

Inclusive disaster risk reduction education for Indonesian children

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Biographical note.

Kieron Sheehy researches within the field of inclusive education. Currently he is working on projects developing inclusive disaster risk reduction education, and understanding fun in learning.

Petra Vackova's research is committed to issues of justice in education of young children, especially in relation to the arts. She has a keen interest in creative, post-qualitative methods and innovative methodologies

Saskia van Manen works at the intersection of academic research and real-world practice to realise human-centred, sustainable and evidence-based disaster risk reduction initiatives. She holds a PhD in Volcanology, an MA in Product Design and Innovation and an M.Sci. in Geophysics.

Sherly Saragih Turnip is a psychologist whose work addresses mental health. This includes using movement, songs and other fun activities with children and youth to positively impact on their understanding of, and response to, natural disasters.

Khofidotur Rofiah trains special education professionals and supervises educational research students. Her particular interests are developing the keyword sign system Signalong Indonesia and facilitating teachers' competencies in inclusive education settings.

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Abstract.

Children with special educational needs and disabilities (SEND) have a profoundly higher risk of death or injury than their peers when natural disasters occur, and international policies call for inclusive disaster risk reduction education (DRRE) to help ameliorate this situation. This paper focuses on Indonesia, a nation with one of the highest incidences of these disasters. A three-part structured literature review was undertaken regarding DRRE and children with SEND, followed by a questionnaire about DRRE in schools. Firstly, potential papers were screened against explicit criteria, yielding 23 papers for inclusion in the review. Secondly, these 23 papers were screened for identifiable DRR programmes, producing 12 items. Thirdly, evaluations of these 12 programmes were sought. The findings from analysis of these three data groups revealed that children with SEND were largely absent within the published research, the DRRE programmes, and all subsequent evaluations of the DRRE programmes. A questionnaire then explored if this absence in the literature was reflected in schools. Responses from 769 teachers from across Indonesia indicated that DRRE was lacking in many schools, and that no programmes that were being used were accessible for all children. This is the first study to gain this insight into Indonesian DRRE research and practice. It concludes that there is a need for DRRE across mainstream, inclusive, and special schools, which is underpinned by an inclusive pedagogy that is accessible for all children. The implications for developing an inclusive and engaging approach to DRRE are discussed

Keywords: disaster risk reduction education, children with special educational needs and disabilities, intellectual disabilities, inclusive education, accessibility, Indonesia.

Introduction

Global climate change is exacerbating the risk of extreme weather events, with the number of climate-related disasters tripling in the last three decades (Oxfam 2021). Indonesia sits within the Pacific region's 'ring of fire' and is one of the nations that experiences most disasters each year through volcanic eruptions, tsunamis, earthquakes, and floods; between 1900-2022 a total of 582 disasters have been recorded, with 343 of these between 2000-2022¹ (EM-DAT The International

¹ For a disaster to be included in the EM-DATA database at least one of the following criteria has to be met: (1) 10 or more people reported killed, (2) 100 or more people reported affected, (3) Declaration of a state of emergency and/or (4) Call for international assistance

Disaster Database; Guha et al., 2022). . Between 2000-2022 188,804 people lost their lives, making Indonesia the nation with the second highest death toll from disasters during this period, surpassed only by Haiti (EM-DAT The International Disaster Database; Guha et al., 2022). The Indonesian National Board for Disaster Management Agency (BNPB) reported 185 disasters the first three weeks of 2021 alone (ABC News 2021) and there has been at least one major event each month since the devastating 2004 tsunami (Mercy Corps 2020).

However, incidence of death, and injury from these events is not evenly distributed. As in other countries, the death and injury rate of disabled people/persons with disabilities is much higher than other people (USAID 2021) and the rate for children is 'alarmingly high' (Dyregrov, Yule, and Olf 2018), accounting for 30-50% of deaths (WHO, 2011 cited in Amir, 2017). In Indonesia this risk is profoundly higher for children with special educational needs and disabilities (SEND) (Indriasari, Widyarani, and Kusuma 2018; Mubarak, Amiruddin, and Gaus 2019).

In seeking to respond to the increased risk for disabled people, international and government policies and conventions have foregrounded disabled people in relation to disaster risk reduction (for example as in the United Nations (UN) Convention on the Rights of People with Disabilities, the Sendai Framework for Disaster Risk Reduction 2015–2030 and the Incheon Strategy 2013–2022 cited in Calgaro et al, 2020). This recognition contains an explicit acknowledgment that the inclusion of disabled people within disaster risk reduction (DRR) programmes is a human right and these people must be afforded the same rights to this DRR as any other citizen (Calgaro, Villeneuve, and Roberts 2020). All Indonesian citizens have this right, within a legal framework (act no. 24 of 2007), to receive DRR education (Amir, 2017). Despite this explicit desire by policy makers, researchers have concluded that how this inclusion and 'greater disaster justice' might be achieved remains unclear (Calgaro, Villeneuve, and Roberts 2020).

These issues of representation and provision appear to be an issue within the field of researching and creating disaster risk reduction education for all children. A decade ago the Inter-agency Network for Education in Emergencies concluded that there was 'limited research on the 'impact of education in the prevention of, response to' natural disasters and complex emergencies (Global Education Cluster (GEC) 2012). However, subsequently there has been a growing evidence base showing the efficacy of DRRE in reducing the risk of death and injury of children (Mubarak, Amiruddin, and Gaus 2019; Proulx and Aboud 2019; Torani et al. 2019). The issue of 'limited research' appears to remain confined to evidence regarding the children who are most at risk i.e. children with special educational needs and disabilities (SEND) (Ronoh 2017; Ronoh, Gaillard, and Marlowe 2015), and notably so in Indonesia, where these young people have profoundly higher risks of death and injury than their peers (Ha 2016; Stough and Kang 2015). It has been identified that there is a research gap concerning DRR education and children with SEND, and that an overall picture of what research does exist is lacking (Ronoh, Gaillard, and Marlowe 2015; Mubarak, Amiruddin, and Gaus 2019).

Inclusive education and DRRE

Since 2009 the Indonesian government's drive to create an inclusive education system (Ediyanto et al. 2017) has provided opportunities for children who might previously have been excluded from education, and therefore also lacked access to DRRE. Beginning at the same time, the government

began piloting *Sekolah Siaga Bencana*, disaster-prepared schools (more recently called *Sekolah Aman Bencana*, disaster safe schools) and by 2013 there were over 25,000 such schools implementing DRRE (Amri et al. 2017). The majority of the 'new' pupils in the system have intellectual disabilities (Sunardi et al. 2011) and are likely to face challenges in accessing a standard school curriculum. However, it is rare for schools to modify their pedagogy or materials (Sheehy & Budiyanto, 2015; Sunardi et al., 2011).

This suggests that there might be a lack of DRRE able to accommodate children with SEND. This is a longstanding issue. For example, in 2012 UNICEF carried out a major review: *Disaster risk reduction in school curricula: case studies from thirty countries*' (UNICEF 2012). Within this landmark work, the term 'disability' was mentioned only twice, in two case studies (Cambodia and The Philippines) that stated the need for developing pedagogical strategies that were effective for children with SEND. The Indonesian case study in this review noted the use of 'hazard-specific textbooks', for all levels, that address 'disaster knowledge, preparedness and recovery' (p.98). Because Indonesian schools develop local curriculum content, the potential was identified for DRRE curriculum developments that were sensitive to 'the specific local needs and contexts in the world's largest archipelago' (p.98) (UNICEF 2012) and examples were given of teachers being encouraged to create their own localized textbooks. However, the issue of inclusive education was not considered, and the report concluded that there were no disability related 'learning outcomes for disaster risk reduction education' (p.53) (UNICEF 2012). Although DRRE was apparently incorporated into all levels of Indonesia's national curriculum from 2009 (Amir, 2017), subsequent research found that Indonesian schools were ill-prepared pedagogically and might lack or not implement a curriculum on disaster education (Putri 2014). These findings suggested that DRRE curriculum activities might not be present in all schools or that, where they were present, then the access preferences (Garcia Carrizosa et al. 2020) of children with SEND were unlikely to be considered. The extent to which this might currently be the case in Indonesian remains unknown.

The UNICEF Indonesian case study also highlighted the importance, and challenges, of moving away from the ubiquitous transmissive teaching approaches, towards new participatory approaches (UNICEF, 2012). There is some suggestion that this development has not yet happened. For example, with regard to accessible and inclusive DRRE for children with visual impairments (VI) and Deaf or hard of hearing (DHH) children, Nikolaraizai et al (2021) concluded that internationally

“there is no research in relation to the education of children with VI or children who are DHH, while the existing research in relation to children with disabilities does not always involve them as active participants “ (Nikolaraizi et al. 2021)

The importance of DRRE for children with SEND in Indonesia is evident from national and international policy but the nature and scale of DRRE research within this area is unknown. Although policies and materials to support DRRE in schools exist, the extent to which these are currently used in the classroom and are accessible for all children is not known. In this context, access would involve DRRE activities being available within the school and appropriately differentiated or facilitated (O'Mara et al. 2012). Inclusive DRRE would involve a pedagogy that produces positive learning outcomes for all children within a diverse classroom and has participatory components (Sheehy and Budiyanto 2015).

This research aimed to begin to address the existing research gap by a) gaining a picture of Indonesian DRRE research and DRRE programmes that consider children with SEND and b) collecting data regarding current materials, practices and needs.

Method

This study used a three-part review of research followed by an online survey.

Structured literature review

Several methods of literature review exist, each of which has different merits. Across these various approaches there is no agreed coherent review terminology, and much overlap and inconsistency exists (Grant and Booth 2009; Pham et al. 2014). Therefore, methods were assessed in relation to the aim of the current research. This sought to examine the research that existed in a way that would allow this examination to be repeated at a later date, to identify changes in the field or support comparative research. A systematic literature review would allow this as its pre-defined process is rigorous and ensures that the outcomes are reliable and meaningful (Munn *et al.*, 2019). Other similar approaches were considered, such as a Scoping review (Pham et al. 2014). This broader approach is less clearly defined (Pham *et al.*, 2014) but has merit in relation to identifying gaps in a research field where it is unclear what specific question might be posed (Munn *et al.*, 2019). Consequently, a structured literature review was carried out (Figure 1). The term 'structured' (Armitage and Keeble-Allen 2008) is used rather than systematic, as this review did not require the full systematic review criteria such as assigning a weighting to the articles under review, as might be done with regard to reported effect sizes (Newman and Gough 2020; Karolinska Institutet 2017). This general method is well established for exploring education and inclusive research issues (Rix et al. 2020) and its transparency is helpful to other researchers in the field (Sheehy et al. 2019).

The core search was carried out using specified keywords to select and filter search results within the Scopus database. Scopus was chosen due to the interdisciplinary nature of DRRE. It is the world's largest database of peer reviewed abstracts and covers a broad and comprehensive spectrum of research, which includes social, life, physical, and health sciences. The keywords used for this search were

- (1) Children.
- (2) Disability Inclusive Disaster Risk Reduction
- (3) 'Disaster risk reduction education'
- (4) 'Disaster risk reduction',
- (5) 'Disaster risk management'
- (6) 'Risk communication'
- (7) 'Hazard education'
- (8) 'inclusive',
- (9) 'accessible',
- (10) 'disability'
- (11) 'universal'
- (12) Special educational needs or disabilities or sensory/physical impairments.

(13) Indonesia

The keyword searches utilised specific inclusion criteria:

- (1) Written in English language
- (2) Published between 2010 - April 2021
- (3) Contains keywords 1 and 13 (Children and Indonesia) and at least one of 2-6 and any of 7-12.
- (4) Concerned with children (children/youth/students/young people), but may be mediated through parents/ carers /teachers
- (5) NOT: duplicates, book chapters, conference papers, books, theses.

Abstracts that did not meet these inclusion criteria were excluded. If the abstract was ambiguous then the full article was screened. In addition, after selection, articles were screened to identify programmes running in Indonesian schools (see Figure 1).

To be included articles had to contain keywords 1 and 13 (Children and Indonesia) and at least one of 2-6 and any of 7-12. This yielded 69 potential research papers and after further screening 23 papers were selected (see Appendix 1). Within these papers 12 indicated DRRE programmes or interventions in Indonesia (See Appendix 2).

Figure 1 about here.

As Figure 1 illustrates the screening process identified 23 papers (see Appendix 1), and within these papers 12 indicated DRRE programmes or interventions in Indonesia (See Appendix 2). Evaluations of these 12 programmes were then sought (See Appendix 2).

Research Questionnaire

An online survey was developed, consisting of 15 items (see Appendix 3). Besides collecting demographic and occupational data (Q1-Q4), it asked about Signalong Indonesia (Q5, Q6), a form of keyword signing to support curriculum access for pupils who might previously have been excluded from education (Rofiah et al. 2021a). This acted as an indicator of schools that used an identifiable inclusive strategy within their teaching. Respondents were subsequently asked about the presence of DRRE programmes in their schools (Q7-Q11), their accessibility for different groups of children, and the type of teaching approach that would work for them and children with special educational needs or disabilities (Q12, Q13). Lastly, participants were asked to respond to the statement 'It is the

teacher's role to teach all children about natural disasters and what to do when they happen', which was followed with space for optional further comments.

Questionnaire responses were collected using the Qualtrics platform and then downloaded to software Statistical Package for the Social Sciences (SPSS v25) for descriptive analysis. Given the nature of the analysis, cleaning the data (Osborne 2010) was straightforward. The issue of including incomplete answers was considered. As participants were given the choice of answering or not any question, all items were retained for incomplete sets. Open ended questions were reviewed, for example to identify nonsense text, however all answers were identified as appropriate.

The research was reviewed and given a favourable by the Human Research Ethics Committee of the Open University (HREC/4097/Sheehy). A link to the questionnaire was posted during an international webinar on disaster risk reduction hosted by Universitas Negeri Surabaya in November 2021. Conference attendees could choose to read and anonymously complete the questionnaire.

Findings

Structured review: Confirming a gap in Indonesian DRR research concerning children with SEND

Within the 23 selected papers, there were three systematic reviews that mentioned Indonesia. These were all identified through "children" AND "disaster risk reduction education" AND "Indonesia". Only one of these studies considered disability, in relation to a need for 'Access to safe places for people with disabilities' (Mirzaei et al. 2019, 12). Seddigghi and colleagues' international review (Seddighi et al. 2021) drew on 2 studies that mentioned disabilities but did not mention children with SEND within their review, and Rahiem and Rahim (Rahiem and Rahim 2020) did not consider the issue in their review of Folklore in Early Childhood Disaster Education. The conclusion from examining these three recent systematic reviews, which included Indonesia and drew together numerous studies in the field, is that children with SEND are entirely absent from these research findings or recommendations for future research. This suggests that not only are the most vulnerable children omitted from the area of research, but that this absence is not necessarily being identified by those evaluating research on DRRE and Indonesian children.

Of the remaining selected papers, one discussed children and disability (Pertiwi, Llewellyn, and Villeneuve 2020). This article focused on Indonesian DRR laws and disability. It highlighted the legislation that exists to support DRRE for all children, for example the 'Guideline on Implementation of Safe School' (BNPB Regulation 4 of 2012) which explicitly directs educators to provide for children with SEND in accordance with the principles of inclusiveness. Pertiwi et al conclude that whilst appropriate legislation exists, there is a need for the 'development of technical guidelines on [the] implementation of disability-inclusive DRR' (Pertiwi, Llewellyn, and Villeneuve 2020, 1).

The 23 selected articles were screened for indications of DRRE programmes or guidance documents and 12 were identified (see Appendix 2). Of these 12 articles only one considered children with

SEND, *A Practical Guideline to Making School Safer from Natural Disaster for School Principals and School Committees* (Indonesian National Agency for Disaster Management (BNPB 2014). This document is a model of good DRRE practice for school development. Its focus is essentially structural in nature, with an emphasis on inclusive design to ensure that during a disaster there should be a suitable evacuation route for 'disabled people' to ensure that 'All school members including people with special need/disable can do self-evacuation' (81). The document makes some reference to pedagogy and sees children's awareness and understanding being enabled through DRRE that is embedded throughout the curriculum in books.

'reading materials such as books, guidelines on disaster risk reduction in school curriculum can be integrated into subjects such as geography, environment, and or extracurricular activities.' (16)

In addition to these materials, the guidance is clear that children will need 'what to do' training. This training will be via *"earthquake drills and simulation, for example, will train the students to secure their head in reflex during the shake and seek shelter in safer area"* (p16). This drill is described as a means of allowing everyone to be *'well trained to immediately do the self-evacuation'* (p16).

This document offers sound DDR guidance, based on national Indonesian recommendations that reflect successful practice in other countries (Sakurai et al. 2018). However, within the suggested 'non-structural' curriculum activities, such as drill and simulated practice, the notion of inclusive pedagogy or the DRR curriculum access needs of pupils with SEND are not considered.

Many of the 12 programmes had been evaluated or researched further (see Appendix 2). Following up and reviewing these evaluations indicated that notions of disability and inclusive DRRE were absent, apart from one instance. An evaluation of *Maena for Disaster Education* mentions that 'it is not evident whether this program could be effective for persons with disability' (Shoji, Takafuji, and Harada 2020, 12). As with the three systematic reviews, children with SEND were not explicitly considered in subsequent programme evaluations. Consequently, programmes are unlikely to become more inclusive or accessible as a result of subsequent research. This finding supports Pertiwi's identification (Pertiwi, Llewellyn, and Villeneuve 2020) of a need for guidance on how to develop and implement inclusive DRRE.

Whilst this gap might appear in published research, it is possible that this does not reflect what is happening 'on the ground' at school level and that, locally, DRRE is being delivered to children with SEND. Therefore, a questionnaire method was used to gain insights into this issue.

Questionnaire responses

The online questionnaire was completed by 769 participants from 17 Indonesian provinces (Figure 2). The majority of participations were teachers or student teachers (74%). The remaining 26% included those who indicated their occupation as head teachers (n=10), university lecturers (n=8), administrators of a university support service for disabled students (n=2), parents (n=22), a

therapist, one youth representative of a political party, with the remainder being (non-teaching) students.

Figure 2 about here

The majority of participants (79%) were from Java, and 6.6% did not indicate their province.

Current use of DRRE programmes.

The use of DRRE programmes in schools was reported by 172 teachers from 16 provinces.

A variety of programmes were named or described. Some of these were training courses that the respondents had undertaken. The most common course was the Psychology of Crisis and Disasters. This e-learning course from Universitas Islam Negeri Raden Intan Lamung discusses the handling of crisis and disaster conditions (Damyant 2021) and was indicated by 12 respondents. The acronym SMCC was given by five people, which probably refers to a centre at the Universitas Negeri Surabaya that supports disaster response training.

(This is ambiguous as it could also refer to the Strengthening Movement Coordination and Cooperation (SMCC) model (Awan et al. 2019) or, less likely, the Social Media Crisis Communication Model (Bukar et al. 2021) which looks at information distribution in crises situations). Six teachers reported attending courses on Crises and Disaster at a Crisis Centre Mitigation Unit, with others undertaking general training in relation to managing fires or floods.

More directly related to children's learning were responses that indicated how DRRE was embedded into school curricula and activities. For example, "In early childhood learning at my institution there is a theme of the universe, where early childhood [*pupils*] is given an understanding of the dangers of natural disasters". Integrating DRRE into this curriculum theme was mentioned by six respondents. Examples were also given of a variety of local practices, which represented their schools' DRRE programme. This included simulation of earthquake, fire, flood and/or tsunami situations and how to respond (n=7), and school greening, and anti-litter and fire prevention programmes (n=7). Question 9 about disaster preparedness education in their schools was answered by 337 people. In 56% of these cases, it was integrated into the curriculum, and it was taught separately in 44% of cases.

Together these responses indicate that, where DRRE occurs, a variety of local practices exist, reflecting local situations and priorities, within Indonesia's locally devolved curriculum (Putera 2018).

Question 10, regarding the accessibility of their DRRE programmes and activities, was responded to by 236 participants and is summarised in Figure 3.

Figure 3 about here

As Figure 3 indicates, the majority felt that the programmes they knew of were *not* accessible. Some were identified as accessible for some groups, ranging between 2.7% of respondents who felt that the programmes they knew were accessible to children with a visual impairment, and 10.6% of respondents regarding children with intellectual disabilities. Participants commenting on the same programme could have a different perspective on its accessibility and no programme was seen as accessible to all groups.

Questions about the use of Signalong Indonesia (SI), were used as a way of identifying schools that were developing inclusive approaches (Budiyanto et al. 2020). Across all the participants 29% had heard of keyword signing and 47% of this group, indicated that it was primarily used to support teaching and other activities. A small number used more recent SI materials such as Sign Supported Big Books (n=21) (Rofiah et al. 2021a) or the Signalong Indonesia app (n= 6) (<https://signalongindonesia.unesa.ac.id>). Signalong Indonesia was being used to support teaching in 104 mainstream schools, 12 inclusive schools and 2 special schools. Whilst schools may be developing inclusive pedagogies in other ways, these responses alone highlight that some mainstream schools are striving to be inclusive and accommodate a diverse range of pupils. Consequently, the accessibility of DRRE is not only relevant to special or designated inclusive schools.

Responses to Q14 revealed that the majority (86%) agreed that 'It is the teacher's role to teach all children about natural disasters and what to do when they happen.' This belief was common across teachers of children of different age ranges and from mainstream, inclusive, and special schools. Only a small number disagreed. For example, with regard to type of school, mainstream (8%), inclusive (5%) and special school teachers (6%) disagreed that it was their role. However, only 4% of all respondents felt that their current approach worked and 92% thought that new accessible materials were needed. In terms of where this provision should occur, 48% felt that the provision of accessible materials to schools was needed and 47% preferred a community-based approach to their creation.

Discussion

The research produces several original findings and highlights factors that have an impact on the educational experiences and life risks of children with SEND in Indonesia.

The findings confirm the suggestions of other researchers (Ronoh 2017; Mubarak, Amiruddin, and Gaus 2019) that there is a paucity of research concerning DRRE in relation to children with disabilities. It reveals the absence of this group from the research agenda and goes beyond this to indicate, for the first time, that this absence applies not only to the research being undertaken, but also to research reviews undertaken by third parties. Furthermore, and perhaps more importantly, the same phenomenon was identified in the sample of Indonesian DRRE programmes and the evaluations of these programmes. This means that the DRRE programmes are unlikely to accommodate children with SEND and that subsequent evaluations of these programmes do not

raise this issue or suggest how programmes might develop to be more accessible or inclusive. Calgaro et al (2020) highlighted that that 'People with disabilities are largely unseen, unheard and unaccounted for in all levels of disaster management' (p321) and suggested that significant factors in this situation were structural, systemic and attitudinal barriers. The current research supports and extend their conclusions. The invisibility of inclusivity and access within Indonesian DRR research, education programmes, and evaluations suggests that there is a structural, systemic

issue which will have a profound effect on the lives of children. The most vulnerable group, those most likely to be hardest hit by natural disasters, appear to lack a meaningful presence within the Indonesian DRRE research agenda.

A caveat to this is claim is that the research review only considered English language publications. However, nuanced support for this claim is provided by the questionnaire responses. Although DRRE might lacking for many children, with only 23% of participants reporting DRRE programmes within their schools, none were seen as being accessible for all children and only a small minority were accessible for some groups of children. Therefore, even though there may be programmes which were not identified in the review, for example being published in Indonesian language, the 'on- the-ground' reports of participants suggest that inclusion and accessibility are not prioritised with currently operational programmes. The use of Signalong Indonesia, although a relatively new approach (Budiyanto et al. 2017b) within mainstream schools suggests that creating inclusive and accessible DREE is relevant to all schools, not only the relatively smaller number of inclusive or special schools in Indonesia.

A social model perspective

Disability activists seeking to improve services for children often draw upon the social model of disability (Oliver 2013). This perspective foregrounds how social and environmental barriers, such as attitudes and professional discourses and practices, can be 'disabling' (RIP:STARS 2018). This has parallels with a perspective that the concept of a 'natural disaster' is misleading, as disasters to a large extent can be seen as the outcome of long term, lack of, planning and society's attitudes. As Kelman states

"Disasters are caused by society and societal processes, forming and perpetuating vulnerabilities through activities, attitudes, behaviour, decisions, paradigms, and values" (p2) (Kelman 2019).

This has resonance with our findings. The absence of disabled children within Indonesian DRRE research and provision is the outcome of societal processes and decisions, which shape the vulnerability of this group of children when extreme environmental events occur. If we are to address this situation then there is a need for future research to explore these underpinning attitudes, processes, and decisions.

A way forward

The findings suggest that Indonesian DRRE research and practice do not foreground the needs of children with SEND. Thus, in a context where many schools do not implement DRRE, even those that do are unlikely to meet the needs of all children. This contrasts markedly with Indonesian policy aspirations that such provision should be developed and implemented (Hasan Dawi and Aini Ahmad 2019). This raises the questions of the best way forward, what inclusive DRRE provision could look

like, and how it might best be implemented in a context where there appears to be a general lack of implementation.

One useful starting point would be to identify existing best practices. Our findings show that some teachers identified current practices as being accessible for specific groups of children. Therefore, these examples should be sought out and explored further to examine what is happening in these schools and to identify the factors that have facilitated the implementation of these, at least partially, accessible classroom practices. This could be complemented with a review of Indonesian language publications and 'grey' literature. This strategy would complement recommendations that successful DRR 'interventions' are more likely to succeed if they can build on existing practices (Gianisa and Le De 2018) and that methodologies for developing DRRE should be participatory (UNICEF 2012). This is an important issue. Our findings show that the implementation of current DRRE programmes is not universal across the schools in our sample. This supports research in other countries showing that even where there are existing outreach and DRR educational initiatives, people commonly do not change their behaviours, beliefs or plans (Van Manen, Avard, and Martínez-Cruz 2015). This phenomenon is not confined to DRRE but is seen more generally. The 'importation' of extra-national approaches does not have a successful record of sustaining development within Indonesia (Allen et al. 2017). It is therefore important that interventions are developed within, and reflect, their cultural context (Tabulawa 2013; Budiyanto et al. 2017a). A rare example of this type of work at a local level used a community participatory approach to create and pilot a fun and engaging way to convey a disaster preparedness program for young children by using song and dance as media of delivery, in the province of Aceh (Turnip et al. 2018). Although not focused on inclusion and access, the importance of fun emerged in overcoming barriers of uptake and implementation. This complements work in Indonesian kindergartens, where fun was found to be a key factor in teachers adopting an inclusive approach to storybooks (Rofiah et al. 2021b). Developing educational approaches that are fun would be in keeping with previous recommendations that new Indonesian DRRE pedagogies should offer an 'effective and joyful approach' (Sardjunani, 2010; UNICEF, 2012).

The participatory development of adult DRR initiatives has been an explicit goal in several international initiatives (Calgaro et al. 2020) and the need to involve children with SEND in a participatory approach to DRRE has been suggested in other countries (Seddiky, Giggins, and Gajendran 2020; Ronoh 2017) and there have been child-led DRR initiatives, albeit not with children with SEND (Wisner 2006; Benson 2007; Lu et al. 2021). This presents a challenge regarding how to support inclusive and accessible participatory research with children who are stigmatised within Indonesian society and often excluded from participation in education more generally (Murdianto and Jayadi 2020; Handoyo et al. 2021; Septian and Hadi 2021).

Conclusion

This research reveals the absence of children with SEND within DRRE research, evaluations, and school programmes in Indonesia. The findings show that there is a need for DRRE across mainstream, inclusive and special schools, and point towards the development of DRRE that has an inclusive pedagogy and is accessible for all children. Achieving this would be supported through participatory approaches that identify and build on existing good practices in schools, to create models of DRRE that are fun, engaging, and impactful for teachers and children.

Disclosure statement

No potential conflict of interest was reported by the authors.

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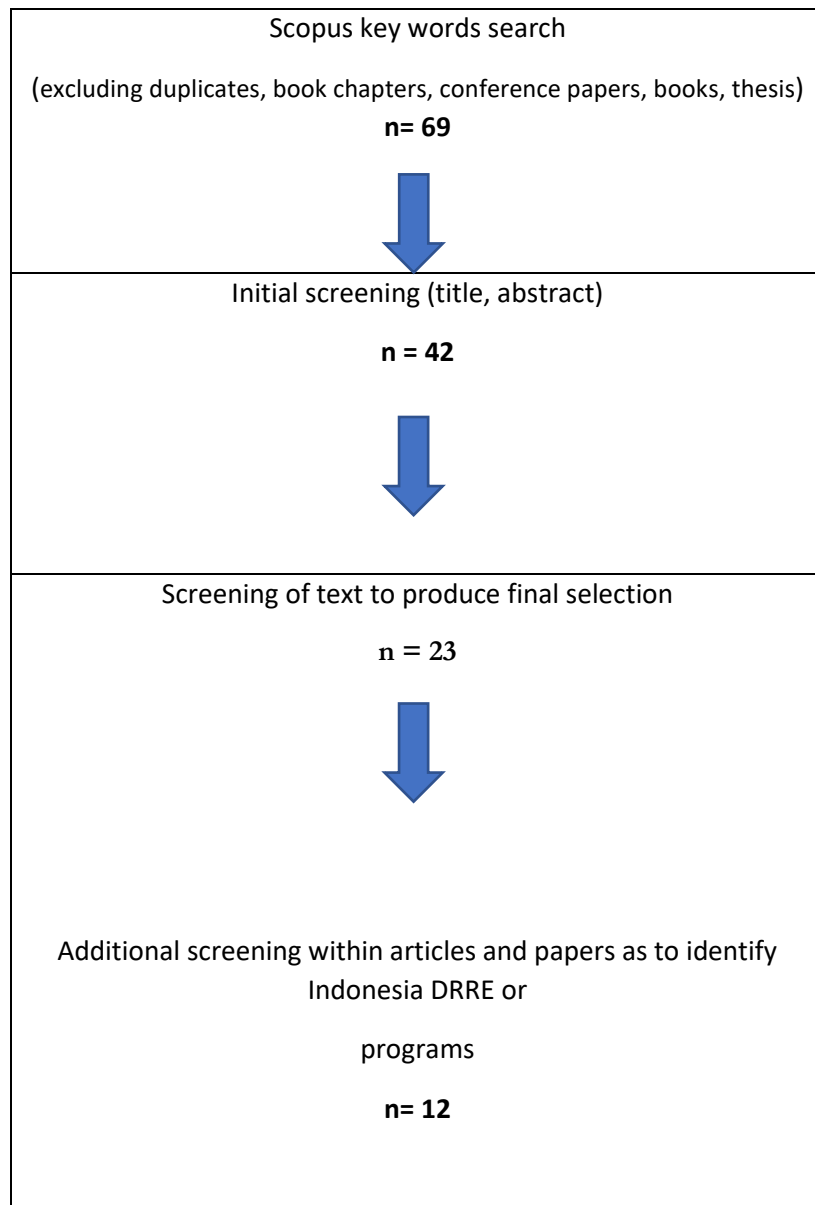


Figure 1 Structured review screening process

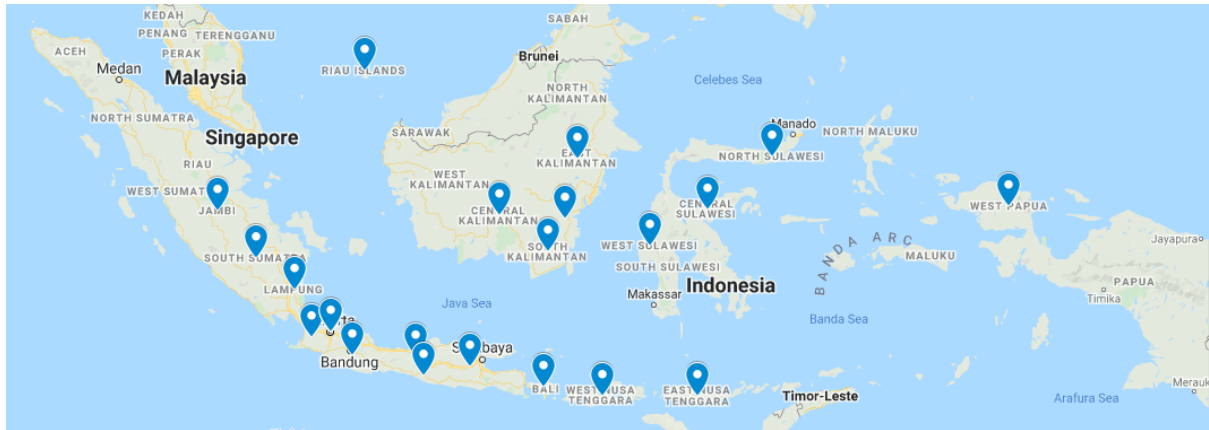


Figure 2. Distribution of questionnaire respondents. [Map data ©2021 Google, INEGI]

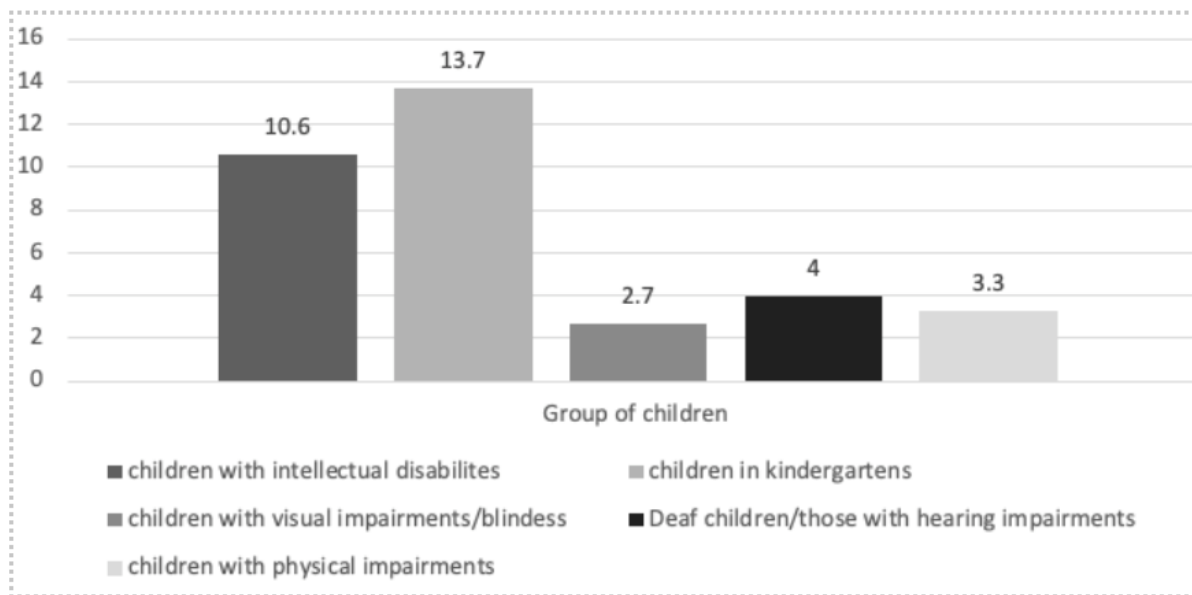


Figure 3 Percentage of DRRE programmes in participants' schools that are accessible for different groups of children.

Appendix 1

The 23 papers selected for the review.

(* indicates that an Indonesian DRRE program was identified from this paper)

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Appendix 2

Indonesian DRRE programmes and evaluations identified within the selected papers (2010-2021).

Name of programme	Key features	Intended users	Uptake and evaluation reference(s).
<p><i>1 Local Content Curriculum</i> (Government of Indonesia)</p>	<p>Curriculum infused with DRR and DRR topics integrated into existing subjects</p> <p>DRR is taught as a special subject within the Local Content Curriculum (LCC). LCC sensitive to specific local needs and contexts</p>	<p>Primary, intermediate and higher secondary students.</p>	<p>National uptake (UNICEF, 2012)</p>
<p><i>2 Sekolah Siaga Bencana (SSB)</i> (Indonesian National Agency for Disaster Management (BNPB), 2014)</p>	<p>Infrastructure repair</p> <p>Activities within school curriculum and extracurricular activities</p> <p>Provision of a tsunami evacuation map, signs and disaster equipment</p>	<p>All stakeholders and school communities</p>	<p>National uptake. 25,000 schools.</p> <p>(Adiyoso & Kanegae, 2012) (Sakurai et al., 2018a) (Sakurai et al., 2018b) (Adiyoso & Kanegae, 2013) (Amri et al., 2017)</p>
<p><i>3 A Practical Guideline to Making School Safer from Natural Disaster For School Principals and School Committees</i></p>	<p>Risk assessment and planning development</p>	<p>School management</p>	<p>Influences public policy. Evaluation not found.</p>

(Indonesian National Agency for Disaster Management (BNPB), 2014)			
<p><i>4 Making Aceh Safer through Disaster Risk Reduction in Development (DRR-A) Project</i></p> <p>(United Nations Development Programme., 2012)</p>	<p>Developed guidelines “Sahabat Siaga”</p> <p>Institutional environment to facilitate a participatory implementation of DRR measures</p> <p>Public awareness programmes to promote a gender sensitive “Culture of Safety”.</p>	Elementary, junior and high schools	<p>10 villages located in 10 districts.</p> <p>Influences public policy</p> <p>(Adiyoso & Kanegae, 2012)</p> <p>(Akbar Meirio, 2012)</p>
<p><i>5 Preschool-based DRR program in rural Indonesia</i></p> <p>(ChildFund International and Sumba Integrated Development-see Proulx & Aboud, 2019)</p>	<p>Weekly evacuation drills, community risk mapping, and hazards education</p> <p>A series of DRR training workshops for preschool teachers .</p> <p>Community awareness work to identify disaster risks and evacuation routes</p>	Preschool children ages 5-6 and their teachers	<p>8 community-based preschools</p> <p>(Proulx & Aboud, 2019a)</p>
<p><i>6 Disaster Risk Re-duction Begins at School: "Disaster Awareness in Primary Schools" (DAPS)</i></p> <p>(Science Education Quality Improvement Project).</p>	A child-centred methodology, including group work. Training local educational consultants, schools staff, and then teachers	Elementary schools (teachers and pupils)	50.000 schools (ISDR, 2007)
<p><i>7.Improve disaster knowledge in senior high school students through geographic literacy</i></p> <p>(Kamil et al., 2020)</p>	Classroom action research design.	Senior high school students (11 th grade)	<p>Observation of 17 Public High Schools</p> <p>24 students for action research</p> <p>(Kamil et al., 2020)</p>

8. <i>The project for supporting education of tsunami disaster prevention in Nanggroe Aceh Darussalam</i> (Sugimoto et al., 2010)	The construction of 85 tsunami memorial height poles plus community disaster education in Banda Aceh city and Aceh Besar.	The whole community: children, local non-government organizations and local school boards	Local uptake (Sugimoto et al., 2010)
9. <i>One Million Safer Schools and Hospitals</i> (Academy of Pediatrics., 2019)	A guide to raise the awareness of the urgency of making schools and hospitals safe from disasters.	Children and adults	International Evaluation not found
10. <i>Depository of educational material related to earthquakes and tsunamis</i> (International Tsunami Information Center, 2020)	Educational material developed by different organizations, includes national and local organizations in Indonesia	All stakeholders	International Evaluation not found
11. <i>Maena for Disaster Education</i> (Shoji et al., 2020)	Teachers learn how to implement the DRRE program. Teachers run interactive workshops with students. Create a unique Maena for each class, demonstrated at local events.	Elementary school teachers and children	All elementary schools at Nias Island, South Nias Regency (Shoji et al., 2020)
12. <i>'Smong', Early Warning System from Simeulue Island</i> (Syafwina, 2014)	Survivors share experiences through poems and songs The songs become cultural assets, performed during community events	All Community	Simeulue Island, Banda Aceh City and Aceh Besar Regency (Syafwina, 2014)

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Appendix 3

Questionnaire items

1. In which Province of Indonesia do you work?
2. What is your role?
3. What is the type of school that you work in?
4. What age range do you typically work with ?
5. Have you heard of Signalong Indonesia? [No. Go to Question 7]
6. Is Signalong Indonesia used in your province/school?
It is used in supporting teaching or other activities
Sign Supported Big Books are used
We use the SIDRA app from the Google store
I have heard of it, but we don't use it.
7. Are Disaster Risk Reduction Education programmes used, and/or is this topic taught, in your school? [No. Go to Question 12]
8. If yes, does this programme have a specific name ?
9. Is this disaster preparedness education
Integrated into curriculum topics
Taught separately
10. Are this programme's materials and activities accessible for and understandable by
children with learning difficulties
children in kindergartens
children with visual impairment /blindness
Deaf children/ those with hearing impairment
children with physical impairments
none of the above
11. To what extent would you agree with the statement
There is a need for new accessible disaster preparation materials for children with special educational needs.
12. Which teaching approach would work best in your current situation?
A community based approach working with children and their families to create accessible materials?
A school-based approach, providing free accessible materials for teachers to use in their classrooms with all children
Our current approach works well and there is no need for additional materials or approaches
13. For children with special educational needs which type of content would be most helpful?
Please rank the following in order of preference
Guidance and ideas for working together with your local community to create materials.
Accessible Illustrated Books
An App that includes video stories.
Activities and materials to use within traditional curriculum areas
14. To what extent would you agree with the statement
It is the teacher's role to teach all children about natural disasters and what to do when they happen.
15. Any brief comments or suggestions that you would like to make about this topic?

