US ERA ARCHIVE DOCUMENT



Natural Disasters and Human Health: Measuring the Prevalence of Stress-Related Disease after the 2002-2003 Illinois Storm, Tornado and Flood Events



Richard Salkowe, DPM, PhD Candidate

University of South Florida

1. Background and Objectives

Prior research has revealed that disaster events are associated with an increased prevalence of stress-related illness that may persist for a prolonged period of time after the initial threat has subsided. The severity of post-disaster disease morbidity is contingent upon the magnitude of the respective event and the associated loss of personal and community resources. This study examines stress-related post disaster disease incidence that is of sufficient severity to require inpatient hospitalization.

2. Study Area

Severe storm, flood ,and tornado events affected several Illinois counties in 2002-2003 resulting in federal disaster declarations with over \$30 million dollars distributed for individual and public assistance by the Federal Emergency Management Agency. The 13 disaster declared counties that are represented in the study area were selected based on a significant incidence of pre-disaster demographic indicators of psychosocial stress in comparison to the Illinois state average (p<0.01).

2000-2001	Study Area	Illinois	
Poverty	18.0%	10.7%	
Unemployment	6.3%	5.4%	
Disability	20.0%	16.1%	
High School Graduation	77.4%	81.4%	
Death Rate per 1000	12.8%	8.4%	
Teenage Births	15.1%	12.0%	



3. Methods

A longitudinal pre-event and post-event comparison of hospital admissions for diagnostic groupings of stress-related disease was performed to determine if a significantly higher rate of admissions existed in 13 disaster stricken rural counties of southern Illinois in the year following the event (2004) compared to the year prior to the disaster event (2001). The same indicators of stress-related disease were evaluated in a control group of 7 rural counties in northern Illinois that did not experience a disaster in 2002-2003. Non-stress-related disease incidence was compared pre-event and post -event to determine the specificity of admission trends.

3a. Stress-Related Disorders

Behavioral Disorders

- •Affective, anxiety, dissociative, & personality disorders
- Alcohol & substance-related mental disorders
- Other mental conditions

Vascular Disease

- Acute cerebrovascular disease
- Acute myocardial infarction
- Cardiac arrest
- Congestive heart failure
- •Coronary atherosclerosis & other heart disease
- Hypertension
- •Other cardiovascular /cerebrovascular disorders

Immune Disorders

- Immunity disorders
- Multiple Sclerosis
- Rheumatoid arthritis & related disease
- •Systemic lupus erythematosus & other connective tissue disorders

Metabolic and Non-Specific Disorders

- •Conditions associated with dizziness or vertigo
- Diabetes mellitus
- Gastritis & duodenitis
- Gastroduodenal ulcer
- •Headache; including migraine
- •Syncope, Malaise & fatigue

3b. Non-Stress-Related Disorders

- Appendicitis
- Biliary tract disease
- •Cancer
- Cataract
- Otitis media

4. Results

Two-sample z-tests for proportions revealed a significant increase in hospital admissions for stress-related illness in a comparison of the predisaster year (2001) and post-disaster year (2004) in the 13 counties of southern Illinois that experienced disasters in 2002-2003 (p<0.01). The incidence of non-stress related hospital admissions in the disaster affected counties significantly decreased (p< 0.05) and the incidence of stress-related hospital admissions in the control counties significantly decreased (p<0.10) during the same time period.

	Disaster counties		Control counties	
	2001	2004	2001	2004
Population	287440	287592	327959	333301
Stress-related admissions	5698	5966	7451	7390
Proportion of population	1.98%	2.07%	2.27%	2.22%
Difference in proportions	-0.09%		0.05%	
Z-statistic for difference in proportions	-2.411***		1.364*	
Non-stress related admissions	922	828		
Proportion of population	0.32%	0.29%		
Difference in proportions	0.03%			
Z-statistic for difference in proportions	2.041**			

p < 0.10*, p < 0.05**, p < 0.01***

5. Conclusion

This cohort study of pre-event and post-event stress-related hospital admissions provides an additional method for evaluating the consequences of disasters and focuses attention on the critical need for post-disaster preventive health interventions that address community vulnerability and well-being with respect to stress-related illness. These findings support the premise that the combined effect of multiple subclinical psychosocial stressors may potentiate negative health outcomes. Adverse reactions to environmental contaminants may be more prevalent in communities with an increased incidence of post-disaster stress-related hospital admissions.

6. Further Research

- •Comparative analysis of stress-related hospital admissions in disaster affected areas with different demographic psychosocial stressor profiles
- •Comparative analysis of out-patient physician encounters for stressrelated illness in disaster affected areas
- •Comparative analysis of stress-related illness in disaster affected counties while controlling for exposure to environmental contaminants

