An ecological analysis of infant neglect by adolescent mothers

Jessica Dym Bartlett a,⁎, Maryna Raskin b, Chie Kotake b, Kristen D. Nearing b, M. Ann Easterbrooksb

a Brazelton Touchpoints Center, Division of Developmental Medicine, Boston Children's Hospital, Harvard Medical School, USA
b Tufts University, USA

A R T I C L E   I N F O
Article history:
Received 22 July 2013
Received in revised form
20 November 2013
Accepted 28 November 2013
Available online 7 January 2014

Keywords:
Infant neglect
Prevention
Adolescent parenthood
Ecological
Risk factors

A B S T R A C T
To inform efforts to prevent child neglect, we investigated a wide range of risk factors that have been largely unexamined in relation to infant neglect, the most commonly occurring form of child maltreatment. Using an ecological model of child neglect, we assessed the influence of characteristics at the level of the child, the mother, the family, and broader childrearing contexts on adolescent mothers’ likelihood of being a perpetrator in a substantiated case of neglect against their firstborn infants (n = 383, M = 12 months). Several factors were associated with infant neglect by young mothers: median block income, low infant birth weight, maternal smoking, maternal childhood history of neglect and of positive care, intimate partner violence (IPV) perpetrated by either the mother or her partner, and maternal use of mental health services. In multivariate models, income, a maternal childhood history of positive care, IPV by either a mother or her partner, and mental health service usage made significant contributions to the odds that a mother neglected her infant. Our findings suggest that these factors have particular salience to policymakers’ and practitioners’ efforts to identify high risk families and to intervene during the earliest months of life to prevent child neglect.

The statistics on child maltreatment in the United States are sobering: an estimated 681,000 children were abused or neglected in 2011 (U.S. Department of Health and Human Services [USDHHS], 2012), and child maltreatment costs the country more than $103.8 billion annually (Wang & Holton, 2007). Approximately 78% of these children experienced neglect, either alone or in combination with other forms of maltreatment (USDHHS, 2012). Children under five years of age are neglected more often than children in any other age group, and infants under one year are in greatest danger of being maltreated (20.6 per 1,000 in 2010). These young victims disproportionately suffer neglect compared to other forms of maltreatment, as well as its most severe consequences (DeBellis, 2005; Hildyard & Wolfe, 2002; USDHHS, 2012). Documented effects of neglect on young children include serious disturbances in cognitive, social, emotional, physical, and brain development that often surpass deficits observed in their physically abused peers (DeBellis, 2005; Manly, Kim, Rogosch, & Cicchetti, 2001).

The considerable human, financial, and societal toll of infant neglect suggests the need for scientific evidence on its etiology, as little is known about how to stop neglect from occurring in the first place. Despite the fact that neglect comprises the largest number of victims, and that very young children are affected most often, the empirical literature on child maltreatment historically has focused on the abuse of older children (Erickson & Egeland, 2011). While child neglect has gained notoriety as a public health concern in recent years (American Humane Association, 2010; National Alliance of Children’s Trust and Prevention Funds, 2011), most studies emphasize the consequences of neglect rather than its causes, even though understanding causality is most salient to prevention (DePanfilis & Dubowitz, 2005). This gap presents an important
opportunity for researchers to generate a sufficient evidence base for policymakers and practitioners to develop effective preventive interventions.

One reason for the paucity of prevention research on infant neglect is its complex etiology and presentation (Dubowitz et al., 2005). Neglect is multiply determined (DePanfilis & Dubowitz, 2005), can take many forms (e.g., failure to provide for a child’s physical, emotional, educational, medical, or supervisory needs), and is difficult to detect, posing considerable challenges to researchers (DePanfilis, 2006). Given the multi-causal nature of neglect, an ecological model has been “the dominant theoretical framework for understanding the casual pathways to maltreatment” (Daro, Barringer, & English, 2009, p. 3). An ecological approach to understanding neglect implicates interactions among risk and protective factors at multiple levels, including the individual child, parent, family, and the broader environmental context (Belsky, 1993; Bronfenbrenner & Morris, 2006; Cicchetti & Valentino, 2006). This approach stands in stark contrast to traditional conceptions of neglect as emerging from parental deficits alone. Studies conducted from this vantage point risk failure to explore the full range of causes and may result in blaming parents for exposure to stressors over which they have little control (e.g., poverty, childhood histories of abuse and neglect). An ecological model, on the other hand, facilitates the identification of individual, interpersonal, and environmental barriers to healthy parenting that can be modified through preventive intervention (Daro et al., 2009).

In addition to a need for further research on factors that either contribute to or reduce the chances that a child experiences neglect, a major challenge to effective prevention is that the period of infancy has gone largely unexplored in the empirical literature (Brodowski et al., 2008). Recent advances in multi-level research on risk and protective factors are encouraging (Schumacher, Smith Slep, & Heyman, 2001; Sedlak et al., 2010; Slack et al., 2011), but there are still few studies particular to the period of infancy, when neglectful parenting behaviors typically first develop (USDHHS, 2012).

Another impediment to research on infant neglect is its low incidence in study samples. Neglect is greatly underreported to child protective services (CPS; Tyler, Allison, & Winsler, 2006), and even elevated rates of maltreatment among infants (21.2 per 1,000; USDHHS, 2012) yield limited statistical power for studies in which neglect is the outcome variable of interest. One solution has been to collapse heterogeneous forms of maltreatment (e.g., physical abuse, sexual abuse, neglect) into the single category of “child maltreatment,” but this is highly problematic given likely disparate antecedents and consequences (Manly et al., 2001). A more effective strategy is to conduct prospective research to examine the occurrence of neglect in high risk samples (Lounds, Borkowski, & Whitman, 2006). This approach has the added potential of revealing causal mechanisms among families in most need of support.

Some research suggests that children of adolescent mothers are at especially high risk for experiencing neglect compared to children of older mothers (Brown, Cohen, Johnson, & Salzinger, 1998; Lounds et al., 2006), and teen parents with infants have become a popular target for child abuse and neglect intervention programs. Rigorous evaluation of child maltreatment prevention programs has generated some of the most sophisticated evidence to date related to the prevention of child maltreatment (DuMont et al., 2010; Olds et al., 1997), yet little evidence on how to avert neglectful parenting. To our knowledge, only three studies examine the prevention of neglect in infancy (Connell-Carrick & Scannapieco, 2006; Easterbrooks et al., 2012; Green et al., 2013). The aim of the present study is to expand knowledge on the determinants of infant neglect in a high-incidence sample, adolescent mothers. The study is guided by an ecological model, which postulates that dynamic, interactive relationships among attributes of children, parents, families, and environmental contexts shape the likelihood of infant neglect (Belsky, 1993; Bronfenbrenner & Morris, 2006).

**Correlates of neglect in early childhood**

Ecological studies of child maltreatment often group risk and protective factors into individual characteristics (e.g., child, parent), family characteristics (e.g., parent-child interactions, intimate relationships), and characteristics of the broader environment (e.g., neighborhood poverty, social support). This categorization does not imply that each domain has an equal causal role, nor an order of importance, but rather assumes that there are multiple spheres of influence on parental functioning (Belsky, 1993).

**Child characteristics.** A small group of studies suggest that early problems in children’s health and development increase the likelihood of child neglect (Sedlak et al., 2010; Sidebotham & Heron, 2006; Strathearn, Gray, O’Callaghan, & Wood, 2001). For instance, higher rates of neglect have been found among infants with special needs, postnatal complications, and health problems, such as low weight at birth, exposure to tobacco, or poor condition at birth as indicated by a low Apgar score (Fullar, 2008; Strathearn et al., 2001; Vanderhoeven & Tolosa, 2010). These complications also may lead to challenges following birth. For example, low birth weight infants may be more difficult to care for, requiring special caregiving behaviors and accommodations, which may exacerbate parenting stress and lead to neglect (Washington, 2009). Infant regulatory difficulties also may be problematic when combined with other stressors that prevent mothers from engaging in attuned, responsive caregiving. Landi et al. (2011), for example, found that substance (primarily tobacco) using mothers were less responsive to infant cues than were mothers who did not use substances. It may be that infant regulatory challenges are only associated with neglect when paired with maternal deficits (e.g., responsiveness to infant cues).

Child age is a robust predictor of neglect as well; the younger the child the higher is his or her risk of being neglected (USDHHS, 2012). Moreover, recent increases in the incidence of neglect have been disproportionately high for the youngest children (ages 0–2) (Sedlak et al., 2010). It is less clear whether or not sex of child is related to infant neglect. In 2010, child victimization was 49% for boys and 51% for girls across all maltreatment types. Boys appear to be at a slight disadvantage...
compared to girls, with younger boys (birth to one year) experiencing neglect more often than girls of the same age (DeVooght, McCoy-Roth, & Freundlich, 2011). Boys also have a higher fatality rate than girls (2.5 versus 1.8 per 100,000 children of the same age; USDHHS, 2012).

**Maternal characteristics.** The infant–parent relationship is a locus of both risk and resilience (Easterbrooks, Driscoll, & Bartlett, 2008), and the personal characteristics of neglectful mothers are relatively well documented. Some of the most frequently identified maternal risk factors that are associated with child neglect include characteristics such as young maternal age, low levels of education, psychosocial functioning (stress, depression), problematic parenting attitudes and behaviors (negative attitudes, belief in corporal punishment, unrealistic expectations of children), and lack of empathy and warmth (Bartlett & Easterbrooks, 2012; Borkowski, Whitman, & Farris, 2007; Brown et al., 1998; Lounds et al., 2006; Slack et al., 2011).

**Family characteristics.** Compared to nonmaltreating families, neglectful families exhibit more problematic interactional patterns, family discord, and exposure to stress. Children living with couples who engage in intimate partner violence (IPV), for example, are more likely to be maltreated than are children who do not experience high levels of conflict in their homes (Margolin, Gordis, Medina, & Oliver, 2003; Tolan, Gorman-Smith, & Henry, 2006). Co-occurrence of IPV and child maltreatment has been estimated at 30–60% (Daro, Edleson, & Pinderhughes, 2004), yet a thorough review of the empirical literature revealed that studies have not fully explored IPV as a distinct risk for neglect, nor whether mother-perpetrated IPV, in addition to partner-perpetrated IPV, increases an infant’s risk of being neglected.

A mother with a childhood history of maltreatment also is at elevated risk for child neglect compared to mothers who were not maltreated (Dukewich, Borkowski, & Whitman, 1996; Ertem, Leventhal, & Dobbs, 2000; Lounds et al., 2006). Childhood maltreatment may be a strong risk factor for neglect by teen mothers, compounding the challenges of early parenting (Bartlett & Easterbrooks, 2012). Literature reviews (Ertem et al., 2000; Kaufman & Zigler, 1987) suggest complex explanations of intergenerational transmission (e.g., maladaptive models of attachment, socialization, poor psychosocial functioning). But the “cycle of abuse” is not inevitable; most parents do no repeat the cycle (Bartlett & Easterbrooks, 2012; Lounds et al., 2006).

**Family structure.** Compared to nonmaltreating families, neglectful families exhibit more problematic interactional patterns, family discord, and exposure to stress. Children living with couples who engage in intimate partner violence (IPV), for example, are more likely to be maltreated than are children who do not experience high levels of conflict in their homes (Margolin, Gordis, Medina, & Oliver, 2003; Tolan, Gorman-Smith, & Henry, 2006). Co-occurrence of IPV and child maltreatment has been estimated at 30–60% (Daro, Edleson, & Pinderhughes, 2004), yet a thorough review of the empirical literature revealed that studies have not fully explored IPV as a distinct risk for neglect, nor whether mother-perpetrated IPV, in addition to partner-perpetrated IPV, increases an infant’s risk of being neglected.

A mother with a childhood history of maltreatment also is at elevated risk for child neglect compared to mothers who were not maltreated (Dukewich, Borkowski, & Whitman, 1996; Ertem, Leventhal, & Dobbs, 2000; Lounds et al., 2006). Childhood maltreatment may be a strong risk factor for neglect by teen mothers, compounding the challenges of early parenting (Bartlett & Easterbrooks, 2012). Literature reviews (Ertem et al., 2000; Kaufman & Zigler, 1987) suggest complex explanations of intergenerational transmission (e.g., maladaptive models of attachment, socialization, poor psychosocial functioning). But the “cycle of abuse” is not inevitable; most parents do no repeat the cycle (Bartlett & Easterbrooks, 2012; Lounds et al., 2006).

**Environmental characteristics.** Ecologically based research on child maltreatment assumes that parent and family dysfunction are not the sole focus of studies on infant neglect. Rather, the social and economic contexts of families are inextricably linked with occurrence of child maltreatment (Cicchetti & Valentino, 2006). The link between poverty and neglect is a prime example of the impact of childrearing contexts (Slack, Holl, McDaniel, Yoo, & Bulger, 2004). Findings from the most recent National Incidence Study (Sedlak et al., 2010) revealed that children living in poor families (according to federal poverty guidelines) were seven times as likely to experience neglect than were children living in less economically stressed households, although most parents who are poor do not neglect their children.

Social isolation is another well-documented environmental risk factor for child neglect. Neglectful parents report more loneliness and dissatisfaction with their social networks and more limited access to social support than do nonmaltreating parents (Gaudin, Polansky, Kilpatrick, & Shilton, 1993; Slack et al., 2004). A lack of social connection with others isolates families from protective influences available in the wider ecosystem, contributes to parental stress and depression, and consequently confers risk for infant neglect (Cicchetti & Valentino, 2006). Conversely, positive relationships with members of social networks enhance the odds that parents provide sensitive and reliable care for children (Werner, 2000). Social connections appear to be especially important to young parents, who may need respite from the demands of early parenting (Dixon, Browne, & Hamilton-Gachrrtis, 2009). What is less clear is precisely what forms of support (e.g., formal support, such as home visiting programs or mental health counseling; informal support—emotional, instrumental, or informational—from peers, family, or community members) are most likely to buffer risk for neglectful parenting. Given that both neglectful families and adolescent families tend to face multiple adversities, successful prevention of neglect in this population likely necessitates that young parents have access to a variety of different supports from a range of different sources. However, additional research is needed to determine which aspects of social support are most salient to this population (Gaudin, 2001).

**Aims of the current study**

Given limited evidence of program efficacy in reducing child neglect and increasing rates of infants in the child protection system (Vig, Chinitz, & Shulman, 2005), more detailed descriptions of how neglect emerges in the first place are needed to develop successful strategies for protecting infants (Brodowski et al., 2008). In the present study, we used an ecological framework to identify risk factors associated with infant neglect by young mothers and hypothesized that neglect by young mothers would be explained by multiple characteristics at various levels, including factors related to the child (sex, age, birth weight, Apgar score, tobacco exposure), mother (age, education, employment, stress, depression, parenting attitudes), family (maternal childhood history, birth intervals, IPV), and childrearing contexts (income, social network, social services).
Table 1
Descriptive and inferential statistics for all study variables for neglectful and non-maltreating mothers (n = 383).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total sample</th>
<th>Neglectful mothers</th>
<th>Non-maltreating mothers</th>
<th>Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant sex</td>
<td>n (%)/M (SD)</td>
<td>Range</td>
<td>n (%)/M (SD)</td>
<td>n (%)/M (SD)</td>
</tr>
<tr>
<td>Infant age at Time 2 (months)</td>
<td>200 (52.20%)</td>
<td>3.00–28.00</td>
<td>10.61 (5.26)</td>
<td>11.59 (5.18)</td>
</tr>
<tr>
<td>Apgar score (5 min)</td>
<td>8.83 (0.60)</td>
<td>5.00–10.00</td>
<td>8.74 (0.75)</td>
<td>8.85 (0.56)</td>
</tr>
<tr>
<td>Low birth weight (&lt;2500 g)</td>
<td>35 (9.70%)</td>
<td></td>
<td>13 (21.00%)</td>
<td>22 (7.40%)</td>
</tr>
<tr>
<td>Maternal age at study enrollment</td>
<td>18.56 (1.31)</td>
<td>16.08–21.00</td>
<td>18.58 (1.31)</td>
<td>18.47 (1.34)</td>
</tr>
<tr>
<td>Maternal employment status</td>
<td>18.73 (1.32)</td>
<td>15.83–21.42</td>
<td>18.60 (1.26)</td>
<td>18.76 (1.28)</td>
</tr>
<tr>
<td>Below 12th grade</td>
<td>171 (44.90%)</td>
<td></td>
<td>31 (50.00%)</td>
<td>140 (43.90%)</td>
</tr>
<tr>
<td>Maternal education</td>
<td>33 (8.70%)</td>
<td></td>
<td>2 (3.20%)</td>
<td>31 (9.70%)</td>
</tr>
<tr>
<td>Maternal employment status</td>
<td>89 (23.40%)</td>
<td></td>
<td>10 (15.90%)</td>
<td>79 (24.80%)</td>
</tr>
<tr>
<td>2nd pregnancy/birth</td>
<td>27 (7.20%)</td>
<td></td>
<td>5 (7.90%)</td>
<td>22 (7.10%)</td>
</tr>
<tr>
<td>Mother smoked during pregnancy</td>
<td>52 (14.5%)</td>
<td></td>
<td>14 (22.60%)</td>
<td>38 (12.80%)</td>
</tr>
<tr>
<td>Number of cigarettes daily</td>
<td>–</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>30 days pre-pregnancy</td>
<td>2.53 (5.67)</td>
<td>0–40</td>
<td>4.81 (8.53)</td>
<td>2.04 (4.747)</td>
</tr>
<tr>
<td>During pregnancy</td>
<td>0.88 (2.84)</td>
<td>0–20</td>
<td>1.63 (4.36)</td>
<td>0.73 (2.41)</td>
</tr>
<tr>
<td>Maternal childhood history of positive care</td>
<td>18.49 (5.90)</td>
<td>0.00–24.00</td>
<td>16.63 (6.90)</td>
<td>18.85 (5.64)</td>
</tr>
<tr>
<td>Maternal childhood maltreatment</td>
<td>107 (35.10%)</td>
<td></td>
<td>22 (38.60%)</td>
<td>85 (34.30%)</td>
</tr>
<tr>
<td>Neglect only</td>
<td>77 (25.20%)</td>
<td></td>
<td>20 (35.10%)</td>
<td>57 (23.00%)</td>
</tr>
<tr>
<td>Maternal education</td>
<td>13.49 (10.72)</td>
<td>0.00–13.05</td>
<td>15.12 (13.05)</td>
<td>13.18 (10.20)</td>
</tr>
<tr>
<td>Parenting stress</td>
<td>71.06 (16.63)</td>
<td>27–114</td>
<td>71.48 (16.26)</td>
<td>70.98 (16.72)</td>
</tr>
<tr>
<td>Parenting attitudes</td>
<td>13.18 (4.25)</td>
<td>1.00–28.00</td>
<td>13.56 (4.01)</td>
<td>13.11 (4.30)</td>
</tr>
<tr>
<td>Lack of empathy</td>
<td>26.61 (5.48)</td>
<td>9.00–40.00</td>
<td>27.09 (5.57)</td>
<td>26.51 (5.47)</td>
</tr>
<tr>
<td>Corporal punishment</td>
<td>29.42 (6.57)</td>
<td>10.00–44.00</td>
<td>30.07 (6.84)</td>
<td>29.29 (6.52)</td>
</tr>
<tr>
<td>Role reversal</td>
<td>15.60 (4.97)</td>
<td>3.00–28.00</td>
<td>16.13 (5.45)</td>
<td>15.50 (4.87)</td>
</tr>
<tr>
<td>Oppressing</td>
<td>14.25 (2.59)</td>
<td>4.00–20.00</td>
<td>14.00 (2.29)</td>
<td>14.29 (2.64)</td>
</tr>
<tr>
<td>Intimate partner violence (Injury)</td>
<td>0.61 (2.79)</td>
<td>0.00–25.00</td>
<td>1.93 (6.26)</td>
<td>0.35 (1.16)</td>
</tr>
<tr>
<td>By partner</td>
<td>0.75 (3.12)</td>
<td>0.00–25.00</td>
<td>2.57 (6.27)</td>
<td>0.39 (1.81)</td>
</tr>
<tr>
<td>By mother</td>
<td>37.73 (16.95)</td>
<td>7.48–115.46</td>
<td>33.62 (13.17)</td>
<td>38.55 (17.51)</td>
</tr>
<tr>
<td>Social connections</td>
<td>66.51 (16.22)</td>
<td>0.00–100.00</td>
<td>63.86 (16.18)</td>
<td>66.98 (16.18)</td>
</tr>
<tr>
<td>Total score</td>
<td>6.95 (2.69)</td>
<td>0.00–12.00</td>
<td>8.36 (3.10)</td>
<td>9.03 (2.60)</td>
</tr>
<tr>
<td>Peers</td>
<td>8.62 (3.23)</td>
<td>0.00–12.00</td>
<td>8.09 (3.40)</td>
<td>8.71 (3.19)</td>
</tr>
<tr>
<td>Community</td>
<td>6.06 (2.89)</td>
<td>0.00–12.00</td>
<td>6.10 (2.65)</td>
<td>6.05 (2.94)</td>
</tr>
<tr>
<td>Maternal mental health services</td>
<td>103 (27.20%)</td>
<td></td>
<td>37 (58.70%)</td>
<td>66 (21.00%)</td>
</tr>
<tr>
<td>Home visiting program</td>
<td>221 (57.70%)</td>
<td></td>
<td>21 (33.30%)</td>
<td>141 (44.10%)</td>
</tr>
</tbody>
</table>

Method

Sample and procedures

Data were drawn from a longitudinal randomized control trial evaluation of Healthy Families Massachusetts (HFM), a paraprofessional home visiting program for first-time young parents. HFM is a statewide adaptation of the Healthy Families America program, designed to prevent child abuse and neglect by supporting positive, effective parenting. Mothers seeking home visiting services were randomly assigned to services or control (referrals and information only) group. Eligibility criteria included being female, 16 or older, having received no services from the program in the past, speaking English or Spanish, and cognitive ability to provide informed consent. A sample of 840 women seeking services were randomly assigned to either the intervention group or control group. Mothers completed a phone interview and were asked to allow researchers access to state agency administrative data (e.g., child protective services). They also were invited to participate in an in-person semi-structured research interview, and were administered written questionnaires. A total of 704 (84%) mothers took part in the study (61% HV group, 39% control group, oversampling HV group per study design); 473 (67%) elected to complete the full protocol. Data for this study were collected at enrollment (Time 1) and one year following enrollment (Time 2). State agency data covered 3.5 years after study enrollment.

This study (n = 383) draws from a subsample of participants who took part in both the intake and research interviews and who had infants who they neglected or did not maltreat (cases of abuse only by a mother were removed). Slightly more than half of the mothers (58%) were in the home visiting group. Characteristics of mothers and their infants are presented in Table 1. Most participants were Hispanics (36%) or non-Hispanic Whites (34%). They averaged 18.6 years old at study...
enrollment and at first birth. By Time 2, half of the mothers (55%) had finished high school, an equivalent, or more. Over half of mothers reported using welfare services (TANF; 57%); on average they had used three types of public assistance programs since becoming pregnant. Participants’ 2000 Census-based median annual block income was $38,000. At Time 2, 68% lived with parent figures (e.g., parent, aunt), 8% lived alone with the child; 54% had moved at least once in the past year; and 34% were single. Mean child age at Time 2 was 11 months.

**Measures**

Details on the methodology of the larger evaluation study are presented elsewhere (Easterbrooks et al., 2012). Here, we briefly describe the subset of evaluation measures used in the present study.

**Family demographics.** Maternal and child demographic characteristics from Time 2 (after all mothers had given birth) were gathered through maternal interviews, and included child age and sex, maternal age at birth and at enrollment, subsequent pregnancies/births, maternal education level, and maternal employment status.

**Prenatal history.** Records of prenatal and birth information were obtained from the state Department of Public Health (DPH) and included maternal smoking (number of cigarettes smoked during pregnancy and 30 days pre-pregnancy), low birth weight (<2500 g), and 5-min Apgar scores (Apgar, 1953). The Apgar score is based on a clinical point-count system that denotes the condition of an infant during the first five minutes of life, and ranges from zero (no sign of life) to ten (best possible condition).

**Maternal use of mental health services.** Mothers indicated whether or not they received mental health services since becoming pregnant at the Time 2 intake interview.

**Home visiting program assignment.** We used a dummy variable to indicate random assignment to either the home visiting intervention group or the control group.

**Maternal history of positive childhood care.** A modified version of the Care subscale of the Parental Bonding Instrument (PBI; Parker, Tupling, & Brown, 1979; Time 2) was used to assess mothers’ perceptions of the quality of care they received from their own caregivers in childhood. Mothers selected a value on a three-point scale (0 = “never”, 1 = “sometimes”, 3 = “often”) in response to 12 questions on their “main caretaker’s” behaviors during their “growing years.” Higher values indicated more positive care.

**Maternal history of childhood maltreatment.** Based on cumulative state child protective services records of substantiated reports of abuse (physical, sexual) and neglect throughout mothers’ childhood provided by the Massachusetts Department of Children and Families, we created a categorical variable to characterize mothers who experienced no substantiated reports of maltreatment (0), only neglect (1), or other types of maltreatment (physical abuse, sexual abuse, or neglect in any combination (2).

**Depressive symptomatology.** We used the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977; Time 2), a 20 item self-report questionnaire, to assess depressive symptoms. Using a four-point Likert scale (0 = not at all, 3 = a lot), respondents indicate how frequently they experienced particular depressive symptom in the last week. We used a continuous scale score representing the sum of all items (scores can range from 0 to 60).

**Parenting stress.** The Parenting Stress Index Short-Form (PSI-SF; Abidin, 1995; Time 2) is a 36-item self-report questionnaire of parenting stress. Mothers indicated the degree to which they agreed with statements (e.g., “Time-out is an effective way to discipline children”) on a 5-point Likert scale (0 = strongly disagree, 4 = strongly agree). The total score indicates the overall level of stress related to parenting.

**Parenting attitudes.** The Adult-Adolescent Parenting Inventory-2 (AAPI-2; Bavolek & Keene, 2001; Time 1) is a 40-item self-report questionnaire assessing parenting attitudes of adolescent and adult parents, and pre-parents. Responses identify attitudes in five areas: inappropriate parental expectations; parental lack of empathic awareness of children’s needs; strong belief in corporal punishment; parent-child role reversal; and, oppressing children’s power and independence. Mothers indicated their level of agreement with statements (e.g., “Time-out is an effective way to discipline children”) on a 5-point Likert scale (0 = Strongly Agree, 4 = Strongly Disagree). Sum scores were calculated for each of the five subscales; higher scores indicate more positive attitudes.

**Intimate partner violence (IPV, Injury Subscale).** The Conflict Tactics Scale-2 Short Form (CTS-2S; Straus & Douglas, 2004; Time 2) is a 20-item self-report questionnaire used to measure partners’ engagement in psychological or physical attacks on another one. We used the Injury subscale to reflect acts that resulted in actual physical harm. Respondents indicate the number of times each act occurred in the past year (“Once” = 1, “Twice” = 2, “3–5 Times” = 4, “6–10 Times” = 8, “11–20 Times” = 15, and “>20 Times” = 25) for each of the two subscale items. Items were rescaled to the midpoint (e.g., “3–5 Times” = 4) and summed for annual chronicity scores (range = 0–50).

**Social connections.** The Connection subscale of the Positive Youth Development measure (PYD; Bowers et al., 2010) at Time 2 assessed mothers’ connection to family (six items; e.g., “My parents give me help and support when I need it”), peers (four items; e.g., “My friends care about me”), and community (five items; “Adults in my city or town make me feel important”). Subscales were calculated using the mean of Likert-scale items and ranged from 0 to 12 points; the total Connection score was a mean of the three subscales standardized to range from 0 to 100.

**Block group income.** To determine participants’ median household income at the block group level (T1), we mapped their home addresses to the 2000 U.S. Census Bureau socioeconomic data (data were collected from mothers prior to 2010) using Geographic Information Systems software (ArcGIS).
Infant neglect. Neglect of infants by their mothers was determined using cumulative data from state child protective services (Massachusetts Department of Children and Families) until approximately Time 2, excluding cases occurring before study enrollment. The response variable was binary: 1 = one or more substantiated reports of neglect by the mother, and 0 = no substantiated reports of any kind. Cases of abuse by the mother and cases of maltreatment by others were included only if accompanied by a substantiated case of neglect by the mother.

Analytic strategy

Analyses were conducted in SPSS 21 (IBM, 2013). All binary variables were set to values of 0 or 1; continuous variables were centered and standardized to assist interpretation of coefficients. We used independent sample t-tests and Chi-square tests to test bivariate associations with infant neglect. We then fit a series of logistic regression models to determine the extent to which they combined together to predict criterion variables (Meyers, Gamst, & Guarino, 2012). Variables were entered into analyses according to Bronfenbrenner’s ecological model (Bronfenbrenner, 1977; Bronfenbrenner & Morris, 2006), which emphasizes the importance of considering the multiple contexts in which individuals develop, from individual to environmental—proximal to distal. Specifically, the models predicted the odds of neglect from characteristics of the child, mother, family, and environment. All variables in this study were chosen for their conceptual and theoretical relation to neglect, and many were conceptually similar and collinear; for this reason, we narrowed down the list of variables to be tested in the regression models based on the strongest bivariate associations. As such, variables predicting odds of neglect were low birth weight (child level), maternal smoking, depression, childhood history of positive care (mother level), IPV (family level), and income and mental health services (environment level). To address multicollinearity issues, we fit separate models for intimate partner violence (IPV) by a partner and by the mother.

We relied on the principles of parsimony (Paulson, 2007; Vittinghoff, Glidden, Shiboski, & McCulloch, 2012) and purposeful selection of variables (Hosmer, Lemeshow, & Sturdivant, 2013) in choosing our final models, as this approach has been shown to promote numerical stability and generalizability of the results (Bursac, Gauss, Williams, & Hosmer, 2008). Parsimony is especially important in logistic regression models predicting rare events (i.e., the group of interest is disproportionately smaller than the non-affected group), given that such models may suffer from small-sample bias. For these reasons, we then removed one at a time those predictor variables that did not make a significant statistical contribution to the model until the parsimonious models with the most predictive power were found. For space considerations, we present only the full and the final (parsimonious) models.

Results

Of the 383 children in the study sample, 16% (n = 63) had at least one substantiated report of neglect by the mother; most children were not maltreated (n = 320, 84%). Several characteristics of neglectful mothers, neglected infants, their families, and their broader environments differed from non-maltreating families (Table 1). Compared to non-maltreating mothers, neglectful mothers had lower median block incomes, were more likely to be smokers prior to and during the prenatal period, and were more likely to have an infant born at a low birth weight. There were no significant differences between neglectful and non-neglectful families on infant sex, age, or Apgar score, or mothers’ age, education level, employment status, or second pregnancies/births.

Neglectful mothers described their primary caretakers in childhood as exhibiting less caring parental styles, and they were more likely to have been victims of maltreatment (74%), than non-maltreating mothers (57%), \( \chi^2(1) = 5.23, p = .022 \). When compared to their non-maltreating counterparts, they also were more likely to have received mental health services and to report IPV in which they sustained an injury by a partner or caused an injury to their partner during the last year. Neglectful and nonmaltreating mothers did not differ in relation to parenting stress or attitudes, social connections, or home visiting program group.

Multivariate results predicting infant neglect

Table 2 displays the results of the multiple logistic regression analysis predicting neglect of infants by their adolescent mothers. A maternal history of neglect or other maltreatment did not significantly predict higher odds of infant neglect by mothers (Models 1a and 1b). Holding other significant predictors constant and omitting nonsignificant variables for parsimony, Models 2a and 2b show that the odds of mothers neglecting their infants were higher among adolescents who had received mental health services since becoming pregnant, who reported less positive care during childhood, who were either victims of IPV (Model 2a) or perpetrators of IPV (Model 2b), and who resided in neighborhoods with lower incomes. The Nagelkerke \( R^2 \) in the final models were .31 and .32, respectively, suggesting improvement over the null model. The \( R^2 \) did not change from the full to final (parsimonious) model, indicating that the additional variables did not explain more variance and the final model was a better fit. Accounting for the effect of other variables, maternal receipt of mental health services was the predictor with the highest relative risk ratio: the odds of infant neglect for a young mother who received mental health services increased by a factor of 8.22 (CI = 3.98–16.95) in Model 2a and 7.72 (CI = 3.74–15.94) in Model 2b, relative to those who did not receive these services.
Table 2

Multiple logistic regression models predicting the probability of infant neglect by adolescent mothers with histories of neglect only or other maltreatment ($n = 383$).

| Variable | IPV by partner | | | IPV by mother | | |
|----------|----------------|----------|----------|----------------|----------|
|          | Model 1a OR (CI) | Model 2a OR (CI) | | Model 1b OR (CI) | Model 2b OR (CI) | |
| Intercept | .07 (.07–.09) | .07 (.07–.09) | | .07 (.07–.09) | .07 (.07–.09) |
| LBW | 2.45 (.84–7.15) | – | 2.27 (.77–6.66) | – |
| Mother smoked during pregnancy | 1.60 (.66–3.88) | – | 1.44 (.58–3.56) | – |
| Depression | .99 (.95–1.02) | – | .99 (.96–1.02) | – |
| History of childhood maltreatment | | | | | |
| Neglect only | .97 (.40–2.38) | – | 1.10 (.45–2.71) | – |
| Other than neglect only | 1.27 (.52–3.13) | – | 1.29 (.52–3.20) | – |
| History positive care | .92 (.87–.97) | .92 (.87–.97) | .92 (.87–.97) | .93 (.88–.98) |
| IPV (Injury) by partner | 1.14 (1.02–1.28) | 1.13 (1.01–1.26) | – | – |
| IPV (Injury) by mother | – | – | 1.12 (1.02–1.24) | 1.12 (1.02–1.22) |
| Block group income | .96 (.94–.98) | .96 (.94–.98) | .96 (.94–.99) | .96 (.94–.99) |
| Mental health services | 7.82 (3.60–17.00) | 8.22 (3.98–16.95) | 7.32 (3.39–15.82) | 7.72 (3.74–15.94) |
| Nagelkerke $R^2$ | .33 | .31 | .33 | .32 |
| Chi-square | 62.00 | 57.76 | 61.97 | 59.65 |
| –2LL | 199.27 | 203.51 | 199.30 | 202.69 |
| Hosmer and Lemeshow Test | 3.53 (df=8) | 3.96 (df=8) | 9.70 (df=8) | 3.87 (df=8) |
| Δ Chi-square | 9 | 4 | 9 | 4 |
| Δ df | 5 | 5 | | |

OR, odds ratio; CI, confidence interval.

* Reference group is no history of maltreatment.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Discussion

The efficacy of efforts to prevent infant neglect rests on knowledge of its complex etiology and circumstances. Infants of young mothers constitute a group at high risk for neglect, in part due to characteristics of young mothers and their environments that preceded or coincided with early parenthood (e.g., poverty, childhood maltreatment), and in part because infants are especially vulnerable to neglect (Howard & Brooks-Gunn, 2009). As little is known about neglect in these young families, the present study stands to add to the literature and to aid in the design of prevention programs and policies.

We took an ecological approach (Belsky, 1993; Bronfenbrenner & Morris, 2006; Cicchetti & Valentino, 2006) to understanding the circumstances surrounding substantiated cases of infant neglect in which mothers were named as perpetrators. This group of young mothers (age 16–20 at first childbirth, who had expressed interest in a statewide universal-access parenting support program for young mothers) was diverse in racial/ethnic background, lived primarily in low-income communities, and experienced much childhood maltreatment. Our study findings related to their difficult personal experiences and living conditions reinforced the use of an ecological framework, which showed promise in disentangling the complex phenomenon of infant neglect in this high incidence sample. Many characteristics the research highlights as having associations with child neglect were independently related to neglect by young mothers during infancy (e.g., IPV, low birth weight baby, low income neighborhoods), while others were not (e.g., maternal age, maternal education and employment, parenting stress and attitudes, child age, second births during adolescence, social connections). Both significant and non-significant findings add to evidence on the etiology of infant neglect.

Individual predictors of infant neglect

As we hypothesized, attributes of infants, mothers, and the contexts in which they were living predicted neglectful parenting in the sample.

Characteristics of infants and their mothers. Infants who were neglected by their mothers were more likely to be of low birth weight and to have mothers who smoked during pregnancy. Low birth weight is linked to infant temperamental difficulty and greater need for attuned parental caregiving (Hughes, Shults, McGrath, & Medoff-Cooper, 2002). Similarly, prenatal nicotine exposure is related to problems with self-regulation during infancy and childhood (DiFranza, Aligne, & Weitzman, 2004), even among infants whose mothers are not heavy smokers (Hernández-Martínez, Val, Subías, & Sans, 2012), as was the case in our sample. Young mothers, who already face the typical demands of parenting at a young age, in turn may encounter the additional challenge of having a baby who is particularly difficult to soothe, a known risk factor for neglectful parenting (Harrington, Black, Starr, & Dubowitz, 1998). Interestingly, baby’s sex, age, and Apgar scores did not discriminate neglect risk, as has been found in some studies with older mothers (DeVooght et al., 2011; Sedlak et al.,
suggesting that the likelihood of neglect by young mothers within the period of infancy may not vary in relation to these characteristics. In our study, the majority of maternal demographic factors were not significantly related to infant neglect, including younger age at birth, low education, unemployment, and second births or pregnancies. Low variability in some indicators may explain this pattern. For example, all of the mothers in our sample were young at childbirth (age 16–20), and had expressed an interest in receiving parenting support services; more than three-quarters of participants were unemployed; half had less than a high school education, and only 9% had attended any college; only 7% of mothers had a second birth or pregnancy during the study period.

Our results also indicate that adolescent mothers who face certain adversities have fewer psychological, behavioral, and financial resources to support healthy parenting than do their non-maltreating counterparts. This finding is consistent with prior research showing that depression is prevalent (23%) among caregivers reported to child protective services, and that it compromises parenting quality (Children’s Bureau, Administration on Children and Families, 2005; National Research Council & Institute of Medicine, 2009). On the other hand, the literature is not clear whether maternal depression is causally related to child maltreatment or closely linked with other risk factors, such as financial distress, substance use (i.e., smoking), and a childhood history of maltreatment (Dearing, Taylor, & McCartney, 2004; DePanfilis, 2006). Indeed, each of these characteristics was associated with infant neglect in the current study, and depression was not significant in the results of our multivariate analysis. Inconsistent findings on the relations between depression and child maltreatment may be due to several factors, including shared variance with other predictors and a conflation of maltreatment types and child age; but these possibilities warrant further investigation. On the other hand, depression may be related to other forms of maltreatment and not neglect in this population. A study by Conron, Beardslee, Koenen, Buka, and Gortmaker (2009) indicated that depression in high-risk mothers was a determinant of psychological aggression but not of neglect or physical assault.

Maternal smoking during pregnancy also predicted the odds of young mothers neglecting their offspring. Substance using mothers may be less responsive to infant emotional cues (both positive cues such as smiles and negative cues such as cries). For instance, with a sample of primarily tobacco-using mothers, Landi et al. (2011) noted that “such reduced neural responsiveness may lead to difficulty in subsequent behavioral maternal response to the infant, and in the formation of infant-caregiver attachment... reduced activation may reflect reduced saliency of infant cues themselves, which may lead to late or inappropriate parental response to the infants needs” (p. 6). Alternatively, maternal smoking may be a proxy for other social or demographic risk factors related to neglect.

**Family relationships.** An important aspect of an ecological model of neglect is the proximal social context that predisposes an individual to neglectful parenting or provides the settings in which neglect occurs. In our study, mothers’ essential relationships were more influential to their risk for neglecting infants than were their attitudes about parenting or levels of parenting stress. Neglectful mothers frequently had histories of maltreatment in their own childhoods, both childhood neglect alone (39%) and maltreatment other than neglect (35%). Although a large proportion of neglectful mothers experienced maltreatment in childhoods, we do not know who the perpetrator was in those cases. And, in the multivariate analysis, the variance shared with other predictors (e.g., history of positive care in childhood, depression, mental health services) rendered the contribution of maltreatment history non-significant. Some mothers may not recall their maltreatment history, particularly in cases of neglect; for others, recent experiences of caregiving by primary caregivers, and interactions with an intimate partner, may be more influential. Young mothers who, according to state child welfare records, neglected their children, also described their own primary caregivers as providing less positive care than did non-maltreating teen mothers. Finally, neglectful mothers experienced more IPV than did non-maltreating mothers. Our findings thus reinforce the viewpoint that mothers’ relationships with their childhood caregivers powerfully influence childrearing in the next generation (Kaufman & Zigler, 1987). Moreover, current relationship dysfunction (IPV) is strongly linked to parenting quality (Tolan et al., 2006).

The early months and years of parenting are challenging physically, economically, and emotionally for all parents, and being a young parent may add additional layers of complexity, as mothers negotiate potentially unsupportive school environments, or harsh social judgments. Navigating the period of infancy without a healthy “blueprint” for parenting, or a supportive intimate relationship in the context of a traumatic childhood history, might exceed any individual’s capacity to parent effectively, especially a young mother. It makes sense, then, that teenagers, who themselves did not receive positive care from caregivers in childhood, are more likely to neglect their infants (Borkowski et al., 2007; Lounds et al., 2006). They may lack models of good parenting, and/or their insecure attachments may prevent them from developing secure internal working models, representations of sensitive parenting, or attachments that enable them to nurture their own children (Bretherton & Munholland, 2008; Cassidy, 2008). Still, it is important to note that more resilient trajectories were apparent as well; 68% of neglectful mothers had been maltreated, yet most did not neglect infants by the end of the study.

During the transition to parenthood, an important source of support for mothers that may fuel positive parenting is the relationship with the father of the baby or with another romantic partner (Cummings, Goeke-Morey, & Raymond, 2004). The young mothers in our study who were neglectful reported greater violence with their partners, highlighting the importance of these close relationships. Children of teen mothers have an increased risk of exposure to IPV, whose effects are most detrimental to infants and very young children (Carpenter & Stacks, 2009). Further, children exposed to interparental conflict show difficulty in stress-regulatory systems, and demonstrate greater emotional and behavioral problems (Cummings, Goeke-Morey, Papp, & Dukewich, 2002; Fitzgerald, McElvay, Schiffman, & Montanez, 2006). Our findings in a sample of adolescent mothers are consistent with research documenting increased odds of child maltreatment in homes...
where there is IPV (Margolin et al., 2003). Home visiting research also indicates that programs may be less effective in preventing child maltreatment among families experiencing IPV (Eckenrode et al., 2000).

Networks of support. While the results discussed thus far may not be surprising from a theoretical or practice perspective, the links between infant neglect and mothers’ support networks may be. The finding that social connections did not reduce the likelihood of neglect conflicts with results of earlier studies showing a buffering effect of social support on risk for child maltreatment (Cicchetti & Valentino, 2006; Dixon et al., 2009). Perhaps our measure of social support was not nuanced enough to detect an effect, compared to measures that separately assess quality, frequency, or dependability of mothers’ social connections. Future studies might take a more in-depth look at the link between different dimensions of social support and infant neglect including type, frequency, and source of support.

Home visiting program participation also was not related to infant neglect in this study. There are several potential explanations for this finding (see Easterbrooks et al., 2012 for a comprehensive examination of the impacts of Healthy Families Massachusetts on child maltreatment). The results from the present study are in keeping with literature that shows “mixed” effects of home visiting programs on maltreatment (Kahn & Moore, 2010) and, in some cases, a higher rate of neglect in the program group compared to the control group, perhaps due to close contact with mandated reporters (e.g., home visitors) (Easterbrooks et al., 2012; Green et al., 2013). Moreover, mothers who had received mental health services since becoming pregnant were at higher risk for neglect. On the surface this finding appears to contradict the notion that support for parent socioemotional well-being lessens the odds of neglect (Zolotor & Runyan, 2006). Considered from a different perspective, it is in line with prior research showing that many parents enrolled in these services struggle with mental illness and family dysfunction, thereby elevating neglect risk (Schumacher et al., 2001). We cannot be certain that mothers in our study experienced mental illness, however, as we only assessed their use of mental health services. Another explanation may be that mothers in the child welfare system were mandated to utilize these services.

Multi-level prediction of infant neglect by adolescent mothers

Ultimately, as an ecological model of neglect would suggest (Belsky, 1993; Cicchetti & Valentino, 2006), a combination of child, parent, family, and environmental characteristics helped to explain the emergence of infant neglect by young mothers. Adolescents who reported less positive care in childhood, were involved in violent intimate relationships that led to physical injury (either perpetrated by the partner or self-perpetrated), used mental health services while pregnant or parenting, and had lower block incomes were more likely to have a substantiated report of infant neglect than were young mothers without these characteristics. Once we accounted for maternal childhood history of parental care, IPV, and mental health service usage, however, a maternal history of neglect, smoking, and infant birth weight did not make significant contributions to the odds of infant neglect. The connection between positive childhood care and parenting is well-established (Werner & Smith, 2001), but this study helps to extend these findings to young mothers with very young children. To our knowledge, this is the first study to identify an association between mother perpetrated IPV and child neglect, suggesting a link between IPV and neglect, regardless of who initiates it.

Limitations

While we feel that this study adds knowledge to the field of child maltreatment prevention, we acknowledge that it has limitations. The first relates to measurement of infant neglect. Our use of CPS data to establish the presence or absence of infant neglect applies a conservative standard, and the rate we observed is likely lower than actual incidence. CPS substantiation status tends to capture the most severe cases, as many neglected children never come to the attention of authorities or, when they do, their maltreatment is not confirmed. Still, these data are collected routinely, adhere to state standards, and are less prone to bias than other methodologies (Hussey et al., 2005). Methods, such as parental self-report, or observational methods, also have limitations (McGee, Wolfe, Yuen, Wilson, & Carnochan, 1995; Slack, Holl, Altenbernd, McDaniel, & Stevens, 2003). In the future, researchers might include measures of neglect that represent multiple approaches.

A second study limitation is that the effect of the prevention program was measured by an “intent to treat” standard (assignment to program group versus control group). This is the “gold standard” for outcome studies with randomized controlled trial designs, yet home visiting program effects vary for different groups of parents under different conditions, and the current analysis provides only a cursory look at the program’s effect on parenting (Howard & Brooks-Gunn, 2009). We did not have more refined indicators of program services, such as service duration, type, and frequency of home visits. Furthermore, the control group received referrals to other programs and may have received those services during the study period.

Third, although we tested a broad range of characteristics and conditions associated with infant neglect, we were not able to examine several factors that might have helped to further explain it (e.g., parental alcohol or drug abuse, child temperament, community violence). This is an obvious area for future research, as it is not yet clear whether these factors relate to neglect during infancy in particular.

Fourth, our findings are generalizable to a specific population—young mothers with infants. Still, the results have considerable value in that, as Howard and Brooks-Gunn (2009) note, first-time adolescent mothers “provide the truest test of a primary prevention program” because the home visiting program may keep parents from ever becoming a neglectful or abusive caregiver (p. 136). The fact that all mothers in the study had expressed an interest in receiving parenting support...
prior to being randomly assigned limits the generalizability to the population of those young mothers who seek support from formal program services.

Implications for research, policies, and practices to prevent infant neglect

Despite these drawbacks, the present study offers information of value to developing effective policies and practices to prevent neglect in the earliest days of a child’s life. One clear inference from this research is that, to be successful, policy and practice aimed at preventing neglect must support positive infant rearing contexts in addition to addressing neglectful parenting behavior more directly. Results of this study make clear that mothers’ families of origin, intimate partners, and access to financial, social, and mental health resources affect young mothers’ capacity to keep their babies safe from harm. An important next step is to determine the extent to which these factors mediate or moderate the effects of prevention programs, and the degree to which enhancing particular service components (e.g., domestic violence services, treatment for maternal depression) maximizes favorable effects for infants and their families.

The high rate of neglect by young mothers during the study period, when children were under two years of age, also reinforces the importance of implementing preventive interventions as early as possible (i.e., prenatally and within the first weeks of life). While this is the period during which home visiting programs have had the most success in preventing child maltreatment (Howard & Brooks-Gunn, 2009), little progress has been made in reducing neglect. Rates of child maltreatment in the U.S. have decreased in recent years, yet incidence of infant neglect has risen (USDHHS, 2012). This troubling gap in program effectiveness highlights the heterogeneity of child maltreatment and suggests that we need public investment in new approaches to stop early neglect, coupled with the broader aim of preventing child maltreatment.

References


