

# Rapid Evidence Assessment (REA) of What Works to Improve Educational Outcomes for People with Disabilities in Low- and Middle-Income Countries

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## Executive summary

**Background:** There are approximately 150 million children with disabilities globally, and, on average, they are less likely to be enrolled in school or to progress as well as their peers without disabilities. Exclusion from education is a violation of human rights, as set out in the UN Convention on the Rights of Persons with Disabilities (UNCRPD). Furthermore, it is a development issue as the Sustainable Development Goals (SDGs) call for quality education for all, including children with disabilities. Barriers to the inclusion of children with disabilities operate at the level of the system (e.g. lack of policy), school (e.g. lack of accessible infrastructure or skilled teachers), and the family/child (e.g. poor health). Consequently, effective interventions should be evaluated to determine 'what works' to produce educational inclusion and good outcomes for children with disabilities.

The aim of this Rapid Evidence Assessment (REA) is to provide an overview assessment of the effectiveness of interventions to improve educational outcomes for people with disabilities in low- and middle-income countries (LMICs).

A second REA has been undertaken to assess the effectiveness of interventions to improve social inclusion and empowerment for people with disabilities in LMICs. These two REAs were commissioned in advance of the Global Disability Summit in July 2018, co-hosted by the UK Government, the Government of Kenya, and International Disability Alliance, and will be used to inform global action to implement the SDGs and the UNCRPD.

**Methods:** The studies included in this REA are taken from the Disability Evidence and Gap Map (EGM) prepared by the Campbell Collaboration for the UK Department for International Development (DFID) under the auspices of the Centre for Excellence for Development Impact and Learning (CEDIL).<sup>1</sup> Eligible studies included systematic reviews and impact evaluations published in English from 2000 onwards that assessed the effectiveness of interventions for people with disabilities in LMICs. Qualitative studies, process evaluations, and non-impact evaluations (e.g. cross-sectional surveys) were not eligible for inclusion, as although these studies can produce valuable insights into the needs and experiences of people with disabilities, they are not designed to measure impact. The assessment is thus restricted to evidence from rigorous studies of effects, not the broader evidence base of research documenting the lived experiences of people with disabilities.

The search for eligible studies for the EGM comprised: (1) an electronic search of over 20 databases and sector-specific websites, and (2) screening of the studies included in the identified systematic reviews. Screening was a two-stage process of first screening by title and abstract and then by the full text reports. During the development of the EGM, basic information was recorded for each study, including: type of intervention, outcomes measured, study design, and location of the study.

The REA focused on studies identified by the EGM that included educational outcomes. In total, 24 primary studies and five systematic reviews which included educational outcomes were included in the REA. Two primary studies were excluded as full text reports could not be identified, and four systematic reviews were excluded as they did not include outcomes for LMICs.

Next, as part of the REA, all studies that had outcomes related to education were assessed in greater detail. Basic information was extracted on each study, including: the study design, the intervention implemented, and the outcomes of the intervention (this process is referred to as 'coding'). For each study, two coders applied a quality assessment and scored the study as having 'low', 'moderate', or 'high' confidence in the study results. A narrative summary and summary of findings/results was produced for each study.

The studies were grouped by education sub-outcomes related to different stages in education across the life course; that is: **early intervention**, **primary education**, **secondary education**, **non-formal education**, and **lifelong learning**.

For each sub-outcome a narrative summary (i.e. a description of the main outcomes in relation to the interventions) was prepared for the main themes and findings, including consideration of where there was strong evidence for effect (e.g. multiple studies consistently finding impact), where there were evidence gaps, and the quality of the evidence.

**Results:** There were 24 eligible individual studies, including studies conducted in the Middle East (5 Turkey, 2 Egypt, 2 Iran, 1 Lebanon), Asia (2 China, 2 India, 1 Malaysia, 1 Thailand, 1 Vietnam), and Africa (1 Ethiopia, 1 Kenya, 1 South Africa, 1 Uganda, 1 Zambia), and only one from Latin America (Brazil), as well as one multi-country study.

**Early intervention results:** Seven studies were included that measured outcomes related to early intervention. Four studies focused on children with autism, two on children with intellectual impairment, and one on children at risk of developmental delay. Five of the interventions attempted to improve the skills of parents (e.g. in stimulating their child), and three attempted to improve the skills of children. The study outcomes were generally positive, with five studies showing improvements in the children's learning skills, two showing improvements in the skills of the parents to teach, and only one showing no impact. However, the quality of all of the studies was judged to be low. Overall, there is 'insufficient evidence' on what works to improve early intervention outcomes for children with disabilities in LMICs, given the small numbers of studies and concerns about their quality.

**Primary education results:** Fifteen studies were included that measured outcomes related to primary education. Four of the studies focused on children with hearing impairment, four on children with intellectual impairments, three on children with autism, two on children with all types of disability, one on children with motor delay, and one on children with visual impairment. Nine of the interventions attempted to improve the skills of the child, six attempted to improve the skills of the teacher or parent, and two made school-level changes. Study outcomes were consistently positive, with 11 studies showing improvements in the children's learning skills, four showing improvements in the skills of the teacher or parent to teach the child, one showing improvements in the child's academic achievement, and one demonstrating a reduction in the perpetration of violence. However, the study quality of 13 studies was deemed to be low, and the two remaining studies were deemed to be moderate. Overall, there is 'promising evidence' that interventions are effective at improving the educational skills of primary-school-aged children with disabilities in LMICs, but better quality evidence is needed to make clearer judgements.

**Secondary education results:** Only two studies were included that measured outcomes related to secondary education. Both studies focused on children with learning disabilities and tested methods to improve children's skills. Both studies showed some improvement in the learning skills of the children as a result of the interventions, although the study quality was low. Overall, there is 'insufficient evidence' on what works to improve secondary school outcomes for children with disabilities in LMICs, given the small numbers of studies and concerns about their quality.

**Non-formal education and lifelong learning results:** No studies were identified that assessed interventions to improve outcomes in lifelong learning or non-formal education, and so there was 'no evidence' of effectiveness for these categories.

### Summary of evidence

The evidence was summarised in relation to each of the sub-outcomes areas. This was rated as 'promising evidence' (green), 'limited evidence' (amber), or 'no evidence' (red).

<b>Stage of education</b>
<b>Early intervention</b> <i>Limited evidence</i>
<b>Primary education</b> <i>Promising evidence</i>
<b>Secondary education</b> <i>Limited evidence</i>
<b>Non-formal education</b> <i>No evidence</i>
<b>Lifelong learning</b> <i>No evidence</i>

### Evidence limitations and gaps

The REA identified, in particular, important evidence gaps. More and better quality studies are needed, that explore system- and school-level interventions, rather than focusing on improving the skills of individual children. Furthermore, evidence was lacking on the effectiveness of interventions by gender (assessed in only two studies); there was a lack of evidence from humanitarian settings (assessed in no studies); and there was a lack of evidence regarding outcomes other than educational skills, such as academic achievements (e.g. high school graduation achieved), social inclusion at school, and stigma.

The findings from the five systematic reviews reinforce those from the 24 primary studies: the evidence on what works to improve educational outcomes is weak, as studies are generally of poor quality, sparse in number, and address a range of interventions and outcomes, thus making comparison difficult.

## Conclusions

Inclusion of people with disabilities in education, so that they can achieve good academic and social outcomes, is an important right, as well as a development need. This REA considered rigorous evidence, limited to impact evaluations and systematic reviews, regarding the effectiveness of interventions to improve educational outcomes for people with disabilities in LMICs. Qualitative studies, observational studies, and non-impact evaluations were not included in the review. The REA findings and recommendations should be understood in this context.

The REA found that there is 'promising' evidence that interventions (e.g. computer-based interventions) can be effective in improving the educational skills of primary-school-aged children with disabilities, and that school-level changes can be impactful. Evidence was 'insufficient' on what works to improve educational outcomes in early intervention and secondary education, and was not available with respect to lifelong and non-formal learning. It is clear that more and better quality evidence is needed on 'what works' for other stages of education, as well as for promoting the inclusive nature of schools, before specific approaches or programmes can be recommended.

### Recommendations for further research:

1. People with disabilities should have a central role in developing policies and programmes to support improvement in educational inclusion and outcomes, and assessing their effectiveness, through participatory processes. This includes having a central role in carrying out these assessments (e.g. in defining the research questions, formulating the intervention for evaluation, and/or collecting and analysing data).
2. Impact evaluations studies need to be funded and undertaken on 'what works' to improve educational outcomes for people with disabilities. Efforts should also be made to integrate measures of disability within planned or ongoing mainstream education impact evaluations and other demographic or household surveys that include education outcomes.
3. New studies should focus on areas where there is large need (e.g. primary and secondary school outcomes), as these are crucial for long-term economic productivity. Addressing lifelong learning and non-formal education may be secondary priorities.
  - a. Studies should use robust methodologies, including randomised control trials (RCTs), and should have a sufficient sample size.
  - b. To support comparison of effectiveness between interventions, studies should use consistent approaches to defining and measuring disability (e.g. using the Washington Group questions<sup>i</sup>), and educational outcomes. This may require the development of new tools.
  - c. Studies undertaken should consistently consider a broad range of characteristics and aspects of identity (e.g. gender, ethnicity) that may influence outcomes.

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<sup>i</sup> [www.washingtongroup-disability.com/washington-group-question-sets/short-set-of-disability-questions/](http://www.washingtongroup-disability.com/washington-group-question-sets/short-set-of-disability-questions/)

- d. More studies need to be conducted in low-income countries (the majority of the studies in this review were from middle-income – generally upper middle-income – countries), and in humanitarian settings, to understand ‘what works’ to advance educational outcomes for people with disabilities in these contexts.
  - e. Advocacy efforts are needed to encourage funders (including governments, multilateral agencies, research institutes, and other foundations) to commit financial support towards these studies.
4. Relevant existing programmes implemented by governments, Disabled People’s Organizations (DPOs), and non-governmental organisations (NGOs), should evaluate whether they are effective in improving educational outcomes for people with disabilities. Given the complexity of undertaking high-quality impact evaluations, programme implementers may wish to seek advice from experts when designing and delivering such studies. The participation of people with disabilities in these evaluations is critical.
  5. Monitoring systems should be implemented that allow disaggregation of educational data by disability/impairment types (e.g. using the Washington Group measures) to assess the inclusion and progress of people with disabilities in education under different circumstances (e.g. inclusive and segregated schools), and whether we are closing the gap in comparison to children without disabilities.

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# 1. Background

## 1.1 Childhood disability and exclusion from education

The 2011 World Report on Disability, produced by the World Health Organization (WHO) and World Bank, estimated that there are up to 150 million children with disabilities globally – equating to one in 20 children worldwide.<sup>2</sup> There is abundant evidence that people with disabilities, including children, are on average poorer, and face exclusions and discrimination in different areas of life.<sup>2,3</sup> Among these, exclusion from education is a key concern.

### **Box1: What is disability?**

The UNCRPD defines disability as '*long-term physical, mental, intellectual or sensory impairments which, in interaction with various barriers, may hinder [a person's] full and effective participation in society on an equal basis with others*'.<sup>4</sup>

There is a lack of comparable data on education for children with disabilities, making it difficult to assess to what extent they are being left behind. A recent UN Educational, Scientific and Cultural Organization (UNESCO) report explored different educational outcomes for people with and without disabilities across 49 countries (Table 1).<sup>5</sup> The report summarised estimates across a broad range of countries (up to 37 in Table 1 below), although there was wide variation between the different countries in estimates and summarised estimates included figures from the USA and other richer settings (e.g. Chile) in some indicators. Notwithstanding these concerns, the different metrics showed that people with disabilities were consistently falling behind in educational outcomes compared to their peers without disabilities, whether measured in terms of school enrolment, school completion, mean years of schooling, or literacy levels. The World Report on Disability also showed that people with disabilities were often excluded from education.<sup>2</sup> Moreover, even when children with disabilities did enrol, their dropout rates were higher and they were on average at a lower level of schooling for their age.<sup>2</sup> Children with disabilities also experience other difficulties at school, such as being more likely to experience violence, whether physical, psychological, or sexual.<sup>6</sup>

Disability is not a homogenous category – and the experience of exclusion will vary by gender, impairment type, and context. The UNESCO data highlighted that girls with disabilities were particularly disadvantaged – boys with disabilities had almost one year more of schooling than girls with disabilities (5.4 versus 4.3), and men with disabilities had higher literacy rates than women with disabilities (62% versus 49%). Furthermore, children with certain impairment types may be more likely to be excluded from schools. An analysis across 30 countries found that children with disabilities were five to 10 times more likely to be excluded from school than children without disabilities, and that children with learning or communication impairments were consistently among the least likely to attend school, particularly in Africa.<sup>7</sup> Children with disabilities in fragile and conflict-affected states may also be particularly left behind in schooling, but here data are lacking.<sup>8</sup>

**Table 1: Summary of UNESCO data on education and disability<sup>5</sup>**

	Countries included	People with disabilities			People without disabilities		
		Total	Male	Female	Total	Male	Female
Young adults (aged 15–29) who ever attended school	37	77%*	74%**	71%	87%	90%	85%
Primary-school-aged children out of school	6	35%	36%	33%	14%	14%	14%
Secondary-school-aged children out of school	6	26%	24%	23%	18%	15%	20%
Completed primary education	5	56%	50%	68%	73%	71%	75%
Completed secondary education	5	36%	47%	56%	53%	52%	54%
Mean years of schooling (people >=25 years)***	22	4.8 years	5.4 years	4.3 years	7.0 years	7.4 years	6.6 years
Adult literacy rate (people >=15 years)	25	56%	62%	49%	74%	79%	69%

\*Percentage represents average across the studies where data are available

\*\*Total is not an average of the estimates for males and females, as not all studies disaggregate by gender.

\*\*\*Estimate includes data from the United States

## 1.2 Importance of education for all children

The UNCRPD specifically recognises the rights of persons with disabilities to education (Article 24).<sup>4</sup> The UN Convention on the Rights of the Child also protects the right of all children to education,<sup>9</sup> and most countries have policies and laws that reinforce the rights of children with disabilities to education.<sup>5</sup> Exclusion from education is therefore a violation of rights.

Exclusion from education is also a development issue. SDG 4 calls for '*inclusive and quality education for all*', and explicitly states that this includes children with disabilities.<sup>10</sup> The SDGs can therefore not be met without a focus on children with disabilities, and as a consequence development agencies and governments are increasingly reflecting the importance of including children with disabilities in education programmes and policies. For instance, DFID has made a commitment in its new education policy that it '*...will show new global leadership on education for*

*children with disabilities, ensuring that larger numbers can transition into mainstream education and learn.*<sup>ii</sup>

There are multiple benefits to the inclusion of children with disabilities in schooling. The pathways by which educational inclusion create positive outcomes for people with disabilities, both financial and non-financial, were reviewed in a previous report, and are summarised in Figure 1.<sup>11</sup> The positive effect of schooling on future job opportunities and earnings is well documented, and so excluding children with disabilities from school will have high economic costs.<sup>11, 12</sup> As an example, a study from Bangladesh estimated that there is a US\$1.2 billion annual loss (1.7% of GDP) due to forgone income from a lack of schooling and employment, both among people with disabilities and their caregivers.<sup>2</sup> Schools are important places where children develop friendships and participate in their community. Schools are also important providers of healthcare and other services – for instance, through school-based dissemination of food or drugs, or school-based screening. Meeting the rights to education of children with disabilities will therefore help other rights to be met – including the right to healthcare, livelihood, and social inclusion.

The benefits of education may be particularly important for girls with disabilities, as it is well established that the education of women generates multiple benefits, including greater protection against abuse, and improved health and educational outcomes of their children.<sup>14</sup> The benefits of education are also voiced by children with disabilities and their families, as demonstrated by the quotes in Box 2, drawn from a range of studies.

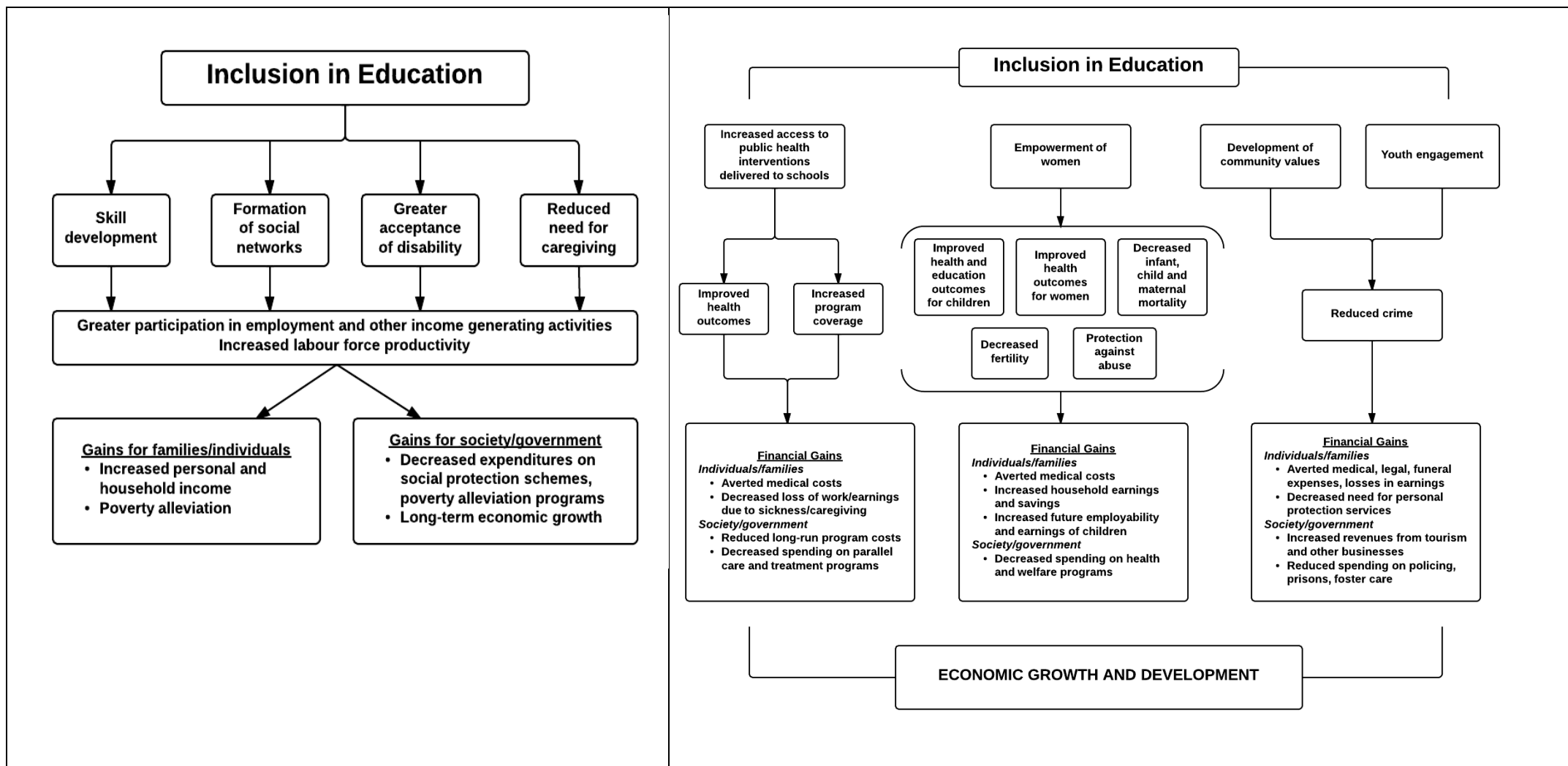
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<sup>ii</sup> [www.gov.uk/government/publications/dfid-education-policy-2018-get-children-learning/dfid-education-policy](http://www.gov.uk/government/publications/dfid-education-policy-2018-get-children-learning/dfid-education-policy)

Figure 1. How education can reap gains for people with disabilities<sup>11</sup>

a) Pathway 1: Earning and labour productivity

b) Pathway 2: Non-employment benefits



## **Box 2. The voices of children with disabilities and their family – why education matters**

### Social participation and independence

*'I would like to go back to school. I admire my friends who go to school... It hurts me [that I was asked to drop out] because if I had continued to go to school, I would've been independent.'* Girl with disabilities, from Malawi <sup>15</sup>

*'It is difficult if you have to sit here the whole day and care for him. When all the children have gone to school he is left alone. The mother might be in town and I might be collecting firewood or on the farm. He is then left on his own under the tree until someone comes home.'*

Describing boy with disabilities, from Kenya <sup>16</sup>

### Future prospects

*'He [wanted] to do well in school so that he can have a bright future. He said for one to get a good job, you have to go to school...[when he dropped out] he cried the whole day. I also cried...I think [now that he has dropped out] his future will be difficult. Education is the only key to a successful future.'* Mother talking about her son with disabilities, from Malawi <sup>15</sup>

*'I think if one is educated, then he can live a happy and good life. Education makes us independent. Like, my parents will grow old soon, so I need to study hard now, be independent, and support my family.'* Adolescent boy with disabilities, Nepal<sup>17</sup>

### Happiness

*'I liked everything about that school, 'I feel sad that I can't go to school.'* Girl with disabilities from Nepal<sup>17</sup>

*'I think if I could study, I would be really happy. I do not need anything else, I just want to study.'* Girl with disabilities from Nepal<sup>18</sup>

### Self-esteem

*'I feel like a donkey because I am just staying at home doing nothing all day.'* Girl with disabilities from Nepal, who does not attend school<sup>17</sup>

*'I used to feel that everybody else was going to school and only I had to miss the schools. I used to feel bad... I was not jealous towards others, but I just felt bad about myself.'*

Adolescent girl with disabilities from Nepal<sup>18</sup>

### Access to famine relief

*'When food is distributed at school it only reaches children with disabilities in school. It leaves out children not enrolled in school, especially those under five years.'* Key informant discussing the situation in Turkana, Kenya<sup>16</sup>

### 1.3 Barriers to inclusion of children with disabilities in education

It is important to consider the barriers to education experienced by children with disabilities, in order to identify how these may be overcome. Children with disabilities are not a homogenous group, and the reasons for exclusion from school will vary for girls and boys, in different settings, and for children with different impairment types. However, in general, barriers can be experienced at the level of the system, the school, the family, or the child.<sup>19</sup>

- System-level barriers include the lack of legislation or policies to support the inclusion of children with disabilities in education. Where there are policies, these may not be implemented due to failure to monitor inclusion or to implement incentives or penalties to promote inclusion. Inadequate resource allocation to support inclusion is also an important barrier to education for children with disabilities.
- School-level barriers include inadequate training and support for teachers to be able to teach children with different needs and abilities effectively, or to use alternative forms of communication (e.g. sign language). In many settings, classes are large and there is a lack of specialist resources and appropriate teaching materials, which also creates challenges for effective inclusion. School curricula may be inflexible, making it difficult to adapt to the needs of different children. Children with disabilities may face other barriers in schools; for instance, the school, transport, or toilets may be physically inaccessible; and children may experience stigmatising attitudes from students and teachers, and this may result in exclusion, violence, and abuse.<sup>6</sup> Even if the built and teaching environments are inclusive, if schools are located far away or lack transportation links, children with disabilities will continue to be excluded. These barriers may operate differently in 'special' schools (e.g. few available and far away) and 'inclusive' schools (e.g. lack of facilities, lack of appropriately trained teachers, poor physical accessibility).
- Family- and child-level barriers include the lack of support from caregivers to encourage the inclusion of their child in schools. For instance, stigmatising attitudes may result in families hiding their children at home and not allowing them to be included in education. Children with disabilities may also experience poor health, and require treatment and rehabilitation, which further constrains their school attendance. Children with disabilities are on average poorer, which may exacerbate other barriers experienced in school attendance (e.g. difficulty in paying for uniforms). Children with disabilities may experience difficulties with different skills required for learning in conventional education settings, such as concentrating and controlling their behaviour, and this may reinforce stigma and negative beliefs that such children are not capable of learning or worth investing in (whether these are the perceptions of parents or teachers).

## 1.4 Strategies used to improve educational inclusion and outcomes for people with disabilities

The ambition of inclusive education is to create '*A world where all children, including children with disabilities, have equal access to quality inclusive education, which is differentiated to support their learning needs and learning outcomes across each stage of the learning cycle and enables them to lead a fulfilling and independent life.*'<sup>iii</sup> A key question is 'what works' to achieve this vision: in other words, which approaches are effective in promoting educational inclusion and improving educational outcomes for children with disabilities?

The solutions to improving the inclusion of children with disabilities in education should address the barriers operating at the levels of the system (e.g. policy and legislation), schools (e.g. better teacher training), families (e.g. providing financial support to aid school attendance), and people with disabilities (e.g. improving reading skills). These changes should operate across the life course, and include inclusion in early childhood, primary, secondary and higher education; as well as non-formal education and lifelong learning<sup>iv</sup>.<sup>20</sup>

Different approaches are used to improve the educational outcomes of children with disabilities in different countries around the world. Traditionally, special schools and special classes have been provided, including in LMICs, involving the segregation of children with disabilities. These schools are often urban based, in short supply, and of variable quality,<sup>19</sup> and they may perpetuate the social exclusion of people with disabilities. In recent decades, the move has been towards inclusive schools, where children with disabilities are supported to attend mainstream schools.<sup>19</sup> Inclusive schools that educate all children together will require the development of teaching skills and resources that respond to a range of children (e.g. with different abilities, speaking different languages, and from different backgrounds), and so they are perceived to produce better outcomes for all children. The inclusion of children with disabilities in mainstream schools may help to reduce stigmatising attitudes in society and help to build a more accommodating, tolerant, society. However, there are a range of barriers faced by teachers in implementing an inclusive classroom, including lack of training, large classrooms, and negative attitudes, as outlined above.<sup>19</sup>

Many interventions to improve educational outcomes for people with disabilities include elements from both approaches (segregation and inclusion), such as the use of itinerant teachers to support teachers to meet the needs of children with disabilities at local, mainstream school, supported by the special school sector. Overall, there has been a lot of focus on integrating children, particularly those with physical impairments, into mainstream schools as this requires little accommodation, but there has been less focus on the holistic inclusion of children who experience the full range of impairment types and varying needs within the education system. Ultimately, this may mean that

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<sup>iii</sup> This statement was generated through a consultative process at the pre-Global Disability Summit Workshop on Inclusive Education hosted by the REAL Centre at the University of Cambridge.

<sup>iv</sup> This spectrum of educational targets is drawn from the community-based rehabilitation (CBR) approach, promoted by the WHO.

'integration' is achieved (i.e. children with disabilities are attending regular schools), rather than 'inclusion' (i.e. schools accommodate all children). Efforts have also focused on improving the skills of people with disabilities, so that they are more effective learners (e.g. computer games to help improve the communication skills of people with autism). Different approaches are likely to be appropriate for improving educational outcomes in different groups. For instance, it is not always a positive experience for deaf children to be included in mainstream schools,<sup>21</sup> and they may prefer special schools where the teachers and students are skilled in using sign language.

The lack of data comparing different approaches/interventions that try to improve educational inclusion and outcomes for children with disabilities makes it difficult to judge what is optimal. A previous review concluded that, based on the available literature, *'It is therefore not yet possible to say with any degree of certainty, what kinds of educational approaches work best for children with disabilities.'*<sup>19</sup> There are also considerations of how inclusion in education should be measured. Most studies have focused on comparing enrolment in school for children with and without disabilities.<sup>19</sup> This metric alone ignores the importance of frequency of attendance and progression through the system, or academic achievements (e.g. graduation). There has also been little focus on the classroom experience of the child, such as whether they are provided with a quality education, are socially included, and feel safe at school, and whether they experience stigmatising attitudes.

## 1.5 Aim of this REA

The improvement in educational inclusion and outcomes for people with disabilities is an important rights-based and development issue. To date, the evidence has not been assessed to identify which strategies may be most effective.

**The aim of the REA is to provide an overview assessment of the effectiveness of interventions to improve educational outcomes for people with disabilities in LMICs.**

A second REA has been undertaken to assess the effectiveness of interventions to improve social inclusion and empowerment for people with disabilities in LMICs. These two REAs were commissioned in advance of the Global Disability Summit in July 2018, co-hosted by the UK Government, the Government of Kenya, and International Disability Alliance, and will be used to inform global action to implement the SDGs and UNCRPD.



## 2. Methods

### 2.1 EGM: Study identification and coding

The studies included in this REA are taken from the EGM prepared by the Campbell Collaboration for DFID under the auspices of CEDIL.<sup>1</sup> The EGM identified the availability of studies exploring the effectiveness of interventions for people with disabilities in achieving outcomes relating to health, education, livelihood, social inclusion, and empowerment. This REA is focused only on those studies related to improving educational outcomes.

The EGM included systematic reviews and primary studies published from 2000 onwards in English that assessed the effectiveness of interventions for people with disabilities in LMICs. Eligible primary studies were restricted to impact evaluations, including RCTs, because they are the optimal designs for assessing whether an intervention is effective at producing the outcome of interest. Qualitative studies, process evaluations, and non-impact evaluations (e.g. cross-sectional surveys) were not eligible for inclusion, as although these studies can produce valuable insights into the needs and experiences of people with disabilities, they are not designed to measure impact. Inclusion of studies and reviews published in non-academic literature ('grey' literature) is part of the protocol of the EGM, but identification of these studies has not been completed in this first stage, and so they were not included in the REA.

The search for studies for the EGM comprised: (1) an electronic search of over 20 databases and sector-specific websites, and (2) screening of the studies identified by the searches against pre-defined inclusion criteria to identify eligibility for inclusion in the EGM (for more details of the search see the protocol for the EGM, Saran *et al.*, 2018).<sup>1</sup>

Screening was a two-stage process of first checking the title and abstract, and then checking the full text report. Screening was undertaken independently by two individuals, with a third-party arbiter becoming involved in the case of disagreement. After studies had been identified as meeting the inclusion criteria, basic information was extracted on each study, including: intervention type, outcomes reported, and study characteristics, such as study design and location (this process of data extraction is referred to as 'coding'). Further information on the studies which were identified by this process is available in the EGM report (White *et al.*, 2018<sup>22</sup>). Additional reports were identified for possible inclusion by checking the reference lists of eligible studies (this process is referred to as 'back-referencing').

### 2.2 REA: Coding of included studies

This REA focuses on those studies identified for the EGM which report interventions or outcomes in the domain of education, in line with the CBR framework.<sup>20</sup> This framework for the categorisation of the targets of interventions is widely used within the disability movement, and it includes the domains of health, education, livelihoods, social inclusion, and empowerment. With respect to education, outcomes are included in

relation to: early childhood, primary education, secondary education, lifelong learning, and non-formal education.

Using these inclusion criteria, the REA included 26 primary studies and nine systematic reviews.

A summary of the included studies was prepared, in addition to the coding described above. This summary consisted of: (1) basic study characteristics (e.g. study design, study population, description of intervention, and whether the study was conducted in a humanitarian context<sup>v</sup>); (2) a narrative summary (i.e. a description of the main outcomes in relation to the intervention); (3) a summary of the findings/results; and (4) a quality assessment (described below). This stage of coding was conducted by pairs of coders, with comparison and discussion taking place to resolve any discrepancies.

### 2.3 Quality assessment tool for individual studies

The tool used to assess study quality is shown in Table 2. This tool includes six criteria that are appropriate for the assessment of quantitative impact evaluations. These are as follows:

1. **Study design** (potential confounders<sup>vi</sup> taken into account): impact evaluations need either a well-designed control group (preferably based on random assignment) or an estimation technique which controls for confounding and the associated possibility of selection bias.
2. **Adequate sample size**: small samples generally mean that a study is underpowered, i.e. there is a high risk of not finding an effect even if the intervention works.
3. **Attrition or losses to follow up**: can be a major source of bias in studies, especially if there is differential attrition between the treatment and comparison group (called the control group in the case of RCTs) so that the two may no longer be balanced in pre-intervention characteristics. The US Institute of Education Sciences What Works Clearing House (WWC) has developed standards for acceptable levels of attrition, in aggregate and the differential, which are applied here.<sup>23</sup>
4. **Clear definition of disability**: for a study to be useful the study population must be clear, which means that the type and degree of disability should be clearly defined, preferably with reference to a widely-used international standard.

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<sup>v</sup> A study was classified as occurring in a humanitarian context if the paper said that the study location was in the context of a manmade crises (e.g. war) or disasters caused by natural hazards (e.g. earthquake).

<sup>vi</sup> A confounder is a variable that is associated with both the exposure and the outcome of interest, and so can produce a spurious association between the exposure and the outcome. For instance, if disability is the exposure and lack of political engagement is the outcome then poverty will be a potential confounder. This is because poorer people may be more likely to be disabled and more likely **not** to be politically engaged. In other words, poverty can confound the association between disability and political engagement. This means that unless we account for poverty in the study design the association between disability and lack of political engagement may be overestimated.

5. **Clear definition of outcome measures** is needed in order to aid the interpretation and reliability of findings, and comparability with other studies. Studies should clearly state the outcomes being used, with a definition, and the basis on which they are measured – preferably with reference to a widely-used international standard.
6. **Baseline balance** means that the characteristics of the treatment and comparison groups are the same at baseline. Lack of balance can bias the results.

Study quality was rated high, moderate, or low, for each of the criteria, applying the standards as shown in Table 2. Overall study quality classification took place on the basis of the lowest rating achieved across the seven criteria – the 'weakest link in the chain' principle. This approach to quality assessment was strict, and therefore would be expected to score few studies as having a high quality (e.g. RCTs with adequate sample size, a detailed description of methods, and adherence to processes to reduce the risk of confounding and bias). Studies were not excluded on the basis of quality assessment.

**Table 2 Study quality assessment criteria**

Criterion	Low	Moderate	High
1 <b>Study design</b> (potential confounders taken into account)	Before-versus-after. Naïve matching	Instrumental variable, regression discontinuity design (RDD), propensity score matching (PSM), double difference	RCT, natural experiment
2 <b>Adequate sample size</b>	≤30 (or fewer than eight clusters)	31–49 (or 8–12 clusters) or larger sample size but no sample size calculation presented	50 or more (or 13 or more clusters) and sample size calculation presented
3 <b>Attrition or losses to follow-up</b> are presented and acceptable	Attrition not reported, or falls well outside WWC acceptable combined levels*	Overall and differential attrition close to WWC combined levels*	Overall and differential attrition within WWC combined levels*
4 <b>Disability measure</b> is clearly defined and reliable	No definition or overall attrition > 50%	Unclear definition or single question item only (e.g. are you disabled?)	Clear definition (e.g. Washington Group questions, detailed measure of impairment)
5 <b>Outcome measures</b> are clearly defined and reliable	No definition	Unclear definition	Clear definition using existing measure, where possible
6 <b>Baseline balance</b> (N.A. for before-versus-after)	No baseline balance test (except RCT) or reported and significant differences on more than five measures. PSM without establishing common support	Baseline balance test, imbalance on five or fewer measures	RCT, RDD
<b>Overall confidence in study findings</b>	Low on any item	Moderate or high confidence on all items	RCT with high confidence on all items

Table 3 provides a worked example of applying the quality assessment tool. The example used (Kaur *et al.*, 2008)<sup>24</sup> is a small RCT of three different interventions to improve the basic mathematical skills of children with learning disabilities. All outcomes were reported at the end of the intervention with no follow-up, so the separate rating of different points in time does not apply in this case. The item-by-item ratings are explained in the notes column. The study fares well in general, ranking high on five of the seven items. However, overall the study is rated as being of low quality on account of its small sample size: there are just 10 children in each treatment arm and 10 in the control, giving an effective sample size of 20, which is very small.

**Table 3 Application of study quality assessment tool to a sample study**

No.	Item	Scoring	Notes
1	Study design, sampling method is appropriate to the study question		RCT
2	Adequate sample size, e.g. sample size calculations undertaken		Total sample 40, but 10 in each treatment arm and control, so effective size 20
3	Attrition or losses to follow-up		Attrition not reported, but full sample used for impact calculations, which implies zero attrition
4	Disability/impairment measure is clearly defined and reliable		A score of $\geq 90$ on Wechsler Intelligence Scale for Children (Primary) by Malin; confirmed learning disability in mathematics based on Diagnostic Test for Learning Disability, and Assessment of Children with Specific Learning Disabilities in Arithmetic
5	Outcome measures are clearly defined and reliable		Assessment of Children with Specific Learning Disabilities in Arithmetic Test
6	Baseline balance		Evidence was not provided to demonstrate that the groups were balanced at baseline
	Overall confidence in study findings		

Scoring: red – 'low'; amber – 'moderate'; green – 'high'

## 2.4 Quality assessment tool for systematic reviews

Quality assessment of systematic reviews was undertaken using the 16-item checklist called AMSTAR 2 ('Assessing the Methodological Quality of Systematic Reviews'). The 16 items assess whether:

1. research questions and inclusion criteria for the review included all PICO components (population, intervention, control, outcome);
2. the protocol was registered before commencement of the review;
3. a rationale was given for included study designs;
4. a comprehensive literature search was undertaken;

5. the review authors performed study selection in duplicate;
6. the review authors performed data extraction in duplicate;
7. a list was provided of excluded studies, with justification for their exclusion;
8. there was adequate description of included studies;
9. there was adequate assessment of the risk of bias for individual studies;
10. sources of funding were reported for the studies in the review;
11. there was appropriate use of meta-analysis;
12. there was assessment of the risk of bias for meta-analysis (if undertaken);
13. there was allowance for risk of bias in discussing the findings of studies;
14. there was analysis of the heterogeneity of results in the review;
15. analysis of publication bias, if a quantitative synthesis, was undertaken; and
16. conflicts of interest were reported for the review.

From this list, items 2, 4, 7, 9, 11, 13, and 15 are termed 'critical', and the remainder are 'non-critical'.

The quality of the reviews was categorised as follows:

- High – *No, or only one, non-critical weakness and no critical flaws*: the systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest.
- Moderate – *More than one non-critical weakness but no critical flaws*: the systematic review has more than one weakness but no critical flaws. It may provide an accurate summary of the results of the available studies that were included in the review.
- Low – *One critical flaw with or without non-critical weaknesses*: the review has a critical flaw and may not provide an accurate and comprehensive summary of the available studies that address the question of interest.
- Critically low – *More than one critical flaw with or without non-critical weaknesses*: the review has more than one critical flaw and should not be relied on to provide an accurate and comprehensive summary of the available studies.

As an example, the review by Maulik (2007)<sup>25</sup> on childhood disability in LMICs was judged to be of low quality overall. It fulfilled many of the quality criteria: for instance, it reported the research questions and inclusion criteria for different components of PICO, provided the rationale for included studies, used a comprehensive literature search strategy, provided a detailed description of included studies and adequate discussion of sources of heterogeneity in study findings, and reported conflicts of interest. However, there were some areas of weakness, such as the lack of the publication of a protocol for the review, the lack of study selection and data extraction in duplicate, no provision of the list of excluded studies with justification of the exclusion, lack of consideration of a risk of bias, lack of meta-analysis, and no reports of funding sources.

## 2.5 Evidence assessment

The studies identified for inclusion in this REA were grouped by sub-outcomes: early intervention, primary, secondary, non-formal, and lifelong learning. For each sub-outcome, a results table was prepared, showing the key study characteristics, outcomes, and quality assessment. From these, a narrative summary was prepared drawing out the main themes and findings, including consideration of where there was strong evidence of effectiveness (number of studies and sample size in those studies, and consistency of findings across studies), where there were evidence gaps, as well as the quality of the individual studies included in the REA.

## 3. Results

### 3.1 Studies included in REA

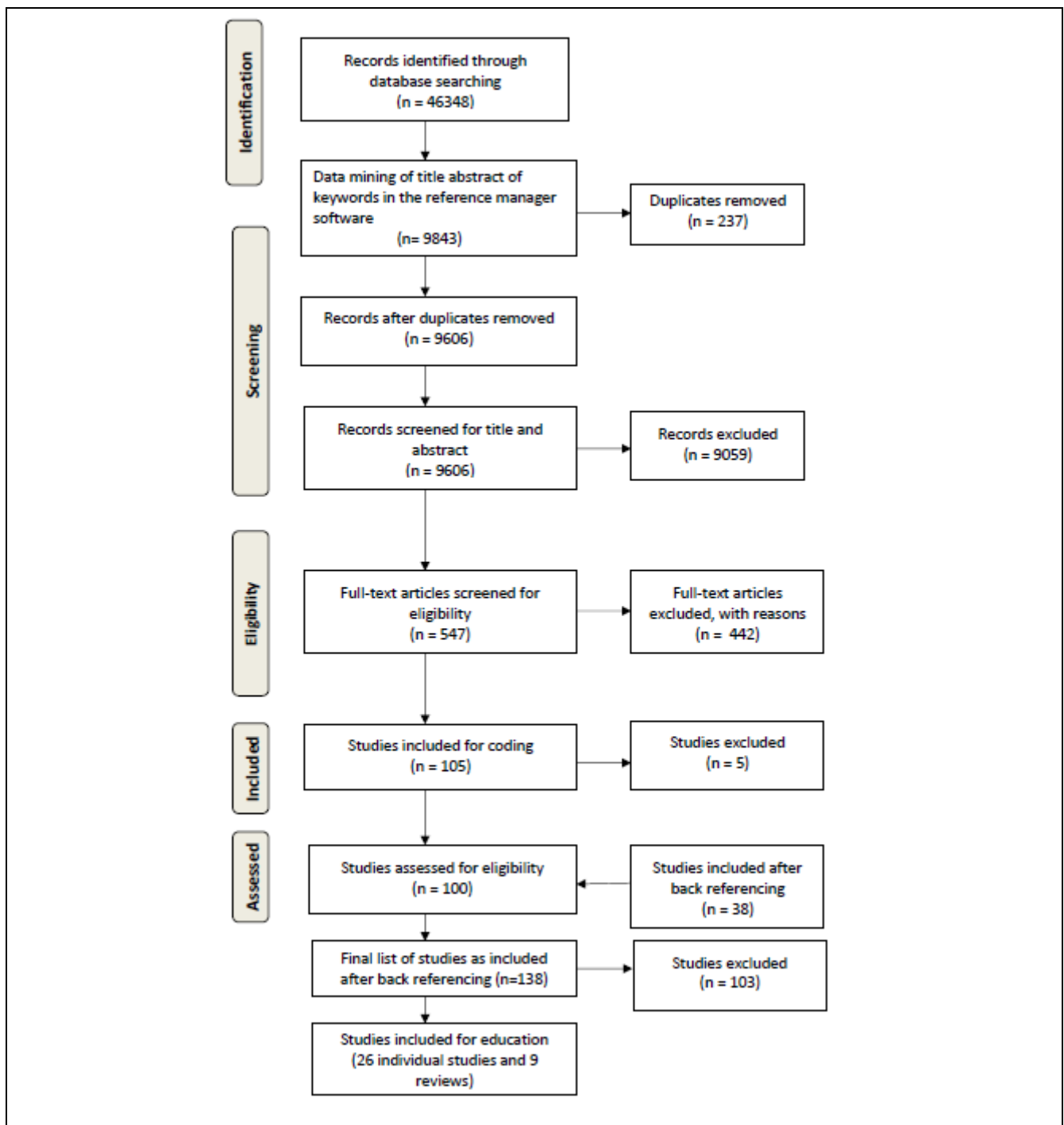
The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart (Figure 2) outlines the steps in the review process. In total, 26 individual studies and nine systematic reviews were included in the REA.<sup>vii</sup> Individual studies included RCTs and other impact evaluations, while reviews were restricted to systematic reviews and meta analyses (where available). The full text could not be retrieved for two of the individual studies,<sup>26, 27</sup> and four of the reviews included no data from LMIC settings,<sup>28-31</sup> so that, eventually, 24 primary studies and five reviews were included in the REA.

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<sup>vii</sup> The studies reported a broad range of outcomes (e.g. livelihood inclusion, empowerment), but for the purpose of this REA only those related to educational outcomes were reported.

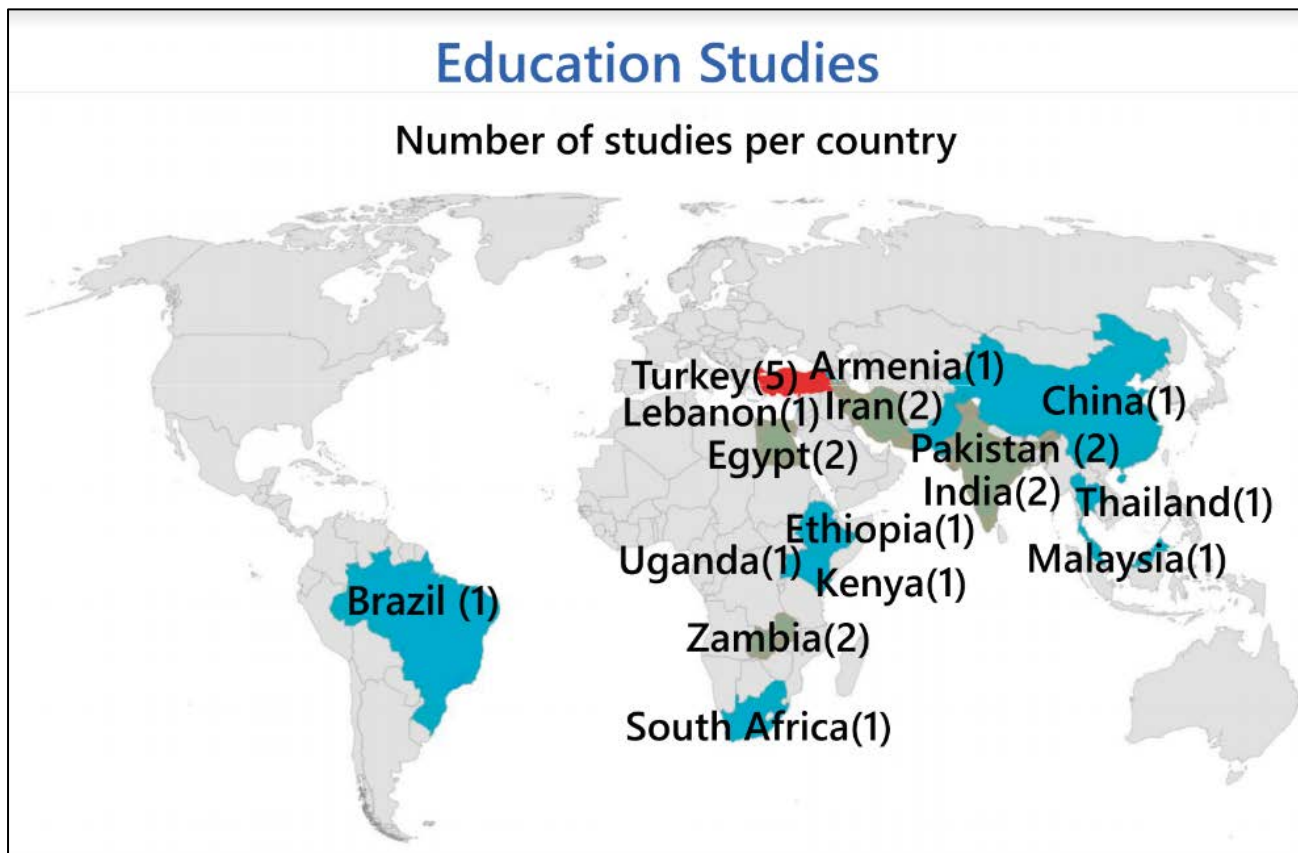


**Figure 2. PRISMA flowchart of studies included from the EGM**



Of the 24 individual studies included, seven were identified that included early intervention-related outcomes, 15 that included primary-school-related outcomes, and two that included secondary school-related outcomes. The countries where the studies were conducted included those in the Middle East (5 Turkey, 2 Egypt, 2 Iran, 1 Lebanon), Asia (2 China, 2 India, 1 Malaysia, 1 Thailand, 1 Vietnam), and Africa (1 Ethiopia, 1 Kenya, 1 South Africa, 1 Uganda, 1 Zambia), with only one from Latin America (Brazil) and one multi-country study.

Figure 3: Map showing the location of studies included in the REA



## 3.2 Individual intervention studies

### 3.2.1 Early intervention-related outcomes

Seven studies were included in the REA that assessed the impact of interventions to promote early intervention outcomes for children with disabilities or at high risk of disabilities (Box 3).

#### **Box 3: Summaries of studies of interventions aiming to improve early intervention outcomes**

1. Besler and Kurt (2016) assessed the effectiveness of video modelling provided by mothers in teaching play skills to children with autism.<sup>32</sup>

- Study design: before-and-after study, with no control group
- Country: Turkey
- Setting: Clinic in university
- Participants: Three boys with autism (aged four to six years)
- Impairment type: Neurological (autism)
- Percentage female: 0%
- Humanitarian setting: No
- Intervention: Two three-hour training sessions were held with mothers over two consecutive days to improve the skills of the mother in the video modelling intervention to improve the skills of child (i.e. developing a video of the target behaviour and showing it to the child)

- Control: No control group
- Follow-up: Five weeks
- Outcome: Skills of mother in video modelling intervention (i.e. developing a video about building structures with Lego and showing it to the child) and correct responses by participating children regarding the skill of building a Lego train
- Cost-effectiveness considered: No

The results of the study showed that mothers were able to implement video modelling following the instructions of the researchers. All the children who participated in the study were able to learn the target skill, maintain their learning, and generalise their new skill to non-teaching conditions. Only boys were included, so gender disaggregation was not possible. The confidence in the study result was low, due to the small sample size, lack of randomisation, and lack of control group.

2. Cattik and Odluyurt (2017) evaluated the effectiveness of the “Smart Board-Based” small-group graduated guidance instruction to teach digital gaming skills to children with autism.<sup>33</sup>

- Study design: Before-and-after study, with no control group
- Country: Turkey
- Setting: Clinic in a university
- Participants: Four boys with autism (aged 47–67 months)
- Impairment type: Neurological (autism)
- Percentage female: 0%
- Humanitarian: No
- Intervention: Use of a Smart board to deliver small-group graduated guidance instruction to teach children with Autism digital gaming skills
- Control: No control group
- Follow -up: 5 weeks
- Outcome Measure: Digital gaming skills of the child
- Cost-effectiveness considered: No

The study found that all children achieved their target digital gaming skills, retained the acquired skills after the instruction was over for five weeks, and exhibited these skills under different conditions (i.e. different individuals, settings, and materials). Only boys were included, so gender disaggregation was not possible. The confidence in the study result was low, due to the small sample size, lack of randomisation, and lack of control group.

3. Karaaslan and Mahoney (2013) assessed the effectiveness of responsive teaching with children with Down’s syndrome.<sup>34</sup>

- Study design: RCT
- Country: Turkey
- Setting: Special rehabilitation centres
- Participants: 15 children with Down’s syndrome aged <6 years
- Impairment type: Intellectual (Down’s syndrome)
- Percentage female: 67%
- Humanitarian setting: No
- Intervention: Responsive teaching is an early intervention curriculum that attempts to promote children's development by encouraging parents to engage in highly responsive interactions with them. The responsive teaching group received bi-

weekly responsive teaching parent–child sessions, in addition to standard services. (n=7)

- Control: Standard pre-school classroom services (n=8)
- Follow-up: Two months
- Outcome measures: Mother’s interactional behaviour with child (responsiveness, affect, achievement-directiveness), functioning and behaviour of child
- Cost-effectiveness considered: No

In the intervention group, the mother’s interactional behaviour with the child improved compared to the control group mothers (e.g. significantly greater increases in their responsiveness and affect, decreases in directiveness). Children in the intervention group improved in their behaviour (attention and initiation) and in their language, compared to children in the control group. Differences in the effect of the intervention by gender were not assessed. The confidence in the study findings was judged as low, because of the small sample size and study design concerns (naïve matching, lack of demonstration of baseline balance between the groups).

4. Pajareya and Mopmaneejumruslers (2011) undertook a pilot RCT of the Developmental, Individual-Difference, Relationship-Based (DIR)/Floortime™ parent training intervention for pre-school children with autism.<sup>35</sup>

- Study design: RCT
- Country: Thailand
- Setting: Home
- Participants: 32 pre-school children with autism (aged two to six)
- Impairment type: Neurological (autism)
- Percentage female: 12.5%
- Humanitarian setting: No
- Intervention: Home-based DIR/Floortime™ intervention – a parent skills intervention (one-day training workshop, plus three-hour DVD lecture and manual). The aim was for the family to undertake activities for at least 20 hours per week for three months (n=16)
- Control: Usual activities (n=16)
- Follow-up: Three months
- Outcome: Emotional status of child (functional emotional assessment and functional emotional development)
- Cost-effectiveness considered: No

There was an improvement in the emotional scores of children in the intervention group compared to those in the control group. Differences in the effect of the intervention by gender were not assessed. Confidence in the study findings was deemed to be low, because of the lack of a demonstration of balance of the control and intervention groups at baseline.

5. Sani-Bozkurt and Ozen (2015) assessed the effectiveness and efficiency of peer and adult models used in video modelling in teaching pretend play skills to children with autism.<sup>36</sup>

- Study design: Alternating treatment design
- Country: Turkey
- Setting: Unit for children with developmental disabilities
- Participants: Three children

- Impairment type: Neurological (autism)
- Percentage female: 33%
- Humanitarian setting: No
- Intervention: Videos of peers (children) and adults demonstrating two play behaviours – (1) cooking soup, and (2) first aid. The children were shown the peer video for one skill and the adult video for the other
- Follow-up: Not reported
- Outcome: Pretend play skills of child
- Cost-effectiveness considered: No

All three participants acquired the target skills via both peer and adult models in the video modelling intervention. There was no significant difference in outcomes for these two teaching procedures. Gender effects were not considered in the analysis. Confidence in the study findings was deemed to be low, because of the small sample size and lack of randomisation.

6. Shin *et al.* (2009) examined the effects of a home-based intervention for young children with intellectual impairments in Vietnam.<sup>37</sup>

- Study design: RCT
- Country: Vietnam
- Setting: Home
- Participants: 30 pre-school children with intellectual impairment (aged three to six)
- Impairment type: Intellectual
- Percentage female: 40%
- Humanitarian setting: No
- Intervention: Training of parents to work with their children through modelling and coaching by teachers during weekly home visits (n=16)
- Control: Usual kindergarten programme (n=14)
- Follow-up: One year
- Outcome: Child's adaptive behaviour (i.e. everyday living skills), personal care, and motor skills

There were no significant differences at 12 months between children in the intervention and control groups in terms of: an overall adaptive behaviour score, communication, daily living skills, social skills, or motor skills. Differences by gender were not reported. Confidence in the study findings was judged to be low, because of the small sample size.

7. Wallander *et al.* (2014) examined the impact of inclusion in an early intervention programme by children at risk of adverse outcomes.<sup>38</sup>

- Study design: RCT
- Country: India, Pakistan, Zambia
- Setting: Communities
- Participants: 376 children at risk of adverse outcomes
- Impairment type: Developmental delay
- Percentage female: 41%
- Humanitarian setting: No
- Intervention: Early Development Intervention (Partners for Learning), bi-weekly home visits with a parent trainer, teaching parents activities targeting developmentally appropriate skills, starting before one month and ending at 36 months, and health education (n=185)

- Control: Health education only (n=191)
- Follow-up: 36 months
- Outcome: Mental and psychomotor development and general development
- Cost-effectiveness considered: No

Significant improvements in mental and psychomotor development were observed in the intervention group compared to the control group by 36 months, although there were no differences in the ages and stages questionnaire. The authors evaluated, but did not find, evidence for effect modification by gender. The confidence in the study findings was low, due to the potential for bias related to attrition.

### 3.2.2 Summary of studies reporting early intervention-related outcomes

Overall, seven studies were included that measured outcomes related to early intervention. **Study settings** were mostly in middle-income countries, including Turkey (four studies), Thailand (one study), and Vietnam (one study), and one multi-country study. None of these were humanitarian settings. The range of **impairment type/disability** represented was narrow: four studies focused on children with autism, two on children with intellectual impairment, and one on children at risk of developmental delay. Five of the **interventions** attempted to improve the skills of parents, and three to improve the skills of children. The **study outcomes** were generally positive, with five studies showing improvements in the children's learning skills, two showing improvements in the skills of the parent, and only one study showing no impact. However, the **study quality** of all of the studies was deemed to be low, because they were generally small (the reason for six studies), lacked a randomised design (n=3), lacked control groups (n=1), or had the potential for bias due to attrition (n=1).

**There were no areas of strong evidence**, given the small studies, their low quality, and the limited consistency in intervention implementation or outcome measurement. Overall, there was 'insufficient evidence' on what works to improve outcomes in this category.

**Large evidence gaps remain:** No studies assessed the impact of systems-level changes (e.g. policy) or school-level changes. Outcomes were only measured in terms of the skill of the child or parent, and not in terms of academic outcomes, quality of education, or stigma. Gender analyses were conducted for one study (where no differences were found), and assessment of the cost-effectiveness of interventions was lacking. None of the studies were conducted in humanitarian settings. Studies including children with physical, visual, or hearing impairments were absent.

### 3.2.3 Primary-school-related outcomes

Thirteen studies were included in the REA that assessed the impact of interventions to promote primary education outcomes for children with disabilities (Box 4).

#### Box 4: Summaries of studies of interventions aiming to improve primary education outcomes

1. Carew *et al.* (2018) assessed the impact of an inclusive education intervention on teacher preparedness to educate children with disabilities in the Lakes Region of Kenya.<sup>39</sup>

- Study design: Before-and-after study, without control
- Country: Kenya
- Setting: Mainstream school
- Participants: 123 in-service teachers from 50 schools
- Impairment type: All
- Percentage female: 46%
- Humanitarian setting: No
- Intervention: Five-day inclusive education training programme
- Control: No control group
- Follow-up: Five months
- Outcome measure: Teachers' self-reported self-efficacy, beliefs, feelings, intentions, and concerns
- Cost-effectiveness considered: No

The intervention increased teaching self-efficacy, produced more favourable cognitive and affective attitudes toward inclusive education, and reduced teacher concerns. However, there was little evidence regarding the impact on inclusive classroom practices. Gender differences in outcomes were not reported. Confidence in the study findings was judged to be low, as randomisation was not undertaken and there was no control group.

2. Devries *et al.* (2018) assessed the effectiveness of a school-based intervention to reduce physical violence toward primary school students with disabilities.<sup>6</sup>

- Study design: Cluster RCT
- Country: Uganda
- Setting: Mainstream primary schools
- Participants: 42 schools, 1,899 students (including 278 children with some functional difficulties, and 104 children with disabilities)
- Impairment type: Functional impairment using Washington Group short set questions
- Percentage female: 49% (of children with disabilities)
- Humanitarian setting: No
- Intervention: Good School Toolkit – a complex behavioural intervention that aims to foster change in the operational culture at the school level (21 schools)
- Control: No intervention (wait list) (21 schools)
- Follow-up: Three months after end of intervention
- Outcome: Physical, emotional, and sexual violence perpetrated by school staff and peers
- Cost-effectiveness considered: No

The trial showed that, after the intervention, the prevalence of physical violence perpetrated in the past week by school staff towards students with some functional difficulties and students with disabilities was lower in intervention schools than in the control schools. The intervention also reduced violence perpetrated by peers. Differences in the effect of the intervention by gender were not reported. Although most of the study

characteristics were appropriate, there was moderate confidence in the results because the adequacy of sample size was not demonstrated through a power calculation.

3. Katonga and Ndhlovu (2015) assessed the role of music in improving the speech intelligibility of learners with post-lingual hearing impairment in selected units in Lusaka District. <sup>40</sup>

- Study design: RCT
- Country: Zambia
- Setting: Special units for 'the deaf'
- Participants: 60 learners with post-lingual hearing impairment and 20 teachers
- Impairment type: Hearing
- Percentage female: Not reported
- Humanitarian setting: No
- Intervention: The experimental group was drilled in singing songs and rhyming words orally until they gained competence (n=30)
- Control: Pupils were drilled in word pronunciation and sentence construction, but not singing (n=30)
- Outcome: Oral word pronunciation and sentence construction
- Follow-up: Six months
- Cost-effectiveness considered: No

The study found that music played an important role in enhancing speech intelligibility as it motivated learners during speech drills. It also helped in clearing the vocal cords, facilitating verbal memory, widening vocabulary, and improving word pronunciation and sentence construction leading to speech intelligibility acquisition. The study also identified several strategies that teachers used to help learners acquire speech intelligibility; these include use of total communication, encouraging lip reading, and use of amplification devices, among other techniques. Gender differences in the effect of the intervention were not reported. The confidence in the study findings was judged to be low, because of the lack of power calculation presented, and the lack of a demonstration of baseline balance between the control and intervention group.

4. Kaur *et al.* (2008) assessed the impact of various instructional strategies for enhancing the mathematical skills of children with learning impairments. <sup>24</sup>

- Study design: RCT
- Country: India
- Setting: Mainstream school
- Participants: 40 children with children with learning impairments
- Impairment type: Intellectual (learning)
- Percentage female: Not reported
- Humanitarian setting: No
- Intervention: Three separate treatment groups to enhance mathematical skills – multimedia, cognitive strategy, and eclectic approach. Each child in the three experimental groups was provided the intervention by the trainer on alternate days (i.e. three times per week for 40 minutes – not specified for how long). (n=10 in each)
- Control: No intervention (n=10)
- Follow-up: Not reported
- Outcome: Assessment of children with specific learning disabilities in arithmetic
- Cost-effectiveness considered: No



All three strategies (i.e. multimedia, cognitive strategy, and eclectic approach) produced significant enhancement in mathematical skills at the post-test assessment for readiness, number concept, computation, problem solving, and total achievement scores. There was no improvement in the test scores in the control group. Gender differences in results were not reported. The confidence in the study findings was deemed to be low, because the individual groups were small (n=10), and there was no evidence that the groups were well balanced.

5. Lal and Bali (2007) assessed the effect of visual strategies on the development of communication skills in children with autism. <sup>41</sup>

- Study design: Before-versus-after design, with naïve matching
- Country: India
- Setting: Special school
- Participants: 30 children (aged 5–11)
- Impairment type: Neurological (autism)
- Percentage female: Not reported
- Humanitarian setting: No
- Intervention: 14 one-to-one sessions focused on the development of comprehension, labelling, description, joint attention, and active interaction through visual supports (n=15)
- Control: No intervention (n=15)
- Follow-up: Not reported
- Outcome: Communication skills of child
- Cost-effectiveness considered: No

Visual strategies were found to be effective in the development of communication skills in children across the age range of five to 11 years. Gender disaggregation was not reported. There was low confidence in the study findings, due to the small sample size.

6. Martinet *et al.* (2001) assessed the impact of cognitive strategy instruction on deaf learners in an international comparative study that included China, the UK, and the USA. <sup>42</sup>

- Study design: Before-and-after study, with control group
- Country: China (UK, USA – not reported below)
- Setting: Schools
- Participants: 47 children aged 8–12
- Impairment type: Hearing
- Percentage female: Not reported
- Humanitarian setting: No
- Intervention: Cognitive strategy instruction given to teachers (training in techniques for teaching higher-level critical and creative cognitive strategies to deaf learners – sessions were twice weekly for six months)
- Control: No control group
- Follow-up: Six months
- Outcome: Skills of students (e.g. reasoning) and skills of teachers (e.g. self-perceived problem-solving)
- Cost-effectiveness considered: No

Students improved in reasoning, devising real-world problem solutions involving critical thinking (but not creative thinking), using cognitive vocabulary in the classroom, and expressing others' viewpoints. Post-intervention focus groups showed teachers in China used a more invariant sequence in teaching the cognitive strategies, but teachers in all three countries experienced similar expansion in cognitive terminology and problem solving skills. Gender differences in the outcomes were not reported. The confidence in the study findings was judged to be low, because the study design was before-versus-after, with no control group.

7. Mohammed and Kanpolat (2010) assessed the effectiveness of computer-assisted instruction on enhancing the classification skills of second-graders at risk of learning disabilities.<sup>43</sup>

- Study design: RCT
- Country: Egypt
- Setting: Mainstream school
- Participants: 68 children with learning difficulties, but no other disabling condition
- Impairment type: Intellectual (learning)
- Percentage female: 40%
- Humanitarian setting: No
- Intervention: School administered 60-session computer assistive instruction programme four times per week, in three-phases: first to familiarise the instructor and participants, second to introduce and train different constituents (colour, shape, number and volume), lastly to revise constituents. Duration not reported (n=34)
- Control: Schooling as usual (n=34)
- Follow-up: One month
- Outcome: Classification skills of children
- Cost-effectiveness considered: No

Higher post-test scores on the classification skills scale were achieved in the intervention group, which remained one month on. Gender differences in the effect of the intervention were not reported. Confidence in the study results was judged to be low, because a power calculation was not included to show that the sample size was adequate.

8. Mulat *et al.* (2018) assessed the actual and self-perceived academic achievement of deaf and hard-of-hearing and hearing students transitioning from the first to the second cycle of primary school in Ethiopia.<sup>44</sup>

- Study design: Cohort
- Country: Ethiopia
- Setting: Mainstream and special (hearing) classes
- Participants: Children with hearing impairment in a special (hearing) classes or school (n=41) and hearing children (n=31) examined at Grades 4 and 5
- Impairment type: Hearing
- Percentage female: Not reported
- Humanitarian setting: No
- Intervention: 72 children transitioning from Year 4 to Year 5 – with cross-over between mainstream and special schools. Hence there were three groups: children with hearing loss moving to a special class in a mainstream school (n=18), children with hearing loss staying in the special school (n=23), and hearing students (n=31)

- Control: See above
- Follow-up: After one school year
- Outcome: Academic achievement, academic self-concept, social self-concept
- Cost-effectiveness considered: No

The results showed a decrease in the academic achievement and academic self-concept of children with hearing impairment who were in a special class (Grade 4) when they transferred to the mainstream (Grade 5), while the academic achievement and self-concept of the students continuing in a special school remained stable. All three groups (children with hearing loss in the mainstream, children with hearing loss in a special school, and hearing students) showed improvements in their social self-concept after the transition. Gender differences were not reported. There was low confidence in the findings, due to the lack of randomisation of the intervention.

9. Rezaiyan *et al.* (2007) investigated the effect of a computer game intervention on the attention capacity of children with intellectual impairments. <sup>45</sup>

- Study design: Quasi-experimental study
- Country: Iran
- Setting: Institutional care
- Participants: 60 children with intellectual impairments from two boarding care centres
- Impairment type: Intellectual
- Percentage female: 0%
- Humanitarian setting: No
- Intervention: Computer game intervention – the programme consisted of 35 sessions of game playing. The game was path-finding and proceeded from easy to hard. The desired time of each session was 20–30 minutes, depending on the subject's inclination
- Control: No intervention
- Follow-up: Five weeks
- Outcome: Attention capacity
- Cost-effectiveness considered: No

Immediately after the intervention, the average attention scores of the experimental group were significantly higher than those of the control group. However, five weeks after the intervention, there was no significant difference. All subjects were male, so consideration of gender differences in effect was not relevant. Confidence in the study findings was low, because of the lack of a randomised design.

10. Thai *et al.* (2016) assessed the effectiveness of the Magic finger teaching method in learning multiplication facts among deaf students in Malaysia. <sup>46</sup>

- Study design: Quasi-experimental control trial
- Country: Malaysia
- Setting: Special education school
- Participants: 70 children who have profound hearing impairment, Years 4–6
- Impairment type: Hearing
- Percentage female: Not reported
- Humanitarian setting: No

- Intervention: Magic fingers teaching method, which focuses on manipulative techniques and the active involvement of students in solving maths problems (n=35)
- Control: Conventional teaching methods (n=35)
- Follow-up: Not reported
- Outcome: Multiplication test scores
- Cost-effectiveness considered: No

There was improvement in multiplication test scores in the intervention group, but not in the control group. Gender differences in effect were not reported. Confidence in the study findings was low, because of concerns about attrition of the sample and lack of confidence that baseline balance was achieved between the intervention and control groups.

11. Travis and Geiger (2010) explored the effectiveness of the picture exchange communication system for children with autism. <sup>47</sup>

- Study design: Before-and-after design without control
- Country: South Africa
- Setting: School for learners with autism
- Participants: Two children with autism
- Impairment type: Neurological (autism)
- Percentage female: 0%
- Humanitarian setting: No
- Intervention: picture exchange communication system – aided, picture-based communication system; bi-weekly sessions for nine weeks
- Control: No control group
- Follow-up: Three months
- Outcome: Frequency of requesting and commenting, and the length of verbal utterances
- Cost-effectiveness considered: No

Requests increased among participants in both the structured and unstructured settings following the intervention; comments increased in structured settings, but not unstructured, and the intervention was effective in increasing the mean length of utterances among one participant and was ineffective for the other. Both participants were male, so gender-specific analyses were not possible. Confidence in the study was low, because of the small sample size and lack of a randomised design, and lack of a control group.

12. Valentini and Rudisill (2004) explored the impact of an inclusive mastery climate intervention on the motor skill development of children with and without disabilities. <sup>48</sup>

A mastery climate is a systematic instructional approach that uses student-centred instruction to target both the motivational level of the student and the processes of learning.

- Study design: RCT
- Country: Brazil
- Setting: Mainstream school
- Participants: 104 children demonstrating motor developmental delay, both with disabilities (n=50) and without disabilities (n=54)
- Impairment type: Physical

- Percentage female: 35%
- Humanitarian setting: No
- Intervention: A variety of activities as well as opportunities to choose tasks, establish rules, share decisions, work with partners, and/or small groups, participate in a private evaluation of progress and effort, and self-manage the time and pace of the activities; 24 60-minute sessions over 12 weeks (n=50)
- Control: Usual schooling (n=54)
- Follow-up: 12 weeks
- Outcome: Locomotor performance and object control
- Cost-effectiveness considered: No

There was a significant increase in locomotor performance and object control among the intervention group (similar in disabled and non-disabled children) but not the control group (both disabled and non-disabled children). Differences were not disaggregated by gender. Although most of the study characteristics were appropriate, there was moderate confidence in the results because the adequacy of the sample size was not demonstrated through a power calculation.

13. Vatandoost (2013) assessed the effect of auditory perception training on the reading performance of students with dyslexia. <sup>49</sup>

- Study design: RCT
- Country: Iran
- Setting: Mainstream school
- Participants: 20 female students with dyslexia
- Impairment type: Learning (dyslexia)
- Percentage female: 100%
- Humanitarian setting: No
- Intervention: 10 45-minute sessions of auditory perception training were conducted (n=10)
- Control: No intervention (n=10)
- Follow-up: Not reported
- Outcome: Reading performance
- Cost-effectiveness considered: No

Auditory perception training is effective in improving functional reading skills in girls with dyslexia. Gender analyses were not appropriate, as all subjects were female. There was no access to the English full text version of the paper (but there was of the abstract), and so full quality assessment could not be conducted. However, there is low confidence in the study findings, due to the small sample size.

14. Wang assessed the effects of a parent training programme on the interactive skills of parents of children with autism in China. <sup>50</sup>

- Study design: RCT
- Country: China
- Setting: Training at university
- Participants: 27 families of children with autism aged <10 years)
- Impairment type: Neurological (autism)
- Percentage female: 15%
- Humanitarian setting: No
- Intervention: Parent training (n=15)

- Control: No intervention (n=12)
- Follow-up: One week after the end of programme
- Outcome: Parents interactive skills
- Cost-effectiveness considered: No

Following the training, parents in the training group, compared with those in the control group, were more sensitive to their child's interests, responded to their child's behaviour more appropriately, were more accepting of their child and his/her behaviour, showed more enjoyment in interacting with their child, and expressed more warmth toward their child throughout the free play interactions. Gender-disaggregated data were not reported. Confidence in the study findings was low, due to the small sample size.

15. Yildiz and Duy (2013) assessed the impact of a psycho-education programme to improve empathy and communication skills of adolescents with visual impairment. <sup>51</sup>

- Study design: RCT
- Country: Turkey
- Setting: Segregated school – school for children with visual impairment
- Participants: 16
- Impairment type: Visual
- Percentage female: 38%
- Humanitarian setting: No
- Intervention: Psycho-education programme: interpersonal communication skills training, nine sessions
- Control: No treatment
- Follow-up: Four months
- Outcome: Empathy and communication skills of children
- Cost-effectiveness considered: No

The intervention improved the emotional and cognitive empathy of the children, as well as communication skills, but there was no significant difference compared to the control group. Gender differences were not reported. The confidence in the study findings was low, because of the small sample size, as well as concerns about reporting of attrition, the definition of disability used, and the lack of confirmation that the intervention and control groups were well balanced at baseline.

### 3.2.4 Summary of studies reporting primary-school-related outcomes

Overall, 15 studies were included that measured outcomes related to primary education. The studies included a broad range of **countries**, including two studies in China, India, and Iran, and one each in Brazil, Egypt, Ethiopia, Kenya, Malaysia, South Africa, Turkey, Uganda, and Zambia. None of these were humanitarian settings. The range of children included by **impairment type/disability** was broad: four of the studies focused on children with hearing impairment, four with intellectual impairments, three with autism, two with all types of disability, one with motor delay, and one with visual impairment. Nine of the **interventions** attempted to improve the skills of the child, five attempted to improve the skills of the teacher, two made school-level changes, and one focused on parents' skills. **Study outcomes** were mostly consistently positive, with nine studies showing improvements in the children's learning skills, four showing improvements in the skills of the

teacher or parent, one showing improvements in the children's academic achievement, and one demonstrating a reduction in perpetration of violence. Two studies showed mixed results in terms of improving the children's learning skills.<sup>44, 45</sup> However, the **study quality** was deemed to be low for all but two studies, because they were small in size (n=5), lacked a randomised design (n=6), lacked balance of control and intervention groups (n=3), or lacked control groups (n=3). The remaining two studies were of 'moderate' quality as they failed to present a sample size calculation. All of these weaknesses in study quality are potential sources of bias, so we can have less confidence in the mainly positive findings from the studies.

**There were no areas of strong evidence** given the lack of consistency in intervention implementation or outcome measurement, and the overall low study quality of the included studies. However, a number of studies showed that the learning skills of children and/or teaching skills of teachers/parents could be improved through an intervention. Consequently, there was 'promising evidence' on the effectiveness of interventions in improving outcomes in this category. In particular, there was consistent evidence that specific interventions (e.g. computer-based interventions, visual strategies, modified teaching approaches) can improve the learning skills of children (e.g. in terms of attention capacity, communication, and mathematics skills). Furthermore, two school-level interventions (inclusive teacher training, violence prevention) worked to improve the preparedness of teachers to educate children with disabilities<sup>39</sup>, and reduced violence perpetrated against children with disabilities,<sup>6</sup> respectively.

**Evidence gaps:** No studies assessed the impact of systems-level changes (e.g. policy) and only two assessed interventions at the level of the school. Outcomes were most often measured in terms of the skill of the child or teacher; only one assessed academic outcomes; and one considered the quality of the school experience (in terms of violence). Outcomes related to stigma were lacking. Gender analyses and cost-effectiveness analyses were lacking, and none of the studies were conducted in humanitarian settings. High-quality studies were absent.

### 3.2.5 Secondary-school-related outcomes

Two studies were included in the REA that assessed the impact of interventions to promote secondary school education outcomes for children with disabilities (Box 5).

#### **Box 5: Summaries of studies of interventions aiming to improve secondary school education outcomes**

1. Awada *et al.* (2017) explored the effect of inclusion versus segregation on reading comprehension of English as a foreign language learners with dyslexia in Lebanon.<sup>52</sup>
  - Study design: RCT
  - Country: Lebanon
  - Setting: Mainstream secondary school
  - Participants: 298 students from public and private schools (Grades 7–10). The participants included 281 students without dyslexia, and 17 students with dyslexia
  - Impairment type: Learning (dyslexia)
  - Percentage female: 35%
  - Humanitarian setting: No
  - Intervention: Strategies to improve the skills of children in reading comprehension (e.g. graphic organisers, visual displays, mnemonic illustrations, computer

exercises, predicting, inference, text structure awareness, main idea identification, summarising, and questioning) for four months at six hours per week (n=33)

- Control: Regular instruction (n=42)
- Follow-up: Four months
- Outcome: Reading comprehension
- Cost-effectiveness considered: No

The study found that the experimental group participants who received combined strategy instruction outperformed their control group counterparts in reading comprehension achievement in Grades 7 and 8. However, there were no differences between the performance of the participants in the control and the experimental groups in Grades 9 and 10. Results were not reported separately for children with and without dyslexia. There was no significant difference by gender in all the grade levels under study. Confidence in the study results was rated as low, because the sample of children with dyslexia was small, and there was no evidence of balance between the two arms.

2. Mourad (2009) assessed the effectiveness of a programme based on self-regulated strategy development on the writing skills of writing-disabled secondary school students.

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- Study design: RCT
- Country: Egypt
- Setting: Mainstream secondary school
- Participants: 67 students with learning difficulties in first year of secondary school
- Impairment type: Learning (presumed dyslexia)
- Percentage female: 40%
- Humanitarian setting: No
- Intervention: School administered three 40–45-minute self-regulated strategy development training sessions per week (n=34)
- Control: Usual schooling (n=33)
- Follow-up: One month
- Outcome: Writing performance
- Cost-effectiveness considered: No

Higher post-test scores were achieved in the writing performance scores in the intervention group, which remained one month on ( $p < 0.01$ ). Although most of the study characteristics were appropriate, there was low confidence in the results because a lack of clarity in the definition of disability, and the adequacy of the sample size, was not demonstrated through a power calculation.

### 3.2.6 Summary of studies reporting secondary school-related outcomes

Only two studies were included that measured outcomes related to secondary education. The studies were both conducted in the Middle East (Egypt and Lebanon). Neither of these were humanitarian settings. The **impairment type/disability** focus was also limited as both studies focused on children with learning disabilities. Both **interventions** tested methods to improve children's learning skills. Positive **study outcomes** were observed, as some



improvement in children's skills was reported as a result of the interventions, although the study quality was low due to various methodological issues.

**There were no areas of strong evidence** given the extremely limited evidence in this category, in terms of number of studies, their focus, and the impairment/disability type considered. Overall, there was 'insufficient evidence' on what works to improve outcomes in this category.

**Evidence gaps:** Wide-ranging evidence gaps are evident, including where the intervention was targeted (none assessed systems-level or school-level changes) and comprehensive assessment of outcomes (only children's skills were assessed, not academic achievement, educational quality, or stigma). Furthermore, evidence was not available for impairment types other than learning disabilities. Evidence on impact by gender, for humanitarian contexts, of cost-effectiveness, or the effect on reducing stigma, were absent. High-quality studies were absent.

### 3.2.7 Non-formal education-related outcomes

Non-formal education programmes cover a wide spectrum, and include community-based day centres that provide respite for parents of children who need intensive care, home-based learning, and programmes for 'school drop-outs' to improve educational outcomes and inclusion. No eligible studies were identified, and so there was 'no evidence' on what works to improve outcomes in this category.<sup>viii</sup>

### 3.2.8 Lifelong learning-related outcomes

Lifelong learning includes adult education, continuing education (e.g. credit or non-credit courses), professional development, and self-directed learning to improve the inclusion and the skills of people with disabilities. No eligible studies were identified, and so there was 'no evidence' on what works to improve outcomes in this category.<sup>6</sup>

### 3.2.9 Quality overview of individual studies

Table 4 shows the studies by our six quality assessment criteria. Overall, there is low confidence in the study findings for all but two of the studies, and moderate confidence in the remaining two studies (related to primary education). This suggests that the literature overall is not of sufficient quality on which to base firm conclusions – specifically in relation to non-formal education of lifelong learning (where there is no evidence) and early intervention and secondary education (where the evidence is of limited quality). Evidence on primary education was, however, more promising.

The study design, sample size, attrition, and balance were generally scored low for the majority of the studies. Disability and outcome measurement do better in individual studies. However, as noted above, the diversity of measures makes assessing the body of evidence difficult.

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<sup>viii</sup> Vocational interventions were not included as eligible under the livelihood interventions category.

**Table 4 Study quality assessed against critical appraisal criteria**

Study	Design	Sample	Attrition	Disability	Outcome	Balance	Overall
Awada (2017)	Green	Red	Green	Green	Green	Red	Red
Besler (2016)	Red	Red	Red	Green	Green	Yellow	Red
Carew (2018)	Red	Yellow	Green	Green	Green	Yellow	Red
Cattik (2017)	Red	Red	Red	Green	Green	Red	Red
Devries (2018)	Green	Yellow	Yellow	Green	Green	Green	Yellow
Karaaslan (2013)	Red	Red	Green	Green	Green	Red	Red
Kaur (2008)	Green	Red	Green	Green	Green	Red	Red
Katongo (2015)	Yellow	Red	Green	Green	Green	Red	Red
Lal (2007)	Red	Red	Red	Green	Green	Yellow	Red
Martin (2001)	Red	Yellow	Green	Green	Green	Red	Red
Mohammed (2010)	Yellow	Yellow	Green	Green	Green	Green	Red
Mourad (2009)	Yellow	Yellow	Green	Red	Green	Green	Red
Mulat (2018)	Red	Yellow	Yellow	Green	Green	Red	Red
Pajareya (2011)	Red	Yellow	Yellow	Yellow	Yellow	Red	Red
Rezaiyan (2007)	Red	Yellow	Green	Green	Green	Yellow	Red
Sani-Bozkurt (2015)	Red	Red	Yellow	Yellow	Yellow	Red	Red
Shin (2009)	Red	Red	Red	Yellow	Yellow	Red	Red
Thai (2016)	Yellow	Yellow	Red	Green	Green	Red	Red
Travis (2010)	Green	Red	Red	Green	Green	Green	Red
Valentini (2004)	Green	Yellow	Green	Green	Green	Green	Yellow
Wallander (2014)	Green	Yellow	Red	Yellow	Yellow	Green	Red
Yildiz (2013)	Yellow	Red	Red	Red	Green	Red	Red

Scoring: Red – 'low'; amber – 'moderate'; green – 'high'

### 3.2.10 Summary of outcomes from individual studies

As should be clear from the above, this is a limited body of evidence, given that it constitutes a disparate set of studies of diverse interventions for people with a range of disabilities with impact measured using different outcome measures, mostly with low confidence in the study findings. Table 5 provides an overview of the body of evidence with respect to each outcome.

**Table 5. Summary of the evidence from the individual studies in the REA**

	<b>Early intervention</b>	<b>Primary</b>	<b>Secondary</b>	<b>Non-formal</b>	<b>Lifelong</b>
<b>Studies included</b>	7	15	2	None	None
<b>Impairment type</b>	Neurological (4); intellectual (2); developmental (1)	Hearing (4); intellectual (4); neurological (3); all (2); physical (1); visual (1)	Intellectual (2)	-	-
<b>Outcomes</b>	Parents' skills (4); children's skills (3)	Children's skills (9); teachers' skills (3); parents' skills (1); academic outcome (1); violence (1)	Children's skills (2)	-	-
<b>Intervention type</b>	Parents' skills training (5); children's skills training (2)	School-level changes implemented (4); children's skills training (9); teacher training (1); parent training (1)	Children's skills training (2)	-	-
<b>Evidence of impact</b>	Yes (6); no (1)	Yes (13); mixed (2)	Yes (2)	-	-
<b>Study quality</b>	Low (7)	Moderate (2); low (13)	Low (2)	-	-
<b>Gender analyses</b>	Yes (1); no (6)	No (15)	Yes (1); no (1)	-	-
<b>Humanitarian setting</b>	No (7)	No (15)	No (2)	-	-
<b>Cost-effectiveness analysis</b>	No (7)	No (15)	No (2)	-	-
<b>Areas of consistent evidence</b>	Interventions effective at improving learning skills of children or teaching skills of teachers/parents	Interventions effective at improving learning skills of children or teaching skills of teachers/parents	None	None	None
<b>Overall evidence assessment</b>	<b>Insufficient evidence</b>	<b>Promising evidence</b>	<b>Insufficient evidence</b>	<b>No evidence</b>	<b>No evidence</b>

### 3.3 Reviews

Five reviews were included in the REA. Maulik *et al.* (2007) undertook a general review of childhood disability in LMICs: considering screening, prevention, services, legislation, and epidemiology.<sup>25</sup> The review covered 80 articles. Six articles considered legislation related to childhood disability, but only one from China highlighted the importance of developing national policies for integrated schooling facilities for children with intellectual disabilities. The review found some evidence for the effectiveness of parent support groups to support child development (early intervention), but did not investigate other educational outcomes. The authors concluded that information on specific interventions, service utilisation, and legislation was lacking, and study quality generally was inadequate. The review was considered to be of low quality, because of gaps in how the methods were presented (e.g. discussion of removal of duplicates or listing of excluded studies), lack of assessment of the risk of bias, and failure to conduct a meta-analysis.

Miyahara *et al.* (2011) undertook a Cochrane systematic review of task-oriented interventions for children with developmental coordination disorder, including evidence from high- and low-/middle-income settings.<sup>54</sup> They identified 15 RCTs or quasi-RCTs, for children aged 4–18, including four studies from China. There was evidence of the effect of task-oriented interventions on motor performance scores. However, the limited numbers of studies prevented meta-analysis of other outcomes, such as participation or alternative measures of motor performance. The authors considered that the risk of bias was moderate to high, and the quality of the evidence was low to very low. The quality of the systematic review was judged to be high.

Einfeld *et al.* (2011) conducted a systematic review of interventions provided by parents of children with intellectual disabilities in LMICs.<sup>55</sup> They covered 20 studies, most of which were small-scale interventions and/or had methodological shortcomings (e.g. used non-randomised designs). Overall, the quality of the evidence for interventions improving performance at school (including academic performance, participation, and behaviour) was low. The review was judged to be of high quality.

Robertson *et al.* (2012) assessed the literature on the efficacy of CBR for children with or at significant risk of intellectual disabilities in LMICs.<sup>56</sup> They identified 10 studies. The quality of the studies was judged to be low, and so the evidence on the impact of CBR on overall performance at school was judged to be very low. The review was judged to be of low quality, because of a lack of meta-analysis, lack of a satisfactory method for assessing risk of bias, and concerns with how the search was conducted.

Hastings *et al.* (2012) assessed the impact of interventions for children with pervasive developmental disorders (including autism) in LMICs.<sup>57</sup> They identified four eligible controlled studies in: Egypt, India, Turkey, and China. These studies all evaluated different interventions. The quality of the review was deemed to be low, because a list was not provided of excluded studies, with reasons for their exclusion, there was no satisfactory technique for assessing risk of bias, and a meta-analysis was not undertaken.

Overall, the findings from the reviews reinforced those from the individual studies; the evidence on what works to improve educational outcomes is weak, as studies are generally of poor quality, sparse in number, and address a range of interventions and outcomes, thus making comparison difficult.

## 4. Discussion

### 4.1 Overview of key results and evidence gaps

The REA shows that the evidence base on 'what works' to improve educational outcomes for people with disabilities is severely limited, both in quantity and in quality (Table 5).

Data are entirely absent for the effectiveness of interventions that aim to **improve non-formal or lifelong learning** outcomes for people with disabilities and so there was judged to be 'no evidence' for 'what works' in these domains. Only two studies were available that measured **secondary-school**-related outcomes – and both of these included only children with learning difficulties, from Middle Eastern countries, and were of low quality.

Consequently, there was 'insufficient evidence' regarding 'what works' for this domain. More studies were available for **early intervention** outcomes, yet these studies focused mostly on children with autism from middle-income settings. Furthermore, their quality was poor as the studies were generally very small and lacked randomisation of the intervention or a control group. As a consequence, the confidence in the study findings was low, although the studies generally reported positive outcomes of the intervention. There was therefore judged to be 'insufficient evidence' regarding what works for this domain.

More evidence is available to assess efforts to improve **primary school** outcomes for children with disabilities, and the data included a broader range of settings and impairment types. The studies focused on primary schools generally included more adequate sample sizes and used more appropriate study designs (RCTs). However, the quality of these studies was judged to be low overall (except for two studies). A consistent finding is that interventions can be effective in improving the skills that children need for learning (e.g. reading, concentrating). Examples of effective programmes include computer-based interventions (e.g. to improve classification skills<sup>43</sup> or attention capacity<sup>45</sup>), visual strategies (e.g. to improve communication<sup>41, 47</sup>) and new teaching approaches (e.g. using music to improve speech intelligibility,<sup>40</sup> new strategies to improve mathematics skills<sup>24, 46</sup> or reasoning skills<sup>42</sup>). School-level interventions are also effective at improving outcomes. Carew *et al.* (2018) found that an inclusive education intervention improved teacher preparedness to educate children with disabilities in the Lakes Region of Kenya, but did not demonstrate that this improved educational outcomes for the children.<sup>39</sup> Devries *et al.* (2017) assessed the effectiveness of a school-based intervention in reducing physical violence toward primary school students,<sup>6</sup> and showed that this mainstream programme was also effective for children with disabilities. However, the follow-up for most of these studies was short and so it could not be determined whether the improvements were sustained. Indeed, some studies found that the positive outcomes were not sustained.<sup>45</sup> Overall, there was considered to be 'promising evidence' regarding what works for this domain. More and better quality studies are needed to identify what works to improve educational outcomes for people with disabilities, including a broader range of countries and impairment types.

Almost none of the studies identified in the REA addressed how inclusion can be increased, but rather focused on improving individual children's skills to learn. Studies also failed to assess the effectiveness of broader inclusive or segregated schooling approaches in improving educational outcomes for children with disabilities, and in identifying what the key features are for creating success. Only two studies assessed the effectiveness of school-level interventions.<sup>6, 39</sup> Further studies evaluating the impact of school-level or system-level interventions (e.g. policy changes) were lacking. Additionally, few studies assessed the

effectiveness of technical solutions or assistive technology,<sup>32, 33, 36, 43, 45, 47</sup> and none addressed efforts to improve the physical accessibility of the school or water, sanitation, and hygiene facilities.

The interventions used varied considerably between studies, so that data synthesis was difficult and meta-analysis impossible. Overall, more studies are needed to evaluate the effectiveness of approaches to improve educational inclusion and outcomes for children with disabilities, including assessing interventions that operate at the level of the system and the school.

The outcomes reported were almost always in terms of improved children's skills, which would support better educational outcomes (e.g. better writing, reading, or concentration), or the skills of teachers or parents to teach children with disabilities. Only one study considered whether there was an impact on academic outcomes.<sup>44</sup> None of the studies assessed enrolment or retention in school, or quality, satisfaction or social inclusion at school. An important gap is that none of the studies assessed reductions in perceived stigma and negative attitudes as outcomes of interventions, although one study measured reductions in violence (which included emotional violence).<sup>6</sup> This is an important omission, as inclusion of children with disabilities in the classroom will not automatically result in social inclusion without efforts made to address stigma. Another issue is that there was a lack of consistency in the outcomes used, making it difficult to compare findings. Greater consistency is needed in the educational outcomes measured in studies, and these should broaden the focus beyond education skills, to include school enrolment and retention, educational outcomes, and social inclusion. This may require the development of new measurement tools.

Disability is an extremely heterogeneous category, including people with a broad range of impairment types, who will face different challenges and facilitators in relation to educational inclusion. Almost all of the studies focused on children with a single impairment type, so that it was not possible to compare the effectiveness of the intervention for children with different impairments. Exceptions were the studies by Carew *et al.*,<sup>39</sup> and by Devries *et al.*, which included children with all types of impairments.<sup>6</sup> However, these studies did not disaggregate outcomes by impairment type, likely because of the small numbers. Furthermore, two studies reported outcomes for both children with and without disabilities together, and did not disaggregate results.<sup>44, 48</sup> Another important source of heterogeneity among people with disabilities results from gender. The majority of studies reported the proportion of children included who were female, but almost none disaggregated the results by gender. There were two exceptions: Wallander *et al.* (2014) examined the impact of inclusion in early intervention by children at risk of adverse outcomes, but did not find differences between boys and girls;<sup>38</sup> Awada *et al.* (2017) explored the effect of inclusion versus segregation on reading comprehension among English as a foreign language learners with dyslexia in Lebanon, and found no difference in effect by gender.<sup>52</sup>

None of the studies were undertaken in a humanitarian setting, representing a further important gap in knowledge. Studies are needed that assess the impact of interventions for a broader range of impairment types, for both males and females, and in humanitarian contexts, and that allow disaggregation of effect.

## 4.2 Strengths and limitations of REA

The strengths and limitations of the REA need to be taken into account when interpreting the validity of the findings.

In terms of strengths, the eligible studies were identified through a comprehensive EGM that searched for data across 20 databases and sector-specific websites and screened more than 46,000 titles for inclusion. Data extraction and coding and quality assessment were undertaken by experienced researchers, using standardised protocols, with double scoring. Both the EGM and the REA were conducted jointly by experts in systematic review (Campbell) and disability (International Centre for Evidence in Disability - ICED), further improving the credibility of the findings.

In terms of limitations, a broad search strategy was used to identify studies related to disability, including specific health conditions or impairment types, anticipating that the data available would be sparse. As a consequence, eligible studies included children at high risk of disabilities (rather than with disabilities)<sup>38</sup> or children with dyslexia (defined as a disability under the UK Disability Act),<sup>49, 52</sup> and these may not be relevant when considering whether interventions work for children with disabilities more generally. There was a lack of consistency in intervention type and outcome measures used, and so meta-analysis was not possible and even narrative synthesis of findings was challenging. Eligible studies were restricted to those published after 2000 and published in English. Furthermore, 'grey' literature was not included in this stage of the EGM (but will be included in a later phase), and consequently some eligible studies may have been missed.

Our restricted eligibility criteria, requiring that primary studies were impact evaluations and conducted in an LMIC, meant that some potentially informative studies were excluded, such as qualitative data and process evaluations. These excluded studies included non-intervention studies conducted in LMICs (e.g. one study assessed the effectiveness and characteristics of leaders in specialised schools for children with blindness in Nigeria, but not using an intervention design)<sup>58</sup>, interventions among people from LMIC communities but living in high-income settings (e.g. a RCT of a specialist liaison worker model for young people with learning disabilities and mental health needs from the South Asian community),<sup>59</sup> or interventions from high-income settings (e.g. an RCT of two early intervention programmes for young children with autism in Australia).<sup>60</sup>

The quality of the studies was generally low, limiting the confidence in the inferences made from the study findings. However, relatively strict criteria were applied for evaluating confidence, and so certain studies were deemed to be of low quality even though they fulfilled most criteria, or only failed to report the sample size calculations.<sup>6, 38, 48</sup> Publication bias is also an important concern across the body of evidence, given that the studies were often small and low quality, yet found positive outcomes of interventions. Reviews were included alongside individual studies, and this may have resulted in double counting of studies.

## 4.3 Implications of REA

### 4.3.1 Implications for policy and practice

It is difficult to identify clear implications for policy and practice to promote educational outcomes for people with disabilities, given the limited evidence available, the generally low quality of studies, and the fact that the REA focused on impact evaluations and reviews, and excluded other study designs or sources of information.

Notwithstanding these concerns, it is important that legislation, policies and strategies which are compliant with the UNCRPD are in place, implemented, and monitored, in order



to improve the educational outcomes of people with disabilities. Consequently, there are implications from the REA for policy and practice in the following categories:

- **Legislation and policies:** Undertaking in-country analyses as to whether legislation and policies related to education are inclusive is helpful to identify where there are gaps, and where advocacy is needed to stimulate change. This has not been assessed in this report as there were no studies of these issues.
- **Strategies and implementation:** The REA shows promising evidence that interventions can be effective in improving the educational skills of children with disabilities in primary education, and/or the skills their teachers. There is also evidence that prevention of violence perpetrated against children with disabilities works, although only from one study.<sup>5</sup> The current evidence base therefore supports the implementation of programmes that aim to improve the educational skills of children with disabilities and their parents/teachers. However, beyond that, implications for policy or practice could not be identified from the REA, as the evidence base was limited in scope, weak in quality, and did not include cost-effectiveness analyses.
- **Monitoring:** Monitoring must be undertaken to assess the level of exclusion of children with disabilities from education, to understand whether they fall behind in terms of educational outcomes, and the implementation of incentives and/or deterrents to ensure that targets are met. Countries are encouraged to collect data on disability within their education management information system (EMIS), and guidelines are in place to support this activity.<sup>61</sup> Certain countries, for instance Fiji, have already included measures of disability within the EMIS, showing that this is feasible and produces helpful information,<sup>62</sup> although it may need to be adapted in different settings. The Washington Group is also developing an educational module, which will help collect data. Ensuring inclusion of people with disabilities in education will require funding, and so budget commitments must be made by governments.

#### 4.3.2 Conclusions and recommendations

Inclusion of people with disabilities in education, so that they can achieve good academic and social outcomes, is an important right, as well as a development need.

Currently, people with disabilities are more likely to be excluded from school and to fail to achieve equitable educational outcomes than those without disabilities. This exclusion from education is a violation of human rights as set out in the UNCRPD, moreover the SDGs (which call for quality education for all) cannot be met without a focus on the educational inclusion of children with disabilities.

This REA found that there is 'promising' evidence that interventions can be effective in improving the educational skills of primary-school-aged children with disabilities through, for example, computer-based interventions and modified teaching approaches. In other domains of education (e.g. early or secondary), evidence of what works was not available or was insufficient. The REA provides a summary of the rigorous evidence, not all evidence, and its findings and recommendations should be understood in that context. It is clear that more and better evidence is urgently needed on what works, so that specific approaches or programmes can be recommended to close the gaps in educational outcomes between people with and without disabilities.

Recommendations:

1. People with disabilities should have a central role in developing policies and programmes to support improvement in educational inclusion and outcomes, and assessing their effectiveness, through participatory processes. This includes having a central role in carrying out these assessments (e.g. in defining the research questions, formulating the intervention for evaluation, and/or collecting and analysing data).
2. Impact evaluations studies need to be funded and undertaken on ‘what works’ to improve educational outcomes for people with disabilities. Efforts should also be made to integrate measures of disability within planned or ongoing mainstream education impact evaluations and other demographic or household surveys that include education outcome.
  - a. There is a strong need for robust evidence on improving educational inclusion and outcomes at primary and secondary level, as well as early intervention, as these are crucial for long-term economic productivity. Addressing evidence gaps in lifelong learning and non-formal education may be secondary priorities.
  - b. Studies should broaden their focus beyond improving the skills of disabled children, to include questions about ‘what works’ to improve the inclusion in schools. Furthermore, more evidence is needed on the relative merits of different approaches to providing education for children with disabilities (e.g. segregated, inclusive, and blended approaches).
  - c. Studies should be high quality and should use robust methodologies, including RCTs with a sufficient sample size. More evidence is needed to provide statistically robust quantitative assessment of whether an intervention is effective in improving education outcomes, and, if so, by how much.
  - d. To support comparison of effectiveness between interventions studies should use consistent approaches to defining and measuring disability (e.g. using the Washington Group questions). This may require the development of new tools (e.g. a tool to assess education participation satisfaction).
  - e. Studies undertaken should consistently consider a broad range of characteristics and aspects of identity (e.g. gender, ethnicity) that may influence outcomes.
  - f. More studies need to be conducted in low-income countries (the majority of the studies in this review were from middle-income – generally upper middle-income – countries), and in humanitarian settings, to understand ‘what works’ to advance educational outcomes for people with disabilities, in these contexts.
  - g. Advocacy efforts are needed to encourage funders (including governments, multilateral agencies, research institutes, and other foundations) to commit financial support for these studies.
3. Relevant existing or planned programmes working to improve educational outcomes for people with disabilities (e.g. those implemented by NGOs, governments, and DPOs) should evaluate whether they are effective in improving educational outcomes for people with disabilities, including looking beyond enrolment alone. Given the complexity of undertaking high-quality impact evaluations, programme

implementers may wish to seek advice from experts when designing and delivering such studies. The participation of people with disabilities in these evaluations is critical.

4. Monitoring systems should be put into place that allow disaggregation of educational data by disability/impairment types (e.g. using the Washington Group measures), to assess the inclusion and progress of people with disabilities in education under different circumstances (e.g. inclusive and segregated schools), and to assess whether we are closing the gap in comparison to children without disabilities.

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## 6. List of abbreviations

AMSTAR	-	Assessing the Methodological Quality of Systematic Reviews
CBR	-	Community-based rehabilitation
CEDIL	-	Centre for Excellence for Development Impact and Learning
DFID	-	UK Department for International Development
DIR	-	Developmental, Individual-Difference, Relationship-Based
EGM	-	Disability Evidence and Gap Map
EMIS	-	Education management information system
ICED	-	International Centre for Evidence in Disability
LMIC	-	Low- or middle-income country
PSM	-	Propensity score mapping
RCT	-	Randomised controlled trial
RDD	-	Regression discontinuity design
REA	-	Rapid Evidence Assessment
UNCRPD	-	United Nations Convention on the Rights of Persons with Disabilities
UNESCO	-	United Nations Educational, Scientific and Cultural Organization
WHO	-	World Health Organization
WWC	-	What Works Clearing House