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**KALAMATA EARTHQUAKE, 1986: PSYCHOLOGICAL REACTIONS AND
ROLES FOR HEALTH CARE WORKERS**

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KALAMATA EARTHQUAKE 1986: PSYCHOLOGICAL REACTIONS
AND A LOOK AT HEALTH CARE WORKERS

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Purposes

1. To identify the psychological effect of disaster on health care workers
2. To determine the subjective impact on disaster victims, one month after the event
3. To conduct a cross-cultural comparison between disaster victims in Greece and disaster victims in U.S.A.
4. To compare the responses of health care disaster workers in Greece with responses of health care disaster workers in U.S.A.

Event

Kalamata, Greece (population 50,000) and the surrounding area was struck by an earthquake, measuring 6.2 on the Richter Scale, at 20:00 Saturday, 13 September 1986. A second earthquake, measuring 5.6 on the Richter Scale occurred at 14:30 on Monday 15 September 1986. Twenty-four deaths were contributed directly to the disaster. Seventy to ninety percent (reports varied) of the buildings were damaged or destroyed. A neighboring village, Eleohore, was completely destroyed.

Following the earthquake, the buildings were inspected for severity of damage. The damaged buildings were marked with red or green paint. The red paint indicated that the building was unsafe and damaged beyond repair. Green paint indicated the building could be repaired. Families whose homes had either a red or a green mark were prohibited by the government from using these properties and had to be relocated. Twelve thousand tents, provided by the Red Cross and the Army, sheltered the majority of the victims. Nine hundred people were housed on a private cruise ship, the Marianna "9", docked in Kalamata. Two hundred fifty people lived on a Naval training battleship, the Aris. The remaining victims, provided their own temporary housing, or found shelter in the surrounding villages.

Red Cross units, from Germany, Yugoslavia, and Sweden, sent large tents to be used for school classrooms. A later shipment from Sweden of 30 metal storage type buildings, was to be used where deemed most necessary--such as the Red Cross Headquarters' offices and clinics. The German Red Cross unit provided a generator, large refrigerator, and workers. They cooked and served 4,000 meals, two

times a day, for the disaster victims. The staff on the Aris and Marianna "9" provided meals and linen for the victims they housed.

Subjects

Interviews were conducted with 87 individuals who were victims of the earthquake. Of that total, 10 were physicians, 8 were registered nurses and the remaining 69 were student nurses. The Impact of Event Scale was administered to 83 subjects, some from the health-care provider group and others from the general disaster-struck population.

Instrument

Horowitz's (Horowitz, Wilner and Alvarez, 1979) Impact of Event Scale (IES) was used to assess the victim's response to the earthquake. It is a scale of 15 current subjective distress items, related to a specific event. The scale is divided into 2 subscales: intrusion (signs of cognitive and affective intrusion) and avoidance (blocking or suppression of thoughts and images). The IES has been found valuable in collecting longitudinal data as it can be tied to the same stressor over the entire span of data collection. It is self-administered, short, and easily understood and accepted by people of various cultures, educational and economic background.

The scores are determined by assigning a value of 0, 1, 3, and 5 to the frequency categories for each item and then summing the values for the specific subscales and scale total.

Reliabilites (Chronbach's alpha) for the intrusian subscale were 0.79 and, for the avoidance subscale, 0.82. Test-retest reliability was reported at 0.87 for the total stress scores, 0.89 for the intrusion subscale, and 0.79 for the avoidance subscale.

As the tool had to be translated into Greek, for administration in the earthquake area, it was important to determine if the internal consistency was maintained in the subscales. The reliability coefficient (Cronbach's alpha) was 0.72 for the intrusian subscale and 0.65 for the avoidance subscale. The internal consistency of the intrusian subscale remained high, but the advoidancy subscale had dipped with the translation although not too low for use.

In addition to the IES, the health care providers were interviewed, with the assistance of an interpretor, to determine their responses to the stresses of disaster work. A structured questionnaire of 10 items, modified from Laube's (1973), was used. Due to the language difficulties, no attempt was made to gather the usual demographic data. The interviews were taped and transcribed.

Method

Entry into the disaster area was facilitated through the American Red Cross, the Hellenic Red Cross, and the Governor of Messini in Greece. The Head of the Hellenic Red Cross disaster services in

Kalamata coordinated the investigator's activities in Kalamata.

The language differences presented some difficulties as the investigator could speak no Greek and a limited number of the subjects could speak English, namely the physicians, shopkeepers and some officials and Red Cross staff. A University of Australia student, on emergency leave to be with his family, served as an interpreter in many of the sessions. Otherwise, communication took place through use of a Berlitz manual, pre-translated statements and instructions, and a lot of non-verbal language. Although individual interviews were preferred, the subjects were interviewed in groups because of limited access to an interpreter.

Anonymity was assured as no names were recorded. Only age and gender were requested on the pencil and paper test. Participation in the interviews and testing was on a voluntary basis. All of the interviewees did not take the test. Conversely, some of those that took the test were not interviewed. The interviews and testing took place over a three week span, beginning four weeks after the first earthquake on 13 September 1986.

To increase the number of subjects for the Impact of Event Scale, assistance was secured from a psychologist, who was volunteering her service in the disaster, and the Social Director of the cruise ship that was serving as temporary living quarters for the homeless. These two individuals administered the tests to their "clients" who volunteered to participate.

To secure normative data, similar to that of the medical student population used by Horowitz et al (1979), assistance was secured from the director of a large school of nursing in Athens, Greece. She administered the IES to 63 nursing students. Students were directed only to relate the items to a significant event in the recent past.

Subjective effect on victims as measured by Impact of Event Scale

There were 9 males in the sample population of 83; thus there was no analysis for gender differences. The age range for the group was 15 - 60 years, the mean was 25.71 years and the median was 20 years. The range for the intrusion subscale was 2 - 41, the mean was 27.26, the median was 28 and the standard deviation was 7.52. The range for the avoidance subscale was 5 - 35, the mean was 21.07, the median was 21, and the standard deviation was 7.67.

There were 8 males in the student nurse group of 63; no analysis was needed for gender differences. The age range for this group was 20 - 51 years, the mean was 31 years and the median age was 30 years. The range for the intrusion subscale was 0 - 35, the mean was 12.32, the median was 12 and the standard deviation was 8.58. The range for the avoidance subscale was 0 - 35, the mean was 12.06, the median was 11, and the standard deviation was 8.64.

As can be seen in Table 1, the Greek disaster victims scored higher on the subscales than did the American patient population used by

Horowitz (1979, p 215), but this difference is true also between the Greek and American non-victim populations.

TABLE 1. Means and Standard Deviations Of Impact of Event Subscales for Disaster Victims and Nursing Students in Greece and Patients and Medical Students in U.S.A.*

Populations	Intrusion		Avoidance	
	Mean	SD	Mean	SD
<u>Greece</u>				
Disaster Victims	27.27	7.53	21.07	7.67
Nursing Students	12.32	8.58	12.06	8.64
<u>U.S.A.</u>				
Patients	21.20	7.90	20.80	10.2
Medical Students				
Men	2.50	3.00	6.90	6.80
Women	6.10	5.30	12.70	10.80

*Statistics taken from Horowitz, Wilner and Alvarez, (1979) Impact of Event Scale: A measure of subjective stress, *Psychomatic Medicine* 4(3), 216.

Using the Pearson Product-Moment test, correlations between the subscales were determined for the disaster victims and for the student nurses. The correlation coefficient was 0.63 ($p = <.006$) for the student nurses and it was 0.21 ($p = <.10$) for the disaster victims. This parallels the findings of Zilberg, Weiss and Horowitz (1982). In their study on U.S.A. subjects, the subscales were substantially correlated in their field subjects but there was little correlation between the subscales in their patient group. Not only does this indicate a cross-cultural patterning, it also substantiates Horowitz's (1976) theory that there is a predictable pattern of response following a severe stress event. He postulated that intrusive symptomatology follows the event, but as this is so painful, avoidance behavior then occurs as a measure of defense. This suggests that correlations on the IES subscales could serve as a diagnostic tool for determining the patient's/victim's pathology and phase of recovery. Comparison of the two cultures is presented in Table 2.

The significance of difference in the subscales between the 2 groups in Greece were determined through use of the t-test. The findings were significant for both, intrusion and avoidance. (See Table 3)

Table 2. Pearson Product-Moment Correlations between Intrusian and Avoidance Subscales for Patients and Field Subjects in U.S.A. and between Subscales for Disaster Victims and Nursing Students in Greece*

Subjects	N	r	p
<u>Greece</u>			
Disaster Victims	83	.21	<.10
Nursing Students	63	.63	<.006
<u>U.S.A.</u>			
Patients	35	.15	<.40
Field Subjects	37	.70	<.01

*U.S.A. statistics from Zilberg, Weiss and Horowitz. (1982) Impact of Event Scale: A cross-validation study and some empirical evidence supporting a conceptual model of stress response syndromes, Journal of Consulting and Clinical Psychology, 50 (3), 412.

Table 3. Means, Standard Deviations and t-tests on the Impact of Event Subscales for Disaster Victims and Nursing Students in Greece

Subscales	Victims	Students	t	df	p
	(N=83) M	(N=63) M			
Intrusian	27.27	12.32	11.19	144	<.006
Avoidance	21.07	12.06	6.65	144	<.006

Health Care Workers Reactions in Disaster Specific numbers could not be obtained due to the large size of the group being interviewed, in some instances, and the limited time for working with an interpreter. The results below are as described by those that responded.

The majority of registered nurses and physicians worked 48 to 60 hours without relief. As described by one, we came back as soon as we could get here and didn't leave until the patients were settled--through discharge or transfer. The longest period of work for the students was 10 hours. The major stresses reported

were their concern for their families, the aged--"the sadness on the older people's faces" and the children--"seeing the children hurt and crying". Some talked of the crowded, uncomfortable living conditions--tents, no privacy, no laundry or bathing facilities. Specific to the care of the injured and the necessary evacuation of the hospital, their major concerns were disorganization, supplies and lack of information. Table 4 compares the major stresses of the two cultures.

Table 4. Major Stresses of Health Care Workers in Disaster: Greece and U.S.A.

Reported Stresses	Greece	U.S.A.
Excessive physical demands	X	X
Concern for own/patients' safety	X	X
Increased medical responsibility		X
Concern for family	X	X
Seeing the poor suffer		X
Injured/scared children	X	X
Injured older persons	X	X
Sadness on the older people's faces	X	
Disorganization	X	X
Seeing so many injured and killed	X	X
Feelings of inadequacy to meet psychological needs		X
The living conditions	X	
Lack of information	X	
Knowing that life will never be the same	X	

When asked how they managed their feelings, many replied that they didn't remember feeling anything--they just worked. As described by one person, he got "caught up in the rush" and didn't seem to feel anything. Only a few admitted to crying as a measure of

tension reduction. One reported that she panicked, felt as if she were "going to pieces, very uncharacteristic". Others reported having somatic symptoms of diarrhea, nausea and vomiting, but not too severe to work. The responses from the health care workers in Greece were not unlike those reported by Laube (1972) under similar conditions in America.

To the question relating to the funniest happening during the disaster, the immediate response was "Nothing." Later, one told the story about her uncle getting caught under a table, because he was too fat. Not being able to get loose, he just ran out with the table stuck on his back. There were a few smiles when the story was told, but no one laughed. Truly, even four weeks after the earthquake, the devastation was too great.

Conclusions

The earthquake victims in Kalamata, Greece experienced great subjective distress. One month post disaster, both intrusive and avoidance symptomatology, as measured by the IES, was significantly greater than normal. Cross-culturally, intrusive symptomatology in the earthquake victims was at a higher level than Horowitz et al (1979) reported for an identified stressed patient population in America. The avoidance symptomatology level was similar in the two populations.

Health care workers in Greece identified similar stresses in disaster as have those in America. In both populations, concern for the elderly, the children, and their own family were paramount. The heavy physical demands and disorganization were also reported in both groups. Emotional responses were similar in both cultural groups.

There was, however, one major difference in health care delivery following the disaster. In Greece, many of the staff physicians and nurses from the disaster area were relieved by professionals from outside the area, some from as far away as Athens (6 to 7 hours by car). This allowed those from Kalamata time to get their living accommodations arranged, take care of their families and themselves, as needed. Under the socialist type of medical care, transfer of staff between hospitals could be arranged. This could not be as easily implemented in the private sector of the U.S.A.

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