PREDICTORS OF RESILIENCE IN CHILDREN AFTER EXPOSE TO FLOODING IN INDONESIA

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ABSTRACT:

Background: Flooding is one of many natural disasters that influence children's development. The declining of academic performance is recognized as a sign of potential risk of developmental disorders of children. Consequently, some supports are required by children to enhance their ability to face difficulties. This study aimed to investigate the relationship between contextual factors (family support, peer support, community support, school support and culture) and resilience in elementary school-aged children exposed to flooding in Indonesia.

Methods: A cross-sectional design was employed. The final participants were 162 children ages 9–12 years old from grade 3rd to 6th and were exposed to flooding in UndarAndir Village, Serang District, Indonesia in 2013. The instruments were self-administered questionnaires. The Connor-Davidson Resilience Scale- 10, Multidimensional Scale of Perceived Social Support, The After-School Environment Scale and The Cultural Competence Self-Assessment Tool were utilized in this study based upon the validity and reliability test. Mean, standard deviation, Pearson correlation and multiple regression were employed for data analysis.

Results: The study showed that there were significant correlated between family support (r = .388, $p < .01$), peer support (r = .445, $p < .01$), community support (r = .350, $p < .01$) and culture (r = .255, $p < .01$) and resilience of children who exposed to flooding. In contrast, school support was not significantly correlated with resilience. Final statistical analysis with multiple regression showed that in contextual factors, family support (Beta= .291, p<.01), peer support (Beta= .260, p< .01), and culture (Beta= .239, $p < .01$) were recognized as predictors of resilience of children exposed to flooding.

Conclusion: Family support, peer support, community support and culture were significantly predicting the level of resilience in elementary school-aged children who were exposed to floods. Therefore, establishing a nursing intervention program based on local cultural approach is required. The program can be formed to build up the relationships between children and family as well as their friends.

Keywords: Resilience in school children, Flooding, Indonesia

INTRODUCTION

For the last few decades, the study of resilience in children has been increasing [1], and one of the reasons is the escalating of natural disaster events [2]. As Indonesia is one of many countries which have high flooding events [3], children have to have capacity to overcome the adverse psychological problems because of flooding. One of their ability is

called resilience that defined as the

"capacity of individuals, their families and their communities to negotiate culturally meaningful ways to share resources" [4, p.3]

Flooding has been identified as a risk factor because it leads children into the crisis situation which directly impact to child development [5]. Therefore, children need the resilience to deal with challenging situations caused by flood events.

Children are recognized as a vulnerable group [1]

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especially in terms of disasters due to physical, emotional and behavioral development, and either partial or complete dependence on adults [5]. Regarding the flooding in Indonesia, the National Disaster Management Agency of Indonesia (BNPB) claimed that flooding is taking part of 38% of disasters events, and Banten province has one of high numbers of flooding events since for the last 10 years. One of the worst flooding events happened in the beginning of 2013 which was caused plenty of water within the river-side area, and then it resulted a flooding that hit Undar Andir, Serang District. This flooding identified as a major flooding by BNPB due to swamped over 669 houses with wave height up to 3 meters. This incidence caused 3,954 people including children to be evacuated to emergency camp for more than one week [3]. According to previous study, children who are experiencing evacuation and separation from family usually ended up with psychological trauma, such as stress and anxiety or even Pots Traumatic Stress Disorder (PTSD). These psychological problems affect to children's development especially in their academic performance [6, 7].

The study of resilience in Indonesia regarding the effect of flooding to children is still limited [5]. However, it can be drawn from previous study that the compensation of adversities including flooding is eventually affected to the academic performance of children. The falling of Grade Point Average (GPA), can lead to psychological problems as a result [8]. Children who encountered major adversity are responding in many ways to resilience including, be able to be well-functioning, fall apart and stop functioning for a while, and then recovery toward to the previous state [8]. There are protective factors which are required for children to become resilient. Several protective factors are obtained from the environmental context.

Resilience model by Kumpfer [9] has proven that children need supports from the contextual factors such as family, peer or friend and community support. If these supports are available either from family or peer or community, this would make children feel comfort and loved thereby reducing their anxieties even under such stressful situation [10]. Another two contextual factors are school and culture. Recognizing of own culture is important of gaining confidence which helps children to overcome the adversity [11, 12]. Furthermore, school is a place where children interact with friends and teachers, so it can plays as an important factor for children to achieve their resilience [13]. Although all of these factors are by no mean found

to be specifically amongst children exposed to the flood incidents, but these factors are considered as external protective factors for children to overcome the circumstances.

The best way to understand how floods affect resilience of children is by assessing their perspective because children are best sources to be able to express their thinking [5]. Moreover, Manning in her research said that children aged nine years old or above are able to reflect the perception of happening incident during their life [14]. One study revealed that children who were involved within the environmental context presented a greater resilience than the contrary [5]. However, the study of resilience is rarely applied to children who are exposed to major floods in Indonesia, and therefore the current study aimed to explore factors associated with resilience in children who were exposed to major floods.

METHODS AND MATERIALS

Design
This is a cross-sectional study.

Sample
The total number of children who exposed to flood in Undar Andir, Serang was 389 in 2013. The sample size was estimated using a confidence interval of 95%, an acceptance error of 2%, and a proportion of having resilience is 0.114 [15]. The entire participants in this study were 186 children who were chosen from two elementary schools in most affected area of flooding. The inclusion criteria of participants were children who (1) aged 9-12 years old, (2) experienced flooding event and evacuation, (3) their homes were covered by floods, (4) got permission from parents or guardian, (5) were able to understand and fill out the questionnaire, and (6) agreed to participate.

Data collection
This study had been approved the ethical approval by Borromarajonani College of Nursing Nopparat Vajira Review Board. By the agreement of parent or guardian, consent and assent formed was obtained from parents and children. Beforehand, the information sheets were given for two days prior to the data collection. Data collection process start with obtaining the permission from the Head of both schools, so data was collected inside the class room at both schools (elementary schools; Undar Andir 1 and Undar Andir 2) on July 10th, 2014. Participants were selected by using simple random method based on proportion in each school. To avoid the discrimination, children who were selected as

participants, but failure to return the parent permission form, were still given the questionnaires. However, those participants were highlighted as exemption questionnaires. In data collection process, the total participants were divided into 13 small groups randomly. These groups were organized by the researcher and assistant researchers who are well-informed regarding the data collection process. The data collection was finished in 70 minutes. However, in the middle of session, participants were given 10 minutes break and some refreshments. Questionnaires were completely checked by the researchers. The questionnaires were kept in sealed envelopes. A token of appreciation was given to participants at the completion of the questionnaires. About 162 questionnaires of participants were performed in statistical analyses, and 24 questionnaires were destroyed with various reasons such as missing items and did not have permission from parents or guardians.

Materials

Resilience

Connor-Davidson Resilience Scale 10 (CD-RISC 10) was used to measure resilience. This questionnaire has been widely used in Indonesia including for populations who were exposed to natural disasters [11, 12]. This questionnaire consists of 10 items with the answer choice are; "not true at all" (score 0), "rarely true" (score 1), "sometimes true" (score 2), "often true" (score 3), and "true nearly all the time" (score 4). The total score of CD-RISC is 40. Reliability of CD-RISC scale 10 was satisfactory with the Cronbach's alpha 0.87 [16].

Family support, peer support and community support

Multidimensional Scale of Perceived Social Support (MSPSS) was used to measure three variables including, family, peer and community support. The total number of question was 12 and divided into subscales of family support (no 3, 4, 8, and 11), peer support (no 6, 7, 9, and 12) and community support (no 1, 2, 5, and 10). The total score of MSPSS of each item is 28 with the answer choices in each item; "1" if very strongly disagree, "2" if strongly disagree, "3" if mildly disagree, "4" if neutral, "5" if mildly agree, "6" if strongly agree, "7" if very strongly agree. The reliability of the questionnaire was satisfactory with Cronbach alpha 0.91 of total scale. For the Family, Peer and Community support subscales, the Cronbach alpha 0.90, 0.94, and 0.95, respectively [17].

School support

The After-School Environment Scale (ASES) was used to measure school support. The total

number of questions was 19 with 76 of the total score. The answer choices in each item are; Never = 1, Sometimes = 2, Most of the Time = 3, Always = 4. Question with (-) indicates that the question is scored inversely. This means that a score of 4 becomes 1, a score of 3 becomes 2, a score of 2 becomes 3, and a score of 1 becomes 4. The reliability was satisfactory with 0.95 [18]

Culture

Cultural Competence Self-Assessment Tool 7 scale (CCSAT-7) was used to measure culture. This questionnaire is intended to identify cultural competence. The total number of questions was 18. The total score all questions is 72 with answer choices of; "1" not at all, "2" barely, "3" fairly well, "4" very well, Except, question no 5 with answer choices; "1" none, "2" a few, "3" some, "4" many. The reliability of CCSAT-7 was satisfactory with the Cronbach's alpha 0.80 [19].

Ethical approval

This study was approved by Ethics Review Board Committee for Research Involving Human Research Subjects, Borommarajonani College of Nursing Nopparat Vajira (ERB of BCNNV No. 41/2014). Participant information sheet (PIS), informed consent and assent forms have been provided for all participants in this study. This study considered the anonymity and confidentiality of personal data of participants. All information was de-identified by assigning a unique code number for this study. The data security was maintained by using computer password protection. Research files were kept in a locked file cabinet in a restricted area accessible only by authorized personnel. The researchers gave freedom to the potential respondents to participate. Participants who met the inclusion criteria and were willing to take part in the study were asked to sign the consent form. The participants could withdraw from the study at any time without any negative consequences.

With concern to the possible harm and discrimination of participants, this study has possible suggested solutions of any potential problems. Therefore, there was neither harm nor discomfort produced by the data collection process.

Data analysis

The statistical analysis was conducted using SPSS software version 15.0 (Kasetsart University, Thailand). Means and standard deviations were calculated for analysis of resilience and other factors of children. Pearson correlation coefficients were computed to define the relationships between resilience and peer support, family support and

Table 1 Level of resilience (*n* = 162)

Personal characteristics	Number	%
Gender		
Male	76	46.9
Female	86	53.1
Age (years)		
9	36	22.2
10	40	24.7
11	36	22.2
12	50	30.9
Illness		
Experiencing of illness	58	35.8
Not experiencing of illness	104	64.2

Table 2 Level of resilience and other factors (*n* = 162)

Variables	Frequency	%
Resilience		
Low	27	16.7
Moderate	106	65.4
High	29	17.9
Mean 24.36 SD 5.14 Min 11 Max 39		
Family support		
Low	25	15.4
Moderate	120	74.1
High	17	10.5
Mean 20.41, SD 4.17, Min 9, Max 27		
Peer support		
Low	32	19.8
Moderate	100	61.7
High	30	18.5
Mean 20.41, SD 4.17, Min 9, Max 27		
Community support		
Low	25	15.4
Moderate	118	72.8
High	19	11.8
Mean 22.15, SD 3.57, Min 10, Max 28		
School support		
Low	34	21
Moderate	108	66.7
High	20	12.3
Mean 60.97 , SD 7.64 , Min 40 , Max 72		
Culture		
Minimal cultural awareness	72	44.4
Knowledgeable of diversity	78	48.2
Culturally competent	12	7.4
Mean 37.93 , SD 10.17, Min 22, Max 64		

community support, school support and culture. Furthermore, multiple regression was used to investigate the factors that can predict resilience of children.

RESULTS

This study investigated the relationships between resilience and contextual factors (family support, peer support, community support, school support and culture). Data was collected from July 7 to 10, 2014. The results of the study are present in the next sections.

Level of resilience and other variables

Table 1 showed that 162 of participants, the majority 53.1% were female. The largest number of participants or around 30.9% was 12 years of age. Regarding illness, participants who experienced illnesses were 35.8%.

According to Table 2, the results showed that majority (65.4%) of children were moderate resilience with the range score of 11-39 (total

Table 3 Coefficients correlation between age, gender, illness, family support, peer support, community support, school support and culture and resilience (*n* = 162)

Variables	1	2	3	4	5	6	7	8	9
Age [a]	-	.023	-.224**	.163*	.228**	.094	.228**	-.075	.129
Gender [b]		-	-.212**	.039	-.155*	.017	-.175*	.131	.098
Illness [b]			-	-.014	-.034	.079	.199*	-.201*	-.035
Peer support [a]				-	.316**	.565**	.089	.100	.445**
Family support [a]					-	.233**	.177*	-.057	.388**
Community support [a]						-	.139	.054	.350**
School support [a]							-	-.209**	.071
Culture [a]								-	.255**
Resilience									-

[a] pearson's coefficient correlation, [b] point biserial
** Correlation is significant at the .01 level (2-tailed)
* Correlation is significant at the .05 level (2-tailed)

Table 4 Predictors of resilience (*n* = 162).

Predictor of resilience	Coefficient ß	Std. Error	Std. Beta	t
Peer support	.321*	.101	.260	3.186
Culture	.121*	.033	.239	3.631
Family support	.010*	.002	.291	4.203
Community support	.004	.003	.122	1.542

R^2 .332, Adjusted R^2.315, F=19.538,
P-value < .01

score = 40), mean of 24.36 and SD = 5.14. In the difficult time related flood event, many of children received high level family support (mean = 23.01, SD = 3.53), high level of peer support (mean = 20.41, SD = 4.17), high level of community support (mean = 22.15, SD = 3.57), and high level of school support (mean = 60.97, SD = 7.64). In terms of culture, many of children showed knowledgeable of diversity (mean = 37.93, SD = 10.17).

Correlation between resilience and independent variables

Table 3, The result of correlation statistic showed that family support (r = .388, *p* < .01), peer support (r = .445, *p* < .01), community support (r = .350, *p* < .01) and culture (r = .255, *p* < .01) were statistically associated with resilience. However, age, gender, illness and school support were not significantly associated with resilience.

According to the results from multiple regression analysis showed in Table 4, all resilience factors produced R^2 = .332, adjusted R^2 = .315, F= 19.538 and *p* < .01. The results also revealed that three factors including, family support (Beta= .291, *p* < .01), peer support (Beta= .260, *p* < .01), and culture (Beta= .239, *p* < .01) were identified as predictor factors significantly affecting resilience. Judging from Beta standardize, family support was the most powerful impact to resilience. Regarding to this finding, if children receive support from family

1 level, so their resilience will increase about .291 when others variables were controlled. In this study, all variables in this model could explain 31.5% of the variation in resilience of children who were exposed to major flood.

DISCUSSION

Level of resilience

According to this finding, resilience in children who were exposed to floods was at a moderate level. It is remarkable that after flooding event has passed for one and a half years to the data collection, many children did not achieve well resilience. This is in line with the report of the schools revealed that many children showed a declining of academic performance. This finding indicated that in a challenging situation, children require resources to force them to become resilient. However, if the resources are not available, so resilience is not easy to achieve [20]. Resources and supports that children required to become resilient play as protective factors against adversities.

Relationship between resilience and family support, peer support, community support, school support and culture

According to findings, contextual factors including family support, peer support, community support and culture reported significantly correlated with resilience. It can be identified that the support

from environmental context was significant to enhance the level of resilience in children who were exposed to floods. In addition, this study supports the previous findings that the more children get support from social environments, the better resilient they are [21]. It means that in spite of adversity, the vulnerability of children would be reduced by support from family, peer and community.

Family support was found to be significantly correlated with resilience in this study. Regarding to the current population, many children are living with their families. This can be enabling children to receive support from family, especially in an adversity situation. In line with previous studies, support from family is identified as a resource for resiliency of children who live in high risk environment [22]. Another study mentioned family is considered as the protector factor for children in conditions of hardship [23].

Peer groups were mentioned as another factor that correlated with resilience in children who exposed to floods. According to the finding of this study, support from peers was positively related to the children's resilience. Consistent with previous studies found children who have positive relationships with peer are easy to overcome condition of hardship [21].

Community support has also been identified as significantly correlated with resilience in this study. This study found that among questions in the community support dimension, the items which has the highest score was when children had someone who was available in the difficult time. Similarly, a previous study revealed that resilience will appear if children feel comforted by support from environmental society when time of negative circumstances [10].

Moreover, the local culture of children cannot be ignored as it is significantly associated with resilience. This study reported that children who were greater culturally competent in their communities showed higher resilience. This is consistent with the previous study that found children who were culturally competent were able to maintain their ability to become resilient [12]. In this study, recognizing Bantenese culture could increase children's ability to become resilient. Therefore, this is supports the previous finding mentioned, that local culture is influencing the resilience level of people who have experienced a disaster [11, 24].

Predictor factors of resilience

In multiple regression with enters method,

family support, peer support and culture accepted as predictors of resilience in children who exposed to major flood. Current study recognizes that support from contextual factors including, family support, peer support and culture were important factors to determine the level of resilience. In addition, current study is relevant with previous finding mentioned that the more children get supportive from others, the better resilient they are [21]. It means that the helplessness of children in spite of adversity would be decreased by supportive from family and peer. Furthermore, this study reported that children who have better understanding of their cultural context showed a higher resilient. In this study, culture recognized as the resources to increase children's ability to become resilient. Therefore, this is supports the previous findings mentioned that the local culture is influencing the resilience level of people who experienced the disaster [11, 4].

Many of children stay closer to their family. Therefore, family support was remarked as the most influencing variable significantly predicting the resilience of children who experienced the major floods. It is important to find family's supports to the children's resilience. As revealed in previous study, children have limited ability and they are dependent to adult or family from potential risk [25]. Therefore, support from family is required as a protective factor to reinforce children's capability to become resilient and to overcome the potential risks related to flood incident. Another variable identified as predictor of resilience is peer support which was significantly associated influencing to resilience. This result supports prior study revealed that children who have a positive relationship with peer are easy to overcome the hardship situation [21]. Fascinatingly, understanding of local culture cannot be ignored as the significantly variable affecting the resilience. Children who were knowledgeable of their culture are having power to be confident in building a decision management in emergency situation. This is steady with earlier study found that children who were culturally competent are able to maintain their ability to act positively and become resilient [12].

CONCLUSION

This study aimed to identify the predictor factors of resilience in elementary school-aged children who were exposed to flooding. There were statistically significant relationships between resilience and family support, peer support, community support and culture. From all of these related factors, multiple regression revealed that family support played as the most predicting factor

for children to become resilient. These results showed that resilience in young people who were exposed to a significant exposure by flooding is influenced by certain factors that can promote its resilience.

LIMITATION

There were some limitations of this study. First, data was collected at school, so it could be possibly obtained the neutrality of children regarding school support. Second, there were many different concepts and perceptions of resilience as widely. However, this research focuses on resilience in young people. Therefore, resilience model by Karol Kumpfer was used in this study.

RECOMENDATION

As result of this research, resilience is a broad concept, so further study in nursing field regarding resilience is needed. Regarding the finding of this study, recognizing culture as one of predictor factor of resilience, building the relationships social supports such as, family and peer groups would be valuable for the increasing the level of resilience. With this, the potential risk of children who were declining in academic performance will be reduced. Therefore, the setup of nursing intervention regarding the promotion of resilience can help nurture the development of children appropriately.

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