ORIGINAL RESEARCH

Posttraumatic Stress Disorder in Parents and Youth After Health-Related Disasters

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ABSTRACT

Objectives: This study investigated the psychosocial responses of children and their parents to pandemic disasters, specifically measuring traumatic stress responses in children and parents with varying disease-containment experiences.

Methods: A mixed-method approach using survey, focus groups, and interviews produced data from 398 parents. Adult respondents completed the University of California at Los Angeles Posttraumatic Stress Disorder Reaction Index (PTSD-RI) Parent Version and the PTSD Check List Civilian Version (PCL-C).

Results: Disease-containment measures such as quarantine and isolation can be traumatizing to a significant portion of children and parents. Criteria for PTSD was met in 30% of isolated or quarantined children based on parental reports, and 25% of quarantined or isolated parents (based on self-reports).

Conclusions: These findings indicate that pandemic disasters and subsequent disease-containment responses may create a condition that families and children find traumatic. Because pandemic disasters are unique and do not include congregate sites for prolonged support and recovery, they require specific response strategies to ensure the behavioral health needs of children and families. Pandemic planning must address these needs and disease-containment measures. *(Disaster Med Public Health Preparedness. 2013;7:105-110)*

Key Words: PTSD, pandemic, psychosocial, disasters

Pandemic disasters have been a part of human history for centuries, and while recent outbreaks have been either extremely mild or quickly contained, experts predict that a major pandemic with projected morbidity rates from 18 to 100 million and projected death rates ranging from 89 000 to 207 000 will occur sometime during the next century.[1,2] Of note is the shift in mortality and morbidity to younger age groups, which has been notable in both seasonal influenza and the recent influenza A (H1N1) pandemic.[3-5] High rates of pediatric infection are predicted for future pandemics,[3] and children will continue to be both victims of illness and vectors of transmission. However, while pediatric deaths may be numerous, equally important is potentially high pediatric morbidity: many more children will live through such illnesses. Pandemic planning, therefore, must consider the needs of those children and their families, ensuring that they do not suffer long-term trauma from either the experience of pandemic illness or public health response strategies.

The unique and specific needs of children during disasters have recently been documented in the findings of the National Commission on Children and Disasters[6] and an earlier report from the National Center for Disaster Preparedness,[7] but little reference to pandemics appear in either. While the recommendations of these reports are important and useful, they fail to address some of the most unique contributing factors of adverse mental health responses to pandemics.

It is true that pandemics have much in common with other disasters: community impact, unpredictability, fatalities, and persistent effects. Response to pandemics necessarily differs from that of other disasters by discouraging convergence and gathering of victims; instead, the exact opposite—separation, isolation, and quarantine—is demanded. While such disease-containment measures may quell the outbreak, they have the unintended consequence of inhibiting family rituals, norms, and values, which regulate and protect family functioning in times of crisis.[8] Relational functioning among family, community, and peers influences individual resilience,[9] and the inhibition or interruption of such functioning may both diminish individual and family resilience and increase the potential for adverse reactions.[10] As Masten and Obradovic wrote about pandemic illness, "families often infect each other before any individual is diagnosed, they also infect each other with fear" (p 9). During a pandemic, family and community response strategies and resulting regulatory actions will significantly influence the health and functioning of individuals,

families, communities, and the nation. Population health, in its broadest sense, is best served by carefully considering all areas of need for children and families in pandemic disaster preparedness.

Deleterious effects of pandemic and pandemic response strategies occurred after the outbreak of severe acute respiratory syndrome (SARS) among patients and hospital workers.[11,12] Family-centered care, a hallmark of pediatric crisis response, was abandoned, with detrimental effects on patients, families, and caregivers.[13,14] The incidence of posttraumatic stress disorder (PTSD) after the SARS pandemic in Canada was found to be similar to that of natural disasters and terrorism (28.9%);[15] however, critics argue that little improvement in pandemic planning has occurred, even in Canada, since then.[16,17]

Even milder pandemics have demanded an examination of their psychosocial effects. Following the H1N1 pandemic, the World Health Organization noted:

> A large amount of information about the natural history and clinical management of 2009 H1N1 virus infection has been obtained in a remarkably short period of time, but considerable gaps remain….public health efforts to reduce risk factors and to identify at-risk populations … should focus on social as well as clinical factors.[17]

The Centers for Disease Control and Prevention (CDC) has recently acknowledged that "mental health is part of the mission" of addressing communicable disease[18] and should serve as a model for public health. To that end, this report examines rates of PTSD symptoms in parents and children who self-identified as having exposure to pandemic conditions. Specifically, this study hypothesizes that disease-containment efforts will negatively impact parent and child mental health, as evidenced by increased symptoms of PTSD. Further explication of the biopsychosocial response of those exposed to pandemic disasters is the first step toward developing best practice approaches to planning, response, and recovery for children and families.

METHODS
Sample
Data were collected from 586 parents who completed a survey in the Spring of 2009 about their experiences with pandemic illness. A "follow-the-virus" sampling method was developed to identify potential respondents, with an emphasis on areas most severely impacted by H1N1, particularly those that experienced high rates of pediatric illness and mortality. This method yielded 5 sample states: Arizona, California, Florida, New York, and Texas. In addition, Kentucky was designated a sample site based on proximity and its role as the pilot state. Two locales in Mexico were sampled, Mexico City and Juarez, as Mexico was the site of the original H1N1 outbreak. Also, Toronto, Canada, was targeted to provide comparative data to the experience and impact of SARS.

Parents were recruited for surveys through broad-based print (via major newspapers in the targeted regions) and website advertising and flyers distributed in health departments, private and public medical offices, conferences, and workshops. Recruitment ads ran for 1 month during the data collection period, and provided a link to a web-based survey. A waiver of consent was obtained from the University of Kentucky Institutional Review Board, but participants were asked to check a box agreeing to participation after reading an informed consent document, which then routed them automatically to the survey. A series of screening questions at the beginning of the survey linked parents to an appropriate set of questions based on their experiences with pandemic quarantine or isolation. The survey was completed by 398 participants; each was offered $10 as incentive payment via a "request for incentive" page that was accessible only at the end of the survey and that was unlinked to the responses.

Measurements
A mixed method approach used surveys, focus groups, and interviews for data collection to support a convergence approach to understanding the data regarding the emerging outbreak. The process of measurement development respected standard social science research requirements for psychometric construction, including attention to question-ordering effects, item exclusivity, and clear and consistent use of key terms. Focus group and interview instruments used a semistructured interview schedule according to recommended approaches.[19]

The parent survey included multiple choice questions, a rating scale, and open-ended questions about experiences and anticipated areas of need during the pandemic, experiences with quarantine or isolation, sources of and trust in information, and perceptions of risk. It also included the parent-report version of the University of California at Los Angeles Posttraumatic Stress Disorder Reaction Index (PTSD-RI), and the PTSD Check List - Civilian Version (PCL-C). The PTSD-RI is a 48-item scale measuring parent reporting of a child's symptoms of trauma. Parents rated the frequency of PTSD symptoms during the previous month (from 0 = none of the time to 4 = most of the time). These items map directly onto the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (*DSM-IV*) PTSD criteria B (intrusion), C (avoidance/numbing), and D (arousal). Of these items, 20 assess PTSD symptoms; 2 additional items assess associated features—fear of recurrence and trauma-related guilt. Developed by Pynoos et al[20], it has strong sensitivity and specificity, validity, and internal consistency. The PCL-C is a 17-item self-report that can be used for PTSD screening, diagnosis, or symptom monitoring. Developed by Weathers and colleagues,[21] the civilian version can be applied generally to any traumatic event and is easily modified to fit specific time frames or events. It is self-administered and requires respondents to rate how often they have been bothered by PTSD symptoms using a 5-point scale

(from 1 = not at all to 5 = extremely). It has been shown to be valid and reliable, and the instrument is available in the public domain.

These measurements were available online (Survey Monkey) and on paper, along with demographic items regarding gender, age, type of exposure to disease, containment procedures (none, isolation, or quarantine), location of residence (by state), mental health services used as a result of the pandemic (yes, no, prefer not to respond), and open-ended questions regarding participation in follow-up interviews and focus groups. All research instruments and consent forms for parents living in the United States and Canada were in English. All research instruments and consent forms for Spanish-speaking populations were translated by professional translators and reviewed for content integrity and comprehension by the project's cultural consultant who is a native of Mexico City and a long-time resident of the Juarez area.

RESULTS

The parent sample was predominantly female (78%), White (66.1%), and aged from 18 to 67 years (mean age, 37 years). More than half were employed full time, although 40% reported average annual household incomes of less than $50 000. Parents from all target areas participated; most were urban or suburban dwellers (87%). Respondents came from all 6 target states, Mexico, and Canada. When asked to name the most serious pandemic event they or someone in their immediate family had experienced, 91% answered H1N1, with 8% reporting SARS and 1% identifying avian influenza. Regarding disease containment experiences, 20.9% reported that they were ordered into isolation, 3.8% reported being quarantined, and 75% reported no quarantine or isolation experience.

Regarding mental health service use, clear differences were seen in utilization patterns between isolated and quarantined families and those with no containment experience. A substantial number of parents who were quarantined or isolated (44.4%) reported that their children did not receive mental health services. However, 33.4% said that their child/children began using mental health services, either during or after the pandemic, related to their experience. The most common diagnoses were acute stress disorder (16.7%), adjustment disorder (16.7%), and grief (16.7%). Only 6.2% of these children were diagnosed with PTSD. Conversely, 93.2% of parents who completed the general survey reported that their children did not receive mental health services related to the pandemic. Of the youth who received services either during or after the pandemic, the most common diagnoses were generalized anxiety disorder (20%) and adjustment disorder (20%), with 1.4% receiving a PTSD diagnosis.

Traumatic Stress Responses

PTSD in parents was measured based on scores meeting the clinical cutoff point on the PCL-C. For screening purposes,

a score of 25 indicated probable PTSD, and a score of 30 indicated a diagnostic threshold for PTSD was met. Of parents who experienced quarantine or isolation, 25% had a PTSD screening score of 25 or greater, indicating that they were at risk for PTSD; 28% had scores of 30 or greater, meeting the diagnostic criteria for PTSD. Only 7% of the parents who did not experience social distancing through isolation or quarantine had a severity score of 25 or greater, and only 5.8% scored above 30. Further analysis found that these differences in meeting criteria for PTSD were significant ($\chi^2 = 31.411$, $P < .001$). Analysis using an independent samples t test found significant differences between the mean scores of parents who did (M = 46.67) and did not experience isolation or quarantine (M = 39.77) ($t = 2.39$, $P = .020$).

Traumatic stress in children was measured by parent reporting on the PTSD-RI, and significant differences were also found between those who experienced social distancing measures and those who did not. Children who experienced isolation or quarantine were more likely to meet the clinical cutoff score for PTSD (30%) than those who had not been in isolation or quarantine (1.1%; $\chi^2 = 49.56$, $P < .001$, Cramer V = .449). Further analysis using independent samples t test revealed a significant difference in mean scores between the 2 groups ($t = 6.59$, $P = .000$), with the mean of the isolated and quarantined groups (22.3) 4 times higher than that of the general group (5.5). In addition, the respondents in the quarantined and/or isolated groups indicated that their child met the PTSD criteria for the subscales of avoidance/numbing (57.8%), re-experiencing (57.8%), and arousal (62.5%) at high rates.

Examination of PTSD symptoms in parents and children within the same family revealed a significant relationship between the 2: of parents meeting PTSD cutoff levels, 85.7% had children also meeting clinical cutoff scores for PTSD, while among parents not meeting PTSD criteria, only 14.3% had children with PTSD symptoms ($x^2 = 65.91$, $df = 1$, $P = .000$ and Cramer V = .518).

PCL-C Scores for Parents

One-way ANOVA post hoc Tamhane tests for the PCL-C revealed that women reported significantly higher rates of PTSD than men. The overall ANOVA was not significant ($P = .21$) for location of residence; therefore, no post hoc tests were investigated. Parents with disease-containment experience had significantly higher rates of PTSD than those who were not quarantined or isolated. A correlational analysis between age and total PTSD score revealed a significant negative correlation ($r = -.34$, $P < .000$) suggesting that younger parents had higher rates of posttraumatic stress on the PCL-C.

Table 1 displays the standardized regression coefficients (β), ΔR^2, and indicators of individual variable significance after sequential entry of all predictors. After step 1, with gender

TABLE 1

Hierarchical Multiple Regression Analyses Predicting PCL-C Scores (N = 378)		
Predictor	**ΔR^2**	**β**
Step 1	.21[a]	
Gender		.24[a]
Age		-.19[a]
Step 2	.01	
Location		
Kentucky		
California		.06
Florida		.09
Arizona		.07
New York		.11
Texas		.06
Step 3	.23[a]	
Disease-containment groups		
None		
Isolation		-.15[a]
Quarantine		-.19[a]
Total R^2	.45[a]	

Abbreviation: PCL-C, Posttraumatic Stress Disorder Check List - Civilian Version.
[a] $P < .001$.

TABLE 2

Hierarchical Multiple Regression Analyses Predicting PTSD-RI Scores (N = 369)		
Predictor	**ΔR^2**	**β**
Step 1	.11[a]	
Gender		.13
Age		-.16[a]
Step 2	.00	
Location		
Kentucky		
California		.11
Florida		.09
Arizona		.07
New York		.06
Texas		.08
Step 3	.33[a]	
Disease-containment groups		
None		
Isolation		-.25[a]
Quarantine		-.19[a]
Total R^2	.44[a]	

Abbreviation: PTSD-RI, University of California at Los Angeles Posttraumatic Stress Disorder Reaction Index.
[a] $P < .001$.

and age in the equation, $R^2 = .21$, F_{inc} (1, 367) = 19.63, and $P < .001$. After step 2, with residential location added to PCL-C score with age and gender, no significant contribution to R^2 was noted ($R^2 = .22$, F_{inc} [2, 367] = 3.25, $P = .06$). After step 3, with disease-containment group added to the PCL-C scores above and beyond gender, age, and living location, $R^2 = .45$, F_{inc} (4, 367) = 31.76, and $P < .001$, indicating a reliably increased R^2.

PTSD-RI Scores for Trauma Symptoms in Children

One-way ANOVA post hoc Tamhane tests for the PTSD-RI disclosed that parents reported no gender differences in posttraumatic stress symptoms based on the gender of their children. The overall ANOVA was not significant ($P = .53$) for location of residence; therefore, no post hoc tests were investigated. Parents with disease-containment experience reported higher levels of posttraumatic distress in their children than those without quarantine or isolation experience. No significant correlation was found between parent age and PTSD-RI scores ($r = .08$, $P = .09$).

Table 2 displays the standardized regression coefficients (β), ΔR^2, and indicators of individual variable significance after entry of the predictor variables in the PTSD-RI model. After step 1, with gender and age in the equation, $R^2 = .11$, F_{inc} (2, 364) = 15.11, and $P < .001$. After step 2, with living location added to age and gender, no significant contribution to R^2 was noted ($R^2 = .11$, F_{inc} [2, 362] = 3.44, $P = .07$). After step 3, with the disease-containment group added to gender, age, and living location, $R^2 = .44$, F_{inc} (4, 365) = 33.87, and $P < .001$, indicating a reliably increased R^2.

Qualitative Responses

Qualitative data from interviews with parents who were affected by pandemic illness provide insight into possible psychosocial impact of pandemic on children and their parents and highlights the perceived threat, confusion, disruption, and isolation imposed by this type of health-related crisis.

> The kids' anxiety was the hardest thing to deal with… my daughter said, "Mommy, are you going to die?" and that was absolutely heartbreaking.
> I stayed away from everyone. I didn't know if it could happen, but I had heard a lot about people dying from this H1N1… my daughter was so upset! She thought I didn't want to be near her.

One healthcare worker noted the relationship disruption imposed by her professional role.

> I'm now suddenly working 20 hours a day and isolating myself, and away from them, and wearing a mask when we're close and not hugging and not sleeping, they can't crawl into bed with you. That was tough, that was the toughest, the hardest part….

One father who was hospitalized with a serious case of H1N1 explains:

> My children were scared. There was no time for good-byes or (to) tell them why. I did not know if I would see them again.

DISCUSSION

Parents reported that the pandemic had a significant impact on their child's mental health. In this study, nearly one-third

of the children who experienced isolation or quarantine demonstrated symptoms that met the overall threshold for PTSD and showed significantly higher rates of PTSD symptoms on all subscales. The estimated prevalence of PTSD in the general population for children varies, but a telephone survey based on a national sample of 4023 adolescents aged 12 to 17 years indicated a lifetime prevalence of 8.1%.[22] In a community sample of older adolescents, 14.5% of those who experienced a serious trauma developed PTSD.[23] A review of children exposed to specific traumas found wide ranges in rates of PTSD diagnoses: 20% to 63% in survivors of child maltreatment, 12% to 53% in the medically ill, and 5% to 95% in disaster survivors.[24] Results indicated that isolated and quarantined children in our sample met the criteria for PTSD at rates closer to children who have experienced disasters and other serious traumatic events. Documented rates of PTSD after exposure to isolation and quarantine experiences suggested a trauma-informed approach to understanding the biopsychosocial reactions to pandemics, indicating subsequent disease-containment measures. This finding appears especially important, because more than two-thirds of those meeting the diagnostic threshold by self-report and parent report were identified as suffering from PTSD when seeking treatment services from community providers.

A strong relationship was found between clinically-significant levels of PTSD symptoms in parent respondents and their children. Among adult respondents who met the clinical cutoff score for PTSD, nearly 86% had children who also met the clinical cutoff score. The finding that many parents and children *simultaneously* meet PTSD criteria also strongly suggests that public health professionals and behavioral health professionals conducting postpandemic surveillance for mental disorders, and behavioral health professionals conducting diagnostic screening, should consider that identification of PTSD in parents should trigger an investigation for behavioral health disorders in their family members.

These tools can easily be integrated into the standard public health response to a pandemic: Available screening tools have between 4 and 19 questions, take an average of 30 to 40 seconds to complete, may be administered by a range of professionals and para-professionals, and are free and publicly available (see *www.nctsn.org*). Further, using a screening tool for traumatic stress enables comparison of symptom profiles at different times for the same client and between individuals and groups of clients based on established national norms. Integration of this trauma screening tool into pediatric health care settings can be accomplished with little impact on service providers or patients. In fact, pilot testing an adult trauma screening tool and a child trauma screening tool during a peak rush period in a rural health department revealed that they were easily administered (on average, taking less than 1 minute), integrated easily into intake protocols, and well-received by subjects, with no refusals to participate.[25]

When no sites for triage are indicated in a pandemic, pediatric health care workers are best suited to conduct screening for traumatic stress symptoms in affected children and families. However, these professionals may need formal training in administering the tools; facilitating appropriate referrals based on the results; and using evidence-informed responses to address those at elevated risk of traumatic stress response. These responses should include a range of interventions from psychoeducation and prevention education (eg, normal and abnormal responses to pandemic, symptoms of traumatic stress, red flags, familial response strategies, and preventive measures) to community service referrals (medical, mental health, and social services) and trauma-focused therapy.

Limitations

Survey research that provides high reliability and standardization in data collection is ideal for comparing responses across groups. However, this approach presents some challenges. This study relies on a parent's retrospective perception of feelings and behaviors associated with a stressful experience; as such, responses are potentially flawed by recall bias and social desirability. Furthermore, the parents' subjective level of distress may interfere with their perceptive capacities regarding their child's symptoms and functioning. Because parent-child discrepancies in reporting appear most evident in clinical populations,[28] the role that traumatic stress reactions may have played in the parents' identification and awareness of symptoms should be the focus of future research. Also, the respondents who completed the online survey represent a self-selected group who may have had a special interest in the topic; therefore, the generalizability of the results is guarded. However, the disease-containment experiences of the respondents varied, and they approximated isolation and quarantine practices used by the general population.[27]

CONCLUSIONS

Pandemics are infrequent but potentially devastating crises that are likely to affect the lives of many children and their families physically, socially, and psychologically. Responders in public health, health care, and behavioral health must collaborate during pandemics to ensure that disease-containment measures are understood and implemented in a manner that minimizes the potential for negative psychosocial consequences in children and families. Use of a traumatic stress framework for organizing the response is a first step toward providing evidence-informed care to survivors of pandemics.

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