



EMERGENCY PREPAREDNESS FOR CHILDREN WITH AUTISM SPECTRUM DISORDER (ASD) IN YOGYAKARTA

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ABSTRACT

Indonesia lies on the *ring of fire* and this includes Yogyakarta province which had experienced some earthquakes. The earthquake that occurred in 2006 caused thousands of people died. Most of the survivors were elderly people and children. Children are a vulnerable group, especially those with special needs. School is the first reference to teach earthquake disaster preparedness to children. This research used observational descriptive design. Purposive sampling technique was used, and data was collected through observation sheet. Respondents were with autism in Special School of Negeri Pembina Yogyakarta (n=23). Storytelling and Simulation on Earthquake Disaster Preparedness gave positive influence towards the mitigation ability by children with special needs, especially those with autism. There were nine children with autism in the category of low IQ, six in the category of average IQ and eight children in the category of superior IQ. Before the storytelling was conducted, children's ability and involvement in the simulation was 35% (8 children). Conversely, the children's ability and involvement raised to 78% (18 children) after being given five times (5x) simulation and storytelling. Storytelling and simulation method were effective as training methods in earthquake disaster mitigation on children with autism. There was 43% increase of mitigation level before and after intervention.

Keywords : *simulation method, mitigation ability, autism*

ABSTRAK

Daerah di Indonesia merupakan *ring of fire* dan Yogyakarta merupakan salah satu daerah yang mengalami gempa bumi. Gempa yang terjadi pada tahun 2006 menimbulkan banyak korban, mayoritas adalah orang lanjut usia dan anak-anak. Anak-anak merupakan kelompok rentan terlebih anak dengan berkebutuhan khusus. Sekolah sebagai tempat rujukan pertama untuk memberikan edukasi siaga bencana terhadap anak-anak. Desain penelitian adalah deskriptif observasional. Teknik pengambilan sampel dengan *purposive* sampel sedangkan teknik pengumpulan data dengan lembar observasi. Metode pengambilan sampel dengan *purposive* sampling. Responden yang mengikuti penelitian ini sebanyak 23 anak autis. Pemberian simulasi siaga bencana gempa bumi memberikan pengaruh positif terhadap kemampuan mitigasi anak berkebutuhan khusus dengan autis. Anak autis dengan kategori IQ rendah 9 orang, IQ sedang 6 orang dan IQ tinggi 8 orang. Sebelum diberikan pembelajaran *story telling*, kemampuan dan keterlibatan anak dalam melakukan simulasi sebanyak 35% (8 anak) namun setelah diberikan pembelajaran dan simulasi sebanyak 5x, kemampuan dan keterlibatan anak meningkat sebanyak 78% (18 anak). Metode simulasi efektif sebagai pembelajaran mitigasi bencana gempa bumi pada anak autis. Peningkatan kemampuan mitigasi sebelum dan sesudah diberikan pembelajaran sebanyak 43%.

Kata kunci : *simulation method, mitigation ability, autism*

BACKGROUND

Earthquake is one of many unpredictable natural disasters. This disaster destroys buildings rapidly, and inflicts injury and even death on people in the affected areas. Earthquake is the movement of the earth as a result of the release of energy that has been accumulated in deformed rocks (Noor, 2011).

Yogyakarta Special Region, is one of the regions susceptible to serious disasters. National Disaster Management Authority stated that Yogyakarta had experienced quakes stronger than magnitude 5 in 1867, 1943, 1976, and 2006. Based on National Disaster Management Authority's data, the earthquake on 27 May 2006 had claimed 5,716 lives and caused 37,927 people injured. The worst impact was in Bantul Regency area, the closest area to the center of the earthquake, where 4,143 people were killed and 12,026 were injured.

Children are the most vulnerable group to suffer from the impacts of a disaster (Government Regulations No. 21, 2008). Children's disaster vulnerability is caused by their limited understanding about the risks in their surrounding area, which causes unpreparedness to deal with disaster.

One of government's efforts in reducing disaster risks is mandated in Law No. 24 2007 on Disaster Management, that should be integrated in development programs, including education sector. Law Number 23 year 2002 on Children Protection clearly states that education serves as one determining factor in reducing disaster risks.

It is also supported by the fact that Indonesia is vulnerable to disasters. According to *International Strategy for Disaster Reduction 2006-2009*, Indonesia is the seventh country experiencing natural disaster in 2005. Knowledge on disaster reduction has not been specifically integrated in Indonesian curriculum (Kemdikbud, 2013). It is contradictory to *Hyogo Framework* arranged by United Nations (UN) which

firmly states that education of disaster preparedness is a priority. It is *Priority for Action 3: Use knowledge, innovation and education to build a culture of safety and resilience at all levels*. Education regarding disaster mitigation has also been applied and integrated in primary and middle year curriculum in 113 countries, such as Bangladesh, Iran, India, Mongolia, the Phillipines, Turkey, and Tonga (United Nations Centre for Regional Development, 2009).

There has been a growing trend in international development to enhance child involvement in DRR (Disaster Risk Reduction). Reviews of child-centred programmes reveal positive outcomes for both the children and communities. One study in South Asia showed that child participation can be incorporated into preparedness, rescue, relief and rehabilitation phases, and that involving children can enhance the community's ownership and sustainability of DRR programs (Nikku, et al 2006). Back et al in Lopez et al (2012) argued that investing in child-centred DRR yield long-term benefits and future savings because learning and practicing DRR at an early age embeds changed behaviour that can be integrated into adult life. Thus an outcome of child participation is the development of a cohort of experienced citizens for future disasters. Studies conducted by Ronan and Johnston (2005) provided evidence that children who participated in school-based hazards education programmes tend to have increased accurate knowledge of hazards, increased reports of home adjustments for hazards preparedness, reduced levels of fear, and more have realistic risk perceptions than their peers. Further, it was found that children who participated in community-based DRR programmes experience increased confidence in advocating for DRR strategies and understand and respond more effectively to risks (Mitchell et al. 2008).

Disaster awareness education can be performed early on through disaster preparedness education at school so that children can be aware of ways to

escape them from danger during a disaster. Disaster awareness education can be started at elementary school age because, according to Piaget's theory, children at this age are in the concrete operational phase (Suhardjo, 2011).

A safer school is needed to protect children's safety during a disaster. The concept of school safety is not limited only in terms of preventing the building from collapsing during a disaster, and the safety of teachers and students, but it aims towards something bigger – the disaster risk management – because children hold the role as the future generation (United Nations Centre for Regional Development, 2009). Children with special needs and disabilities are the most vulnerable group in the times of disaster. Some of them have mobility hindrances to perform independent self-protection and escape, therefore, information on rescue procedures or plans for Children with special needs and disabilities, which involve surrounding people (e.g. teachers, classmates, school staffs), is essential. Based on a preliminary study performed by the researcher, there are eight schools in Giwangan sub-district, one of them is a special school, Special school of Negeri Pembina is one of the biggest special schools which has 230 students.

METHOD

This research is an observational descriptive design. Data analysis was

performed using a descriptive qualitative analysis. The researchers intended to identify the methods that can be applied in mitigation learning as a risk in children with autism. The methods applied were storytelling and simulation. The research was conducted from January to November in 2017. The research took place in SLB N (School for special need children) Pembina Yogyakarta, with a population of 30 students with autism.

The samples were selected by considering students' data at SLB N Pembina, Yogyakarta, with the following inclusion criteria: autistic; not suffering from any diseases; and willing to participate as a respondent. Whereas the exclusion criteria was: partial participation of learning.

There were 6 groups containing 3 to 4 children. Each group was given emergency preparedness education through storytelling method and they continued doing disaster simulation after the storytelling activity. Informed consent was obtained from autism class teachers. Children were given storytelling and simulation learning during teaching and learning hours.

Data was collected after the approval of *ethical clearance* from Ethics Committee of Health Polytechnic Ministry of Health of Yogyakarta No. LB.01.01/KE-02/VI.70/2017. The instrument of the research was simulation observation checklist and picture story in the form of *flip chart*.

RESULTS

Table 1. Frequency Distribution of Autistic Children Based on Age and IQ at Special School of Negeri Pembina Year 2017 (n=23).

Category	Low IQ		Medium IQ		High IQ		Total	
	n	%	n	%	n	%	n	%
Gender								
Males	6	26.1	6	26.1	8	34.5	23	100
Females	2	8.7	0	0.0	1	4.3		
Education Level								
Elementary	2	8.7	0	0.0	4	17.4	23	100
Junior HS	3	13.0	3	13.0	3	13.0		
High School	4	17.4	2	8.7	2	8.7		

In table 1, the total number of respondents is 23. Special needs children

with autism at SLB N Pembina were categorized into three, namely, high IQ;

medium IQ; and low IQ. Most respondents are males and those who have a low IQ are 34.5%.

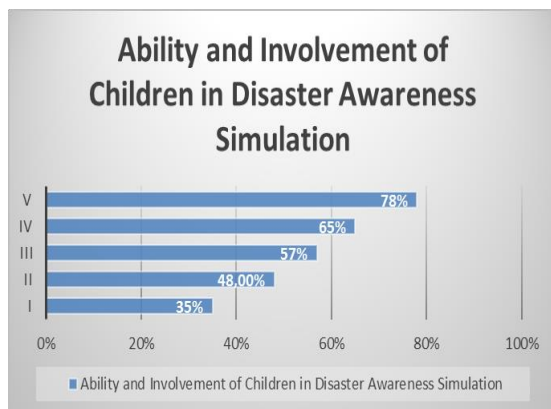


Diagram 1. Ability and Involvement of Children in Disaster Awareness Simulation at SLB N Pembina Yogyakarta, Year 2017 (n=23)

There were 8 children involved in the first simulation (35%). The number increased to 18 children (78%) after the simulation was conducted five times (5x).

DISCUSSION

WHO defined autism, especially *childhood autism* as abnormality or development disorders that occurs before children reach 3 years old with three abnormal characteristics, including social interaction, communication and repetitive behavior. Children with autism are categorized as special needs who suffer from neurobiological disorders with obstacles on the brain neurological functions which dealing with communication function, social motoric and attention. Obstacles that children with autism (ASD) experience are combinations of some brain neurological development disorders and what appears as children's behavior within their first three years (Foundation for the Development of Disabled Children, 2013).

In this research, respondents' characteristics based on gender were dominated by males (n=20), and the number of female respondents were 2. Autism may occur to children from various social strata and various cultures. Surveys taken from several countries showed that 2-4 per 10,000 children are susceptible to

develop autism, and the ratio between males and females was 3:1. This is supported by Gamsiz, *et al* (2013) in their research, which stated that male children tend to be more vulnerable to experience nervous system development disorder, including autism, than female children. And the risk of autism when having siblings with autism is 3%. Another study showed that twin siblings of the same gender who are monozygotic have 300 times greater risk than dizygotic of developing autism.

According to Indonesian National Board for Disaster Management (2012), education of disaster management can be given to trainings in the form of lecture and simulation. In this research, lecture and simulation were both used as methods to train disaster management to children.

The first method, lecture, is not always considered effective to develop students' knowledge, if it is not well prepared and supported by media that attracts students' attention. According to Slavin (2010), teacher's ability and attitude in teaching is closely influencing the successful learning process. Teachers with good performance will be able to foster enthusiasm and students' learning motivation which in other words will be able to increase the quality of learning.

Storytelling is the ancient art of creating and communicating narrative structures of words, images, sounds, or actions, as a means to entertain, preserve a culture, and educate. Storytelling, meant as listening at narratives created by others, or as creating own stories, is something human beings experience since early childhood. With the advent of interactive multimedia technology, traditional-paper based or oral – storytelling has evolved to digital and interactive storytelling, which has become increasingly popular for children (Garzotto, 2014). Children could easily get information from movements and sounds through storytelling so they developed their imagination. They also could depict visually on the story they listened to.

Some advantages of story telling method according to Widia (2017) are:

storytelling can reach relatively more children, the time is used effectively and efficiently, it is easier for teachers to manage and control the class and it is also cost effective.

Learning media that support this research was flip chart which was used in the storytelling. The flip chart was made with colors that would attract children's attention so they would be enthusiastic in listening to the story. The story covered actions or things to do when an earthquake happens, including *drop*, *cover*, and *hold*. On the other hand, the story also told the children not to put things on the cupboard as they could befall anyone. Next, the story told children to help or ask friends to save themselves when an earthquake occurred as well as to go to gathering point.

Golzari, *et al* (2015) stated that story telling is effective for children with ASD. Storytelling method is recommended as a selected approach by teachers/companion, parents, friends and the society when interacting with ASD children. Storytelling method is considered able to stimulate children with ASD to communicate with other people, both in direct verbally and non-verbally.

Based on Giuliani., *et al* (2016) in his research, there were some approaches to children with ASD, i.e. through therapeutic approach by telling a story. Duration of telling story is between 1-2 hours. Storytelling method significantly affects in a positive way to children with ASD, by giving social support such as increasing their confidence and reducing stress level, creating a comfortable environment, establishing a dynamic social interaction with peers, strengthening children's motivation, improving both verbal and non-verbal communication such as eye contact, body gesture and facial expressions, developing children's imagination ability and children's empathy. The story telling method is also valued as a supporting method in an active and interactive learning process for children with ASD. It is in line with what Matos and Figueiredo (2017) stated that story telling method is one of the learning choices for

children with autism. Storytelling method needs some media such as tables, chairs, illustrative pictures in accordance with the events or real situations depicted in the form of flashcards sized 6x3 cm and texts that describe the story theme. Each story theme was presented in various *flashcards* and texts. In the initiative stage, teachers/shadow teacher of the children with autism spectrum disorder (ASD) told story through media that has been provided with duration of 30 minutes per story theme. Further, children with ASD were asked to re-tell the story that has been told through the same media. In the final stage, the children with ASD were asked to re-tell the story without any media. This research found out that through storytelling method, children with ASD could tell 3 out of 5 story themes. Although they have not been able to tell the story 100%, there was an elevated knowledge that the children with ASD got through story telling.

There are some aspects in applying storytelling. The first aspect is that there is two-way interaction between the storyteller and children. During the two-way interaction, more information is received so it will be recorded in children's memory. Children with ASD have a different experience in interacting socially compared to other children. According to Maulana (2007), three main disruptions that happen to children with ASD are communication, social interaction and behavior so the study was implemented in small groups in the hope that children would be focus more on the materials being delivered.

The second aspect is the information that the storyteller delivers to children. The information which was delivered visually made them easily remember the materials and enrich their vocabulary. It is coherent with Garzotto (2014) who argued that applying storytelling can attract children's attention and can also direct their imagination so it is in accordance with the materials being given.

The third aspect is storyteller's vocal and gesture when telling the story.

This aspect stimulates and directs children's imagination. Based on the observation, three children said that they should run to the hill whenever an earthquake occurs while two children could imitate the movement of covering head and neck. In addition, five children could restate that they should cover themselves under a table when an earthquake occurs.

The fourth aspect is that children is given an opportunity to give feedback in the process of storytelling. It is aimed to check and make sure whether the children have understood the materials being delivered. The observation result showed that 7 children answered that they would not go back to the house or a room when the earthquake has stopped.

The fifth aspect is that children is given a chance to memorize the content of the story after storyteller finished telling the story. The observation result showed that there were 5 children who were able to retell the story on what to do when an earthquake occurs. They said that they would cover their head and neck and walk outside the room towards assembly point after the earthquake stopped.

The second method was simulation. It is a way of presenting learning experience by using mock situation to understand the concept, principles, or certain skills. Simulation can be used as a teaching method assuming that not all learning processes can be conducted directly to the real objects (Sanjaya, 2013).

According to Bernardini *et al* (2014), games as a way of simulation can help children or teachers in the teaching and learning process as well as to develop communication skills in children with ASD. This theory is supported by Zakari, *et al* (2014), who stated that simulation in the form of games is a traditional therapy to children with ASD in order to improve communication, learning, social behavior and, in different ways, motor abilities.

Actions of simulation being conducted were: huddling, covering head and neck, holding and withstanding until the earthquake finishes and walking to

gathering point. On the first simulation, there were 8 capable children being involved. Huddling could be done by 4 children, covering head and neck could be done by 5 children while walking to the gathering point could be done by 8 children. Children who could follow actions on the first simulation have got superior and average IQ. According to Foundation for the Development of Disabled Children (2013), children with ASD with good prognosis can have almost normal or normal social life so they can succeed whether at school or at work.

Researchers divided students into 6 groups; each group consisted of 3 to 4 students. This is supported by Hidayat (2016) who stated that group learning strategy on children with ASD can increase children with autism's learning concentration in inclusive schools and the effects that the students experience cover cognitive, affective and psychomotor aspects. According to Slavin (2010), students who work cooperatively in groups could study more than those who were arranged in a traditional classes. The main factors are motivation and cognitive. Students's self-motivation could be seen clearly when they together wanted to reach a goal in their group and in expressing good norms for the sake of the group's success.

Disaster risk reduction activities, as mandated in Law No. 24 Year 2007 on Disaster Management must be integrated to the development program, including education sector. It is also supported by Law No. 23 Year 2002 on Children Protection. The law also emphasizes that education is a defining factor in disaster risk reduction activities.

Children involvement is an important component in disaster risk reduction. Efforts in reducing disaster risks are: giving education to children so they have sufficient knowledge on disaster alert (UNICEF, 2012).

School is the first reference to give education of disaster alert to children. The school's success in disaster risk reduction is also a success in giving education to the next generation

(International Finance Corporation, 2010).

CONCLUSION

The use of storytelling and simulation method earthquake disaster awareness training gives a positive influence on the autistic children's mitigation ability. These autistic children get actively involved, and after doing five times simulations, there was an increase of 43% earthquake disaster mitigation ability. Before training is given, these autistic children's involvement was 35%, and after the simulation their involvement is 78%. The increased percentage indicates that children with autism spectrum disorder are better prepared with storytelling and simulation methods in facing earthquake disaster.

REFERENCES

- Bernardini, S., Porayska-Pomsta, K., Smith, T.J. (2014). *ECHOES: An intelligent serious game for fostering social communication in children with autism*. In Information Sciences, vol. 264, pp. 41-60.
- Foundation for the Development of Disabled Children. (2013). *Buku Pedoman Penanganan dan Pendidikan Autisme YPAC*. Yayasan Autisme Indonesia.
- Garzotto, Franca. (2014). Interactive storytelling for children: a survey, *Int. J. Arts and Technology, Vol. 7, No. 1*
- Gamsiz, E.D, et al. (2013). *Intellectual Disability Is Associated with Increased Runs of Homozygosity in Simplex Autism*. The American Journal of Human Genetics (93)
- Giuliani, F., Marchetti, B, C., Perrenoud, V., Korh, P, E. (2016). *Is Storytelling Therapy Useful for Children with Autism Spectrum Disorders and Severe Mental Retardation?*. *Advanced Techniques in Biology & Medicine*. 4(1). p: 1-5
- Golzari, F., Alamdaroo, G, H., Moradi, S. (2015). *The Effect of a Social Stories Intervention on the Social Skills of Male Students With Autism Spectrum Disorder*. SAGE Journal. p: 1-8
- Government Regulation of The Republic of Indonesia. (2008). *Penyelenggaraan Penanggulangan Bencana*, No 21.
- Hidayat, M.A, 2016. Strategi Guru Dalam Peningkatan Konsentrasi Belajar Siswa Autis di Sekolah Inklusi. *Tesis*. Universitas Islam Negeri Maulana Malik Ibrahim Malang.
- Indonesian National Board for Disaster Management. (2012). *Pengembangan Kurikulum Pendidikan dan Pelatihan Berbasis Kompetensi*. BNPB. Jakarta.
- International Finance Corporation. (2010). *Disaster and Emergency Preparedness: Guidance for Schools*. International Finance Corporation: World Bank Group.
- Lopez, Y., Hayden, J., Cologon, K & Hadley, F. (2012). Child participation and disaster risk reduction. *Int J Early Years Educ*,20(3), 300-308
- Matos, D,C., Figueiredo R, M, E. (2017). Teaching Intraverbal Storytelling to Children with Autism and Other Cases of Language Delays. *Psychology*. 8. p: 798-814.
- Maulana, Mirza. (2007). *Anak Autis: Mendidik Anak Autis dan Gangguan Mental Lain*. Yogyakarta: Ar-Ruzz Media Group.
- Ministry of Education and Culture. (2013). *Kurikulum 2013 Kompetensi Dasar Sekolah Dasar (SD)/ Madrasah Ibtidaiyah (MI)*. Jakarta: Kementerian Pendidikan dan Kebudayaan
- Mitchell, T., K. Haynes, N. Hall, C. Wei, and K. Oven. (2008). The role of children and youth in communicating risk. *Children, Youth and Environments* 18: 254_79.

- National Disaster Management Authority. (2014). *Data dan Informasi Bencana Indonesia*. Accessed on 13 Mei 2017. Available on: http://dibi.bnpp.go.id/DesInventar/simple_data.jsp.
- Nikku, B. R., Sah, N & Karkara, R. (2006) Child Rights Perspective in Response to Natural Disasters in South Asia : A Retrospective Study, Save the Children Sweden
- Noor, Djauhari. (2011). *Geologi Lingkungan*. Graha Ilmu. Yogyakarta.
- Ronan, K., and D. Johnston. (2005). Promoting community resilience in disasters: The role for schools, youth, and families. New York: Springer.
- Sanjaya, W. (2013). *Strategi Pembelajaran: Berorientasi Standar Proses Pendidikan*. Kencana Prenadamedia Group. Jakarta.
- Slavin, R.E. (2010). *Cooperative Learning (Teori, Riset dan Praktek)*, Penerbit Nusa Media, Bandung.
- Suhardjo, D. (2011). *Arti Penting Pendidikan Mitigasi Bencana Dalam Mengurangi Resiko Bencana*. Cakrawala Pendidikan, Juni, Th. XXX, 2.
- UNICEF. (2012). *UNICEF and Child-Centred Disaster Risk Reduction*. Available on: <http://www.unicef.org/emergencies.com/downloads/eresource/docs/DRR/Child-centred%20DRR.pdf>
- United Nations Centre for Regional Development. (2009). *Mengurangi Kerentanan Anak-anak Sekolah terhadap Bahaya Gempa Bumi*. Proyek Inisiatif Keselamatan Sekolah Terhadap Gempa Bumi (SESI). UNCRD.
- Widia, E.P. (2017) Penerapan Metode Bercerita Untuk Mengembangkan Nilai-nilai Agama Dan Moral Anak Usia Dini Di TK Dwi Pertiwi Sukarame Bandar Lampung, Skripsi: Fakultas Tarbiyah Dan Keguruan Institut Agama Islam Negeri Raden Intan Lampung
- Zakari, H.M, Ma, M., Simmons, D., (2014). *A Review of Serious Games for Children with Autism Spectrum Disorders (ASD)*. In M. Ma, Oliveira M.F. e Baalsrud Hauge J. (Eds.), SGDA. Springer, Heidelberg, vol. 8778, pp. 93-106.