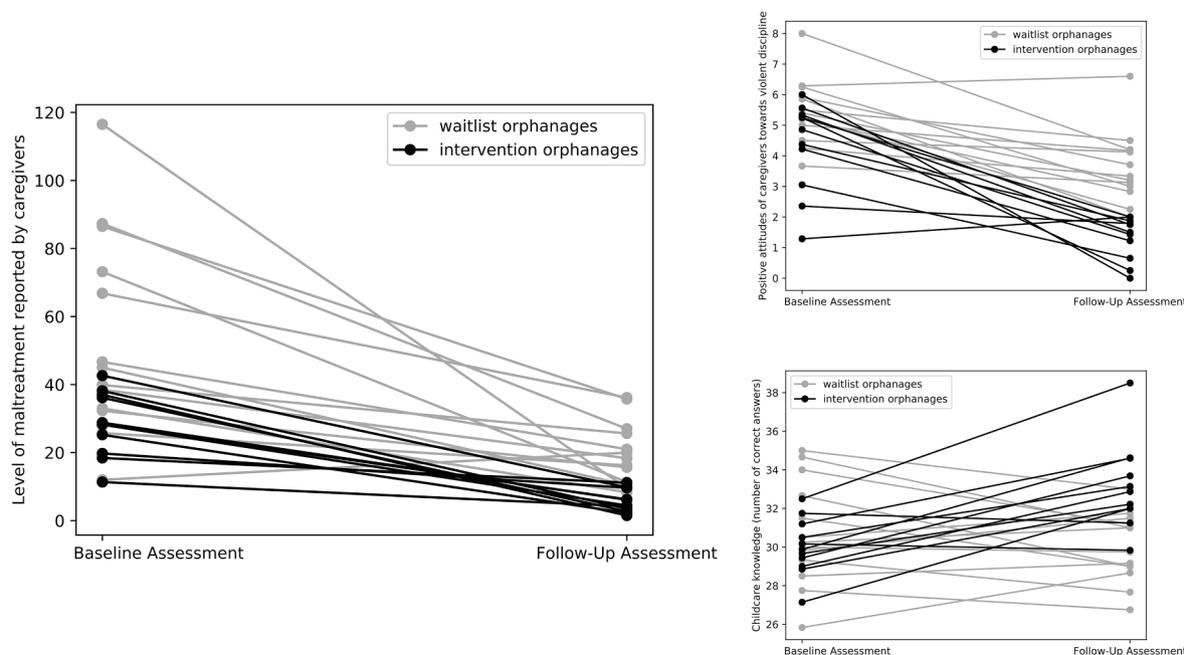
Fig. 2. Primary and secondary outcomes: Change from baseline to follow-up in the primary outcome measure *maltreatment by caregivers* (caregivers' report) as well as the secondary outcome measures *positive attitude toward violence* and *childcare knowledge* in each of the orphanages (separated by allocation to intervention and waitlist condition). Across all variables a clear picture emerges: the values in all orphanages in the intervention condition are mostly similar and support our hypotheses, whereas the values in the orphanages in the control conditions do not show a uniform pattern.

this study with all its challenges. Factors such as size, location, religious orientation, resources and more may all contribute to the heterogeneity of the orphanages. This study gives insight into the complex structure of this setting. It is likely that many factors modify the real effect of the intervention. The implementation of interventions in settings like this faces various challenges like structural and logistical dynamics (e.g., infrastructure of the facilities), administrative aspects (e.g., high staff-turnover), and challenges at the caregiver level (e.g., high workload and different educational backgrounds) (Wright et al., 2014). Still, it is important to conduct investigations in naturalistic settings to achieve high ecological validity and examine program effectiveness under realistic conditions (Toth and Cicchetti, 2013). Although the caregivers in both the intervention and waitlist condition reported using less maltreatment from baseline to follow-up, the decrease was significantly stronger in the intervention condition, indicating a specific intervention effect with a moderate effect size. The decrease of maltreatment in the waitlist group may be explained by the fact that simply participating in this study might have activated self-monitoring of caregiving strategies (McCambridge et al., 2014). We argue that the *ICC-C* intervention, which includes key principles targeting autonomy leads to intrinsic motivation and therefore to a longer lasting behavioural change. This is in line with previous research, which shows that caregiver trainings seem to be effective across contexts and conditions (Hermenau et al., 2017; Werner et al., 2016). Further, social desirability could have influenced the assessment differently at baseline and at follow-up as randomization took place after baseline assessment. Caregivers might have intended to 'demonstrate' their high need for training at baseline. In contrast, at follow-up caregivers in the waitlist group already knew that they would receive training. This knowledge might have caused caregivers to show their effort in changing their behavior. Further, we cannot completely rule out communication between caregivers across the conditions.

The effectiveness in decreasing maltreatment receives further promising corroboration by looking at positive attitudes toward violent discipline. Intervention participation predicted a significant decrease in positive attitudes toward violent disciplining methods. This reduction could have significant implications, as the presence of positive attitudes

toward violent discipline has been identified as a robust predictor of violent behavior (Holden et al., 2014). Given the fact that corporal punishment in Tanzania is socially accepted, a change in the acceptance and norms of corporal punishment is an important step in changing the behavior. We demonstrated that positive attitudes toward violence decreased after two weeks of intervention. Similar findings were identified when testing the *ICC* version for teachers (Nkuba et al., 2018). Participation in the intervention was also found to foster an increase in caregivers' childcare knowledge. This measure does not rely on self-report data, so it is less prone to subjective distortion. Knowledge is an important precondition of behavior and a determinant for behavioral change (Michie et al., 2009).

However, these promising findings are tempered by the lack of detectable intervention effects in the children's sample. Overall children reported higher levels of maltreatment than caregivers. Children's maltreatment reports decreased significantly from baseline to follow-up. However, we could not show an intervention effect in the children's sample. This challenge is reflected in the literature, as meta-analyses were also only able to demonstrate robust short-term effects of caregiver trainings for caregivers, while the findings for children – who were only indirectly affected by the training – were less clear (Fukkink and Lont, 2007; Werner et al., 2016). Investigations after a longer follow-up period might offer better insights into the effectiveness of the intervention regarding child reports. Further we cannot rule out caregivers influence and pressure on children's reports, especially at follow-up where caregivers already were aware of the content of the children's interview. Further, there might be children who are more frequently exposed to harsh discipline than others are. A differential look at children with different ages, gender, or behavioral problems might offer further insights in the effectiveness based on children's report.

The feasibility of *ICC-C* was very positively evaluated by participating caregivers. Despite the differences in prior knowledge and experience in childcare, participating caregivers rated the training as very comprehensive and useful. Although many different topics were discussed within two weeks, caregivers endorsed implementing the newly learned skills and techniques in their daily work. Even though the training was implemented in a low resource setting and facing difficult

conditions, participating caregivers evaluated the training as excellent. This is in line with previous research evaluating an earlier implementation (Hermenau et al., 2015b).

Overall, our results are consistent with previous findings that interventions for caregivers working in institutional care settings have positive effects on the wellbeing of both children and caregivers (Wright et al., 2019). However, a lack of interventions which also focus on the prevention of maltreatment persists (Hermenau et al., 2017). The presence of above-average rates of maltreatment in orphanages speaks to the urgency of addressing this lack (Sherr et al., 2017). Despite the difficult conditions encountered during this study, the *ICC-C* intervention was found to have significant impacts. The intervention directly addressed the needs of caregivers and showed approaches to preventing the maltreatment of children without requiring substantial resources.

4.1. Strengths and limitations

The study was conducted in only one region in Tanzania, limiting the generalizability of the findings. However, this limitation is mitigated by the fact that *ICC-C* was tested in a heterogeneous sample of numerous orphanages in Dar es Salaam, which are comparable to orphanages in other regions of Tanzania. Further, the intervention was found to be effective in previous studies in different populations (Hermenau et al., 2015b). To confirm the generalizability of the findings, though, *ICC-C* should be evaluated in other countries and cultural settings. Using a non-intent-to-treat approach, our findings reflect the intervention effect among those who remained in the study. However, we cannot rule out that those who dropped out may have differed from those who remained and that this may have distorted the intervention effect. However, dropout rates were relatively higher in the waiting list group, which again suggests acceptance of the intervention. Caregivers were not blinded, and social desirability cannot be ruled out as we assessed only self-report data. Objective assessments like observations are needed to address this problem. Assessment instruments have been adapted to assess caregivers' attitudes toward violent discipline. The psychometric properties of the instruments adapted for this study still need to be proven. Children were asked about their maltreatment experiences of the last month, which is a long period especially for young children. With this measure we aimed at assessing subjective maltreatment experiences and severe forms of violence. Caregivers who did not participate in the intervention were not interviewed at follow-up, which would have been informative to investigate spillover effects.

5. Conclusion

There is an urgent need for interventions in low-resource childcare institutions, particularly for interventions including a focus on maltreatment prevention (Hermenau et al., 2017; Hermenau et al., 2015b). This study indicated initial evidence for the effectiveness of *ICC-C* and showed very good feasibility for the training implementation. Despite the heterogeneity of the orphanages and caregivers' limited pre-existing knowledge about childcare techniques, a two-week training for caregivers reduced caregivers' reported maltreatment of children, lowered their positive attitudes toward violent discipline, and increased their knowledge of effective childcare approaches. In a cautionary note, though, these promising results were not reflected in the children's reports. Nevertheless, it seems to be possible to begin the process of improving the situation in institutional care settings in low-resource countries by providing support to caregivers using a feasible and effective approach.

Declaration of Competing Interest

We declare that none of the authors have competing financial or non-financial interests. The study was funded by the Young Researchers' Fund of Bielefeld University.

Access to data and data sharing

The corresponding author confirms that he had full access to all data and takes responsibility for the integrity and the accuracy of the data analysis. The study protocol, all assessment materials, and the datasets are available from the corresponding author on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pmedr.2021.101593.

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