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I. PRIMARY MENTAL HEALTH CARE

The importance of primary care as the main strategy for attaining the goal of "health for all by the year 2000" has been widely accepted. Primary health care has been defined by the World Health Organization 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 and 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 1965). Its main strategies include:

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

Primary health care involves a variety of priority areas, such as maternal and child health, immunizations, 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). Mental health programs are part of the various activities developed for health promotion and disease prevention, whose aims are to achieve the following goals (Gulbinat 1983):

- prevention and treatment of psychiatric disorders, which is 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 the patients with emotional and psychiatric problems are managed through the general/primary care sector (Regier et al 1978), and almost one half of all office visits to a physician resulting in a mental disorder diagnosis are to non-psychiatrists, mostly in primary care (Schurman et al 1985). It can be assumed that a similar pattern of service utilization exists in developing countries where specialized mental health resources are so blatantly inadequate (Harding 1976).

Hence, various efforts have been made to develop the capability of the primary care sector for the identification and management of patients with emotional problems. The WHO study on "Strategies for Extending Mental Health Care" has identified crucial programmatic aspects for the successful design and implementation of a primary mental health care program (World Health Organization 1984):

- o formulating a national policy on mental health and establishing a mental health department or unit within each country's national or regional administration;
- o providing adequate financial support for:
  - the recruitment, training and employment of personnel,
  - the adequate provision of drugs,
  - a network of facilities, including transportation,
  - data collection and research;

- o decentralizing mental health services, integrating them with the general health services, and collaborating closely and effectively with non-medical community agencies;
- o having all non-specialized health workers at all levels- from primary health worker nurse or doctor - undertaking certain basic mental health tasks as part of their routine work;
- o having all specialized mental health workers devoting but a part of their working hours to the clinical care of patients, and spending the greater part of their efforts training and supervising the non-specialized health workers who will themselves provide basic mental health care to the community;
- o providing the mental health professionals adequate instruction and supervised experience in this new task of training and supporting non-specialized health workers.

In developing countries, the primary care worker (PCW) may be the general doctor or the nurse, but more frequently he 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 the nurse practitioner (Lamb and Napodona 1984, Rosenaur et al 1984), whose mental health training can be varied (Burns and Scott 1982, Cohen-Cole and Bird 1984).

The PWC's mental health training has included the conditions seen in routine clinical practice, such as (Harding et al 1980):

- o first-aid in neuropsychiatric emergencies;
- o maintenance treatment of the chronically mentally ill;
- o advice and support to high risk families;
- o referral of mentally ill people in a non-acute or unclear state to the nearest health facilities;
- o family education about psychosocial development and the needs of the elderly and the handicapped;
- o support and education of the mentally ill about selfcare; and
- o collaboration with community leaders in activities aimed at protecting and promoting mental health.

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

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

II. 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;

- o disaster victims are known to be 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 1964, Shore et al 1986,

Titchener and Kapp 1976, Wilkinson 1983);

- o the community is usually concerned about the disaster and its health and mental health consequences for the victims (Barton 1970); and
- o as it has been shown that the PCWs can be trained to carry out relatively simple and 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 efffectively 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, but 86.4% occurred in developing nations, producing a total of 42 million deaths and 1.4 billion affected individuals. Seventy eight percent of all deaths occurered in developing countries, where 97.5% of all affected individuals are located. The observed ratio between affected and killed, of only 2.9 for the developed nations, is tenfold greater for developing countries. Hence, not only are disasters disproportionately more frequent events in the Third World, but they are also responsible for a much higher proportion of victims who, having survived the impact, need long-term management of their biopsychosocial needs. The recent disasters in Latin America and elsewhere (i.e., Bhopal and Cameroon) highlight the increasing health impact of these events.

INSERT TABLE 1 HERE

Disasters are also more likely to affect socio-economically disadvantaged populations, in both developed and developing countries, as the fast rise in the urban population, the pressure on the land and the steadily deteriorating economic conditions have forced the underprivileged populations into increasingly more hazaradous areas, hence increasing their vulnerability to disaster (Seaman 1984). These socio-economically disadvantaged populations, who have little access to specialized mental health care, however, 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 suprisingly 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 mental health care to victims of disasters in developing countries in the medium-and long-term range (Lima 1986), mostly because these psychological consequences have been in general largely underestimated (Clayer et al 1985). This neglect may be due to various factors, that include the competing health

needs disaster victims have, ranging from the management of individual physical problems to the improvement of environmental conditions (Pan American Health Organization 1981) giving mental health a relatively low priority in the overall disaster response planning (Lechat 1979). It may also be due to the perceived difficulties in training the PCW 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. Even if disaster victims have access to specialized mental health services, however, they may still be reluctant to utilize them (Lindy et al 1981), as 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 with bush-fire victims in Australia support this assumption (1984, 1986).

In the U.S., the fastest growing segment of the population is represented by the Hispanics (pop=14 million), whose percent increase between 1985 and 2000 (+45.91%) will exceed those for the Black (+22.97%) and the White population (+9.62%) (U.S. Bureau of the Census 1986). Sixty percent of the Hispanics are located in high-risk areas for disasters: California, Texas and Southern Florida. The recent earthquakes in Los Angeles (October

1987) and the destruction of the village of Saragosa in Texas are vivid examples. For these populations, the experience derived in providing health and mental health services to victims and affected communities in developing countries is of greatest importance, as it will permit 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 the integration of mental health care into general health services at the primary level of care. (Pucheu 1985, Soberon et al 1986). However, it needs to be established clearly that the frequency, severity and types of mental health problems of victims are significant, not only in the immediate aftermath of the tragedy, but also in the medium- and long-term range and that the PCW can develop effective mental health intervention to prevent and control the psychiatric morbidity of victims. These issues are addressed by our project. The prevalence of psychiatric problems among disaster victims in tent camps is reported in this paper. The prevalence of the problems in primary care clinics and their recognition by the primary care worker will be reported in a subsequent paper. A project developed in Ecuador following the earthquakes in March 1987 that struck its northern provinces has addressed the training of the primary care worker in disaster mental health, but the data have not been analyzed as yet.

III. THE ORIGINS OF THE ARMERO PROJECT

The Division of Mental Hygiene of the Colombian Ministry of Health had the initiative of designing, implementing and evaluating a national primary mental health care plan, for which it requested consultation to the Pan American Health Organization. One of us (B.R.L.) started working on the Plan in August 1985 as a consultant (Lima 1985), and a subsequent national meeting was scheduled for November 27-29 in the town of Ibague, capital of the State of Tolima, when the state mental health directors would discuss the proposed plan. The State of Tolima was selected as the site for the meeting because, due to the excellence of its community-base mental health services, the plan would be pilottested in its northern area. However, neither the meeting nor the visit to the regional psychiatric hospital in the neighboring town of Armero were to take place. The volcanic eruption on November 13 produced a mudslide that completely destroyed Armero, leaving in its wake a total of 24,000 dead, 5,000 injured and scores of homeless survivors in dire economic condition (Sigurdsson and Carey 1986).

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. Firstly, 80% of the 30,000 inhabitants of Armero had died in the tragedy, and the small towns of Lerida and Guayabal, with an original population of about 3,000 people each, had to assimilate approximately 6,000 homeless victims. Survivors were mostly unskilled workers with limited possibility for alternative gainful employment,

representing the population group at whom primary care is targeted. The population had been 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. These features have been identified by Quarantelli (1985) as strong predictors of emotional difficulties among victims. Subsequently, in reviewing the clinical observations of health care providers local to the disaster area, these initial 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 experience of the victims. In the following months, psychophysiological disorders and complaints were noted to increase in frequency and/or severity, and included backache 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 had become more conspicuous. As temporary shelters were still being used for housing, and jobs had not become available to most, growing dissatisfaction with living conditions was seen. A higher frequency of alcohol and drug abuse was observed, as well as episodes of conduct problems, such as violence and thefts. Hence, in the course of a few months, it was noted a wide variety of

problems intimately intertwined, that encompassed the biological, psychological and social areas. An integrated biopsychosocial approach was therefore thought to be the most appropriate for the effective detection and management of victims' health problems.

Secondly, 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 the specialized mental health resource s, and automatically shifting to the general/primary health care sectors the responsibility for meeting the victims' mental health needs. (Servicio De Salud Del Tolima, Seccione De Salud Mental 1986)

One of us (B.R.L.) took advantage of this naturalistic experiment, and submitted a proposal to the Pan American Health Organization that a 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-term 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 (Nov. 29 - Dec. 8, 1985) and its finding have been reported (Lima 1986b). This consultation eventually led to the development of the Armero Project.

IV. THE ARMERO PROJECT

On the basis of the previous observations and assumptions, the authors have evolved a long-range plan to ascertain the magnitude of emotional disorders of victims and to effectively train the PCW 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:

- o ascertaining the prevalence of emotional disorders among disaster victims in the community and in primary health care clinics;
- o designing appropriate instruments for the screening of victims with emotional disorders;
- o developing training material for the PCW in disaster mental health; and
- o evaluating selected outcomes of the training program, such as improvement in the 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.

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

A. Screening

All adult victims located in two shelters and one camp of the the disaster area and a convenience sample of a second camp were recruited into the study (N=200). No subject refused to participate. The socio-demographic characteristics of the two total and convenience samples were not significantly different.

The screening was done by mental health professionals local to the disaster area, and incuded 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. No subject refused to be interviewed. Actually, they seemed to welcome the opportunity to go over the traumatic experience and to ventilate 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 focusing the health care workers' efforts in collecting research data already distracts them from pressing service delivery issues. 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' socio-demographic 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 to include a number of questions covering the above areas. It also included a modified version of 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 a given individual scoring positively is likely to be a case. The specific nature of the disorder, however, cannot be determined, the final criteria for caseness resting on the psychiatric examination performed by a well-trained clinician.

The original SRQ consists of a 20-item neurotic subscale and a 4-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. The initial definition of "probable case" according to the score on the SRQ was based on the following criteria: a score of 8 or more points in the neurotic subscale, or a score of 1 or more points in 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 the X2 test with Yates correction when appropriate.

B. Interview

A subsample of the victims screened were 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 would be 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 modalities were available (e.g., Alcoholic Anonymous or self-help, community-based groups) for which the specialized mental health services needed not to be utilized. The only victim with a positive score on the question on epilepsy was felt to be an idiosyncratic case, who 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 a positive SRQ score, and 87 had a negative SRQ score. We attempted to interview all subjects with a positive SRQ score, and about one-third of those with a negative SRQ score. Seventy of the positives and 34 of the negatives were eventually interviewed by

the research psychiatrists. Even though attempts were made to ramdomly select the subsample of 104 subjects who were interviewed, this could not be accomplished, mostly because many individuals had moved out of the area. Only two subjects refused the interview (Figure 1).

INSERT FIGURE 1 HERE

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, as they conducted all the psychiatric interviews for the SRQ positives before they did the same for the SRQ negatives. The interviews for the SRQ positive group were conducted concurrently with the screening, but the interviews for the SRQ negative group were carried out later, with a gap of approximately 10-12 weeks between the screening and the psychiatric interviews of the SRQ negatives.

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 that a formal training in the use of a standardized

interview schedule be developed. 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 socio-demographic 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 mental status examination. Upon completion of the interview, the psychiatrists entered their clinical diagnosis.

The augment standardization of results and generalizability of the findings, however, a symptom checklist (Helzer 1984) was appended to the interview schedule to generate diagnoses according the criteria established by the the third edition of 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, a comparison of confirmed psychiatric cases with the SRQ score grouping was carried out to ascertain the properties of the instrument in correctly identifying victims with psychiatric problems.

V. RESULTS

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

A. 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 elementary education, but one third were illiterate. All subjects were of a mixed racial

composition.

INSERT TABLE 2 HERE

The overall prevalence of emotional psychiatric problems was 55.5%. When the 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 the subject with a negative SRQ (3.39 ± 2.14) was about a third of the mean score for the subjects with 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).

INSERT TABLE 3 HERE

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).

INSERT TABLE 4 HERE

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).

INSERT TABLE 5 HERE

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 of increasing age and lower education with a positive SRQ score was noted with a borderline statistical significance.

Various aspects of the disaster experience that could be thought as being closely related to the victims' mental health were not significantly associated with increased emotional distress. For instance, seeing horrible things in the disaster, losing any 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 include 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 a positive SRQ score, particularly complaints of epigastric pain, non-specific 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.

INSERT TABLE 6 HERE

B. Interviews

The sociodemographic characteristics of the subsample interviewed by a psychiatric (N=177) are also given on table 2. There was a slightly greater proportion of females (52%), two thirds of the subject being 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 a 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 ± 2.07) was less than a third of the mean for the subjects with a positive SRQ (11.19 ± 3.50). This difference was very significant as well ($P<.001$).

An initial comparisison between the interviewed and non-interviewed groups was carried out (Table 7) to see whether they differed significantly in their socio-demographic 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.

INSERT TABLE 7 HERE

Among the SRQ positives, no significant differences were found between the interviewed and non-interviewed groups in any of the selected variables, which include 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 noninterviewed 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 sub-groups 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. There were two diagnoses of dissociative disorder and one diagnosis for each of the following: tobacco dependence, borderline mental retardation, and schizpid, 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 American (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 non-reproducible 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 the diagnostic category or to ignore the cultural variations of psychopathology.

The diagnostic distribution for both SRQ positives and negatives is given on 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 DSMIII. 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 seen, with post-traumatic stress disorder and major depression being the most frequent ones.

INSERT TABLE 8 HERE

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 which criterion for defining a case was used. The

lowest false-negative rate was seen when the clinician's diagnosis was used as the validating criterion.

INSERT TABLE 9 HERE

VI. DISCUSSION

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

A. 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, when the community as a whole is not significantly affected (e.g. a plane crash) (Barton 1969). The Armero disaster was a central disaster of major proportions, a fact which may relate not only to the high prevalence of emotional distress seen in our investigation, but to a pattern of psychiatric symptomatology which may have favored the screening with the SRQ as well. Disasters of a lesser magnitude or disasters that affect only a specific group of the entire community are not so devastating, and may not produce such long lasting and prevalent emotional disorders.

B. The Sampling Process

Most of the Armero survivors were individuals of low socio-economic background, as 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 socio-economic strata. However, socio-economically disadvantaged victims are the target population for the delivery of primary mental health care in developing countries, the group we are particularly interested within the long-term objectives of our project.

We do not have a control population to see whether the 55% prevalence rate for emotional problems noted in our sample differs 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 prevalence rate for emotional problems among the primary care clinic attenders in four developing countries was of 13.9%. In the Colombian center, the observed rate was of 10.8%. Our findings reveal a communitybased prevalence rate which is 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 prevalence rate of emotional distress identified by the

screening is lowered to 45%, which is still a very high rate. These observations lend support to the assumption that this high prevalence of psychiatric disorders is likely to have been precipitated by the disaster either directly or by the difficult socio-economic situation victims had to face in the post-impact period.

C. The Psychiatric Interview

The main issues related to the psychiatric interviews phase of the study include the non-random 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 compromise between an ideal research protocol and a post-disaster situation in a developing country. This compromise is a 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 in the extent it was possible.

1. The subjects interviewed were 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, were 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 working against proving the validity of the SRQ.

2. The clinicians who conducted the psychiatric interview 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 diagnose more often the individuals from the SRQ positive group and to underdiagnose the victims previously identified as "probable normals" by the screening instrument.

Our data, however, suggest that such a bias, if existent, might have been minimal. Firstly, the SRQ was administered by other mental health workers, and the clinicians had no need to justify its results. Secondly, 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 the assumption of a lack of bias. Also, clinicians generally tend to trust their own clinical diagnostic impression over the findings of an experimental questionnaire.

3. 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 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.

VII. CONCLUSIONS

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

A. Substantive Issues

1. We have identified a very high prevalence of emotional distress among adult victims of a major disaster located in temporary shelters seven months after a major disaster in a developing country. One of every two adults had psychological symptoms of such a severity and frequency that the instument used identified him/her as a "probable case". The subsequent interview showed that the individuals identified by the SRQ received a definitive psychiatric diagnosis this indicate that not only did we seem to have a high level of "non-specific" or "minor psychiatric morbidity" which is frequently seen in primary care settings (Goldberg and Blackwell 1970, Ingham and Miller 1982, Jenkins

1980,) and community-base surveys (Bebbington et al 1981, Finlay-Jones and Burvill 1977, Weissman and Meyers, 1978,) but we were also dealing with 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 in 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 a pattern of severe and multiple psychiatric symptoms, or a relative absence of symptoms. The latter may be related to various protective factors, such as personality structure, level of community support received, or a massive denial of the emotional problems.

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

4. Certain environmental aspects need to be considered while 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, the disaster-relief agencies could make special efforts to inform the 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 may conjecture at this point that in a disaster of such a magnitude the total loss experienced by many of the survivors blurs the 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 seen in the aftermath of the catastrophe were not identified, 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, with poor housing, unemployment and disrupted family and social support systems. Nonetheless, particularly in developing countries, this situation is more often the rule, rather than the exception, in the medium and long-term management of disaster victims, and it can be seen as an integral

component of the disaster, extending its impact over time (Bates 1982, Couch and Kroll-Smith 1985).

6. 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 are quite supportive of its usefulness in a post-disaster situation as well.

7. The most frequent disorders identified among the Armero victims by the psychiatric interview were post-traumatic stress disorder, major depression and generalized anxiety disorder. While it can be questioned 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 a 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).