Stress reactions in school-aged children after the great Hanshin-Awaji earthquake.
Fumio Yamada
In M. Sato, H. Tokura, S. Watanuki (Eds.), *Recent Advances in Physiological Anthropology*,1999, Chapter29, 211-216.

Chapter 29

Stress Reactions in School-Aged Children after the Great Hanshin-Awaji Earthquake

Fumio Yamada

Laboratory of Psychology, Osaka Prefectural College of Nursing, 3–7–30 Habikino, Habikino, Osaka 583–8555, Japan

Abstract

The purpose of this report is to review our research on school aged children's stress reactions after the Great Hanshin-Awaji earthquake and to suggest some guidelines for a manual of mental health care.

Know Yourself Questionnaire, the tool for assessing children's stress reactions after disaster (PTSD/ASD), was performed on 1,490 elementary school pupils and junior high school students in Nishinomiya City, 2 months, 6 months, and 1 year after the earthquake as a health education program, especially a stress management education after disaster. The mean scores of three stress reactions were significantly higher in high risk children; their houses were destroyed or severely damaged, any family members were injured, and they had very traumatic experiences. Anxiety, Depression, and Humanity scores were significantly higher in females than in males across all age groups, but the Distraction scores were higher in males at the first survey. These fundamental results continued until a year after the disaster, although each stress score significantly decreased within initial 6 months. Our mental health activities in these schools, debriefing to the school teachers, consultations to each child through school teachers, and special support for school nurses, were based on the results of this survey.

Results showed that special mental care, educational consideration, and accurate social support would be needed for females, younger, and severely affected children.

Key words: children's stress reactions, earthquake, disaster, PTSD, ASD, mental health care

Introduction

As all known, more than 5,500 people died and more than 40,000 people injured by the Great Hanshin-Awaji Earthquake occurred in the early morning on January 17, 1995. Just after the earthquake, about 300,000 people took refuge in public schools and community centers. Everyday life of the school aged children had been unusual and stressful for long days, at most for six months, because more than 30,000 children had to evacuate into various areas in Japan and almost all of gymnasium, classrooms, and playground of their school were used as temporary shelters for people whose houses had been destroyed by the earthquake.

Our mental health care group for school aged children named Working Group of Children's Stress had taken a special care for two primary and one junior high schools in Nishinomiya City since February 5 in 1995. At that time, over more than 10% of pupils did not attend school and there were around 500 victims and about 100 volunteers in these

schools. Teachers were very busy because they had to manage victims and volunteers in addition to the normal school activity. In such a situation, we decided that our mental health care should not to be done to children directly but should be done through their school teachers as an educational care. So our intervention consisted of (1) special consultation to school teachers, (2) facilitating their debriefing, (3) presentation of information about children's stress reactions after disaster, (4) teaching about stress management techniques, (5) medical or nursing care in the school health center, and (6) referring children to the hospital.

In this special intervention into public schools just after the disaster, our academic concern was to understand the children's stress reactions as a result of the earthquake disaster. Because understanding the present condition of children would give us of suitable solution or valid care method. To realize this purpose, we established the questionnaire which can evaluate the children's symptoms of post-traumatic stress disorder (PTSD) at the early stage of our intervention. This questionnaire was named "Know Yourself Check List" (Hattori et al., 1995). The purpose of this report is to abstract the children's disaster stress reactions and their changes across time passage objectively. In this manner, mental health care program or care manual for earthquake stress could be established from the stand point of physiological anthropology.

Method

Subjects

Subjects were school aged children from two elementary schools (A and B) and one junior high school (C) in Nishinomiya City, aged from 6 to 15 years. Number of subjects at the first survey done on March was 1112 (613 boys and 499 girls) from elementary school and 378 (199 boys and 179 girls) from junior high school.

We assessed the stress reactions of children three times, 2 months, 6 months, and 1 year after the earthquake in the same manner, as a health education program, especially a stress management education after disaster.

Questionnaire

The questionnaire we used to evaluate children's stress reaction was 'Know Yourself Questionnaire'. This check list includes 23 (Ver.1.5; at the 1st survey) or 24 (Ver. 2.0 & 2.1; at the 2nd & 3rd surveys) illustrations as shown in Fig. 1 on A4 size hard sheet. These illustrations drown by professional illustrator Mr. Kohama, M., were picked up from the symptom lists included in some check lists for children's PTSD, i.e., CPTSD-RI (children's post-traumatic stress disorder reaction index) established by Pynoos et al. (1993), and from our clinical experience in these schools. Each illustration means the typical stress reactions or mental symptoms after the earthquake disaster.

Procedure

School teachers introduced how to check this questionnaire in their classroom as a health education program. Children responded to each question with 6-points scale. Children were instructed to look at each illustration and to choose whether they had the same symptom drawn in the given illustration or not. After that they must check one of six categories to show the degree of such symptom. The categories were labeled 'no-no-no', 'no-no', 'no', and 'yes', 'yes-yes', 'yes-yes-yes' as the degree of symptom increases. In statistical analysis and scoring process, an each category is given from 1 to 6 respectively.

Fig. 1. An example of illustration included in "Know Yourself Check List". This illustration shows the symptom of sleep disorder after disaster.

Results

1. Factor analyses

Factor analysis was done on the data matrix of the first survey to classify the items into small categories of stress reactions. As shown in Table 1, Varimax rotated factor loadings of 4 factors for each item based on principal component resolution, the result indicated that these items were classified into three stress reactions factors; 1) Anxiety, 2) Depression, and 3) Distraction, and additional 4) Humanity factors. Anxiety factor includes sleep disorder with nightmare (#8, #9), flashback (#10, #11), startle reaction (#20), anxiety for additional earthquake (#22), and so on. Depression factor include loss of sensation (#5), alienation or loneliness (#7), sense of crime (#12), melancholy (#14), and psychosomatic disease (#16). Distraction factor includes rage (#2), loss of motivation about learning (#6), dysfunction of memory (#13) and loss of decision (#17). After these results we established an easy scoring method to assess the degree of children's stress reaction for stress care for children.

2. Sex difference and age effect

Fig. 2 shows changes in mean scores of Anxiety, Depression, Distraction, and Humanity for boys and girls in elementary school children as a function of time course from the earthquake. The 2-way ANOVA as variables of Sex and Age (grade) were carried out on these data indicated that Anxiety, Depression, Humanity scores were significantly higher in females than in males across all age groups, but the Distraction scores were higher in males (not significantly) than in females at the first survey.

These fundamental results continued until 1 year after the disaster, although each stress score significantly decreased within initial 6 months.

3. High risk children

The mean scores of three stress reactions were significantly higher in high risk children;

Table 1. Varimax rotated factor loadings of 4 factors; Anxiety, Depression, Distraction, and Humanity

	Anxiety	Depression	Distraction	Humanity
Q22	0.70968	0.09084	0.13824	0.12329
Q20	0.67804	0.11302	0.20037	0.07414
Q10	0.67306	0.21991	0.21001	0.10492
Q21	0.51960	0.24645	0.31993	0.13161
Q11	0.51759	0.30765	0.01510	0.23077
Q1	0.48140	0.40250	0.17251	0.09338
Q9	0.46899	0.41105	0.01983	0.13924
Q8	0.33733	0.28975	0.33614	0.02684
Q19	−0.38170	−0.02135	0.16019	0.00441
Q3	0.18870	0.67537	0.10895	0.12261
Q7	0.22667	0.56335	0.18385	0.10580
Q5	0.05012	0.53857	0.20274	0.07518
Q14	0.11988	0.45243	0.21201	−0.03054
Q12	0.21532	0.34499	0.26364	0.15717
Q16	0.23422	0.33301	0.23941	0.11339
Q13	0.09676	0.27152	0.51923	0.06820
Q4	−0.06694	−0.07576	0.49858	0.07336
Q17	0.16735	0.26187	0.48890	0.02046
Q6	0.08874	0.19543	0.46870	−0.00243
Q2	0.04033	0.28600	0.46718	0.02599
Q15	0.18279	0.21325	0.29055	−0.02063
Q23	0.12686	0.12585	0.05625	0.83863
Q18	0.24070	0.08678	0.04962	0.31757

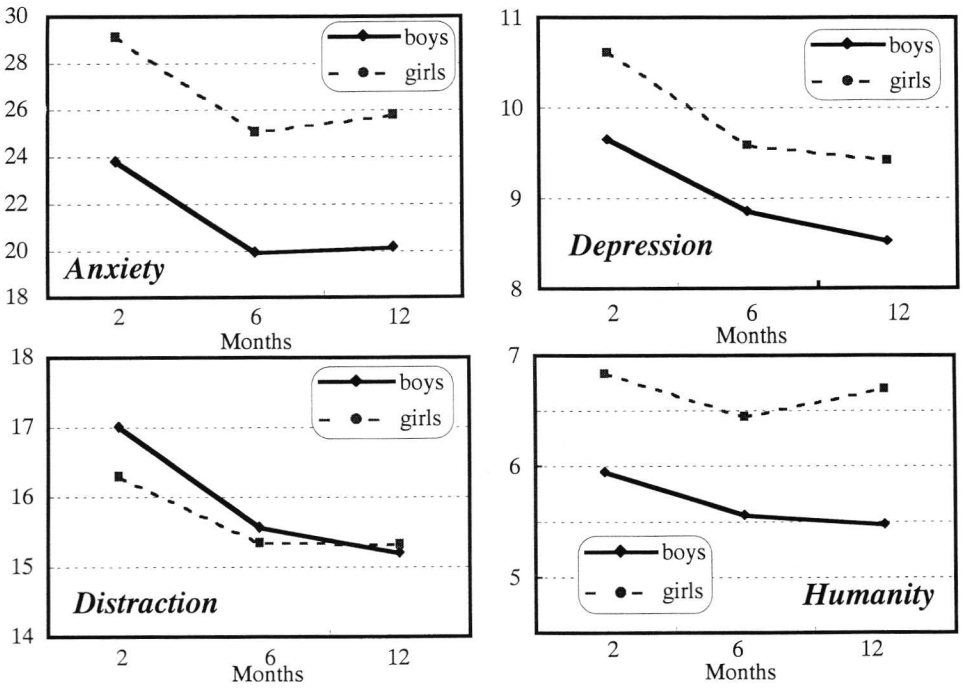

Fig. 2. Mean scores of Anxiety, Depression, Distraction, and Humanity in 2, 6, and 12 months after the earthquake. Number of subjects who responded three times is 566 for males and 492 for females.

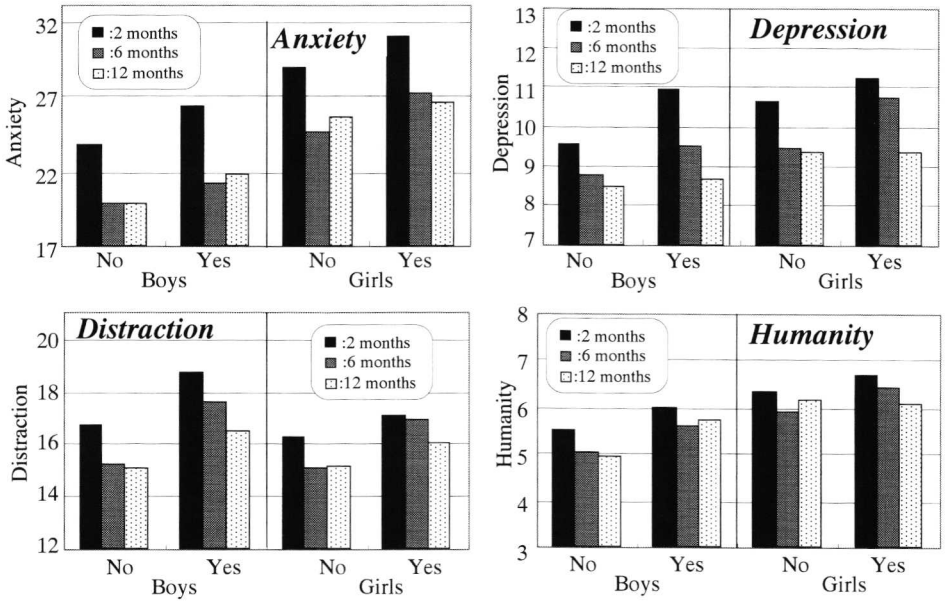

Fig. 3. Traumatic experience enhances children's stress reactions.

their houses were destroyed or severely damaged, any family members were injured, and they had very traumatic experiences as shown in Fig. 3.

Discussion

Our mental health activities in these schools, debriefing to the school teachers, consultations to each child through school teachers, and special support for school nurses, were based on the results of this survey, i.e., degree of stress reactions for each child. Results of this survey showed that special mental care, educational consideration, and accurate social support would be needed for females, younger, and severely affected children as soon as possible in such a big natural disaster.

Our concern was to make up a stress care manual for school children under earthquake from the stand point of our fundamental data as reported here. So, we made a guideline for the mental health care manual (Yamada, 1997). After these guideline, we established and published the Japanese version of stress care manual for elementary school children (SRG of JSPA, 1998). As many researchers noted, it is important to prepare any environmental conditions before earthquake. And it is also important for victims to receive an early mental health care not to be in PTSD. For high risky persons, i.e., younger children, handicapped, and aged victims, early care as soon as possible after earthquake. In our care manual, in order to prevent children's PTSD after earthquake, it is recommended to use a stress management education for children at any stages. It is noted that stress management education programs including relaxation training with concentration, imagery, autogenic training, muscle relaxation, and respiration training is recommended for children.

References

Pynoos, R.S., Goenjian, A., Tashjian, M., Karakashian, M., Manjikian, R., Manoukian, G., Steinberg, A.M., & Fairbanks, L.A. (1993) Post-traumatic stress reactions in children after the 1988 Armenian Earthquake, British Journal of Psychiatry, 163: 239–247

Hattori, S., Yamada, F., Saeki, K., Ohtani, A., Yamanaka, K., Ueno, A., Onishi, H., Shimai, S., Ono, T., Dodo, N., Takenaka, K., Watanabe, J., & Noda, T. (1995) Survey on children's posttraumatic stress reactions. Research-Aid Paper of the Yasuda Life Welfare Foundation, 31(2): 18–2 (In Japanese)

Yamada, F. (1997) Children's stress reactions to earthquake disaster: Guideline for the mental health care manual. Type A, 8(1): 29–34 (In Japanese with English abstract)

SRG of JSPA (1998) Stress Care Manual for elementary school children (Japanese Version), Stress Research Group of Japan Society of Physiological Anthropology, January