



Original Research

A multilevel analysis of long-term psychological distress among Belarusians affected by the Chernobyl disaster

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Summary *Background:* Radiation contamination and sociopolitical instability following the Chernobyl nuclear power plant disaster have had a profound impact on Belarus. *Objective:* To investigate the factors that impact long-term mental health outcomes of this population almost 20 years after the disaster.

Study design: Cross-sectional study.

Methods: In-person interviews were conducted with 381 men and women from two geographic areas of differing radiation contamination within Belarus. Participants completed surveys of demographics, psychosocial factors and psychological distress. Individual-level characteristics were combined with household-level measures of radiation contamination exposure and family characteristics to create multilevel predictive models of psychological distress.

Results: Between-household effects accounted for 20% of variability in depression and anxiety scores, but only 8% of variability in somatization scores. Degree of chronic daily stressors showed a significant positive relationship with psychological distress, whereas mastery/controllability showed a significant inverse relationship with distress. At household level, perceived family problems, but not level of residential radiation contamination, was the best predictor of distress.

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Conclusions: Multilevel modelling indicates that long-term psychological distress among Belarusians affected by the Chernobyl disaster is better predicted by stress-modulating psychosocial factors present in one's daily life than by level of residential radiation contamination.

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Introduction

Although the immediate impact of large-scale disasters is often readily apparent, the long-term impact is often less clear. The Chernobyl nuclear power plant disaster on 26 April 1986 remains the world's largest nuclear disaster to date.¹ Research into the effect of exposure to radiation contamination from Chernobyl has typically failed to confirm an increase in most health outcomes other than childhood thyroid cancer.^{2–4} However, the Chernobyl disaster is a prime example of how disasters may exert their strongest influence on psychological outcomes.⁵ Psychological effects of the disaster, such as poor perceived health status and depression, are well documented.^{6–16} Previous research has identified several high-risk groups that may be particularly sensitive to the impact of disasters, including women and mothers,^{17–21} older adults,^{19,20} evacuees⁹ and those with a high degree of exposure to the disaster.^{9,10,17,19,22}

Nevertheless, levels of psychological distress may tend to decrease over time and be increasingly influenced by a variety of chronic stressors that may be indirectly related to the disaster itself.^{18,23} Although literature assessing everyday life in the former Soviet republics is limited, there is the suggestion that the economic and political turmoil in these regions has resulted in relatively low life satisfaction,^{24,25} potentially contributing to psychological distress following the Chernobyl disaster. The psychological impact of the Chernobyl disaster remains an important area of investigation given changes in public perception of the disaster combined with subsequent alterations in the sociopolitical landscape of Belarus as a country formerly under Soviet control.

Previous studies of the Chernobyl disaster have largely investigated the influence of individual-level demographic risk factors, proximity to the disaster site or exposure to radiation contamination when assessing the psychological effects of the disaster. However, it has been argued that epidemiological and social science research has generally failed to consider contextual factors

appropriately when identifying predictors of health outcomes.^{26,27} Even fewer studies have capitalized on the availability of multilevel modelling techniques to estimate the influence of context on distress more accurately. The current study assessed the relative contribution of both individual- and household-level variables to the experience of psychological distress among Belarusians. Households were chosen as the clustering variable, not only to maximize efficiency in terms of data collection but also to assess the familial relationship and residential factors that may act as either risk or protective factors of mental health outcomes. Therefore, this investigation aimed to answer the following questions:

1. Does long-term psychological distress following the Chernobyl disaster vary by household?
2. Do individual-level predictors identified in previous disaster research (age, gender, occupation, chronic stressors, mastery/controllability, negative life events, evacuation history) account for significant variance in long-term psychological distress?
3. Do household-level predictors (region of residence, level of residential ground contamination, family history of leukaemia, perceived family problems, perceived family cohesion) add predictive ability to individual-level predictors of long-term psychological distress?
4. Does the association between significant individual-level psychosocial predictors and psychological distress vary by region of residence?

Methods

Study sample

Participants for the current study were selected from a previous case–control study of childhood leukaemia among Belarusian families exposed to radionuclides from the Chernobyl disaster.²⁸ The

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