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Original Article

Detection of childhood developmental disorders, behavioral disorders, and depression in a post-earthquake setting

Yogi Prawira,[1] Intan Tumbelaka,[1] Ali Alhadar,[1] Erwin Hendrata,[1] Renno Hidayat,[1] Dave Anderson,[1] Trevino Pakasi,[2] Bernie Endyarni,[1] Rini Sekartini[1]

Abstract

Background Disasters, including earthquakes, may strike abruptly without warning. Children may develop psychological damage resulting from experiencing an overwhelmingly traumatic event. They may feel very frightened during a disaster and demonstrate emotional and behavioral problems afterwards.

Objective To evaluate the presence of developmental disorders, behavioral disorders, and depression in children after the earthquake at Padang and Pariaman on September 30th, 2009.

Methods This was a cross-sectional study using the developmental prescreening questionnaire (KPSP), Pediatric Symptoms Checklist-17 (PSC-17), and Child Depression Inventory (CDI) in children after the Padang and Pariaman earthquake (September 30th, 2009), in Sungai Limau and Sungai Geringging District, Pariaman Region, West Sumatera. Our study was conducted October 15th to November 28th, 2009.

Results There were 172 children screened using the KPSP. Forty-two (25%) children scored 7-8 (reason for concern), 18 (10%) children scored <7 (suspected to have a developmental disorder), and the remainder scored as developmentally appropriate. Behavioral disorder screening was performed in 339 children using the PSC-17. Internalizing disorder alone was suspected in 58 (17%) children, externalizing disorder alone in 26 (7.7%), and attention-deficit disorder alone in 5 (1.5%). Eight (2.4%) children were suspected to have both internalizing and attention-deficit disorders, 4 (1.2%) children externalizing and attention-deficit disorders, 22 (6.5%) children internalizing and externalizing disorders, and 15 (4.4%) children all three disorders. From 49 children who underwent depression screening using CDI, 15 (30.6%) children were suspected to have depression.

Conclusion After the Padang and Pariaman earthquake, we found 10% of subjects screened were suspected of having a developmental disorder. The most common behavioral disorder found was internalizing disorder. Possible depression was found in 30.6% of children surveyed. Traumatized children are at risk for developing post traumatic stress disorder. **[Paediatr Indones. 2011;51:133-7]**.

Keywords: *earthquake, children, developmental disorder, behavioral disorder, depression*

In recent years, disasters have struck Indonesia without warning. Among these was the catastrophic Padang-Pariaman earthquake on September 30th 2009 with a magnitude of 7.6 on the Richter scale. Local victims were devastated, but the most vulnerable were children. They lost their parents, siblings, friends, houses, schools and playgrounds. They experienced an overwhelmingly traumatic event, which will impact their future lives.

From the Department of Child Health, University of Indonesia Medical School, Cipto Mangunkusumo Hospital, Jakarta, Indonesia.[1] From the Department of Public Health, University of Indonesia Medical School, Jakarta, Indonesia.[2]

Reprint requests to: Yogi Prawira, Department of Child Health, University of Indonesia Medical School, Jalan Salemba 6, Jakarta 10430, Indonesia. Tel. +62-21-3919016, E-mail: *dr_yogiprawira@yahoo.com*

Traumatic events are known to cause emotional and behavioral disorders in children.[1] Previous studies have reported symptoms of depression, anxiety, and mental disorders in children who are victims of natural disasters.[1,2] Most survivors will eventually cope with the trauma, but 5-30% will experience post-traumatic stress disorder (PTSD).[3] Based on DSM-IV, there are three main criteria of PTSD: (1) reexperiencing, (2) avoidance, and (3) arousal.[4] Other signs and symptoms include feelings of guilt and self-blame, depression, anxiety, anger, sadness, chronic somatic problems, destructive behavior, and personality change. Each child is unique and responds differently depending on temperament, age, home environment, and family.[5] Children aged <11 years who experience traumatic events have a three times greater potential of developing serious emotional and behavioral disorders compared to older children.[6]

It is acceptable for a child to show a mental-emotional reaction and behavioral disorder after traumatic events.[5] Several common problems may be observed, such as behavioral changes (attention deficit disorder in school-aged children, temper tantrums in pre-school children), declining academic performance (low achievement, absenteeism), somatic complaints (headaches, stomachaches), negative behavior and emotions, repeated questioning about the events, regressive behavior (nocturia), and many others.[6,7] Mental- emotional responses are considered severe and in need of attention if they impair the child's daily activity (e.g., attending school, playing, relationships with others), and more so if the responses are prolonged. In these delicate situations, professional help will be needed.[5]

The aim of this study was to identify developmental disorders, behavioral disorders, and depression in the child victims of the Padang-Pariaman earthquake.

Methods

This was a cross-sectional study from October 15th to November 28th, 2009 using the developmental prescreening questionnaire (KPSP), Pediatric Symptoms Checklist-17 (PSC-17), and Child Depression Inventory (CDI) in children who experienced the Padang and Pariaman earthquake (September 30th, 2009), in Sungai Limau and Sungai Geringging District, Pariaman Region, West Sumatera. This study was performed by the Department of Child Health residents, who joined the Medical Team of Faculty of Medicine, University of Indonesia.

We included all children who attended school in Sungai Limau and Sungai Geringging District, Pariaman Region, West Sumatra on the selected date and exculuded those who was unable to completed the questionnaire. Informed consent was obtained from each participant or their teachers.

Results

We screened 172 children for developmental status using the KPSP questionnaire. Forty-two (25%) children scored 7-8 (reason for concern), 18 (10%) children scored <7 (suspected to have a developmental disorder), and the remainder were developmentally appropriate. **(Figure 1)**

Behavioral disorder screening was performed in 339 children using the PSC-17. Internalizing disorder alone was suspected in 58 (17.1%) children, externalizing disorder alone in 26 (7.7%), and attention deficit disorder alone in 5 (1.5%). Eight (2.4%) children were suspected to have both internalizing and attention-deficit disorders, 4 (1.2%) with externalizing and attention-deficit disorders, 22

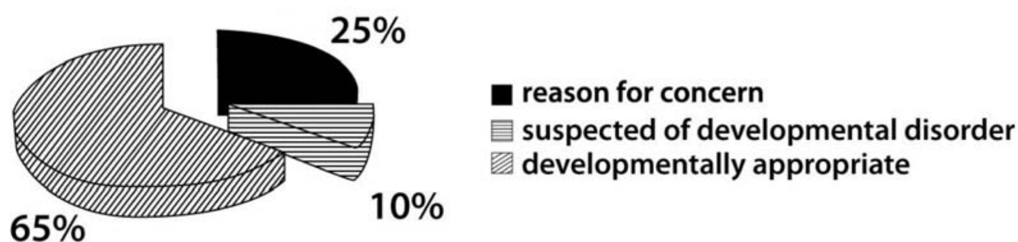

Figure 1. Distribution of KPSP results

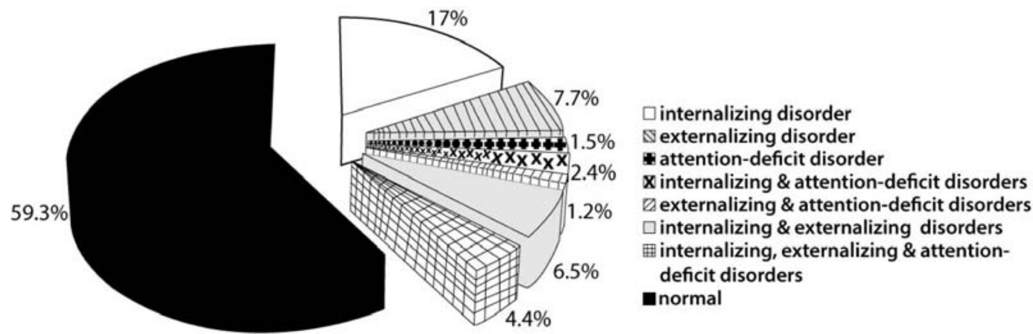

Figure 2. Distribution of PSC-17 results

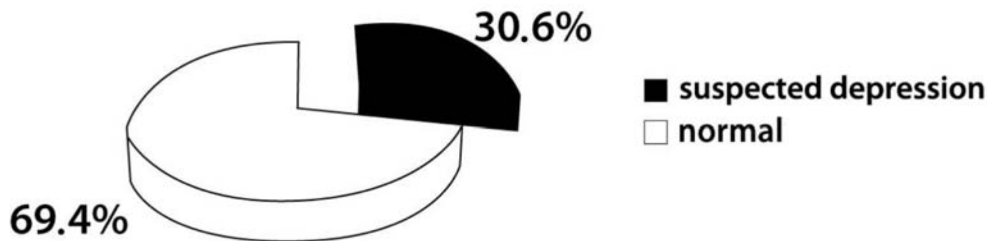

Figure 3. Distribution of CDI results

(6.5%) with internalizing and externalizing disorders, and 15 (4.4%) children with all three disorders. **(Figure 2)**

From 49 children who underwent depression screening using CDI, 15 (30.6%) children were suspected to have depression.

Discussion

Trauma is defined as shock due to extreme experiences or direct exposure to an event which is frightening and/or life-threatening.[8,9] Trauma may be physical and/or mental. Physical trauma includes the body's response to severe injury, while mental trauma includes frightening, terrifying and devastating experiences.[10] Natural disasters may be a type of traumatic experience with great medical, non-medical, and mental impact in children and adolescents. Traumatic events in children require special care and management by professionals due to the possibility of lifelong effects on children's mental health.[5,8]

Depending on the duration of exposure, trauma may classified as acute and chronic. The longer the duration, the greater the impact and the more difficult it is to treat.[8] Children, unlike adults, have their own unique needs and are more vulnerable. Those in the child's environment must understand the child's needs and try to provide for them. Children with post-traumatic stress not only require fulfillment of physical needs, but also mental needs in order to regain a normal and high quality of life.

People may face traumatic events all the time, but most will only have temporary mental distress, unlike the 10-20% who develop severe mental disorders, such as post- traumatic stress disorder (PTSD), depression, and anxiety. This minority group will need professional help, such as from psychiatrists.[3,11]

Reactions to traumatic experiences are divided into 4 phases: (1) acute stress disorder, (2) acute post-traumatic stress disorder, (3) chronic post-traumatic disorder, and (4) delayed onset post-traumatic stress disorder.[2] Reactions to trauma reflect impairment in physical, cognitive, affective, moral, sexual, and interpersonal aspects of life.[2] Children also react differently according to their age.[12]

This study used three screening tools: (1) developmental prescreening questionnaire (KPSP), (2) pediatric symptoms checklist (PSC-17), and (3) child depression inventory (CDI). KPSP is a

prescreening tool designed to detect developmental disorders in children. The schedule for routine KPSP screening is at 3, 6, 9, 12, 15, 18, 21, 24, 30, 36, 42, 48, 54, 60, 66, and 72 months of age. This screening may be performed by healthcare professionals, kindergarten teachers, and other trained staff.[13] The pediatric symptoms checklist (PSC) is a screening tool for behavioral disorders in children 4-16 years of age, with 68% specificity and 95% sensitivity. The PSC-17 consists of 17 questions, five of which detect disorders of internalization, seven detect disorders of externalization, and the remaining five detect attention disorders. Child Depression Inventory (CDI) is a self-report scale consisting of 27 points to evaluate symptoms of depression, commonly used for children aged 7 to 17 years. This evaluation consists of assessments for negative mood, interpersonal problems, ineffectiveness, anhedonia, and negative self-esteem.

Using the KPSP assessment, we found 42 children (25%) with "reason for concern" score and 18 children (10%) with suspected developmental disorders. The KPSP is not a commonly used screening tool in the population of children following disasters. As such we could not find comparable studies in the literature. Behavioral screening using PSC-17 identified 58 children (17.1%) with internalization disorders alone, 26 children (7.7%) with externalization disorders alone, and 5 children (1.5%) with attention-deficit disorders alone. In addition, there were 8 children (2.4%) suspected of having internalization and attention-deficit disorders, 4 children (1.2%) with externalization and attention-deficit disorders, and 22 children (6.5%) with internalization and externalization disorders. Fifteen children (4.4%) were suspected to have experienced all three disorders.

Our results differ from the study by Bradburn, who used PTSD symptomatology to detect emotional and behavioral problems in children who experienced an earthquake. They found 27% of children had moderate PTSD and 36% of children had mild PTSD.[2] This finding was similar to a study in 179 American children, which found suspected PTSD in 37% of the study population.[14,15] In addition, from 49 children, we found 15 (30.6%) suspected to have depression based on the CDI questionnaire. Similarly, Ronan[16] found 25.4% of 118 children who had experienced a volcanic explosion, were suspected to be depressed based on the CDI questionnaire. In addition, a controlled study in an adolescent population after a massive fire in the Netherlands showed a significant increase in problems related to drug abuse, smoking, and use of narcotics in those exposed to the disaster.[17]

Our data shows a relatively high rate of developmental disorders, behavioral disorders, and suspected depression in the Padang-Pariaman population of children after the September 2009 earthquake. A cause-effect relationship between the earthquake and the disorders in these children could not be established, since there was no baseline information on developmental, behavioral, and depression states in these children before the earthquake occurred. This lack of baseline data is a limitation of this study.

Children and adolescents experiencing post-traumatic stress should be provided with a comprehensive and multimodal approach. The 6 main components of intervention to this patient group can be safety, self-regulation, self-reflective information processing, integration of traumatic experience, relational engagement, and positive affect enhancement.[18]

Based on our study results, the Department of Child Health FKUI-RSCM established a working program, aiming to improve the knowledge, attitude, and behavior of healthcare professionals in revitalizing the child health service at Puskesmas Sungai Limau-Pariaman area. This program was performed in an integrative and holistic manner, covering promotive, preventive, curative, and rehabilitative healthcare programs. Planned activities included: (1) education on newborn care, kangaroo mother care training, lactation management training, provision of complementary feeding to breastmilk, immunizations for infants and children, (2) trainings for stimulation, early detection, and intervention for abnormal child growth and development, including methods of stimulation for infants and toddlers, weight and height measurements, health status assignment, head circumference measurement, detection of child development using KPSP, detection of mental and emotional problems, detection of behavioral disorders (autism, ADHD), screening for visual disturbances (letter E), and methods for developmental disorder intervention.

After the Padang-Pariaman earthquake, 10% of children were suspected to have developmental disorders using KPSP. Using PSC-17 for assessment, the most common behavioral disorder category was internalization disorder alone. Depression was also suspected in 30.6% of children using CDI. Post-disaster child victims have the potential of developing post-traumatic disorders. Early detection and counseling are vital for these children in order to help them move on with their lives. In addition, there is a need for further studies to evaluate development in child victims of disasters. Awareness of possible post-traumatic disorders in children should be increased both through further evaluation and practical instructions.

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