Natural Hazard Research

PRIMARY MENTAL HEALTH CARE IN DISASTERS: ARMERO, COLOMBIA

The Prevalence of Psychiatric Disorders Among Victims in Tent Camps

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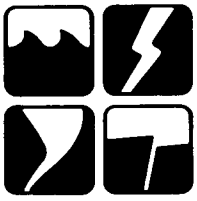

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SUMMARY

The eruption of Nevado del Ruiz on November 13, 1985, produced a mudslide that completely destroyed the town of Armero and left in its wake over 24,000 dead, 5,000 injured, and scores of homeless survivors in dire economic straits. The Armero disaster provided an excellent opportunity for exploring the special role of the primary care worker (PCW) in delivering mental health care to disaster victims. The authors' findings cover substantive issues, mental health/primary care interactions, and operational aspects of conducting such an investigation.

Specifically, seven months after the event, the researchers found a very high prevalence of emotional distress among adult victims who were living in temporary shelters. They found that a self-reporting questionnaire (SRQ) used to identify "probable cases" was highly reliable in screening for emotional disorders among victims. Most importantly, the research strongly suggests that, with only minimal training, PCWs can be effective in providing mental health care for the most common problems occurring after disasters. The authors conclude that, because PCWs can manage most of the routine and direct mental health services following a disaster, and because specialized mental health resources in developing countries are extremely limited, the role of the specialized mental health worker should be that of a program designer and implementor, and a trainer, supervisor, and expert consultant for primary care workers.

The authors further cite several operational aspects of their research that other researchers should be aware of in future studies. In brief, they suggest that it is particularly important to establish and maintain a good working relationship with national, state, and local health officials in a disaster-prone area prior to an actual event, that research must be well

integrated into actual post-disaster services, that the research effort should be a joint effort among outside investigators and local researchers, and that the research should employ local workers to collect data, if possible.

PREFACE

This paper is one of a series on research in progress in the field of human adjustments to natural hazards. The series is intended to aid the rapid dissemination of research findings and information on research in progress. The series was started in 1968 by Gilbert White, Robert Kates, and Ian Burton with National Science Foundation funds. It is now on a self-supporting basis and produced by the:

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PRIMARY MENTAL HEALTH CARE

The importance of primary care as the main strategy for attaining "health for all by the year 2000" has been widely accepted. Primary health care has been defined by the World Health Organization (WHO) as

> essential health care made universally accessible to individuals and families in the community by means acceptable to them, through their full participation and at a cost that the community and country can afford. It forms an integral part both of the country's health system of which it is the nucleus and of the overall social and economic development of the community. (World Health Organization, 1978)

Primary health care services must be organized in a way that will assure they will be delivered longitudinally, locally, comprehensively, in a personalized manner, and with the full participation of the community (Busnello, 1976). The main strategies of primary health care include:

- extension of health care coverage and improvement of environmental conditions;
- community organization that encourages active community participation in its own well-being;
- development of inter-sectorial collaboration;
- development of appropriate research and technology;
- availability of human, financial and physical resources; and
- international cooperation.

Primary health care involves a variety of priority areas, such as maternal and child health, immunization, acute respiratory diseases, malaria, food and nutrition, cardiovascular and degenerative diseases, cancer, occupational diseases, and mental health (Pan American Health Organization, 1980).

Mental health is one of the essential elements of primary care both in developed countries (Shepherd, 1980), where it has been called the "keystone of community psychiatry" (World Health Organization, 1973), and in developing nations (World Health Organization, 1975), where the success of mental health

programs largely depends on how well mental health care is integrated with primary health care (Lin, 1983). As part of the various activities developed for health promotion and disease prevention, mental health programs have the following goals (Gulbinat, 1983):

- prevention and treatment of psychiatric disorders (the classic model);
- increased application of mental health knowledge to general health programs; and
- prevention of the harmful consequences of accelerated social changes.

The need to provide primary mental health services is widely supported by clinical epidemiological studies. Fifteen to twenty-five percent of patients attending primary care clinics in both developed (Shepherd, 1967) and developing countries (Harding et al., 1980) have diagnosable mental health problems. Furthermore, even in the United States, where extensive specialized mental health resources are available, 60% of all patients with emotional and psychiatric problems are managed within the general/primary care sector (Regier et al., 1978), and almost one-half of all office visits resulting in a mental disorder diagnosis are to nonpsychiatrists--mostly primary care physicians (Schurman et al., 1985). A similar pattern of service utilization probably exists in developing countries where specialized mental health resources are blatantly inadequate (Harding, 1976).

Hence, various efforts have been made to develop the capability of the primary care sector to identify and manage patients with emotional problems. The WHO study on strategies for extending mental health care has identified crucial aspects for the successful design and implementation of a primary mental health care program (World Health Organization, 1984):

- formulating a national policy on mental health and establishing a mental health department or unit within each country's national or regional administration;

- providing adequate financial support for:
  - the recruitment, training, and employment of personnel,
  - the provision of drugs,
  - a network of facilities, including transportation,
  - data collection and research;

- decentralizing mental health services, integrating them with general health services, and collaborating closely and effectively with nonmedical community agencies;

- having all nonspecialized health workers at all levels--primary health worker, nurse, or doctor--undertake certain basic mental health tasks as part of their routine work;

- having all specialized mental health workers devote only a part of their working hours to the clinical care of patients, so that they can spend the greater part of their efforts training and supervising the nonspecialized health workers who will themselves provide basic mental health care to the community;

- providing mental health professionals with adequate instruction and supervised experience in this new task of training and supporting nonspecialized health workers.

In developing countries, the primary care worker (PCW) may be the general doctor or the nurse, but more frequently he or she is a person with limited education and training, selected by the local community or with the community's agreement to perform basic health actions (World Health Organization, 1980). In developed countries, the PCW has been variously defined (Spiegel et al., 1983), but may include the family doctor, the internist, the gynecologist, or the pediatrician (Draper and Smits, 1975), as well as the specialist (Aiken et al., 1979), or the intermediate level health professional, such as the physician assistant or nurse practitioner (Lamb and Napodona, 1984; Rosenauer et al., 1984), whose mental health training can vary considerably (Burns and Scott, 1982; Cohen-Cole and Bird, 1984).

Of course, the PCW's mental health training includes the conditions seen and experience gained in routine clinical practice, such as:

- administration of first-aid in neuropsychiatric emergencies;

- maintenance treatment of the chronically mentally ill;

- delivery of advice and support to high-risk families;
- referral of mentally ill people in a non-acute or unclear state to nearby health facilities;
- provision of family education about psychosocial development and the needs of the elderly and the handicapped;
- support of the mentally ill and education about self-care; and
- collaboration with community leaders in activities aimed at protecting and promoting mental health. (Harding et al., 1980)

To increase the effectiveness of mental health interventions by the PCW, priority mental health problems to be addressed at the primary level of care have been identified by the World Health Organization (1984), and include:

- psychiatric emergencies;
- chronic psychiatric disorders;
- mental health problems of patients attending health units, general clinics, and other curative services; and
- psychiatric and emotional problems of high-risk groups.

These broad categories have to be adjusted to local needs following the criteria developed for pediatric priorities in developing countries (Morley, 1973) and adapted for psychiatric problems in primary care (Giel and Harding, 1976). These criteria are the point-prevalence and seriousness of the problem, the existence of simple techniques for its effective management, and the concern of the community.

DISASTERS AND PRIMARY MENTAL HEALTH CARE

When the criteria for the identification of priority conditions in the delivery of primary mental health care are applied to disasters, victims can be considered a priority population for various reasons:

- disaster victims are known to be a group at high-risk for developing emotional problems, both shortly after the impact and in the long-run (Bromet et al., 1982; Burke et al., 1982; Dohrenwend et al., 1981; Dunal et al., 1985; Glass, 1959; Gleser et al., 1981; Hoiberg and McCaughey, 1984; Kinston and Rosser, 1974; Mellick, 1978; Newman, 1976; Parker, 1975; Patrick and Patrick, 1981; Perry and Lindell, 1978; Popovic and Petrovic, 1984; Shore et al., 1986; Titchener and Kapp, 1976; Wilkinson, 1983);

- the community is usually concerned about the disaster and its health and mental health consequences for the victims (Barton, 1970); and

- since it has been shown that PCWs can be trained to carry out relatively simple, well-defined mental health interventions for the identification and management of problems seen in primary care settings (Harding et al., 1980), it is reasonable to expect that they can be similarly trained to intervene effectively with disaster victims.

In developing countries, disasters represent a significant public health problem (Table 1). Excluding disasters in the United States (United States Agency for International Development, 1986), in this century there were 2,392 disasters in the world, 86.4% of which occurred in developing nations. These latter events resulted in 42 million deaths (78% of all deaths) and 1.4 billion affected individuals (97.5% of all affected persons). The observed ratio between affected and killed--only 2.9 for the developed nations--is tenfold greater for developing countries. Hence, not only are disasters disproportionately more frequent in the Third World, they are also responsible for a much higher proportion of victims who, having survived the disaster impact, need long-term management of their biological, psychological, and social needs. Recent disasters in Latin America and elsewhere (i.e., Bhopal

TABLE 1

WORLDWIDE DISASTERS (EXCLUDING UNITED STATES):
KILLED AND AFFECTED INDIVIDUALS AND NUMBER OF DISASTERS, 1900-1975

INDIVIDUALS	TOTAL		DEVELOPED COUNTRIES		DEVELOPING COUNTRIES	
	N	%	N	%	N	%
KILLED	53,245,836	100	12,056,683	22.0	42,040,168	78.0
AFFECTED	1,419,351,000	100	35,822,000	2.5	1,383,529,000	97.5
TOTAL	1,472,596,836		47,878,683		1,425,569,168	
RATIO	26.7		2.97		32.9	
NUMBER OF DISASTERS	2,392	100	327	13.6	2,036	86.4

(United States Agency for International Development, 1986)

and Cameroon) highlight the increasing health impact of such events.

Disasters are also more likely to affect socioeconomically disadvantaged populations in both developed and developing countries, because the fast rise in urban population, the pressure on land, and steadily deteriorating economic conditions have forced underprivileged populations into increasingly more hazardous areas and thus increased their vulnerability to disaster (Seaman, 1984). Although these socioeconomically disadvantaged populations have little access to specialized mental health care, they constitute the highest priority group for whom primary care has been recognized as the most appropriate strategy for mental health service delivery (World Health Organization, 1978).

For these reasons, disaster victims, as a group at high-risk for presenting psychological problems, should constitute a priority for primary mental health care, but the detection and management of their emotional difficulties

at the primary level of health care have been surprisingly neglected. Although mental health interventions in the more immediate post-impact phase have been proposed (Brownstone et al., 1977), no systematic attention has been paid to the development, implementation, and evaluation of the PCW's role in providing medium- and long-term mental health care to victims of disasters in developing countries (Lima, 1986a)--mostly because these psychological consequences have been, in general, largely underestimated (Clayer et al., 1985). This neglect may be due to various factors--including the competing health needs of disaster victims, ranging from the management of individual physical problems to the improvement of environmental conditions (Pan American Health Organization, 1981)--that result in mental health having a relatively low priority in overall disaster response planning (Lechat, 1979). The neglect may also be due to perceived difficulties in training PCWs in the appropriate detection and effective management of victims' emotional problems.

In developed countries, the greater availability of specialized mental health resources can overshadow the role of the PCW. However, even if disaster victims have access to specialized mental health services they may still be reluctant to utilize them (Lindy et al., 1981), because victims see themselves as normal individuals who have been subjected to an extreme situation (Cohen, 1985) and not as psychiatric patients. It is reasonable to expect that victims will utilize the PCW, rather than the specialized mental health professional, for the management of their emotional and social difficulties alongside their physical problems. The studies conducted by McFarlane (1984, 1986) with bushfire victims in Australia support this assumption.

In the U.S., the fastest growing segment of the population is Hispanics with a current population of over 14 million and a projected increase between 1985 and 2000 of 45.91%, as compared to a projected increase of 22.97% in the

black population and 9.62% in the white (U.S. Bureau of the Census, 1986). Sixty percent of Hispanics are located in high-risk areas for disasters: California, Texas, and Southern Florida. The recent earthquakes in Los Angeles and destruction of the town of Saragosa, Texas by tornadoes are vivid examples of the kinds of events that can occur in these areas. Clearly, the experience derived in providing health and mental health services to victims and affected communities in developing countries is of great importance to disaster management in the U.S.; it will significantly aid the development of culturally appropriate models of mental health service delivery.

Disasters represent an opportunity for furthering the development of a decentralized primary health care system and integrating mental health care into general health services at the primary level of care. (Pucheu, 1985; Soberon et al., 1986). However, for this process to begin, it needs to be clearly established that the frequency, severity, and types of mental health problems of disaster victims are significant, not only in the immediate aftermath of the tragedy, but also in the medium- and long-term, and that PCWs can learn and use effective mental health interventions to prevent and control the psychiatric morbidity of victims.

These issues have been addressed by our project. In this paper, we report the prevalence of psychiatric problems among disaster victims in tent camps. The prevalence of the problems in primary care clinics and their recognition by primary care workers will be reported in a subsequent paper. A later project undertaken following the earthquakes of March, 1987 that struck Ecuador's northern provinces specifically addressed the training of the primary care worker in disaster mental health, but the data from that effort have not been analyzed as yet.

THE ORIGINS OF THE ARMERO PROJECT

The Division of Mental Hygiene of the Colombian Ministry of Health took the initiative of designing, implementing, and evaluating a national primary mental health care plan, for which it consulted the Pan American Health Organization. One of us (Lima) started working on the plan in August, 1985 as a consultant (Lima, 1985), and a subsequent national meeting was scheduled for November 27-29, 1985 in the town of Ibague, capital of the State of Tolima, to permit state mental health directors to discuss the proposed plan. The State of Tolima was selected as the site for the meeting because, due to the excellence of its community-based mental health services, the plan would be pilot-tested in its northern regions. However, neither the meeting nor the visit to the regional psychiatric hospital in the neighboring town of Armero took place. The eruption of Nevado del Ruiz on November 13 produced a mudslide that completely destroyed Armero and left a total of 24,000 dead, 5,000 injured, and scores of homeless survivors in dire economic condition (Sigurdsson and Carey, 1986).

For several reasons, the special characteristics of this disaster seemed to provide an excellent opportunity for exploring the role of the PCW in delivering mental health care to disaster victims. Eighty percent of the 30,000 inhabitants of Armero had perished in the tragedy, and the small towns of Lerida and Guayabal, with original populations of about 3,000 people each, had to assimilate approximately 6,000 homeless victims. Survivors, to whom primary care would be targeted, were mostly unskilled workers with limited possibility for alternative gainful employment. The population was unprepared for the disaster in which it was rapidly and deeply involved; the disaster had not been anticipated and the events were totally unfamiliar to the community.

All of these features have been identified by Quarantelli (1985) as

strong predictors of emotional difficulties among victims. In reviewing the clinical observations of health care providers local to the disaster area, these initial assumptions were confirmed. Two weeks after the eruption, various psychosocial problems were noted--particularly, depressive states and acute anxiety, with recurrent nightmares and intrusive fantasies that recapitulated the disaster experiences of the victims. In the following months, an increase in both frequency and severity of psychophysiological disorders was noted; complaints included backaches and headaches, hypertension, cardiovascular problems, and gastrointestinal complaints. Chronic disorders that required careful management--such as diabetes and epilepsy--were being poorly controlled, secondary to difficulties in complying with prescribed regimes. Six to twelve months later, additional problems also became conspicuous. Because temporary shelters were still being used for housing and jobs had not become available to most, survivors showed a growing dissatisfaction with living conditions. The frequency of alcohol and drug abuse increased, as did episodes of conduct problems, such as violence and thefts. Hence, in the course of a few months, a wide variety of interrelated problems emerged, encompassing biological, psychological, and social aspects of survivors' lives. An integrated biopsychosocial approach to health care was therefore thought to be most appropriate for the effective detection and management of victims' health problems.

In addition, the 90-bed regional psychiatric hospital in Armero, representing 87% of the state's inpatient resources, was completely destroyed. Thirty-seven of its professional, administrative, and ancillary staff perished, drastically decreasing specialized mental health resources, and automatically shifting to the general/primary health care sectors the responsibility for meeting victims' mental health needs (Servicio De Salud Del Tolima,

Seccione De Salud Mental, 1986)

One of us (Lima) took advantage of this naturalistic experiment and submitted a proposal to the Pan American Health Organization that special mental health consultation be provided to explore the role of the primary care sector in delivering mental health care to victims in the medium- and long-range. This proposal was enthusiastically accepted by the Pan American Health Organization and by the Division of Mental Health of the Colombian Ministry of Health. The consultation was carried out immediately after the disaster (November 29 to December 8, 1985) and its findings have been reported (Lima, 1986b). This consultation eventually led to the development of the Armero Project.

THE ARMERO PROJECT

On the basis of the previous observations and assumptions, the authors have developed a long-range plan to ascertain the magnitude of emotional disorders of victims of disasters and to train PCWs effectively in the identification and management of these problems. The successful completion of the project should encourage the adoption of national health policies to promote the role of the PCW in the delivery of mental health care to victims of disasters, particularly in developing countries.

The various stages of the project are:

- ascertaining the prevalence of emotional disorders among disaster victims in the community and in primary health care clinics;
- designing appropriate instruments for the screening of victims with emotional disorders;
- developing training material for the PCW on disaster mental health; and
- evaluating selected outcomes of the training program, such as improvement in PCWs' knowledge of disaster mental health and in their skills in identifying and managing victims with psychiatric problems, and improvement in the clinical status of victims.

Our study in Armero consisted of a two-stage evaluation of the psychiatric status of adult survivors of the disaster: an initial screening of a sample of victims for emotional disorders, and a subsequent clinical interview of a subsample of respondents, conducted by a psychiatrist.

Screening

All adult victims located in two shelters and one camp of the disaster area and a convenience sample of a second camp were recruited into the study (n=200). No subject refused to participate. The sociodemographic characteristics of the various groups were not significantly different.

The screening was done by mental health professionals local to the

disaster area, and included two psychologists, a psychiatric nurse, and a psychiatric occupational therapist.

The screening interviews were conducted in the shelter and camps seven and eight months after the disaster. Victims were approached by the interviewer and invited to participate in the study. Not only did no subject refuse to be interviewed, survivors actually seemed to welcome the opportunity to go over the traumatic experience and to air their feelings, often times extending the interview over the anticipated period of 30 minutes.

We were not able to collect data on a control group. The difficulties present in carrying out a disaster study in a developing country are formidable, and asking health care workers in Armero to go beyond the delivery of needed services to collect research data was already distracting. Moreover, the population in surrounding communities, although not directly affected by the volcanic eruption, had become so involved with the disaster that they could not be seen as a control group. To screen a community sample in a geographically different area was simply not feasible.

Data were collected on the victims' sociodemographic characteristics, their disaster experience, the emergency shelter environment and social supports available, and their reported physical and emotional complaints. An extensive screening questionnaire was prepared that included a number of questions covering the above areas. It also included a modified version of the Self-Reporting Questionnaire (SRQ), a simple and reliable instrument for the identification of individuals with emotional problems, which had been used in various developing countries (Harding et al., 1980; Mari and Williams, 1985; Sen et al., 1987). Similar to other screening instruments, the SRQ indicates that, if a given individual scores positively, he or she is a "probable case," although the specific nature of the disorder cannot be

stated--the final determination being made after a psychiatric examination performed by a well-trained clinician.

The original SRQ consists of a twenty-item neurotic subscale and a four-item psychotic subscale (Appendix 1). Based on our previous experience with this instrument in Brazil (Busnello et al., 1985), we added one question on epilepsy and one question on alcohol abuse. Initially a probable case, according to the score on the SRQ, was defined as a score of eight or more points on the neurotic subscale, or a score of one or more points on the psychotic subscale, or a positive answer to either the question of epilepsy or alcohol.

Based on their scores on the SRQ, the total sample of 200 individuals was divided into two groups: those who scored positively as per the criteria given above and those who scored negatively. The data regarding their socio-demographic characteristics, their experience of the disaster, their emergency shelter environment, and their reported physical and emotional problems were then compared for those two groups to identify significant associations with the level of emotional distress as measured by the SRQ. Significance of any such noted differences was tested by chi square with Yates correction when appropriate.

Interview

A subsample of the victims screened was interviewed by a psychiatrist. Twenty-three cases were dropped because their SRQ positivity was based only on a positive answer to the alcohol question (n=22) or the epilepsy question (n=1). This decision was based on the rationale that the research project had been conceived not only as a way for developing new knowledge but also as a strategy for improving the mental health services that were being delivered to the victims. Given the scarcity of specialized mental health resources in the

area and the multiple demands placed on them, it was deemed most efficient to concentrate the efforts on those patients for whom the screening instrument had indicated the probable presence of a mental disorder. For the victims who were thought to have only a probable alcohol problem, alternative treatment was available (e.g., Alcoholics Anonymous or self-help, community-based groups) for which the specialized mental health services did not have to be utilized. The only victim with a positive score on the question on epilepsy was felt to be an idiosyncratic case that should not be included in the more homogenous group.

This brought the total number of individuals in the interviewed sample to 177. Of these, 90 subjects had positive SRQ scores, and 87 had negative SRQ scores. We attempted to interview all subjects with positive SRQ scores, and about one-third of those with negative SRQ scores. Seventy of the positives and 34 of the negatives were eventually interviewed by the research psychiatrists. Even though attempts were made to randomly select the subsample of 104 subjects who were interviewed, this could not be accomplished, mostly because many individuals had moved out of the area by the time this process began. Only two subjects refused the interview (Figure 1).

The interviewers (n=9) were faculty of the Department of Psychiatry and psychiatric residents of the University of Javeriana. They were all experienced clinicians who had been working in the area at the time of the tragedy. They were familiar with issues of disaster mental health and had been given additional training in this specific area.

The interviewers were not blind to the SRQ positive and SRQ negative grouping of the total sample; they conducted all the psychiatric interviews for the SRQ positives before they did the same for the SRQ negatives. The

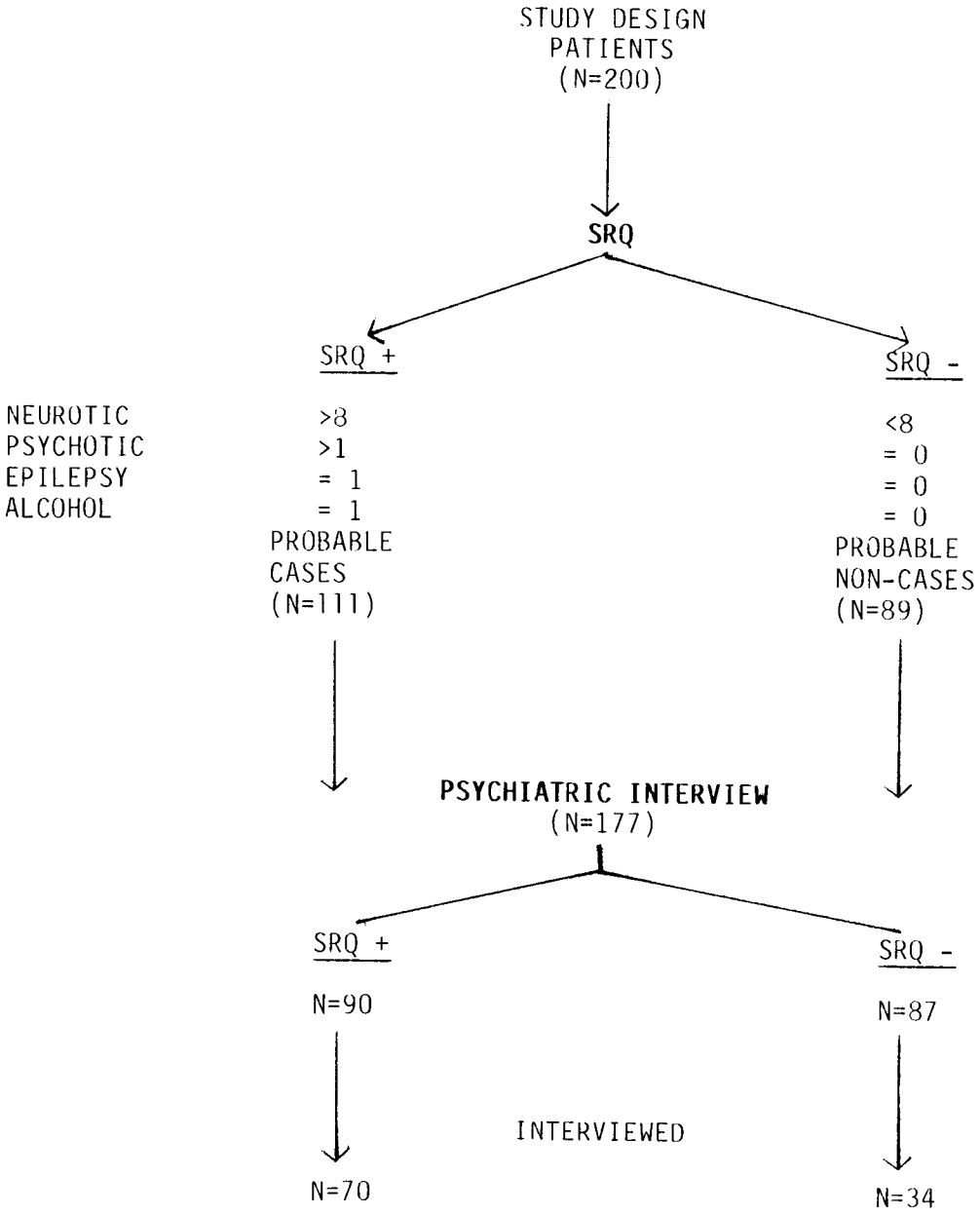

FIGURE 1

THE SELECTION OF SUBJECTS TO BE INTERVIEWED

interviews for the SRQ positive group were conducted concurrently with the screening, but the interviews for the SRQ negative group were carried out later, approximately 10-12 weeks after initial screening.

The psychiatric interview schedule was developed taking into consideration various issues, such as the training of the clinicians, the specific disaster circumstances, and the need to produce generalizable results. The excessive demands for delivering mental health care to victims in the post-impact period prevented formal training in the use of a standardized interview schedule. Psychiatrists were most familiar with the format routinely used in their clinical services, and it was decided to utilize this interview schedule for conducting the psychiatric examination. This clinical interview schedule was adjusted to obtain data relevant to the specific disaster situation. It gathered information on sociodemographic data, family and personal history, personality structure, previous psychiatric disorders, past and current medical disorders, health and mental health care received, disaster experience, current emotional problems, and current mental status. Upon completion of the interview, the psychiatrists entered their clinical diagnosis.

To augment standardization of results and generalizability of the findings, a symptom checklist (Helzer, 1984) was appended to the interview schedule to generate diagnoses according to the criteria established by the third edition of the Diagnostic and Statistical Manual (DSM-III) (American Psychiatric Association, 1980). The clinicians were asked to check the identified symptoms after their clinical diagnosis had been recorded. For economy of time, only certain DSM-III categories of the original symptom checklist were chosen, as it was thought they would cover most of the psychiatric problems commonly reported among disaster victims. The diagnostic categories selected were: organic mental syndrome, schizophrenia, major depression, mania,

dysthymic disorder, atypical bipolar disorder, phobias, panic disorder, generalized anxiety disorder, obsessive-compulsive disorder, post-traumatic stress disorder, somatization disorder, adjustment disorder, psychological factors complicating physical illness, alcohol abuse and dependence, and drug abuse and dependence. The symptoms checked by the psychiatrist were reviewed by an independent rater who was familiar with DSM-III criteria to produce DSM-III diagnoses for each individual case.

Selected variables of the victims who were interviewed and not interviewed within each group of SRQ scores were compared to ascertain the possible impact of differences in these background variables on the eventual psychiatric diagnosis. The diagnoses produced by the clinicians and by DSM-III criteria were analyzed, and criteria for the establishment of confirmed cases were defined. Finally, confirmed psychiatric cases were compared with SRQ score groupings to ascertain the properties of the instrument in correctly identifying victims with psychiatric problems.

RESULTS

Results of the screening of victims with SRQ and the diagnoses produced by the psychiatric interviews are reported below.

Screening

The findings of the analysis are given in Tables 2 through 6. As can be seen on Table 2, a little over half of the sample (52.5%) were males, with 70% being under age 45. Fifty-seven percent were either legally married or had a common-law marriage. One-fifth were single. Half of the sample had elemen-

TABLE 2

DISTRIBUTION (%) OF SELECTED SOCIODEMOGRAPHIC CHARACTERISTICS AND MEAN SRQ (SELF-REPORTING QUESTIONNAIRE) SCORES OF THE ARMERO VICTIMS

	SCREENED (n=200)	AVAILABLE FOR INTERVIEW (n=177)
SEX		
MALES	53	48
FEMALES	47	52
AGE		
18-44	70	68
45-64	22	23
65+	8	9
MARITAL STATUS		
SINGLE	20	20
MARRIED	13	14
COMMON-LAW	45	43
SEPARATED	8	9
WIDOW	14	14
EDUCATION		
NONE	31	31
1-5	54	54
6+	15	15

tary education, but one-third were illiterate. All subjects were of mixed racial composition.

The overall prevalence of emotional psychiatric problems was 55.5%. When neurotic subscales of subjects from the SRQ positive and the SRQ negative groups were compared, a large difference in the mean SRQ scores was noted. The mean score of the neurotic subscale for subjects with a negative SRQ (3.39 ± 2.14) was about a third of the mean score for subjects with a positive SRQ (9.78 ± 4.36). This difference was highly significant ($p < .001$).

The acknowledgement of the presence of any of the twenty symptoms in the neurotic subscale of the SRQ was significantly associated with a positive SRQ score (Table 3).

The most frequently reported symptoms in the neurotic subscale of the SRQ were: feeling nervous, tense, or worried; being easily frightened; and having headaches (Table 4).

The strongest predictors of SRQ positivity, however, were the neurotic symptoms of feeling unable to play a useful part in life, feeling tired all the time, and having problems in thinking clearly (Table 5).

The presence of emotional distress as indicated by the results of the SRQ was examined in relation to selected personal variables, the disaster experience, environmental variables, and reported physical and emotional problems (Table 6). Among the personal variables, only living alone was significantly associated with emotional problems. A consistent trend indicating possible positive relationships between increasing age and positive SRQ scores as well as decreasing education and positive SRQ scores was also noted with a borderline statistical significance.

Various aspects of the disaster experience that might have been thought to be closely related to the victims' mental health were not significantly

TABLE 3

PREVALENCE (%) OF EMOTIONAL DISTRESS DEFINED BY SRQ
BY NEUROTIC SYMPTOMS INCLUDED IN THE SRQ

NEUROTIC SYMPTOMS	SYMPTOM PRESENT? YES N	YES % WITH EMOTIONAL DISTRESS	NO N	NO % WITH EMOTIONAL DISTRESS	P
1. DO YOU OFTEN HAVE HEADACHES?	112	68.8	88	38.6	<.001
2. IS YOUR APPETITE POOR?	85	76.5	115	40.0	<.001
3. DO YOU SLEEP BADLY?	84	70.2	116	44.8	<.001
4. ARE YOU EASILY FRIGHTENED?	117	66.7	83	39.8	<.001
5. DO YOUR HANDS SHAKE?	72	84.7.	128	39.1	<.001
6. DO YOU FEEL NERVOUS, TENSE OR WORRIED?	163	62.6	37	24.3	<.001
7. IS YOUR DIGESTION POOR?	43	81.4	157	48.4	<.001
8. DO YOU HAVE TROUBLE THINKING CLEARLY?	34	91.2	164	47.6	<.001
9. DO YOU FEEL UNHAPPY?	68	83.8	131	40.5	<.001
10. DO YOU CRY MORE THAN USUAL?	45	82.2	153	47.1	<.001
11. DO YOU FIND IT DIFFICULT TO ENJOY YOUR DAILY ACTIVITIES?	73	89.0	126	35.7	<.001
12. DO YOU FIND IT DIFFICULT TO MAKE DECISIONS?	68	76.5	131	45.0	<.001
13. IS YOUR DAILY WORK SUFFERING?	63	87.3	137	40.9	<.001
14. ARE YOU UNABLE TO PLAY A USEFUL PART IN LIFE?	31	100.0	169	47.3	<.001
15. HAVE YOU LOST INTEREST IN THINGS?	70	82.9	130	40.8	<.001
16. DO YOU FEEL THAT YOU ARE A WORTHLESS PERSON?	44	86.4	156	46.8	<.001
17. HAS THE THOUGHT OF ENDING YOUR LIFE BEEN IN YOUR MIND?	34	85.3	166	49.4	<.001
18. DO YOU FEEL TIRED ALL THE TIME?	42	95.2	155	43.9	<.001
19. DO YOU HAVE UNCOMFORTABLE FEELINGS IN YOUR STOMACH?	47	87.2	150	46.0	<.001
20. ARE YOU EASILY TIRED?	93	80.6	104	32.7	<.001

TABLE 4

PREVALENCE (%) OF EMOTIONAL DISTRESS DEFINED BY SRQ
BY THE MOST FREQUENT NEUROTIC SYMPTOMS INCLUDED IN THE SRQ

NEUROTIC SYMPTOMS	SYMPTOM PRESENT? YES N	YES % WITH EMOTIONAL DISTRESS	NO N	NO % WITH EMOTIONAL DISTRESS	P
1. DO YOU FEEL NERVOUS, TENSE OR WORRIED?	163	62.6	37	24.3	<.001
2. ARE YOU EASILY FRIGHTENED?	117	66.7	83	39.8	<.001
3. DO YOU OFTEN HAVE HEADACHES?	112	68.8	88	38.6	<.001

TABLE 5

PREVALENCE (%) OF EMOTIONAL DISTRESS DEFINED BY SRQ
BY THE STRONGEST PREDICTORS OF SRQ POSITIVITY

NEUROTIC SYMPTOMS	SYMPTOM PRESENT? YES N	YES % WITH EMOTIONAL DISTRESS	NO N	NO % WITH EMOTIONAL DISTRESS	P
1. DO YOU FEEL TIRED ALL THE TIME?	42	95.2	155	43.9	<.001
2. DO YOU HAVE TROUBLE THINKING CLEARLY?	34	91.2	164	47.6	<.001
3. ARE YOU UNABLE TO PLAY A USEFUL PART IN LIFE?	31	100.0	169	47.3	<.001

TABLE 6

PREVALENCE (%) OF EMOTIONAL DISTRESS DEFINED BY SRQ
BY SELECTED VARIABLES

		VARIABLE PRESENT? YES		VARIABLE PRESENT? NO		
		N	% WITH EMOTIONAL DISTRESS	N	% WITH EMOTIONAL DISTRESS	P
I.	PERSONAL VARIABLES					
	LIVING ALONE	18	83.3	162	51.9	<.03
	AGE (YEARS) 18-44	140	51.4		NA	~.06
	45-64	43	62.8		NA	
	65+	17	70.6		NA	
	EDUCATION (YEARS) NONE	61	62.8		NA	~.07
	1-5	109	55.0		NA	
	6+	30	43.3		NA	
II.	ENVIRONMENTAL VARIABLES					
	HAVING LOST PREVIOUS JOB	52	75.4	76	50.0	<.003
	BEING HELPED NOW	114	46.5	85	67.1	<.004
	KNOWING DATE FOR LEAVING	83	45.8	105	62.9	<.02
	SATISFIED WITH LIVING ARRANGEMENT	48	39.6	151	60.3	<.02
III.	REPORTED PHYSICAL PROBLEMS					
	EPIGASTRIC PAIN	13	92.3	187	52.9	<.02
	NON-SPECIFIC SYMPTOMS	29	72.4	171	52.6	<.05
	NUMBER OF PHYSICAL COMPLAINTS NONE	84	45.2		NA	
	1	72	59.7		NA	<.02
	2	39	60.0		NA	
	3	14	86.7		NA	

TABLE 6 (Continued)

PREVALENCE (%) OF EMOTIONAL DISTRESS DEFINED BY SRQ
BY SELECTED VARIABLES

	VARIABLE PRESENT? YES		VARIABLE PRESENT? NO		
	N	% WITH EMOTIONAL DISTRESS	N	% WITH EMOTIONAL DISTRESS	P
IV. DISASTER EXPERIENCE					
SEEN HORRIBLE THINGS	184	54.9	14	57.1	NS
LOSING ANY FAMILY MEMBER	157	56.1	42	52.4	NS
UNAWARE OF IMPENDING DANGER	70	51.4	130	57.7	NS
CONTINGENCY PLANS	24	54.2	175	55.4	NS
BEEN INJURED	62	62.9	133	50.4	NS
RECOVERED FROM INJURIES	40	57.5	25	76.0	NS
BEEN OF HELP TO OTHERS	63	60.3	134	53.7	NS

associated with increased emotional distress. For instance, seeing horrible things in the disaster, losing family members, being unaware of the impending danger, not having made contingency plans for self-protection, having been injured or not having recovered, and not having been of help to others were not predictive of subsequent emotional problems.

Various current experiences were significantly associated with emotional distress. These included having lost a previous job, not feeling that someone was being of help, not knowing a date for leaving the temporary housing, and being dissatisfied with living arrangements. Certain reported physical problems were significantly related to positive SRQ scores, particularly complaints of epigastric pain, nonspecific symptoms, and increasing number of physical complaints. Patients who complained of emotional distress, such as depression, psychosomatic problems, or interpersonal difficulties, were also significantly more likely to score positively on the SRQ.

Interviews

The sociodemographic characteristics of the subsample interviewed (n=177) are also given on Table 2. There was a slightly greater proportion of females (52%), and two-thirds of the subjects were under age 45. Slightly over half of the sample had elementary education, but one-third were illiterate. About half were married or had a common-law marriage. All subjects were of mixed racial composition. The demographic characteristics of this sample of 177 subjects was similar to that of the original sample of 200 victims, and there were no significant differences between the mean SRQ score for the neurotic and psychotic subscales between the two samples.

When the neurotic subscales of subjects from the SRQ positive and the SRQ negative groups were compared, there was again a large difference in the mean SRQ scores. The mean score of the neurotic subscale for the subjects with a

negative SRQ (3.31 $\pm$ 2.07) was less than a third of the mean for the subjects with a positive SRQ (11.19 $\pm$ 3.50). This difference was very significant as well ($p < .001$).

An initial comparison between the interviewed and non-interviewed groups was carried out (Table 7) to see whether they differed significantly in their sociodemographic characteristics and in the distribution of some of the variables which, in the original sample of 200 subjects, had been significantly associated with a higher risk for experiencing emotional distress as defined by a positive SRQ score.

Among the SRQ positives, no significant differences were found between the interviewed and non-interviewed groups in any of the selected variables, which included mean SRQ score for the neurotic and psychotic subscales, age, sex, education, marital status, current occupation, presenting physical problems, feeling that people had been of help, and knowing the date for leaving the temporary camp. Among the SRQ negatives, however, significant differences between the interviewed and non-interviewed groups were noted, with a higher proportion of women and unemployed victims being in the interviewed group. Also, the mean SRQ scores for these two subgroups differed significantly, with a higher mean of the neurotic subscale being present in the interviewed group.

A comparison of the diagnostic categories included in the DSM-III symptom checklist with the diagnoses made by the clinicians indicated that some of the selected categories proved unnecessary, as no subject received a diagnosis of schizophrenia, mania, obsessive-compulsive disorder, dysthymic disorder or drug abuse or dependence. On the other hand, the clinicians made some diagnoses for which there were no available DSM-III categories for validation in the symptom checklist. The frequency of these diagnoses, however, was small.

TABLE 7

SELECTED CHARACTERISTICS OF ARMERO VICTIMS (n=177)
BY SRQ AND INTERVIEW STATUS

		SELF REPORTING QUESTIONNAIRE					
		NEGATIVE (N=87)			POSITIVE (N=90)		
		INTERVIEWED (N=34)	NOT INTERVIEWED (N=53)	P	INTERVIEWED (N=70)	NOT INTERVIEWED (N=20)	P
MEAN SRQ SCORE							
Neurotic Subscale		4.03 ± 2.01	2.85 ± 1.98	.008	11.41 ± 3.57	10.40 ± 3.20	NS
Psychotic Subscale		-----	-----	----	.77 ± .95	.65 ± .67	NS
AGE (YEARS)	18-44	70.6	79.2		58.6	70.0	
	45-64	20.6	17.0	NS	27.1	25.0	NS
	65+	8.8	3.8		14.3	5.0	
SEX	MALE	32.4	64.2	.004	38.6	60.0	NS
	FEMALE	67.6	35.8		61.4	40.0	
EDUCATION (YEARS)	NONE	32.4	22.6		40.0	20.0	
	1-5	52.9	54.7	NS	48.6	70.0	NS
	6+	14.7	22.6		11.4	10.0	
MARITAL STATUS	SINGLE	8.8	20.8		20.0	35.0	
	MARRIED	8.8	17.0		15.7	10.0	
	COMMON-LAW	50.0	45.3	NS	40.0	35.0	NS
	DIVORCED	11.8	3.8		11.4	5.0	
	WIDOW	20.6	13.2		12.9	15.0	
CURRENT OCCUPATION	NONE	73.5	34.0	.001	75.7	70.0	NS
	SOME	26.5	64.2		24.3	30.0	
PHYSICAL PROBLEMS	YES	55.9	41.5	NS	73.9	60.0	NS
	NO	44.1	58.5		26.1	40.0	
PEOPLE HELPING	YES	64.7	69.8	NS	52.9	52.6	NS
	NO	35.3	30.2		47.1	47.4	
DATE FOR LEAVING	YES	52.9	56.6	NS	58.6	60.0	NS
	NO	47.1	43.4		41.4	40.0	

There were two diagnoses of dissociative disorder and one diagnosis for each of the following: tobacco dependence, borderline mental retardation, and schizoid, paranoid, and inadequate personality disorders. Except for the one subject with the diagnosis of borderline mental retardation, all the others had at least one additional concurrent DSM-III diagnosis which was included in the checklist.

For the study of the validity of the SRQ, three criteria for psychiatric "caseness" were developed, with varying degrees of stringency:

Criterion 1: The subject had at least one psychiatric diagnosis given by the clinician and subsequently confirmed by DSM-III criteria.

Criterion 2: The subject had at least one psychiatric diagnosis given by the clinician, which may or may not have been confirmed by DSM-III criteria.

Criterion 3: The subject had at least one psychiatric diagnosis as per DSM-III, which may or may not have been diagnosed by the clinician.

These criteria are not mutually exclusive, and each has its advantages and disadvantages. Criterion 1, which is the most stringent in defining a case, may include cases which would be definitely diagnosable but may miss those cases that do not fully meet DSM-III criteria. Given the questionable applicability of DSM-III in Latin America (Alarcon, 1983), culturally-defined cases could be missed, inflating the false-negative rate and depriving potential patients of needed services. Criterion 2, on the other hand, includes all the cases that would receive a clinical diagnosis made by a psychiatrist who shares the subjects' cultural background, though the diagnosis may not meet the more stringent DSM-III criteria for casesness. It relies on clinical criteria which may be perceived as being idiosyncratic, and the diagnoses are usually based on information collected in a somewhat nonreproducible manner. It may tend to diagnose more false positives, thereby inflating the prevalence

rate and inappropriately increasing the provision of mental health services. Criterion 3 may be the most standardized and replicable method for defining a case. However, in the present study it may tend to exclude cases for which the DSM-III checklist did not include a diagnostic category or to ignore the cultural variations of psychopathology.

The diagnostic distribution for both SRQ positives and negatives is given in Table 8 according to the three criteria defined above. It should be noted that most subjects received more than one diagnosis, made either by the clinician or by DSM-III. Among the SRQ positives, the most frequent diagnosis by any criteria was post-traumatic stress disorder, followed by major depression, generalized anxiety disorder, alcohol abuse, and phobias. All other diagnoses were sporadic. Among the SRQ negatives, a similar diagnostic distribution was found, with post-traumatic stress disorder and major depression being the most frequent diagnoses.

The analysis of the validity of the SRQ compared to the criteria for caseness (Table 9) indicates that the sensitivity and the positive predictive value of the SRQ were consistently high irrespective of the criterion used to define a case. The lowest false-negative rate appeared when the clinician's diagnosis was used as the validating criterion.

TABLE 8

DISTRIBUTION OF PSYCHIATRIC DIAGNOSES OF THE ARMERO DISASTER VICTIMS BY RESULTS OF THE SRQ AND BY DIFFERENT CRITERIA FOR CASENESS

DIAGNOSIS	CRITERIA FOR CASENESS* BOTH	CLINICIAN	DSM-III
SRQ POSITIVES			
POST-TRAUMATIC STRESS DISORDER	33	51	35
MAJOR DEPRESSION	24	25	33
GENERALIZED ANXIETY DISORDER	2	15	2
ALCOHOL ABUSE OR DEPENDENCE	4	8	4
PHOBIAS	8	8	14
PSYCHOLOGICAL FACTORS COMPLICATING PHYSICAL ILLNESS	2	2	2
ATYPICAL BIPOLAR DISORDER	1		
SOMATIZATION DISORDERS		4	1
PANIC DISORDER	1	2	1
ADJUSTMENT DISORDER		1	
CONVERSION DISORDER		1	
DISSOCIATIVE DISORDER		1	
SENILE DEMENTIA		1	
PERSONALITY DISORDER			
PARANOID		1	
SCHIZOID		1	
INADEQUATE		1	
MENTAL RETARDATION, BORDERLINE		1	
TOBACCO DEPENDENCE		1	
SRQ NEGATIVES			
POST-TRAUMATIC STRESS DISORDERS	5	12	5
ADJUSTMENT DISORDERS	1	1	1
MAJOR DEPRESSION	3	3	3
GENERALIZED ANXIETY DISORDER	1	1	1
DISSOCIATIVE DISORDER	1	1	1
ALCOHOL ABUSE	1	1	1
PHOBIA		1	

*Both: the diagnosis given by the clinician was confirmed by DSM-III criteria (Criterion 1).

Clinician: the diagnosis by the clinician may or may not have been confirmed by DSM-III (Criterion 2).

DSM-III: the diagnosis met DSM-III criteria, but may or may not have been made by the clinician (Criterion 3).

TABLE 9

VALIDITY OF THE SRQ COMPARED TO DIFFERENT CRITERIA FOR CASENESS OF THE ARMERO VICTIMS INTERVIEWED (n=104)

	CHARACTERISTICS OF THE SRQ				
CRITERIA FOR CASENESS	SRQ+ (n=70)	SRQ- (N=34)	SENSITIVITY	SPECIFICITY	POSITIVE PREDICTIVE VALUE
CRITERION 1: CLINICIAN'S DIAGNOSIS AND DSM-III DIAGNOSIS					
YES	53	8	.87	.60	.75
NO	17	26			
CRITERION 2: CLINICIAN'S DIAGNOSIS					
YES	64	14	.82	.77	.91
NO	6	20			
CRITERION 3: DSM-III DIAGNOSIS					
YES	57	8	.87	.67	.81
NO	13	26			

DISCUSSION

The interpretation of these findings is limited by the special characteristics of the Armero disaster, the sampling process, and the psychiatric interview.

Characteristics of the Disaster

It is known that disasters which disrupt the fabric of the community (i.e., central disasters) are associated with higher levels of psychiatric morbidity than peripheral disasters, wherein the community as a whole is not significantly affected (e.g., a plane crash) (Barton, 1970). The Armero disaster was a central disaster of major proportions--a fact which may account not only for the high prevalence of emotional distress we found during our investigation, but also for a pattern of psychiatric symptomatology which may have favored screening with the SRQ. Disasters of a lesser magnitude or disasters that affect only a specific group of an entire community are not so devastating and may not produce such long-lasting and prevalent emotional disorders.

The Sampling Process

Most of the Armero survivors were individuals of low socioeconomic background; the mudslide caused the greatest damage to the most affluent areas of the town. Furthermore, our research subjects were drawn from the survivors housed in the shelters and camps of the disaster area and were not representative of the entire affected community. It is possible, therefore, that the identified psychiatric prevalence would not have been so high had the selected sample been representative of victims from all socioeconomic strata. However, socioeconomically disadvantaged victims are the target population for the delivery of primary mental health care in developing countries--the group

with which we are particularly interested within the long-term objectives of our project.

We did not survey a control population to see whether the 55% prevalence rate for emotional problems noted in our sample differed from the levels of emotional distress of the general nonaffected population. However, the SRQ was used in the WHO Collaborative Study on "Strategies for Extending Mental Health Care" in developing countries which was carried out in seven centers, including Colombia (Climent et al., 1980). This study produced prevalence rates of emotional problems in primary health care clinics rather than in communities, but it seems reasonable to assume that emotional disorders will be at least the same, and probably higher, in health facilities when compared to a community sample. The total rate of emotional problems among the primary care clinic attenders in four developing countries was 13.9%. In the Colombian center, the observed rate was 10.8%. Our findings revealed a community-based rate four times the one found in primary health care clinics. If the subjects whose positive SRQ score were due solely to their positive response to the questions on alcohol and epilepsy are excluded (n=23), the rate of emotional distress identified by the screening is lowered to 45%--still a very high rate. These observations support the assumption that the high prevalence of psychiatric disorders was likely to have been precipitated either by the disaster directly or by the difficult socioeconomic situation victims faced in the post-impact period.

The Psychiatric Interview

The main issues related to the psychiatric interview phase of the study include the nonrandom selection of subjects for the interview, the fact that clinicians were not blind to the results of the initial screening, and the differential time lapse between the screening and the interview for the SRQ

positives and negatives. While these issues are of concern, they reflect a necessary compromise between an ideal research protocol and the realities of a post-disaster situation in a developing country. In Armero, this compromise was the result of the continuous attention paid to the dual goal of collecting standardized data on a sample of victims while ensuring that their mental health needs were being met to the extent possible.

Concerning the first issue, the subjects interviewed were, in fact, not randomly selected from each group of SRQ negatives and positives. This may have led to a disproportionate representation of emotionally disturbed or undisturbed individuals in each of the interviewed groups. However, subsequent comparison of these groups revealed that there were no significant differences among the interviewed and non-interviewed groups of the SRQ positives. The differences observed in the interviewed and non-interviewed groups of the SRQ negatives (Table 7) indicate a higher representation in the interviewed group, of females, unemployed, and victims with a higher SRQ score. These variables, however, have been noted to be associated with a higher psychiatric morbidity (Lima et al., in press, a), therefore increasing the number of false negatives, and, as such, not supporting the validity of the SRQ.

Concerning the second issue, the clinicians who conducted the psychiatric interviews for validation of the SRQ were not blind to the SRQ positive and negative grouping of the individuals they interviewed. It is possible, therefore, that they may have been biased to some extent to arrive at positive diagnoses for the individuals from the SRQ positive group and to underdiagnose the victims previously identified as "probable normals."

Our data, however, suggest that such a bias, if existent, was probably minimal. First, the SRQ was administered by other mental health workers, and

the clinicians had no need to justify its results. Second, using the clinicians' diagnosis as the criterion for caseness (Table 9), there was a higher proportion of diagnosed cases among the SRQ negatives interviewed than indicated by either one of the other criteria. This finding supports an assumption of lack of bias. Also, typically, clinicians generally tend to trust their own clinical diagnostic impression over the findings of an experimental questionnaire.

A third point of concern is the longer time lapse between the initial SRQ screening and the subsequent psychiatric interview for the SRQ negatives compared to the SRQ positives. There is a possibility that this lapse may have led to improvement of transient psychopathology, if it initially existed among the SRQ negatives, hence leading to a reduced detection of false negatives. However, since the initial SRQ screening itself was conducted seven months after the disaster, the likelihood of transient psychopathology being present is slight.

CONCLUSIONS

The initial analysis of the data collected in Armero underscores a variety of substantive issues related to disaster mental health, highlights operational aspects of international collaborative research on the interface of disaster, mental health, and primary care, and provides guidelines for the interaction between specialized mental health resources and the primary level of care.

Substantive Issues

1) In our study, we identified a very high prevalence of emotional distress among adult victims located in temporary shelters seven months after a major disaster in a developing country. One of every two adults had psychological symptoms of such severity and frequency that the diagnostic instrument used identified him/her as a "probable case." Subsequent interviews resulted in the individuals identified by the SRQ receiving a definitive psychiatric diagnosis, thus indicating that not only did there seem to be a high level of "nonspecific" or "minor psychiatric morbidity," which is frequently seen in primary care settings (Goldberg and Blackwell, 1970; Ingham and Miller, 1982; Jenkins, 1980) and community-based surveys (Beddington et al., 1981; Finlay-Jones and Burvill, 1977; Weissman and Meyers, 1978), but also that these were more differentiated forms of psychopathology that met the criteria for at least one psychiatric diagnosis.

2) Subjects with positive and negative SRQ results had a very different distribution of mean scores on the neurotic subscale of the screening instrument. The four-fold difference seen between "probable cases" and "probable normals" indicates that victims may cope with disaster in two ways: either with a pattern of severe and multiple psychiatric symptoms or with a relative

absence of symptoms. The latter response may be the result, in part, of various protective factors, such as personality structure, level of community support received, or massive denial of emotional problems.

3) Those factors identified as being associated with the presence of mental health problems (e.g., having become unemployed or presenting multiple somatic complaints) are important for the early identification of individuals at risk for emotional disorder. The PCW could easily learn to identify an individual at higher risk for emotional problems by screening for such factors. The PCW can also be trained through a brief and objective course to implement simple mental health interventions for these individuals (Murthy and Wig, 1983). It should be noted that the symptoms that occurred with highest frequency were not the best predictors of emotional problems, whereas relatively infrequent symptoms, when present, were strong indicators of such problems (Tables 4 and 5).

4) Certain environmental issues need to be considered when providing emergency shelter to disaster victims. For example, identifying a specific date for moving from the temporary shelters into permanent housing seems to be an important protective factor. Additionally, it would probably also be helpful if disaster relief agencies made special efforts to inform victims of the various actions being taken to help them.

5) Events that one may intuitively and naturally expect to be associated with emotional distress, such as the death of a family member, failed to be significantly associated with a positive SRQ score. One might conjecture that in a disaster of such magnitude as Armero's the total loss experienced by many of the survivors blurs their capacity to discriminate emotionally among individual losses--the response being to the total loss, irrespective of its individuals components.

6) These data were collected seven months after the tragedy. Hence, transient emotional reactions in the immediate aftermath of the catastrophe were not seen, and we were probably dealing with more severe, delayed, or chronic forms of psychopathology. It is also possible that some of the emotional problems seen may have been produced not by the disaster itself, but by the continuing difficult living situation of the survivors, who experienced poor housing, unemployment, and disrupted family and social support systems. Nonetheless, particularly in developing countries, these conditions are more often the rule, rather than the exception, in the medium- and long-term management of disaster victims, and such conditions should perhaps not be seen as separate, but as a usual aspect of the disaster, extending its impact over time (Bates, 1982; Couch and Kroll-Smith, 1985).

7) The SRQ proved to be a good instrument to screen for emotional disorders among disaster victims in developing countries. It yielded acceptable sensitivity, specificity, and positive predictive values, irrespective of the criterion used for case definition. The SRQ had been proved to be a good screening instrument in routine clinical care settings in developing countries, and these results support its usefulness in a post-disaster situation as well.

8) The psychiatric interviews identified the most frequent disorders among the Armero victims as post-traumatic stress disorder, major depression, and generalized anxiety disorder. While one can question whether these disorders will also be the most frequent among victims of other disasters, previous studies have shown that anxiety and depression are the predominant features of disaster psychopathology. Hence, our findings indicate that, given the time pressures and the limited resources in the post-disaster period, the training of the PCW in delivering mental health services for

disaster victims should focus on the identification and management of the most frequent and clinically relevant conditions. It should not focus on all the disorders which are commonly encountered in routine clinical practice, such as acute and chronic psychoses, organic mental syndromes, mental retardation, epilepsy, and the chronic complainer (Climent and De Arango, 1983: Giel and Harding, 1976; Lima, 1981; Murthy, 1985).

Operational Aspects

The Armero project led to the identification of five basic principles that were fundamental for its successful completion:

1) A previous relationship needs to exist between the local mental health officials and clinical staff, and the disaster researcher from the outside.

If no previous relationship exists with the health officials of a disaster area, it may be extremely difficult, if not impossible, to develop successful collaborative research in the aftermath of a disaster. If a relationship does exist prior to the disaster, however, it can evolve very rapidly into an effective research effort. Communications with the health sector and other sectors of the disaster relief system are facilitated by the special disaster context which promotes intra- and intersectorial collaboration. To increase the likelihood of successful research, an ongoing relationship between disaster researchers or research centers and health officials of disaster-prone areas should be established prior to any disaster events. In the Armero project, one of us (Lima) had provided mental health consultation prior to the disaster to the Colombian Division of Mental Health concerning the design of a Primary Mental Health Care Plan, and, following the disaster, concerning mental health services to victims at the primary level of care. This joint work established a prior relationship and greatly facilitated the development of the project.

2) The research project must have both a service and a research component--the latter being conceptually, immediately, and concretely related to the former.

The research questions addressed in the Armero project were clearly related to pressing service needs at three levels. First, the consultation provided before and after the disaster highlighted the relationship between the assessment of mental health needs of disaster victims and the development of effective treatment interventions through the utilization of the PCW for the detection and management of emotional problems. Second, the disaster experience was subsequently incorporated in the Colombian Primary Mental Health Care Plan. Third, the research data have supported the various initiatives undertaken locally for training the health providers of the disaster area in disaster mental health (Lima et al., in press, b)

3) The data collection has to be carried out by health workers local to the disaster area.

The data collection in the Armero project was carried out by a team of mental health professionals who had worked very closely with the affected community in delivering routine mental health care. They were accepted members of the community with a clearly perceived commitment to its welfare. This special strategy circumvented the frequently encountered problem of victim uncooperativeness which has hindered some other disaster research projects. None of the 200 subjects approached for recruitment into the study refused to participate and, of the subjects who scored positively on the screening instrument and were also available for a psychiatric interview, only one refused the interview.

4) The disaster area needs to have a fairly well developed general and primary health care system that maintains a good relationship with the

national or state mental health authorities, who, in turn, are accepted and respected at the local level because of their previous work. Again, such collaboration paves the way for the successful introduction of a disaster mental health research project.

Armero had the only psychiatric hospital in the State of Tolima, with 87% of the state's psychiatric beds. The hospital had a large outpatient department with approximately 5,000 yearly visits, and a close involvement with primary care clinics and other community agencies in the region, such as schools. The local general health practitioners were aware of the importance of mental health issues and initiatives. The relationship of the mental health officials and clinical staff with the general health sector, particularly with primary care providers, was active and productive.

5) All stages of the project must involve a joint effort between the outside research team and the local research team.

Partnership is the key concept, and it needs to be reflected everywhere from the design of the project, to the development of instruments, to data collection, analysis, and interpretation, to publication of findings. The Armero project was conceived during the initial consultation provided by one of us (Lima) following the tragedy, and it was refined in subsequent meetings of all the investigators involved. Communication by mail and telephone has been extensive, and every opportunity for personal contacts has been utilized to follow up the research progress and the analysis of the data. The data base has been copied for independent analytical work at both centers, all results have been shared and extensively discussed, and papers have always been written or presented jointly.

Mental Health/Primary Care Interaction

Our findings indicate that a major disaster in a developing country is

likely to produce very high levels of emotional distress, essentially affecting every other adult victim. Moreover, these problems are present as late as half a year after the impact, and our clinical observations lend no support to the expectation that this situation may improve. Therefore, it can be stated with certainty that, for the underprivileged persons in developing countries who become victims of a major disaster, a very high level of mental morbidity can be expected which will require adequate management. In developing countries, specialized mental health resources are already inadequate for the management of emotional problems in routine clinical settings, and in a disaster situation, when the mental morbidity may increase manyfold, they will become totally insufficient. Hence, the role of the PCW in providing mental health interventions in developing countries needs to be further explored as a possible strategy for meeting these important needs.

The role of the specialized mental health sector in the comprehensive care of disaster victims needs to be re-examined as well. Certainly it should not consist of routine and direct service delivery, not only because the demands are likely to be much greater than the resources available, but also because mental health services delivered through the primary level of care may be more appropriate to the victim's health needs. The role of the specialized mental health sector, therefore, should be related to program design, implementation, and evaluation; to the training and education of the primary care worker; and to providing that worker with continuing support through consultation and supervision. In disaster-prone countries in particular, a small national disaster mental health team should develop and master a simple, well-structured educational and training package adjusted to the particular country (Figure 2). Once a disaster strikes, this national/regional team becomes responsible for training the local mental health team serving the

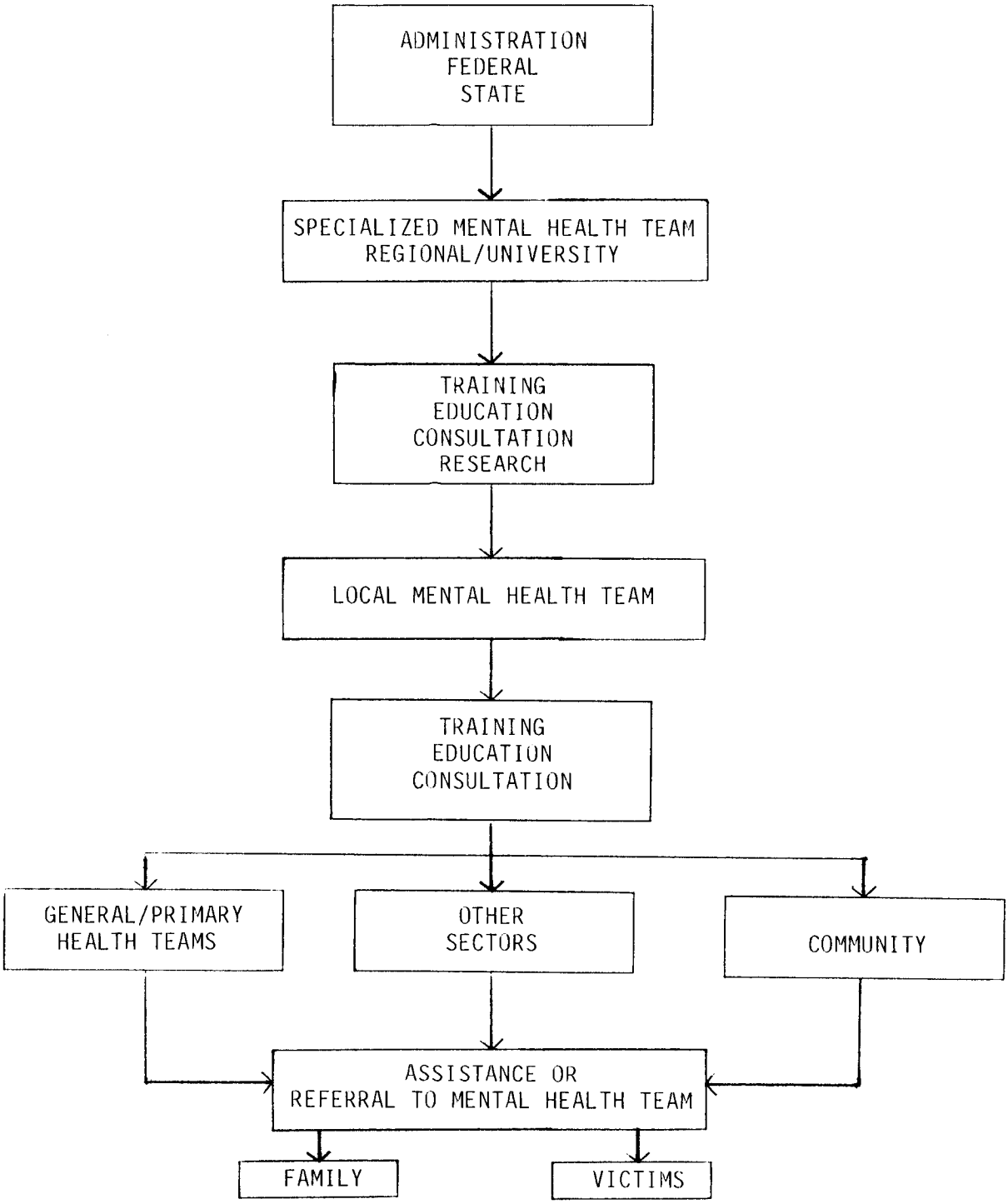

FIGURE 2

THE ORGANIZATION OF THE PROVISION OF DISASTER MENTAL HEALTH SERVICES FROM THE FEDERAL/STATE LEVEL TO THE FAMILY/INDIVIDUAL LEVEL

affected community. The local mental health team will then provide training and continuing support to the general health sector and to the front-line primary care workers, other sectors of the disaster-relief operation, and to the community. The trained primary care worker will in turn provide routine mental health care to victims, families, and others in the affected communities. The specialized mental health worker will continue to be available for evaluation and/or treatment of referred patients whose psychiatric problems are too complex to be handled at the primary care level.

Clearly, the next investigative step is to evaluate the focused training of the local PCW in the management of the most relevant psychiatric disorders seen among disaster victims--a task for which this study provides initial guidelines.

The successful completion of this project should do much to promote the role of the PCW in the delivery of mental health care to victims of disasters. The Armero project resulted in several positive steps, particularly in the areas of research, health care delivery, training, education, and planning. A course for the training of the PCW in disaster mental health was given to general doctors and nurses of the Armero area utilizing a training manual written by one of us (Lima, 1987). Following the earthquakes in March, 1987, the Division of Mental Health of the Ministry of Health in Ecuador implemented a similar course for health workers utilizing an abridged version of the same manual. Additional courses to ancillary health staff are planned. The Colombian Primary Mental Health Care Plan (Colombia, 1986) contains a special section on primary mental health care to disaster victims.

Our experience also shows that international research on disaster primary mental health care is feasible, yields good quality data, promotes the local development of initiatives to address the long-term mental health needs of

victims, and shapes national policy in mental health issues. It is expected our efforts will be replicated elsewhere and that the data generated by these related projects will further support the provision of primary mental health to disaster victims in developing countries.

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APPENDIX 1

ITEMS OF THE SELF-REPORTING QUESTIONNAIRE (SRQ)

Neurotic Subscale

1. Do you often have headaches?
2. Is your appetite poor?
3. Do you sleep badly?
4. Are you easily frightened?
5. Do your hands shake?
6. Do you feel nervous, tense or worried?
7. Is your digestion poor?
8. Do you have trouble thinking clearly?
9. Do you feel unhappy?
10. Do you cry more than usual?
11. Do you find it difficult to enjoy your daily activities?
12. Do you find it difficult to make decision?
13. Is your daily work suffering?
14. Are you unable to play a useful part in life?
15. Have you lost interest in things?
16. Do you feel that you are a worthless person?
17. Has the thought of ending your life been in your mind?
18. Do you feel tired all the time?
19. Do you have uncomfortable feelings in your stomach?
20. Are you easily tired?

Psychotic Subscale

1. Do you feel that somebody has been trying to harm you in some way?
2. Are you a much more important person than most people think?
3. Have you noticed any interference or anything else unusual with your thinking?
4. Do you ever hear voices without knowing where they come from or which other people cannot hear?

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