

Trauma-Informed Financial Empowerment Programming Improves Food Security Among Families With Young Children

Pam Phojanakong, PhD, MPH¹; Seth Welles, PhD¹; Jerome Dugan, PhD²; Layla Booshehri, PhD²; Emily Brown Weida, MSW³; Mariana Chilton, PhD, MPH³

ABSTRACT

Objective: To determine how trauma-informed programming affects household food insecurity (HFI) over 12 months.

Design: Change was assessed in HFI from baseline to 12 months in response to a single-arm cohort intervention. Measures were taken at baseline and in every quarter. Two participant groups were compared: participation in ≥ 4 sessions (full participation) vs participation in < 4 sessions (low/no participation).

Setting: Community-based setting in Philadelphia, Pennsylvania.

Participants: A total of 372 parents of children aged < 6 years, participating in *Temporary Assistance for Needy Families* and the *Supplemental Nutrition Assistance Program*, recruited from county assistance offices and community-based settings.

Intervention: Trauma-informed programming incorporates healing-centered approaches to address previous exposures to trauma. Sixteen sessions addressed emotional management, social and family dynamics related to violence exposure and childhood adversity, and financial skills.

Main Outcome Measures: Household food insecurity, as defined by the US Department of Agriculture Household Food Security Survey Module.

Analysis: Mixed-effects logistic regression models were used to compare groups from baseline to 12 months, controlling for adverse childhood experiences, depression, and public assistance.

Results: Those with full participation had 55% lower odds of facing HFI compared with the low/no participation group (adjusted odds ratio = 0.45; 95% confidence interval, 0.22–0.90).

Conclusions and Implications: Trauma-informed programming can reduce the odds of HFI and may reduce trauma-related symptoms associated with depression and poverty.

Key Words: food insecurity, food security, depression, adverse childhood experiences, trauma-informed (*J Nutr Educ Behav.* 2020; 52:465–473.)

Accepted February 13, 2020.

INTRODUCTION

Food insecurity, or the lack of access to enough food for an active and healthy life because of limited economic resources, is a major public

health challenge associated with negative health outcomes such as higher rates of hospitalization and developmental risk among infants, children, and adolescents,¹ as well as higher rates of depression and chronic

disease among adults.^{2,3} It is well established that adverse childhood experiences (ACEs), which include exposure to emotional and physical neglect, childhood sexual abuse, and household-level adversity, such as witnessing domestic violence or having a parent in prison, are associated with household food insecurity (HFI) during adulthood.^{4–8} These associations are driven by ACEs' strong links with depressive symptoms, suicide, and isolation, which are also correlated with unemployment, underemployment, and HFI.⁹ Furthermore, HFI is associated with other mental health issues, such as social isolation and suicidal ideation, which make maintaining stable employment difficult.^{3,9} Although the directionality between depression and

¹Department of Epidemiology, Dornsife School of Public Health, Drexel University, Philadelphia, PA

²Department of Health Services, School of Public Health, University of Washington, Seattle, WA

³Department of Health Management and Policy, Dornsife School of Public Health, Drexel University, Philadelphia, PA

Conflict of Interest Disclosure: The authors have not stated any conflicts of interest.

Address for /correspondence: Mariana Chilton, PhD, MPH, Department of Health Management and Policy, Dornsife School of Public Health, 3600 Market St, 7th fl, Philadelphia, PA 19104; E-mail: mmc33@drexel.edu

© 2020 The Authors. Published by Elsevier Inc. on behalf of Society for Nutrition Education and Behavior. This is an open access article under the CC BY-NC-ND license.

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

<https://doi.org/10.1016/j.jneb.2020.02.008>

food insecurity is challenging to disentangle, it is clear that depression can affect a person's ability to find and maintain employment or limit one's ability to be employed and earn an income, and therefore pay for food.¹⁰ Conversely, food insecurity can also affect a person's mental health, because it is associated with anxiety about money and food adequacy.¹¹ In addition, nutritional deprivation or consumption of low-quality food is associated with depressive symptoms.¹² Despite knowledge of underlying social, physical, and mental health issues associated with food insecurity, interventions to address food insecurity have primarily focused on improving access to food and have been ignoring behavioral and socioemotional antecedents such as depression, social isolation, and ACEs as targets for intervention.¹³

This study sought to test the effectiveness of a trauma-informed intervention to reduce HFI, called the *Building Wealth and Health Network* (the Network). The Network was designed to improve health and economic security among parents of children under the age of 6 years, participating in public assistance programs. The Network consisted of 16 financial empowerment classes held once weekly. The purpose of this study was to assess the impact of participation in trauma-informed programming on HFI. Because exposure to violence and adversity are likely upstream risk factors leading to HFI,

it was hypothesized that a trauma-informed peer-support curriculum would positively affect food security vis-à-vis addressing depression, poor physical health, and unemployment (Figure). Each of these factors operates through a mediated pathway and has been shown to be associated with food insecurity: employment affects income and one's ability to buy food, physical health affects a person's ability to earn income and to get high-quality food because of cost or mobility/transportation problems, and depression affects a person's ability to earn money and/or to get high-quality food. The Network's combined curriculum seeks to improve financial practices and increase opportunities for healthy social interaction and bonding, which can reduce depression.¹⁴ This, in turn, promotes physical health and employment, and can lead to reduced HFI.¹⁵ Established support programs such as *Temporary Assistance for Needy Families* (TANF), *Supplemental Nutrition Assistance Program* (SNAP), and *Special Supplemental Nutrition Program for Women, Infants, and Children* (WIC) also reduce HFI.^{16,17}

METHODS

Study Design

The Network started as a randomized controlled trial pilot study (NCT02577705) in 2014–2015 with 3 treatment groups: standard TANF

programming (control), 7-month financial education programming only (intervention arm 1), and a combined 7-month financial empowerment and trauma-informed peer support (intervention arm 2). Results demonstrated that the combined curriculum improved depressive symptoms and economic security.¹⁸ In addition, focus groups with Network participants at the end of the Network randomized controlled trial program elicited advice to create a shorter program. Based on these results, the program was relaunched in October 2015 as a single-arm, prospective study of a 16-week peer education program (the Network Phase II). The sessions integrated the evidence-based Sanctuary Model of trauma-informed approach to organizational and group processes to prevent re-traumatization and promote healing, recovery, and behavior change that can lead to personal and group transformation.¹⁹ The Sanctuary Model uses a psychoeducation approach that helps people learn how exposure to violence can create trauma-related symptoms such as hypervigilance, loss of trust and emotional control, sleep disturbance, anxiety, and dissociation that can limit employment opportunities, and potentially lead to depression, alcoholism, and drug addiction. In addition to the curriculum helping people to learn about trauma responses that are normal and protective during traumatic events (but can create problems when the violence is no longer taking place),

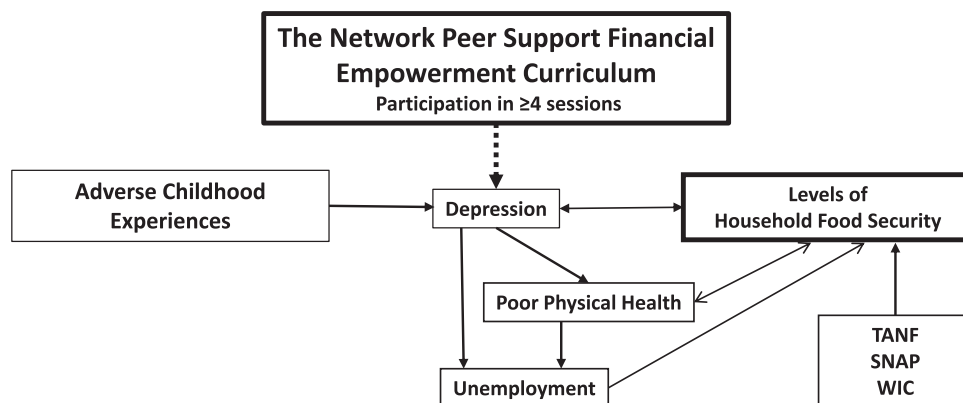


Figure. The *Building Wealth and Health Network* mechanism. Solid lines represent proposed pathway to household food security; dotted lines represent the Network intervention pathway. SNAP indicates *Supplemental Nutrition Assistance Program*; TANF, *Temporary Assistance for Needy Families*; WIC, *Special Supplemental Nutrition Program for Women, Infants, and Children*.

it also helps participants to acknowledge, understand, and practice new ways of building relationships, managing emotions, imagining a future, and practicing self-care. The peer-support tool focuses on taking care of safety, emotional management, loss and letting go, and developing a sense of future). Combined into these group resource-sharing experiences were learning modules on financial education that included strategies for banking, improving credit scores, reducing debt, and increasing income. The curriculum was delivered in 3-hour interactive sessions once a week for 16 weeks in an adult-based peer-support model. The empowerment-focused curriculum emphasized sharing of resources, ideas, and experiences among the group, rather than relying on a coach to teach the curriculum, and dialogues were fostered to strengthen social support.²⁰ The approach of taking care of safety, emotional management, loss and letting go, and developing a sense of future helps individuals navigate struggles associated with exposure to violence and related mental health challenges, as well as finances, employment, family, and community resources. In addition to learning money management techniques and problem-solving skills, members shared their knowledge, experience, and support with each other. The curriculum did not specifically focus on management of food purchases or nutrition education. The curriculum structure of the sessions was uniform throughout, yet timing and some content were adapted to respond to each cohort's interests, experiences, and needs. Two coaches facilitated the curriculum in a peer group, trauma-informed empowerment education format. A trauma-informed approach uses a culture of safety and focuses on healing by realizing, recognizing, and responding to how exposure to trauma shapes behavior, decision-making, and interpersonal relationships.²¹ Coaches were trained in the Sanctuary Model. One coach had prior experience providing financial education, whereas the other had master's level social work training.

Participants in the Network are referred to as members. At baseline

and follow-up, members reported on their health and economic well-being, including banking, employment, and household food security using audio computer-assisted self-interviews. Members who participated in ≥ 4 sessions were considered the full participation group, whereas those who agreed to participate and complete surveys but attended < 4 sessions constituted the low/no participation group. The attendance cutoff of 4 sessions was chosen because ≥ 4 sessions allowed members to establish engagement with the curriculum, develop consistent relationships with coaches and other members, and open a savings account representing full exposure to the intervention (financial and behavioral components). The Network helped establish credit union accounts for members and was prepared to match member savings 1:1 up to \$20/mo for a year. Written informed consent was obtained and the Drexel University Institutional Review Board approved this study.

Participants

Members were eligible if they were (1) a primary caregiver of a child aged < 6 ; (2) able to speak English; (3) self-reported participants in at least 1 public assistance program, including TANF, SNAP, WIC, Medicaid, or housing subsidies (Section 8/Housing Choice, or living in a Philadelphia Housing Authority home); and (4) a Philadelphia resident. Exposure to trauma was not part of the eligibility criteria, although high rates of ACEs and exposure to violence were prevalent across the study population.²⁰ Members were recruited in person by research assistants in 1 of 2 ways: (1) in 3 of the state's local county assistance offices at the time of TANF renewal or newly accepted application ($n = 256$), or (2) through flyers and orientations at community centers and child care centers ($n = 116$). Recruitment occurred 1 week before the start of sessions and continued up through the third week of sessions. Each cohort was composed of 25–35 members, with 10–15 members attending weekly sessions on average. Transportation costs for participation and child care support

were provided by the TANF program for those recruited from county assistance offices. Those recruited in community settings received transportation passes for participation. Members were enrolled from October 2015 to May 2017 and observed for a year, with the last cohort finishing in June 2018. Surveys were completed at baseline and 3-month intervals (a total of 5 surveys). Across 11 cohorts, 372 individuals consented to participate in the program and completed a baseline survey. At month 12, 208 of the 372 participants completed the full 12-month follow-up survey. To see sustained post-curricular changes in food insecurity, depression, and health status, participants provided information over the course of 12 months.

Measures

Household food insecurity within the last 30 days was assessed using the validated 18-item Household Food Security Survey Module.²² Accordingly, participants' household food security was categorized as high, marginal, low, or very low, as a function of self-reported access to food and diet quality. For greater statistical power, participants were further classified as food secure, which includes high and marginal food security, indicating little or no food access problems, and food insecure, which includes low and very low food security, indicating problems ranging from worry that they would run out of food before there was money to buy more, to reduced diet quality, to reduced food intake and disrupted eating patterns.

The ACEs measure is a retrospective 10-question survey regarding experiences before the age of 18 years, including physical, emotional, and sexual abuse; physical and emotional neglect; and household dysfunction, including loss of a parent through separation or divorce, exposure to domestic violence and substance abuse, mental illness, and incarceration of a household member.²³ The ACEs scale measure has high internal consistency, construct validity, and strong correlation with health and childhood trauma.²⁴ A cumulative score was calculated for each member on the basis

of the number of ACEs reported (0–10 possible ACEs), each corresponding to 1 point. In keeping with the literature on the differential impact of ACEs on health outcomes, cumulative ACEs scores were categorized into 3 levels: 0, 1–3, and ≥ 4 .²⁵

Depressive symptoms, including depressed mood, feelings of guilt, worthlessness, helplessness, hopelessness, and sleep disturbance, were measured with the Center for Epidemiological Studies–Revised Depression Scale 10 (CES-D-10), a 10-item screening tool that has been validated for identifying individuals at risk for clinical depression. This scale previously demonstrated good sensitivity and specificity, as well as high internal consistency.²⁶ The CES-D-10 measures the frequencies of depressive symptoms over the past week: 0 = rarely or none of the time, 1 = some of the time (1–2 days), 2 = occasionally or a moderate amount of the time (3–4 days), and 3 = most or all the time (5–7 days). Accordingly, the range of scores is 0–30 points; the cut point of ≥ 10 indicates depression.²⁷

Caregiver self-rated physical health, a known confounder in the association of ACEs with depression and food insecurity, was assessed using standard validated questions adapted from the National Health and Nutrition Examination Survey.²⁸ Responses were dichotomized to excellent or good vs fair or poor. In addition to physical health, program satisfaction was considered a variable that could affect the relationship between program participation and food insecurity. To account for the possibility that members who were more satisfied with the program might be more likely to attend sessions and adhere to the session schedule, a program satisfaction score was included in the models by summing the responses to 7 questions developed internally to evaluate satisfaction with the behavioral health and financial sessions, coaches, and peer-support group at the 3-month follow-up survey, shortly after program sessions were completed. Each question was scored on a 5-point Likert scale (ranging from 1 = strongly agree to 5 = strongly disagree). The possible scores ranged from 7 to 35, with lower scores representing a high degree of program

satisfaction and higher scores representing a low degree of satisfaction.

Savings accounts were managed through a credit union with multiple branches. Although members could make weekly deposits with coaches and credit union representatives on-site and at any automated teller machine, deposits and withdrawals from the accounts were irregular. Monthly savings balances averaged $< \$15$ with large SDs. Therefore, the wide variability in savings amounts and the timing of deposits and withdrawals were not considered for this analysis.

Statistical Methods

Mann–Whitney *U* tests (for continuous variables) and Pearson chi-square tests for independence (for categorical variables) were used to evaluate differences in demographics between members in the full (≥ 4 sessions) and low/no (0–3 sessions) participation groups at baseline, as well as to identify potential confounders in the relationship between program participation and HFI. To evaluate the effectiveness of the curriculum in reducing HFI, self-reported levels of HFI through 12 months after program initiation were compared between 2 groups of participants: those with full participation in the curriculum (≥ 4 sessions) and those with low/no participation (0–3 sessions). More specifically, to model the effect of program attendance on HFI over time, separate bivariate mixed-effects logistic regression models with HFI (food secure vs food insecure) as the outcome were first run for program attendance (full vs low/no participation); ACE category (0, 1–3, or ≥ 4 ACEs); level of depressive symptoms, an indicator variable for time from enrollment (eg, 1 = baseline, 2 = 3 months, 3 = 6 months, etc); and program satisfaction, as well as for the presence of a partner in the home, educational attainment, age, race/ethnicity, employment, and receipt of public assistance (using an indicator variable for receipt of TANF, SNAP, and WIC). Mixed-effects models were chosen to account for the longitudinal nature of the study, allowing for variation in HFI both between and within individuals (owing to repeated

measures). In addition, 2 more specifications were considered with different combinations of covariates: a fully specified model with a hypothesized set of covariates and a parsimonious model derived from the full model using covariates significant at $\alpha = 0.10$.

Two versions of the models were fit: preliminary versions based on the 208 members with complete food security data and the presented versions based on all 372 members with missing values imputed using the last and next method, a nonrandom imputation procedure that assigns the average of the member's last known and next known observations to missing values.²⁹ Compared with leading imputation methods, the last and next method was shown to be superior in both estimating missing values without biasing observations toward better health and preserving the variance of the true values.²⁹ SAS software (version 9.4, SAS Institute, Inc, Cary, NC, 2013) was used. Results were considered statistically significant at $\alpha = 0.05$ unless otherwise noted.

RESULTS

The overall survey attrition rate among members was 44%. Among members recruited from the county assistance offices, the attrition rate was 48% (123 of 256), and in the community, it was 35% (41 of 116). Baseline characteristics of members who completed surveys through the 12-month period were similar to those who did not complete the surveys, with a few exceptions. Among those who completed surveys through the 12-month period, there were lower percentages of members who were recruited at the county assistance offices and who received TANF. There were also higher percentages of members who had a checking account and members participating in ≥ 4 sessions (results not shown). A comparison of effect estimates between the models using imputed and nonimputed data showed no significant differences, except for receipt of public benefits, which was associated with greater odds of HFI in the model using imputed data. Because effect estimates were similar for participation (the effect of interest), results presented in

this study were based on models using imputed data. This allowed for greater precision in model estimates, incorporating data from all 372 participants.

Table 1 shows member characteristics. Mean (SD) age of members at baseline was 28.0 years (11.4 years). On average, members were highly satisfied with the program. The mean program satisfaction scores (based on Likert scales on level of agreement ranged from highly satisfied on all components [7 points] to not satisfied [35 points]) measured at 3 months were 9.0 (4.2) points for all members, 9.7 (4.5) points for full participation members, and 8.6 (4.0) points for low participation members (Mann–Whitney *U* test; *P* = .08). There were no significant differences between full participation and low participation groups with respect to demographic characteristics and current enrollment in TANF, SNAP, and WIC. There were also no significant differences between groups in food security status, employment, bank accounts, self-rated physical health, and depressive symptoms at baseline. Among the low/no participation group, the distribution of demographic, economic, food security, and health characteristics was not significantly different between members who attended 1–3 sessions and those who never attended sessions, with 2 exceptions—those with low participation had higher percentages of WIC receipt and recruitment from county assistance offices compared with those with no participation (results not shown).

Compared with the low/no participation group, those with full participation had significantly reduced odds of HFI after 12 months. In bivariate models, odds of HFI were 60% lower in the full participation group, compared with the low/no participation group (Table 2). Employment status (employed vs unemployed) and time from enrollment (considered in 3-month intervals) were also associated with reduced odds of HFI (odds ratios [OR] = 0.65; 95% confidence interval [CI], 0.64–0.91; and OR = 0.75; CI, 0.68–0.81, respectively). Increased depressive symptoms (a unit increase in CES-D-10 scores) were associated with increased odds of HFI (OR = 1.11; CI, 1.08–1.14), as were receipt of public

assistance benefits and program satisfaction (OR = 1.55; CI, 1.15–2.10; and OR = 1.08; CI, 1.01–1.16, respectively). In the full multiple regression model using imputed data, compared with those with low/no participation, high program participation was not significantly associated with reduced odds of HFI (model 2: adjusted OR [AOR] = 0.50; CI, 0.21–1.20), although increased depressive symptoms and time from enrollment were associated with increased odds of HFI (AOR = 1.13; CI, 1.08–1.19; and AOR = 5.97; CI, 3.02–11.17, respectively). In the parsimonious model of imputed data, full program participation significantly reduced HFI by 55% (model 3: AOR = 0.45; CI, 0.22–0.90). As seen in the full model, among the full sample, without regard to level of participation, increased depressive symptoms and time from enrollment were associated with increased odds of HFI in the parsimonious model (AOR = 1.16; CI, 1.11–1.21; and AOR = 5.38; CI, 3.08–9.39, respectively).

DISCUSSION

This study sought to test the effectiveness of the Network, a trauma-informed intervention designed to improve health and economic security among parents participating in public assistance programs, in reducing HFI.

Broadening goals of public assistance to promote health and well-being may have wide-reaching and long-lasting population health benefits.

The authors believed that the construction of the comparison groups (full participation vs low or no participation) was appropriate for the analysis because there were negligible differences between the low to no participation group. These differences (higher WIC participation and higher recruitment from the county assistance offices among low participators compared with nonparticipants) were due likely to state-sanctioned

practices of moving TANF recipients into jobs quickly or diverting them from TANF participation³⁰ and therefore from the Network program. Conversely, WIC participants are required to keep their appointments at WIC offices to maintain their benefits, which may account for higher WIC participation in this group. In addition, because the Network was built especially for those with higher exposure to adversity, people who sought connection with others on emotional challenges may have been more likely to participate. The effect of participation in the full model may be statistically insignificant owing to overadjustment for covariates. It is possible that the number of considered covariates may have obscured the true effects of the covariates of interest, biasing the results toward the null.³¹ The parsimonious model rectified the overadjustment.

Results from this study demonstrate that participation in the Network's trauma-informed financial empowerment curriculum dramatically reduced HFI, independent of participation in key public assistance programs and employment status. Moreover, the effect of program attendance was sustained over time well past the initial intervention and persisted despite members' depressive symptoms and ACEs. Results suggest that the reduction in odds of HFI was due to trauma-informed curricular components that address the underlying depression that exacerbates HFI. Moreover, the peer group format likely helped to reduce isolation associated with both HFI and depression. Peer group learning has been especially effective for people with traumatic experiences and shown to reduce depression among those with ACEs.¹⁴ This is consistent with other TANF intervention studies in which improving mental health was shown to improve employment and economic outcomes, although such interventions relied on diagnosis or self-report of chronic disease and the interventions were not group-oriented but rather relied on one-on-one interactions with trained mental health professionals or nurses.¹⁵ The Network's approach was different from other interventions focused on mental health and adversity in that

Table 1. Baseline Characteristics of *Building Wealth and Health Network* (the Network) Participants, by Level of Participation, Network Phase II, 2015–2017^a

Variable	Total (n = 372)	Low/No Participation Members ^b (n = 183)	High Participation Members ^b (n = 189)	P ^c
Demographics				
Caregiver age, y (mean [SD])	28.0 (11.4)	29.2 (8.4)	26.9 (13.5)	.05
Children in household, n (mean [SD])	2.1 (1.3)	2.2 (1.4)	2.0 (1.2)	.28
Gender				.22
Male	5.1 (19)	5.5 (10)	4.8 (9)	
Female	94.1 (349)	94.5 (172)	93.7 (177)	
Race/ethnicity				.49
Black	91.1 (339)	91.8 (168)	90.5 (171)	
White	2.4 (9)	1.6 (3)	3.2 (6)	
Hispanic	3.5 (13)	4.4 (8)	2.7 (5)	
Other	3.0 (11)	2.2 (4)	3.7 (7)	
Partner in home	21.3 (79)	20.3 (42)	21.3 (42)	.40
Sexual orientation				.36
Heterosexual	85.2 (316)	86.3 (157)	84.1 (159)	
Gay or lesbian	2.4 (5)	2.8 (5)	4.2 (8)	
Bisexual	9.6 (20)	6.6 (12)	8.5 (16)	
Education				.68
Some high school	25.3 (94)	27.5 (50)	23.3 (44)	
High school or General Educational Development diploma	46.1 (171)	44.0 (80)	48.2 (91)	
Some college	24.5 (91)	24.7 (45)	24.3 (46)	
College or more	3.6 (7)	4.2 (8)	4.0 (15)	
Recruitment site				.92
County Assistance Office	69.5 (258)	69.8 (131)	69.3 (131)	
Community	30.5 (113)	30.2 (55)	30.7 (58)	
Economic well-being				
Checking account	36.9 (137)	39.0 (71)	34.9 (66)	.46
Savings account	26.7 (99)	30.2 (55)	23.3 (44)	.34
Currently, employed	16.7 (64)	15.9 (29)	18.6 (35)	.50
Receive <i>Temporary Assistance for Needy Families</i>	77.0 (267)	78.0 (131)	76.0 (136)	.66
Receive <i>Supplemental Nutrition Assistance Program</i>	96.8 (358)	96.2 (176)	97.3 (182)	.53
Receive <i>Special Supplemental Nutrition Program for Women, Infants, and Children</i>	92.7 (343)	91.8 (168)	93.6 (175)	.51
Food security				.79
High	30.2 (113)	28.0 (51)	32.3 (61)	
Marginal	16.7 (62)	17.0 (31)	16.4 (31)	
Low	24.8 (92)	24.7 (45)	24.9 (47)	
Very low	28.3 (105)	30.2 (55)	26.5 (50)	
Health status				
Self-rated physical health				.65
Excellent or good	60.1 (223)	58.2 (106)	61.9 (117)	
Fair or poor	39.9 (148)	41.8 (76)	38.1 (72)	
Depressive symptoms ^d	56.2 (209)	59.0 (108)	48.3 (101)	.28
Adverse childhood experiences				.60
None	27.0 (100)	28.0 (51)	25.9 (49)	
1–3	37.7 (140)	35.2 (64)	40.2 (76)	
≥ 4	35.3 (131)	36.8 (67)	33.9 (64)	
Program satisfaction score (mean [SD]) ^e	9.0 (4.2)	9.7 (4.5)	8.6 (4.0)	.08

^aValues are % (n) unless otherwise noted; ^bParticipants who attended ≥4 sessions were considered the high participation group, whereas those who attended <4 sessions constituted the low/no participation group; ^cTested by Pearson chi-square tests for independence in which values are % (n), otherwise Mann–Whitney *U* test was used; ^dPresence of significant depressive symptoms, indicated by a score of ≥10 on the Center for Epidemiological Studies–Revised Depression Scale 10, with scores ranging from 0 to 30; ^eProgram satisfaction score was measured at 3-mo survey, near completion of classes.

Table 2. Association of Full Program Participation With Food Insecurity Over 12 Mo, Network Phase II, 2015–2017 (n = 372)

Fixed Effect ^c	Bivariate Models ^a		Full Multiple Regression Model ^a		Parsimonious Multiple Regression Model ^{a,b}	
	OR	95% CI	OR	95% CI	OR	95% CI
Full vs low/no participation	0.40	(0.24–0.66)	<i>0.50</i>	<i>(0.21–1.20)</i>	0.45	(0.22–0.90)
Adverse childhood experiences	<i>1.28</i>	<i>(0.93–1.77)</i>	<i>1.38</i>	<i>(0.82–2.32)</i>		
Depressive symptoms	1.11	(1.08–1.14)	1.13	(1.08–1.19)	1.16	(1.11–1.21)
Partner in home	<i>0.93</i>	<i>(0.76–1.15)</i>	<i>0.84</i>	<i>(0.63–1.11)</i>		
Education	<i>0.84</i>	<i>(0.62–1.15)</i>	<i>0.88</i>	<i>(0.56–1.41)</i>		
Age	<i>0.99</i>	<i>(0.89–1.11)</i>	<i>1.18</i>	<i>(0.99–1.40)</i>	<i>1.15</i>	<i>(0.97–1.36)</i>
Race/ethnicity	<i>1.11</i>	<i>(0.90–1.37)</i>	<i>1.13</i>	<i>(0.85–1.50)</i>		
Employment status	0.65	(0.64–0.91)	<i>0.80</i>	<i>(0.41–1.58)</i>		
Public benefits	1.55	(1.15–2.10)	<i>1.40</i>	<i>(0.90–2.20)</i>	<i>1.35</i>	<i>(0.92–2.00)</i>
Time from enrollment	0.75	(0.68–0.82)	5.97	(3.20–11.17)	5.38	(3.08–9.39)
Program satisfaction	1.08	(1.01–1.16)	<i>1.07</i>	<i>(0.94–1.21)</i>		

CI indicates confidence interval; OR, odds ratio.

^aModel parameters were based on the imputed data set; ^bRemaining variables were selected on the basis of effect size and significance ($P < .10$) in the full multiple regression model; ^cParticipation: ≥ 4 classes (full) vs ≤ 3 classes (low/no).

Notes: Significant effects at $P < .05$ are shown in bold. Effects that are significant at $P < .10$ are italicized. Depressive symptoms indicated by Center for Epidemiological Studies–Revised Depression Scale 10 scores. Education: Highest level obtained (eg, high school/General Educational Development diploma). Age: Parameterized as 5-year increases. Public benefits: Indicator variable for receipt of *Temporary Assistance for Needy Families*, *Supplemental Nutrition Assistance Program*, and *Supplemental Nutrition Program for Women, Infants, and Children*. Time from enrollment: Indicator variable for follow-up time for members, measured in 3-mo intervals (eg, 1 = baseline/0 mo, 2 = 3 mo, 3 = 6 mo, 4 = 9 mo, and 5 = 12 mo).

it included trauma-informed peer group support with integrated financial empowerment education. The financial education components (in which facilitators assisted members in developing budgeting strategies and identifying how to cut costs and how to save) could have influenced members to minimize making trade-offs between bills. For instance, financial education can reduce the amount of cost-related nonadherence in health care,³² which is related to making trade-offs among medicine, health care, and food.¹ In addition, the curriculum helped people open bank accounts and avoid alternative financial practices, such as relying on check cashing locales or pawn shops, which are associated with lower food security.^{33,34} Members saved small amounts from weeks 4 through 16, and although most savings account balances dwindled after the curriculum sessions ended, the Network helped members to build a practice of thinking tangibly about the future, creating new habits that promoted economic security. This mechanism of financial

education is consistent with findings from studies demonstrating that nutrition education and budgeting within SNAP–Education can improve household food security.^{35,36} These studies solely provided nutrition education and budgeting associated with food and shopping, and varied in terms of timing, assessment measures, and effectiveness,³⁷ whereas the Network covered a broader range of financial skills, such as banking, credit repair, and debt reduction and grounded these lessons in a trauma-informed peer-support approach that addressed psychological and emotional dimensions associated with HFI.

Participation in trauma-informed programming decreases household food insecurity without directly providing food.

Results of this study are limited by loss to follow-up. Members lost to follow-up may be more likely to experience hardship because of

housing instability, phone shutoffs, and other similar factors. The attrition rate was comparable to many real-world intervention studies with hard-to-reach populations with similar hardships.³⁸ A higher percentage of members lost to follow-up were recruited from the county assistance offices and were receiving help from the TANF program, which may be a by-product of the TANF program's intention to move people quickly into the workforce and off TANF enrollment.³⁰ Despite the loss to follow-up, bias toward results demonstrating reduced food insecurity was minimized because the distribution of demographics, baseline employment, household food security, depression, and ACEs did not differ significantly between members with complete data and those with missing data. Results may also have been biased by higher loss to follow-up among low/no participation members; however, the use of established epidemiological methods to impute missing data mitigates the bias from losing members over the follow-up period and increases the precision of study estimates.²⁹

Because the sample consisted of urban residents only, these findings may not extend to rural and suburban populations. Finally, because increased savings habits among full participants was built into the curriculum itself, it is impossible to disentangle discrete financial effects of the program from the trauma-informed aspects of the curriculum.

Integrating trauma-informed approaches into public assistance programming may help to improve the overall wealth and health of families.

IMPLICATIONS FOR RESEARCH AND PRACTICE

Participation in the Network significantly reduced odds of HFI for families with young children with low or no income. This was achieved by addressing the underlying social, behavioral, and emotional issues associated with HFI among caregivers with young children. Future research is needed to address whether expansion of the Network to other locales will have similar effects, as well as to address whether the program can work for different populations such as youths, adults without dependents, and formerly incarcerated individuals. The Network focuses on helping people heal from adversity and feel less isolated, thereby improving economic security. Despite decades of evidence regarding the effectiveness and promise of trauma-informed approaches, the Agency for Children and Families (which administers TANF) and the US Department of Agriculture (which administers SNAP and some education and training programs) have yet to embrace such approaches and integrate them into standing public assistance programming. Based on the current study's findings, broadening the stated goals of public assistance programs such as TANF and SNAP to include promoting improvements in health and well-being, in addition to work participation or food access, may show promise for improving health.

As health professionals seek to improve interventions that address social determinants of health, public assistance programming can adopt similar trauma-informed approaches to move toward a culture of health, which recognizes that all aspects of people's lives should support active and healthy living.³⁹ Policy-makers can assist with this integration because they are increasingly being called upon by the public health community to integrate trauma-informed concepts into major policies related to poverty and nutrition.^{40,41} Integrating trauma-informed approaches into public assistance programming may help to improve the overall wealth and health of families.

ACKNOWLEDGMENTS

This study was funded by the WK Kellogg Foundation, Robert Wood Johnson Foundation—Systems for Action, Claneil Foundation, Inc, Pew Charitable Trusts, and Annie E. Casey Foundation.

REFERENCES

- Knowles M, Rabinowich J, Ettinger de Cuba S, Cutts DB, Chilton M. "Do You Wanna Breathe or Eat?": parent perspectives on child health consequences of food insecurity, trade-offs, and toxic stress. *Matern Child Health J*. 2016;20:25–32.
- Berkowitz SA, Basu S, Meigs JB, Seligman HK. Food insecurity and health care expenditures in the United States, 2011–2013. *Health Serv Res*. 2017;53:1600.
- Alaimo K, Olson CM, Frongillo EA Jr. Family food insufficiency is associated with dysthymia and suicidal symptoms in adolescents: results from NHANES III. *J Nutr*. 2002;132:719–725.
- Sun J, Knowles M, Patel F, Frank DA, Heeren TC, Chilton M. Childhood adversity and adult reports of food insecurity among households with children. *Am J Prev Med*. 2016;50:561–572.
- Chilton MM, Rabinowich JR, Woolf NH. Very low food security in the USA is linked with exposure to violence. *Public Health Nutr*. 2014;17:73–82.
- Hernandez DC, Marshall A, Mineo C. Maternal depression mediates the association between intimate partner violence and food insecurity. *J Womens Health (Larchmt)*. 2014;23:29–37.
- Jackson DB, Chilton M, Johnson KR, Vaughn MG. Adverse childhood experiences and household food insecurity: findings from the 2016 National Survey of Children's Health. *Am J Prev Med*. 2019;57:667–674.
- Jackson DB, Johnson KR, Vaughn MG. Household food insufficiency and children witnessing physical violence in the home: do family mental illness and substance misuse moderate the association? *Matern Child Health J*. 2019;23:961–970.
- Maynard M, Andrade L, Packull-McCormick S, Perlman CM, Leos-Toro C, Kirkpatrick SI. Food insecurity and mental health among females in high-income countries. *Int J Environ Res Public Health*. 2018;15.
- Corcoran M, Danziger SK, Tolman R. Long term employment of African-American and white welfare recipients and the role of persistent health and mental health problems. *Women Health*. 2004;39:21–40.
- Heflin CM, Siefert K, Williams DR. Food insufficiency and women's mental health: findings from a 3-year panel of welfare recipients. *Soc Sci Med*. 2005;61:1971–1982.
- Lai JS, Hiles S, Bisquera A, Hure AJ, McEvoy M, Attia J. A systematic review and meta-analysis of dietary patterns and depression in community-dwelling adults. *Am J Clin Nutr*. 2014;99:181–197.
- Loopstra R. Interventions to address household food insecurity in high-income countries. *Proc Nutr Soc*. 2018;77:270–281.
- Murphy A, Steele H, Bate J, et al. Group attachment-based intervention: trauma-informed care for families with adverse childhood experiences. *Fam Community Health*. 2015;38:268–279.
- Kneipp SM, Kairalla JA, Sheely AL. A randomized controlled trial to improve health among women receiving welfare in the US: the relationship between employment outcomes and the economic recession. *Soc Sci Med*. 2013;80:130–140.
- Nestle M. The Supplemental Nutrition Assistance Program (SNAP): history, politics, and public health implications. *Am J Public Health*. 2019;109:1631–1635.
- Black MM, Quigg AM, Cook J, et al. WIC participation and attenuation of stress-related child health risks of household food insecurity and

- caregiver depressive symptoms. *Arch Pediatr Adolesc Med.* 2012;166:444–451.
18. Booshehri LG, Dugan J, Patel F, Bloom S, Chilton M. Trauma-informed temporary assistance for needy families (TANF): a randomized controlled trial with a two-generation impact. *J Child Fam Stud.* 2018;27:1594–1604.
 19. Bloom SL, Farragher BJ. *Restoring Sanctuary: A New Operating System for Trauma-Informed Systems of Care.* Oxford: Oxford University Press; 2013.
 20. Sun J, Patel F, Kirzner R, et al. The Building Wealth and Health Network: methods and baseline characteristics from a randomized controlled trial for families with young children participating in temporary assistance for needy families (TANF). *BMC Public Health.* 2016;16:583.
 21. Substance Abuse and Mental Health Services Administration. *SAMHSA's Concept of Trauma and Guidance for a Trauma-Informed Approach.* Rockville, MD: Office of Policy, Planning and Innovation, Substance Abuse and Mental Health Services Administration, HHS; 2014.
 22. Bickel G, Nord M, Price C, Hamilton W, Cook J. *Measuring Food Security in the United States: Guide to Measuring Household Food Security.* Alexandria, VA: US Department of Agriculture, Food and Nutrition Service, Office of Analysis and Evaluation; 2000.
 23. Liu Y, Croft JB, Chapman DP, et al. Relationship between adverse childhood experiences and unemployment among adults from five U.S. states. *Soc Psychiatry Psychiatr Epidemiol.* 2013;48:357–369.
 24. Finkelhor D, Shattuck A, Turner H, Hamby S. Improving the adverse childhood experiences study scale. *JAMA Pediatr.* 2013;167:70–75.
 25. Bethell CD, Carle A, Hudziak J, et al. Methods to assess adverse childhood experiences of children and families: toward approaches to promote child well-being in policy and practice. *Acad Pediatr.* 2017;17(suppl 7):S51–S69.
 26. Knight RG, Williams S, McGee R, Olaman S. Psychometric properties of the Centre for Epidemiologic Studies Depression Scale (CES-D) in a sample of women in middle life. *Behav Res Ther.* 1997;35:373–380.
 27. Zhang W, O'Brien N, Forrest JI, et al. Validating a shortened depression scale (10 item CES-D) among HIV-positive people in British Columbia, Canada. *PLoS One.* 2012;7:e40793.
 28. Idler EL, Benyamini Y. Self-rated health and mortality: a review of twenty-seven community studies. *J Health Soc Behav.* 1997;38:21–37.
 29. Engels JM, Diehr P. Imputation of missing longitudinal data: a comparison of methods. *J Clin Epidemiol.* 2003;56:968–976.
 30. Ziliak JP. *Temporary Assistance for Needy Families.* Cambridge, MA: National Bureau of Economic Research; 2015. <https://www.nber.org/papers/w21038.pdf>. Accessed June 10, 2018 .
 31. Schisterman EF, Cole SR, Platt RW. Overadjustment bias and unnecessary adjustment in epidemiologic studies. *Epidemiology.* 2009;20:488–495.
 32. Patel MR, Kruger DJ, Cupal S, Zimmerman MA. Effect of financial stress and positive financial behaviors on cost-related nonadherence to health regimens among adults in a community-based setting. *Prev Chronic Dis.* 2016;13:E46.
 33. Fitzpatrick K. Bank accounts, nonbank financial transaction products, and food insecurity among households with children. *J Con Aff.* 2017;51:631–658.
 34. Carman KG, Zamarro G. Does financial literacy contribute to food security? *Int J Food Agric Econ.* 2016;4:1–19.
 35. Rivera RL, Maulding MK, Abbott AR, Craig BA, Eicher-Miller HA. SNAP-Ed (Supplemental Nutrition Assistance Program-Education) increases long-term food security among Indiana households with children in a randomized controlled study. *J Nutr.* 2016;146:2375–2382.
 36. Eicher-Miller HA, Mason AC, Abbott AR, McCabe GP, Boushey CJ. The effect of Food Stamp Nutrition Education on the food insecurity of low-income women participants. *J Nutr Educ Behav.* 2009;41:161–168.
 37. Rivera RL, Maulding MK, Eicher-Miller HA. Effect of Supplemental Nutrition Assistance Program-Education (SNAP-Ed) on food security and dietary outcomes. *Nutr Rev.* 2019;77:903–921.
 38. Gress-Smith JL, Luecken LJ, Lemery-Chalfant K, Howe R. Postpartum depression prevalence and impact on infant health, weight, and sleep in low-income and ethnic minority women and infants. *Matern Child Health J.* 2012;16:887–893.
 39. Plough AL. Building a culture of health: a critical role for public health services and systems research. *Am J Public Health.* 2015;105(suppl 2):S150–S152.
 40. Hecht AA, Biehl E, Buzogany S, Neff RA. Using a trauma-informed policy approach to create a resilient urban food system. *Public Health Nutr.* 2018;21:1961–1970.
 41. Bowen EA, Murshid NS. Trauma-informed social policy: a conceptual framework for policy analysis and advocacy. *Am J Public Health.* 2016;106:223–229.