Dosage Matters: The Relationship between Participation in the Nurturing Parenting Program for Infants, Toddlers, and Preschoolers and Subsequent Child Maltreatment

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Abstract

This article uses statewide data on caregivers of young children referred to the Nurturing Parenting Program (NPP) for allegations of abuse and neglect to examine the relationship between program dosage and subsequent maltreatment. At six months after participating in the program, caregivers who attended more sessions were significantly less likely to be *reported* for child maltreatment, holding other factors constant. At two years after participating, caregivers attending more sessions were significantly less likely to have a substantiated maltreatment incidence, controlling for other characteristics of families associated with maltreatment. These findings demonstrate the program can be effective for preventing short-term allegations and longer-term substantiated incidences of maltreatment for a child welfare population. By demonstrating the importance of participation in a promising program, we increase the evidence about effective programs for this population.

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Introduction

The deleterious and long-term effects of maltreatment are well documented (Gilbert et al., 2009; Haapasalo & Pokela, 1999; Widom & Maxfield, 2001). Parent education, also called parent training, is one of the most commonly used interventions in child welfare to prevent child maltreatment (Barth et al., 2005; Huebner, 2002; Hurlburt, Barth, Leslie, & Landsverk, 2007). While the knowledge gap about these programs is shrinking (Waldfogel, 2009), we know surprisingly little about the effectiveness of parent education for families involved in the child welfare system, and in particular, about the implementation of these programs within the real-world constraints of child welfare agencies (Barth et al., 2005; Chaffin & Friedrich, 2004). These gaps are likely due to limited use of evidence-based parent training programs for families already involved in the child welfare system (Lee, Aos, & Miller, 2008) and limited monitoring of program implementation and outcomes, including longer-term follow-ups.

A large national foundation partnered with a southern state's child welfare agency to evaluate the effectiveness of the Nurturing Parenting Program (NPP) (Bavolek, 2005) for Infants, Toddlers, and Preschoolers in preventing maltreatment. The program was implemented statewide in 2006, though some centers started in late 2005. This study builds upon the evidence base of parent training in child welfare by using a large sample comprised of participants involved in the child welfare system following an allegation of abuse or neglect of one or more children in their care. In addition, it uses administrative data to document the changes in reported and substantiated incidences of post-intervention maltreatment over an extended period of time. In this study, we define "substantiated" as findings of abuse or neglect as the result of an investigation.

Parent Education Programs

In child welfare, parent training interventions serve families who are trying to keep their children from entering out-of-home care or who are seeking reunification (Barth et al., 2005). Yet, the use of evidence-informed or evidence-based parent training programs is scarce. The parenting programs with the strongest evidence of overall effectiveness have most commonly been studied in clinical settings and primarily focused on child behavior problems (Barth et al., 2005). Parent training programs such as *MultiSystemic Therapy* (Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 1998), *Parent-Child Interaction Therapy* (Eyberg & Robinson, 1982), *The Incredible Years* (Webster-Stratton, 2007), and *Parent Management Training* (Patterson, Reid, & Eddy, 2002) are primarily focused on preventing, reducing, and treating children with serious behavior problems. They have been touted as having the most promise for use in child welfare based on their empirical evidence with other at-risk populations (Barth et al., 2005).

While children with social and emotional difficulties represent a portion of the child welfare population and these programs are a valuable resource to meet their specific needs, just over half of all families (60%) involved in the child welfare system are facing allegations of parental neglect (including medical neglect), and 32% of all victims are four-years-old and younger (Administration for Children and Families, 2007). Thus, questions of whether parent education can prevent maltreatment, particularly neglect, among young children, and, concomitantly, repeat maltreatment in a child welfare population, are paramount. And, effective interventions for parents with young children are especially critical as this age group is at greatest risk for entry into care (Wulczyn, Hislop, & Jones Harden, 2002) and this period sets the stage for positive parenting practices throughout a child's development and life course.

Programs for Families at Risk for Entry into Child Welfare

In an extensive review of parent education programs in child welfare, there were only a few randomized control trials of parent education programs in 'at risk' populations as described

above, but even fewer focus solely on families already involved in the child welfare system (Barth et al., 2005; Johnson et al., 2008). For families not involved in the child welfare system, about a handful of prevention-focused, home visitation programs have been conducted with promising findings in RCT studies (Bugental et al., 2002; Duggan et al., 2004) and matched comparison groups (Huxley & Warner, 1993) while others show inconclusive findings (Barth, 1991; Duggan et al., 1999; 2007; DuMont et al., 2008; Marcenko, Spence, & Samost, 1996; Wagner & Clayton, 1999). One notable exception to this is the Elmira trial of the Nurse Family Partnership (NFP) program, which found a significant decline in the incidence of abuse and neglect when the study children were 15-years old (Olds et al., 1997). Despite this, it is important to note that the NFP was a prevention program for first-time mothers; it was not designed as a program for families already involved in the child welfare system. Findings are also mixed for those programs with a home visiting *component* with some showing positive outcomes (Reynolds & Robertson, 2003) while others demonstrate inconclusive findings (Stevens-Simon, Nelligan, & Kelly, 2001). Among those parent training programs without a home visiting component, promising findings have been detected for a population-level administration of the Positive Parenting Program (Prinz, Sanders, Shapiro, Whitaker, & Lutzker, 2009) and a parent education program for at-risk (defined as young age and low-income status) mothers (Britner & Reppucci, 1997).

Programs for Families in Child Welfare

To our knowledge, Chaffin et al. (2004) conducted the only published evaluation of parent training using a randomized control design with a child welfare population. They examined the effectiveness of Parent-Child Interaction Therapy (PCIT) in preventing maltreatment recurrence with 110 families. Their results indicated that PCIT reduced subsequent maltreatment among physically abusive parents more than 2-years later at follow-up. Outcomes for child neglect were not improved by PCIT. Project SafeCare, an in-home

parent training for families already involved in the child welfare system, has demonstrated promise for reducing maltreatment (Gershater-Molko, Lutzker, & Wesch, 2002), while other home visiting programs with this population have not (MacMillan et al., 2005). And, finally, several recent smaller scale evaluations have looked at parent education program effects with a child welfare population on intermediate variables hypothesized to be associated with child maltreatment, such as parenting attitudes (e.g., Letarte, Normandeau, & Allard, 2010; Marcynyszyn, Maher, & Corwin, 2010; Stern, Alaggia, Watson, & Morton, 2008), but there is a dearth of large-scale evaluations on maltreatment outcomes for this population. For a comprehensive review on this topic see studies by Lee, Aos, and Miller (2008); MacMillan et al., (2005); and Reynolds, Mathieson, and Topitzes (2009).

The Nurturing Parenting Program

The NPP (Bavolek, 2005) is one parent education program identified as holding promise for effectiveness in child welfare. Based on the available research evidence and primary focus on reducing abusive or neglectful behavior, the California Evidence-Based Clearinghouse (CEBC) for Child Welfare rated the Nurturing Parenting programs as a Level 1 (highest level) for relevance to child welfare. However, despite findings from pre/post-test design evaluation studies (see Cowen, 2001; Devall, 2004; Hodnett, Faulk, Dellinger, & Maher, 2009), the lack of randomized control trials resulted in a scientific rating of Level 3, "Promising Research Evidence," for evidence of effectiveness (CEBC for Child Welfare, 2010). In addition, the NPP contains all three of the essential components identified in a recent meta-analysis by Kaminski, Valle, Filene, and Boyle (2008) on parent training program effectiveness in other populations (e.g., not necessarily child welfare). These included teaching parents emotional communication and positive parent-child interaction skills, teaching about discipline consistency and time out, and providing parents with the opportunity to practice new skills with children during the training sessions (Kaminski et al., 2008).

Program Dosage and Recurrence

Parent participation and engagement in a program is pivotal for its effectiveness. Holding case characteristics believed to predict maltreatment recurrence constant (child vulnerability, family stress, partner abuse, and social support deficiencies), DePanfilis and Zuravin (2002) found that only attendance at services recommended in the case plans predicted less recurrence of child maltreatment. Further, a more recent review by Waldfogel (2009) highlights the essential role of program dosage and family engagement as fundamental to the effectiveness of prevention programs, such as parent education. As is especially true for a child welfare population, interventions must be of sufficient intensity and duration to address the severity of familial and sociodemographic risk factors (Lundahl, Nimer, & Parsons, 2006; Thomlison, 2003). However, these findings conflict with earlier research by Littell (1997), which indicated that length of family preservation services was unrelated to the recurrence of child maltreatment. It may be possible to shed light on these seemingly contradictory findings by recognizing an inherent confound: those families at higher risk for maltreatment are more likely to receive services over a longer period of time. Building on this research about program length, the current evaluation examines whether dosage, as defined by the total number of NPP group or in-home sessions, affects maltreatment following program participation, while controlling for numerous factors known to be correlated with maltreatment.

The Current Study

Although many studies identify maltreatment prevention as a program goal, most do not measure its occurrence. Instead, investigators tend to measure behaviors believed to be associated with neglect such as maladaptive parenting skills, social isolation, depression, or substance abuse. This study specifically examines the relationship between NPP dosage and maltreatment following program participation. Given that prior evaluation studies with families involved in the child welfare system have generally been low in methodological rigor due to

selective sampling, small sample sizes, short follow-up periods, and lack of actual maltreatment outcome data (e.g., Guterman, 1997; Kaplan, Pelcovitz, Labruna, 1999), the current evaluation is poised to make a much needed contribution to the field by examining maltreatment following NPP participation at both six months and two years post-intervention in a large, statewide child welfare population using state record data.

While we acknowledge that examining the relationship between NPP participation and post-intervention maltreatment using a cross-sectional design with follow-up and administrative data is not the gold standard in establishing effectiveness, it represents a step forward along a continuum to establish this program's promise for a child welfare population. Whereas this study does not fulfill the need for a randomized control trial, it builds on the existing knowledge base by analyzing the systematic, statewide implementation of one specific parenting intervention and provides an analysis of program dosage while holding factors associated with risk, such as caregiver education, age, marital status, and number of children in the household constant. Moreover, the current evaluation is conducted by investigators who are independent of the intervention developer.

Using administrative data merged with pre-intervention, caregiver self-report surveys on parenting behaviors and beliefs, this evaluation addresses the following research question: What is the relationship between NPP dosage and reported and substantiated incidences of child maltreatment following the program at six months and two years post-participation?

Methods

Study Population

Our study relies on the population of caregivers who attended the NPP in ten of the twelve family resource centers that served this southern state's child welfare population between October 2005 and April 2008. Eleven of the twelve centers offered the program, but families served in one of the resource centers were excluded due to the program modifications

necessitated by Hurricane Katrina. With the exception of this one resource center, we used the total population of all caregivers served by the NPP during this time period – not a selected sample. The resource centers offered the NPP to all families with children under six with child abuse and/or neglect allegations, while screening for circumstances and behaviors that would prevent constructive participation in the program (serious cognitive impairment, work barriers, substance abuse), although these factors did not necessarily preclude participation. With the exception of a very small number of families who were screened out across the state (~50), all child welfare-involved families with infants, toddlers, or preschool-aged children in the state assessed as needing parent education were referred to the NPP at one of the eleven resource centers. The study population consists of 564 caregivers who enrolled in the NPP in one of the ten resource centers offering the program. Eighteen caregivers participated in the NPP twice. Because the range of possible attendance differs for individuals who enrolled in the program twice, rather than only once, these caregivers were removed from the analysis, which resulted in 528 unique participants in the NPP.

The Intervention

The NPP (Bavolek, 2005) is based on social learning theory (Bandura, 1977; 1986) and the associated premise that most parenting patterns are learned during childhood and replicated later in life when the child becomes a parent. The program is designed to assess, treat, and prevent maltreatment by developing nurturing parenting skills as a counter to the key constructs of abusive and neglectful parenting identified by Bavolek, Kline, McLaughlin, and Publicover (1979) from the literature and expert advisors (as cited in Bavolek, 2005). The constructs center around parental expectations of the child, empathy toward children's needs, use of corporal punishment as a means of discipline, parent-child role responsibilities, and children's power and independence.

The NPP is built on the core principle that empathy is the foundation of responsive parenting, for which there is general agreement that promoting nurturing and empathic parenting practices is critical to the safety and well-being of children (Donald & Jureidini, 2004; Kochanska & Aksan, 1995; Laible, 2004). The specific program for parents of infants, toddlers, and pre-school children focuses on parental self-awareness and empowerment, the development of empathy, understanding child development and the role of discipline, emotional communication, behavior skills training, the importance of nurturing routines, and making good choices for child safety (Bavolek & Dellinger-Bavolek, 1985). The program is designed to be flexible in its application and involves lesson guides, DVDs, parent handbooks, assessment inventories, behavioral modeling, discussion, role playing, and family activities to promote cognitive and affective learning. Finally, the NPP is structured to involve children in the learning process.

The state child welfare agency provided funding to train resource center staff to be NPP facilitators. In addition, front-line child welfare staff were also trained so they could become familiar with the program model. The NPP was administered as a 16-week group-based program, but home visits were also used in some of the centers to compliment the group sessions or for participants who missed a group session. Group sessions lasted approximately two and a half hours, and home sessions averaged around one hour. The NPP manual is written at the 5th grade level, and the state child welfare agency worked with the program developer to create an "Easy Reader" version of the materials for use with caregivers with more limited reading ability. To promote accessibility, the resource center staff were expected to assist caregivers in developing transportation plans as needed.

Data

Data for this analysis is drawn from three sources merged on unique case IDs: NPP attendance data; the state child welfare Tracking and Information Payment System (TIPS),

which is the state administrative child welfare data; and, Adult-Adolescent Parenting Inventory-2 (AAPI-2) pre- and post-test surveys. Attendance was recorded by the resource centers for each caregiver's participation in home and/or group sessions of the NPP. In addition to demographic information, TIPS data included up to date information on the dates, types, and status of child maltreatment investigations. The AAPI-2 pre-test and post-test surveys contain demographic questions and 40 statements, each measured on a 5-point Likert scale, to assess parents': (a) inappropriate expectations of children, (b) parental lack of empathy toward children's needs, (c) strong belief in the use of corporal punishment, (d) parent-child role reversal, and (e) oppressing children's power and independence.

Dependent Variables

We examined the relationship between NPP participation and both reported and substantiated maltreatment. Federal child care statistics generally rely on counts of substantiated incidences, yet existing research uses one or the other, unless an explicit comparison is being made (e.g., Hussey et al., 2005). Significant debate about the meaning and value of unsubstantiated reports exists in both the child welfare literature and among community stakeholders (Hussey et al., 2005). Also of relevance is that some unsubstantiated reports, do, in fact, involve maltreatment (Waldfogel, 2009). Thus, we chose to include both reported and substantiated maltreatment incidences as outcome measures to investigate possible differences in the relationships between program dosage and each type of outcome.

The dependent variables for the four analytical models were whether or not a caregiver had a reported or substantiated incidence of maltreatment six months or two years subsequent to the end of their participation in the NPP. These variables were constructed from the TIPS data and included any allegation of neglect, physical abuse, sexual abuse, or other type of maltreatment during the relevant time period. The maltreatment allegation after participation in the NPP could be for any child under the caregiver's supervision, not necessarily for the child

between birth to 5 years of age, for whom they were referred to the program. The four dichotomous dependent variables are: (a) a reported incidence of child maltreatment within six months of the NPP closure; (b) a substantiated incidence of child maltreatment within six months of the NPP closure; (c) a reported incidence of child maltreatment within two years of the NPP closure; and (d) a substantiated incidence of child maltreatment within two years of the NPP closure.

The six-month window of opportunity for maltreatment after participation in the NPP was selected based upon the federal definition of maltreatment recurrence (Department of Health and Human Services, 2006). Fluke, Shusterman, Hollinshead, and Yuan (2005) demonstrate that while rates of repeat and reported maltreatment taper after six months following an incidence of child abuse and/or neglect, the cumulative percentages of children with a reported or substantiated maltreatment incidence increase substantially beyond the six months following a maltreatment incidence (e.g., 10.3% re-reporting after six months, 16.4% after twelve months, 20.6% after eighteen months). TIPS data for the NPP participants showed a similar pattern. Thus, we chose the two-year time frame, as well, as this was the longest-term follow-up the data would allow.

Independent Variables

Program Dosage

Program dosage, our key variable of interest, was measured as a continuous variable of the total number of home and group sessions participated in by each caregiver from the NPP attendance data.

Sociodemographic and Caregiver Characteristics

We controlled for sociodemographic characteristics of families found to be associated with child maltreatment, including number of children, caregiver education, age, marital status, income, ethnicity, and gender (Hussey, Chang, & Kotch, 2006; Kotch et al., 1995; Miller &

Cross, 2006; Wu et al., 2004). Demographic information was collected from participants before and after their participation in the NPP on the AAPI-2. In cases where pre- or post-test AAPI-2 demographic information was missing, we used information from the TIPS data. Dichotomous variables were constructed for gender (1 = female, 0 = male), and ethnicity (1 = non-white, 0 = white). We used the nonwhite/white categories to represent ethnicity since most of the participants (96%) were either African American or white with a small percentage of Hispanics, Native Americans, Pacific Islanders, and caregivers of other ethnicities, all of which were included in the non-white category. Caregiver age was coded continuously in years and marital status was measured by two dichotomous variables representing married (1 = married, 0 = not married) or cohabitating (1 = cohabitating, 0 = not cohabitating) with non-married and non-cohabitating (i.e., single) as the omitted category in the models. Number of children was coded as a continuous variable based on the number of children that caregivers reported. We constructed a dichotomous variable for whether or not the caregiver completed the 12^{th} grade (1 = yes, 0 = no) based on their response to the highest grade level completed in school. (We do not have information on whether or not a caregiver received a GED or high school diploma—only years of schooling completed.) This dichotomous variable was included in our model because in our exploratory analyses we did not find a linear relationship with years of education and our outcomes. Rather, we found a significant association ($p < .05$) between some of our outcomes and caregivers who completed the 12^{th} grade. Annual household income was measured as a continuous variable in thousands of dollars. This variable was constructed from income categories and converted to a continuous variable by using the mid-point of the categories.

We also controlled for whether or not the caregiver experienced abuse within and/or outside their family as a child, given findings about the intergenerational transmission of maltreatment (Dorsey, Mustillo, Farmer, & Elbogen, 2008). These dichotomous variables were

constructed from the AAPI-2 and measured whether or not the participant experienced any type of abuse outside of the family (1 = yes, 0 = no) and/or within the family (1 = yes, 0 = no).

We controlled for risk of maltreatment by including two measures. First, we used the AAPI-2 pre-test raw subscale scores, which measured parenting attitudes along the five dimensions outlined above in the description of the AAPI-2. These raw subscales are continuous measures, with higher scores indicating less risk. Second, we used the number of substantiated maltreatment investigations (from the TIPS data) for each caregiver from January 1, 1980 until the caregiver started the NPP. Since most of the prior investigations were due to neglect, we did not control for type of prior investigations.

Finally, we included a set of dichotomous variables representing each resource center (with one center as the omitted category) to control for unmeasured differences between the centers.

Analysis

We used logistic regression to estimate the association between NPP attendance and our four outcome variables of interest—the presence of a reported or substantiated maltreatment incidence at six months or two years after participating in the program. We explored different types of estimation approaches (count models) using different constructions of our dependent variables. However, the majority of individuals with maltreatment allegations, whether reported or substantiated, during the two years following an NPP closure date, had only one such allegation. Of those individuals with multiple allegations of maltreatment, reported or substantiated, within two years of the program end, the vast majority had only two allegations. Thus, logistic regression with a binary outcome was the most feasible approach. Finally, we used the robust clustering command in our logistic regression models in STATA 10 to adjust the standard errors for the lack of independence between observations due to the clustering of participants within centers (StataCorp, 2007).

Missing Data

Across all variables in the model, we had a significant amount of missing data (23%), which was primarily due to missing or incomplete information on the AAPI-2. To address the missing data, we used a multiple imputation routine in STATA 10 with the bootstrap option for all variables (Royston, 2007). We performed 25 imputations to match the percentage of missing data as recommended by Bodner (2008).

Results

Descriptive Statistics

Table 1 presents descriptive statistics on the caregivers in the study population. We report descriptive statistics before and after multiple imputation to illustrate the similarity of the estimates and the extent of missing data for each variable. However, we focus on the imputed means in the text.

The caregivers participated in an average of 17.5 NPP group and home sessions. The means on caregivers' raw scores on the AAPI sub-scales ranged from 19.7 (Inappropriate Parental Expectations of Children and Oppressing Children's Power and Independence) to 39.6 (Strong Belief in Corporal Punishment). Converting these raw scores to scores standardized to a population of abusive and non-abusive parents maintained by the instrument developer (Bavolek & Keene, 2001), the average population risk on each of the AAPI-2 sub-scales was considered high, except for the Strong Belief in Corporal Punishment, which was in the moderate risk category, but very close to the high risk cut-off. We used the raw scores in our analysis rather than the standardized risk scores because of their greater variation. Prior to being referred to the NPP, caregivers had an average of 1.2 substantiated reports of maltreatment.

Our study population was 41.8% nonwhite and 74.2% female. Forty-three percent completed 12th grade and the average age was 27.4 years. The average annual household

income was $13,900. Just over one-quarter were married (29.7%), while only 7.0% were cohabitating. On average, the caregivers had 2.6 children. Many of the caregivers were victims of abuse themselves as children. Almost one-third of the caregivers (30.8%) reported having experienced abuse as a child by a family member, with just under one-fifth (18.6%) from a perpetrator outside their family. Finally, the percent of the population enrolled in the NPP at each of the ten resource centers ranged from 4.2% to 18.0%.

In terms of our dependent variable, at six months after participation in the NPP, 6.8% of the population had a substantiated and 13.8% had a reported incidence of maltreatment after participating in the NPP. Two years following participation, 16.9% of the population had a substantiated maltreatment incidence compared to just over a third (33.7%) with a reported incidence.

Multivariate Results

We used logistic regression to estimate the association between participation in the NPP and subsequent reported and substantiated maltreatment incidences at two different time points. This approach resulted in estimating four separate models as presented in Table 2. The coefficients for each resource center, with one omitted, are not included in Table 2, but are available upon request. Many of the resource center coefficients in the models were significant, suggesting unmeasured differences between the centers contribute to differences in subsequent maltreatment rates.

Reported and Substantiated Maltreatment Six Months after the NPP

The first two models examined whether the degree of program attendance is associated with the likelihood of reported and substantiated incidences of maltreatment within a six-month time frame after participation in the program. The number of NPP sessions attended was significantly and negatively associated with the likelihood of reported incidences of maltreatment six months after participation in the program, but not substantiated incidences, though this

relationship approaches significance in the same direction. More specifically, using post-estimation commands for categorical models developed by Long and Freese (2006) in STATA 10, we found that for each additional Nurturing Parenting session attended, the percent change in the odds of a reported incidence of maltreatment was approximately 3.8% lower, controlling for all other variables. Stated differently, for an otherwise average caregiver who completed 3 sessions of the NPP, the probability of having an incidence of subsequent maltreatment reports was .177 compared to .108 for a caregiver having completed 18 sessions. In these six-month models, only a few of our demographic and other control variables had a significant association with reported incidences of subsequent maltreatment.

Female caregivers and caregivers with more children were both significantly more likely than male caregivers or those with fewer children to have a reported incidence of subsequent maltreatment. Caregivers who graduated high school were significantly less likely than those who didn't to have a subsequent maltreatment report during the six-month time period following the program. Only caregiver's childhood experience of abuse by a family member predicted a substantiated incidence for this time period. Those caregivers who experienced abuse by a person within their family were significantly less likely to have a substantiated incidence of subsequent maltreatment within six months. While this finding may seem counterintuitive due to possible intergenerational transmission of abuse (Dorsey, Mustillo, Farmer, & Elbogen, 2008), it could be that caregivers who have experienced abuse in their own family are at greater risk for more incidences of maltreatment. In fact, those caregivers who experienced abuse within their family as a child do have a greater number of prior incidences of substantiated maltreatment, on average, prior to participation in the NPP, though this difference is not statically significant. However, once this risk was accounted for in our models, a subset of these families might be more likely to have made changes in their parenting practices to break this cycle and be more likely to engage in behaviors leading to fewer reports of maltreatment.

Reported and Substantiated Maltreatment Two Years after the NPP

In tracking the caregivers' Child Protective Services involvement two years after the program ended, a different pattern emerged. In fact, NPP participation only had a significant and negative relationship with *substantiated* maltreatment, not reported. For each additional Nurturing Parenting session attended, the odds of a reported incidence of subsequent maltreatment within two years decreased by 3.3%. As an illustration of effect size, for caregivers attending only three sessions of the NPP, their probability of a subsequent incidence of substantiated maltreatment within two years was .195, compared to a probability of .127 for those who attended 18, holding all other variables at their mean. As in the six-month models, only a few demographic characteristics predicted the likelihood of a reported incidence of subsequent maltreatment two years after the program ended. As the number of children increases, the likelihood of a reported incidence within this time frame significantly increases. Additionally, caregivers who completed 12th grade compared to those who did not were significantly less likely to have a subsequent maltreatment incidence within two years. None of the control variables, other than the resource centers, had a significant relationship with substantiated incidences of maltreatment two years after participating in the NPP.

We conducted some exploratory analyses to investigate whether the caregiver's child was in foster care at the time of participation in the NPP and whether this explained the different associations between program dosage and reported and substantiated maltreatment for the two time periods. Without controlling for any other variables, we found that caregivers who had a child in foster care were less likely to have a subsequent reported and substantiated maltreatment incidence at six months after NPP participation and reported maltreatment incidence at 2 years; this association disappeared when we controlled for prior risk and other demographic covariates. In other words, the presence of a child in foster care at a single time point did not affect the independent relationship between program dosage and the outcomes.

We did not include the foster care variable in our final multivariate models because it does not adequately capture whether or not there may be another child in the home for whom a maltreatment incidence could occur or the timing and length of the foster care placement.

In summary, the NPP is associated with subsequent incidences of maltreatment, but it is dependent on both the timeframe in which the incidence occurred and the type of incidence—reported or substantiated. Six months following participation, the number of sessions attended reduced the likelihood of reported incidences of maltreatment, but not substantiated. The program may positively change caregiver behavior in such a way as to raise fewer concerns by others. However, in the two year time frame following participation, those caregivers who participated in more sessions of the NPP had fewer substantiated incidences of maltreatment, suggesting the program had enduring effects on the maltreatment outcomes of most concern. The NPP appears to have changed parenting behavior significantly for those parents who would otherwise be at risk for child maltreatment.

Discussion

Research on repeat maltreatment of children whose families are already involved in the child welfare system documents a substantial incidence of re-entry into foster care (Terling, 1999). Parent education and training is a primary vehicle used by caseworkers to help parents who are trying to keep their children from entering out-of-home care or seeking reunification. Evidence on the effectiveness of parent education programs for this population on maltreatment outcomes lags behind.

The results of this study, which build on an initial evaluation of the NPP in this southern state (Hodnett et al., 2009), provide several important findings about program effectiveness as it relates to the level of program participation. First, this study documents the significant association between extent of program participation and fewer subsequent reports of child maltreatment within six months of program completion for families already referred to child

welfare services. This finding is particularly important because it is well documented that maltreatment recurrences and re-referrals to child welfare agencies are most likely to occur within six months following a report of maltreatment (Fluke et al. 2005; DePanfilis & Zuravin, 1999; English, Marshall, Brummel, & Orme, 1999). Secondly, this study demonstrates the longer-term impact of program participation on substantiated allegations of child maltreatment. Long-term reductions in substantiated maltreatment incidences are the ultimate goal of any parent education program implemented in child welfare. Thus, our findings suggest parent education can prevent subsequent episodes of maltreatment and foster care re-entry, by extension, among families already involved in child welfare. And, this relationship, especially for those who participate more fully, persists over time. Finally, our study demonstrates the importance of program dosage for achieving these outcomes. Families involved in the child welfare system are often hard to engage in services, yet attendance at services has been shown to be negatively associated with the recurrence of child maltreatment (DePanfilis & Zuravin, 2002). As reported in our results, caregivers attended an average of 17.6 parenting sessions over a 16-week period, which represents a significant level of engagement and points to the relevance of this program and its resonance with families who are involved in the child welfare system.

Although a direct comparison cannot be made, the current study is similar to the study by Chaffin et al. (2004) in which PCIT was found to reduce repeat maltreatment in a physically abusive population. Of particular interest, however, is the fact that neglectful parents, who make up the majority of child welfare families, did not demonstrate improvement after participation in PCIT. Furthermore, as a randomized control trial, significant resources were available to ensure the intervention was delivered with high quality and model integrity, neither of which are routinely achieved in a typical child welfare setting. This comparison makes our findings about the NPP particularly impressive –each additional program dose of the NPP reduces subsequent

maltreatment allegations or substantiations by 3.8 and 3.3 percent, respectively, depending on the time period. And, like other child welfare populations, the vast majority of the study population was referred to the NPP due to neglect.

Our study produced some results that require additional explanation—namely the different pattern of findings for the two types of reports (all reports vs. substantiated reports) at two time periods. To review, we found that program dosage was only significantly associated with reported incidences of maltreatment within six months and substantiated incidences within two years after participation in the NPP. The commonly referred to "surveillance effect" could be one explanation as to why we see a reduction in subsequent reports at six months after participation in the NPP. For example, under the watchful eye of service providers, caregivers may find themselves more likely to be reported for inappropriate parenting behaviors. However, those caregivers who participated more intensely in the program, may be less likely to be reported, due to positive changes in behavior and/or service providers' perception of these caregivers' willingness to change as compared to those who were less engaged. While there were no differences in the number of substantiated instances of maltreatment, greater program participation during this critical time period resulted in fewer overall *allegations* of maltreatment.

Two years following program participation, our results indicate that caregivers appear to have made enough change in parenting behaviors to not engage in abusive or neglectful practices that would result in agency-verified substantiation. However, we saw no significant association with reports of maltreatment. Outside of child welfare involvement, the often unstable lifestyle of child welfare-involved families may still correspond with outside reports to child protective services. Attitudes, perceptions, and biases against high risk caregivers may not be so easily changed regardless of a parent's improvement. Consequently, reporters continue to make allegations of abuse or neglect, but upon investigation, those who benefitted from attending more sessions are less likely to be substantiated for child maltreatment. Future

research could investigate the source of maltreatment reports to elucidate the differential impact of program participation on the type and timing of reports.

Limitations

Our study has several limitations in addition to its strengths. Since our study relies on the population of families served, our results are certainly generalizable to the child welfare population referred to parent education in this southern state; however, it may not be representative of other states or the national population. Even with a large study population such as this, we were unable to estimate the effect of program participation on type (i.e., abuse or neglect) or severity of repeat maltreatment due to the relatively low frequency of certain types of maltreatment (i.e., physical and sexual abuse) on an already low frequency outcome (subsequent maltreatment) and the absence of data on severity. Given the high percentage of neglect incidences, however, it is safe to presume that the program works effectively to prevent ongoing reports of neglect for two of our four outcomes. Ideally, we would have liked to have limited our sample or adjusted the timeframes for each case to account for the fact that some caregivers may not have had the "opportunity to maltreat" when their child(ren) were placed temporarily in out-of-home care. However, we were unable to use the administrative data to identify these time periods or identify the presence of other children in the home, even if one child was placed in out-of-home care. Thus, we were unable to accurately assess the "opportunity to maltreat" and some caregivers may have had a more limited opportunity for repeat maltreatment than others. Finally, one of the major limitations was our inability to definitively make causal attributions to NPP participation because of other unmeasured factors that could be associated with program attendance and could explain the observed relationship between program attendance and repeat maltreatment. We did, however, examine our data for significant differences between high and low levels of attendance and did not find any significant

differences in the variables we had available, other than site (resource center) differences, which we controlled for.

Conclusion

The stakes for families involved in the child welfare system are high – child safety in the immediate sense and permanency and well-being for children in the long term. This study provides justification for continued use of this parent education model in this southern state and supports the need for ongoing evaluation of both process and outcome measures. By continuing to study promising models such as the NPP, we are adding to the evidence base of effective programs for this population. As promising evidence accumulates, the justification for investing significant resources in a randomized control trial of this program increases. These studies are needed to definitively establish a program's effectiveness with this population, which is, ultimately, what children and families deserve—investments that are known to work.

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The current manuscript builds upon on a report by Hodnett, Faulk, Dellinger, and Maher (2009), which analyzed some of the statewide data presented in this paper. This paper differs from the report in that it uses more data extracted over a longer period of time to examine the relationship between program dosage and subsequent maltreatment and employs statistical techniques to address missing data.

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Table 1

Study population characteristics of the Nurturing Parenting Program participants

Characteristics	*N*	*M* (*SD*) or % before imputation	Range of values	*M* (*SE*) or % after imputation (*N* = 528)
Independent Variables				
Program dosage	522	17.55 (9.69)	1 – 32	17.55 (.42)
Gender (%)	526			
Male		25.67		25.77
Female		74.33		74.23
Race/ethnicity (%)	526			
White		58.17		58.24
Nonwhite		41.83		41.76
Age at program start	526	27.38 (7.35)	12 – 60	27.38 (.32)
Income (in thousands)	452	13.92 (11.86)	7.5 – 60	13.88 (.57)
Educational level (%)	466			
Less than high school		55.80		57.45
High school or greater		44.20		42.55
Marital status (%)	501			
Single		63.48		63.37
Married		29.74		29.68
Cohabitating		6.78		6.95
Number of children	468	2.57 (1.50)	0 – 10	2.57 (.07)
Adult-Adolescent Parenting Inventory-2	442			
Inappropriate expectations		19.68 (4.58)	8 – 33	19.66 (.24)
Lack of empathy		36.92 (6.37)	19 – 50	36.96 (.31)
Corporal punishment		39.57 (7.69)	18 – 55	39.58 (.39)
Role reversal		23.39 (5.44)	9 – 35	23.22 (.27)
Power and independence		19.65 (3.00)	10 – 25	19.66 (.15)
Abuse as a child within family (%)	467	29.98		30.77
Abuse as a child outside of family (%)	467	18.63		18.63
Prior substantiated maltreatment investigations	528	1.20 (.99)	0 – 6	1.20 (.04)
Resource centers (% of sample)	528			
Provider 1		17.99		17.99
Provider 2		7.58		7.58
Provider 3		12.50		12.50
Provider 4		7.20		7.20
Provider 5		4.17		4.17
Provider 6		7.39		7.39
Provider 7		13.83		13.83
Provider 8		5.87		5.87
Provider 9		7.58		7.58
Provider 10		15.91		15.91
Dependent Variables				
Reported incidence of maltreatment within six months of the NPP closure (%)	528	13.83		13.83
Substantiated incidence of maltreatment within six months of the NPP closure (%)	528	6.82		6.82

Reported incidence of maltreatment within two years of the NPP closure (%)	528	33.71	33.71
Substantiated incidence of maltreatment within two years of the NPP closure (%)	528	16.86	16.86

Table 2

Logistic regression models of reported and substantiated child maltreatment at two time periods after NPP completion (N = 528)

	Reported incidence within six months		Substantiated incidence within six months[a]		Reported incidence within two years		Substantiated incidence within two years	
	OR	SE	OR	SE	OR	SE	OR	SE
Program dosage	.96**	.01	.96	.02	.98	.01	.97**	.01
Female	1.90*	.49	1.54	.50	1.55	.39	1.28	.46
Nonwhite	.48	.19	.62	.16	.71	.20	.98	.48
Age	1.01	.02	1.01	.02	1.01	.01	1.00	.02
Income	1.01	.01	1.01	.02	1.01	.01	1.01	.01
High school graduate	.61*	.14	.89	.32	.69*	.11	.84	.20
Marital status[b]								
Married	.86	.27	.91	.43	1.08	.24	1.19	.46
Cohabitating	.59	.29	.68	.48	1.44	.80	1.74	1.03
Number of children	1.19*	.09	1.16	.15	1.27**	.10	1.19	.14
Adult-Adolescent Parenting Inventory-2								
Inappropriate expectations	.99	.04	.97	.07	.99	.03	1.01	.07
Lack of empathy	.98	.03	1.00	.04	.98	.03	.95	.03
Physical punishment	1.03	.02	1.01	.04	1.02	.01	1.03	.02
Role reversal	.96	.03	.95	.05	.98	.02	.97	.03
Power and independence	.99	.04	.98	.09	.99	.04	1.06	.07
Abuse as a child (within family)	.67	.16	.32*	.18	.83	.28	.90	.35
Abuse as a child (outside of family)	1.33	.50	2.02	1.15	1.36	.33	1.25	.43
Prior substantiated maltreatment investigations	1.04	.18	1.13	.16	1.07	.13	1.19	.17

Note. The coefficients for each resource center were included in the models, but are not displayed in this table. They are available from the authors upon request.

[a]In the logistic regression model with "substantiated incidence within six months" as the outcome variable, caregivers from one resource center were dropped from the analysis because there was no variation in the outcome variable, reducing the population size to 488.

[b]Single is the reference category.

*$p < 0.05$; **$p < 0.01$