A Statewide Trial of the SafeCare Home-based Services Model With Parents in Child Protective Services

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WHAT'S KNOWN ON THIS SUBJECT: Neglect cases in Child Protective Services often receive home-based interventions, but their success in preventing maltreatment recidivism has been elusive. Structured, behavioral skills models, such as SafeCare, are promising but have not been tested in full-scale implementation trials.

WHAT THIS STUDY ADDS: This cluster trial experiment demonstrates significant maltreatment recidivism reduction due to implementing the SafeCare model in a fully scaled-up statewide system. The findings support adopting the SafeCare model for these types of services.

abstract

OBJECTIVES: In this trial, we compared Child Protective Services (CPS) recidivism outcomes between the home-based SafeCare (SC) model for child neglect and comparable home-based services, but without SC modules, for parents in the CPS system across 2 quality control strategies: coached (C) and uncoached implementation. SC is a home-based behavioral skills training model designed for neglecting or maltreating parents. The study was conducted in a scaled-up, statewide implementation setting.

METHODS: Two thousand one hundred seventy-five maltreating parents, treated by 219 home visitors, were enrolled and treated in a 2 × 2 (SC versus services as usual × C versus uncoached implementation strategy) randomized cluster experiment. Cases were followed for an average of 6 years for CPS recidivism events. Subpopulation analyses were conducted for parents meeting customary SC inclusion criteria.

RESULTS: Consistently significant main effects in favor of SC were found across simple and more complex modeling approaches (hazard ratios = 0.74–0.83). Larger effects were found among the subpopulation meeting customary SC inclusion criteria. C implementation yielded smaller and occasionally significant effects in analyses that included more diverse cases falling outside customary SC inclusion criteria.

CONCLUSIONS: Findings support the adoption and use of SC within CPS home-based services systems. C implementation may be especially valuable for cases where the client-model fit is less strong. *Pediatrics* 2012;129:509–515

Home-based programs serve thousands of families in the Child Protective Services (CPS) system, predominantly families with child neglect. Neglect is the dominant maltreatment type in CPS, comprising 78% of cases.[1] Little intervention science has been devoted to neglect.[2] Neglect recidivism is high and difficult to lower.[3] Experimental trials testing home-based neglect services have yielded discouraging findings. Two federal reviews revealed that evidence for effectiveness is weak.[4–6] Benefits often are small, are not durable over time, and do not translate into recidivism reduction. This pattern of findings includes results from services delivered by paraprofessional home visitors (HVs) and by public health nurses.[7,8]

The SafeCare (SC) model, originally known as Project 12-Ways, was developed as a home-based treatment of parents in CPS for child neglect.[9–11] SC is a structured behavioral skills training program that focuses on concrete caregiving, household management, and parenting skills. The model has been used in university-based settings since 1979 and described in over 60 publications. Many studies have been single-case experiments.[9,12–15] There have been 3 small quasi-experimental outcome trials,[16–18] and 1 completers-only randomized trial revealing reduced CPS recidivism.[19] Two randomized trials outside CPS have been conducted with developmentally delayed parents,[20,21] and 1 randomized trial has been conducted with prevention cases.[22] Taken together, the body of SC research suggests that the model is promising. The model has yet to be tested in a scaled-up field implementation.

Implementation in scaled-up services systems requires quality control. Benefits commonly wane when models are scaled up. Drift and loss of fidelity can attenuate effectiveness.[23] Hierarchical supervisory structures are common

quality control strategies used to manage drift.[24] Direct practice observation and in vivo coaching is a more labor intensive and potentially more effective strategy.[25] Whether this additional measure of quality control would translate into improved outcomes in home-based services has not been tested. The current study was designed to test SC versus home-based services as usual (SAU) and also coached (C) versus uncoached (UC) quality control strategies in a scaled-up implementation. A 2 × 2 cluster experimental design was used so that each main effect and their interaction could be tested. The main outcome of interest was CPS recidivism with hypothesized SC and C benefits.

METHOD

Human Subjects

Participants were 2175 parents or caregivers enrolled in a statewide system of home-based services operated by community-based agencies under contract with CPS between September 30, 2003, and October 1, 2006. Six CPS administrative regions of the state, 2 urban and 4 rural, were served by a lead agency within each region. Eligible parents were all nonsexual abusers referred to the programs by CPS. One maltreating parent per household was enrolled, prioritizing the primary caregiver. Parents were recruited in their homes by a research assistant shortly after service enrollment. A total of 3116 prospective participants were approached, 18 did not complete the recruitment process, 23 were determined to be ineligible, and 816 declined or did not complete baseline data collection, yielding an overall enrollment of 2259 (72% of all individuals approached). Eighty-four participants were withdrawn after enrollment, leaving an analysis sample of 2175. The project was overseen by the University of Oklahoma Health Sciences Center Institutional

Review Board and a study-specific Data and Safety Monitoring Board. There were no study related adverse events.

Procedures

A 2 × 2 cluster randomized design was used. SC versus SAU was assigned at the agency/region level ($n = 6$). Within agencies/regions, small HV teams were randomized to coaching conditions. Thus, each HV ($n = 219$) was assigned to deliver only 1 of the 4 design cells. Region/agency assignment to treatment condition began by randomizing the 2 urban regions, then all possible assignment permutations were evaluated and the solution with the best balance of prestudy case demographics was accepted. Once assigned, treatment conditions were formalized in agency funding contracts. For HVs, 21% were assigned to SAU/UC, 25% to SAU/C, 30% to SC/UC, and 25% to SC/C. For cases, 23% were assigned to SAU/UC, 24% to SAU/C, 28% to SC/UC, and 25% to SC/C.

TREATMENTS

Common Elements

SC and SAU services were comparable, with the exception of the SC modules themselves. Commonalities included the home-based format, caseloads, service duration (6 months), visit frequency (at least weekly), service goals, minimum workforce qualifications, case management practices, reporting requirements, administrative definitions, assessment tools, and funding. All HVs were trained in basic motivational interviewing and domestic violence safety planning skills and had access to emergency funds to help families meet basic concrete needs.

SC

SC is a manualized, structured behavioral skills training model. SC modules address (1) parent/child or parent/infant

interaction, basic caregiving structure, and parenting routines; (2) home safety; and (3) child health. SC can be delivered as a free-standing intervention or as 1 component of a broader home visiting service, and the latter was the case here. Practice details can be found in the SC manual[11] or through the SC training institute (http://chhs.gsu.edu/safecare/). Initial SC training was delivered by study investigators with participation and oversight from model developers. Training occurred in small 1-week workshops by using live skill demonstration and role play to criterion, followed by 1 directly observed field session, then regular clinical supervision. HVs assigned to the in vivo coaching condition received additional quality control beyond this.

Customary SC inclusion criteria are a preschool-aged child in the home and no untreated substance use disorder. Because this study was conducted within a more inclusive service system, families with children up to age 12 were served irrespective of untreated substance abuse. No SC model modifications were made. Fifty-five percent (55%; n = 1191) of the sample met customary SC inclusion criteria, and subpopulation analyses were planned.

SAU

SAU were periodically observed in the field by study investigators for descriptive purposes. The term "SAU" in behavioral studies often connotes ad hoc or minimal services, neither of which was the case here. With the exception of the SC structure and the content modules themselves, SAU recipients received essentially the same type and dose of service. SAU addressed comparable goals and issues but in a less structured and more discussion oriented manner.

Coaching

Coaches were selected from agency staff, favoring providers viewed as credible and influential by other HVs. Coaching was structured to be distinct from regular supervision, being advisory rather than supervisory. All coaches were trained by using Stoltenberg's developmental consultation model.[26] Coaches traveled with HVs to the home at least monthly. SC coaches used fidelity checklists, had additional advanced SC model training, and met regularly with investigators and SC developers. SAU coaches focused on general service issues and problem solving rather than fidelity.

Data Collection

Client survey data were collected in the home by independent research assistants by using audio-assisted computerized interviews. The interview captured demographic and questionnaire measures. Measures included the Child Abuse Potential Inventory[27]; Family Resources Scale[28]; Beck Depression Inventory[29]; Social Provisions Scale[30]; and the alcohol and drug disorders modules of the Diagnostic Interview Schedule.[31] All scales demonstrated adequate internal consistency. HVs were not present during data collection nor informed about client research participation. A federal Certificate of Confidentiality was obtained, and no individual data were shared outside the study. Missing baseline data were rare, under 1% for most variables.

Past and future CPS reports were extracted from a statewide CPS database. Matches were for the study participant as the perpetrator. Dispositional practices shifted over time, so we opted to include all reports rather than only screened-in or confirmed dispositions. A total of 13 144 unduplicated past and future reports were captured, of which 76% were for neglect only, 9% were for physical abuse only, <1% were for sexual abuse only, and 14% were mixed type (usually neglect and physical abuse). Average follow-up time was ~6 years. A recidivism event was defined as any report occurring after study enrollment. Sixty-nine percent (69%) of participants had 1 or more events, 52% had 2 or more, and 37% had 3 or more.

HV level data were drawn from a companion project (G. Aarons, principal investigator). HV characteristics were collected by using an online questionnaire administered to HVs. Caseload information was provided by the agencies so that each case could be matched with the HV who served the case.

Data Analysis

SC/SAU assignment clusters were small in number (n = 6), so data were disaggregated to the HV level and then analyzed as a 2-level (ie, HV level and client level) model with experimental conditions modeled at the HV level. Propensity stratification[32] was employed to improve covariate balance. Two-level recurrent event survival models were used to model recidivism outcomes. Two Cox survival indicators were modeled as reflecting a latent factor with a random effect.[33] Separate treatment effects were estimated within each propensity stratum, then pooled into an aggregate weighted effect. Raw propensity scores were included as covariates at the HV level. Both main and interaction effects were tested, followed by simple main effects models if the interaction was insignificant. Subpopulation analyses were conducted for customary SC inclusion criteria (55% of the study sample). Models were executed by using MPlus 6.1.[34] Syntax is available upon request from the first author.

Client Risk

Program evaluation data were available from 4777 previous CPS cases seen in the same services and agencies before implementing SC in 2003. These data were used to create baseline risk estimates. For each study subject, we

estimated their covariate dependent recidivism risk based on prestudy patterns and trends.[35] The risk estimate allowed us to evaluate how each study case's observed survival differed from what we predicted it would have been, based on their risk factors, if the study had never been conducted. Risk estimates were created by using a combined data set (n = 6952 or 4777 prestudy cases + 2175 study cases), which included the following covariates: age, gender, race, education, employment status, number of children in the family, age of the youngest child in the family, number of previous CPS referrals, Family Resources Scale score, substance use screener score, depression screener score, and time trend. Intercept terms and time trends were allowed to be region/agency specific in the multigroup estimation models. The risk prediction estimate was significantly associated with actual recidivism in the study sample (estimate = 0.503; SE = 0.70; P < .001). To manage geographic variations in local case finding and population maltreatment rates, a per capita (under age 18) report rate was calculated for each county of residence (n = 72). This significantly predicted observed recidivism survival in the study population (estimate = 0.734; SE = 0.179; P < .0001).

Propensity Strata

Propensity stratification was employed at the HV level to create more homogeneous groups of HV-case pairings, manage observed covariate imbalances, and improve the rigor of the cluster design. All available HV and caseload variables were examined to create propensity strata. Single-predictor (n = 181) and 3-predictor logit models (2 main effects plus their interaction; n = 16 290) were executed, the 40 most significant nonredundant coefficients were selected, and predicted probabilities saved, 1 for SC/SAU (mean = 0.55, SD = 0.25) and 1 for C/UC (mean = 0.52, SD = 0.22).

HVs were grouped into propensity strata by using 2 approaches. The first approach divided Cartesian propensity score plots into 4 quadrants plus a central area. The least populated quadrant was unbalanced and was dropped. The resulting 4-strata solution captured 185 of 219 HVs and 2035 of 2175 cases. The second approach used Coarsened Exact Matching (CEM).[36] CEM coarsens or bins continuous variables that otherwise are difficult to match exactly, then seeks exact matches, yielding more homogenous strata but at the expense of excluding cases. A 6-strata CEM solution was accepted, which successfully matched 68 HVs and 959 cases. Analyses were planned by using each of the 2 propensity solutions: the more inclusive 4-strata solution, which captures a broader range of cases, and the more homogenous CEM strata solution, which potentially could yield more precise causal effect estimates. To the extent that findings across the 2 solutions are similar, confidence can be increased.

RESULTS

Participants

To test sample representativeness, we used 2000–2010 data from these same service programs (total n = 15 169 cases). Compared with the full decade of all service recipients, study enrollees were 0.4 years younger and had 0.1 more children, 0.4 fewer previous referrals, 3% more non-Hispanic white participants, 2% more women, 2% more unemployment, slightly fewer family resources, and slightly more depression symptoms. The differences were small and no other variables differed, so representativeness seemed reasonable. Participant and HV characteristics by treatment conditions are shown in Table 1. Table 1 illustrates some of the covariate balance issues in the cluster design, particularly for HV characteristics, that supported using propensity stratification.

Survival Analyses

Analysis of recidivism outcomes began with simple preliminary models and then moved step-by-step into more complex models designed to balance covariates and account for clustering, to establish sensitivity ranges for findings across modeling approaches. Effect sizes are reported as hazard ratios (HRs), which are interpretatively similar to risk ratios, along with 95% confidence intervals (CIs). In the simplest case, a preliminary single-event survival model was fitted with a 1-level structure and no covariates or propensity strata. A significant interaction was found in favor of SC/C (estimate = −0.223, SE = 0.104, P = .03, HR = 0.80, CI = 0.65–0.98). Adding client-level covariates attenuated the interaction effect (estimate = −0.164, SE = 0.105, P = .12, HR = 0.85, CI = 0.65–1.05), in favor of a SC main effect (estimate = −0.126, SE = 0.054, P = .02, HR = 0.88, CI = 0.79–0.98). A similar SC main effect was found when the same model was executed for recurrent events (estimate = −0.166, SE = 0.06, P = .003, HR = 0.85, CI = 0.76–0.94).

Next, the full 2-level propensity stratified recurrent event frailty models were fitted. For the 4-strata solution, a significant pooled main effect in favor of SC was found (estimate = −0.186, SE = 0.087, P = .03, HR = 0.83, CI = 0.70–0.98) and also in favor of coaching (estimate = −0.160, SE = 0.077, P = .04, HR = 0.85, CI = 0.73–0.99; Fig 1, left side). Across CEM strata, a similar SC main effect was found (estimate = −0.181, SE = 0.056, P = .001, HR = 0.83, CI = 0.75–0.93) but no coaching effect.

Within the customary SC inclusion criteria subpopulation, a significant SC effect was found in the 4-strata solution (estimate = −0.301, SE = 0.125, P = .016, HR = 0.74, CI = 0.58–0.95) and the coaching effect was not significant (Fig 1, right side). By using CEM strata, the SC main effect was again significant

TABLE 1 Participant and HV Characteristics by Treatment Model Condition and Coaching Condition

	Treatment		Coaching		Total
	SC	SAU	C	UC	
Participants					
Women, %	92	90	91	91	91
Race					
African American, %[a]	11	8	9	10	9
American Indian, %[a,b]	19	14	16	17	16
Hispanic, %[a]	4	5	5	4	5
White, non-Hispanic, %[a,b]	64	70	67	67	67
Age, y[a]	29	30	29	29.7	29.4
Married, %[a]	30	32	30	32	31
Number of children	2.8	2.9	2.8	2.9	2.8
Preschool-aged child, %[b]	79	72	76	75	76
Monthly income[a]	915	918	950	900	932
Below poverty line, %[a]	82	83	81	83	82
Education, %[a]					
Less than ninth	7	8	9	6	7
Less than 12th	33	32	32	34	33
High school or equivalent	33	35	34	34	34
Some beyond high school	22	21	21	22	22
College graduate	5	4	4	5	4
Community size > 75 000, %[a,b,c]	29	26	28	27	28
Sexual abuse history, %[a]	42	40	42	40	41
Physical abuse history, %[a]	40	40	41	38	40
Ever removed from parents, %[a]	21	23	23	21	22
BDI score[a]	12.8	13.1	13.1	12.7	12.9
Significant depression (BDI > 19), %[a]	26	28	28	27	27
Drug or alcohol disorder, %[a]	30	29	28	30	29
FRS basic needs item mean (1–5)[a]	4.4	4.3	4.4	4.3	4.4
FRS total item mean (1–5)[a]	3.8	3.8	3.8	3.8	3.8
CAPI score[a]	159	164	164	159	161
Previous CPS reports[a,b]	4.41	5.07	4.51	4.95	4.73
Program completion, %[a,b]	90	86	89	88	88
Baseline risk estimate[a,b]	0.72	0.56	0.66	0.63	0.65
County report proneness[a,b]	0.45	0.41	0.44	0.42	0.43
Mean follow-up time in d[b,c]	2246	2283	2282	2245	2264
HVs					
HV women, %[a,b]	85	91	87	89	88
HV age, y[a,b,c]	40.4	36.3	38.3	38.6	38.5
HV y on the job[a,b]	7.1	4.1	5.7	5.55	5.62
HV race, %					
African American[a]	20	18	18	19	19
American Indian[a,b]	18	10	15	13	14
Hispanic[a,b,c]	2	7	8	1	4
White, non-Hispanic[a,b,c]	60	66	60	67	63
HV licensed, %[a,b,c]	15	20	20	15	17
HV any graduate education, %[a,b,c]	23	42	41	23	32
HV mean study cases[a,b]	16.8	18.5	18.0	17.2	17.6

BDI, Beck Depression Inventory; CAPI, Child Abuse Potential Inventory; FRS, Family Resources Scale.
[a] Region differences ($n = 6$; not shown); $P < .05$. Group differences were tested by using generalized linear models for nested main effects.
[b] SC/SAU; $P < .05$.
[c] C/UC; $P < .05$.

(estimate = −0.241, SE = 0.086, $P <$ .005, HR = 0.79, CI = 0.66–0.93), and the coaching effect was not significant.

In addition to intent-to-treat models, exploratory analyses were conducted across treatment compliers versus noncompliers. Noncompliance was defined as either a service refusal or 3 consecutive failed visits without reactivation. Compliance was high in both SC (89%) and SAU (87%). Multigroup models revealed no significant differences in compliance predictors between SC versus SAU. Cross-level compliance by treatment condition interactions were added within each propensity stratum of the 2-level, 4-strata model. The compliance main effect was significant, demonstrating that treatment compliers in both conditions had lower recidivism (estimate = −0.308, SE = 0.125, P = .014, HR = 0.73, CI = 0.57–0.94). The compliance effect did not significantly differ between SC and SAU. Compliance variations did not affect treatment effects.

DISCUSSION

Findings support the SC model for home-based CPS service systems. SC main effects were consistently significant across models, with HRs between 0.74 and 0.83. Given first-year recidivism of 45% for SAU, the estimated number needed to treat (the number of cases treated with SC to prevent 1 re-report by year 1) would fall between 9.6 and 15.7.[37] A home-based service system treating 1000 cases would prevent 64–104 estimated first-year recurrences by adopting SC. SC benefits were stronger among cases meeting customary inclusion criteria, suggesting that additional SC development work is needed to increase effect sizes among families with older children. The C implementation strategy yielded smaller and less consistently significant advantages (HRs between 0.85 and 0.94). The significant effect was found among more diverse cases that included those falling outside customary SC inclusion criteria, suggesting that coaching may be more important for working with more challenging and heterogeneous cases.

The nature of the SAU comparison is key to understanding these findings. SAU were comparable to SC, with the exception of the SC modules themselves. SAU were fairly typical home-based services, and we believe they were good quality. Not all CPS systems have
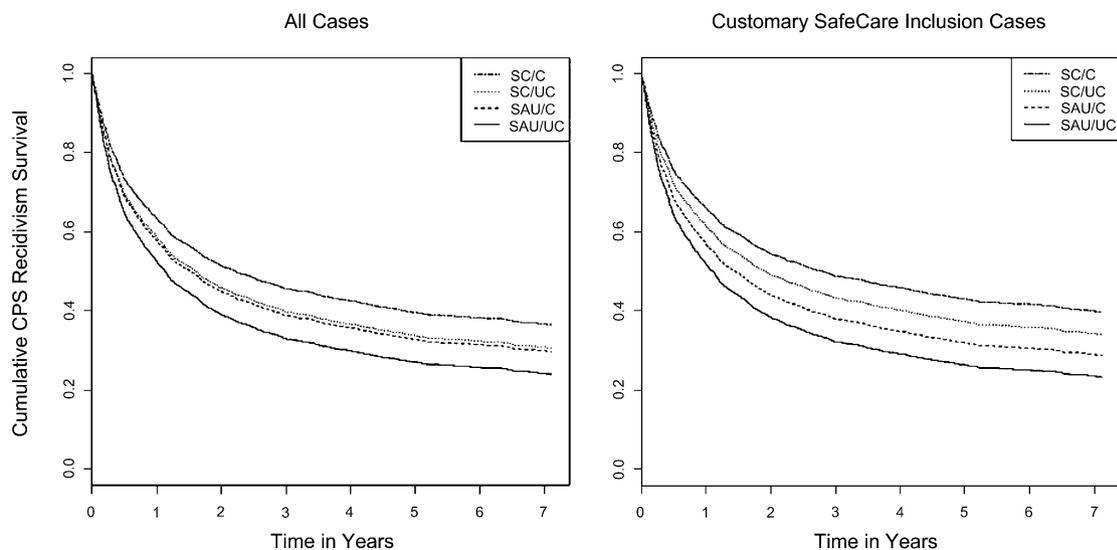
All Cases

Customary SafeCare Inclusion Cases

FIGURE 1
Plots of 2-level CPS recidivism survival models with propensity stratification and covariates. Full sample and customary SC inclusion subpopulation survival for first child maltreatment recidivism report.

a good home-based services network, so we would expect larger SC effects compared with no services or weaker services.

The limitations of the experimental design should be considered. Cluster designs with a small number of clusters are common in scaled-up behavioral field trials. Propensity stratification and baseline risk estimates were used to improve covariate balance and causal effect estimation in this context, but their sufficiency cannot be confirmed or disconfirmed. Because findings are drawn from 1 state, generalizations should be made cautiously.

The main strength of this study is its context: a scaled-up statewide field implementation involving 219 HVs. Studies conducted at this scale sometimes yield attenuated or absent effects,

even for models with strong laboratory or development setting findings. CPS recidivism has proven to be an elusive outcome to alter at scale, especially for neglect cases,[3,5,6] so findings on this outcome in a statewide trial are encouraging. Additional strengths include the size and representativeness of the sample and 6-year follow-up. These findings inject a note of optimism into the child neglect intervention literature, demonstrating that recidivism can be meaningfully lowered by using a structured behavioral model that is feasible, deliverable, and effective at scale. CPS policy makers and service providers should consider these findings in adopting evidence-based practices.

ACKNOWLEDGMENTS

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