Tikule limodzi (Let's grow together)

The impact caregiver training has on children with disabilities in Malawi

Final report

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Abbreviations and acronyms

AECDM Association of Early Childhood Development in Malawi CBCC community-based childcare centre

CBO Community-based organisation

CFM Child functioning module

CG Caregiver

CGMSQ Caregiver motivation and satisfaction questionnaire

CRCT Cluster-randomised controlled trial

DFID Department for International Development

ECDE Early childhood development and education

ESRC Economic and Social Research Council

LMIC Low and middle income countries

MDAT Malawi Developmental Assessment Tool

MoGCDSW Ministry of Gender, Children, Disability and Social Welfare

NGO Non-governmental organisation

SEN Special educational needs

SRS School readiness scale

UNICEF United Nations Children's Education Fund

WGCFS Washington Group Child Function Survey

Executive summary

Introduction

This report presents the results from a cluster-randomised controlled trial (CRCT) of a caregiver training intervention in Thyolo District in the Southern Region of Malawi. The training (intervention) consisted of a two-week programme based on the basic National Caregiver Training Programme, with additional modules on how to improve the inclusion and participation of children with disabilities. The aim of the trial was to measure the impact of the training on child language and social development outcomes. In addition, it collected data on learning environment, children's school readiness and caregiver job satisfaction.

The CRCT was part of a larger study that focused on the quality of early childhood development and education (ECDE), and included i) a review of national policies and curricula for ECDE in Malawi; ii) development of a caregiver training package with a focus on disability inclusion; and iii) complementary community-based participatory research and case studies exploring the lived experiences of the families of children with disabilities.

Methods

Design

The trial involved 48 community-based child centres (CBCCs) randomly allocated to the control and intervention arms (24 CBCCs each). The baseline data was collected between December 2016 and May 2017. The training took place over the summer holidays (July to August 2017). The endline data collection started nine months after the training had been delivered, and took place between May and July 2018. At endline, 44 out of 48 CBCCs (22 CBCCs in each arm) could be found and followed up.

Sampling

Study CBCCs were selected randomly from a sampling frame of just over 400 CBCCs in the district, based on the records available to the district authorities. The sample size was calculated to detect a 10% change in the proportion of children whose developmental age is equal to their biological age; 95% confidence interval, 80% power, 10% non-response and 50% variation between the clusters. Based on these we aimed to recruit 960 children (480 per arm) or 20 children per CBCC. Children were selected randomly at both baseline and endline.

Study tools

Data was collected using six tools: i) the CBCC questionnaire and work roster; ii) the CBCC environmental rating scale (observation tool)); iii) the caregiver satisfaction questionnaire; iv) the UNICEF/Washington Group Child Functioning Module (CFM); v) the Malawi Development Assessment tool (MDAT) (language and social domains); and vi) the school readiness scale.

The main outcomes, where the intervention was expected to lead to a causal change, were:

- Percentage of children with developmental age equal to actual age (primary outcome)
- Caregiver satisfaction and retention
- Changes in CBCC environmental rating scale

Data analysis

All analysis was done using Stata version 15. Baseline and endline summary statistics were compared and a percentage change was computed to assess an increase or a decrease between the two evaluation points. To assess if the change was statistically significant, we conducted Chi-squared tests and used a threshold of 5% to identify statistically-significant variables.

Ethics

The whole study was approved by the National Committee on Research in the Social Sciences and Humanities, National Commission for Science and Technology, Malawi, and the University of Birmingham Ethics Committee. All CBCC chairs/caregivers provided consent to be observed and be interviewed. Parents/guardians provided individual written consent on behalf of their children.

Results

44 CBCCs (22 intervention and 22 control) participated in the CBCC survey at endline, compared to 47 CBCCs (24 control and 23 intervention) at baseline. One hundred caregivers participated in the caregiver survey at endline, compared to 106 at baseline. Functional difficulties (disability) using the UNICEF/Washington Group CFM were assessed among 935 children from 47 CBCCs at baseline and 881 children from 44 CBCCs at endline. Developmental delays using the MDAT (language and social domains) were assessed among 933 children at baseline and 881 children at endline.

Impact of the training on the main outcomes of the trial

Developmental delay

Evidence from the trial suggests that the training of caregivers had some positive effect on the development of children attending CBCCs. At baseline the proportion of children with any (either social or language) delay was 11.7% (n=109), overall. In the intervention areas the proportion was 11.6% (n=54) and 11.8% (n=55) in the control areas. At endline, the proportion of children with developmental delay, overall, was 8.2% (n=72). In the intervention areas it was 6.3% (n=28) and in the control areas was 10.0% (n=44).

Similar changes were observed among domain-specific results. The prevalence of delay in the language domain was very similar between the control and intervention groups at baseline (3.9% (n=18) and 4.7% (n=22)). They had diverged at endline, although the results were not statistically significant (4.5% (n=20) and 2.5% (n=11)).

The prevalence of delay in the social domain was similar among both groups at baseline and endline. At baseline, the prevalence of social delay in the control CBCCs was 8.6% (n=40) and 7.9% in the intervention CBCCs. At endline, the prevalence was 7.3% (n=32) in the control CBCCs and 5% (n=22) in the intervention CBCCs.

It is, however, important to note that the endline assessment in this trial took place nine months after the training, and it is not known whether the change in caregiver skills and practices, and subsequently the impact on child development, will be sustained over time. Also, the sample size of this study did not allow for comparisons of children with and without disabilities, and we do not know whether children with disabilities benefited from this intervention in the same way as children without disabilities.

Caregiver satisfaction

The main changes in the levels of satisfaction among the caregivers participating in the study was satisfaction with the training they had received for their job. At baseline, the proportion of satisfaction with regards to training among caregivers was very low in both groups (6% control and 13% intervention). By the end of the study, 70% of caregivers in the intervention areas were satisfied with their training, compared to only one in five (20% in the control areas. It is important to note that not all caregivers included in the endline survey in the intervention areas had been trained by the project. The proportion of caregivers in the intervention CBCCs reporting any training at endline was about 70% and the majority of them (96%) had been trained seven to 12 months before the survey. We assume that this was the training provided by the project; therefore all those who had been trained by the project were satisfied with the training they received.

Satisfaction with other aspects of work was generally high in both control and intervention groups. However, caregivers in the intervention CBCCs reported higher levels of satisfaction, including with being a caregiver (100% vs 89%); work recognition (96% vs 89%); and working environment (100% vs 92%).

CBCC environment

The impact of the caregiver training on CBCC day-to-day practices and caregiver interactions with the children varied, depending on the aspect of the CBCC environment assessed. The main differences between the control and intervention groups were noted in social interactions, communications, caregiver engagement, support of children with disabilities, and some aspects of teaching literacy and numeracy.

The caregivers in the intervention CBCCs were more likely to encourage positive interactions between children and help them to develop appropriate social behaviour with peers during the play time and other activities (50% vs 14%). After the training there were no intervention CBCCs where caregivers were recorded doing little or nothing to encourage positive social interactions, or discourage negative or harmful interactions between the children, whereas this was observed in 41% of control CBCCs. Furthermore, caregivers in the intervention CBCCs were more likely to spend at least one hour directly interacting with the children (82% vs 50%) and were more likely to ensure that all children were engaged in CBCC activities (41% vs 18%). These caregivers were also more likely to demonstrate good communication practices with the children (such as listening attentively, making eye contact and encouraging children in a polite way to listen when adults speak) (36% vs 9%), and create natural speaking opportunities, as well as use games and other activities to encourage communication (32% vs 18%).

A higher proportion, although still only a third of CBCCs in the intervention group (32%), showed good practices in responding to the needs of children with disabilities and including children with disabilities in CBCC activities. The proportion of such CBCCs in the control group at endline continued to be very small (5%).

The main differences between the intervention and control CBCCs in teaching literacy and numeracy were around the way the alphabet and numbers were taught. Caregivers in the intervention CBCCs were more likely to teach alphabet and counting in relation to common objects shown to or handled by the children (41% vs 5%, and 27% vs 5%, respectively). Caregivers in the intervention CBCCs were also more likely to facilitate role-play at least at specific moments (55% vs 32%), while in the control CBCCs there was a higher likelihood of no role-play being provided for the children (68% vs 36%).

One aspect of the CBCC environment where the training had little impact was routine and structure, with the majority of CBCCs in both groups continuing to use one collective group and have very limited or no use of activity corners. Also, there was little difference in the observed approaches used to control children's behaviour, involve parents of children with disabilities in CBCC activities, or reading with or to the children.

Overall, the areas of the CBCC environment that could be more easily managed by the caregivers (including social interactions, caregiver engagement, communication and styles of teaching), were more likely to be adapted following the training than the aspects dependent on the established routines and ways of working.

Impact of the training on other variables measured in the trial

Structure and operations

We did not anticipate and did not observe any major changes in the structures or operating schedules of CBCCs in either group between baseline and endline.

The only difference observed was in the receiving and allocating of funding. The number of CBCCs receiving no funding decreased between the baseline and endline in both intervention and control groups, but the change was greater in the intervention group (from 48% to 18%) compared to the control group (from 40% to 32%). The main difference was due to more intervention CBCCs reporting funds from the community and parent contributions. Also at endline, more CBCCs in both groups reported allocation of funds for children who were orphans or had special needs, but the increase was greater in the intervention group, from 35% to 68% and from 38% to 64%, respectively, compared to from 38% to 45% in the control group.

Maintaining records

All CBCCs were provided with registers at baseline, and an increase in registry use and attendance records was observed in both intervention and control groups. At baseline, 91% of CBCCs (87%

intervention and 96% control) reported that they maintained a registry of children attending CBCC and 77% of CBCCs (87% intervention and 67% control) reported monitoring attendance. However, both types of records could be verified in only 30% of CBCCs in both groups.

At the end of the study, all CBCCs in both groups reported that they were maintaining a registry and attendance records. The presence of both types of records was verified in 89% of CBCCs (95% intervention and 82% control). The fact that the increase was observed in both intervention and control groups may suggest that the change was not caused by the training, but by the provision of records books that hadn't previously been available.

However, when asked about individual child behaviour records or portfolios, only four CBCCs (two intervention (8.6%) and two control (8.3%)) maintained this type of records at baseline. The situation did not change towards the end of the study, with only three CBCCs (13.6%) in the intervention group and one CBCC (4.5%) in the control group reporting these records.

CBCC education materials and timetable

The training of caregivers had an impact on the availability of timetables as well as education and playing materials in CBCCs. The proportion of CBCCs following a timetable, having education and playing materials, and having caregivers trained to use them at endline, was significantly higher in the intervention areas (73%, 91% and 95%), compared to the control areas (18%, 27% and 33%, respectively). Play materials were, of course, provided to caregivers as part of the intervention training package.

School readiness scale

The training of caregivers seemed to have some impact on the school readiness results among children aged over three years, with the children in the intervention CBCCs achieving higher pass marks in a number of school readiness domains – although the difference is difficult to interpret as the study was not powered to detect the difference in the school readiness test.

Despite the sample size limitations, changes were observed among children's scores. At endline, children over three years in the intervention CBCCs were observed to have significantly better scores than their counterparts in the control CBCCs in the literacy: symbols domain. Those aged three- to four-years-old passed more age-appropriate questions (10.2% vs 3.4%;χ^2 = 10.55, p=0.001) as did those aged five years and over (16.5% vs 5%; (χ^2 = 8.92, p=0.003). Another significant difference was observed among three- to four-year-olds in the mathematical and numerical knowledge domain as 94.1% passed age-appropriate questions in the intervention group, compared with 88.8% in the control group (χ^2 = 5.22, p=0.022).

Prevalence of disability

One of the most interesting findings of this study was that the prevalence of disability at endline was significantly lower than at baseline – in both groups. One likely explanation of this finding is, given that the majority of functional difficulties reported at baseline were of a psycho-social nature (anxiety, behavioural problems, adapting to change), there was a possible stressful environmental factor (such as famine following extensive flooding in the region) that could have influenced children's psycho-social state at the time of the baseline survey. Further research applying CFM in similar settings over time would be useful to assess these propositions. It was also interesting that the only type of functional difficulty that increased in both groups, particularly in the intervention group, was difficulty in walking. Given that difficulty is walking is easy to identify, one may suggest that the training, and the study itself, increased awareness of disability in the local community and more children with physical problems or a delay in walking were brought to the CBCCs. This is, however, no more than a hypothesis, which needs to be further investigated in future research.

Conclusions

The training of caregivers in how to include young children with disabilities in learning and daily activities of a CBCC had positive effects on the development of pre-school children, and resulted in a lower proportion of children experiencing social and/or language-related delays. The training also had a positive impact on caregiver teaching practices, specifically in relation to how they interacted and communicated with the children, supported children with disabilities and, for some, how they taught pre-literacy and numeracy skills. The caregivers expressed high levels of satisfaction with the training they received, as well as other aspects of their role. Where caregivers had been trained, they were more likely to follow a structured timetable and use educational and play materials.

The impact of the intervention, however, was observed only over a short period, nine months after the training. Future studies need to explore what impact short training programmes have on the development of experience-dependent skill sets in the medium to long term. Ideally, a longer training course for caregivers would probably have a greater impact on learning outcomes but this study operated within certain financial and time restraints. Future studies should also consider larger sample sizes and longer caregiver training programmes to allow for the disaggregation of results by disability and other children's characteristics, including anthropometric measures, to account for factors such as stunting.

Introduction

Early childhood is a critical phase of human development, which lays out the foundations for the individual's entire life(1, 2, 3). The benefits of early childhood development have been well-documented, with evidence showing that developmental stimulation in the first few years of life can not only affect children's growth in the early years, but can make significant differences to long-term economic and psycho-social outcomes in adulthood(4, 5).

The high levels of developmental delays, as well as disabilities, in children in low- and middle-income countries (LMICs) have been acknowledged by the global community; and yet in many development programmes these children are either excluded or their needs are not appropriately catered for(6, 7).

Strategies are therefore being put in place on a global scale to provide interventions in the stimulation, communication, nutrition and health of children in the early years(4, 8), with the focus on the poorest and the most marginalised communities and population sub-groups(8). However, rigorous evidence on which interventions work, for whom and in which settings, remains very limited.

This report presents the results from a cluster-randomised controlled trial (CRCT) of a caregiver training intervention in Thyolo district in the Southern Region of Malawi. The trial involved 48 community-based child centres (CBCCs) randomly allocated to the control and intervention arms (24 CBCCs each). The training (intervention) consisted of a two-week programme based on the basic National Caregiver Training Programme, with additional modules on how to improve the inclusion and participation of children with disabilities in CBCCs. The baseline data was collected between December 2016 and May 2017. The training took place over the summer holidays (July to August 2017), when most CBCCs were closed. The endline data collection started 9 months after the training intervention had been delivered, and took place between May and July 2018. At endline, 44 out of 48 CBCCs (22 CBCCs in each arm) could be found with two CBCCs in each arm having been closed and therefore unavailable to follow up.

The aim of the trial was to measure changes in children's language and emotional development outcomes. In addition, the study collected data on children's school readiness, caregiver job satisfaction and CBCCs' learning environments.

The CRCT was part of a larger study that focused on the quality of early childhood development and education and included i) a review of national policies and curricula for ECDE in Malawi; ii) development of a caregiver training package, with a focus on disability inclusion; and iii) complementary community-based participatory research into lived experiences of the families of children with disabilities. The overall objectives of the study can be found in Appendix 1 and the details of the training package are shown in Box 1 on the following page. This report presents the CRCT endline collected from 48 CBCCs. The baseline data is presented in detail in a separate report(10).

Box 1: Training programme for caregivers

The training programme was provided to caregivers from CBCCs that were randomised to the intervention arm of the trial following baseline data collection. Training was facilitated by national ECD caregiver trainers from AECDM, Magomero College and the Ministry of Gender, Children, Disability and Social Welfare.

During training, an Inclusion Resource Pack was developed by the University of Birmingham, in collaboration with Chancellor College, Sightsavers and National ECD trainers in Malawi, to highlight disability and promote the inclusion of children with disabilities in the daily activities of the CBCCs. Training covered the following topics:

1. Understanding of disability
2. Inclusive games
3. Early literacy and storytelling
4. Wellbeing and involvement
5. Safety and risk management
6. Early maths
7. Inclusive environment
8. Inclusion of CBCCs
9. Identification of common types of disability
10. Working with parents of children with disabilities

Each of the 24 CBCCs who participated in the training was given a resource pack, which included items to facilitate the learning and inclusion of children with different disabilities.

Methods

Study design and sampling

The CRCT design and the detailed sampling methodology was described in the baseline report(10). In brief, 48 study CBCCs were selected randomly from a sampling frame of just over 400 CBCCs, based on the records available to the district authorities. The sample size was calculated to detect a 10% change in the proportion of children whose developmental age is equal to their biological age; 95% confidence interval, 80% power, 10% non-response and 50% variation between the clusters(11). Based on these we aimed to recruit 960 children (480 per arm) or 20 children per CBCC.

Twenty children per CBCC were selected at random at both baseline and endline, meaning they may not necessarily be the same children at the two time periods.

The main outcomes, where the intervention was expected to lead to a causal change and therefore measured by the CRCT, are:

- Percentage of children with developmental age equal to actual age (primary outcome)
- Caregiver satisfaction and retention
- Changes in CBCC environmental rating scale

In addition, the report presents other variables measured at the baseline and endline, including CBCC operation schedule, record keeping, available materials for play and learning, disability prevalence and school readiness scale.

Data in this study was collected using six tools, described in detail in the Baseline report(10) and in Appendix 1: i) the CBCC questionnaire and work roster; ii) the CBCC environmental rating scale (observation tool)); iii) the caregiver satisfaction questionnaire; iv) the UNICEF/Washington Group Child Functioning Module (CFM); v); the Malawi Development Assessment tool (MDAT) (language and socio-emotional domains); and vi) the school readiness scale. The number of units involved in the baseline and endline data collection is shown in table 1.

Table 1: Overview of responses to survey tools

Survey	Baseline	Endline
COMMUNITY-BASED CHILDCARE CENTRE SURVEYS		
CBCC questionnaire	47	44
CBCC environmental rating scales	47	44
CAREGIVER SURVEYS		
Caregiver satisfaction and motivation questionnaires	127	137
CHILD SURVEYS		

Survey	Baseline	Endline
Malawi developmental assessment tool (MDAT)	933	881
UNICEF/Washington Group Child Functioning Module (CFM)	935	881
School readiness	932	881

Data analysis

Baseline and endline summary statistics of the six tools were compared, and a percentage change (endline statistic-baseline statistic) was computed for each variable to establish if there was an increase or decrease between the two evaluation points.

To assess if the change was statistically significant, we tested whether each of the key outcomes, such as 1) Percentage of children with developmental age equal to actual age (primary outcome); 2) Caregiver satisfaction and motivation; and 3) CBCC environmental rating scale, differed significantly at the two evaluation points. To do this, we conducted t-tests (for numerical variables that followed a normal distribution), Chi-squared tests for categorical variables, and Wilcoxon rank sum test for variables that did not follow the normal distribution. Normality was tested using the Shapiro-Wilk test(12).

Primary outcome

To assess the factors affecting the primary outcome, the research null hypothesis (H0) stated that any or all independent variables have no significant influence on the response variable, which is percentage of children with developmental age not equal to actual age, while the alternative hypothesis (H1) states that independent variables have a significant influence on the response variable.

$$H_0 = \beta_1 = \ldots = \beta_k = 0$$
$$H_1 = \beta \neq \beta_2 \neq \ldots \neq \beta_k \neq 0$$

Where β_k are coefficients of k independent variables.

Table 2: Variable description

Response variables	Variable definition	Levels of measurement
Any delay		
Children with developmental age equal to actual age experiencing any (language or social emotional) delay	1=child has any delay	0=child has no delay
Language delay		
Children with developmental age equal to actual age measured by language-related tasks	1=child has language delay	0= child has no language delay
Socio-emotional delay		
Children with developmental age equal to actual age measured by social tasks	1=child has social delay	0=child has no social delay

Measuring the effect of the intervention

In this study, the intervention (caregiver training) was given at the CBCC, or cluster, level, although the primary outcome (developmental delay) was measured at the child, or individual, level. It is generally assumed that children within a cluster are more likely to be similar than children selected at random from different clusters, and this lack of independence between individuals means that we need to account for the effects of clustering in our statistical analyses. Generally, this means that the standard errors calculated to estimate the variance around estimates need to account for the effect of clustering, or design effect. Chi-squared tests are corrected through the method described by Rao and Scott and are embedded within Stata software(13).

A statistical significance of 5% was used to identify significant variables. All analysis was done using Stata, version 15.

Ethics

The trial was approved by the National Committee on Research in the Social Sciences and Humanities, National Commission for Science and Technology, Malawi (P.02/16/83), and the University of Birmingham Ethics Committee (ERN_15-0048).

All data collectors completed a UNICEF supported Introduction to Ethics in Evidence Generation course. All CBCC chairs/representatives provided consent on behalf of the CBCC to observe activities and be interviewed as part of the study. Parents/guardians were individually asked for written consent on behalf of their children. Caregivers were individually asked for written consent to be interviewed as part of the study.

Results: Community-based childcare centres

Data on CBCCs was collected using the CBCC questionnaire and on-site observations. The CBCC questionnaire asked the managing caregiver, or the chairman of the CBCC, to answer a number of questions about CBCC operations, including schedule of work, sources of funding, record keeping and availability of timetable, curriculum and playing and learning materials.

At baseline, 47 CBCCs (24 control and 23 intervention) completed the questionnaire and had observation records. One CBCC did not complete the CBCC questionnaire due to the absence of the relevant staff on the day of data collection. Forty-five (95.7%) CBCC interviews were conducted in Chichewa, one (2.1%) in English and one (2.1%) did not specify the language. At endline, 44 CBCCs (22 intervention and 22 control) completed the questionnaire and had observation records. Three CBCCs were no longer operational when the study team revisited them. Forty-three (97.7%) interviews were conducted in Chichewa and one in English.

Characteristics of community-based childcare centres

CBCC operations

All CBCCs involved in the endline assessment followed the school academic calendar and almost all (22 control CBCCs and 21 intervention CBCCs) were open for nine months a year. At baseline, 91.5% of CBCCs (23 control CBCCs and 20 intervention CBCCs) followed the school academic year, and 76.6% of CBCCs (70.8% control and 78.3% intervention) were open for nine months a year.

At endline, most centres (86% control and 91% intervention) operated five days a week and the majority (96% control and 92% intervention) opened between 7.30am and 8.30am. The respective figures at baseline were 83.3% and 82.6% for number of days open and 95.8% and 100% for opening between 7.30am and 8.30am (tables 3 and 4).

Table 1: Number of days CBCCs open a week

Days	Baseline				Endline			
	Control (N=24)		Intervention (N=23)		Control (N=22)		Intervention (N=22)	
	N	%	N	%	N	%	N	%
0-3	2	8%	0	0%	0	0%	0	0%
4	0	0%	1	4%	2	9%	0	0%
5	20	83%	19	83%	19	86%	20	91%
6-7	2	8%	3	13%	1	5%	2	9%

Table 2: CBCC opening times

Opening time	Baseline			Endline		
	Control (N=24)	Intervention (N=23)		Control (N=22)	Intervention (N=22)	
	%	**%**	**Total**	**%**	**%**	**Total**
6.30am	0%	0%	0%	5%	0%	2%
7am	4%	0%	2%	9%	14%	11%
7.30am	42%	48%	45%	23%	23%	23%
8am	46%	43%	45%	55%	55%	55%
8.30am	8%	0%	4%	9%	9%	9%
9am	0%	9%	4%	0%	0%	0%

CBCC funding

The number of CBCCs receiving no funding decreased between the baseline and endline in both intervention and control groups, but the change was greater in the intervention group (10 (48%) to four (18%)), compared to the control group (eight (40%) to seven (32%)). The main difference was due to receiving funds from the community fund and parent contributions. The number of CBCCs reporting this source of funding in the intervention group increased from four (19%) to 10 (45%). In the control group, the number of such CBCCs decreased from nine (45%) to seven (32%) (table 5).

Table 3: CBCCs' sources of funding

Sources of funding for CBCCs	Baseline			Endline		
	Control (N=20)	**Intervention (N=21)**	**Total (N=41)**	**Control (N=22)**	**Intervention (N=22)**	**Total (N=42)**
National government	5%	0%	2%	0%	0%	0%
Local government	0%	5%	2%	14%	14%	14%
NGO	20%	10%	15%	18%	14%	16%
Community fund and parents' contribution	45%	19%	32%	32%	45%	39%
School committee	10%	10%	10%	0%	5%	2%
Well-wishers	5%	19%	12%	5%	9%	7%
Other companies	0%	5%	2%	5%	0%	2%
No funding	40%	48%	44%	32%	18%	25%

At baseline, 15 CBCCs (nine (38%) control and eight (35%) intervention) said that they allocated funds specifically for children who were orphans, and 18 CBCCs (nine (38%) in each group) allocated funds to children with special needs. At endline, more CBCCs in both groups reported allocation of such special funds but the increase was greater in the intervention group, from eight (35%) to 15 (68%) and from nine (38%) to 14 (64%), respectively, compared to from nine (38%) to 10 (45%) CBCCs in the control group.

Maintaining children's records

When the baseline survey was conducted, 43 (91%) of CBCCs (20 (87%) intervention and 23 (96%) control reported that they maintained a registry of children attending the CBCC. Children's attendance records were reported by 36 (76.6%) CBCCs (20 (87%) intervention and 16 (67%) control. However, both types of records could only be verified in 14 (30%) of CBCCs, in both groups.

At the end of the study, all CBCCs in both groups reported that they were maintaining a registry and attendance records. The presence of both types of records was verified in 39 (88.6%) of CBCCs (21 (95%) intervention and 18 (82%) control). The type of information in the records differed, but one can confidently state that record keeping at endline improved in all aspects (figure 1) and this change happened in both intervention and control groups.

When asked about individual child behaviour records or portfolios, only four CBCCs (two intervention (8.6%) and two control (8.3%)) maintained these types of records at baseline. The situation did not change towards the end of the study, with only three CBCCs (13.6%) in the intervention group and one CBCC (4.5%) in the control group reporting these records.

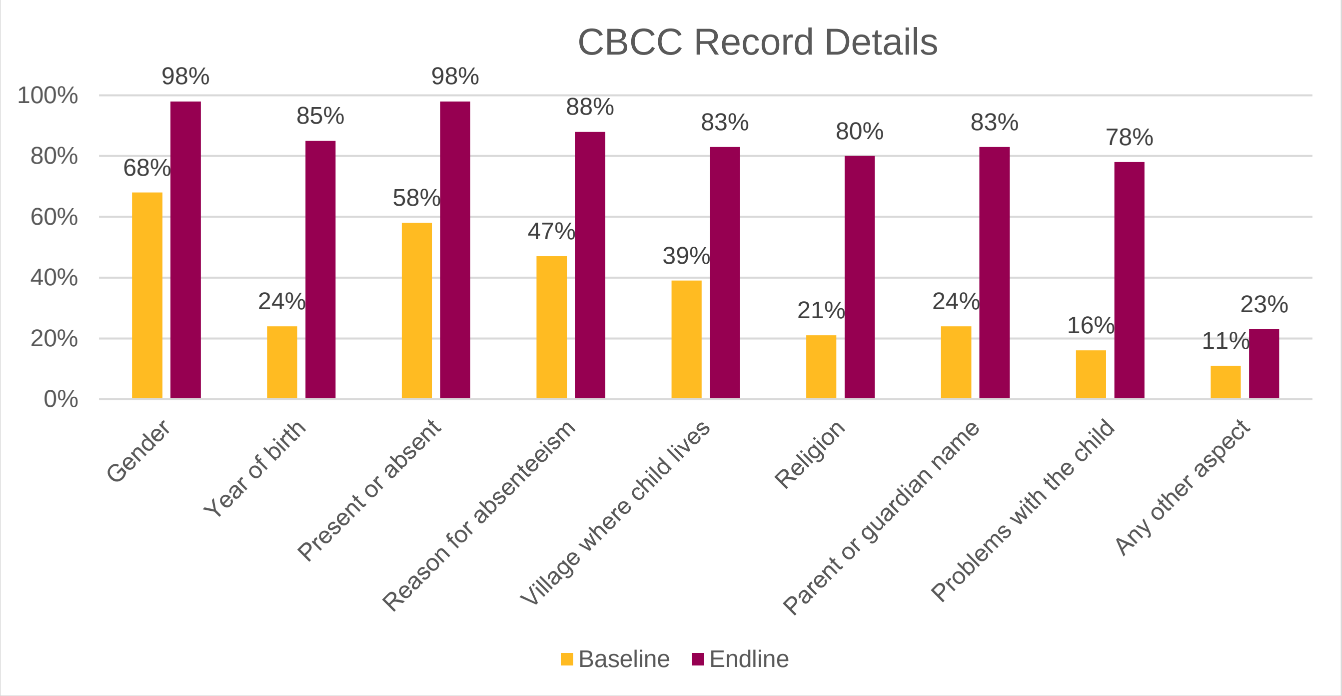

Figure 1: Types of child data recorded within CBCC records

The average (median) number of children registered in the CBCC at baseline was 55 in the control group and 50 in the intervention group. At the end of the study, the respective numbers were 46 and 69. At baseline, the average number of children reported attending daily was 31 and 33 in the control and intervention groups, respectively. At endline, the respective numbers were 34 and 44.

Children with special needs, as reported by CBCC caregivers

At baseline, the median number of children with disabilities or special needs per CBCC, as reported by caregivers, was two – in both intervention and control groups. The respective numbers at endline were 2 and 1.5. At baseline, the total number of children with disabilities or special needs, as reported by caregivers, was 31 in the intervention group and 34 in the control group. By the end of the study, the reported number of children with disabilities/special needs in the control areas decreased slightly (n=31). In the intervention areas this number significantly increased (n=53).

The number of children reported by caregivers to have different types of impairments in the control areas either did not change or decrease, with the only exception of children with delayed speech, where the reported number increased from zero to seven (figure 2). In the intervention CBCCs, there was an increase of children with almost all types of impairments; the only exceptions were hearing impairments and multiple impairments. The most noticeable increases were in the reported number of children with physical impairments (from 10 to 20); delayed speech (from two to 10); visual impairments (from five to eight); and intellectual impairments (from six to nine) (figure 2).

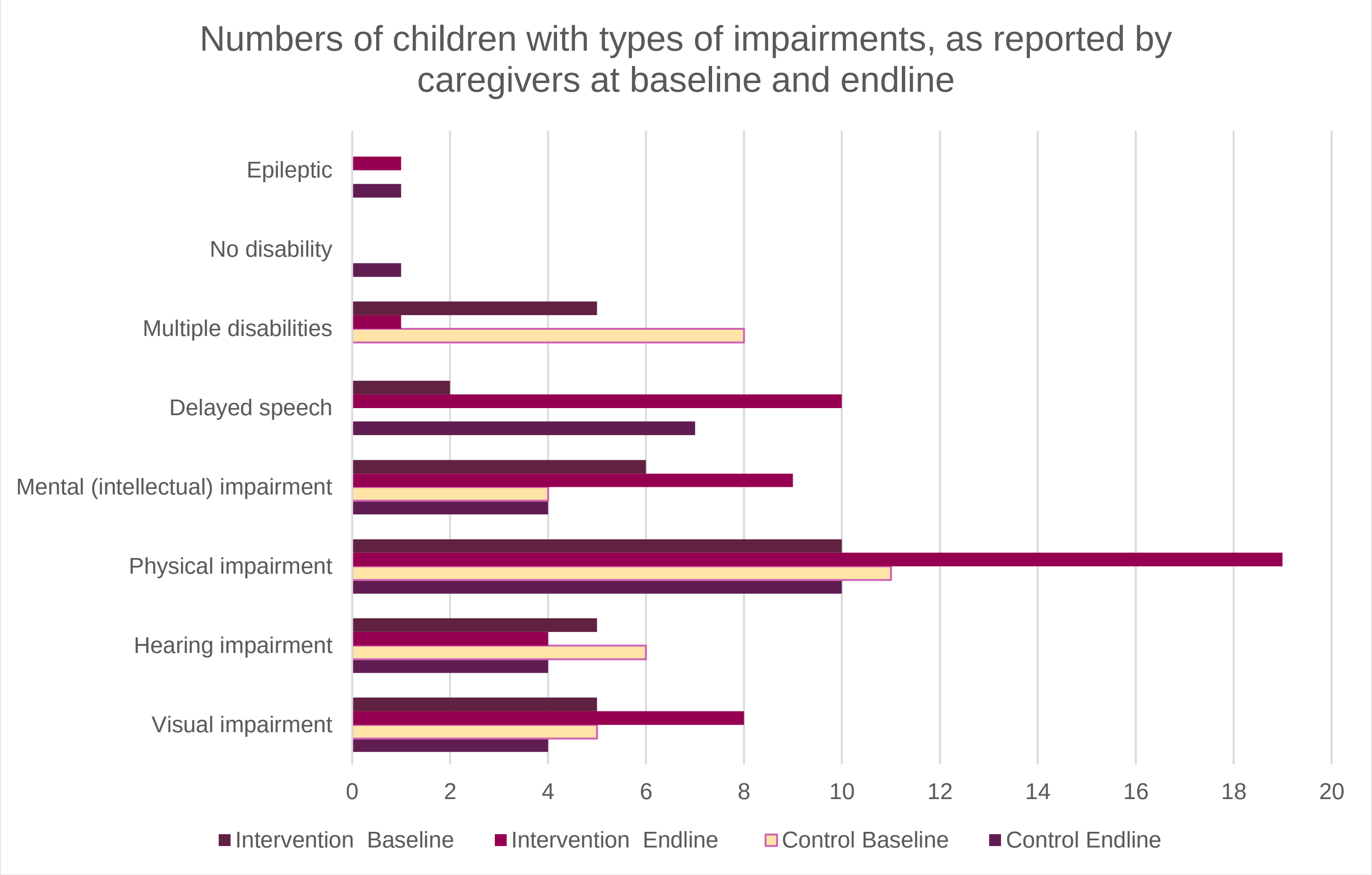

Figure 2: Type of impairment reported by caregivers at baseline and endline

CBCC curriculum and playing and learning materials

At baseline, very few CBCCs (seven; 29%) in the control and (four; 17%) intervention groups had learning or playing materials; by the end of the intervention, the number of CBCCs with learning and playing materials increased in the intervention group only, from four (17%) to 20 (91%). In the control group the number of CBCCs with playing and learning materials decreased from seven (29%) to six (27%). Almost all (95%) intervention CBCCs with playing and learning materials at endline had staff trained to use these materials, compared to only two out of six CBCCs (33.3%) in the control group. Provision of, and training with, play materials was part of the intervention under evaluation.

At baseline, 12 out of 47 CBCCs (seven (30%) intervention and five (21%) control) reported that they had a daily timetable for activities; by the end of the study, the number of CBCCs with a timetable increased in the intervention group, from seven (30%) to 16 (73%); in the control group the number of CBCCs with a timetable decreased from five (21%) to four (18%). Among CBCCs with a timetable, the majority followed the timetable always and others followed it sometimes (as opposed to ‘never’), with little difference between the intervention and control groups at either baseline or endline. When asked about children with disabilities/special needs at baseline, the majority of CBCCs (11/12; 92%) with a timetable said that these children followed the timetable always and in the remaining one CBCC they followed it sometimes. At endline, 75% (15/20) CBCCs reporting using a timetable reported that children with disabilities/special needs always followed it, with the remainder (5/20; 25%) reported they followed it sometimes. No differences were observed between control and intervention groups at either baseline or endline.

Table 6: Timetable adherence

CBCCs’ adherence to timetable		**Baseline**			**Endline**		
		Control	**Intervention**	**Total**	**Control**	**Intervention**	**Total**
Daily timetable for activities	No	79%	70%	74%	82%	27%	55%
	Yes	21%	30%	26%	18%	73%	45%
Adhere to timetable	Always	80%	71%	75%	75%	63%	65%
	Sometimes	20%	29%	25%	25%	38%	35%
	Never	0%	0%	0%	0%	0%	0%
All children follow the same timetable	Always	100%	86%	92%	75%	75%	75%
	Sometimes	0%	14%	8%	25%	25%	25%
	Never	0%	0%	0%	0%	0%	0%

Environment assessment at community-based childcare centres

The CBCC Environmental Rating Scale comprised a total of 23 questions across eight sub-scales: Routine and structure, Supervision, Caregiver engagement, Managing children’s behaviour, Communication, Social development, Inclusion of children with disabilities and Numeracy, literacy and problem solving. The rating was based on the independent observations by two trained researchers, who followed observation guidelines and then positioned their agreed results across a three-point scale: one indicating a low score, two indicating an intermediate score and three indicating a high score (Appendix 2). At baseline, the highest number of children present in the 47 CBCCs observed was a mean of 38.9 and 40.1 in the control (23 CBCCs) and intervention CBCCs (24 CBCCs), respectively (NB – one CBCC that answered the CBCC questionnaire did not have environmental assessment data, and the CBCC without CBCC questionnaire data did have environmental assessment data). At endline, the respective numbers were 36.0 and 42.7 (22 CBCCs in each of the control and intervention arms).

1. Routine and structure

Two aspects of the teaching and learning environment were assessed in the routine and structure sub-scale: i) the use of small groups and individual activities; and ii) the use of activity corners. At baseline, only four (8.5%) CBCCs (two (8%) control and two (9%) intervention) received high scores for the use of different types of activities (a mix of collective, small group and individual activities). At endline, the situation did not change in either of the groups, with only one (5%) and two (9%) CBCCs receiving the high score in the intervention and control, respectively. The group structure continued to be one collective group in the majority of CBCCs (20 (91%) control and 17 (77%) intervention).

At baseline, no CBCCs in either group used activity stations or corners more than once or twice, if at all. At endline, the number of such CBCCs increased but was very small in both groups (one (5%) CBCC in the control group and three (14%) CBCCs in the intervention group).

Table 7a: Treatment breakdown for routine and structure

Indicator		Baseline		Endline	
		Control (N=23)	Intervention (N=24)	Control (N=22)	Intervention (N=22)
How the caregiver(s) has organised children during the observation	Only works with the children as one collective group	19; 83%	21; 91%	20; 91%	17; 77%
	Facilitates predominantly collective activities and occasionally splits the children into small groups	2; 9%	0; 0%	1; 5%	3; 14%
	Facilitates a mix of collective, small group and individual activities	2; 9%	2; 9%	1; 5%	2; 9%
Use of Activity Corners (ACs)	Not used during the observation period (either inside or outside)	16; 70%	19; 79%	20; 91%	12; 55%
	Used once or twice by (more than half of) the children during the observation period	7; 30%	5; 21%	1; 5%	7; 32%
	Used by (more than half of) the children several times throughout the observation period	0; 0%	0; 0%	1; 5%	3; 14%

2. Supervision

Two sub-scales were assessed here: i) attention to children's needs; and ii) attention to children's safety.

About two thirds of CBCCs in both groups (16 (70%) control and 14 (61%) intervention) scored highly on attending to children needs in a caring manner at baseline. At endline, there was an overall drop in observed performance, but the decrease was greater in the control group (16 (70%) to nine (41%)), compared to the intervention group (14 (61%) to 13 (n=59%)).

The proportion of CBCCs that scored highly on 'attention to safety without restricting children's behaviour' at baseline was 61% (n=14) in the intervention areas, and 70% (n=16) in the control areas. At endline, the proportion of such CBCCs also decreased in both groups and the decrease was greater in the control areas, from 16 (70%) to eight (36%) CBCCs, compared to from 15 (65%) to nine (41%) in the intervention CBCCs.

Table 7b: Treatment breakdown for supervision

Indicator		Baseline		Endline	
		Control (N=23)	Intervention (N=24)	Control (N=22)	Intervention (N=22)
Attending to children's needs	Immediate needs not recognised by or responded to by CG(s)	3; 13%	3; 13%	0; 0%	0; 0%
	Immediate needs are occasionally responded to or responded to by annoyed/irritated CG(s)	4; 17%	6; 26%	13; 59%	9; 41%
	Immediate needs are usually responded to by CG(s) in a caring way	16; 70%	14; 61%	9; 41%	13; 59%
Attention to children's safety in their surroundings	No attention to children's safety (no actions taken or verbal instructions or caution on safety by CG(s))	3; 13%	3; 13%	0; 0%	1; 5%
	Attention to safety is provided but children's behaviour is restricted unnecessarily	4; 17%	5; 22%	14; 64%	12; 55%

Indicator		Baseline		Endline	
		Control (N=23)	Intervention (N=24)	Control (N=22)	Intervention (N=22)
	Attention to safety is provided without restricting children’s behaviour unnecessarily	16; 70%	15; 65%	8; 36%	9; 41%

1. Caregiver engagement

Three aspects of caregiver engagement were assessed within this sub-scale: i) the length of time caregivers interacted with children; ii) the inclusion of all children in groups; and iii) the position in which the caregiver interacted with children (sitting or standing).

The proportion of CBCCs where caregivers were observed to spend at least one hour interacting with the children decreased in both control and intervention groups between baseline and endline. Among control CBCCs the decrease was from 91% to 50% (n=21 to n11). In the intervention CBCCs, the decrease was less, from 87% to 82% (n=21 to n=18).

There was an increase in the proportion of CBCCs scoring highly on including all children in group or individual activities in both groups, although it was greater in the intervention group. At baseline, two intervention CBCCs (8%) scored highly, compared with nine (41%) at endline. In control CBCCs, this increased from one (4%) to four (18%).

Caregiver position in relation to children showed mixed changes between baseline and endline. At baseline, the majority of intervention CBCCs scored poorly (46%), 33% scored intermediate, and 21% scored highly. In the control group, the majority scored intermediate (48%), 39% scored poorly and 13% scored highly. By endline, however, the majority of intervention CBCCs scored intermediate (59%), and the remainder scored poorly (41%), with none scoring highly. In the control CBCCs, the majority scored poorly (45%), 41% scored intermediate, and 14% scored highly.

Table 7c: Treatment breakdown for caregiver engagement

Indicator		Baseline		Endline	
		Control (N=23)	Intervention (N=24)	Control (N=22)	Intervention (N=22)
Length of time caregiver(s) interacts with the children	Less than 1 hour	2; 9%	3; 13%	11; 50%	4; 18%
	1hr to 1hr 30 minutes	21; 91%	20; 83%	8; 36%	15; 68%
	More than 1 hour 30 minutes	0; 0%	1; 4%	3; 14%	3; 14%
Quality of engagement	CG(s) does very little to ensure most of the children are	3; 13%	1; 4%	2; 9%	0; 0%

Indicator		Baseline		Endline	
		Control (N=23)	Intervention (N=24)	Control (N=22)	Intervention (N=22)
	engaged, either alone or in groups				
	CG(s) seeks to ensure that some of the children are engaged, either alone or in groups	19; 83%	21; 88%	16; 73%	13; 59%
	CG seeks to ensure all children are engaged, either alone or in groups	1; 4%	2; 8%	4; 18%	9; 41%
Caregiver(s) position during engagement	Standing when interacting with the children	9; 39%	11; 46%	10; 45%	9; 41%
	Both sitting and standing (either on a chair or the floor) when interacting with the children	11; 48%	8; 33%	9; 41%	13; 59%
	Largely sitting (either on a chair or on the floor) when interacting with the children	3; 13%	5; 21%	3; 14%	0; 0%

1. Managing children's behaviour

Four aspects were assessed in this sub-scale: i) use of physical methods (like spanking, slapping hands, pulling a child roughly by the arm, striking with a stick, hurrying children along physically) to control behaviour; ii) use of yelling; iii) use of other punitive methods (such as isolation longer than three to four minutes, denying snacks, threatening, making them stand on one leg, squat, and so on); and iv) use of positive methods.

At baseline, the majority of CBCCs (20 (87%) control and 20 (83%) intervention) managed children's behaviour with no apparent signs of physical punishment. At endline, the proportion of such CBCCs remained at 20 (91%) in the intervention areas and reduced slightly to 18 CBCCs (82%) in the control areas.

The number of CBCCs, where caregivers did not yell to control children's behaviour was 21 (91%) in the control areas and 14 (58%) in the intervention areas. By the end of the study, the number of such CBCCs decreased in the control group, to 12 (55%), and increased in the intervention group to 14 (64%).

Similarly, the proportion of CBCCs that used no other punitive methods at baseline was 22 (96%) in the control areas and 21 (88%) in the intervention areas. By the end of the study, these proportions reduced slightly but remained high in both groups, with 20 CBCCs (91%) in the control areas and 18 (82%) in the intervention areas.

In only two CBCCs (one intervention (4%) and one control (4%)) positive methods of behaviour management were always or mostly used at baseline. At endline, the proportion of such CBCCs increased but continued to be small in both groups – four (18%) control and six (27%) intervention CBCCs.

Table 7d: Treatment breakdown for routine, engagement and management of behaviour

Indicator		Baseline		Endline	
		Control (N=23)	Intervention (N=24)	Control (N=22)	Intervention (N=22)
Use of physical methods to control behaviour	More usually controlled by the CG(s) using physical methods	1; 4%	1; 4%	0; 0%	0; 0%
	Occasionally controlled by the CG(s) with physical methods	2; 9%	3; 13%	4; 18%	2; 9%
	Never controlled by the CG(s) with physical methods	20; 87%	20; 83%	18; 82%	20; 91%
Use of yelling to control behaviour	Mostly controlled by the CG(s) with yelling	0; 0%	1; 4%	1; 5%	0; 0%
	Occasionally controlled by the CG(s) with yelling	2; 9%	9; 38%	9; 41%	8; 36%
	Never controlled by the CG(s) with yelling	21; 91%	14; 58%	12; 55%	14; 64%
Use of other punitive methods to control bad behaviour	Mostly controlled with other punitive methods	0; 0%	2; 8%	1; 5%	0; 0%
	Occasionally controlled with one or more punitive methods	1; 4%	1; 4%	1; 5%	4; 18%
	Never controlled with punitive methods	22; 96%	21, 88%	20; 91%	18; 82%

Indicator		Baseline		Endline	
		Control (N=23)	Intervention (N=24)	Control (N=22)	Intervention (N=22)
Use of positive methods to control behaviour	Never controlled through positive methods	2; 9%	2; 8%	0; 0%	0; 0%
	Occasionally controlled through positive methods	20; 87%	21; 88%	18; 82%	16; 73%
	Always/mostly controlled with one or more positive methods	1; 4%	1; 4%	4; 18%	6; 27%

2. Communication

Two aspects were assessed in the Communication sub-scale: i) creating speaking opportunities for children; and ii) encouraging mutual respect between children and adults.

At baseline, eight (35%) control CBCCs and six (25%) intervention CBCCs were scored highly on creating opportunities for children to speak using games, activities and objects as opportunities for communication. By the end of the study, the number of such CBCCs in the control group decreased to four (18%), while in the intervention group it increased slightly to seven (32%) CBCCs.

At baseline, 14 (61%) control CBCCs and 12 (50%) intervention CBCCs scored highly on encouraging respect in communications, by using techniques like active listening, eye contact, treating children fairly and encouraging them to be polite. At endline, the number of such CBCCs decreased in both control and intervention CBCCs, but the decrease was more substantial in the control CBCCs, where only two (9%) scored highly. In the intervention CBCCs, eight (36%) scored highly at endline. The majority of CBCCs at endline in both the control (19 (86%)) and intervention (14 (64%)) groups were described as showing good practice communications between caregivers and children, but only occasionally (intermediate score).

Table 7e: Treatment breakdown for communication

Indicator		Baseline		Endline	
		Control (N=23)	Intervention (N=24)	Control (N=22)	Intervention (N=22)
Caregiver(s) creates speaking opportunities for children	Children speak a lot, but it is formal or routine	14; 61%	18; 75%	9; 41%	4; 18%
	Children are given lots of natural speaking opportunities but do not speak for some reason	1; 4%	0; 0%	9; 41%	11; 50%

Indicator		Baseline		Endline	
		Control (N=23)	Intervention (N=24)	Control (N=22)	Intervention (N=22)
	Children have lots of natural speaking opportunities and the CG(s) uses games and/or activities to encourage communication	8; 35%	6; 25%	4; 18%	7; 32%
Caregiver(s) encourages development of mutual respect between children and adults	CG(s) doesn't show respect for children through techniques	1; 4%	2; 8%	1; 5%	0; 0%
	CG(s) occasionally shows respect for children	8; 35%	10; 42%	19; 86%	14; 64%
	CG(S) shows respect for children	14; 61%	12; 50%	2; 9%	8; 36%

3. Social development

Two aspects were assessed in this sub-scale: i) social interactions including during free playtime and outdoor activities; and ii) providing opportunities for children to work together to complete tasks.

At baseline, encouragement of positive social interactions between children was observed in six (26%) control and five (21%) intervention CBCCs. At endline, the number of such CBCCs in the control group reduced to three (14%). In the intervention group the number increased to 11 (50%). In the other 50% (n=11) of intervention CBCCs, caregivers encouraged positive social interactions, but usually as an intervention measure to prevent negative or harmful interaction between the children. In the control areas, the observers noted the same in 10 (45%) CBCCs, while in another nine (41%) CBCCs, caregivers 'did little or nothing to either encourage positive interactions or prevent negative or harmful interactions between the children'.

At baseline, 11 (48%) CBCCs in the control group and eight (33%) CBCCs in the intervention group scored highly on encouraging children to work together to complete a task. By the end of the study, the number of such CBCCs decreased in both areas, but the decrease was much sharper in the control areas from 11 (48%) to one (5%) CBCCs, compared to from eight (33%) to four (18%) in the intervention areas. Instead, at endline, in the majority of CBCCs in both groups (12 (55%) control and 15 (68%) intervention), caregivers were described as sometimes encouraging children to work together to complete a task (intermediate score).

Table 7f: Treatment breakdown for social development

Indicator		Baseline		Endline	
		Control (N=23)	Intervention (N=24)	Control (N=22)	Intervention (N=22)
Social interaction including during free play and outdoors activities. Not limited to verbal communication	CG(s) does little or nothing to encourage positive interaction	3; 13%	2; 8%	9; 41%	0; 0%
	CG(s) does little to encourage positive interaction between children	14; 61%	17; 71%	10; 45%	11; 50%
	CG(s) deliberately encourages positive social interaction	6; 26%	5; 21%	3; 14%	11; 50%
Caregiver(s) provides opportunities for children to work together to complete tasks	Does little to encourage children to work together to complete a task	1; 4%	7; 29%	9; 41%	3; 14%
	Sometimes encourages children to work together to complete a task	11; 48%	9; 38%	12; 55%	15; 68%
	Provides opportunities for children to work together to complete a task	11; 48%	8; 33%	1; 5%	4; 18%

1. Involvement of children with disabilities

Three aspects were observed within this sub-scale: i) responding to the needs of children with disabilities; ii) involving children with disabilities in activities with the rest of the group; and iii) engaging parents of children with disabilities to support the children’s participation. Observations were only made in CBCCs where study team members were able to observe children with disabilities. At baseline, this was in 29 CBCCs (13 control and 16 intervention) and at endline it was 17 CBCCs (five control and 12 intervention).

At baseline, no CBCCs in either group (where children with disabilities were observed on the day) were scored highly on responding to the needs of children with disabilities. By the end of the study only one CBCC (20% of the five observed) was scored highly in the control group, while the number of such CBCCs in the intervention group increased to seven (58% of the 12 observed). By the end of the study, two (40%) of the CBCCs in the control group and one (8%) in the intervention group 'made little or no attempt at modifications'.

One CBCC (in the intervention group only (6% of 16 observed)) scored highly on 'the inclusion of children with disabilities with the rest of the group' at baseline. At endline, the number of such CBCCs in the intervention group increased to seven (58% of the 12 observed). In the control group, no CBCCs were scored high in this dimension at baseline and only one control CBCC (20% of the five observed) was scored high at endline.

There was no observed involvement of parents of children with disabilities in activities in 61% (n=eight of 13 observed) of CBCCs in the control group, and 94% (n=15 of 16 observed) in the intervention group at baseline. At endline, the numbers were 4% (n=four of five observed) and 58% (n= seven of 12 observed), respectively. There was only one (8% of the 12 observed) CBCC in the intervention areas that scored highly on parents' involvement at the end of the study, and four CBCCs (33%) showed some evidence of involvement. The respective numbers in the control areas were zero and one (20%).

Table 7g: Treatment breakdown for involvement of children with disabilities

Indicator		Baseline		Endline	
		Control (N=13)	Intervention (N=16)	Control (N=5)	Intervention (N=12)
Responding to children's disabilities and needs	Little or no attempt to meet individual needs of children with disabilities	5; 38%	5; 31%	2; 40%	1; 8%
	Minor modifications made to meet individual needs of children with disabilities	8; 62%	11; 69%	2; 40%	4; 33%
	Modifications made in an environment, programme and schedule	0; 0%	0; 0%	1; 20%	7; 58%
Involvement of children with disabilities with the rest of the group	Very little or no involvement of children with disabilities with the rest of the group	6; 46%	1; 6%	2; 40%	0; 0%
	Some involvement of children with disabilities in the ongoing activities	7; 54%	14; 88%	2; 40%	5; 42%

Indicator		Baseline		Endline	
		Control (N=13)	Intervention (N=16)	Control (N=5)	Intervention (N=12)
	with the other children				
	Children with disabilities are included into the group and participate in most/all activities	0; 0%	1; 6%	1; 20%	7; 58%
Evidence of involvement of parents with children with disabilities	No evidence of parents' involvement in their child's participation in the CBCC	8; 61%	15; 94%	4; 80%	7; 58%
	Some evidence of parents' involvement in their child's participation in the CBCC	5; 38%	1; 6%	1; 20%	4; 33%
	Parents are actively involved in their child's participation in the CBCC	0; 0%	0; 0%	0; 0%	1; 8%

2. Numeracy, literacy and problem solving

Five aspects were assessed in this sub-scale: i) style of teaching numbers; ii) frequency of counting; iii) style of teaching alphabet; iv) reading with children; and v) the use of role-play and modelling.

At baseline, only five (22%) CBCCs in the control group and none in the intervention group scored highly on the style used to teach numbers, for example, children actively wrote numbers or counted under 10 in relation to seeing or handling the appropriate number of objects. At endline, the number of such CBCCs in the control areas decreased to one (5%) but increased to six (27%) in the intervention areas.

At baseline, only one (4%) CBCC in the control group and none in the intervention group scored highly on the frequency of counting, for example where children were encouraged to count in a variety of activities. At endline, the respective numbers were zero and four (18%) CBCCs.

About 78% (n=18) of CBCCs in the control group and 71% (n=17) in the intervention group scored intermediate on the style for teaching the alphabet at baseline, so 'when teaching takes place, children recite and or/copy alphabet in relation to initial sounds (for instance, 'a is for apple')'. Only three CBCCs (one (4%) control and two (8%) intervention) scored highly. At endline, only one CBCC (5%) remained scoring highly in the control group, but nine (41%) scored highly in the intervention group.

No CBCCs scored highly, and only one CBCC (4%) in the intervention group and no CBCCs in the control group scored intermediate on reading with children at baseline. The situation changed marginally in both groups at the end of the study, with one CBCC (5%) in the control group and two (9%) CBCCs in the intervention group scoring highly in this sub-scale. In the majority of CBCCs (86% (n=19)) control and 14 (64%)) intervention), caregivers never read with, or to, the children during the endline observation period.

Finally, only two (9%) CBCCs in the control areas and three (13%) CBCCs in the intervention areas scored highly on role-play and modelling at baseline. The situation was very similar at endline, with no CBCCs in the control areas and only two (9%) CBCCs in the intervention areas receiving a high score in this sub-scale. In 55% of intervention CBCCs (n=12) at endline, caregivers facilitated role-play at specific moments, but without much connection to learning. In the control areas, the proportion of such CBCCs was 32% (n=seven). In the majority of control CBCCs at endline (n=15, 68%), caregivers did not promote any role-play; the proportion of such CBCCs in the intervention areas was 36% (n=eight).

Table 7h: Treatment breakdown for numeracy, literacy and problem solving

Indicator		Baseline		Endline	
		Control (N=23)	Intervention (N=24)	Control (N=22)	Intervention (N=22)
Style of teaching numbers	No teaching of numbers is observed, either verbally or written	7; 30%	6; 25%	6; 27%	8; 36%
	When teaching takes place children recite and/or copy numbers without relating to number of objects	11; 48%	18; 75%	15; 68%	8; 36%
	When teaching takes place, counting and or writing of numbers under 10 is done in relation to seeing or handling the appropriate number of objects	5; 22%	0; 0%	1; 5%	6; 27%
Frequency of counting across all activities	Children are never encouraged to count objects	15; 65%	21; 88%	14; 64%	5; 23%
	Children only count objects when that is the focus of the activity	7; 30%	3; 13%	8; 36%	13; 59%
	Children are encouraged to count objects during a variety of activities	1; 4%	0; 0%	0; 0%	4; 18%

Indicator		Baseline		Endline	
		Control (N=23)	Intervention (N=24)	Control (N=22)	Intervention (N=22)
Style of teaching alphabet	No teaching of the alphabet is observed, either verbally or written	4; 17%	5; 21%	3; 14%	3; 14%
	When teaching takes place, children recite and or/copy alphabet in relation to initial sounds (‘a is for apple’)	18; 78%	17; 71%	18; 82%	10; 45%
	When teaching takes place, children are encouraged to recognise the alphabet in relation to initial sounds of common objects which are shown to and/or handled by the children	1; 4%	2; 8%	1; 5%	9; 41%
Reading with children	CG(s) never reads with or to children in the observation period	23; 100%	23; 96%	19; 86%	14; 64%
	CG(s) reads to children, children are rarely involved or encouraged to participate	0; 0%	1; 4%	2; 9%	6; 27%
	CG(s) reads to children and children are encouraged to participate	0; 0%	0; 0%	1; 5%	2; 9%
Role-playing and make-believe	CG(s) does not promote or facilitate role-play or make-believe	10; 43%	16; 67%	15; 68%	8; 36%
	CG(s) promotes/facilitates role-play or make-believe at specific moments during the observation, but without much elaboration or connection of the role-play with learning	11; 48%	5; 21%	7; 32%	12; 55%

Indicator		Baseline		Endline	
		Control (N=23)	Intervention (N=24)	Control (N=22)	Intervention (N=22)
	CG(s) facilitates role-play or make-believe activities and often uses the role-play as an opportunity to expand children’s experience or knowledge in some way	2; 9%	3; 13%	0; 0%	2; 9%

Results: Caregivers at community-based childcare centres

One hundred and twenty seven caregivers were reported to have worked (or volunteered) at 48 CBCCs in the past six months at baseline – a mean of 2.6 per centre. Although most centres reported two caregivers (a minimum inclusion criteria for the study), the maximum number reported was seven. One hundred and six of the 127 caregivers (83.5%) participated in the caregiver survey module.

One hundred and thirty eight caregivers were reported to have worked (or volunteered) at 45 CBCCs in the past six months at endline – a mean of 3.1 per centre. Although most centres reported three caregivers, the minimum reported number was two and the maximum number reported was six. One hundred of the 138 caregivers (72.5%) participated in the caregiver survey module.

Characteristics of caregivers at community-based childcare centres

At baseline, the majority of caregivers participating in the survey were female (93%) and the median age was 33 years. Although the sex distribution was broadly similar in the control and intervention CBCCs, the caregivers in the intervention CBCCs were slightly younger than those in the control CBCCs (30 years compared with 34 years). At endline, the proportion of caregivers participating in the survey who were female remained at 93%, and the mean age increased slightly to 35 years. The gender split remained broadly similar, and the mean age in the control and intervention centres remained higher in the control centres (36 years) than the intervention centres (32 years).

At both baseline and endline in control and intervention CBCCs, the majority of caregivers had worked in their current situation for over two years. The difference between control and intervention centres at baseline was negligible (77.1% and 77.6%), and was slightly wider at endline (85.7% and 72.6%).

Although the majority of caregivers reported working on a voluntary basis at both baseline (86%) and endline (95%), there was a broad difference between control and intervention CBCCs at baseline (98% and 76%), which was much smaller at endline (92% and 98%). The majority of caregivers reported their motivation to work at the CBCC was driven by their desire to help children and their communities more broadly. Little difference could be observed between the study groups.

Table 8: Caregiver characteristics and motivations

Characteristics of a caregiver		**Baseline**		**Endline**		
	Control	Intervention	Total	Control	Intervention	Total
Sex						
Male	3; 6.3%	5; 8.6%	8; 7.5%	4; 8.2%	3; 5.9%	7; 7.0%
Female	45; 93.7%	53; 91.4%	98; 92.5%	45; 91.8%	48; 94.1%	93; 93%
Median age	34	30	32	36	32	35
Highest level of education						
Standard 1-4 (lower primary)	0; 0%	4; 6.9%	4; 3.8%	0; 0%	3; 5.9%	3; 3.0%
Standard 5-8 (higher primary)	18; 37.5%	15; 25.9%	33; 31.1%	18; 36.7%	17; 33.3%	35; 35.0%
Form 1-2 (lower secondary)	14; 29.2%	16; 27.6%	30; 28.3%	17; 34.7%	12; 23.5%	29; 29.0%
Form 3-4 (higher secondary)	16; 3.3	22; 37.9%	38; 35.9%	14; 28.6%	19; 37.3%	33; 3.0%
How long has the caregiver been a caregiver at this location?						
0 to 1 month	1; 2.1%	0; 0%	1; 1.0%	1; 2.0%	0; 0%	1; 1.0%
1 to 6 months	6; 12.5%	3; 5.2%	9; 8.5%	1; 2.0%	3; 5.9%	4; 4.0%
7 to 12 months	0; 0%	1; 1.7%	1; 0.9%	1; 2.0%	9; 17.7%	10; 10.0%
1 to 2 years	4; 8.3%	9; 15.5%	13; 12.3%	4; 8.2%	2; 3.9%	6; 6.0%
Over 2 years	37; 77.1%	45; 77.6%	82; 77.4%	42; 85.7%	37; 72.6%	79; 79.0%
How are you remunerated for your work at the CBCC?						
Given money	1; 2.1%	10; 17.2%	11; 10.4%	4; 8.2%	1; 2.0%	5; 5.0%
Given foodstuffs	0; 0%	4; 6.9%	4; 3.8%	0; 0%	0; 0%	0; 0%
Voluntary	47; 97.9%	4; 75.9%	91; 85.9%	45; 91.8%	50; 98.0%	95; 95.0%
Why did you become a caregiver?						
Earn money	6; 12.5%	7; 12.1%	13; 12.3%	2; 4.1%	0; 0%	2; 2.0%
Help children	42; 87.5%	56; 96.6%	98; 92.5%	46; 93.9%	51; 100.0%	97; 97.0%
So my child could attend the CBCC	4; 8.3%	7; 12.1%	11; 10.4%	8; 16.3%	6; 11.8%	14; 14.0%
Nothing else to do	1; 2.1%	6; 10.3%	7; 6.6%	5; 10.2%	5; 9.8%	10; 10.0%

Characteristics of a caregiver		Baseline		Endline		
	Control	Intervention	Total	Control	Intervention	Total
Learn new skills	1; 2.1%	2; 3.5%	3; 2.8%	6; 12.2%	3; 5.9%	9; 9.0%
Help the community	33; 68.8%	39; 67.2%	72; 67.9%	43; 87.8%	40; 78.4%	83; 83.0%
Other	21; 43.8%	18; 31.0%	39; 36.8%	2; 4.1%	5; 9.8%	7; 7.0%

Caregiver retention

Only nine of 44 CBCCs (20.5%) visited at endline reported any of the caregivers interviewed at baseline as still working there (five intervention CBCCs and four control CBCCs). Eight reported 100% retention of all original caregivers and one reported two out of three (67%) of original caregivers were still in post. Overall, 14.6% of the caregivers enrolled at baseline were reported to still work in the CBCCs at endline – 17.2% (n=11/64) in the intervention CBCCs and 12.3% (n=9/73) in the control CBCCs.

Caregiver satisfaction

The questionnaire administered in face-to-face interviews asked about caregivers' satisfaction by offering the respondents the opportunity to place their level of agreement with four statements over a five-point Likert scale. The four areas enquired about in the questionnaire were: i) satisfaction with work as a caregiver; ii) recognition for the work; iii) work-related conditions; and iv) work-related training. The caregivers, who either strongly agreed or agreed with the proposed statements, were considered to be satisfied with that aspect of their job.

In general, caregivers indicated satisfaction with their work at baseline (95.3%) and endline (95.0%), with little differences between the control and intervention groups. They also felt satisfied with the recognition they get for their work at both baseline (89.6%) and endline (93%), and that their work conditions allow them to perform well (baseline 93.4%, endline 96%). Satisfaction with training was more complex: at baseline only 10.6% reported satisfaction with their training opportunities (6.3% in the control group; 13.8% in the intervention group), compared with 88.7% who were not satisfied. Those in the control group were particularly likely to be dissatisfied (93.8%), compared with those in the intervention group (84.4%). At endline, satisfaction had increased to 45% (18.3% in the control group and 70.6% in the intervention group). Dissatisfaction reduced to 61.2% in the control group and to 23.6% in the intervention group.

Table 9: Caregiver satisfaction levels at baseline and endline

Caregiver satisfaction level	Baseline			Endline			% change control	% change intervention
	Control	Intervention	Total	Control	Intervention	Total		
1. In general, I am satisfied with my work (job)/working in a CBCC as a caregiver								
Strongly disagree	1; 2.1%	2; 3.5%	3; 2.8%	1; 2.0%	0; 0%	1; 1%	0.1%	-3.5%
Disagree	0; 0%	0; 0%	0; 0%	4; 8.2%	0; 0%	4; 4%	8.2%	0%

Caregiver satisfaction level	Baseline			Endline			% change control	% change intervention
	Control	Intervention	Total	Control	Intervention	Total		
Neither disagree/agree	0; 0%	2; 3.5%	2; 1.9%	0; 0%	0; 0%	0; 0%	0%	-3.5%
Agree	18; 37.5%	30; 51.7%	48; 45.3%	14; 28.6%	254; 47.1%	38; 38%	-8.9%	-4.6%
Strongly agree	29; 60.4%	24; 41.4%	53; 50.0%	30; 61.2%	27; 52.9%	57; 57%	0.8%	11.5%
2. I am satisfied with the recognition I get for the work I do								
Strongly disagree	1; 2.1%	3; 5.2%	4; 3.8%	0; 0%	0; 0%	0; 0%	-2.1%	-5.2%
Disagree	2; 4.2%	2; 3.5%	4; 3.8%	4; 8.2%	1; 2.0%	5; 5%	4%	-1.5%
Neither disagree/agree	0; 0%	3; 5.2%	3; 2.8%	1; 2.0%	1; 2.0%	2; 2.0%	2%	-3.2%
Agree	20; 41.7%	33; 56.9%	53; 50.0%	16; 32.7%	29; 56.9%	45; 45%	-9%	0%
Strongly agree	25; 52.1%	17; 29.3%	42; 39.6%	28; 57.1%	20; 39.2%	48; 48%	5%	-9.9%
3. I feel my job/work conditions allow me to perform well								
Strongly disagree	1; 2.1%	1; 0.7%	2; 1.9%	0; 0%	0; 0%	0; 0%	-2.1%	-0.7%
Disagree	0; 0%	3; 5.2%	3; 2.8%	2; 4.1%	0; 0%	2; 2%	4.1%	-5.2%
Neither disagree/agree	0; 0%	2; 3.5%	2; 1.9%	2; 4.1%	0; 0%	2; 2%	4.1%	-3.5%
Agree	23; 47.9%	31; 53.5%	54; 50.9%	33; 67.4%	34; 66.7%	67; 67%	19.5%	13.2%
Strongly agree	24; 50.0%	21; 36.2%	45; 42.5%	12; 24.5%	17; 33.3%	29; 29%	-25.5%	-2.9%
4. I am satisfied with the educational/training opportunities that I get								
Strongly disagree	39; 81.3%	39; 67.2%	78; 73.6%	13; 26.5%	1; 2.0%	14; 14%	-54.8%	-65.2%
Disagree	6; 12.5%	10; 17.2%	16; 15.1%	17; 34.7%	11; 21.6%	28; 28%	22.2%	4.4%
Neither disagree/ agree	0; 0%	1; 1.7%	1; 0.9%	10; 20.4%	3; 5.9%	13; 13.0%	20.4%	4.2%
Agree	1; 2.1%	6; 10.3%	7; 6.6%	6; 12.2%	23; 45.1%	29; 29%	10.1%	34.8%
Strongly agree	2; 4.2%	2; 3.5%	4; 3.8%	3; 6.1%	13; 25.5%	16; 16%	1.9%	22.0%

Results: Children attending community-based childcare centres

For individual child assessments, 20 children from each CBCC were randomly selected, based on children recorded at the CBCC and their parents/guardians interviewed. Disability (functional difficulties) was assessed using the UNICEF/Washington Group Child Functioning Module (CFM). The Malawi Development Assessment Tool (MDAT) developed by Gladstone et al(14) was used to measure the primary outcome of the trial (child development). School readiness was assessed using curriculum-based tasks that were appropriate to the ages indicated in the Malawian Early Learning and Development Standards (ELDS).

Functional difficulty/disability measured by Child Functioning Module

In total, 924 children from 47 CBCCs completed every domain of the CFM at baseline and 878 children from 44 CBCCs completed every domain at endline. At baseline, 723 children (78.3%) were aged two to four years and 201 (21.8%) were five years or above. At endline, 601 children (68.5%) were aged two to four years and 277 (31.5%) were aged five years and above.

Prevalence of disability/functional difficulty

At baseline, 95 out of 924 children (10.3%) were categorised as having a disability (functional difficulty) using the CFM recommended cut-off points. This included 41 children in the control CBCCs (8.9%) and 54 children in the intervention CBCCs (11.7%) (corrected χ^2=16.7, p=0.005). At endline, 52 out of 878 screened children had a disability (5.9%), including 27 children in the control areas (6.2%) and 25 children in the intervention areas (5.7%) (corrected χ^2=0.084, p=0.77).

This indicates a decrease in intervention CBCCs of 6% and a decrease in control CBCCs of 2.7%. Overlapping confidence intervals in control areas indicates a non-meaningful difference, while the independence of the confidence intervals in the intervention areas indicates evidence of a meaningful difference.

Prevalence of disability was higher among older children at both baseline and endline. At baseline, 28.4% (57/201) of children aged five years or over were categorised as having a disability using the CFM cut-offs, compared to 5.3% (38/723) among two to four-year-olds (corrected χ^2=88.7, p<0.0001). At endline, the respective figures were 11.6% (32/277) and 3.3% (20/601), (corrected χ^2=16.7, p=0.005).

Prevalence was similar among boys and girls at baseline, (10.7% (44/411) among boys, compared with 9.9% (51/513) among girls; corrected χ^2=0.1250, p=0.73). At endline, the prevalence among boys was significantly higher than that among girls (8.8% (32/362), compared with 3.9% (20/516); corrected χ^2=8.74, p=0.002).

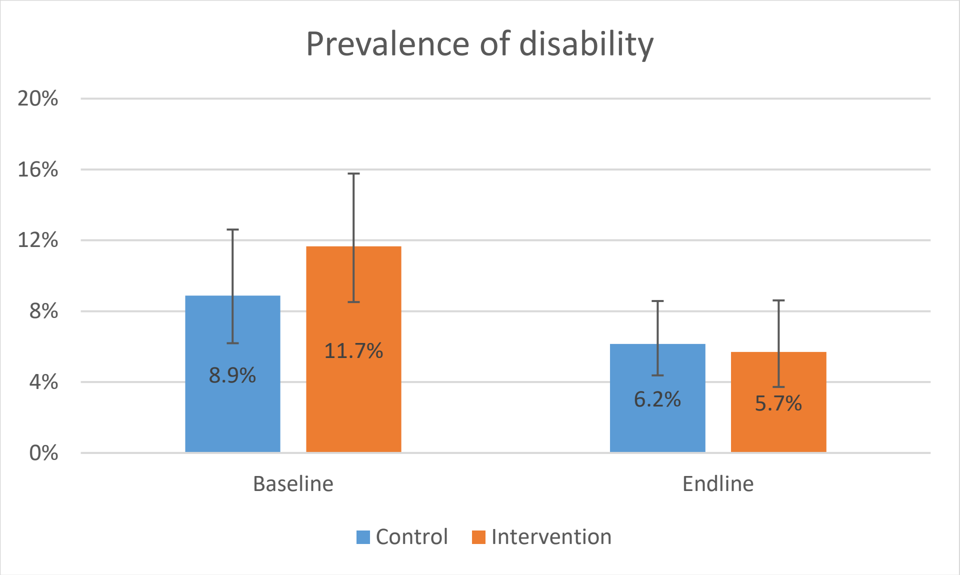

Figure 3: Prevalence of disability in both groups at baseline and endline

Functional domains

Children two to four years

At baseline, the most commonly reported difficulties in children aged two to four years were in the communication (1.5% prevalence) and learning domains (1.4% prevalence), followed by difficulties with hearing (1%), walking (0.8%), and behaviour 0.8%), with no observable differences between the control and intervention groups.

At endline, the most commonly reported difficulties were in the communication (1.7%), playing (1%) and learning 0.8%), with no observable differences between the groups.

Table 10: Prevalence of difficulties in functional domains among children aged two to four years

	Baseline				**Endline**				**Total**			
	Control		**Intervention**		**Control**		**Intervention**		**Baseline**		**Endline**	
Domain	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Seeing	2	0.6	1	0.3	1	0.3	1	0.4	3	0.4	2	0.3
Hearing	4	1.1	3	0.8	1	0.3	1	0.4	7	1.0	2	0.3
Walking	2	0.5	4	1.1	2	0.6	1	0.4	6	0.8	3	0.5
Fine motor	2	0.6	0	0	1	0.3	3	1.1	2	0.3	4	0.7
Communication	4	1.1	7	2.0	5	1.6	5	1.8	11	1.5	10	1.7
Learning	7	1.9	3	0.8	4	1.3	1	0.4	10	1.4	5	0.8
Playing	2	0.6	3	0.8	5	1.6	1	0.4	5	0.7	6	1.0
Behaviour	2	0.6	4	1.1	0	0	1	0.4	6	0.8	1	0.2
Overall disability	**18**	**4.9**	**20**	**5.6**	**11**	**3.5**	**9**	**3.2**	**38**	**5.3**	**20**	**3.3**

Children five+ years

Among children aged five+ years at baseline, the most common functional difficulties were anxiety 9.4%), behaviour (6.9%), remembering (5.9%), accepting change (5.4%), depression (4.9%) and communication (4.4%).

At endline, the most commonly reported domains were walking (3.3%), anxiety (2.9%), and accepting change (2.9%).

Small shifts in the distribution of the various types of functional difficulties occurred between baseline and endline, but the sample size was too small to draw any conclusions.

Table 11: Prevalence of difficulties in functional domains among children aged five+ years

	Baseline				**Endline**				**Total**			
	Control		**Intervention**		**Control**		**Intervention**		**Baseline**		**Endline**	
Domain	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Seeing	2	2.0	3	2.8	0	0	1	0.6	5	2.4	1	0.4
Hearing	0	0.0	2	1.9	0	0	1	0.6	2	1.0	1	0.4
Walking	1	1.1	2	1.9	3	2.5	6	3.8	3	1.5	9	3.3
Self-care	4	4.1	3	2.8	1	0.8	5	3.1	7	3.4	6	2.1
Communication	4	4.2	5	4.7	2	1.7	3	1.9	9	4.4	5	1.8
Learning	2	2.0	3	2.8	1	0.8	3	1.9	5	2.4	4	1.4
Remembering	7	7.3	5	4.7	2	1.7	4	2.6	12	5.9	6	2.2
Concentrating	2	2.1	2	1.9	2	1.7	2	1.3	4	2.0	4	1.4
Accepting change	7	7.3	4	3.7	5	4.2	3	1.9	11	5.4	8	2.9
Behaviour	7	7.3	7	6.5	2	1.7	4	2.6	14	6.9	6	2.2
Making friends	1	1.0	3	2.8	0	0	3	1.9	4	2.0	3	1.1
Anxiety	7	7.3	12	11.2	4	3.3	4	2.6	19	9.4	8	2.9
Depression	2	2.1	8	7.5	0	0	3	1.9	10	4.9	3	1.1
Overall disability	**28**	**27.7**	**38**	**34.9**	**18**	**14.8**	**19**	**11.9**	**66**	**31.4**	**37**	**13.1**

Malawi Developmental Assessment Tool: Intervention effect (primary outcome of the trial)

Assessment of developmental delay

The MDAT uses culturally-valued developmental milestones to detect neuro disabilities in children, by scoring child development age against a reference range of scores for given ages. In this study, two out of four MDAT domains – language and social – were assessed (see Appendix 1). Each domain included 34 tasks of increasing difficulty, which were assessed and scored. The calculated individual score for each child was compared with a reference range for their biological age. Developmental delay in either modality was defined as a child of a given age scoring lower than the 2.5th centile of the reference group of children of the same age (a Z-score of less than -1.96).

A total of 933 children at baseline and 881 children at endline were assessed using the MDAT (language and social domains). At baseline, the proportion of children with any (either social or language) delay was 11.7% (n=109) overall. In the intervention areas the proportion was 11.6% (n=54) and 11.8% (n=55) in the control areas – a non-significant difference (corrected χ^2=0.0132, p=0.91).

At endline, the proportion of children with developmental delay, overall, was 8.2% (n=72). In the intervention areas it was 6.3% (n=28) and in the control areas it was 10.0% (n=44) – indicating a stronger relationship between the intervention and CBCCs, albeit not a significant one (corrected χ^2=3.68, p=0.062).

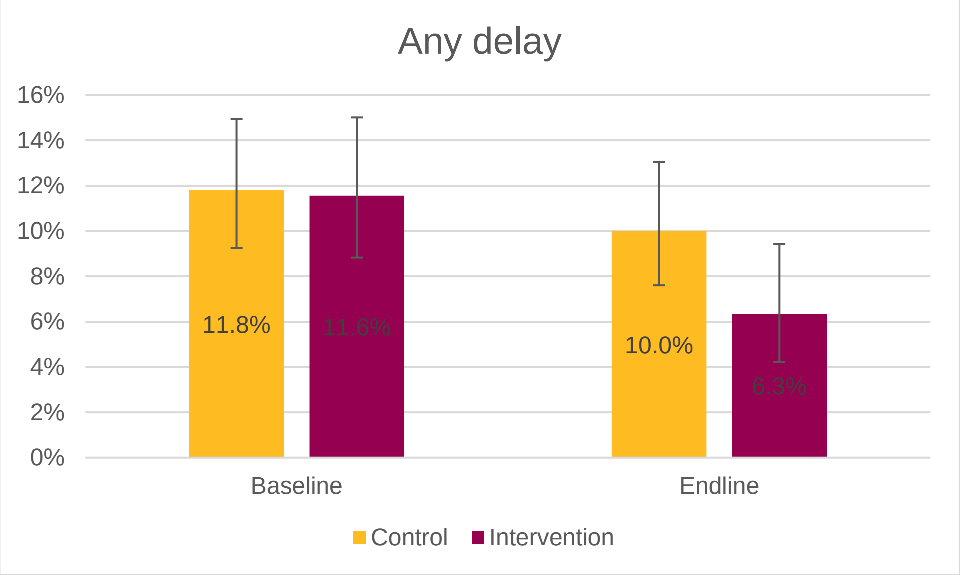

Figure 4: Prevalence of any delay among children in control and intervention groups

Similar changes were observed among domain-specific results. The prevalence of delay in the language domain was very similar between the control and intervention groups at baseline (3.9% (n=18) and 4.7% (n=22); corrected χ^2=0.35, p=0.56). At endline, they had diverged, although the results were not statistically significant (4.5% (n=20) and 2.5% (n=11); corrected χ^2=3.08, p=0.09).

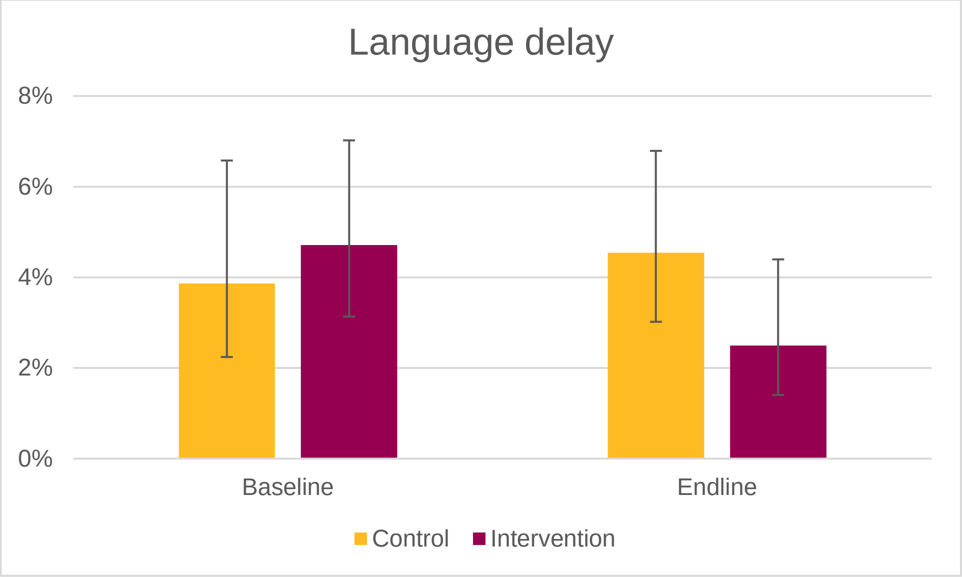

Figure 5: Prevalence of language delay among children in control and intervention groups

The prevalence of delay in the social domain was similar among both groups at baseline and endline. At baseline the prevalence of social delay in the control CBCCs was 8.6% (n=40) and 7.9% in the intervention CBCCs (corrected χ^2=0.12, p=0.73). At baseline, the prevalence was 7.3% (n=32) in the control CBCCs and 5% (n=22) in the intervention CBCCs (corrected χ^2=1.80, p=0.19).

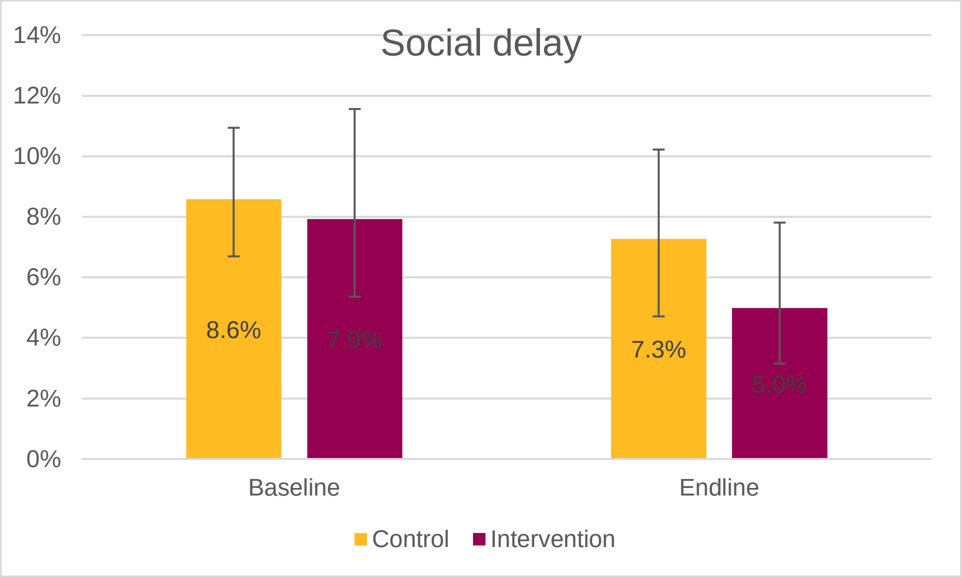

Figure 6: Prevalence of social delay among children in control and intervention groups

Relationship between disability and developmental delay

Examined together, the relationship between disability (functional difficulties) and developmental delay is strong. At baseline, children with disabilities had 4.6 times greater odds of developmental delay than children without disabilities (adjusted for clustering, p<0.001). The link with social delay was particularly strong – children with disabilities had 6.3 times greater odds of social delay than children without disabilities (adjusted for clustering, p<0.001). Children with disabilities had 2.9 times greater odds of language delay, compared with children without disabilities (adjusted for clustering, p=0.007).

At endline, children with disabilities had 11.6 times greater odds of having any developmental delay than children without disabilities (adjusted for clustering, p<0.001). Again, the link with social delay was particularly strong and children with disabilities had 16.8 times greater odds than children without disabilities of a social delay (adjusted for clustering, p<0.001). Children with disabilities had 15.0 times greater odds of a language delay than children without disabilities (adjusted for clustering, p<0.001).

School readiness scale

The school readiness test asked children to perform up to 18 tasks that were grouped and graded into sets of three of increasing difficulty, and corresponding to six curriculum areas, although this was reduced to four areas at endline (literacy symbols, literacy reading, literacy writing and numeracy). All curriculum-based tasks were based on the ages indicated in the Malawian Early Learning and Development Standards (ELDS), and children were only asked to perform age-appropriate tasks. If a child did not pass a particular task then no further questions for this domain were requested, as further questions were more challenging than the earlier ones.

Baseline data was collected from 933 children. Eleven children (1.2%) were two years of age, 716 (76.7%) were three- to four-years-old and 206 (22.1%) were five years and above.

At the endline, data was collected from 880 children. Thirty-one children (3.5%) were two years old, 570 (64.8%) were three- to four-years-old, and 279 (31.7%) were aged five and above.

Literacy: symbols

The three indicators in this domain were:

1. Recognises familiar symbols from the environment (all children)
2. Can recognise some letters as opposed to non-letter symbols, including first letter of name (children aged three and above)
3. Can recognise three letters (children aged five and above)

60% of children in control CBCCs, and 40% in intervention CBCCs, passed age-appropriate questions at baseline (question 4). By endline, this increased to 62.5% in the control CBCCs and to 57.1% in the intervention CBCCs. Very few three and four-year-olds passed age-appropriate questions in either the control or intervention CBCCs at baseline (3.6% and 2.6%) or endline (3.4% and 10.2%), although the difference between the control and intervention groups at endline was statistically significant (χ^2 = 10.55, p=0.001). Among children aged five year and over, pass rates were also low among children in control and intervention CBCCs at baseline (4.1% and 0.9%) although a small increase was seen in the control CBCCs at endline (5%) and a larger one in the endline CBCCs (16.5%), and they were also different statistically (χ^2 = 8.92, p=0.003).

Table 12a: Age-appropriate pass rates in the literacy: symbols domain

Age-appropriate pass	Baseline	Endline		

	Control	Intervention	Control	Intervention	**% change control**	**% change Intervention**
Literary: symbols						
2+ (question 4 only)	3/5; 60.0%	2/5; 40.0%	15/24; 62.5%	4/7; 57.1%	2.5%	17.1%
3-4 (question 4 and 5)	13/363; 3.6%	9/353; 2.6%	10/295; 3.4%	28/275; 10.2%	-0.2%	7.6%
5+ (question 4, 5 and 6)	4/98; 4.1%	1/108; 0.9%	6/121; 5.0%	26/158; 16.5%	-3.2%	11.5%

Literacy: reading

The three indicators in the reading domain were:

4. Recognises pictures in books (all children)
5. Talks about pictures in books a handle books correctly (children aged three and above)
6. Tells a story from a series of pictures or diagrams or objects in a book (children aged five and above)

At baseline, all children aged up to two years in the control CBCCs and 60% in the intervention CBCCs passed the age-appropriate questions (question one) in this domain. Pass rates decreased in the control CBCCs at endline by 20% to 79.2%, and increased in the intervention CBCCs to 71.4%. Among three and four-year-olds, 26.2% in the control CBCCS passed their age-appropriate questions (one and two) at baseline, compared with 20.1% in the intervention CBCCs. At endline, pass rates in the control group remained the same, but increased by 12.6% in the intervention group to 33%. Among children aged five years and over, 35.7% in the control CBCCs and 42.6% in the intervention CBCCs passed age-appropriate (all three) questions. Pass rates increased in both groups by endline, but by more than 11.4% to 47.1% in the control CBCCs, compared with an increase of 3.6% in the intervention CBCCs to 46.2%.

Table 12b: Age-appropriate pass rates in the literacy: reading domain

Age-appropriate pass	**Baseline**		**Endline**		**% change control**	**% change intervention**
	Control	**Intervention**	**Control**	**Intervention**		
Literacy: reading						
2+ (question 1 only)	5/5; 100.0%	3/5; 60.0%	19/24; 79.2%	5/7; 71.4%	-20.8%	11.4%
3-4 (question 1 and 2)	95/363; 26.2%	71/353; 20.1%	76/295; 25.8%	90/275; 32.7%	-0.4%	12.6%
5+ (question 1, 2 and 3)	35/98; 35.7%	46/108; 42.6%	57/121; 47.1%	73/158; 46.2%	11.4%	3.6%

Literacy: writing

The three indicators in this domain were:

7. Can scribble (all children)
8. Can write three letters (children aged three and above)
9. Can write some words, including their name (children aged five and above)

100% of children in the control CCCs and 60% of those in the intervention CBCCs passed age-appropriate questions at baseline. At endline, 91.7% in the control CBCCs and 85.7% in the intervention CBCCs passed. Very few children aged three- to four-years-old in control and intervention CBCCs passed age-appropriate questions at either baseline (1.7% and 2%) or endline (2% and 3.6%). Similarly, few children aged five years and above passed age-appropriate questions (all questions) in either control or intervention BCCs at baseline (0% and 0.9%) or endline (1.7% and 3.2%).

Table 12c: Age-appropriate pass rates in the literacy: writing domain

Age-appropriate pass	**Baseline**		**Endline**		**% change control**	**% change intervention**
	Control	Intervention	Control	Intervention		
Literacy: writng						
2+ (question 7 only)	5/5; 100.0%	3/5; 60.0%	22/24; 91.7%	6/7; 85.7%	-8.3%	25.7%
3-4 (question 7 and 8)	6/363; 1.7%	7/353; 2.0%	6/295; 2.0%	10/275; 3.6%	0.3%	1.6%
5+ (question 7, 8 and 9)	0/98; 0.0%	1/108; 0.9%	2/121; 1.7%	5/158; 3.2%	1.7%	2.3%

Mathematics and numerical knowledge

The three indicators in this domain were:

10. Can indicate more when comparing quantities (all children)
11. Can identify quantities – one and two objects (children aged three and above)
12. Can count and conserve up to five (children aged five and above)

80% of children aged two years in the control CBCCs, and 60% in the intervention CBCCs, passed age-appropriate questions at baseline. At endline, this decreased to 54.2% in the control CBCCs and increased to 71.4% in the intervention CBCCs. 90.1% and 90.9% of three and four-year-olds in the control and intervention CBCs passed age-appropriate questions at baseline. At endline this decreased slightly to 88.8% in the control CBCCs and increased slightly to 94.1% in the intervention CBCCs – a statistically-significant difference (χ^2 = 5.22, p=0.022).

Table 12d: Age-appropriate pass rates in the mathematics and numerical knowledge domain

Age-appropriate pass	**Baseline**		**Endline**		**% change control**	**% change intervention**
	Control	Intervention	Control	Intervention		
Mathematical and numerical knowledge						
2+ (question 10 only)	4/5; 80.0%	3/5; 60.0%	13/24; 54.2%	5/7; 71.4%	-25.2%	11.4%
3-4 (question 10 and 11)	327/363; 90.1%	321/353; 90.9%	262/295; 88.8%	259/275; 94.2%	-1.3%	3.3%
5+ (question 10, 11 and 12)	47/98; 48.0%	49/108; 45.4%	59/121; 48.8%	93/158; 58.9%	0.8%	13.5%

Discussion

Impact of the training on the main outcomes of the trial

Developmental delay

The evidence from the follow-up survey suggests that training of caregivers had some positive effect on the development of pre-school children included in the trial, with the overall prevalence of developmental delay being lower in the intervention group (6.3%) than in the control group (10%). The difference observed between the two groups was small but statistically-significant at 5% level, suggesting that children attending CBCCs, where caregivers had been trained using the inclusive training package tested in this study, were less likely to be behind their biological age milestones than the children attending CBCCs, where the caregivers had not undertaken such training. The difference between the two groups was more evident when the results by the two separate domains of development were considered. The prevalence of developmental delay was lower in the intervention group in both social (5% vs 7.3%) and language (2.5% vs 4.5%) domains. However, it is important to note that the endline in this trial took place nine months after the training and it remains unclear whether the change in caregiver skills and practices and subsequently the impact on child development will be sustained over time. Also, the sample size of this study did not allow for comparisons of children with and without disabilities and we do not know whether children with disabilities benefited from this intervention in the same way as children without disabilities.

Caregiver satisfaction

The main difference in the levels of satisfaction among the caregivers participating in the study was satisfaction with the training they had received for their job. At baseline, the proportion of such caregivers was very low in both groups (6% control and 13% intervention). By the end of the study, 70% of caregivers in the intervention areas were satisfied with their training, compared to only one in five (20%) in the control areas. It is important to note that not all caregivers included in the endline survey in the intervention areas had been trained by the project. The proportion of caregivers in the intervention CBCCs reporting any training at endline was about 70%, and the majority of them (96%) had been trained seven to 12 months before the survey. We assume that this was the training provided by the project and therefore all those who had been trained by the project were satisfied with the training they received.

Caregivers in the intervention areas were also more satisfied with other aspects of their job, including being a caregiver (100% vs 89%); work recognition (96% vs 89%); and working environment (100% vs 92%).

Retention of caregivers from baseline to endline appears very low – at less than 15%, overall, and the majority of CBCCs reporting 0% retention. However, the wide variety of responses to the questions raises concerns about whether they were consistently answered correctly.

CBCC environment

The impact of the caregiver training on CBCC day-to day-practices and caregiver interactions with children varied, depending on the aspect of the CBCC environment assessed. The main differences between the control and intervention groups were noted in social interactions, communication, support of children with disabilities, caregiver engagement and some aspects of teaching literacy and numeracy – all of which were key aspects covered by the training curriculum.

So the caregivers in the intervention CBCCs were more likely to encourage positive interactions between children and help them to develop appropriate social behaviour with peers during the play time and other activities (50% vs 14%). There was a reduction in negative or passive interactions between the caregiver and the children. After the training there were no intervention CBCCs where caregivers were recorded doing little or nothing to encourage positive social interactions or discourage negative or harmful interactions between the children, whereas this was observed in 41% of control CBCCs.

Furthermore, caregivers in the intervention CBCCs were more likely to spend at least one hour directly interacting with the children (82% vs 50%) and were more likely to ensure that all children were engaged in CBCC activities (41% vs 18%). These caregivers were also more likely to demonstrate good communication practices with the children (for example, listening attentively, making eye contact and encouraging children in a polite way to listen when adults speak) (36% vs 9%), and create natural speaking opportunities, as well as use games and other activities to encourage communication (32% vs 18%).

A higher, although still low, proportion of CBCCs in the intervention group showed good practices in responding to the needs of children with disabilities (32% compared to 5% control CBCCs), and including children with disabilities in CBCC activities (32% compared to 5%).

The main differences between the intervention and control CBCCs in the teaching of literacy and numeracy curriculum areas were around the way the alphabet and numbers were taught. Caregivers in the intervention CBCCs were more likely to encourage children to read the alphabet and count in relation to common objects shown to or handled by the children (41% vs 5%, and 27% vs 5%, respectively). Caregivers in the intervention CBCCs were also more likely to facilitate role-play at least at specific moments (55% vs 32%), while in the control CBCCs they were less likely to use role-play at all (68% vs 36%).

One aspect of the CBCC environment where the training had little impact was routine and structure, with the majority of CBCCs in both groups continuing to use one collective group and have very limited (or no) use of activity corners. This may be due to the relatively little attention it was given within the training curriculum. Also, there was little difference in the observed approaches used to control children's behaviour, involve the parents of children with disabilities in CBCC activities, or read with, or to, the children.

Overall, areas of the CBCC environment that could be more easily adapted by the caregivers as a result of training, could include developing social interactions, increasing caregiver engagement, communication and changing styles of teaching for children with disabilities. Aspects more dependent on the established routines and ways of working are more difficult to change, in spite of the training.

Impact of the training on other variables

CBCC operations and records

We did not expect any significant changes in the CBCC operating hours or governance, and there were no major changes observed – except for CBCC funding, with more CBCCs in the intervention group reporting community funds and parental contributions as their source of funding.

All CBCCs were provided with registers and attendance records at the outset of the study and both groups reported an increased use of CBCC registers and attendance records. The increase was observed in both intervention and control groups, which may suggest that the change was not caused by the training but by the availability of the resources.

CBCC education materials and timetable

The training of caregivers had an impact on the availability of timetables as well as education and playing materials in CBCCs. The proportion of CBCCs following a timetable and having education and playing materials and caregivers trained to use them at endline was significantly higher in the intervention areas (73%, 91% and 95%), compared to the control areas (18%, 27% and 33%, respectively). Interestingly, the CBCCs that had a timetable used it with equal frequency, irrespective of the study group; the difference was the availability of the timetables rather than their use.

School readiness test

The training of caregivers seemed to have some impact on the school readiness results, largely in older age groups (three- to four-years-old and five+ years), with the children in the intervention CBCCs achieving higher pass marks in a number of school readiness domains (although the difference is difficult to interpret as the study was not designed to detect the difference in the school readiness scale).

Children in the intervention CBCCs performed better in talking about pictures in the books (32% vs 26%); comparing (75% vs 56%) and identifying (65% vs 50%) quantities and counting and conversing to 5 (59% vs 48%.). Some differences were observed in distinguishing between letter and non-letter symbols and recognising three letters, although the proportion of those who passed these tests was low in both groups (10% vs 4% and 16% vs 5%). There was little or no difference between the groups in telling a story from a series of pictures in a book (47% both groups), or writing skills of children aged three to four years and five+ years (4% vs 2% for three to four years and 3% vs 2% for five+ years).

Prevalence of disability

One of the most interesting findings of this study was that the prevalence of disability at endline was significantly lower than at baseline in both groups. This may suggest that the difference observed was either due to how the tool was administered or, given that the majority of functional difficulties reported at baseline were of a psycho-social nature (anxiety, behavioural problems, adapting to change), there was a stressful environmental factor (such as a drought period followed by a poor harvest and famine in the region) that could have influenced children's psycho-social and emotional state at the time of the baseline survey. Further research applying CFM in similar settings over time would be useful to assess these propositions. It was also interesting that the only type of functional difficulty that increased in both groups (particularly in the intervention group) was difficulty in walking. Because difficulty in walking is easy to identify, this may suggest that the training, and the study itself, increased awareness of disability in the local community and more children with physical problems or a delay in walking were brought to the CBCCs. This is, however, no more than a hypothesis, which needs to be further investigated in future research.

Conclusion

The training of caregivers in more inclusive early years curriculum had positive effects on the development of pre-school children. This resulted in a lower proportion of children experiencing social and/or language-related delays. The trading has also had a positive impact on caregiver teaching practices, specifically their social interactions and communication with the children, support of children with disabilities and some aspects of teaching literacy and numeracy. The training was well-received by the caregivers and they showed high levels of satisfaction with their training and other aspects of the caregiver job. Where caregivers had been trained, they were more likely to follow a structured timetable and have educational and play materials, and caregivers trained to use them.

The impact of the intervention, however, was observed only over a short period, and nine months after the training. Future studies need to explore what impact short training programmes have on the development of experience-dependent skill sets in the medium to long term. Ideally, a longer training course for caregivers would probably have a greater impact on learning outcomes, but this study

operated within certain financial and time restraints. Future studies should also consider larger sample sizes and longer caregiver training programmes to allow for the disaggregation of results by disability, and other children’s characteristics, including anthropometric measures, to account for factors such as stunting.

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Appendices

Appendix 1: Six tools used in the trial

CBCC assessments

1. CBCC questionnaire

The CBCC questionnaire was adopted from a set of questions drawn from the Early Childhood Environmental Scale, with additional questions from other household survey questionnaires. The questionnaire had previously been used in Malawi(15). Local adaptations were made based on input from the government officials and education specialists at the national and district levels. The CBCC chair or lead caregiver answered the questions about the CBCC. The questionnaire included questions in the following categories:

- General information: when the CBCC was established, who established the CBCC, its registration status, its days of operation, sources of funding, reasons for providing the services and challenges faced by the CBCC.
- Parental involvement and support for the CBCC, including funding or other contributions and parents' groups.
- Child information: existing child enrolment, selection procedures, registration, attendance information, behaviour records and details of any children with special needs or disabilities.
- Staff information: age and sex breakdown of caregivers, the frequency of shifts, attractive caregiver qualities, methods of recruitment and selection.
- Health and food: procedures for looking after children who become ill while at the CBCC, assessment of children with disabilities, provision of snacks or meals, cooking facilities and utensils.
- CBCC curriculum and daily activities: use of timetables or schedules for activities, curriculum provision for children with special needs or disabilities, activities and frequency of activities, source play materials.
- CBCC supervision: visits by child protection workers and community development assistants, feedback from visits.
- Observer notes about the structure of the CBCC: buildings composition, if any, cooking facilities, staff-to-child ratio, the presence of furniture (tables and chairs).
- CBCC location: GPS coordinates of the CBCC and details of the location (urban, boma, rural).

Only some of the CBCC questions were asked at endline.

2. CBCC rating scale

The CBCC rating scale tool was based on the ECERS-R and used to measure interactions of caregivers and children, methods of teaching and behaviour control, as well as considering any specific adaptations made for children with disabilities.

1. Routine and structure
2. Supervision (attending to children's needs and safety)
3. Caregiver engagement (quality and time-length)
4. Free play
5. Managing children's behavior and communication
6. Social development (interaction with children)
7. Provision for children with disabilities
8. Numeracy, literacy and problem-solving

Structured caregiver and child observations using the CBCC rating scale were carried out on the first visit to the CBCC. The observations were made by two trained researchers who observed the classes using a set of guidelines to help to determine appropriate scores. Particular attention was given to interactions between the caregivers and the children, both inside and out of the CBCC. Observers were advised to sit apart and to position themselves so that they were a minimal distraction to the class but were still able to observe interactions.

Observations were carried out for 90 minutes, continuously, with notes taken on a separate pad during the observation time. Observers independently rated the CBCC drawing on a set of guidelines to help them interpret the three levels for each rubric. After the period of observation, both observers compared their ratings and agreed on a consensus score for each observation area. Observers were advised to choose the single answer that gave the best representation of the observation period. In cases where there were multiple caregivers, answers relating to caregivers were generalised to be representative of the interactions as a whole. If the CBCC was split into age groups, the observers focused on observing the three to five-year-old children.

3. Caregiver motivation and satisfaction questionnaire (CGMSQ)

The CGMSQ was developed to understand the role of the CBCC caregiver, their motivations for taking on the role, and any satisfaction they derived as a result. Motivations including remuneration or social approbation were considered, as well as the age and sex distribution of caregivers, the education level of caregivers, duration in the post, and any training they may have received, including any special education needs training. Caregivers were asked to rank motivation for four different aspects of their role.

Child development assessments

4. The Malawi Development Assessment Tool (MDAT)

Child development was assessed using the Malawi Development Assessment Tool (MDAT)(14). The tool is simple to use, has good inter-rater reliability, and takes approximately 30 minutes to administer. Locally-available and familiar objects are used to allow children to demonstrate easily observable behaviours.

In this survey, two out of four MDAT domains – the language and social domains - were assessed. Questions administered to children included assessing the ability to follow simple commands, for example, “give me the cup”, saying two words together, assessing whether the child smiles in response to a person, and sharing with others. Each domain included 34 tasks of increasing difficulty, which were assessed and then scored ‘pass’, ‘fail’ or ‘did before/not sure’. For each child, the score in each modality was defined as the number of tasks that were completed until the point that the child failed six consecutive tasks. In the case that a given task could not be assessed, the weighted score was defined as the proportion of the tasks that could be completed, scaled to a total score of 34 for each modality. The calculated score was compared against a reference range for their biological age. Developmental delay in either modality was defined as a child of a given age scoring lower than the 2.5th centile of the reference group of children of the same age (a Z-score of less than -1.96).

5. Washington Group/UNICEF Child Functioning Module

The Washington Group/UNICEF Child Functioning Module on disability is a tool developed jointly by the UN Office of Statistics Washington Group and UNICEF. The tool assesses functional difficulties in children in a number of domains, including hearing, vision, communication/comprehension, learning, mobility and emotions. The tool is validated for use in children aged two to 17 years, but two separate sets of questions appropriate for the child age are used with children aged two to four years and those aged five+ years. The purpose of the tools is to identify the sub-population of children who are at greater risk than other children of the same age of experiencing limited participation in an unaccommodating environment. The tool was used to classify children with functional disabilities, with disability defined as a response of a lot of difficulty or cannot do at all in any one of the domains(16).

6. School readiness scale (SRS)

The school readiness scale (SRS) was adapted from the ELDS. It is based on the national ECD Early Learning Development Standards which the Malawi Government expects caregivers to teach children under their care(17). This was adopted from the Washington State Early Learning and Development Benchmarks: a Guide to Young Children’s Learning and Development(18).

The SRS is a curriculum-based assessment, which examines how children are performing in relation to the expectations of the curriculum set in the ELDS. Children were individually assessed on eighteen tasks across five domains: literacy (reading and writing), mathematics (numerical knowledge, measurement and spatial relationships). Each outcome was considered as a ‘pass’ or ’fail’ assessment, with the expectation that a child starting at primary school would be able to pass all outcomes.

Appendix 2: Guidelines for child-based community centre rating scale

Rubric	**Rating**
Routine and structure	
• Group structure	• The class is never divided into small groups • The majority of time is spent in one collective group, splitting children into smaller groups on occasion • The class is often intentionally split into smaller groups
• Use of activity corners	• Never or rarely use activity corners • Occasionally use activity corners • Always/often use activity corners
Supervision	
• Attending to children's needs	• Immediate needs of children are not responded to or addressed • The caregiver responds to children's needs occasionally or appears to be angry/annoyed when doing so • The caregiver responds to children's needs in a friendly/helpful/caring manner
• Attention to children's safety in their surroundings	• No actions or comments by the caregiver about safety • The caregiver is overly or unnecessarily concerned about safety therefore limiting children's development, exploration, and so on • The caregiver provides a good amount of time on children's safety; the children are not in any unsafe situation or the caregiver appropriately addresses any unsafe situations
Caregiver engagement	
• Length of time caregiver interacts with the children	• The caregiver supervises but spends little time engaging with the children • The caregiver spends some time/occasionally engages with the children • The caregiver is actively engaged with the children most of the time
• Quality of engagement	• Children are not engaged in the activities and seem bored, distracted, uninterested, non-responsive • Some children are engaged in the activities and some are not • All children are engaged in the activities
• Caregiver position during engagement	• The caregiver is standing the entire time of the engagement • The caregiver is standing and sitting during the engagement • The caregiver is sitting the entire time of the engagement

Rubric	Rating
Managing children's behaviour	
• Use of physical methods to control behaviour	• The caregiver often uses physical methods (like hitting with a stick, slapping, pulling by the ear) to control children's bad behaviour • The caregiver occasionally uses physical methods (like hitting with a stick, slapping, pulling by the ear) to control children's bad behaviour • The caregiver never uses physical methods (like hitting with a stick, slapping, pulling by the ear) to control children's bad behaviour
• Use of yelling to control behaviour	• The caregiver often uses shouting and yelling, and the tone of voice is negative most of the time • The caregiver sometimes uses shouting and yelling, and the tone of voice is negative some of the time • The caregiver never uses shouting and yelling, and the tone of voice is positive most of the time
• Use of other punitive methods to control bad behaviour	• The caregiver often/most of the time uses methods like long isolation, food restriction, and threatening in response to bad behaviour • The caregiver sometimes uses methods like long isolation, food restriction, and threatening in response to bad behaviour • The caregiver never uses methods like long isolation, food restriction, and threatening in response to bad behaviour
• Use of positive methods to control behaviour	• The caregiver never uses positive methods to control bad behaviour • The caregiver occasionally uses positive methods to control bad behaviour • The caregiver mostly/always uses positive methods to control bad behaviour
Communication (verbal communication across all activities)	
• Caregivers create speaking opportunities for children	• Children speak to the caregiver in a formal or routine manner • The caregiver creates natural speaking abilities, but the children are largely silent or unengaged • The caregiver creates natural speaking opportunities; the classroom is organised as an open discussion or dialogue, where the caregiver may not be looking for one specific answer

Rubric	**Rating**
• Caregivers encourage development of mutual respect between children and adults	• The children are not given positive individual attention, (for instance, the caregiver does not encourage children to share their stories or respond to a question) • The children are occasionally given positive individual attention • The children are always/mostly given positive individual attention
Social development	
• Social interaction	• The caregiver does not discourage negative interactions and does not promote positive interactions between the children • The caregiver discourages negative interactions between children but does not promote positive interactions between the children • The caregiver discourages negative interactions and promotes positive interactions between the children
• Caregivers provide opportunities for children to work together to complete tasks	• The caregiver does not set up tasks or activities that encourage children to work together to complete a task • The caregiver occasionally sets up tasks or activities that encourage children to work together to complete a task • The caregiver always/mostly sets up tasks or activities that encourage children to work together to complete a task
Provision for children with disabilities	
• Responding to children's disabilities and needs	• The CBCC environment (both inside and outside of the classroom) has not been modified or adapted to meet the individual needs of children with disabilities to enable free movement and participation in activities; there is little interaction between the caregiver and children with disabilities; the caregiver does not respond to the needs of children with disabilities • The CBCC environment had some, but limited, modifications or adaptations to meet the individual needs of children with disabilities; there are occasional interactions between the caregiver and children with disabilities; the caregiver occasionally responds to the needs of children with disabilities • The CBCC environment had appropriate modifications or adaptations to meet the individual needs of children with disabilities; there are frequent interactions between the caregiver and children with disabilities; the caregiver

Rubric	Rating
	always/mostly responds to the needs of children with disabilities
- Involvement of children with disabilities with the rest of the group	- The caregiver does not encourage children with disabilities to be part of a group activity at any time - The caregiver is aware of the abilities and needs of the children with disabilities and can involve them in some activities - The caregiver is aware of the abilities and needs of the children with disabilities and can involve them in most/all activities
- Evidence of involvement of parents with children with disabilities	- Parents of children with disabilities are discouraged from entering into the classroom with their children or sitting outside and are not engaging in any activities - Parents of children with disabilities are present in the CBCC but are not allowed to be involved in their child's participation - Parents of children with disabilities are present and are encouraged to be involved in their child's participation
Numeracy, literacy and problem solving	
- Style of teaching numbers	- No numbers are taught during the observation - Numbers are taught but children are simply reciting the names of numbers "1, 2, 3" - Children are writing/counting numbers in relation to seeing or handling a number of objects
- Frequency of counting across all activities	- No counting is recorded during the observation period - Counting is present but only when numbers/counting was the focus of the activity - Counting is done across a variety of activities
- Style of teaching alphabet	- No letters are taught during the observation - Letters are taught but children are simply reciting and/or copying the alphabet in relation to initial sounds - Children are taught letters in relation to common objects named
- Reading with children	- Reading does not occur during the observation period - The caregiver is reading to children but the children are not participating/discussing - The caregiver is reading to children and the children are actively participating/discussing
- Role-playing and make-believe	- No role-playing activities recorded during the observation - The caregiver sets up a structured role-play activity but does not connect it to other learning

Rubric	Rating
	• The caregiver sets up a structured role play and participates in the role-play, or the role-play is advanced with many diverse materials, or the caregiver connects the role-play to other learning activities

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