

Chernobyl: Living with risk and uncertainty

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Abstract

The nuclear accident in Chernobyl in 1986 is a dramatic example of the type of incidents that are characteristic of a 'risk society'. The consequences of the incident are indeterminate, the causes complex and future developments unpredictable. Nothing can compensate for its effects and it affects a broad population indiscriminately. This paper examines the lived experience of those who experienced biographical disruption as residents of the region on the basis of qualitative case studies carried out in 2003 in the Chernobyl regions of Russia, Ukraine and Belarus. Our analysis indicates that informants tend to view their future as highly uncertain and unpredictable; they experience uncertainty about whether they are already contaminated, and they have to take hazardous decisions about where to go and what to eat. Fear, rumours and experts compete in supplying information to residents about the actual and potential consequences of the disaster, but there is little trust in, and only limited awareness of, the information that is provided. Most informants continue with their lives and 'do what they must' or even 'what they like', even where the risks are known. They often describe their behaviour as being due to economic circumstances; where there is extreme poverty, even hazardous food sources are better than none. Unlike previous studies, we identify a pronounced tendency among informants not to separate the problems associated with the disaster from the hardships that have resulted from the break-up of the USSR, with both events creating a deep-seated sense of resignation and fatalism. Although most informants hold their governments to blame for lack of information, support and preventive measures, there is little or no collective action to have these put in place. This contrasts with previous research which has suggested that populations affected by disasters attribute crucial significance to that incident and, as a consequence, become increasingly politicized with regard to related policy agendas.

Keywords: *Nuclear accident, risk society, situations at risk of illness, biographical disruption*

Introduction

On Saturday April 26, 1986, reactor number four of the Chernobyl Nuclear Power Complex exploded, rupturing the reactor vessel. This caused major structural damage to the building and resulted in a fire which took 10 days to extinguish. A large quantity of radioactive substances was released into the atmosphere which contaminated Northern Ukraine as far south as Kiev, Western Russia and Southern and Eastern Belarus. In this area, radioactivity levels remain a dozen times higher than normal and are likely to do so for around 300 years (Grey 2002, Metivier 2002, Lovgren 2004). The USSR, which did not have the economic resources at the time of the accident to take measures to mitigate the consequences (Malko 1998), initially downplayed the seriousness of the accident. Yet the area around the plant was evacuated immediately and subsequently measures were taken to mitigate the impact of

the fall-out and to advise the population in the affected zones on the actions they should take to reduce exposure to further risk (Grey 2002). Residents were also given special support by the state, including welfare payments, annual medical check-ups, concessionary travel and holidays outside the contaminated zone (Grey 2002). Following the break-up of the USSR, the level and type of support started to become variable among the affected countries (Petryna 2002).

Today, there remains considerable uncertainty about the actual and potential health consequences of the accident. This concerns issues such as who is at risk and what behaviour is risky. This uncertainty is largely due to that fact that the accident was unprecedented. As a consequence the long-term health effects of exposure to the radioiodine in the initial fallout, and of living in an environment contaminated with caesium-137C, are unknown (Williams 2001). In addition the rainfall and wind patterns at the time of the accident resulted in a mosaic spread of fallout and, even within the contaminated zone, some areas were more affected than others (Ilyin *et al.* 1990). Within the affected population this uncertainty is compounded by a lack of trust and credibility accorded to the authorities (Drottz-Sjoberg 2000) which is partially due to the initial 'optimistic misinformation' released by the authorities and the subsequent 'pessimistic misinformation' provided by the mass media (Lazareu 1997). There is evidence that the accident has impacted adversely on the health, well-being and economic situation of the people living in the contaminated zone (Grey 2002, Rahu 2003, Lovgren 2004). Yet the only *direct* adverse health consequence of the accident on which there is widespread agreement is an increase in the incidence of thyroid cancer, especially among those who were under 18 in 1986 (Ilyin *et al.* 1990, Adler 1999, UNSCEAR 2000, Grey 2002). Local doctors have reported increases in infectious diseases, blood abnormalities, thyroid cancers and leukaemia, but incident rates do not provide a clear indication that there has been a real increase attributable to the radioactive fall-out. Rather it has been suggested that the apparent increase may be attributable to the routine medical screening of the population (Adler 1999, Grey 2002, Metivier 2002). People in the contaminated zone have reported poorer health, which they tend to attribute to the accident (Mozgovaya 1993). There also appears to be a greater incidence of stress-related illness and poorer self-reported health than in comparable non-contaminated regions (Buzunov *et al.* 1996, Bard *et al.* 1997, Havenaar *et al.* 1997, Grey 2002, Metivier 2002, Grey 2003), which has been attributed to hazard perception, risk perception and the nature of information collection (Havenaar *et al.* 2003).

Grey (2002) concludes that the anxiety caused by the accident, which appears to show no sign of diminishing, and its negative impact on the living conditions in the affected areas, may be the principal reason for the increase in poor reported health. Beyond this, it has been argued that a culture has developed in which people perceive themselves to be victims, where there is a lack of trust, where ill-health is expected, where there are general feelings of anxiety, instability, helplessness and a generalized fear about the future; all of which have resulted in an increased inability to adjust to changed circumstances (Mozgovaya 1993, Grey 2002).

The negative impact of the accident has been compounded by a breakdown in the infrastructure of community life, increased poverty, poor diet and generally poor living conditions (Grey 2002) which have deteriorated further following the break up of the USSR in 1991. Today there remains an expectation that the state should provide for the needs of citizens and specifically for the victims of Chernobyl (Drottz-Sjoberg 2000, Petryna 2002). At the same time, post-Soviet citizens are increasingly expected to take responsibility for their own welfare although they do not always have the resources to do so (Abbott and Wallace 2005, Abbott *et al.* 2006).

Risk, disaster and uncertainty

The Chernobyl accident represents a possible example of some of the conditions characteristic of a world risk society (Beck 1992a, 1995, 2002): the consequences of the incident are indeterminate and irreparable, the causes complex and future developments are unpredictable. The incident was the result of human decisions. Yet nothing can compensate for its effects. The resultant risks are not detectable by human senses, and they affect all those living in contaminated areas indiscriminately.

Nonetheless the applicability of Beck's concept of a risk society to the Chernobyl region is limited, if only because the affected area is suffering from material deprivation which hardly allows for it to be characterized as post-industrial. Equally, it would be difficult to argue that the polity of the Chernobyl region matches one of the core political characteristics Beck's model, namely the replacement of 'antagonisms between capital and labour' (Beck 1992b: 111) by frictions between those who profit from risk and those who are affected by risk.

What is indisputable is that Chernobyl accident has results in significant disruption because it was sudden, dangerous and overwhelming (Figly 1986). As a consequence of the disaster, the Chernobyl region is now part of a risk culture which is characterized by instability and uncertainty. As Armstrong points out:

Risk has no fixed nor necessary relationship with future illness, it simply opens up a space of possibility. Moreover, the risk factor exists in a mobile relationship with other risks, appearing and disappearing, aggregating and disaggregating, creating spaces within and without the corporal body (Armstrong 1995: 401).

In a risky environment, such as the Chernobyl region, it is difficult to try to isolate particular risks, such as health risks, from other problems affecting people's multidimensional lives (Cornwell 1984, Graham 1987, Mitchell *et al.* 2001). Rather the ways in which individuals define risks, how relevant they see them as being to themselves, and how they think that risks can be tackled, are linked to their ability to manage their life in general as well as being influenced by the socio-cultural situation and their accumulated biographical knowledge (Zinn 2005). The responses to this risky environment are embedded in interpersonal interactions and expectations. People may be aware of the negative consequences of their risky behaviour but other concerns may be given priority (Cornwell 1984, Graham 1987, Abbott and Wallace 2005, Abbott *et al.* 2006).

It has been argued that, although Governments are responsible for some aspects of risk control, individuals are accountable for risky behaviours, lifestyles and health behaviour (Petersen and Lupton 1996, Petersen 1997, Green *et al.* 2000). Some risks are experienced and addressed individually rather than collectively even though they result from wider socio-economic processes beyond the control of the individual (Beck 1992a, Furlong and Cartmel 1997). Beck points to the process of individualization in the risk society, with individuals becoming more self-reliant and reflexive. Crotty and Crane (2004), meanwhile, argue that in post-Soviet Russia a process of social individualization has taken place, where individuals increasingly fail to take action to promote their own welfare in a situation where the state no longer takes responsibility for the welfare of citizens (see also Ashwin 1998, Yanitsky 1999, 2000, Abbott *et al.* 2006). While our study finds evidence for a lack of willingness among informants to accept responsibility for their actions, this hesitancy to take charge of personal well-being is closely associated with feelings of fear and uncertainty which are directly linked to the experience of the Chernobyl incident.

There is a broad consensus that it is important to distinguish between expert and lay knowledge about risks and risky behaviour and the ways in which knowledge is constructed, and meanings negotiated, in the context of people's everyday lives. Lay claims to knowledge are based on everyday experience of the world in the context of a social and economic milieu and networks of communication. Lay epidemiology and unofficial expertise (Brown 1987, Davison *et al.* 1991, Williams and Popay 1994) often inform the ways in which people make sense of health risks, the ways in which they manage risk and the decisions they take about risky behaviours. Individuals rarely make decisions based solely on professional knowledge. Moreover, when talking about risk decisions they often use complex frames of reference which only loosely relate to those of experts. This study confirms that many informants view expert frames of reference critically. However, it also appears that, rather than weighing different sources expert evidence against each other, or against lay epidemiology, there is a tendency among informants to discount health risks because of paramount concerns for economic survival.

Oliver-Smith (1996) has argued that many disasters occur at the interface of society, technology and the environment, and therefore affect virtually all elements of community life. Due to their totalizing nature (Torry 1979), victims of disasters typically perceive these as isolated cataclysmic events which give rise to risk structures which, themselves, are uniquely and directly linked to the respective event. Individual narratives about disasters, such as earthquakes (Oliver-Smith 1979) or chemical spills (Dyer *et al.* 1992), therefore tend to have a common and clear focal point which is linked to the respective key event. Unlike previous studies on the social perception of disasters in affected regions, this study notes that, primarily due to the dramatic changes accompanying the collapse of the Soviet Union, respondents in the regions adjoining Chernobyl no longer attribute a uniquely central role to the Chernobyl incident itself. On the collective level, we find little evidence of a mobilizing effect of the disaster which previous research would predict (Peacock *et al.* 1996). Similarly on the individual level, the informants appear to exhibit the first two stages of behaviour observed among those 'at risk of illness' (Carricaburu and Pierret 1995), namely a disruption of taken-for-granted assumptions and a rethinking of biography (Bury 1982), but not the third stage where resources are mobilized to face an altered situation.

The study

This paper draws on qualitative case studies carried out in 2003 in the Chernobyl regions in Russia (Brjansk), Ukraine (Chernigov) and Belarus (Gomel). The case studies were carried out in areas which experienced radiological contamination following the nuclear accident in April 1986, but are outwith the exclusion/resettlement zones. The qualitative case studies include:

- Thirty interviews with informants aged 35–57 in each country (90 in total), with equal numbers of men and women. Half of the informants lived in rural areas and half in urban areas. Roughly half had completed secondary education, with the rest split between those with higher education and those with incomplete secondary education. Each interview lasted approximately an hour. The informants were selected to approximate the socio-economic mix of the respective region.
- One focus group with men and one with women, aged 30–50, in each country (six focus groups in total, each with eight participants). Focus groups lasted between 90 minutes and 2 hours. Again, participants were selected to represent a range of socio-economic groups.

- Essays on the topic *Me: Yesterday, today and tomorrow*, written by a sample of older secondary-school pupils. Eighty-four usable essays were received.
- Interviews with local, regional and national health experts (three local, two regional, and one national in each country), 18 in total.

The interviewers were sociologists employed as research assistants by a partner university in Belarus and trained by the research team in qualitative interviewing and data analysis. The agendas for the interviews and the topics for the focus groups were discussed with the research assistants and covered living conditions, lifestyle and health. As well as asking informants to describe their everyday lives, their diet, their smoking and drinking practices, their engagement in exercise, their use of the health services, the support they received from family and friends and their non-work activities, we asked them to tell us about their memories of the accident and to describe the impact it had on their lives. We maintained contact with the lead researchers during the fieldwork phase by e-mail and made field visits. A training manual and a guide to carrying out the research was produced in Russian and English after the first summer school (Wallace *et al.* 2002). This manual alerted researchers to the potential pitfalls of qualitative research and emphasized issues of reliability and validity.

The interviews, which were held in informants' homes, and focus groups were recorded and transcribed. The *Framework* system (O'Connor *et al.* 2003) was used for preliminary thematic coding and to categorize and summarize the individual interviews. This enabled the complex of knowledge, beliefs, meanings and routinized practices inherent in the accounts to emerge from the data. We worked with the research assistants on a sample of translated interviews to agree the main themes and to construct an index. This process ensured that a desirable degree of uniformity in approaches to data gathering and analysis was maintained. The research assistants then constructed the matrix charts for the individual interviews, summarizing what each informant had said on each topic in the index, keeping as close as possible to the informants' own words and including illustrative quotes. The charts were then translated into English. We used as translator (at research team meetings and for translating the charts) a University research assistant who taught English to sociology students.

This paper is based on an analysis of the interview charts, the complete translated expert interviews and focus group transcripts as well as notes from meetings with the research assistants. The team also decided to include student essays as these provided a means of gauging the views of a younger population which might have been more difficult to elicit in the presence of adults.

Findings

Memories of Chernobyl

Being exposed to radiation does not directly correspond to the onset sort of chronic illness which sociology has traditionally investigated. Yet, in many ways, it mirrors what Carricaburu and Pierret (1992) have described as 'a situation at risk of illness', where no medical diagnosis can predict who will actually fall ill, and where persons must manage an apparently healthy life in conditions of uncertainty (Carricaburu and Pierret 1995). In such situations, many of the observations made in the context of the onset of a chronic illness in the seminal work of Bury (1982) apply. Thus, in line with Bury's (1982) predictions, the majority of the informants described the Chernobyl disaster as a

disruption of taken-for-granted behaviours and a breaching of commonsense boundaries. Most informants remembered the day of the accident and the weeks immediately following. They depicted this time as a period of pronounced disruption and uncertainty.

Some informants described seeing a cloud and experiencing a strong wind and rain but not knowing what it was. A male informant from Belarus stated:

We opened the windows and we could see it, we could see the fire. The wind was very strong. We did not know what it was. We saw a cloud and it moved directly over us.

Similarly a woman from Belarus recalled:

The accident? We listened on the radio—an accident had taken place, they saved people, we were very sorry for the people who worked there. The fire was so fierce they died in the fire. We felt pity.

Virtually all our informants said that they had no understanding, at the time, of the potential consequences of the accident. They just carried on with their lives as normal. A male informant from Russia said:

We did not understand at the time. I was not aware of all the dangers. It was as if it happened somewhere far away and did not touch us. Now we have got to know the consequences of radiation.

A rare exception was a woman from Belarus who told us that:

My nephew works in Russia at a nuclear power plant, he phoned and explained what had happened and what the consequences would be.

Many of the informants expressed anger over the authorities' failure to provide adequate and truthful information, which led to their children being exposed to what they now saw as unnecessary risks. One male informant from Belarus remarked:

They tried to conceal it from us. On May 1 there was a demonstration . . . They did not tell anyone about it, nothing. The children were outside. We did not know what the consequences could be.

Another male respondent from the same group noted:

They told us different things and about different things. There were rumours and gossip. It was hard to understand it.

The authorities subsequently gave out more information about the possible consequences of the accident. Lazarev (1997) suggested that they were excessively optimistic until 1989 and then there was shift to a pessimistic approach, which was difficult to moderate subsequently. One of our female informants from Belarus reported that the population was told that one in five people would die of cancer. Others reported being told to go out as little as possible and to move away from the area if they could. According to the informants, the reaction to the ways in which the authorities gave out information was

panic, with people being scared and perplexed. As one female informant from Belarus remarked:

It was terror. It was terror. It was scary. I did not know what to do, where to run, to go and then I was perplexed. Why did it happen like that and why was everything so calm.

While many residents reported that they had been frightened and concerned about the possible consequences of the accident, the majority of the informants recalled their response as being passive, relying on what they were told by the authorities and expecting the state to take any necessary actions.

Some of the informants noted that they wanted to leave the contaminated zone but could not afford to do so. Others said that they wanted to leave but did not want to depart from their homes and their friends and relatives. One male informant from Belarus stated:

I wanted to move away but I was sad at the thought of leaving my flat . . . all my relatives live here—my mother was here, my father was here, my brother, my sister all live here.

Some tried moving but could not find accommodation or settle outside the area and moved back. The medical experts told us that the better off who could afford to leave had done so. They also said that it was difficult to get medical doctors and other trained staff to work in the region; those who came, left as soon as they could.

Living with uncertainty

Our informants were aware that they were living with risk and uncertainty. They were aware of the severity of the Chernobyl incident and blamed it for high levels of sickness in the region. They recognized that the change in environment was irreversible and that they were living in a world different from that of the pre-Chernobyl period. Again there were strong parallels with behaviour observed in connection with the onset of chronic illness (Bury 1982). Thus, many respondents saw their world and their lives as having two time frames, 'before Chernobyl' and 'after Chernobyl'. Chernobyl marked a radical break in their lives and, in that sense, represented a genuine biographical disruption. They saw themselves as facing the real consequences of a disaster, not statistical risks. They were living with risks in the aftermath of what they now perceived of as a catastrophic event, with the possibility of illness and premature death being the consequence of the initial exposure, and with risks arising from living in the environment on account of risky behaviours such as the consumption of contaminated food.

As one of the members of the male focus group in Belarus said, 'Radiation is invisible now, but it mows down, it mows down'. There was also a sense of hopelessness and of being abandoned. As one of our male Russian informants put it:

Essentially nobody solves the Chernobyl problem. Everything is garbled because science doesn't know how to react to it and no one cares about the people living in the zone. No one can tell us what will happen.

In line with Bury's observation of a 'profound disruptions in explanatory systems' (1982: 169) among the chronically ill, many informants struggled to understand what their likelihood of becoming seriously ill was and also with understanding what actions they could take to protect themselves from further contamination.

In this general climate of uncertainty, people were overwhelmingly concerned about the future. Only a very few shared the attitude of one of the male informants from Belarus who said:

I try not to think about it. 'Till now I am OK with my health. We have an annual medical check up.

The vast majority shared the view of a female informant from Belarus who told us, that 'it is scary because the future is unknown'. Similarly a member of a male focus group in Russia said it was 'a very large nervous shock. For example I feel nervous about the future. It is because of Chernobyl'. Informants were clearly concerned about their present and future health status. They saw an uncertain future; they saw themselves as being profoundly endangered. This attitude was confirmed in the student essays where a majority of the young people wrote about their concerns about their own health and that of members of their families when asked to write about their lives. There was a sense that there was dissolution of the boundary between health and illness; a space of ever-present illness potential, with people ever alert to the possibility of becoming seriously ill.

Virtually all the informants reported that they, and their children, had health problems which they blamed on Chernobyl. Health was reported to have deteriorated in the region following the accident, especially thyroid gland problems in children, respiratory diseases, poor eyesight, cancers, stomach ulcers, colitis and nervous stress. Health concerns were paramount to many informants who felt abandoned by the authorities in a way which compounded the prevailing sense of uncertainty and fear. A female informant from the Ukraine stated in a focus group:

A very large nervous shock... I feel uncertain about the future... my father-in-law, my mother-in-law died of cancer. My daughter has goitre. Every second person dies of cancer—lots of deaths—the mortality rate is very high—children are born unhealthy—you are old by 40 years.

This was echoed in a student essay, where a female student stated:

I am very serious about my health, especially because of the accident at the Chernobyl Nuclear Power Station. I don't know how I would live if I lived in a clean zone, but I was born in the polluted territory. I can't say that I feel terrible but radiation affects me and I see the results. Almost everyone has problems with their thyroid gland. My mother was operated on for an enlarged thyroid gland and then it became enlarged again—what can be done about it? I also have problems with my thyroid gland. My brother has a genetic abnormality of his head. My father has suffered for a long time with psoriasis. This is why I think about health all the time. I am always think about my health when I look at the blackboard and I cannot see what is written as my eyesight is very poor.

Another essay by a female student noted:

In general my life is only problems. What about my health? I have problems because of radiation since I was 14. I have a lot of illness that people do not usually get until old age—50 or 60 years. All my joints hurt, I have poor circulation and heart disease, I have problems with my kidneys and my stomach and nobody cares about my health, nobody cures me. If you are ill they let you remain sick.

Responding to the disaster

In his theory of biographical disruption, Bury (1982) describes how the initial disruption of taken-for-granted assumptions and the subsequent disintegration of explanatory systems are followed by a third phase involving 'the mobilization of resources in facing an alerted situation' (1982: 170). This bears strong parallels to the disaster literature which suggests that, after an initial period of disruption, communities frequently respond to disasters with an increase in political mobilization (Oliver-Smith 1996, Peacock *et al.* 1996).

Following the Chernobyl disasters, affected populations were given concrete advice with regard to reducing their exposure to radioactive fallout. Yet there was no universal acceptance of the recommendations been given out by the authorities. Rather, many informants who experienced the consequences of the accident directly gained knowledge from multiple sources, including their own everyday lived experience. From a number of theoretical perspectives, including the issue of expert versus lay risk assessment, it is interesting to explore what informants perceived to be key risks and which behaviours they view as being risky.

While many of informants had a generalized understanding that there were certain areas they should not visit, and locally produced food they should not eat, many echoed the views of a female Ukrainian informant who told us:

We were at a loss. We did not know what radiation was and how to protect ourselves and our children.

A relatively small number of our informants thought that the risks from the accident had been exaggerated and that people incorrectly blamed all their health problems on it. This minority group of informants generally agreed that there had been an increase in health problems, but saw this as being connected with the collapse of the Soviet Union. Specifically, there was some tendency to attribute health problems to irregular employment or a lack of employment opportunities in the region.

The majority of informants, expert and lay, however, blamed the accident for an increase in poor health in the region. The lived reality for the vast majority of the informants was that their health and that of their family and friends had got worse since the accident. Most relied on lay epidemiology to inform their understanding of the health risks and consequences.

Most informants had been informed about which precautions to take, but not all of them understood what they had been told, and there was general mistrust of the authorities. One common misconception was that there was no point in continuing to take precautions. A Ukrainian woman put it as follows:

So after Chernobyl they said that it was necessary to wash floors. Everyone cleaned houses, brushed everything. That was at the beginning. Now radiation is in the genes. How can we take it away? It has taken root. We live with it, sleep with it . . .

This was echoed by a female informant from Russia:

We were told not to drink local milk or eat milk products, catch fish in the local river, eat fruit and vegetables from our gardens or eat mushrooms, or berries from the forest or hunt game in the forest. Everyone was worried at the time and did not catch fish in the river or eat mushrooms. Now we eat everything.

Around half the informants in Ukraine, but only a minority in Russia, and less than 10% in Belarus, said they were not aware of the precautions they should take about the food they eat or places where they could go. Virtually all the rest of the respondents in the Ukraine, and most in Russia and Belarus, said they were aware of precautions they should take but that they did not necessarily take any. About half the Russians, and two thirds of the Belarusians, said that they did not go to the forest or eat food from the forest but they did consume food produced in the region and from their own plots, including the milk produced from the cows kept in the region. Only a few informants (7% from the Ukraine 10% from Russia and 17% from Belarus) said that they took all the recommended precautions, including not going to the forbidden areas, not eating food from the forest, buying clean products produced outside the region, peeling the skin thickly on vegetables and potatoes and did not cook meat with bones. A male informant from the Ukraine said during a focus group meeting:

We collect mushrooms and berries. We know it is harmful—the zone is polluted and that you should not collect mushrooms, everyone knows it but everyone does it.

In Belarus, informants frequently pointed out that there are signs indicating the places that are forbidden and that the authorities convict and fine people who were caught there. No mention was made by Russian or Ukrainian informants of signs or fines, although one Russian woman said that in the past it would not have been possible to go to the forest and collect mushrooms and berries because the authorities would have prevented people from doing so.

Some informants suggested that they did not see any benefits to be gained from following the advice given by the authorities. A male informant from Belarus said that ‘you can’t do anything about it, it is impossible to change anything’. A female informant from Belarus similarly stated that ‘people don’t care about anything now—there is no way out’.

Yet others suggested that other factors influenced their decisions about what precautions to take and what food to eat. For many, their financial situation was often the deterrent factor, with a number suggesting that it is better to die of radiation than of hunger and others pointing out that they and their children would get no vitamins at all in their diet if they did not eat the fruit and vegetables they grew in their gardens. A female informant from Belarus said:

In general it was very scary. At first we didn’t go to the riverbank, didn’t drink cow’s milk, didn’t eat mushrooms, and berries. My grandpa had a garden and we cut off the cranberries. But now time has gone by and we are used to everything, you can’t see the radiation, you can’t feel it. That is why we now go to the river and swim and collect berries and mushrooms. Maybe we should buy food from elsewhere but we have no money. We eat what we grow ourselves and what we collect in the forest.

During a focus group, a female informant from Belarus similarly observed:

When it is summer children get some vitamins from eating the produce from the kitchen garden. But imagine we live in the contaminated zone where we should not eat anything we grow on our land because it is contaminated. But all the children eat home produced food. All the children have anaemia. All the children have thyroid gland disease.

This was closely echoed by a female group informant from the Ukraine:

Should I die because of hunger? It is better to die of radiation than to die of hunger. So we eat even though there is radiation, we collect mushrooms, we eat fish, we drink milk.

In as far as compliance with governmental guidance can be considered a form of mobilization of resources aimed at reducing the risk of illness, this process was at best very incomplete. Rather than responding to Chernobyl by placing greater emphasis on recommended and 'healthy' behaviours, a number of factors appear to have encouraged the population to adopt passive and fatalistic attitudes. Thus, while Chernobyl had a major impact on their lives, many informants did not separate the effects of the disaster from the negative impact that the economic collapse after 1991 had had on their well-being. The responses reported by the informants can be broadly described as routinization, resignation and fatalism. A male informant from Belarus stated:

It was scary at the time but later on I became indifferent. In any case you have to die sometime.

Similarly a medical expert from Russia observed:

There is no such thing as radiation phobia now. The population has adjusted and got used to the situation. Things are calm now.

For many there was no reason to assess the risk of not taking the recommended precautions because, as far as they were concerned, their fate was already determined. During a focus group a female informant from Russia observed:

I know a lot of young people who know nothing about it. We haven't lived without it. We have lived with radiation all our conscious lives. We received it in childhood and it is still with us. We can do nothing about it.

This view was echoed by a female informant from the Ukraine:

I don't have radiation phobia. I understand that there are problems with the environment and people's health. We live with it, it is necessary to do so.

A male informant from Belarus stated:

At the time I felt hopelessness. You can't do anything about it. Now I feel pity for small children. It doesn't influence adults, and even if it does influence their health it is not important, they will die soon anyway. It is the children I feel sorry for; they will get illnesses when they get older. Nothing can protect them from this. I don't pay attention to the issue; if you did think about it all the time it would just make life even worse.

There was a strong sense of being abandoned by the state. Informants frequently made reference to the provision of holidays for children, of special allowances for people living in the region and of free medical care; but this was often qualified by concern that these benefits were being reduced or withdrawn. The members of the female focus group in

Russia illustrated this graphically with reference to the reasons why they did not follow the advice on what not to eat, the state no longer made the necessary provision:

You know the first years after the Chernobyl catastrophe the supply of products was very good here—tinned milk and tinned meat—and it would not have been possible to go to the forest and collect berries, and mushrooms.

Many informants reported that their economic situation meant that they could not afford to look after their health, they had to take into account the relative risks of contamination and starvation. During a focus group, a female informant from Russia noted:

We know it is harmful but you have to eat something. We don't have enough money to buy clean products. If we had the money we could buy clean products.

There was a sense that, while nothing could be done about Chernobyl, there was some possibility that something could be done to improve the financial situation. A female informant from Belarus said:

It doesn't frighten me so much (radiation) but it might frighten young people if they have children. The thing that frightens me, that makes life so hard is that people haven't got enough money. It is unclear what will happen to us.

Interestingly many Russian informants, who were, on the whole, marginally better off than the informants from Belarus and Ukraine, tended to see Chernobyl as their main problem. Meanwhile, informants from Belarus and Ukraine were more likely to stress economic problems. Specifically, there was a tendency among Belarusian and Ukrainian informants to draw a causal connections between their current economic hardship, the collapse of the Soviet Union, lack of access to health services and personal health problems. Russian informants, by contrast, tended to place focus on the Chernobyl incident as a source of health problems, with less emphasis being placed on the role of health services. Moreover, a small minority of Russian informants were willing to concede that the economic transformation of their region had created positive side effects, both in terms of better access to consumer goods, and in terms of new employment opportunities.

A majority of informants across all regions, meanwhile, stressed that poverty and stress meant they, and or other people, had lifestyles that were a risk to their health: poor diet, alcohol consumption and smoking cigarettes. A male informant from Russia stated during a focus group:

We can't have a good diet in our zone to keep the family healthy. I earn a pittance, to keep a family, to provide my child with good food is not possible.

This view was echoed by a female informant from the Ukraine who stated during a focus group:

Increase our wages. People should be able to buy more than potatoes and fat. They should be able to buy medicines, they should be able to afford to go on holiday—not just to spend their leave working on their plots and do repairs on their homes.

At the same focus group another female informant noted:

In Soviet times people did not drink as much in the village. Now almost everyone drinks. In Soviet times there was hope, people were interested in their lives, you worked hard but you earned money.

Not untypical were the views expressed by a male informant from Russia during a focus group:

Drinking is a good thing. It calms down the nerves a little. You have a drink and the headache is gone. So it is a kind of medicine.

This view was closely mirrored by a male informant from Russia during a focus group:

Because the youth understand that they will not live long they drink, smoke and take drugs.

A female from the Ukraine similarly noted during a focus group:

People started to drink more after 1986. There is no accommodation, virtually no work. What can they do? They start drinking because the future is so uncertain.

A female Ukrainian informant remarked:

Health is influenced first of all by bad material conditions. To keep healthy it is necessary to have money and the majority of people who live in this region don't have enough money even for the most basic essentials or to have a holiday. Also there is the impact of the accident at Chernobyl power station.

A small number of informants noted that the suffering caused by Chernobyl might have made people more concerned about the environment. One of the young male students wrote in his essay:

Today I am worried about the environmental question. In our world there are a lot of people who care about the environment. The explosion at the Chernobyl atomic power station played a big role in that. A lot of countries have suffered from that explosion and Belarus most of all.

However, the recognition that the accident had an impact outside of Chernobyl was rare. Perhaps more importantly there were no references to any form of collective action by residents to lobby for environmental reforms in general, or for specific actions to support Chernobyl residents. Although most of informants talked about the suffering they had experienced as a result of the accident, none spoke about any actions they had taken, or were aware others had taken, to protest about their plight, or to press their case for more support from the state. Moreover, there was little evidence that our informants had actively sought out information about the accident, the risks to themselves or any precautions that they should be taking. One explanation for this situation may be that taking collective action would require high levels of generalized trust (Inglehart 1999), which is generally lacking in societies in which there is no history of pressure group activities. Pressure group activities,

moreover, would require certain levels of material resources which seem to be lacking in the region, particularly among those most affected by the accident.

Conclusions

In the wake of the Chernobyl accident the future has become uncertain and unpredictable for those living in the contaminated zone. The accident has put the population in an uncertain situation where risks are unknown and unknowable and where fear, rumours and experts compete to inform citizens of actual and potential consequences. The suffering of informants has been compounded by the economic collapse that followed the break-up of the USSR in 1991, leaving them living in what Rinkevicius (2000) has called 'double risk societies'.

In this paper we have tried to consider the ways in which the citizens of Chernobyl experience the social significance and moral meaning of the nuclear accident and its aftermath. The informants had survived the disaster but they now live with profound uncertainty (a sense of being afflicted) and with the possibility of becoming ill always present. Their self-identity is marred by a feeling of being continuously at risk and facing an uncertain future. Many informants conveyed an inability to construct positive meanings for self and society in the aftermath of the events. They portrayed themselves as victims, suffering from feelings of hopelessness engendered by a struggle to cope with poor health and the ever-present fear of life-threatening illness. For most, Chernobyl marked a profound biographical break in their lives, with post-Chernobyl life compared unfavourably with life before Chernobyl and all their present suffering blamed on the effects of the accident. Yet this experience often appeared to be seen as being inseparable from the problems created by the collapse of the USSR. In other words, the informants appeared to be unable, or unwilling, to separate the experience of hazard and danger associated with the Chernobyl incident from those sources of uncertainty which have arisen primarily from the disintegration of state socialism.

As concerns individual responses to the accident, there was a move from an initial lack of understanding immediately following the accident, through panic, to resignation and fatalism, with a retreat into habitual ways of coping. Among many respondents there was a general feeling that there was nothing that they could do to change their lives and little to reduce the risk of future illness. These attitudes contrast with the conventional understanding of individual behaviour during 'situations at risk of illness'. Thus, while we observe the predicted stages of initial confusion and biographical re-evaluation, there is little evidence of a third stage where a mobilization of resources to face an altered situation takes place (Bury 1982, Carricaburu and Pierret 1985).

Few, even of those who thought that there might be benefits to be gained from doing so, took the recommended precautions, primarily because of their economic situation. There was no evidence of individual or collective protest or action to campaign for more or better support and services, although many of our respondents complained about the lack of official help they received. To the extent that they took any action it was individual and aimed at gaining services for themselves and their families.

Coupled with these feelings of resignation at the individual level was a pronounced absence of political mobilization. Most of our informants noted that the experience of the disaster had neither led them to prioritize environmental issues in their political outlook, nor encouraged them to become politically active in relation to issues associated with the disaster. This contrasts with past studies of disasters which have repeatedly highlighted the socially transformatory effect of such events (Carr 1932, Prince 1968, Peacock *et al.* 1996).

According to Oliver-Smith (1996), post-disaster social transformation can occur because the disaster-event becomes an opportunity and cause for local political socialization and mobilization, or because the disaster causes changes in the relationship between the community and organs of the state. We suggest that the absence of these processes in the Chernobyl region is attributable to an erosion of trust and social cohesiveness in post-soviet societies as well as a pervasive lack of resources. Thus, rather than acting as a catalyst for change, the Chernobyl disaster appears to have further drained the material and social resources which would be needed to establish the infrastructure on which political activism could be based.

To summarize, the experience of residents affected by the Chernobyl disaster is unique in several ways. First, unlike in other disasters, the perception of uncertainty among informants is linked, not only to the incident itself, but also economic problems and the institutional disintegration of the USSR. Both events, despite their very different origins and time horizons, appear to reinforce each other in the views of the respondents. Second, instead of politicizing the population, the Chernobyl disaster appears to have further undermined the willingness of residents of the region, both to take an active stance with regard to managing their personal health and with regard to influencing future political developments and agendas. Using the previously mentioned metaphor of a 'double risk society', it appears that the double risk of the Chernobyl incident being followed by the transition period has undermined the types of efforts aimed at re-establishing sustainability which have been reported in the context of other disasters. The regions affected by the Chernobyl disaster continue to be inhabited by a substantial population, but this population does not appear to have regained any confidence in its environment or the institutions which govern it.

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