

Research Article

The Impact of Relationship on Goal Attainment in a Home-Based Family Support Program

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Home-based family support programs provide early intervention to support families with young children. Home visiting models typically serve pregnant and parenting women with risk factors known to influence the caregiver-child relationship including history of trauma, low academic achievement, low income, limited support networks, maternal depression, and maternal substance use. Few, if any, home visiting models, however, were developed specifically to support families affected by maternal substance use. The Team for Infants Exposed to Substance use (TIES) Program is a home-based family support program exclusively serving families affected by maternal substance use. The model design and intensive services allow TIES participants to achieve significant positive outcomes in the program's six goal areas: maternal substance use, parenting skills, child mental and physical health, maternal mental and physical health, family income, and family housing. Goal scores are assessed jointly by participants and staff throughout the program using a validated scale. Program staff hypothesize that goal attainment in these areas may be influenced by the therapeutic relationship developed between home visitors and participants. This relationship is assessed using the Working Alliance Inventory (WAI), a validated assessment of therapeutic alliance administered to both participants and staff. An analysis of 127 program participants shows that when controlling for home visitor WAI scores in multilevel models (MLMs), goal attainment scores improved from intake to discharge across all goal areas except for housing stability. These results stress the importance of the therapeutic relationship in maximizing TIES participants' growth and success.

1. Introduction

Home-based family support programs provide early intervention to support families with young children, and their effectiveness is evidenced by a substantial body of literature. Perhaps the most comprehensive review of the effectiveness of home visiting programs is the Mother and Infant Home Visiting Program Evaluation (MIHOPE) study, a longitudinal study of the effects of Maternal, Infant, and Early Childhood Home Visiting (MIECHV)-funded home visiting programs on child and family outcomes. MIHOPE has issued multiple reports including one from January 2019 highlighting benefits of home visiting programs across goals

such as maternal health, birth outcomes, economic self-sufficiency, parenting skills, and child health [1].

Home visiting models seek to address the risk factors known to influence the caregiver-child relationship including history of trauma, low academic achievement, low income, limited support networks, and maternal depression [2–7]. Few, if any, home visiting models, however, were developed specifically to support families affected by maternal substance use, and most models do not focus on substance use-related indicators or outcomes [8]. When maternal substance use is identified among participant families, studies indicate that home visitors typically lack the specialized training and clinical background required to

successfully support these families, as well as sustained supports necessary to address secondary trauma among staff and prevent burnout and turnover [4, 5, 7, 9–14].

The TIES Program, a program of Children’s Mercy Hospital in Kansas City, is a home-based family support program delivered by masters-prepared social workers alongside endorsed infant family specialists to serve families affected by maternal substance use exclusively [7]. Infant Family Specialist is a credential of the World Association for Infant Mental Health to denote competency in supporting the social-emotional health of young children. It is granted to those whose related academic degree, specialized training, and hours of reflective supervision have been documented and approved. The TIES model, initially developed in 1991, was designed to address the gaps identified in other home visiting models while addressing the unique, complex needs of this special population. The model design and intensive services have allowed TIES participants to achieve significant positive outcomes in the program’s six goal areas: maternal substance use, parenting skills, child mental and physical health, maternal mental and physical health, family income, and family housing [7, 15]. In addition to specialized clinical training and supportive supervision to mitigate secondary trauma and burnout, program staff hypothesize that the success of the program may be due in part to the therapeutic relationship developed between staff and participants throughout the program [7].

The TIES Program formally assesses the relationship between staff and participants using the Working Alliance Inventory (WAI), a validated assessment of therapeutic alliance [16, 17]. To date, studies assessing the home visitor-participant relationship have focused on how the relationship affects program engagement and the amount of time spent in visits [18–21]. This research has shown the relationship to be a reliable predictor of retention and engagement [22]. Moreover, studies have shown that participants are more likely to remain in services when focusing on alignment of goals and their specific needs, rather than focusing primarily on case management [22, 23]. Even in these studies, however, most evaluation involves assessment administration to either home visitors or program participants, not both. The TIES Program administers the WAI to both home visitors and program participants to evaluate the relationship from both perspectives and to examine the concordance or discordance between scores. Additionally, while the focus on retention and engagement is important for intensive, long-term home-based family support programs, these studies lack an examination of how the home visitor-participant relationship affects program outcomes. This paper attempts to fill this gap in the literature and estimate the impact that the relationship between the TIES participant and the home visitor, as measured by the WAI, has on goal-attainment measures, as measured by the Individualized Family Service Plan (IFSP) goal attainment scale. The IFSP goal attainment scale is a validated tool used to track goal attainment over time in the following areas: maternal substance use, parenting skills, child physical and mental health, maternal physical and mental health, income

stability, and housing stability. Goal areas are jointly scored by families with their home visitors and used to produce action steps and to track progress over time [15]. These two measures are used to address two research questions: (1) what is the impact of WAI scores from the perspective of the home visitor on the six Individualized Family Service Plan (IFSP) goal attainment scores after controlling for other demographic factors and (2) what is the impact of WAI scores from the perspective of the TIES participant on the six IFSP goal attainment scores after controlling for other demographic factors.

This paper builds on previous work by O’Malley et al. [7] which provides a detailed overview of the Team for Infants Exposed to Substance use (TIES) Program, as well as high-level results based on paired *t*-tests showing a statistically significant improvement in mean scores for all six goal-attainment measures between Time 1 (intake) and Time 5 (discharge).

1.1. The TIES Model. O’Malley et al. [7] provides a comprehensive summary of the TIES model and its development. The TIES Program is a home-based family support model that supports pregnant and postpartum women and their families affected by maternal substance use. The TIES Program serves an average of 100 families annually. Eligible participants are pregnant women and those with infants less than 6 months of age and their families who are affected by maternal substance use and living in the TIES catchment area. Participation is free of charge and voluntary, and a mother must acknowledge that substance use is creating difficulties for her and her family and that she is interested in addressing those issues [7]. Mothers must be at least 18 years of age and must have the focus child in their custody or in a relative’s care. The program provides individualized, culturally, and linguistically appropriate services including crisis intervention and supportive counseling, promotion of infant attachment and bonding with assessment of child development, parent education and coaching, support for substance use treatment, and coordination of wraparound services needed in multiple areas with connection to other community resources [7]. Participants are enrolled until the focus child reaches 24 months of age. A typical TIES participant at program intake is unemployed, has at least one additional child in her care, reports little or no household income, qualifies for Medicaid, lacks a high school degree, and lacks secure housing. Table 1 provides a demographic summary of TIES participants.

Home visitors meet with mothers in their homes and in other community locations at least once per week on average. The program uses a two-role model. Family Support Specialists are masters-prepared social workers who provide direct support and services and coordinate access to other resources. Parent Resource Specialists are infant and early childhood mental health experts and early childhood parent educators who focus on the caregiver-child relationship. Home visitors partner with mothers to identify strengths and goals and work towards increasing parenting confidence, capacity, and self-efficacy.

TABLE 1: Sociodemographic characteristics of TIES participants.

	All participants (<i>N</i> = 127)	
	<i>N</i>	%
Age in years (mean ± SD)	28.4 (4.8)	
Program location		
Kansas	61	48.0
Missouri	66	52.0
Race		
African American or Black	35	27.6
White/Caucasian	81	63.8
Other	9	7.1
Not provided	2	1.6
Ethnicity		
Non-Hispanic	110	86.6
Hispanic or Latino	15	11.8
Not provided	2	1.6
Marital status		
Single	92	72.4
Married	11	8.7
Separated/divorced	14	11.0
Domestic partner	6	4.7
Not provided	4	3.1
Educational attainment		
Less than high school diploma	61	48.0
High school graduate/GED or higher	64	50.4
Not provided	2	1.6
Employed at intake		
Full time	7	5.5
Part time	13	10.2
Unemployed	105	82.7
Not provided	2	1.6
Housing status		
Rents/shares own home/apartment	45	35.4
Lives with family/friends	33	26.0
Residential treatment	2	1.6
Shelter	7	5.5
Supportive housing	10	7.9
Transitional housing	21	16.5
Homeless	6	4.7
Correctional facility	1	0.8
Not provided	2	1.6
Health insurance		
Medicaid	92	72.4
Applied for Medicaid	3	2.4
Commercial	6	4.7
No insurance	9	7.1
Not provided	17	13.4
Additional children to whom mother has access		
0	31	24.4
1–4	82	64.6
5–8	11	8.7
Substance use type		
Alcoholic beverages (beer, wine, spirits, etc.)	107	84.3
Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)	76	59.8
Cannabis (marijuana, pot, grass, hash, etc.)	110	86.6
Cocaine (coke, crack, etc.)	68	53.5
Hallucinogens (LSD, acid, mushrooms, PCP, special K, etc.)	42	33.1
Inhalants (nitrous, glue, petrol, paint thinner, etc.)	14	11.0
Opioids (heroin, morphine, methadone, codeine, etc.)	47	37.0
Sedatives or sleeping pills (valium, serepax, rohypnol, etc.)	10	7.9
Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	38	29.9

The TIES model uses a variety of validated assessment tools to screen for and measure maternal depression, child development, parent-child interaction, drug and alcohol use, protective factors, home safety, intimate partner violence, staff-participant relationship, and program goal attainment. This study focuses on two assessment tools: (1) the IFSP, which includes a goal attainment scale covering six domains (maternal substance use, parenting skills, child mental and physical health, maternal mental and physical health, income stability, and housing stability) and (2) the WAI [16], which evaluates the therapeutic relationship between the participant and the home visitor. Program staff theorize that the quality of the relationships between the home visitors and participants may be a significant contributor to overall program success for this special population.

2. Methods

2.1. Participants. The analysis included 127 participants in the TIES Program from 2012 to 2022, who had completed at least one IFSP goal attainment scale and at least one WAI administration. Table 1 provides a description of the 127 families who participated in the TIES Program during this period. Over half of the participants (63.8%) were White and almost a third (27.6%) were African American. Most participants were non-Hispanic (86.6%) and single moms (72.4%). At enrollment, over eighty percent of participants were unemployed (82.7%) and nearly half had not completed high school (48.0%). The average maternal age at enrollment was 28.4 years. Thirty-five percent of the participants (35.4%) rented/shared a home/apartment, and 26% lived with family/friends. For 24% of moms, the focus child was their only child, and 73.2% of participants had at least one additional child to whom the mother had access. Many participants had a history of multiple substance use, with 86.6% reporting cannabis, 84.3% reporting alcohol, 59.8% reporting amphetamine, 53.5% reporting cocaine, and 37.0% reporting opioids. Nearly thirty percent of participants also used tobacco products (29.9%).

Approval for program evaluation was obtained from the Children's Mercy Hospital Institutional Review Board (IRB). All participants completed a written consent form at the program enrollment.

2.2. Measures. The TIES IFSP goal attainment scale [15] consists of a 5-point Likert scale that assesses and tracks participants' goal attainment over time in the following areas: maternal substance use, parenting skills, child physical and mental health, maternal physical and mental health, income stability, and housing stability. Plans are individualized, and families and specialists mutually agree on goals based on specific needs. The tool details the plan for service delivery, and supportive activities provided during home visits enhance participants' abilities to work towards the established goals. The home visitors and families develop these goals together and jointly score goals and track progress using the IFSP goal attainment scale. TIES specialists score the family's status in goal areas at intake (Time 1) and discharge (Time 5), and, together with the family, track progress over time at child's age of 3–7 months (Time

2), 9–13 months (Time 3), and 18–22 months (Time 4). On the five-point Likert scale, 1 represents very low (crisis); 2, low (vulnerable); 3, adequate (stable); 4, high (advanced); and 5, very high (thriving). Goal areas are scored by calculating a mean score from subscale items. Each scale point is well defined in comprehensive rubrics containing a range of three to eight subscale items specific to each goal area. The parenting skills goal, for example, "assesses basic needs, parent-child interactions, appropriate expectations, parenting strategies and problem-solving, access of resources and services, and safety and supervision" [7]. Figure 1 includes scale descriptors for a single component of each goal area. The reliability coefficient was 0.90, and only mean scores of the domains were used. TIES staff enter all data into a program-specific REDCap (Research Electronic Data Capture) database, a web-based, HIPAA-compliant software platform used for data management [24].

The Working Alliance Inventory-Short Form (WAI-S) [16] assesses the collaborative relationship between mothers and home visitors with 12 items in three subscales: bond, goal, and task. The WAI was adapted to assess and quantify the quality of the relationship between home visitors and participants and their sense of agreement about the quality of their partnership related to engagement, mutual trust, and consensus on goals. The home visitors and the TIES participants respond to the survey separately. Responses range from 1 (never) to 7 (always) with higher scores indicating greater alignment. The WAI is completed at the 3–7-month interval, early in the working relationship, and 18–22-month interval, closer to the conclusion of the program. The WAI is administered to both home visitors and program participants by a third-party evaluator. Individual responses remain confidential.

In addition, since the WAI was originally developed to assess the working alliance between therapists and psychotherapy patients, research recommended that the measurement properties of the WAI should continue to be evaluated when applying to a different setting or different target population [25]. Hence, the psychometric properties of the WAI were re-evaluated for the target population of this study. We first randomly sampled 30 records from the initial WAI for exploratory factor analysis to find the underlying factors and used the remaining records from initial WAI ($n=87$) and final WAI ($n=61$) for confirmatory factor analysis to determine a final latent structure. The new structure for the WAI (bond) subscale consists of four items (see Table 2 for items) with excellent model fit, $\chi^2(2)_{hv}=0.766$, $p=0.68$, CFI=0.99, TLI=0.98, RMSEA=0.07, and SRMR=0.02 and $\chi^2(2)_{parent}=3.20$, $p=0.202$, CFI=1.00, TLI=1.00, RMSEA<0.001, and SRMR=0.007. The reliability coefficient is high, $\alpha_{hv}=0.92$ and $\alpha_{parent}=0.92$. Table 2 displays the items and coefficients for the WAI (bond) subscale.

2.3. Analysis. We started the analysis by examining the concordance of each of the 12 WAI item scores provided by TIES participants and home visitors at both timepoints to

Maternal Substance Use	5	4	3	2	1	Score
Support Groups and Specialist Involvement	<input type="checkbox"/> Actively involved in 12 Step or other recovery support group (i.e. secured sponsor, regular attendance) OR has developed other network of recovery support.	<input type="checkbox"/> Seeking recovery support through service providers (i.e. participating in recovery support) OR actively involved with TIES Specialist and community resources.	<input type="checkbox"/> Receiving recovery support with TIES Specialist and/or receiving other regular education.	<input type="checkbox"/> Participates inconsistently in recovery support with TIES Specialist and/or receiving other sporadic education.	<input type="checkbox"/> Limited or no involvement/engagement with community or TIES Specialist for recovery.	
Parenting Skills	5	4	3	2	1	Score
Access of Resources and Services <input type="checkbox"/> N/A if none recommended.	<input type="checkbox"/> Parent consistently ensures child receives recommended development services when available OR child placed on wait list or child does not qualify for services	<input type="checkbox"/> With encouragement and assistance, parent follows through with recommended child development services OR is placed on wait list or does not qualify.	<input type="checkbox"/> With encouragement and assistance, parent explores recommended child development services.	<input type="checkbox"/> Parent acknowledges recommendations but does not explore or access recommended child development services.	<input type="checkbox"/> Parent does not follow through with any recommended services for child OR parent does not acknowledge need for developmental services as identified by professionals.	
Child Health	5	4	3	2	1	Score
Child Health Status (Health Insurance)	<input type="checkbox"/> Child has access to adequate private health insurance.	<input type="checkbox"/> Child has Medicaid, other health insurance, or access to free/reduced cost health care services.	<input type="checkbox"/> Application for Medicaid, other health insurance, or free/reduced cost health care services have been submitted on behalf of child.	<input type="checkbox"/> There is consideration or agreement to begin application process for Medicaid or other health insurance, or free/reduced cost health care services.	<input type="checkbox"/> Child does not have Medicaid or other health insurance, does not have access to free/reduced cost health care services, or has private health insurance with unaffordable copays.	
Maternal Health	5	4	3	2	1	Score
Access to Health Insurance	<input type="checkbox"/> Has access to adequate private health insurance.	<input type="checkbox"/> Has Medicaid or other affordable health insurance, OR reliable access to free/ reduced cost health care services.	<input type="checkbox"/> Has applied for Medicaid, other health insurance, OR can receive free/ reduced cost health care services.	<input type="checkbox"/> Is considering or has agreed to begin application process for Medicaid or other health insurance OR is applying for free/ reduced cost health care services.	<input type="checkbox"/> Does not have Medicaid or other health insurance OR does not have access to free health care services OR has private health insurance with unaffordable copays.	
Income Stability	5	4	3	2	1	Score
Family Income	<input type="checkbox"/> Stable ongoing income sufficient to meet basic needs and prepare for upcoming needs.	<input type="checkbox"/> Income sufficient to meet basic needs.	<input type="checkbox"/> Income sufficient to meet basic needs with public assistance, child support, or emergency assistance.	<input type="checkbox"/> Income from wages AND/OR public assistance/SSDI, but still cannot consistently meet basic needs.	<input type="checkbox"/> No steady income (i.e. SO pays everything but is unreliable, family provides income assistance but is unreliable, or income comes from illicit sources).	
Housing Stability	5	4	3	2	1	Score
Stability	<input type="checkbox"/> Live in independent, affordable, unsubsidized housing.	<input type="checkbox"/> Live in independent, affordable, subsidized housing	<input type="checkbox"/> Live in sufficient housing while pursuing more affordable housing OR long-term, supported transitional housing program.	<input type="checkbox"/> Live in temporary shelter (i.e., emergency shelter, treatment center, domestic violence shelter or time-limited transitional living) without prospects for more permanent housing OR with family/friends in overcrowded or inadequate housing OR with family/friends in temporary situation OR in temporary or clearly unaffordable housing.	<input type="checkbox"/> Live in structure not intended for habitation OR cannot access home (i.e., objection to visits; staff safety concerns) OR No consistent shelter OR whereabouts unknown.	

FIGURE 1: Sample subscale items from goal attainment scale rubric.

get an initial picture for how the relationship is described from both perspectives (Table 3). Next, we used multilevel models (MLMs) to account for the nested structure of the data generated by the TIES Program. With data collection timepoints nested within observations, a two-level multilevel model was used to estimate the impact that WAI (bond), time (the change in score from intake to discharge), and

demographic variables (maternal age, race, ethnicity, employment status, insurance status, marital status, educational attainment, number of children the mother has access to, and state of residence) had on the six goal scores. Time is the level 1 variable and TIES participants are the level 2 units. The dependent variables are the six goal scores. In the dataset used to estimate MLM, each TIES participant will have up to

TABLE 2: Re-evaluated WAI-bond items, factor loadings, and coefficients.

Working alliance inventory bond items	Home visitor ¹				Parent ²					
	λ	SE	p	σ^2	R^2	λ	SE	p	σ^2	R^2
5. I am confident in my ability to help the parent/I am confident in my HV's ability to help me	0.85	0.06	<0.001	0.28	0.72	0.89	0.07	<0.001	0.21	0.79
6. We are working toward mutually agreed upon goals	0.94	0.03	<0.001	0.11	0.89	0.95	0.03	<0.001	0.09	0.91
8. We agree/My HV and I agree on what is important for the parent to work on	0.98	0.01	<0.001	0.04	0.96	0.92	0.06	<0.001	0.15	0.85
12. The parent/HV believes the way we are working toward her/his goals is correct	0.87	0.09	<0.001	0.24	0.76	0.95	0.18	<0.001	0.58	0.42

Note. ¹ $\chi^2(2) = 0.766$, $p = 0.68$, CFI = 0.99, TLI = 0.98, RMSEA = 0.07, SRMR = 0.02. ² $\chi^2(2) = 3.20$, $p = 0.202$, CFI = 1.00, TLI = 1.00, RMSEA < 0.001, and SRMR = 0.01.

TABLE 3: Concordance of agreement between parent and home visitor WAI scores in percentage of total.

WAI items	1	2	3	4	5	6	7	8	9	10	11	12
<i>Difference in initial WAI scores in %</i>												
HV score is greater	7	0	0	0	0	0	0	0	0	0	0	0
	6	0	0	1	0	0	0	0	0	0	1	0
	5	1	1	0	3	0	0	0	0	0	5	0
	4	0	0	0	1	0	0	0	0	0	5	1
	3	1	2	0	2	0	0	1	1	0	3	0
	2	1	5	2	2	2	1	6	2	1	5	1
	1	11	14	8	3	2	8	15	6	5	10	8
Scores agree	0	30	28	54	18	29	34	69	33	53	28	33
Parent score is greater	1	35	20	16	35	45	33	2	36	19	17	31
	2	9	13	9	11	6	5	1	8	9	13	13
	3	6	8	4	13	10	10	1	6	5	4	6
	4	1	2	0	2	1	1	0	2	2	2	2
	5	1	1	0	2	0	1	0	0	0	1	0
	6	0	0	0	2	0	0	0	0	0	2	0
	7	0	0	0	0	0	0	0	0	0	0	0
<i>Difference in final WAI scores in %</i>												
HV score is greater	7	0	0	0	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0	0	1	0
	5	0	0	0	1	0	0	0	0	0	3	0
	4	1	1	1	0	0	0	0	0	0	1	1
	3	0	0	0	1	1	1	1	1	0	3	0
	2	4	3	1	0	1	0	6	1	3	3	3
	1	7	13	4	4	7	4	6	3	6	17	7
Scores agree	0	30	25	61	16	17	38	65	32	45	26	26
Parent score is greater	1	25	23	9	32	33	23	6	29	23	17	29
	2	13	9	6	16	14	10	3	10	7	9	9
	3	6	10	1	12	10	7	0	9	3	6	10
	4	0	3	3	1	1	1	0	1	0	1	1
	5	1	1	0	1	0	1	0	1	0	0	1
	6	0	0	0	1	1	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0	0	0	0

Note. HV = home visitor. Missing observations are excluded so columns may not sum to 100%.

two rows of data. The first row holds data for a TIES participant’s first IFSP scores and their first WAI scores (from both parent and home visitor perspectives), and the second row contains data for their last recorded IFSP score and their second WAI scores. Last recorded IFSP scores usually come from Time 5, but occasionally come from Time 4. If a TIES participant does not have a second WAI score, that participant will have only a single row of data. The main predictors were time and WAI (bond). Initial WAI (bond) scores were aligned with Time 1 goal scores, and final WAI (bond) scores with Time 5 goal scores in the data cleaning process.

Interaction terms between time and demographic variables were included where a likelihood ratio test indicated that the interaction terms resulted in a better fitting model. A random intercept for each TIES participant was included in each model estimated. The MLMs are estimated on the WAI-parent data and WAI-home visitor data separately, which allows us to see if the impact of relationship on goal attainment changes depending on the perspective of the WAI (bond) data: TIES participant or home visitor. Tables 4 and 5

show the MLMs output for time, WAI (bond), and significant coefficients. Data were cleaned and imported into SAS software, Version 9.4 for analysis [26].

3. Results

The evaluation of WAI score concordance between parents and home visitors showed that parents’ responses across most WAI items tended to be higher than those provided by home visitors (see Table 3). Scores provided by parents across 12 items tend to be higher than those provided by home visitors at both time points. While some items had more agreement than others, there was an overall bias toward higher parent scores across WAI items at both time points.

In multilevel models, when time was the fixed effect in the model, there were statistically significant positive changes in all goal areas except for income stability. Figure 2 presents a boxplot of goal attainment scores over five timepoints. The boxplots show an upward trend in each of the mean goal scores over time, though some goals (e.g.,

TABLE 4: Parameter estimates of six goals with model fit using WAI-home visitor data.

Parameter	β	SE	DF	t	p	LL	AIC	BIC
Maternal drug use								
Intercept	0.30	1.06	97	0.28	0.78	384.3	388.3	393.6
WAI (bond)	0.11	0.08	34	1.35	0.19			
Time	1.06	0.58	34	1.83	0.08			
Age	0.04	0.02	34	2.33	0.03			
Hispanic/Latino	-2.14	0.76	34	-2.81	0.01			
Kansas	-0.75	0.17	34	-4.56	<0.001			
Time * Hispanic/Latino	1.59	0.56	34	2.84	0.01			
Parenting skills								
Intercept	0.87	0.77	84	1.13	0.26	325.9	329.9	335.3
WAI (bond)	0.12	0.08	32	1.51	0.14			
Time	0.82	0.15	32	5.55	<0.001			
African American/Black	-0.54	0.20	32	-2.74	0.01			
Not single	-0.44	0.20	32	-2.15	0.04			
Child physical and mental health								
Intercept	0.47	0.71	79	0.66	0.51	297.4	301.4	306.8
WAI (bond)	0.21	0.07	34	2.88	0.01			
Time	0.63	0.13	34	4.83	<0.001			
Age	0.05	0.02	34	2.82	0.01			
Maternal physical and mental health								
Intercept	-0.59	0.95	96	-0.62	0.54	453.2	457.2	462.5
WAI (bond)	0.35	0.11	38	3.34	<0.01			
Time	0.50	0.20	38	2.51	0.02			
Kansas	-0.44	0.20	38	-2.20	0.03			
Income stability								
Intercept	0.72	1.05	97	0.68	0.50	376.8	380.8	386.1
WAI (bond)	0.13	0.08	34	1.62	0.11			
Time	1.19	0.59	34	2.00	0.05			
Unemployed	-1.81	0.57	34	-3.17	<0.01			
Insured	1.53	0.67	34	2.27	0.03			
HS diploma or above	-1.17	0.42	34	-2.77	0.01			
Time * insured	-1.16	0.48	34	-2.43	0.02			
Time * HS grad or more	0.98	0.31	34	3.12	<0.01			
Housing stability								
Intercept	1.18	0.73	96	1.61	0.11	376.0	380.0	385.4
WAI (bond)	0.08	0.07	40	1.14	0.26			
Time	0.93	0.13	40	7.23	<0.001			

Bold values = significant at 0.05 alpha level or lower.

maternal substance use) showed a plateau in mean score around Time 3. The magnitude of the impact of time in the TIES Program varied across the six goal areas but was generally consistent across models that include either the parent or home visitor WAI (bond) scores. The two exceptions to this generalization were maternal substance use and maternal physical and mental health; these two goals saw noticeably different estimates of the impact of time in the TIES Program depending on whether parent WAI (bond) scores or home visitor WAI (bond) scores were included in the MLM (see Figure 3). All coefficients for time in the TIES Program were positive and most were statistically significant, indicating that goal attainment scores do tend to increase throughout the TIES Program.

Higher WAI (bond) scores from the home visitor perspective are associated with higher scores on each of the six goal attainment scores, with those for child and maternal physical and mental health being statistically significant. Higher WAI (bond) scores from the parent perspective are associated with higher scores in all goal attainment areas

except one that for child physical and mental health. In this case, the impact of the WAI (bond) variable was found to be negative, though not statistically significant (see Figure 4). For the maternal substance use goal, a one unit increase in WAI (bond) was associated with a 0.11 and 0.09 unit increase in the goal attainment score from the home visitor and parent WAI data, respectively, although neither coefficient was statistically significant. For the parenting skills goal, a one unit increase in WAI (bond) from the home visitor perspective was associated with a 0.12 unit increase in mean score ($p=0.14$), while a one unit increase in WAI (bond) from the parent perspective was associated with a 0.17-point increase in mean score for this goal, though not significant ($p=0.25$). WAI (bond) had a statistically significant impact on the goals of child and maternal physical and mental health using the home visitor WAI data, with coefficients of 0.21 ($p=0.01$) and 0.35 ($p<0.001$), respectively, highlighting the importance of the relationship between participants and staff for these two health-related goals. The impact of WAI (bond) was positive on income

TABLE 5: Parameter estimates of six goals with model fit using WAI-parent data.

Parameter	β	SE	DF	t	p	LL	AIC	BIC
Maternal substance use								
Intercept	0.98	1.06	100	0.92	0.36	427.7	431.7	437.1
WAI (bond)	0.09	0.13	43	0.72	0.48			
Time	0.69	0.15	43	4.67	<0.001			
Maternal age	0.04	0.02	43	2.44	0.02			
African American/Black	-0.43	0.19	43	-2.22	0.03			
Kansas	-0.85	0.17	43	-4.96	<0.001			
Parenting skills								
Intercept	0.34	1.17	88	0.29	0.77	341.2	345.2	350.6
WAI (bond)	0.17	0.14	33	1.16	0.25			
Time	0.80	0.14	33	5.86	<0.001			
African American/Black	-0.56	0.20	33	-2.85	0.01			
Child physical and mental health								
Intercept	2.26	1.08	82	2.09	0.04	319.0	323.0	328.4
WAI (bond)	-0.07	0.13	35	-0.52	0.61			
Time	0.61	0.13	35	4.58	<0.001			
Maternal age	0.05	0.02	35	2.72	0.01			
Maternal physical and mental health								
Intercept	-1.51	1.61	99	-0.94	0.35	464.5	468.5	473.9
WAI (bond)	0.26	0.16	35	1.58	0.12			
Time	1.27	0.79	35	1.61	0.12			
Insured	2.59	0.91	35	2.85	0.01			
Location (Kansas)	-0.42	0.21	35	-2.04	0.05			
Time * insured	-1.49	0.62	35	-2.41	0.02			
Income stability								
Intercept	-0.61	1.21	100	-0.51	0.61	398.6	402.6	408.0
WAI (bond)	0.30	0.12	37	2.45	0.02			
Time	1.16	0.59	37	1.96	0.06			
Unemployed	-1.84	0.55	37	-3.32	<0.01			
Insured	1.62	0.68	37	2.39	0.02			
HS diploma or above	-1.24	0.41	37	-3.01	<0.01			
Time * insured	-1.31	0.46	37	-2.84	0.01			
Time * HS diploma or above	1.00	0.30	37	3.39	<0.01			
Housing stability								
Intercept	1.08	0.98	99	1.10	0.27	395.4	399.4	404.8
WAI (bond)	0.06	0.11	43	0.50	0.62			
Time	0.92	0.12	43	7.50	<0.001			

Bold values = significant at 0.05 alpha level or lower.

stability, with a coefficient of 0.13 ($p = 0.11$) from the home visitor perspective and a coefficient of 0.30 ($p = 0.02$) from the parent perspective. Additionally, the impact of WAI (bond) had its smallest impact on housing stability, with coefficients of 0.08 and 0.06 from the home visitor and parent WAI data, respectively, neither of which was statistically significant.

There were significant results related to the impact of WAI (bond) and demographic variables on the six goal areas (see Tables 4 and 5). For the maternal substance use goal, the mean score from intake to discharge was significantly impacted by maternal age, ethnicity, geographic location of residence, and race. Specifically, maternal substance use was moderated by maternal age ($\beta_{\text{hv}} = 0.04$, $p_{\text{hv}} = 0.03$ and $\beta_{\text{parent}} = 0.04$, $p_{\text{parent}} = 0.02$). The older a mother is, the more likely she is to show a reduction in substance use. African American/Black moms in the TIES Program ($\beta_{\text{parent}} = -0.43$, $p_{\text{parent}} = 0.03$) and moms who live in the Kansas zip codes ($\beta_{\text{hv}} = -0.75$, $p_{\text{hv}} < 0.001$; $\beta_{\text{parent}} = -0.85$, $p_{\text{parent}} < 0.001$) tend to score lower on this goal. Additionally, the interaction

term between ethnicity and time was significant, showing that Hispanic moms gained more growth over time in substance use reduction ($\beta_{\text{hv}} = 1.59$, $p_{\text{hv}} = 0.01$). The follow-up analysis indicated that Hispanic mothers had a lower baseline than non-Hispanic mothers, but they grew faster and gained more on this goal over time (see Figure 5(a)). The goal attainment in parenting skills was affected by time, race, and marital status. Participants in the TIES Program had a significant and consistent growth in parenting skills ($\beta_{\text{hv}} = 0.82$, $p_{\text{hv}} < 0.001$ and $\beta_{\text{parent}} = 0.80$, $p_{\text{parent}} < 0.001$) over time, regardless of their socioeconomic background. African American/Black moms in the program ($\beta_{\text{hv}} = -0.54$, $p_{\text{hv}} = 0.01$ and $\beta_{\text{parent}} = -0.56$, $p_{\text{parent}} = 0.01$) tend to score lower on this goal. In addition, participants who were not single at intake tend to score lower on this goal area ($\beta_{\text{hv}} = -0.44$, $p_{\text{hv}} = 0.04$).

In terms of the health-related goals, both the child physical and mental health goal and maternal physical and mental health goal, were significantly impacted by the working relationship between participants and home

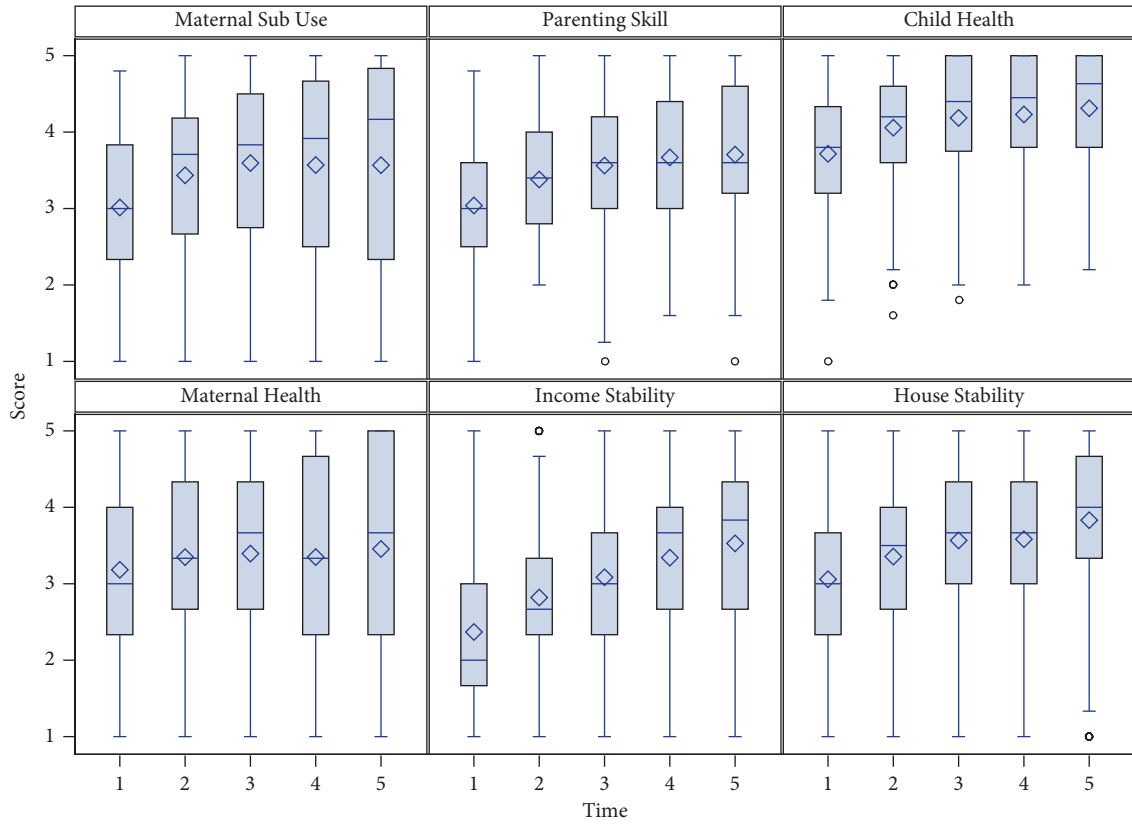


FIGURE 2: Boxplot of goal attainment progress over time.

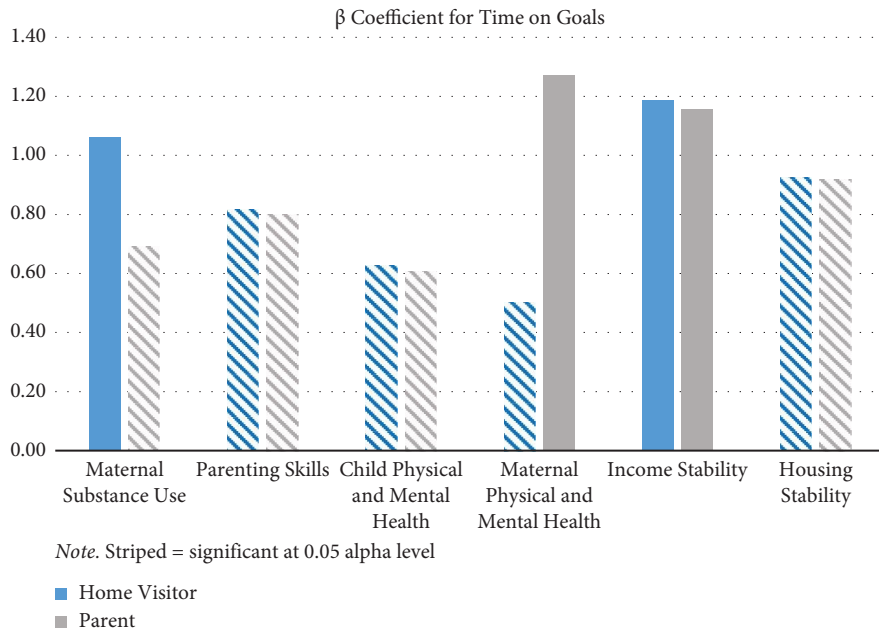


FIGURE 3: Beta coefficient for time on goal areas.

visitors, as measured by the WAI (bond) scale in this case. For child physical and mental health, goal attainment was affected by WAI (bond), time, and maternal age. Overall, children in the TIES Program had a significant and consistent improvement in their health goal ($\beta_{hv} = 0.63$,

$p_{hv} < 0.001$ and $\beta_{parent} = 0.61$, $p_{parent} < 0.001$). Importantly, WAI (bond) showed a significant predicting effect on child health ($\beta_{hv} = 0.21$, $p_{hv} = 0.01$). The stronger the relationship between the staff and the mothers was, the more improvement there was for child health. In addition, child

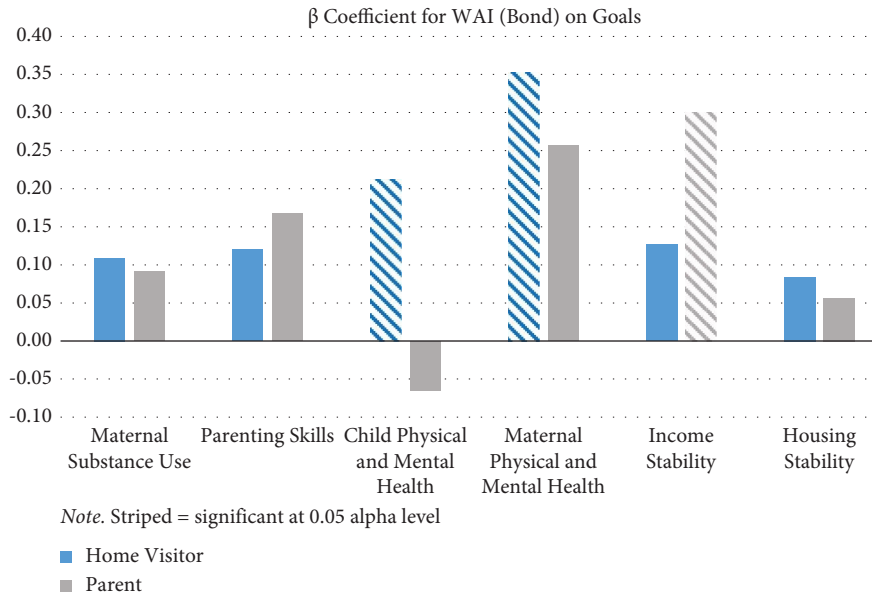


FIGURE 4: Beta coefficient for WAI (bond) on goal areas.

health was moderated by maternal age ($\beta_{hv} = 0.05, p_{hv} = 0.01$ and $\beta_{parent} = 0.05, p_{parent} = 0.01$), indicating that the older a mother is, the more likely she is to be able to address her child’s physical and mental health. On the other hand, growth in the maternal physical and mental health goal area was significantly impacted by WAI (bond), time, health insurance, and geographic location of residence. Overall, mothers in the TIES Program had significant improvement over time in their physical and mental health ($\beta_{hv} = 0.50, p_{hv} = 0.02$). Importantly, WAI (bond) also showed a significant predicting effect on maternal health ($\beta_{hv} = 0.35, p_{hv} < 0.01$). Participants who lived in the Kansas zip codes ($\beta_{hv} = -0.44, p_{hv} = 0.03$ and $\beta_{parent} = -0.42, p_{parent} = 0.05$) tended to score lower on this goal, compared to participants who lived in Missouri. Finally, mothers who came to the program with health insurance had a higher baseline but less growth over time in this goal ($\beta_{parent} = -1.49, p_{parent} = 0.02$) compared to mothers who did not have health insurance at intake (see Figure 5(b)). However, being insured, in general, is significantly associated with an improvement in maternal health ($\beta_{parent} = 2.59, p_{parent} = 0.01$).

Finally, income stability and housing stability were affected by interaction effects. The improvement in income stability over time was significantly impacted by WAI (bond), employment status, health insurance, and educational attainment. WAI (bond) had a significant predicting effect on income stability ($\beta_{parent} = 0.30, p_{parent} = 0.02$). The stronger the staff-participant relationship, the more improvement there was for income stability. Mothers who did not have a job ($\beta_{hv} = -1.81, p_{hv} < 0.01$ and $\beta_{parent} = -1.84, p_{parent} < 0.01$) tended to score lower on this goal. On the other hand, income was positively moderated by education ($\beta_{hv} = 0.98, p_{hv} < 0.01$ and $\beta_{parent} = 1.00, p_{parent} < 0.01$). Moms with more education were more likely to have stable income. Furthermore, mothers with health insurance had a higher baseline but less growth over time ($\beta_{hv} = -1.16,$

$p_{hv} = 0.02$ and $\beta_{parent} = -1.31, p_{parent} = 0.01$) compared to mothers without health insurance (see Figure 5(c)). However, being insured, in general, was significantly associated with improvement in income stability ($\beta_{hv} = 1.53, p_{hv} = 0.03$ and $\beta_{parent} = 1.62, p_{parent} = 0.02$). Housing stability was impacted by time, which indicated that participants in the TIES Program had a significant and consistent improvement in housing stability ($\beta_{hv} = 0.93, p_{hv} < 0.001$ and $\beta_{parent} = 0.92, p_{parent} < 0.001$) regardless of their socioeconomic status.

4. Discussion

When goal attainment scores were modeled over time for this study population, there were statistically significant improvements in all areas except for maternal physical and mental health. This is consistent with historical data analysis performed by the program’s third-party evaluator which has consistently indicated positive trends in goal attainment over time. The impact of parent-home visitor relationship, as assessed by the home visitor and parents, is significant on child physical and mental health, maternal physical and mental health, and income stability but is clearly meaningful to the other goal areas, in that all the goals are correlated. This suggests that the stronger the parent-home visitor relationship, the greater the improvement in goal scores from intake to discharge in general.

The home visitor assessment of the staff-participant relationship is a significant factor in goal attainment scores for child physical and mental health, and maternal physical and mental health while the parent assessment of the same relationship is a statistically significant factor for income stability. The magnitude of goal score changes overtime may seem small and incremental, but they represent meaningful, practical progression across goal areas: from having enough income to meet only basic needs to having enough income to plan for future needs and from

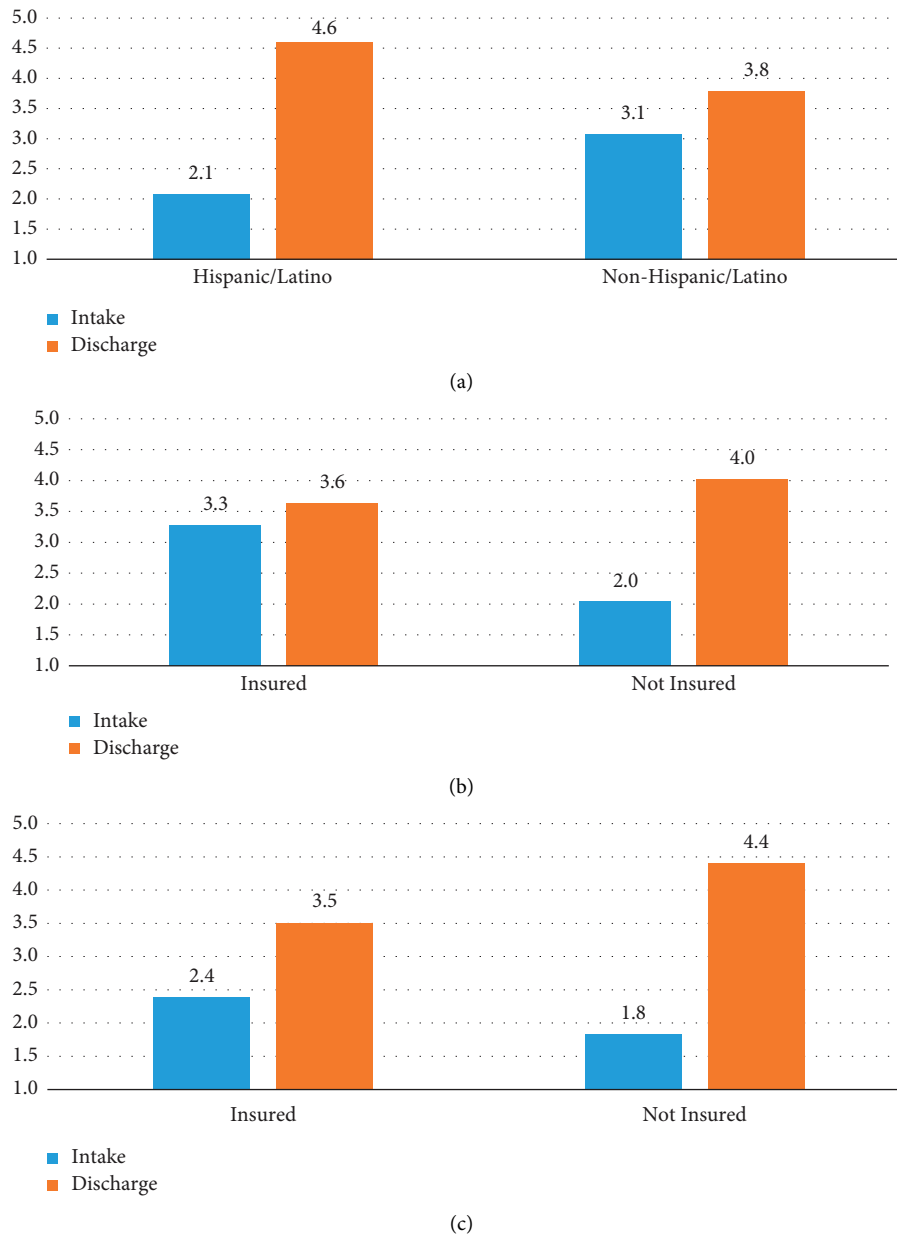


FIGURE 5: Illustration of growth trajectory for interaction terms. (a) Mean maternal substance use score by ethnicity and time. (b) Mean maternal health score by insurance status and time. (c) Mean income stability score by insurance status and time.

having no engagement with drug treatment/recovery support to sporadic participation in recovery support. These incremental changes are facilitated by the wraparound services provided by the TIES Program and supported by the relationship developed between participants and their home visitors.

4.1. Social Determinants of Health. In addition, goal attainment is also moderated by participants' characteristics, with some participants growing faster and greater in some goal areas than others. The average age of a mother in the TIES Program is 29 years old, and older mothers are more likely to show improvements in the goal areas of maternal

substance use and child physical and mental health. Participants' goal attainment progress is also affected by their racial/ethnic status. Even with a small sample size (35 out of 127), the African American/Black mothers in the program with a lower baseline in maternal substance use and parenting skills benefited significantly from the TIES Program as they were able to make significant growth over time, from 2.7 to 3.2 for maternal substance use and from 2.8 to 3.2 for parenting skills. Furthermore, Hispanic mothers benefited more than non-Hispanic mothers by being in the program; they started from a lower baseline at 2.1 for maternal substance use yet surpassed the non-Hispanic mothers over time and achieved a mean of 4.6 at discharge (see Figure 5(a)). Health insurance plays a role in maternal physical

and mental health and income stability. Participants who came to the program with health insurance did not have as much growth as those who started off without health insurance. This might be because participants lost Medicaid coverage after the perinatal period, which is particularly true for participants who live in a state where Medicaid has not been expanded. The improvement in maternal health for participants without insurance at intake might be associated with income status, as the income stability goal grew significantly for participants without insurance as well from intake to discharge. Or, it may be more related to securing insurance of any sort, public or private. If mothers either access Medicaid or secure employment income and employer-provided insurance, they are more able to access health care for themselves. When lack of insurance and other financial barriers are lessened, women are in a better position to address their own health care.

Housing stability also improved significantly over time but was not significantly affected by either staff-participant relationship perceptions or by participants' socioeconomic background. Housing stability, which includes assessment of the stability of the home environment, household composition, safety and sanitation, and family planning, is a complex goal area. Goal attainment in this area may be more influenced by family dynamics, community violence, and financial resources available to secure safe stable housing, than by a parent's relationship with the home visitor.

4.2. Implications to Services. In aggregate, participants in the TIES Program, regardless of their socioeconomic status, were able to make significant progress in all six goals over time though they faced significant challenges and limited resources, and many had experienced previous unsuccessful involvement with human service agencies. Although some participants achieved more in some goal areas than other participants, the relationship between family and home visitor was an important factor. Findings demonstrated that it is essential to meet families where they are, build a trusting relationship, clearly define family-centered goals, and check in regularly on progress. As families' desires and resources are validated, recorded, and used to develop understanding between family and home visitor, goals can be set, tracked, and advanced. Furthermore, growth is not only attributed to the relationship between staff and participants, but also by how well families can access related community resources. It is critical for programs to connect participants with available resources in the community, as well as collaborate with other services to meet the needs of families, and this is more efficiently accomplished when there is congruence and understanding between home visitors and families. Providing specialized training and targeting a special population can be helpful to developing home visitors' skills and assessing the working alliance of workers and families helps identify the value of building partnerships between families and home visitors.

4.3. Strengths, Limitations, and Future Research. This study adds to the current literature on home visiting by examining how perceptions of the therapeutic relationship between

home visitors and participants affect mutually assessed program goal attainment using a validated tool. Additionally, this study incorporates analysis of both the home visitor's and the participant's assessment of the working relationship over time. The administration of the WAI to both home visitors and participants is a strength of this study and a positive program practice. Other study strengths include the fact that the WAI is administered by a third-party evaluator and remains confidential. Neither home visitors nor participants see individual responses to the WAI, and this hopefully promotes more accurate assessment. WAI scores endorsed by participants tended toward the high end of the assessment scale, which may be indicative of a response bias whereby the participants are hoping to please the evaluator or program staff. Families may also have little experience with long-term relationships with professionals built on their strengths and their goals and may rate the relationship with little comparative data. These overall positive responses with little variability also make it difficult to detect differences for purposes of program evaluation and statistical modeling. This may be addressed in future research via qualitative interviews to supplement the WAI administration.

Additional study limitations include incomplete data collection for all tools across all time points, which can reduce effective sample size and increase missing data fields in the mixed models. The effective sample size of WAI administrations was reduced significantly from the initial administration to the final administration. Additionally, many participants included in the analysis lack all five timepoints of the goal attainment scale. Missing assessments may be due to the parent being lost to follow-up, inability to schedule a visit with the parent and the third-party evaluator to administer the tools, or staff oversight. Assessments may also be delayed or skipped if the home visitor and participant need to focus on crisis management or other important issues during visits, missing scheduled assessments.

This study focuses primarily on the impact of relationship on outcomes, rather than service delivery process. Future research should investigate how the perception of the staff-participant relationship affects how staff work with a family, leading to varying program outcomes (e.g., program completion rate). A qualitative component could also be added to further explore families' assessment of individual characteristics of the relationship and their effects on families' goal attainment progress and program outcomes. Additionally, an alumni study is currently underway to determine whether gains in the program's six goal areas are maintained after program completion.

5. Conclusions

This study demonstrated the importance of the relationship between families and home visitors beyond its relationship to program engagement, which has previously been explored by other studies. The perceived quality of the therapeutic relationship between TIES home visitors and parent participants affected goal attainment in the six domains of maternal substance use, parenting skills, child mental and

physical health, maternal mental and physical health, income stability, and housing stability. While the parent assessment of the therapeutic relationship demonstrated a ceiling effect with little variability and only showed a statistically significant effect on income stability, home visitor assessment of the relationship was shown to have a statistically significant effect on goal attainment in child physical and mental health and maternal physical and mental health. Relationships that build trust, promote bonding, and have clearly defined, family-centered goals can support positive program outcomes. This is a rich area for further exploration in home-based family support programs.

Data Availability

The data from this study are not publicly available as they contain information that could compromise participant privacy.

Additional Points

Significance. Home visiting models seek to address the risk factors known to influence the caregiver-child relationship including history of trauma, low academic achievement, low income, limited support networks, and maternal depression. Research indicates that home visitors feel ill-equipped to address the complex needs of families affected by maternal alcohol or other drug use, which may lead to suboptimal outcomes around parenting and attachment, connection to community resources, and prevention of child maltreatment as well as overall program retention. This article presents data from The Team for Infants Exposed to Substance use (TIES) Program, a home-based family support program exclusively serving families affected by maternal substance use and demonstrates how a focus on the therapeutic relationship between staff and participants supports goal attainment and positive program outcomes.

Disclosure

The content is of the authors and does not necessarily represent the official views of, or an endorsement by HRSA, HHS, the U.S. Government, local funders, The Children's Mercy Hospital, the Curators of the University of Missouri, or the University of Missouri-Kansas City.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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