Tailored Nurse Support Program Promoting Positive Parenting and Family Preservation

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Background: Public health nurse home visiting is a promising approach for addressing the complex needs of families at risk of child maltreatment. The Colorado Nurse Support Program advances service provision by using evidence-based practices to provide tailored assessment and intervention to low-income, primiparous, and multiparous families with children under 18 years of age identified as high risk by county human service systems.

Objectives: This study aimed to test the effects of the Nurse Support Program on child protective services case characteristics between Nurse Support Program families and a demographically comparable reference group of families and evaluate changes in parenting outcomes from pre- to postprogram involvement for Nurse Support Program families.

Methods: We used a matched comparison group quasi-experimental design in which families in the Nurse Support Program ($n = 48$) were compared to families ($n = 150$) who were identified using administrative data from Colorado's Comprehensive Child Welfare Information System. Outcomes were child protective case characteristics (child protection referrals, open assessments, founded assessments, open cases, and children's placement in out-of-home care) and parenting outcomes.

Results: Nurse Support Program families were less likely to have a child protection case opened or have their child placed in out-of-home care. There were no significant between-group differences in child protection referrals, open assessments, or founded assessments. Families in the Nurse Support Program showed improvements in parenting outcomes over time.

Discussion: Findings suggest that the Nurse Support Program is a successful public health nurse home-visiting approach to promote positive parenting and family preservation among families with complex needs. Implementing tailored public health nurse home-visiting programs, such as the Nurse Support Program, should continue to be evaluated and supported to mitigate the public health risk of child maltreatment.

Key Words: child abuse ● family preservation ● nurse home visiting ● parenting ● public health nursing

Child abuse and neglect is a significant public health issue. In Colorado, approximately 35 per 1,000 children were investigated for child maltreatment in 2020 (U.S. Department of Health and Human Services, 2022). Child protective services are often underresourced to meet the complex needs of families at risk of child abuse and neglect (Blome & Steib, 2008). Evidence suggests that public health nurse home-visiting programs may be one promising approach to prevent and mitigate the consequences of child maltreatment (Casillas et al., 2016; Kim, 2019; Nievar et al., 2010). Indeed, research indicates that personalizing care through tailored nurse home visiting is particularly beneficial in many areas, including reducing child maltreatment risk and improving birth outcomes, chil-

dren's health and development, and parenting behaviors (McCabe et al., 2020; Mejdoubi et al., 2015; van der Put et al., 2018).

Although several studies demonstrate small to large effects of home-visiting programs, these findings are generally heterogeneous. Many home-visiting programs target maltreatment risk during the perinatal period or require strict, manualized guidelines, thereby limiting their reach to a wider range of families who might benefit more from individualized support and resources. For example, Healthy Families Massachusetts, a home-visiting program for primiparous young parents, reduces the recurrence of child protective services reports (Easterbrooks et al., 2019). Another program targeting primiparous mothers, Healthy Families New York, found positive changes in parenting attitudes after program participation (DuMont et al., 2008). This home-visiting intervention has been expanded to multiparous caregivers involved with child protective services and demonstrates favorable findings for reducing child maltreatment compared to a control group (Lee et al., 2018). The Mother and Infant Home Visiting Program Evaluation (Michalopoulos et al., 2019) examined the extent to which evidence-based home-visiting programs benefit families and found that manualized programs, such as Parents as Teachers, also show significant reductions in child maltreatment risk

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and improvements in parenting behaviors among high-risk families (Chaiyachati et al., 2018; Lahti et al., 2019).

The Nurse–Family Partnership is one of the most well-researched, home-visiting programs that uses highly trained nurses to deliver weekly home visits for low-income, primiparous mothers (Nurse–Family Partnership, 2022). The Nurse–Family Partnership program has been shown to prevent child injuries and maltreatment recurrence (MacMillan et al., 2009; Olds et al., 1995); however, some studies have found null effects of the program on their primary outcome of preventing child abuse and neglect (Olds, Kitzman, et al., 1997). This may be partly due to the use of child protective services records of substantiated cases, which can be biased because substantiated reports only capture a small portion of actual incidence of child maltreatment (Sweet & Appelbaum, 2004), as well as the use of homogenous samples and different Nurse–Family Partnership program models. For example, some Nurse–Family Partnership models enroll large numbers of unmarried and adolescent mothers; vary in the frequency of home visits, with more visits occurring in times of family crisis; and may use both nurses and paraprofessionals as home visitors (Olds, 2008). Although some research is mixed, public health nurse home visiting may be especially important in improving parent–child relationships, parental understanding of child development, and overall home safety (Green et al., 2014; Lahti et al., 2019; U.S. Department of Health and Human Services, n.d.). Indeed, home-visiting programs in which nurses are the intervention providers are shown to enhance positive parenting, which may, in turn, reduce the risk of child maltreatment and its consequences (Han & Oh, 2022). However, less is known about the effectiveness of nurse home visiting on the outcomes of families with differential risk factors, such as low-income, multiparous families involved with human service systems (e.g., child welfare and financial assistance programs).

As such, several programmatic limitations of extant nurse home-visiting programs exist. For example, focusing only on first-time mothers may exclude families with multiple children who would otherwise benefit from home-visiting services. In addition, manualized curricula specific to the prenatal period and infancy may ignore the important aspects of other critical developmental stages in early childhood and limit the extent to which they can address the unique needs of families. Also absent from the literature is an advanced understanding of programmatic effects on reducing the risk of out-of-home placement among families reported to child protective services, which may influence long-term family preservation. Research on the effects of nurse home-visiting programs designed to reach a broader range of families with complex and multifaceted needs is thus warranted.

The Colorado Nurse Support Program (NSP) is an example of a locally designed program that aims to reach a more extensive range of families than the priority population served by the Nurse–Family Partnership and other home-visiting programs. The NSP also uses specially trained bachelor's prepared nurses and evidence-based practices to deliver services to families. However, the NSP provides tailored assessment and intervention to *any family* with children (i.e., those with one or more than one child under 18 years old) identified as high risk by county human service systems. Through a collaborative partnership between local public health and county human service departments in Colorado, families receive tailored programming to improve family dynamics and promote behavior change. Although the NSP was first developed in 1999 and has since been implemented in the community, there is limited research documenting its effectiveness.

One study evaluating the NSP used longitudinal modified treatment policy analyses to demonstrate that the NSP had lasting effects on parenting knowledge, behavior, and status among the families served (Huling et al., 2022). Building from this preliminary work, the current study aimed to evaluate child protective services and parenting outcomes associated with participation in the NSP. The first aim was to compare child protective services case characteristics (i.e., child protection referrals, open assessments, founded assessments, open cases, and children's placement in out-of-home care) between NSP families and a demographically comparable reference group of families within 1 year of participating in the NSP program. The second aim was to evaluate changes in parenting outcomes from pre- to postprogram involvement for NSP families. Given that some evidence is mixed regarding the effect of nurse home-visiting programs on reducing the incidence of child maltreatment and entry into child protective services from administrative records, we hypothesized that (a) NSP families would show improvements in family preservation by having fewer open child protective services cases and out-of-home placements than matched comparison group families, (b) no differences would be found for child protective services referrals or assessments, and (c) that NSP families would show improvements in parenting outcomes over time.

METHOD

Sample and Procedure

Low-income, primiparous, and multiparous families with children under 18 years old were eligible to voluntarily participate in the NSP if they were identified as high risk by county human services; specifically, if child protective services referred them and/or they qualified for assistance from Colorado Works/Temporary Assistance to Needy Families (TANF). Families (including both mothers and fathers) who received services in the NSP in 2018 in two counties and who completed at least eight home visits were included in this study to systematically assess progress in the NSP; completion of eight home visits was selected to systematically evaluate families and because the comprehensive nursing intervention can be implemented within this approximate time frame. Comparison group families were identified using administrative data from Colorado's

Comprehensive Child Welfare Information System (CCWIS). The CCWIS includes documentation of families who come to the attention of child protective services in Colorado. Comparison group families from the two same counties as those participating in the NSP who had come to the attention of child protective services and had a closed referral or case in 2018 and could be eligible for enrollment in the NSP but not enrolled (e.g., because of not being referred for unknown reasons) were identified. To understand possible differences in child protective services outcomes 1 year following NSP exit or child protective services case closure, data on child protection referrals, open assessments, founded assessments, open cases, and children's placement in out-of-home care were examined for families between January and December 2019. Thus, child protective services outcomes assessed both child maltreatment recurrence (for NSP families referred by child protective services and comparison families) and incidence (for NSP families referred by TANF). Changes in parenting outcomes were only examined for NSP families before beginning the program (preassessment) and after program completion (postassessment). The Colorado State University institutional review board approved this study, and all families participating in the NSP completed informed consent.

Nurse Support Program

The NSP is grounded in a socioecological perspective by emphasizing the importance of proximal-level factors that occur within the family environment, such as parenting behavior and maltreatment risk, as well as distal-level factors that occur within the broader community. For example, the NSP adopted evidence-based practices, such as strengthening families framework (Center for the Study of Social Policy, n.d.), motivational interviewing, and trauma-informed care, to better engage families with different experiences of psychosocial risk and promote safe, stable, and nurturing environments to reduce child abuse and neglect and its consequences. Nurses identify protective factors to focus their assessments, such as the family's social support systems and access to community resources. In turn, they use nursing education to tailor the intervention to best suit the needs of each family. An integral part of the NSP is the program's structure, which allows nurses to implement various assessments and focus on specific topics that can be tailored to individual families. Therefore, no specified order of topics covered with families or number of sessions is required. However, content topics generally include (a) establishing program and family goals; (b) child health, development, and safety; (c) family violence; (d) parental mental health; (e) parental substance use; (f) social support; and (g) identifying additional supports and resources. Importantly, parenting in the context of each of these topics is discussed. Families are evaluated monthly to assess progress and discharged from the NSP when they have achieved both program and family goals. Regarding program fidelity, a minimum of four chart audits of home-based visits are conducted each year, and nurses receive both individual- and group-based reflective supervision two times per month.

Variables

Sociodemographic Characteristics
Sociodemographic characteristics included the child's county of residence, race/ethnicity, gender, and age. The two counties that were included are characterized by large, diverse populations as well as urban, suburban, and rural communities that are situated in the eastern and northern parts of the Denver metro area.

Child Protective Services
Child protective services outcomes data were obtained from CCWIS administrative data. Referrals to child protective services encompassed all calls made to the Colorado Child Abuse and Neglect Hotline System as well as other methods of referral (e.g., letter or walk-in to a county human services department). Open child protective services assessments were defined by whether a referral was screened in, including a referral accepted for follow-up. Founded child protective services assessments were determined if an allegation of child abuse and/or neglect was substantiated through a formal investigation. A child protective services case was opened if a family was assigned a permanency caseworker and provided services. Children's placement in out-of-home care was determined if they were removed from their primary caregivers and placed in kinship, foster care, or congregate care. These variables were dichotomized to indicate whether a family experienced each child protective case characteristic.

Omaha System of Documentation
The Omaha System is one of the oldest and most well-validated nursing classification guides widely used to document and evaluate interventions and outcomes (Martin, 2005; Omaha System Guidelines, n.d.; Topaz et al., 2014). The public health nurses utilized the Omaha System of Documentation to assess, monitor, and evaluate the status of families during program enrollment. Using the Omaha System, families enrolled in the NSP were routinely assessed to determine strengths and challenges that the program can address, and nurses applied personalized nursing interventions, such as teaching, guidance, counseling, case management, and care coordination, to support the caregiver and improve their ability to provide care to their children. The Omaha System was used to classify problems, describe the intervention, and then rate the outcome of the intervention in three categories: *knowledge* (the ability of the client to remember and interpret information), *behavior* (observable responses, actions, or activities of the client fitting the occasion or purpose), and *status* (condition of the client in relation to objective and subjective characteristics; Martin, 2005). Ratings are on a scale of 1–5, with 1 denoting the highest problem severity (e.g., caregiver has no knowledge of age and developmentally specific safety, caregiver does not provide for child's health and safety needs, and caregiver is consistently anxious and negative about caregiving responsibilities) and 5 denoting lowest problem severity (e.g., caregiver has superior knowledge of age and developmentally specific healthcare, caregiver consistently provides for child's health and safety needs,

and caregiver enjoys caregiving). Therefore, higher scores from pre- to postassessment indicate improvements. For this study, the Omaha System of Documentation of Caretaking and Parenting Problems was used to evaluate nursing intervention because it was the most identified problem in the Omaha Systems Problem Classification Scheme. In these cases, the evaluation was centered on the caregivers' responses to the NSP intervention. As part of the NSP, extensive training related to these guidelines is provided; nurses are required to engage in monthly practice to identify which system problems should be assessed, how often a system problem should be rated, and how to document tailored NSP intervention. Quality of documentation is measured quarterly through peer and supervisor reviews with reflective feedback.

Data Analyses

To help reduce bias resulting from the nonexperimental nature of this study, propensity score matching (PSM) was used to construct samples with a similar distribution of selected characteristics between the NSP treatment and comparison groups (Rosenbaum & Rubin, 1983; Stuart, 2010). This algorithm was implemented using the R package *MatchIt* (Ho et al., 2011). The probability of being assigned to the treatment group, also known as a propensity score, was estimated using logistic regression. Although the CCWIS includes a range of information on all children who come to the attention of child protective services, information used for matching must be available for families who completed the NSP and those in the comparison group. Furthermore, because the CCWIS may list multiple caregivers involved in a child abuse and neglect report, child demographic variables were selected over caregiver demographic variables to ensure sufficient matching. Whether

or not a case was assigned to the treatment group was regressed on four demographic variables: the child's county of residence, race/ethnicity, gender, and age as of January 1, 2019. Outcome variables are not considered components of PSM.

Propensity scores were then matched between the two groups using k:1 nearest neighbor matching with a variable matching ratio, where k is the number of comparison cases matched to a treatment case on aggregate. Propensity score weights were also computed and used in the analysis to account for differences in treatment selection between the two groups. To prevent poor matching and help reduce bias, treatment cases were only matched to comparison cases within 0.20 standard deviations of the logit of the propensity score, known as a caliper (Austin, 2011). Variable ratio matching allows treatment cases to be matched to a variable number of comparison cases. On aggregate, the matched data will have approximately k times the number of comparison cases as treatment cases. The maximum number of comparison cases to which a treatment case could be matched and k were determined using a grid search and selecting the parameters based on the match with the best balance. *Balance* is the match where all covariates had an absolute standardized mean difference of less than 0.25, variance ratios between 0.5 and 2.0, and the smallest average absolute standardized mean difference (Rubin, 2001; Stuart, 2010). This resulted in an aggregated match of 3:1 and a variable matching of up to four comparison cases per treatment case. Comparison cases that were not matched to a treatment case were discarded.

Table 1 summarizes the unmatched raw cases and compares them to the matched cases after the PSM. The sample size of the remaining matched cases, though smaller, is expected to improve

TABLE 1. Comparison of Unmatched and Matched Child Demographic Characteristics

Demographic characteristics	Unmatched		Matched		Difference tests
	NSP treatment ($n = 51$)	Comparison ($n = 1,464$)	NSP treatment ($n = 48$)	Comparison ($n = 150$)	
County (%)					$\chi^2(1) = 0.28$
County 1	58.8	43.7	58.3	49.5	
County 2	41.2	56.3	41.7	50.5	
Child race/ethnicity (%)					$\chi^2(2) = 0.41$
American Indian/Alaska Native	2.0	0.8	0.0	0.0	
Asian	3.9	0.0	0.0	0.0	
Black/African American	13.7	23.0	14.6	15.1	
White	37.3	44.9	39.6	44.3	
Hispanic/Latinx	43.1	30.5	45.8	40.6	
Native Hawaiian/Pacific Islander	0.0	0.9	0.0	0.0	
Child gender (%)					$\chi^2(1) = 0.37$
Female	60.8	47.5	58.3	63.0	
Male	39.2	52.5	41.7	37.0	
Child age in years (M)	2.0	3.5	2.0	1.9	$t(196) = -0.45$

Note. NSP = Nurse Support Program.

TABLE 2. Comparisons Between Nurse Support Program and Matched Comparison Families on 1-Year Child Protective Services Outcomes

| | Condition | | |
| | NSP treatment | Comparison | Cramer's *V* |
Outcome variables	(*n* = 48) *n* (%)	(*n* = 150) *n* (%)	effect size
Referral	13 (27.1)	55 (36.7)	.09
Open assessment	9 (18.8)	41 (27.3)	.09
Founded assessment	1 (2.1)	11 (7.3)	.09
Open case	1 (2.1)	26 (17.3)	.19
OOH placement	0 (0.0)	16 (10.7)	.17

Note. NSP = Nurse Support Program; OOH = out of home.

statistical power by reducing extrapolation because the treatment and comparison groups are more similar on aggregate (Ho et al., 2007; Stuart, 2010). The proportion at each level of county and child race/ethnicity and gender, as well as the average age, is closer in the matched sample than the unmatched sample.

After creating the two matched groups, we calculated descriptive statistics on demographic characteristics. To determine group equivalence, analyses of the differences between groups for demographic characteristics included independent samples *t*-tests and chi-square tests for continuous and categorical variables, respectively. Chi-square analyses with Fisher's exact test and Cramer's *V* effect sizes were used to examine differences in child protective services outcomes between the treatment and comparison groups. Paired samples *t*-tests and Cohen's *d* effect sizes were used to investigate changes in caretaking and parenting outcomes from pre- to postassessment for families in the NSP treatment group. Propensity score weights were applied to all outcome analyses. Listwise deletion was used to handle missing data.

RESULTS

Sample Characteristics

Of the 51 families served by the NSP in 2018 and of the 1,464 families with closed child protective services cases in 2018, 48 and 150 families were included in the matched treatment and comparison groups, respectively (see Table 1). Treatment group families completed an average of 11.73 (*SD* = 3.09) home visits. For both groups, there were more female children than male children, with a mean age of approximately 2 years. Children in the treatment group were mostly Hispanic/Latinx,

followed by White and Black/African American, and more children were from County 1 than County 2. Children in the comparison group were mostly White, followed by Hispanic/Latinx and Black/African American. These children were almost equally from County 1 and County 2. Treatment and comparison groups did not significantly differ in child demographic characteristics.

Child Protective Services

Child protective services outcome data are reported in Table 2. There were no significant between-group differences in child protection referrals (Fisher's exact $p = .30$, Cramer's $V = .09$), open assessments (Fisher's exact $p = .26$, Cramer's $V = .09$), or founded assessments (Fisher's exact $p = .30$, Cramer's $V = .09$). NSP families were significantly less likely to have a child protection case opened (Fisher's exact $p < .01$, Cramer's $V = .19$), or if their case was opened, have their child placed in out-of-home care (Fisher's exact $p < .01$, Cramer's $V = .17$).

Caretaking and Parenting

Caretaking and parenting outcome data are reported in Table 3. A significant within-group effect was found for caretaking and parenting outcomes, such that NSP families showed improvements in caretaking and parenting knowledge, $t(38) = -10.96$, $p < .001$, Cohen's $d = .58$; behavior, $t(38) = -5.93$, $p < .001$, Cohen's $d = .81$; and status, $t(38) = -3.94$, $p < .001$, Cohen's $d = .85$, from pre- to postassessment.

DISCUSSION

Findings from this study demonstrate that NSP families experience better child protective services outcomes concerning

TABLE 3. Pre- and Postassessment Scores on Caretaking and Parenting Knowledge, Behavior, and Status Among Families in the Nurse Support Program

| | NSP treatment (*n* = 39) | | |
| | Preassessment | Postassessment | Cohen's |
Caretaking and parenting	*M* (*SD*)	*M* (*SD*)	*d* effect size
Knowledge	2.74 (0.44)	3.77 (0.43)	.58
Behavior	3.46 (0.60)	4.23 (0.71)	.81
Status	3.69 (0.86)	4.23 (1.11)	.85

Note. NSP = Nurse Support Program.

family preservation; they are less likely to have a child protection case opened or have their child placed in out-of-home care than comparison families. Our findings also indicate that families participating in the NSP show improvements in aspects of caretaking and parenting over time.

Our findings extend support for public health nurse home-visiting programs and suggest that tailored nurse home-visiting programs may not only benefit low-income, first-time mothers but also multiparous caregivers with children under 18 years old and their families identified with high psychosocial risk. Although NSP families tended to have fewer referrals and open assessments with child protective services, these findings were not statistically significant when compared to families matched on child demographic characteristics. These findings corroborate the mixed evidence on the effects of home visiting in preventing entry into child protective services. For example, in other randomized controlled trials of home visiting, no program effects were found on reports of maltreatment (Duggan et al., 2007). In contrast, Olds, Eckenrode, et al. (1997) found that nurse-visited mothers were less likely to abuse and neglect their children, especially among low-income, single-parent families. Moreover, nurse-visited infants had reduced child protective services investigations through 5 years of age (Goodman et al., 2021). Because child protective services referrals may not capture the true nature of child maltreatment, more research is needed to replicate the NSP model with varied assessments of maltreatment risk among families involved with county human service systems.

Notably, our findings are consistent with research showing that home-visiting programs are associated with improvements in positive parenting (Molloy et al., 2021). Specifically, nurse-rated caretaking and parenting outcomes improved for NSP families over time in knowledge, behavior, and status domains. These findings build on early research on the NSP (Huling et al., 2022); they are critical for families served, given that extant research demonstrates that positive parenting, as evidenced by warmth, sensitivity, and responsiveness, has lasting effects on child health and well-being and is a key mechanism implicated in reducing the risk of child maltreatment (Thomas & Zimmer-Gembeck, 2011). Indeed, the practice of the NSP, although similar to evidence-based manualized program curricula, is unique in that interventions are tailored for each family based on standard nursing assessments conducted during home visits. The nurse home visitor utilizes their assessment skills to identify strengths and deficits in the care being provided by the caregiver and applies personalized nursing interventions guided by the Omaha System. This flexibility and strengths-based approach assures that NSP families receive standardized yet client-centered interventions that may target factors implicated in positive parenting. In addition, the Omaha System provides standard evaluation of client progress, such as those necessary to measure client status like reduced anxiety and increased positive feelings about caregiving, ex-

pectations for child behavior that is appropriate for the child's age and development, and changes in involvement with child protective services.

Limitations and Implications

This study has some limitations. Although the use of the matched comparison group allows for inferences about the effects of the NSP on child protective services case characteristics and parenting outcomes, randomized controlled trials would better determine the causal effects of the program on myriad family outcomes. To obtain outcome data from the matched comparison group, measures of child maltreatment were also limited to reentry into child protective services within a 1-year time frame. In addition, the evaluation of the NSP was conducted in two counties in a single region of the United States and among families who were referred from both child protective services and TANF. This may introduce selection bias as families involved with human service systems chose to participate in complying with agency recommendations and families with prior child protective services involvement may be at increased risk for the recurrence of maltreatment (Hindley et al., 2006). It may also limit generalizability to families who did not attend a minimum of eight home visits and those experiencing socioeconomic disadvantage but who may not be at risk of child maltreatment as well as those living in rural communities or other geographic regions of the United States. Furthermore, data used to match families were based on available child sociodemographic characteristics; there may be other pertinent household or child protective services features that could be used in future research to strengthen the comparability of groups. Finally, outcome data were obtained from child protective services administrative records and nurse report, which may contain biases in reporting.

Despite these limitations, there are several implications for future research and practice. To build on the extant evidence of the NSP and evaluate program effectiveness, future research should test the NSP with more rigorous study designs and larger samples as well as use other sources of data, including self-reports of caretaking and parenting, observations of the home environment and parent–child interactions, and the optimal number of sessions needed to identify improvements in familial outcomes. Regarding practice, a deeper understanding of how the NSP fits within the broader public health and human service system context and the identification of barriers and facilitators that can be used to guide successful implementation is warranted. As such, a crucial next step is to disseminate this high-quality nursing intervention to more families identified as high risk.

Conclusion

The NSP may be a successful approach to promoting positive parenting and preservation among low-income families. Public health nurse home-visiting programs, in general, would benefit

from expanding beyond first-time mothers during the perinatal period to families with children under 18 years old, and establishing public health–academic partnerships to adopt standardized practices for evaluating program outcomes to increase the body of evidence to support nurse home visitation. Such evidence also adds to early childhood science in a manner consistent with lifespan development frameworks; it also spotlights community-based interventions that are consistently working and accepted in local public health today. Improving the accessibility of the NSP and similar locally designed nurse home-visiting programs that do not yet have evidence-based practice designation may be an important community investment to address child maltreatment risk and parenting outcomes among families with complex needs.

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