D. SUBSTANTIVE RESEARCH RESULTS IN RUSSIA: SOCIAL, PSYCHOLOGICAL AND MEDICAL IMPACT OF DISASTERS

9. ECOLOGICAL DISASTERS AND THE PECULIARITIES OF THE PSYCHOLOGICAL REACTIONS OF THE INVOLVED POPULATIONS

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Introduction

We first briefly summarize what we did The aim of our study was to depict the peculiarities of maladjustment in a "post-Chernobyl" population and to clarify the structure of their stress reaction. For our purpose, we used the General Health Questionnaire (GHQ) developed by Goldberg (see Goldberg and Williams, 1988). In its total of 28 items, there are four subscales. The instrument has acceptable validity, and discriminates between groups with/without mental disorders.

We conducted the investigation in the most contaminated territories of the Briansk area, as well as in a clean area, and also among a group of the relocated population. The total number of respondents was 1,384 and their age ranged from 18 to 70 years old..

The most pronounced psychological maladjustments occurred among the population of the contaminated areas. They differed significantly from the results obtained from those living in the clean (or controlled) areas and from those persons who had relocated. Those who lived in clean territories also showed relatively high distress levels when compared to world wide data; this is possibly determined by socioeconomic factors.

Background of the Study

The stress factors that effect human beings are the result of conditions that go from internal ones and the communicating problems of people, to more complex conditions such as the interaction of "man-society" or "man-and surroundings." The latter involves not only the mentality of single persons, but that of the larger community also.

World experience with catastrophes and their study shows that the weight of consequences depends more on psychological and social aspects than on physical injuries (De Marchi, 1991). Now the populations involved in ecological disasters experience not one stress, but a sequence of traumatic events that exist for a long time. Thus, the long term consequences might surpass any immediate effects.

More than ten years have passed since the Chernobyl disaster, one of the most remarkable disasters to have affected the environment. The peculiarity of this disaster is that it resulted in significant changes in the living environment for several million

people who reside in territories contaminated with radionuclei as well as for those who relocated to clean areas.

The structure of psychological stress connected with this disaster also includes specific features of the radiation factor itself. These include its inability to be perceived by human sense organs, the implications of radiation not only for current health but also for the future, the involuntariness of the exposure to the threat, the restriction on personal freedom that resulted from the necessity to take countermeasures, and the necessity for such measures that in themselves cause psychological stress (e.g., relocation).

The perception and the attitude of the population to these stress factors, create or form the image of the threat, and the personal and collective responses to it determine the contents of psychological maladjustment found in the populations affected by the nuclear plant accident. However, a collective psychological trauma associated with radiation contamination of the environment is not the only stress factor. The alteration and partial destruction of the social construction of the society involved in the accident has aggravated the maladjustments and stimulated the development of a "post-Chernobyl syndrome."

The fact of psychological maladjustment in the population affected by the Chernobyl disaster is beyond doubt (Alexandrovskiy et al, 1991; Chuprikov, 1993; Drottz Shoberg et al, 1994), although the prevalence of the stress reactions in different population groups has not yet been clarified. There are no data about the dynamics of the levels of psychological maladjustment and the clinical-psychological structure of stress reactions. There is also absolutely no information about the effects of countermeasures, for instance such as relocation, on the stabilization or vice versa, the destabilization of mental health. Such data would have allowed a development of appropriate therapeutic and rehabilitation measures

The objective of detecting neurotic reactions in the population has raised some methodological questions. This is because the descriptive method used to evaluate mental health pathology, which has been traditionally preferred in Russian psychiatry, frequently results in some hyperdiagnosis of borderline cases.

The Study

For that reason, for the first time in this country, we have employed a questionnaire widely used internationally in survey investigations of large populations. This was the General Health Questionnaire developed by M. Goldberg (see Goldberg and Williams, 1988)

Material and method

The GHQ is one of the most popular instruments for surveying populations It has been translated into more than 40 languages and tested on European, Asian and American populations. It is widely used for investigation of different populations groups, and also for patients visiting general medical and specialized facilities. In the development of the questionnaire the authors used the so-called hierarchy model that clarifies the differences between the category of mental patients and the category of the mentally healthy. The questionnaire is intentionally oriented toward a certain borderline area lying between mental disorder and mental health. However, the GHQ does not allow one to make a clinical diagnosis. Nevertheless, being a kind of indicator, it has a high probability of revealing syndromes.

Different versions of the GHQ include 60, 30, 28 and 12 questions. The primary version (GHQ 60) after being subjected to factor analysis, resulted in the distinguishing of four different scales: somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression (which later was used to form the GHQ-28). This later variant, being briefer and structured, happened to be the most acceptable for population surveys. In a joint Russian-Dutch project, the data from GHQ-28 were compared to the clinical criteria of DSM-III-R. For our purposes, the findings of the investigation showed sufficient validity to allow use of a Russian language version of the questionnaire (this material is being prepared for later publication).

In order to discriminate between the populations with/without mental disorders, the operational concepts of "case" and "non-case" were used. Those individuals with scores of five or more are assigned to the category of "cases", and with those having a score of 15 being seen as having pronounced neurotic conditions. All scores were obtained by using the means of the GHQ score

Our study was carried out by the conducting of a random sample in the most contaminated territories of the Briansk area, in the city of Novozybkov and in adjoining rural areas. In the summer of 1992, a total of 436 persons were questioned, and one year later, in the summer of 1993, another 342 were studied. In the same year, a similar sample of 408 persons which we used as a control group were studied in a clean area. Also studied was a group of 198 relocated individuals. Thus, the total number of respondents was 1,384 adults, whose age ranged from 18 to 70 The social and demographic characteristics of those studied are presented in Table 1 which follows

Results of the Study

We found, when compared to the population in the control group, that distress characteristics are much higher for those persons in the areas affected by the disaster. Our data also showed that we had 59.5 percent "cases" in 1992, and 66.9 percent in 1993, that is, people with mental problems The percentage of "cases" in

Table 1

Socio-demografic characteristics by groups

Groups	N	Gender		Age			Mean ages (SD)	Educational census			Family status		
		M	F	<= 30	31-49	>= 50		pri-mary	se-con-dary	hi-gher	mar-ried	sin-gle	divorced, widower
contaminated area (1992)	436	212	224	134	202	100	38.0 (12.8)	31	290	115	324	88	24
contaminated area (1993)	342	142	200	100	127	115	41.7 (15.0)	30	252	60	276	22	44
relocated (1993)	198	84	114	73	77	48	39.2 (15.1)	33	139	26	155	29	14
clean (control) area - (1993)	408	189	291	120	154	134	40.9 (15.2)	30	264	114	248	81	79

the population in the clean areas is 41.6 percent, which is significantly lower The percentage of instances of persons with pronounced pathology (see De Marchi, 1991) is also significantly higher in the contaminated areas: 22 8-24.9 percent versus 6.6 percent in the clean areas (see table 2).

The stress level in the relocated residents is similar to that among the residents of our control territories and the percentage of their pronounced pathology is also close to that in the clean territory (see Tables 3-6).

Among the groups we investigated there were certain differences in the structure of distress. The somatic scale score of neurotic symptoms is much higher among the residents of the contaminated areas; this change took place in 1993. Somatic symptoms are also important for the relocated groups. Among the population of the clean areas, these symptoms are not something important. The somatic scale does not happen to prevail here even among persons who have mentioned their somatic disorders. However, the presence of a somatic disorder in the residents of the contaminated areas and among relocated respondents, increases the number of somatic symptoms we find within the neurotic complex. In the respondents from clean areas these symptoms increase the contribution of the scale to indications of social dysfunction. Social dysfunction particular prevails in men, especially those of a younger age.

The anxiety scale score, especially in 1993, is also somewhat higher among the residents of contaminated territories and also among the relocated respondents, when compared to those from clean territories. Depressive disorders are the least prominent in all of the populations studied, and do not show differences between the territories. We should mention that in our respondents from the clean area and among the relocated persons, the depression rate is relative higher among respondents younger than 29 years of age. It is important to observe that in 1993 there were no notable changes in those with pronounced pathology, in contrast to those we classified as "cases." The structure of syndromes also differs. The level of social dysfunction is higher in 1993, especially in those from contaminated territories and among the group of the relocated. All the scales in the latter group, except depression, are equally high. The depression scale also happens to be higher in the residents from clean territories. In all the areas studied, the risk of showing neurotic disturbances tends to increase with age. However, this tendency is less apparent in the relocated.

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Table 2

Prevalence of mental disorders
(% of the population studied)

Mental disorder	Clean territories	Relocated resident	Contaminated area	
			1992	1993
All cases	41,6	39,5	59,5	66,9
includin				
preclinic for	34,9	31,5	36,7	42,0
pronounc	6,7	8,0	22,8	24,9
patholo				

Table 3

Mean share of the persons suffering mental disorders
in communities lived in the clean areas

Scale (Likert-score)	Percentage of the total population	Percentage of the respective groups of the population				
		gender		age		
		men	wome	0-30	31-49	50 and mor
Somatic symptoms						
Mean	16.7	16.5	17.4	12.7	14.3	15.1
SD	3.5	2.3	3.7	3.3	3.8	3.9
Anxiety						
Mean	16.0	16.5	17.0	12.6	14.1	14.0
SD	3.2	2.9	3.3	3.8	3.9	3.9
Social dysfunction						
Mean	16.5	16.7	16.3	14.5	14.8	14.9
SD	3.0	2.9	2.6	2.4	2.6	2 8
Depression						
Mean	11.3	11.9	12.5	10.0	10 3	9.6
SD	4 6	4 7	4.6	4.0	3.8	3.9
General score						
Mean	60.5	61.6	63.2	49.7	53 4	53 6
SD	8 4	8 8	9.3	10.9	11.0	11 8

Table 4

Mean Share of the persons suffering mental disorders
in the groups relocated from contaminated areas

Scale (Likert-score)	Percentage of the total population	Percentage of the respective groups of the population				
		gender		age		
		men	wome	0-30	31-49	50 and mor
Somatic symptoms						
Mean	18.0	17.6	18 1	13.6	15.2	14.9
SD	2.7	1.8	3.0	3.9	3.8	3.3
Anxiety						
Mean	16.2	16.0	17.6	13.0	14.3	13.7
SD	3.4	3.2	3.4	4.5	4.1	3.1
Social dysfunction						
Mean	16.2	15.7	16.4	14.5	14 9	15.1
SD	3.2	3.3	3.2	1.8	2.8	3.0
Depression						
Mean	11.1	10.2	11.3	9.2	9.2	9.3
SD	3.9	2.8	4.2	3.5	3.2	2.4
General score						
Mean	62.5	59.6	63.4	50.4	53.6	52.9
SD	8.8	7.6	8.9	10.8	11.2	9.6

Table 5

Mean share of the persons suffering mental disorders
in communities lived in the contaminated areas in 1992

Scale (Likert-score)	Percentage of the total population	Percentage of the respective groups of the population				
		gender		age		
		men	wome	0-30	31-49	50 and mor
Somatic symptoms						
Mean	18.8	17.7	19.2	15.1	16.3	17.4
SD	3 8	3.8	3 7	4.1	4 5	5 1
Anxiety						
Mean	17.7	16.3	18.2	13.4	15 3	16.1
SD	4.0	3.6	4.0	4.2	4.8	4.8
Social dysfunction						
Mean	17 3	17 3	17 3	14 8	16.0	16.2
SD	3.0	3 9	3 0	2.7	3 3	3 8
Depression						
Mean	11 7	10 8	12 0	10 7	10 3	10.2
SD	4 2	4 4	4 0	4 4	3 5	3.7
General score						
Mean	65 6	62 1	66 7	54 0	57 8	59.9
SD	10.2	10.3	10 0	12.0	13.2	14.7

Table 6

Mean share of the persons suffering mental disorders
in communities lived in the contaminated areas in 1993

Scale (Likert-score)	Percentage of the total population	Percentage of the respective groups of the population				
		gender		age		
		men	wome	0-30	31-49	50 and mor
Somatic symptoms						
Mean	19.5	19.5	19.6	15.6	17.8	19.4
SD	3.4	3.5	3.4	3.7	3.8	4.1
Anxiety						
Mean	16.7	16.8	16.6	13.1	15.4	16.4
SD	4.0	3.5	4.3	3.8	4.2	4.3
Social dysfunction						
Mean	17.9	17.6	18.1	15.4	16.6	17.8
SD	3.2	2.7	3.5	3.0	3.4	3.2
Depression						
Mean	11 2	10.3	11.8	10 5	10.3	10 7
SD	4.3	2.7	4.6	4.0	3.9	3.7
General score						
Mean	65.3	64.2	65.9	54.6	60.0	64.7
SD	10.0	9.6	10.2	10 6	11.0	12.2

Discussion of the Findings

The differences in the level of neurotic disturbances detected by GHQ-28 indicate that the stress level in the contaminated territories is much higher than in the clean areas we used for control purposes. The stress level among the relocated is compatible to that in the clean areas. This requires some explanation because some authors have mentioned that the relocated are more stressed because they have experienced not one but two stress situations (Krizhanovskaia, 1993)

The finding that the somatization scale dominates among people who continue to live under chronic ecological stress, indicates that the distress vector is directed toward health. These findings correspond to the actual possible effects of low-dose radiation exposure on health, the lack of sufficient knowledge about the delayed effects of radiation exposure, and the learning of new information about its specific effects.

The domination of the somatization scale among relocated respondents testifies to the fact that they have not overcome the distress associated with the ideas they have about future effects of radiation. The relocation has only prevented further exposure to radiation. However, it has not changed anything in the dose received earlier.

The neurotic experiences of the respondents from clear territories are not fixed on their health, but rather on problems associated with social position, this especially being true of men and the young. The neurotic features present in these groups is manifested in changes in general functioning and decreased affect.

The data we obtained shows an unfavorable dynamics in the stress reactions in the group residing in 1993 in the contaminated territory There are increases in light, initial maladjustment forms, although the number of pronounced cases remains the same. These changes cannot be the result of the radiological situation because it is improving with the years, and the radiation dose accumulated by each person is coming down. Also, the general economic situation changed for the worse during the month when the survey was undertaken. Inhabitants of the territories studied could not be paid their salaries and financial compensations. In addition, a firm belief had developed that gradually the compensations provided by the government would be canceled. Thus, the main stressor was supplemented by another, associated with the primary trauma, and the result was a higher rate of neurotic disturbances.

A similar situation was also observed seven years after the Three Mile Island nuclear plant accident in the United States, where the rates of anxiety and somatic symptoms sharply increased after the plant resumed its work. Those investigating this situation linked this fact with a sensitization of the mental sphere (Bromet et al, 1987). Perhaps a population sensitized by a chronic ecological stress cannot manage a situation of socioeconomic crisis well enough, so the result is a higher rate of neurotic disturbances

We should also mention that the rate of mental disturbances for those in the clean territory is also higher than the rate reported in the literature for the general population, and tends to approach that of social strata living in unfavorable conditions (Goldberg and Williams, 1988). There has been an emphasis in the literature that the rate of minor mental disorders registered by the GHQ depends to a great extent on the social situation. For that reason we propose to use Goldberg's questionnaire to later evaluate "the quality of life."

It is possible social factors could explain the low rate of mental disturbances in the relocated population. The investigations of introversion and extroversion characteristics in the same population groups have shown that the relocated tend to accept the responsibility for the solution of their problems. Accordingly, they are less stressed than the residents of contaminated territories (Rumiantseva et al, 1993).

The analysis of legislation and relocation procedures has revealed that a number of important matters might have influenced the coping abilities of the population concerning distress. In contrast to what happened in other countries in the former Soviet Union affected by the Chernobyl accident, relocation in Russia was mainly voluntary. The process was less massive and was implemented within the same administrative territory. Thus, the relocated population did not experience a breaking of ties with their former places of residence. For a long time, they could preserve their former homes, which also helped to relieve the material and psychological problems associated with relocation.

During the pilot study, we created the conception of risky groups with respect to the appearance of psychological disturbance among the population involved in the accident. Studies previously published had pointed out that somatic patients fitted exactly this risky group, and this fact is completely in agreement with the direction of the basic impact - the impact of radiation on health. In papers devoted to the psychological consequences of Three Mile Island, mothers with children were singled out as a major group at risk. This group also happens to be sensitive to psychological disturbances.

Two other groups were also singled out with respect to sociological criteria, and not because of the accumulated doses of radiation that they had. These were teachers and medical personnel suffering from severe neurotic symptoms. In part the high level of distress among these social categories could be explained by the predominance in them of women. However, according to some research results, the level of stress among teachers correlates with insufficient knowledge about radiation, a deficiency in a willingness to improve this knowledge, and a lack of a rational way to overcoming the situation. It is also important to note that teachers deal with children whose health was damaged by the accident in the first place

Conclusions

The comparison of populations living under different degrees of ecological stress has shown that the most pronounced psychological maladjustment occurs among the residents of the areas contaminated with radiation. They differ significantly in their maladjustments when compared to those persons from the clean territories and among the relocated group. To put it another way, the ecological stress caused by radiation exposure is responsible for higher rates and severity of neurotic disturbances. It also changes their structure.

Structural changes in minor mental disorders are connected to characteristics of biological factors themselves. Its effect on physical health is perceived by the population as the main constituent of distress. The response to it is a manifestation of somatoform symptoms, which also remain the leading ones in the relocated population.

The population living in clean territories also shows relatively high distress rates when compared to world wide data. This is possibly the result of socioeconomic factors and is characterized by a reduced level of and difficulties in functioning.

The psychological sphere happens to be sensitive to chronic ecological stress lasting for many years, which can be aggravated by additional factors, which in their turn may act to further decomposition, or the opposite, to stabilization. The data we obtained indicate there is an important role for psychogenic factors in the formation of neurotic disturbances in populations involved in chronic ecological stress situations, which however does not reduce the role of the biological constituent. Finally, our investigation has shown that a Russian-language version of Goldberg's GHQ-28 is an effective instrument for epidemiological screening that allows a revealing of the rate of minor mental disorders and permits an investigation of population phenomenology.