Using Theory to Examine Fatal Child Maltreatment Among a Sample of Children Known to Child Protective Services

EMILY M. DOUGLAS

Bridgewater State University, Bridgewater, MA, USA

The purpose of this study was to use theory to test different models to predict fatal maltreatment: parental psychopathology, social/ economic stress, and ecological theory. These models were tested using a subsample of children who were identified as "prior victims" in the National Child Abuse & Neglect Data Set from 2008 to 2012. At the multivariate level, the analyses suggest a statistically significant relationship between social/economic stress variables, including partner violence, inadequate housing, and financial problems. Repeated reports to child protective services and interactions between the age of child and financial problems often acted as protective factors. Implications for research and the child welfare field are discussed.

KEYWORDS   child maltreatment, child protection, child welfare

UNICEF estimates that the United States has one of the highest rates of child maltreatment fatalities (CMFs) when compared with other "rich" nations (UNICEF, 2003). In 2012, 1,593 children, or 2.20 per 100,000 children in the United States died as a result of abuse or neglect (U.S. Department of Health & Human Services [US DHHS], 2013). Research has noted a number of child and family characteristics that increase risk for CMFs (Anderson, Ambrosino, Valentine, & Lauderdale, 1983; Schnitzer & Ewigman, 2008; Stiffman, Schnitzer, Adam, Kruse, & Ewigman, 2002). Nevertheless, the research on fatal child maltreatment is still in development; most of the research is limited by having

used descriptive or bivariate statistics, small samples, or datasets from single states. The field of knowledge could be enhanced with research that is theoretically driven, uses large sample sizes, and appropriate statistical techniques. This study addresses some of these gaps.

CHILD MALTREATMENT FATALITIES

Annual data from the US DHHS show that children die from different forms of maltreatment. In 2012, 78.8% of victims experienced neglect, and 44.3% experienced physical abuse; this sums to more than 100% because children often experience multiple forms of maltreatment (US DHHS, 2013). Previous research shows that children who die from physical abuse versus neglect vary in regard to victim and family characteristics (Damashek, Nelson, & Bonner, 2013; Douglas, 2014) and that non-fatal abuse and neglect spring from different child and family risk factors (Stith et al., 2009). Thus, the models tested in this paper will be tested by type of abuse.

Children who die from abuse or neglect are very young. In 2012, 44.4% of CMF victims in the United States were younger than age 1 year and 70.3% were younger than age 3 years (US DHHS, 2013). Male children tend to be victimized slightly more often than female children, but that difference is rarely statistically significant (Lucas et al., 2002). African American children tend to be more at risk for fatal maltreatment (Herman-Giddens, Smith, Mittal, Carlson, & Butts, 2003; Kunz & Bahr, 1996), which is consistent with non-fatal child maltreatment (Knott & Donovan, 2010). Parents are primarily responsible for CMFs; in 2012, 80.0% of CMFs were perpetrated by birthparents—most often mothers (39.6%), followed by fathers (19.2%), and then mothers and fathers together (21.2%; US DHHS, 2013). Perpetrators are also generally in early adulthood (Chance & Scannapieco, 2002; Herman-Giddens et al., 2003).

THEORETICAL MODELS OF CHILD ABUSE AND NEGLECT

Child abuse and neglect has primarily been through three different theoretical models: *parent psychopathology model*, *social/economic stress model*, and *ecological theory model*.

Parent Psychopathology Model

The parent psychopathology model was the first approach used to understand the "causes" of child abuse and neglect in the twentieth century (Kaplan, Pelcovitz, Salzinger, & Ganeles, 1983; Kempe, Silverman, Steele, Droege-mueller, & Silver, 1962; Ounsted, Oppenheimer, & Lindsay, 1974). This model suggests that the primary reason for child maltreatment is the mental instability

of the parent (Boisvert, 1972). The parent psychopathology model suggests that some parents are incapable of controlling their behaviors/moods and that their irrational behavior leads to abuse or neglect. Recent research using national or large child welfare data files has found that between 17% to 25% of child welfare cases involved parental mental health problems (Administration for Children and Families, 2008; Staudt & Cherry, 2009). An extension of parent psychopathology is parent alcohol and substance abuse problems, which has been well documented in research on child welfare populations (Harris, 2008) and often co-occurs with mental health problems (Drake, Bartels, Teague, Noordsy, & Clark, 1993). Nationally, of children who encounter the child welfare system, 9% have a parent with an alcohol problem and 20% have a parent with a substance abuse problem (US DHHS, 2013). Descriptive research shows that mental illness has played a role in some CMFs (Douglas, 2013; Korbin, 1987; Meyer, Oberman, & Rone, 2001), but this has not been confirmed by bivariate or multivariate analyses (Chance & Scannapieco, 2002; Yampolskaya, Greenbaum, & Berson, 2009). This study will examine the predictive properties of parental mental health, alcohol, and substance abuse problems on CMFs, using a large, national dataset of child welfare cases.

Social/Economic Stress Model

The parent psychopathology model prevailed into the 1970s, when it was largely discarded in favor of the Social/Economic Stress model (Gelles, 1973). This model suggests that families that endure social/economic stressors, such as poverty, racism, low levels of education, housing difficulties, and domestic violence, are at an increased risk for maltreatment (Stith et al., 2009; World Health Organization, 2001). Studies with varying methods and sample sizes link poverty to an increased risk for maltreatment (Merritt, 2009). Additionally, parental perception of material and neighborhood hardship is also a significant predictor for child maltreatment (Slack, Holl, McDaniel, Yoo, & Bolger, 2004). The social/economic stress model is the basis for the modern-day child welfare and social service system. Families are given supportive services to alleviate their stress and, in theory, the risk for maltreatment declines (Delsordo & Leavitt, 1974; Gelles, 1973). Research has examined portions of the social/ economic stress model with regard to CMFs, with inconclusive results (Chance & Scannapieco, 2002; Stiffman et al., 2002). Further, many social and economic stressors, such as housing, poverty, and domestic violence have been understudied in relation to CMFs, all of which will be addressed in this discussion.

Ecological Theory Model

The ecological model incorporates elements of both the parent psychopathology and social/economic stress models, acknowledging that influences at

multiple levels may have an impact on a child's life (Gershenson, 1977). Children may be most immediately affected by those closest to them—family and other caregivers; the next level away from a child might be the child's community, neighborhood, church, or school; finally, children are influenced by larger social forces such as a state's economy, government structure, political forces, etc. In addition to these influences, each of these factors can have an effect on one another, further influencing a child (Bronfenbrenner, 1970, 2004). Previous research has shown a link between ecological factors and CMFs (Chance & Scannapieco, 2002; Damashek & Bonner, 2010; Douglas & Mohn, 2014; Graham, Stepura, Baumann, & Kern, 2010). However, this research is limited by bivariate analyses, using samples from single states, or had smaller samples than what can be found with a national dataset. The current paper builds on this previous research, but uses a large national dataset, to conduct multivariate analyses with interaction effects, to predict CMFs using a number of different child, caregiver, and household characteristics.

Research Questions

The three theories outlined have been important in assisting practitioners, researchers, and decision/policy-makers to better understand the risk factors for maltreatment. This allows the field to provide better service delivery and to pass more effective social policies. These theories have been tested in order to examine the difference between maltreating and non-maltreating families. This paper uses those same theoretical approaches with a national sample of children who had contact with child protective services, the National Child Abuse and Neglect Data Set (NCANDS), in order to examine whether these models can help distinguish between families perpetrating fatal and non-fatal maltreatment. Approximately 50% to 70% of CMF victims are unknown to child welfare services at the time of their death (Anderson et al., 1983; Damashek et al., 2013). In such instances, the first report to child protective service would be to report the fatality; if there are no surviving children in the family, very little information would be collected on the family. The purpose of this paper is to use case information to predict, through statistical analyses, when a case might be more likely to end in a fatality. Thus, this paper focuses on cases that were already known to child protective services prior to their fatality, because those are the cases on which child welfare professionals can act. The following questions are addressed:

(1) Do any of the common theoretical approaches used to explain child maltreatment—parent psychopathology model, social/economic stress model, ecological theory model —predict when a previously maltreated child might die from abuse or neglect?

(2) Does this prediction vary by type of maltreatment or age of the child?

METHODS

Data

NCANDS was used to address these questions, which is the primary source of U.S. national information on abused and neglected children known to state child protective service agencies. It is a national data collection system created in response to the requirements of the federal Child Abuse Prevention and Treatment Act (National Data Archive on Child Abuse and Neglect, n.d.). Specifically, the NCANDS child file was used for this set of analyses, which consists of child-specific data of investigated reports of maltreatment to state child welfare service agencies. The NCANDS data set represents information that is collected annually on all children, in nearly every state, who were reported for suspected/known child abuse or neglect to child protective services in their state/county. Information is garnered from each state's public child welfare agency's administrative data systems and reported to the federal government. The quantity of data for each case varies considerably since some cases are screened out after a report, while others might be closed after an investigation, or still others may remain open for years. The NCANDS dataset is publicly available and is housed at the National Data Archive on Child Abuse and Neglect at Cornell. With few exceptions (such as age of victim/perpetrator), the data in the NCANDS file is dichotomous with 1 = Yes; 2 = No. The data was recoded so that 1 = Yes; 0 = No. In instances where a third option was available, "Unable to determine," the data was coded as missing. The staff at the Archive at Cornell provided a dataset that had multiple years' worth of data, which provided a larger number of fatalities. This was especially important because of the large number of missing data in the NCANDS file. The dataset that the Archive staff prepared for this set of analyses only contained prior victims, from the years 2008 to 2012, and did not include any duplicate cases between years.

Sample

The data file from the Archive contained almost 4.6 million cases; data on the dependent variable, maltreatment fatality, was available for 3,130,865 cases, with 1,037 cases ending in fatality. When running the full multivariate analyses, the n values ranged in size from 2,138,769 (727 fatality cases) to 26,374 (99 fatality cases). The characteristics of the samples are presented in Table 1. Descriptive statistics show that the children in this sample of prior victims were primary school-age children, about 50% were male, about 25% were African American, about 66% were white, and over 20% were Latino/a. With regard to living arrangements, close to one-quarter live either with both parents or a single parent. Two-thirds of perpetrators are female and on average, they are in early-middle adulthood.

TABLE 1 Demographic and Descriptive Information of Independent Variables Among Children Who Were Previously Determined by Child Protective Services to be Victims ($n \sim = 3{,}131{,}902$)

Variable	Mean (SD)/%
Demographic Information	
Maltreatment Fatality Victim[1]	.03
Child Age	8.54 (4.79) years
Child—Infant	2.61
Child Sex—Male	50.30
Child African American	27.35
Child American Indian	2.60
Child Asian American	0.84
Child Caucasian	67.23
Child Hawaiian/Pacific Islander	0.37
Child Latino/a	20.84
Child Lives with Both Parents	23.79
Child Lives with Single Parent	23.65
Child Lives with Single Parent and Other Adult	16.61
Victim of Physical Abuse	18.47
Victim of Physical Neglect[2]	59.33
Victim of Medical Neglect[2]	1.33
Perpetrator Age	34.07 (9.62) years
Perpetrator Sex—Male	36.24
Number of Prior Reports on Family	3.71 (2.65)
Additional Independent Variables	
Alcohol problem by caregiver	8.16
Drug problem by caregiver	16.22
Emotional problem with caregiver	8.83
Partner violence present in household	13.96
Inadequate housing	40.02
Financial problems	43.69
Partner violence × Inadequate housing	5.12
Partner violence × Financial problems	6.07
Inadequate housing × Financial problems	41.09
Alcohol problems × Emotional problems	1.30
Drug problems × Emotional problems	2.38
Alcohol problems × Partner violence	2.85
Drug problems × Partner violence	4.51
Alcohol problems × Inadequate housing	0.91
Drug problems × Inadequate housing	2.00
Child is infant × Alcohol problems	0.25
Child is infant × Drug problems	0.60
Child is infant × Emotional problems	0.31
Child is infant × Partner violence	0.58
Child is infant × Housing problems	1.49
Child is infant × Financial problems	1.58

[1] CMF cases = 1,037.
[2] These two categories were combined to make one measure of "neglect."

Measures

The dependent variable, maltreatment fatality, is defined in NCANDS as "The child died as a result of abuse or neglect, because either: (a) an injury resulting from the abuse or neglect was the cause of death; or (b) abuse and/or neglect were contributing factors to the cause of death" (p. 113, US DHHS, 2013). This single variable was used to determine a fatality outcome. The measure of "primary type of maltreatment" was used to determine whether a child had been the victim of physical abuse or neglect; the measure of neglect was a combination of physical neglect and medical neglect.

The following independent variables were used in the models to predict fatal child maltreatment.

Child Characteristics

The models included: age, gender, and African American/Black. These variables were selected based on the standing literature and on the absence of missing data. Additional child race or ethnicity variables were not included in the analyses because of concerns about missing data and because African American/Black children are so over-represented in the child welfare population (Jimenez, 2006; Knott & Giwa, 2012). The models also included children's living arrangement: with both parents, with a single parent, and with a single parent plus another adult (could be a step-parent, an intimate partner, another family member, or unspecified). Ecological theory especially suggests that child characteristics, such as the age of the child, can place a child at risk for maltreatment and fatal maltreatment (Chance & Scannapieco, 2002; Damashek & Bonner, 2010). Thus, since infants are at the highest risk for fatality, child age was dichotomized to be 1 = infants (< 1 year) and 0 = non-infants.

Parent Mental Health and Substance Abuse

These variables included measures of caregiver alcohol problems, drug problems, or emotional problems.

Social/Economic Stress

For this set of characteristics, the models included information that would indicate stress in the household or living circumstances: presence of partner violence in the home; inadequate housing; and financial problems.

Ecological Approaches and Interactions

Research suggests that some of the most high-risk situations for children are when there is the presence of multiple different stressors (Anderson et al.,

1983; Graham et al., 2010). Using the existing literature and ecological theory as a guide, a number of different two-way combinations of stressors were examined. Child age as an infant was examined by each of the following family/parent stressors: caregiver alcohol problem, drug problem, or emotional problem and household stressors including family violence, inadequate housing, and financial problems. During initial investigation with the data, three-way interactions were explored, but this approach resulted in too much missing data; these combinations were dropped. Finally, the models included the number of times that each child was the subject of a report to child protective services, which provides some context regarding history of maltreatment and potential contact with systems outside of the family.

Analysis

The first analyses performed were bivariate, correlation analyses between the dependent and independent variables, and for restricted samples that are based on maltreatment type and age of the victim. The results of these analyses are not presented due to space, but are available upon request from the author. The variables that had a statistically significant relationship, or a trend toward significance, to the dependent variable were retained for multivariate analyses. Rare event logistic regression, which is an add-on analysis in the statistical program, Stata, was used to predict fatality. Logistic regression was selected because the dependent variable is binary, 0 or 1. Rare event logistic regression is used when the dependent variable has a binary outcome, but it is especially recommended for use in situations where the dependent variable occurs less than 5% of the time in the dataset (King & Zeng, 2001). Among the sample of prior victims, fatalities occurred .03% of the time ($n = 1{,}037$).

RESULTS

The bivariate analyses showed many significant interactions between the independent and dependent variables. This dataset shows fewer significant relationships between fatality and parent alcohol, drug, or emotional problems and shows more support for children's age, household stressors, and interactions between different sociodemographic factors. The variables with correlations meeting a $p \leq .10$ cut off were retained for multivariate analyses.

The parsimonious results of the rare events logistic regression are presented in Table 2. The model predicting fatal child maltreatment among all children, for all causes, showed that infants were 17.96 times as likely to die ($p < .001$); males were 1.34 times as likely to die as females ($p < .001$), African American/Black children were 1.59 as likely to die as compared with children of other races and ethnicities ($p < .001$); and, children who lived in homes where partner violence was present were 2.11 times as likely to die

TABLE 2 Parsimonious Summaries of Rare Events Logistic Regression, Predicting Fatal Child Maltreatment Among Victims by Type of Maltreatment and Age

Independent Variable	B	SE	OR	95% Confidence Interval		Wald	p
CMF for all causes, all children, (n = 2,138,769, Cases of fatalities = 727)							
Child was infant	2.89	.09	17.96	2.72	3.06	32.88	<.001
Child sex (1 = Male)	0.29	.08	1.34	0.15	0.44	3.93	<.001
Child race (1 = African American/Black)	0.46	.08	1.59	0.31	0.61	6.03	<.001
Child living situation: Single parent	−0.56	0.11	0.57	−0.77	−0.35	−5.33	<.001
Partner violence present in household	0.75	0.11	2.11	0.53	0.96	6.84	<.001
Child was infant × Partner violence present	−1.14	0.22	0.32	−1.58	−0.70	−5.10	<.001
Number of CPS reports 2008–2012	−0.14	.02	0.87	−0.19	−0.10	−6.39	<.001
CMF for all causes, <3, (n = 75,701, Cases of fatalities = 135)							
Child was infant	1.59	0.21	4.90	1.18	2.00	7.54	<.001
Child race (1 = African American/Black)	0.62	0.18	1.85	0.26	0.97	3.40	.001
Child living situation: Both birth parents	0.46	0.21	1.58	.04	0.88	2.13	.033
Drug problem by caregiver	−0.72	0.34	0.49	−1.38	−.06	−2.13	.033
Partner violence present in household	0.79	0.28	2.21	0.25	1.34	2.85	.004
Inadequate housing	1.00	0.22	2.72	0.56	1.43	4.50	<.001
Financial problems	−0.62	0.27	0.54	−1.15	−.09	−2.30	.022
Drug problem × Partner violence present	1.03	0.47	2.79	0.11	1.94	2.21	.027
Child was infant × Partner violence present	−1.02	0.40	0.36	−1.80	−0.24	−2.57	.010
CMF for Physical Abuse, all ages, (n = 289,796, Cases of fatalities = 157)							
Child was infant	2.97	0.22	19.57	2.54	3.41	13.39	<.001
Child race (1 = African American/Black)	0.35	0.17	1.42	.02	0.68	2.11	.035
Child living situation: Both birth parents	0.51	0.19	1.67	0.15	0.88	2.74	.006
Partner violence present in household	1.63	0.21	5.11	1.22	2.04	7.85	<.001
Inadequate housing	0.82	0.36	2.27	0.11	1.53	2.25	.025
Financial problems	−0.76	0.37	0.47	−1.48	−.04	−2.06	.039

(Continued)

TABLE 2 – *continued*

Independent Variable	B	SE	OR	95% Confidence Interval		Wald	p
Child was infant × Partner violence present	−1.41	0.47	0.24	−2.32	−0.49	−3.02	.003
Number of CPS reports 2008–2012	−0.23	.05	0.79	−0.34	−0.13	−4.41	<.001
CMF for Physical Abuse, <3, (n = 26,374, Cases of fatalities = 99)							
Child was infant	0.90	0.29	2.47	0.34	1.47	3.14	.002
Child race (1 = African American/Black)	0.51	0.21	1.66	0.10	0.91	2.44	.015
Child living situation: Both birth parents	0.60	0.23	1.83	0.14	1.06	2.58	.010
Partner violence present in household	0.55	0.32	1.73	−.070	1.17	1.73	.083
Inadequate housing	−0.61	0.33	0.55	−1.25	.04	−1.83	.067
Child was infant × Partner violence present	−1.21	0.54	0.30	−2.27	−0.14	−2.22	.026
Inadequate housing × Partner violence present	1.96	0.49	7.08	1.00	2.92	3.99	<.001
Inadequate housing × Child was infant	0.84	0.46	2.32	−.05	1.74	1.85	.065
CMF for neglect, all kids, (n = 824,579, Cases of fatalities = 251)							
Child was infant	2.43	0.14	11.33	2.15	2.71	16.94	<.001
Child race (1 = African American/Black)	0.48	0.13	1.62	0.22	0.74	3.64	<.001
Child living situation: Single parent	−0.47	0.17	0.62	−0.80	−0.15	−2.84	.004
Inadequate housing	1.23	0.23	3.41	0.77	1.68	5.29	<.001
Financial problems	0.44	0.24	1.55	−.03	0.91	1.83	.068
Inadequate housing × Financial problems	−1.93	0.33	0.15	−2.58	−1.27	−5.80	<.001
Number of CPS reports 2008–2012	−.08	.04	0.92	−0.15	.00	−2.00	.046
CMF for neglect, kids <3, (n = 136,047, Cases of fatalities = 154)							
Child was infant	1.32	0.16	3.74	1.00	1.64	8.01	<.001
Child race (1 = African American/Black)	0.33	0.17	1.39	−.01	0.67	1.90	.057
Child living situation: Single parent	−0.42	0.23	0.65	−0.87	.03	−1.85	.064
Financial problems	−0.36	0.16	0.70	−0.68	−.04	−2.21	.027
Number of CPS reports 2008–2012	−0.19	.09	0.83	−0.36	−.03	−2.26	.024

from maltreatment ($p < .001$). Some factors had a negative relationship to fatalities. Living with a single parent served as a protective factor as children were less likely to die (OR = .57, $p < .001$); children who were infants and who lived in homes where partner violence was present were less likely to experience a fatality (OR = .32, $p < .001$). Each successive report made about a child's well-being to child protective services decreased a child's chances of dying (OR = .87, $p < .001$).

With regard to children younger than age 3 years, infants were 4.90 times as likely to die as 2 and 3 year olds ($p < .001$). African American/Black toddlers were 1.85 as likely to die from maltreatment as children of other races ($p = .001$). Other increased risk factors included living with both parents (OR = 1.58, $p = .033$), living in a home where partner violence was present (OR = 2.21, $p = .004$) or inadequate housing (OR2.72, $p < .001$). The presence of a parental drug problem decreased risk for death (OR.49, $p = .033$), but the combination of both a parental drug problem and the presence of partner violence increased risk (OR = 2.79, $p = .027$). Having financial problems (OR = 0.54, $p = .022$) and the combination of the child being an infant and the presence of partner violence (OR = .036, $p = .010$) also decreased risk for CMF.

The model predicting death by physical abuse had similar outcomes. The strongest predictors of CMF were being an infant (OR = 19.57, $p < .001$) and living in a household where partner violence was present, which increased risk by more than a factor of 5 (OR = 5.11, $p < .001$). Other characteristics that increased risk for fatality included being African American/ Black (OR = 1.42, $p = .035$), living with both birth parents (OR = 1.67, $p = .006$), and having inadequate housing (OR = 2.27, $p = .039$). Factors which decreased risk included the combination of the child being an infant and having partner violence the household (OR = .24, $p = .003$) and number of reports to child protective services; for each addition report that was made, children were 0.79 times as likely, or 21% less likely, to die from maltreatment ($p < .001$).

Children younger than age 3 years were much more likely to die of physical abuse when they had a combination of inadequate housing and partner violence in their home (OR = 7.08, $p < .001$). Other risk factors which increased risk for toddlers, at the $p = .05$ criterion level included being an infant (OR = 2.47, $p = .002$), being African American/Black (OR = 1.66, $p = .015$), and living with both birth parents (OR = 1.83, $p = .010$). Children were at a decreased risk for death by physical abuse when they were an infant and when partner violence present (OR = .30, $p = .026$).

With regard to death by neglect, infants were 11.33 times as likely to die as non-infants ($p < .001$); children with inadequate housing were 3.41 times as likely to die from neglect as children who had adequate housing ($p < .001$). The remaining findings had a negative relationship to the dependent variable: living with a single parent (OR = .62, $p = .004$), have multiple reports made to

child protective services (OR = .92, p = .046) and the combination of inadequate housing and financial problems (OR = .15, p < .001).

The model for death by neglect among children younger than age 3 years was less complex. Children who were infants were at a higher risk for death (OR = 3.74, p < .001). But, having family financial problems (OR = .70, p = .027) or multiple reports to child protective services (OR = .83, p = .024) were less likely to die from neglect.

DISCUSSION

The purpose of this study was to investigate whether theoretical approaches that are generally used to understand non-fatal child maltreatment could help to explain fatal child maltreatment. The results of the analyses show that there is a fair amount of support for approaches that consider the social/economic stressors on a family, as well as ecological approaches. There was less support for parent psychopathology or substance use.

Factors That Increased Risk

The results showed that child age was the most significant predictor of becoming a victim of fatal maltreatment. In the subsamples that were examined, as compared to children of all other ages, infants were 11.33–19.57 times more likely to die as compared to children of other ages; as compared to toddlers, infants were 2.47 to 4.90 times more likely to die than children age 1 to 2 years. This finding is consistent with standing research and likely the most consistent predictor of fatality (Damashek et al., 2013; Kunz & Bahr, 1996; Palusci & Covington, 2014; US DHHS, 2012; Welch & Bonner, 2013). The results also showed that African American/Black children were at an increased risk for fatality. This is consistent with the literature that has found that African American/Black children are over-represented in the child welfare population and that heightened social pressures and poverty that accompany being a racial minority in the United States could be associated with higher rates of child maltreatment (Hill, 2004; Jimenez, 2006; Knott & Donovan, 2010). Discrimination may also explain higher rates of African American/Black families in the child welfare system; community members may be more willing to report Black child; child welfare workers may be more likely to substantiate a Black child, and medical examiners may be more willing to conclude that abuse and neglect were involved in a child's death (Wells, Merritt, & Briggs, 2009).

After child age, the social, economic, and household factors most consistently placed a child at risk for fatality. This finding was true across maltreatment types and across age groups. The presence of partner violence in the household placed children an increased risk for fatality, but especially for death by physical abuse. This finding speaks to the increased attention to

connection between the child welfare and domestic violence fields in the past several decades (Humphreys & Absler, 2011). A large body of literature exists which has explored the risks to children who are living in homes where partner violence is present and in the co-occurrence of child maltreatment and partner violence (Devaney, 2008; Giles-Sims, 1985; Holden, 2003). Inadequate housing also raised the odds of a child dying in maltreatment and age groups. There were also some combinations of stressors that increased risk for fatalities. For example, having inadequate housing and the presence of partner violence increased risk for death by physical abuse for toddlers. One other study of fatal and non-fatal maltreatment explored interactions in risk factors (Graham et al., 2010) and found that a variety of different child and caregiver characteristics increased risk for children; in fact, they found that there were more interactions that were significant than main effects on a child's likelihood of dying.

Factors That Decreased Risk

A number of factors decreased risk for fatalities. Living with a single parent generally decreased risk for fatality. Having financial problems, or financial problems in combination with another social stressor, or having an infant in combination with other stressors, also decreased risk for fatality. These findings are consistent with previous research that has shown a negative relationship between common risk factors for maltreatment and a child welfare fatality (Graham et al., 2010). The authors suggested that some higher-level risk factors may have prompted intervention from child protective services, which thus decreased the likelihood that a child would die. This intervention may be the case with the NCANDS data as well. Similarly, the findings of this study suggest that calling child protective services is effective. Despite the notions that multiple reports about a concerned child will not make a difference (Davis, 1987), this study shoes that children who are the target of multiple reports were less likely to die from abuse or neglect.

Insignificant Relationships and Future Directions

This study offers a new contribution to the literature through the testing of theoretical approaches on a large, national dataset, and uses interaction terms that have only been explored by one other study in maltreatment fatalities (Graham et al., 2010). The findings confirm some of the existing literature on fatal maltreatment. These analyses showed that younger children are at an increased risk for fatalities, which is the most consistent finding in the literature today (US DHHS, 2013). The analyses also showed that despite some fluctuations in annual reports (US DHHS, 2013), male and female children are at similar levels of risk for fatalities.

Parental mental health and substance use was not a predictor of CMFs. This finding is consistent with other research (Yampolskaya et al., 2009), but,

given the strong correlation between mental health concerns, substance abuse, and non-fatal child maltreatment (Harris, 2008), this area warrants further exploration. It is possible that the dataset, NCANDS, is inadequate for testing this particular set of risk factors. In general, mental health problems are not as high in the NCANDS dataset as other research has shown (Staudt & Cherry, 2009).

It is possible that some of the child, caregiver, and family factors used in this study do not adequately explain whether a child will be "maltreated-to-death." A small body of literature suggests that parents who have killed their children or who are responsible for their children's deaths may have a poor relationship with their children (Korbin, 1987). They may have age-inappropriate expectations of their children (Chance & Scannapieco, 2002) and may have deficits in their knowledge of child development (Graham et al., 2010). NCANDS does not have information that would make it possible to test this theory; but it is an area for future research.

Limitations

There are several limitations to this set of analyses. First, the dataset has a large amount of missing data, which is a common problem in social service-type datasets (Bellamy, 2008). Despite this limitation, there have been calls from leaders in the field for researchers to use the NCANDS data (Berliner & Finkelhor, 2014). Second, the NCANDS data is not particularly sensitive. The data is dichotomous and does not provide for any variation in the degree or severity to which a family might experience any of the problems noted in the dataset. For example, a parent with an "emotional problem" could be depressed or have schizophrenia. Third, the sample was limited to cases that were known to child protective agencies prior to the child's death, which is a subsample of children who die. Nationwide, approximately 70% of all CMF victims are younger than age 3 years (US DHHS, 2013); in the sample used for this paper, only 61% of the fatality victims were in this same age group. Nevertheless, this study makes an important contribution to the literature by using a large dataset to examine CMFs. Fourth, the data may contain errors. For example, if a parent is marked as having an "emotional" problem, this point could be reported by the parent himself or herself, determined by the caseworker, or a mental health provider. These data does not indicate the source of information.

CONCLUSION

This study tested common theories of child maltreatment to determine to what extent the theories help to explain fatal maltreatment. Results show that parent social/economic stressors are risk factors for fatal maltreatment and that certain

combinations of social stressors also place a child at increased risk for fatality. There is some evidence that financial problems alone, or in combination with other stressors, such as having an infant can decrease risk for fatality. In other words, if enough stressors are present, a family may receive services that decrease the risk.

Given the limitations of the NCANDS dataset, the results should be considered tentative until confirmed with other child welfare-based datasets. That said, this study builds on the extant research and the work done before it; nevertheless, many gaps remain in the knowledge of risk factors for CMF. If the research and practice arenas are unsure of what moves a maltreatment case into the "red zone," it is difficult to prevent children from dying. Social science research is always worthy of replication and this set of analyses is no different. The child welfare field could benefit from repeated studies that examine the ability of theoretical models to predict fatal maltreatment, since these are often the basis for intervention (Bath & Haapala, 1993; Danoff, Kemper, & Sherry, 1994; LeCroy & Whitaker, 2005). Further, there are additional areas that could benefit from exploration, mainly in the areas of the parent-child relationship, parent expectations of their children, and parent knowledge of child development. The NCANDS dataset does not collect this kind of information, nor is it among the standardized information child death review teams collect (National Center for the Review and Prevention of Child Deaths, n.d.). Finally, this study showed that additional reports to child protective services reduce risk for fatality, which suggests that engaging child welfare professionals in the lives of at-risk children may act as a protective factor.

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CONTRIBUTOR

Emily M. Douglas, PhD, is an Associate Professor in the School of Social Work at Bridgewater State University in Bridgewater, MA.