

# Psychological Factors Affecting Health after the Chernobyl Disaster: A 20-Year Review

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# The psychological impact of the Chernobyl disaster

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- Disaster: Latin “ bad star” or “ill fate”
- From the beginning debate about the extent of psychological damage
- Chernobyl disaster viewed as a worst case scenario, associated with nuclear energy production
- The general public regards nuclear power with almost apocalyptic awe



# 2006 Report of the Chernobyl Forum

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“The mental health impact of Chernobyl is the largest public health problem caused by the accident to date.”

What is the evidence that documents this conclusion?



# Psychological consequences of disasters

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- Over the past 100 years, many descriptive epidemiologic and clinical studies of the psychological impact of natural and human-made disasters

\*high risk groups

\*general population



# Psychological impact of disasters

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- Depression (suicide)
- Anxiety (especially post-traumatic stress)
- Medically unexplained physical sx (MUPS) (fatigue, weakness, headaches, joint and muscle pain)
- Substance abuse
- Changes in health related behaviour
  - Increased medical service utilization
  - Changes in attributional style



# Common risk factors for adverse emotional outcomes after disasters:

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- Personal:  
female; having young children; prior psychiatric or alcohol history; poverty; low social support; poor physical health
- Disaster:  
magnitude & severity of exposure; number of deaths; evacuation; death of a loved one; physical threat
- Post-disaster:  
inadequate practical or emotional support; inadequate or inappropriate professional interventions; media coverage



# Two post-disaster risk factors unique to toxic disasters

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Stigma

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Fear of cancer and congenital  
abnormalities



# Radiation events and stigma

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- Japanese survivors – hibakusha (explosion-affected people)
  - A-bomb neurosis – excessive anxiety about health and fear of cancer
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- Chernobyl evacuees - “glow worms”
  - Vegetative dystonia – weakness, headaches, fatigue (non-specific physical sx and stress reactions)
  - Radiophobia – excessive anxiety (derogatory & non-scientific)



# Features that Chernobyl a “high-risk” disaster (1)

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- Widespread exposure
- Death toll??
- Delayed, chaotic and permanent evacuation
- Abortion assembly-lines
- Battle for residency permits
- Increase in thyroid disease in exposed children



## Chernobyl features (2)

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- Incomplete disclosure by authorities
- Prolonged contradictory reports by news media
- Distrust in government authorities
- Wide array of symptoms attributed to event by medical community
- Intensive health monitoring by international community



## Chernobyl features (3)

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- Followed by political and social upheaval
- Decline in standard of living
- Periods when food and electricity were not available
- Shortening of life expectancy in men
- Broken promises in terms of benefits to evacuee pop.
- Locally referred to as “second Chernobyl”



# Evidence on psychological “fall-out”

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cautionary comments



# 1. Context of the research

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- Prior to Chernobyl, no tradition of: epidemiology or of western psychiatry
- No baseline data on prevalence of mental illness, mental retardation, dementia, or alcoholism
- Suicide data unreliable
- No experience adapting standardized tools for studying well-being used in other parts of the world



## 2. Disentangling the effects of multiple stressors

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- Socio-economic conditions and political turmoil also contributed to pop. mental health
- Chernobyl itself entailed multiple stressors
- Complex web of exposures whose effects are inseparable



### 3. Reliable psychological research began 6 years later

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Acute psychological effects, and effects during first 5 years, were not documented at the time they occurred



# Areas of research

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1. Population-based morbidity studies
2. Cognitive impairment in at risk children
3. Mental health of liquidators



# Four population-based morbidity studies

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- Finnish/Russian community study
- Dutch/Belarus epidemiologic study
- US/Kiev high risk group study
- Ukraine national survey findings



# Population-based morbidity studies: conclusion

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- Significant adverse psychol consequences – prolonged (anxiety, MUPS)
- - increased use of medical services
- No apparent rise in diagnosable disorder
- Risk factors – female, having young children, poverty, risk perceptions

Consistent with research on TMI and Hiroshima/Nagasaki, and toxic disasters



## (2) Cognitive Impairment in Children

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International Pilot Study of Brain Damage In-Utero (WHO) (age 7)

Additional follow-up in Belarus

Additional work in Kiev RCRM

Stony Brook/Kiev research (age 11)

Israeli study of children expo < age 4 (+ in utero)



# Cognitive Impairment in Children

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Each study involved:

- a battery of neuropsychological tests of memory, intelligence, attention
- standard psychological evaluations
- non-exposed control group
- Separate evaluation of children *in utero*



# Cognitive Impairment in Children

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No exposure effects:

- WHO sample (age 7, from all 3 republics)
- Stony Brook/Kiev (age 11)
- Israeli sample (from Gomel (hi expo; N=667), Mogilev & Kiev (mild expo; N=408), and non-expo regions (N=564))



# Cognitive Impairment in Children: Conclusion

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Highest levels of exposure in exposed children were lower than the levels at which mental retardation was found in the offspring of Hiroshima/Nagasaki survivors

Tentative conclusion: no compelling evidence suggesting adverse effects of radiation exposure



## (3) Mental health of liquidators

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2 issues:

Effects of exposure on neurocognitive  
impairment (3 reports)

Emotional or alcohol-related consequences



# Suicide: Estonia

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Rahu et al. 1997

- Cohort of ~5,000 cleanup workers assembled in 1992; ave. age at arrival at C. = 32 yrs
- No significant excess of cancer deaths (1986-1993)
- Significant excess of suicide (SMR=1.52; 95% CI=1.01-2.19)



# Mental health of liquidators: conclusion

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- Mental health effects are unknown, but findings on neurocognitive effects are dubious (or reflect excess alcoholism)
- Suicide findings are worrisome
  - *Dropped the ball in this area:*
- Occupational stress research → significant diff's in alcoholism and depression between C-expo and other work forces



Does the evidence support the WHO  
conclusion about public mental  
health impact of Chernobyl?



# Conclusions

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- Psychological impact is long-term, protracted
- Anxiety, depression, MUPS
- Increased use of medical services
- High risk groups (women, mothers, evacuees)
- No evidence of brain effects or diagnosable psychiatric disorders
- Psychological effects not only in area of mental health, but also in health-related behaviours



# Are the findings from Chernobyl unique?

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- Findings are consistent with research on other toxic exposures
- Consistency of the basic findings with other research is crucial aspect of one's ability to generalize (Rothman & Greenland 1998)

TMI	A-bomb
Bhopal	Tokyo gas attack
Chemical spills	Persian Gulf
Toxic waste leaks	Occup. Exposures



# Future directions

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- Descriptive studies of clean-up workers
- Analytic epid. studies of risk and protective factors for psychiatric problems
- (testable) interventions to reduce the level of psychological morbidity:
  - Medical professionals/health authorities
  - Local research communities
  - Participants in ongoing research studies
- Public health community must take other health impacts seriously



**Thank you for your attention**

