Emotional and Physical Distress Following Hurricane Agnes in Wyoming Valley of Pennsylvania

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THE RECOVERY PERIOD following a natural disaster is a critical time with respect to health status of the disaster victims. The length of the recovery period varies for individual victims and, in many ways, the series of stressful consequences such as unemployment, monetary losses, work on damaged dwelling units, and temporary living conditions encountered during this period may be perceived by the victims as a "second disaster."

Mental or physical health problems in the early days following disaster impact have been reported (*1–3*) but, for the most part, literature on the health effects of natural disasters is either descriptive or qualitative (*4,5*). Few controlled quantitative surveys have been described relating to the extended recovery period. However, the consistency of clinical impressions reported for major natural disasters, such as the Hurricane Agnes flood of 1972 (*3,6,7*), the Buffalo Creek flood in West Virginia (*8–11*), and cyclone Tracy (*12*), to name a few, supports the theory that long-term health sequelae will be experienced. Controlled surveys such as Bennet's epidemiologic followup study of victims of the Bristol, England, floods (*13*) provide even stronger support.

Susser and Watson (*14*) referred to disasters, bereavement, and grief as transitional crises which can be causally associated with mental illness. Kolb (*15*) noted that disasters can lead to "gross stress reactions" which may mimic anxiety neurosis. Although the mental health effects of disasters in the United States were minimized in the past, major events of the past

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decade, including the Buffalo Creek, Rapid City, and Agnes floods of 1972 and the more recent Grand Teton flood of 1976, have demonstrated the need for crisis intervention to relieve mental health problems (*16*).

Long-term mental and physical health problems associated with natural disasters have recently been summarized by the National Institute of Mental Health (*17*). Children's problems include "phobias, prolonged sleep disturbances and nightmares, loss of interest in school, and lack of reponsibility." A state of anxiety is frequently observed among adults just after the disaster, and this is often followed by feelings of anger, resentment, and hostility. Depression and a loss of ambition are also encountered. Problems relating to marriage and the family increase. Finally, the victims may suffer from such disorders as ulcers, headaches, and hypertension.

Natural disasters such as the Agnes and Buffalo Creek floods can be viewed as major stressful conditions or social stressors (*18*). The stressors as such do not cause disease but change a person's susceptibility to disease, thus serving as a precipitating factor. Important stressor characteristics to be considered in research on natural disasters include the magnitude, intensity, duration, unpredictability, and novelty of the event. Hurricane Agnes has been referred to as the greatest natural disaster in U.S. history (*19*). Rabkin and Struening (*18*) pointed out that stressors with sufficient intensity and duration will give rise to acute stress reactions for persons experiencing the event, across the range of dispositions characterizing these persons. The length of the recovery period following disaster varies for each victim according to his or her perception of the event's intensity as well as the duration of the recovery.

Flooding in the Wyoming Valley (part of Luzerne County) of northeastern Pennsylvania during Hurricane Agnes was both unpredictable and novel. The communities had little warning of the imminence or the magnitude of the approaching flood (*19*). Agnes led to a mass exodus of 120,000 people, caused flooding of all but 20 of the 6,000 homes in the city of Kingston (sister city to Wilkes-Barre) and of many homes in adjoining communities, and generally resulted in colossal property damage (*20*).

In a review of the literature on natural disasters, we found that this field of stress research has received little attention—especially with regard to long-term health effects. Many of the reports of studies document "impressions" obtained by trained observers; these reports evidence the need for well-planned studies of exposure and control groups to assess the contribution of disasters to the emergence of health problems. Melick (*21*), in recognition of this need, conducted a cross-sectional study in 1975 of Agnes flood victims in the Wyoming Valley and compared them with a control group. Melick's study sample consisted of an exposed group and a control group of middle-aged, working-class men; each group contained about 50 men. Although both groups were statistically similar concerning the kinds of illnesses experienced after the flood, the exposed group's illnesses lasted longer during two specific post-flood periods, June 1972 to January 1975 and January to June 1975.

We conducted a retrospective survey in early 1977 among residents of the Wyoming Valley (*22*). The study was designed to investigate the long-term effects of the Agnes flood on health and other domains during the recovery and post-recovery periods. The findings regarding health effects during the recovery period are presented here.

Study Methods

The research approach followed a retrospective cohort design in which physical and mental health status during the 5 years after the flood were compared. The study group consisted of families whose homes had been flood damaged, and the comparison group was composed of families not so affected. Questionnaires were mailed to women of the households who were 21 years old or older. Women were selected to be the respondents in order to complement Melick's survey of men (*21*) and because women are at greater risk in the mental health domain (*23,24*).

Sample selection. All households in Kingston and the adjoining towns that were listed under the same address in the 1972 and 1976 editions of the "Greater Wilkes-Barre City Directory" (*25,26*) were eligible for the study. Every fourth household was chosen to be contacted; households without a listed female member were skipped. This procedure yielded 748 households in Kingston and 755 households in the adjoining towns. The questionnaires were returned disproportionately, 307 from Kingston and 155 from the adjoining towns. An intensive telephone followup in Kingston yielded 100 additional questionnaires.

Sample characteristics. Although the response rate was relatively low in the towns adjoining Kingston, the distribution of participants was geographically representative. There was no statistical difference in residence, either among the 4 towns studied or among the 19 "blocks" with an equal number of households that the towns encompassed.

Sample allocation was based on flood damage rather than on residence. Of the Kingston residents, 15 reported that their homes had not been flooded, whereas

4 participants from the adjoining towns reported flood damage. Thus, the flood group consisted of 396 households and the nonflood group of 166 households. Statistically significant differences were noted for several characteristics. The flood group respondents reported a somewhat higher economic status (education, occupation, income), were more diverse in religions, and were more dependent on their families of origin before the flood.

Survey instrument. The questionnaire contained 105 questions; it included items relating to demographic characteristics, the disaster experience, recovery experience, health status, major life events, and the extent of social support at various periods.

Questions pertinent to long-term effects of the flood, the focus of this report, included the following:

Which of the following best describes the damage which was done to your home and possessions as a result of the flood?

If your home was flooded, how do you feel about the physical work you and your immediate family had to do after the flood to get your home "back in shape"?

Which of the following statements best describes how much of a financial problem you and your immediate family experienced because of the flood?

How much did the flood hinder you and your immediate family from getting regular medical check-ups?

Did you find that you were using tranquilizers or other medications to help you calm down after the 1972 flood?

How helpful would you say that drinking wine, beer, or liquor was to you after the flood to help you relax and forget your problems?

Which of the following statements best describes your state of mind after the flood occurred?

If either you or your husband (if you were married at the time of the flood) or the both of you were unemployed due to the flood, how "stressful" was this situation for you and your family?

Which of the following best describes the amount of distress you and your immediate family experienced, in general, in the long recovery period after the flood?

Who in your immediate family suffered the most emotional distress as a result of the flood? How long after the flood did this distress last?

Who in your immediate family suffered the most physical distress as a result of the flood? How long after the flood did this distress last?

Statistical analysis. All dependent variables were treated statistically as continuous variables since the responses were ordered and the underlying distributions were assumed to be continuous (27). Unpaired Student's *t*-tests were applied to between-group comparisons of unadjusted means. A three-way analysis of covariance procedure was used for some between-group comparisons when sample sizes were large enough to adjust for group differences. Flooding of dwelling unit (yes or no), religion (Catholic versus other), and age (<60 years versus ≥ 60 years) were entered as control variables, and income, education, and a pre-flood social support variable (dependence on family of origin) as covariates. The adjusted weighted means generated by the covariance procedure, as well as the results of the appropriate statistics, t or F, and the corresponding probability levels and degrees of freedom, are presented in the appropriate tables.

Results

For data presentation in this report, survey items are grouped under four topics: severity of disaster experience, use of sedatives and alcohol, extent of emotional distress, and duration of emotional and physical stress. The first topic refers to the flood group only, and the remaining items contrast the flood group with the controls. Some of the tabulated evidence is augmented by information presented in the text only.

The impact of the flood on the respondents' families is shown in table 1. More than half of the respondents reported total or extremely severe destruction of property. Damage to their homes required exhausting physical work for two-thirds of the families, which resulted in a member "becoming sick" in one of every five families. For 65 of the 71 families so affected, the sick

Table 1. Impact of Hurricane Agnes on families whose homes were flooded

Impact	*Percent*
Flood damage to home and family possessions (N=393).	
Everything destroyed	27
Extremely severe	27
Very severe	17
Severe	18
Moderate or some	11
Family's physical work on home after flood (N=382):	
So hard that someone became sick	19
Very hard, family worn out	47
Hard, but not many problems	16
Few or no problems	14
Work done by someone else	4
Family's financial problems due to flood (N=386):	
Severe	31
Moderate	33
Some	27
None	9
Medical attention for regular checkup hindered (N=371):	
Very much	10
Moderately	11
Somewhat	23
Not at all	56

member was the husband, 49 percent; the respondent, 34 percent; or another relative, 17 percent. Financial problems caused by the flood were judged severe by nearly one-third of the families, in contrast to 3 percent of the controls who also answered this item. No financial problems were reported by 9 percent of the flood group and by 69 percent of the controls. There were some impediments to receiving medical attention, but they were not serious. Difficulties in getting regular medical checkups were reported by 44 percent of the flood group (controls, 27 percent) and in receiving medical attention for specific problems by 35 percent (controls, 23 percent); these differences were not statistically significant.

In table 2 the use of sedatives and alcohol "to help you calm down and relax" is compared for the flood and the control groups. Tranquilizers or other sedatives were used by one-third of the respondents in the flood group but by only 9 percent of the controls. More than 50 percent of the flood group found alcoholic beverages helpful, in contrast to 16 percent of the controls (nondrinkers were excluded). These differences are highly significant.

The extent of stress experienced in the recovery period is shown in table 3. Among the flood group respondents, 61 percent were deeply discouraged after the flood—in contrast to 7 percent of the controls. Unemployment of the respondent or her husband was judged stressful for the family by 82 percent of the flood group and 55 percent of the controls. Although the proportion of unemployed husbands was similar in the

Table 2. Respondents' use of sedatives and alcohol during recovery period

Use and results	*Percent flood group*	*Percent control group*
Used tranquilizers or other sedatives	(N=388)	(N=164)
Not at all	65	91
Some of the time	25	8
Quite a bit of the time	3	0
Most of the time	7	1
Adjusted mean ± SE [1]	1.54 ± 0.04	1.07 ± 0.03
Relief obtained from alcohol (excluding nondrinkers)	(N=169)	(N=49)
None	46	84
Somewhat helpful	34	14
Moderately helpful	12	2
Very helpful	9	0
Unadjusted mean ± SE [2]	1.85 ± 0.07	1.18 ± 0.06

[1] $F = 36.09$, $df = 1,421$, $P < .001$. Based on a 4-point scale ordered from 1 (not at all) to 4 (most of the time).
[2] $t = 4.72$, $df = 216$, $P < .001$. Based on a 4-point scale ordered from 1 (none) to 4 (very helpful).

Table 3. Extent of emotional distress during recovery period

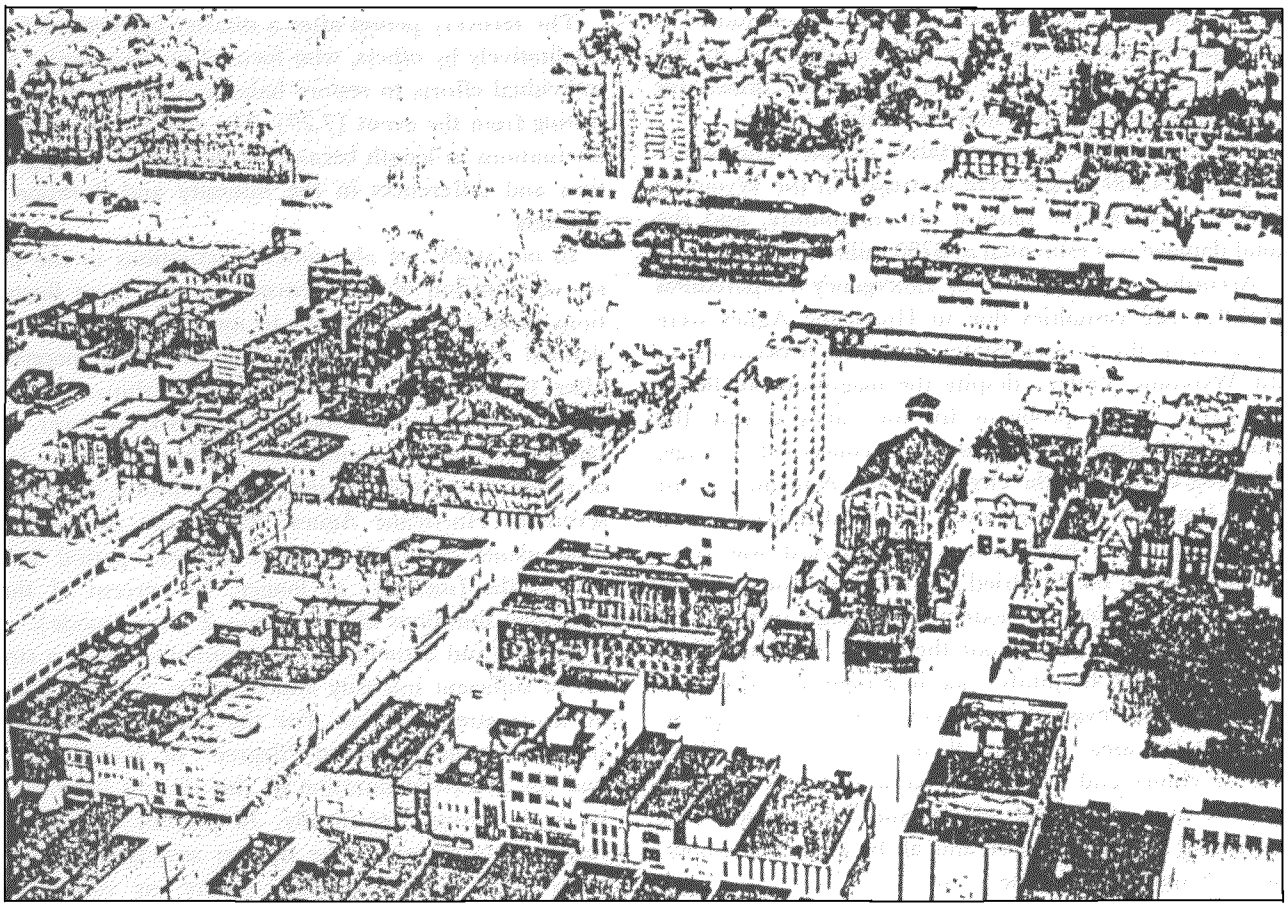
Extent of distress	*Percent flood group*	*Percent control group*
Respondent's state of mind after flood occurred	(N=390)	(N=156)
Felt like giving up	20	0
Very discouraged	44	7
Moderately discouraged	15	14
Somewhat discouraged	14	39
Not at all discouraged	7	40
Adjusted mean ± SE [1]	2.40 ± 0.06	4.04 ± 0.07
Distress due to respondent's and/or husband's unemployment after flood	(N=103)	(N=51)
Not at all stressful	18	45
Somewhat stressful	45	29
Moderately stressful	12	16
Very stressful	25	10
Unadjusted mean ± SE [2]	2.44 ± 0.10	1.90 ± 0.14
Overall distress of respondent's family in recovery period	(N=382)	(N=152)
None	6	38
Slight	18	32
Moderate	49	22
Severe	21	5
Very severe	6	3
Adjusted mean ± SE [3]	3.05 ± 0.05	2.04 ± 0.08

[1] $F = 202.06$, $df = 1,416$, $P < .001$. Based on a 5-point scale ordered from 1 (felt like giving up) to 5 (not at all discouraged).
[2] $t = 2.99$, $df = 152$; $.001 < P < .005$. Based on a 4-point scale ordered from 1 (not at all stressful) to 4 (very stressful).
[3] $F = 99.88$, $df = 1,418$, $P < .001$. Based on a 5-point scale ordered from 1 (none) to 5 (very severe).

Table 4. Duration of distress for family member suffering most distress

Duration (years)	*Percent flood group*	*Percent control group*
Emotional distress	(N=290)	(N=57)
½	21	47
1	22	18
1½ to 2	23	16
2½ to 4	13	7
More than 4	21	12
Unadjusted mean ± SE [1]	4.32 ± 0.18	3.00 ± 0.37
Physical distress	(N=244)	(N=40)
½	16	45
1	16	15
1½ to 2	21	15
2½ to 4	20	5
More than 4	27	20
Unadjusted mean ± SE [2]	4.99 ± 0.20	3.35 ± 0.50

[1] $t = 3.02$, $df = 345$, $.001 < P < .005$. Based on a 9-point scale ordered in 6-month intervals from 1 (½ year) to 8 (4 years), with 9 as a maximum (more than 4 years).
[2] $t = 3.11$, $df = 282$, $.001 < P < .005$. Scale identical to above.



Susquehanna River rages through downtown business section of Wilkes-Barre, Pa., causing millions of dollars of damage as a result of Hurricane Agnes in 1972. At center, smoke rises from a burning building as firefighters train hoses on the blaze. Official U.S. Coast Guard photo

two groups--22 percent in the flood group and 18 percent in the control group—husbands in the flood group were unemployed longer, on the average (8.9 months as opposed to 6 months for the control group). Unemployment of the respondents was reported for 36 percent of the flood group (7 months' average duration) and 28 percent of the controls (3.7 months' average duration). The overall rating of stress suffered by the respondents' families during the recovery period was significantly greater for the flood group; 27 percent experienced severe or very severe distress, in contrast to 8 percent of the controls.

Table 4 lists duration of stress for the family member who suffered the most emotional or physical distress as a result of the flood. Both emotional and physical distress lasted about 1 year longer among the flood group than among the controls. Duration of stress was assessed further for a subset, married couples in the flood group. Husbands and wives suffered the most emotional stress with almost equal frequency (101 versus 96), and the stress lasted about 2 years for each group. In contrast, twice as many husbands as wives (109 versus 56) suffered the most physical distress, and the duration differed--about 2 years for husbands versus about 3 years for wives.

Another item asked for an estimate of the recovery period of the respondent's family as a whole. Of the 353 women in the flood group who answered this question, about one-third stated up to 1 year; one-third, more than 1 to 2 years; and one-third, more than 2 years.

Discussion

The data presented here were derived from a larger project dealing with the long-term effects, both health and other, associated with the recovery and post-recovery periods following Hurricane Agnes in the Wyoming Valley of Pennsylvania. Our focus is on mental and physical distress during the recovery period as perceived by female respondents about 5 years after the event. Since the results are based on a retrospective approach, they must be qualified. Among possible biases associated with this technique, the respondent's memory of the recovery period could be "contaminated" because of recall problems and circumstances affecting the respondent at the time of the survey, as well as her

present health status. Moreover, how representative is this specific disaster of other natural disasters in the United States? Thus, the inferences to be drawn for future national disasters may be limited.

The Agnes disaster was certainly unique. The homes of about 25,000 people were destroyed in the Wyoming Valley, probably the hardest hit community, and the total damage was estimated at $730 million (*19*).

According to the Office of Emergency Preparedness (OEP), 122 casualties due to Hurricane Agnes were reported in the United States, but only 6 occurred in the Wyoming Valley—despite the magnitude of flooding (*20*). Major problems for the valley during the emergency phase of the disaster concerned sewage, drinking water, and the electric power. A health hazard arose from silt deposited over the flooded area mixed with waste from local sewers. This hazard was compounded when the silt dried and created clouds of dust.

OEP also noted the extensive damage inflicted on medical facilities throughout the valley. In the Wilkes-Barre area, two hospitals—one in Kingston and one in Wilkes Barre—evacuated patients. Of the 300 physicians in the area, 167 lost their facilities. Also, 50 of the 57 clinics and 54 pharmacies were flooded. About half of the physicians' offices and pharmacies were operating by early August and all by early September, about 3 months after the event.

The extent of loss experienced by the flood victims is partially reflected in table 1. Clearly, a majority of the respondents suffered total or severe property loss, which demanded strenuous physical work to restore their homes. Financial problems were moderate to severe in most cases. As perceived by one of every five respondents, the physical labor was so demanding that someone in the immediate family became ill. The loss of the facilities of more than half of the physicians in the area for 2 to 3 months surely contributed to the difficulty that 44 percent of the flood victims had in obtaining regular medical care during the recovery period.

The respondents' relatively greater use of alcohol and sedatives during the recovery period, summarized in table 2, was one form of attempts to obtain relief from stress. The flood victims used these substances more frequently than the control group. Increased use of alcohol or sedatives, or both, after major disasters also has been reported by others. Erikson (*28*), for example, reported that the use of alcohol and drugs appeared to increase after the 1972 flood in the Buffalo Creek area. Staff members of Project Outreach working in the Wyoming Valley noted new problems after the first 3 months of the recovery period, including increased consumption of alcohol and family tensions among people who were housed together after the flood (*6*).

The recovery period after a disaster has been defined qualitatively by others, who focused on community and individual efforts to restore balance after the chaos resulting from the event (*7,29*). The period is marked by fluctuations in length because of differences among victims and differences in the intensity and duration of disasters.

In our study, we also noted fluctuations in the perceived duration of the recovery period; these fluctuations ranged from 1 month to more than 2 years. We defined the recovery period as the time necessary after the disaster impact to "restore things back to normal." Despite the range of responses, however, certain group statistics (nonparametric because of the kind of distribution) may be relevant for future disasters as severe as Hurricane Agnes. 59 percent of the flood respondents reported that the recovery period lasted 18 months (median) or longer; 54 percent of these indicated durations of more than 2 years (mode).

Rabkin and Struening (*18*) pointed out that a stressor of sufficient intensity and duration can give rise to an acute stress reaction. For the flood respondents in this study, the perceived "degree" of overall distress and the perceived duration of this distress were severe on both counts. Specifically, 76 percent of the flood respondents perceived the distress associated with the recovery as either moderate, severe, or very severe, and the average duration of the distress for this group was reported to be 2 years or more. Emotional distress was experienced by 79 percent of the flood victims and by 53 percent of the nonflood group for more than 6 months. Physical distress was experienced by 34 percent of the flood victims and by 55 percent of the nonflood victims for more than 6

During Hurricane Donna in 1960, 10-foot tides washed into streets and homes in 3 of New York City's 5 boroughs. Rescuers administer mouth-to-mouth resuscitation to a storm victim. American Red Cross photo

months. Rabkin and Struening further pointed out that stressors with sufficient duration and intensity can also be associated with long-term disabilities.

Various measures of mental and physical distress reported for the recovery period can be viewed as dependent variables with respect to the independent variable—the actual flooding of the dwelling unit. The variables may also be considered independent variables with respect to long-term post-recovery health status, such as we investigated.

A definite association had been noted (*22*) between high levels of perceived stress during the recovery period and long-term post-recovery health problems. Although this finding was based to a large extent on retrospective information, it was consistent for various stressors and the strength of the association was high.

Self-reported emotional and physical distress during the recovery period by married female flood victims in this study revealed a slightly higher frequency of emotional than of physical distress. The distribution of emotional distress was approximately equal for both sexes, but for physical distress husbands were reported twice as frequently as wives. Bennet (*13*) reported a similar sex gradient for physical symptoms 1 year after the Bristol floods, although the opposite trend existed for "psychiatric" symptoms. A study, similar in design to Bennet's of the effects of the 1974 Brisbane floods, by Abrahams and associates (*30*) found equal reporting of physical symptoms by both sexes 1 year after the disaster, but, like Bennet, higher reporting of psychiatric symptoms by female victims. Bennet noted that physical symptoms were reported more frequently than psychiatric symptoms in the Bristol study; the opposite trend, however, was noted in the Brisbane study.

Using male respondents, Melick (*21*) found that men in the flood group reported more emotional distress for themselves (53 percent) than for wives (33 percent) or children (13 percent). Moore and Friedsam (*31*) used female respondents in their investigation of the effects of a tornado. These respondents reported that women were most likely to report emotional distress for themselves first and next for their children; they made little mention of men experiencing emotional distress.

Disasters are everyday occurrences throughout the world and will increase in time as the population of the world increases. In this country, property damage from floods and flash floods, the major cause of death and destruction among disasters due to weather-related incidents, currently averages about $1 billion annually (*32*). This cost is predicted to increase further to more than $3 billion by the year 2000 unless proper precautions are taken. More than 15,000 U.S. communities and recreational areas are at risk of flash flooding, but this is only a part of the problem.

In the past, much attention has been placed on disasters that result in great loss of life. This situation should reverse to some extent in the future because of better alerting and evacuation procedures. Flooding in the Wyoming Valley, for example, resulted in little loss of life but high property damage for both individuals and the community. Western (*29*) affirms that mortality rates inflicted by disaster may have little association with the long-term effects of the event, including social and medical effects.

The Disaster Research Center at Ohio State University recently described a new area of concern with respect to manmade disasters—major events associated with technological failures (*33*). Past research on manmade disasters emphasized war-related events, including concentration camps and prisoner-of-war camps. As a result of advanced technology and modernization in this country over the past few decades, disasters due to modern technology have occurred with increasing frequency. Such phenomena include major air pollution episodes (Donora, Pa.), nuclear energy accidents (Three-Mile Island, Harrisburg, Pa.) and contamination of a community due to industrial waste (Love Canal, N.Y.). Although manmade and natural disasters were generally seen by researchers as inherently different phenomena in the past, a common approach to modern-day disasters, either natural or technological, may be appropriate—especially when these events affect entire communities. Thus, it is conceivable that victims of stress such as that related to the Three-Mile Island accident may suffer mental and physical health effects similar to those of the victims of natural disasters (aside from the physical effects of low-level ionizing radiation) and may benefit from intervention by trained professionals.

An especially important recommendation resulting from studies of recent natural disasters focuses on the need for crisis intervention, including a suitable outreach program (*16*). Lessons learned from the Agnes flood (*7*) highlighted the need to provide crisis intervention to disaster victims, an area truly neglected in past disaster relief.

Under Section 413 of the Disaster Relief Act of 1974, the National Institute of Mental Health, in cooperation with the Federal Disaster Assistance Administration, is authorized to provide assistance to victims of major disasters to alleviate disaster-related mental health problems (*16*). When the President designates a disaster area in need of Federal assistance, support may be provided for 180 days, with possible extension based on individual need. Other agencies engaged in public

health preventive and research strategies are the Center for Disease Control (*29,34*) and the American National Red Cross (*35*).

In summary, this study has demonstrated significantly higher levels of both physical and mental distress for respondents whose homes had been flooded compared to controls who did not experience flooding. The perceived duration of distress was about 2 years. Health care providers should be aware that victims of a natural disaster experience severe problems in the recovery period following the event. In this study, these problems were associated with excess physical and mental distress extending over a number of years.

It is also important to evaluate and to reduce distress in the recovery period, since its prolongation may be an important risk factor with respect to long-term morbidity in the post-recovery period. Appropriate crisis intervention throughout the recovery period may, therefore, help to lessen the effects of various stressors if health care providers are aware of their existence and importance.

References

1. Tyhurst, J. S.: Individual reactions to community disaster. Am J Psychiatry 107: 764–769 (1951).
2. Edwards, J. G.: Psychiatric aspects of civilian disasters. Br Med J 1: 944–947 (1976).
3. Knaus, R. L.: Crisis intervention in a disaster area: The Pennsylvania flood in Wilkes-Barre. J Am Osteopath Assoc 75: 297–301 (1975).
4. Kinston, W., and Rosser, R.: Disaster: Effects on mental and physical state. J Psychosom Res 18: 437–456 (1974).
5. Barton, A. H.: Communities in disaster. Doubleday, New York, 1969.
6. Okura, K. P.: Mobilizing in response to a major disaster. Community Ment Health J 11: 136–141 (1975).
7. Kafrissen, S. R., Heffron, E. F., and Zusman, J.: Mental health problems in environmental disasters. *In* Emergency psychiatric care: The management of mental health crises, edited by H. L. P. Resnick and H. L. Ruben. The Charles Press Publishers, Bowie, Md., 1975.
8. Titchner, J. L., and Kapp, F. T.: Disaster at Buffalo Creek: family and character range at Buffalo Creek. Am J Psychiatry 133: 295–299 (1976).
9. Newman, C. J.: Children of disaster: Clinical observations at Buffalo Creek. Am J Psychiatry 133: 306–312 (1976).
10. Rangell, L.: Discussion of the Buffalo Creek disaster: The course of psychic trauma. Am J Psychiatry 133: 313–316 (1976).
11. Lifton, F. J., and Olson, E.: The human meaning of total disaster: The Buffalo Creek experience. Psychiatry 39: 1–18 (1976).
12. Parker, G.: Cyclone Tracy and Darwin evacuees: On the restoration of the species. Br J Psychiatry 130: 548–555 (1977).
13. Bennet, G.: Bristol floods 1968: Controlled survey of effects on health of local community disaster. Br Med J 3: 454–458 (1970).
14. Susser, M. W., and Watson, W.: Sociology in medicine. Oxford University Press, New York, 1971.
15. Kolb, L. C.: Modern clinical psychiatry. W. B. Saunders Company, Philadelphia, 1973.
16. Frederick, C. J.: Current thinking about crisis or psychological intervention in United States disasters. Mass Emergencies 2: 43–50 (1977).
17. U.S. Public Health Service: Disaster assistance and emergency mental health. DHEW Publication No. (ADM) 76-327. Department of Health, Education, and Welfare, Washington, D.C., 1976.
18. Rahkin, J. G., and Struening, E. L.: Life events, stress, and illness. Science 194: 1013–1020 (1976).
19. U.S. Department of the Army, Corps of Engineers (Baltimore District): Wyoming Valley flood control, Susquehanna River, Pennsylvania. Baltimore, Md., December 1972.
20. Executive Office of the President, Office of Emergency Preparedness: The Federal response to tropical storm Agnes. Washington, D.C., May 1973.
21. Melick, M. E.: Social, psychological and medical aspects of stress-related illness in the recovery period of a natural disaster. PhD dissertation. State University of New York at Albany, 1976.
22. Logue, J. N.: Long-term effects of a major natural disaster: The Hurricane Agnes flood in the Wyoming Valley of Pennsylvania, June 1972. DrPH dissertation. Columbia University School of Public Health, New York, 1978.
23. Silverman, C.: The epidemiology of depression. The Johns Hopkins Press, Baltimore, 1968.
24. Weissman, M. W., and Klerman, G. L.: Sex differences and the epidemiology of depression. Arch Gen Psychiatry 34: 98–111 (1977).
25. Greater Wilkes-Barre City Directory. R. L. Polk, Boston, 1972.
26. Greater Wilkes-Barre City Directory. R. L. Polk, Boston, 1976.
27. Snedecor, G. W., and Cochran, W. G.: Statistical methods. The Iowa State University Press, Ames, 1967, pp. 243–246.
28. Erikson, K. T.: Disaster at Buffalo Creek: Loss of community at Buffalo Creek. Am J Psychiatry 133: 302–305 (1976).
29. Western, K. A.: The epidemiology of natural and man-made disasters: The present state of the art. DTPH dissertation. London School of Hygiene and Public Health, University of London, 1972.
30. Abrahams, M. J., Price, J., Whitlock, F. A., and Williams, G.: The Brisbane floods, January 1974: Their impact on health. Med J Aust 2: 936–939 (1976).
31. Moore, H. E., and Friedsam, J. H.: Reported emotional stress following a disaster. Soc Forces 38: 135–139 (1959).
32. American Meteorological Society: Statement of concern: Flash floods—A national problem. Bull Am Meteorological Soc 59: 585–586 (1978).
33. Ohio State University: Unscheduled events (newsletter). Disaster Research Center, Columbus, Ohio, vol. 12, No. 2, 1978.
34. Foege, W. H.: The changing priorities of the Center for Disease Control. Public Health Rep 93: 616–621, November-December 1978.
35. Popkin, R. S.: The American Red Cross response to disasters. Mass Emergencies 3: 49–53 (1978).