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Long-Term Effects of *Focus on Families* on Substance Use Disorders Among Children of Parents in Methadone Treatment

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Abstract

Aims—This study examines the efficacy of the Focus on Families project (currently called Families Facing the Future), a preventive intervention to reduce substance use disorders among children in families with a parent in methadone treatment.

Design—One hundred and thirty families were randomly assigned to a methadone clinic treatment-as-usual control condition or treatment-as-usual plus the Focus on Families intervention [1] between 1991 and 1993.

Setting—Participants were recruited from two methadone clinics in the Pacific Northwest.

Participants—This study examines the development of substance use disorders among the 177 children (56.84% male) involved in the program using data from a long-term follow-up in 2005, when these participants ranged in age from 15 to 29 years.

Intervention—The intervention was delivered through group parent-training workshops at the methadone clinics and through individualized home-based services. The intervention taught parenting skills and skills for avoiding relapse to drug abuse.

Measurements—At long-term follow-up, substance use disorders were measured by the Composite International Diagnostic Interview (CIDI). Survival analyses were used to assess intervention versus control differences in the hazard of developing substance use disorders.

Findings—Overall, intervention and control participants did not differ significantly in risk of developing substance use disorders. However, there was evidence of a significant difference in intervention effect by gender. There was a significant reduction in the risk of developing a substance use disorder for intervention group males compared to control group males (Hazard Ratio = .53, $p = .03$), while intervention versus control differences among girls were nonsignificant and favored the control condition.

Conclusions—Results from this study suggest that helping parents in recovery focus on both reducing their drug use and improving their parenting skills may have long-term effects on reducing substance use disorders among their male children. However, the overall long-term benefits of this program are not supported by the results for female children.

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Keywords

Children of drug users; Prevention; Methadone; Substance use disorder; Young adult; Children of addicts

Introduction

Children of drug abusers are at high risk for developing substance use disorders (SUDs) [2,3,4,5]. Family factors, including genetics, significantly affect children's risk of drug abuse, delinquency, and other problem behaviors [6,7,8,9,10], and children of drug-abusing parents are frequently exposed to elevated levels of genetic and environmental family-related risks [3,4,11,12]. With respect to environmental risks, the lives of children of drug abusers are characterized by high parent and family conflict, frequent moves, household financial troubles, and family legal conflicts [13,14,15,16,17].

Involvement in methadone treatment can stabilize the lives of some addicts [18]. There is evidence that combining family-based interventions with substance abuse treatment has positive effects on children of addicts when it builds family routines and promotes strong bonds to non-drug-using family members [13,19]. A number of parent or family programs have been developed to reduce children's risk of developing SUDs when parents have a substance abuse problem [9,20,21,22,23,24,25,26,27], but only a few rigorous experimental evaluations of these programs have been published. Those that have examined the effectiveness of prevention approaches for parents in treatment demonstrate the potential to reduce the risk of children's drug abuse and associated problems [19,22,28,29,30,31]. However, efficacy trials have been limited by small sample sizes and short follow-up periods [32]. There have yet to be any long-term follow-up studies of these programs to assess their effectiveness in preventing substance use disorders as the children mature into late adolescence and early adulthood, when rates of these disorders increase [33]. The current study begins to fill this gap in research, providing a 12-year follow-up of the Focus on Families intervention.

The Focus on Families Project

The original evaluation of FOF (described below in more detail) was an experimental study with random assignment of families to the intervention or a treatment-as-usual control group. At posttest, intervention parents showed greater relapse prevention skills and self-efficacy than control parents [28]. One year later, the intervention had reduced parents' drug use, domestic conflict, and deviant peer networks, and increased the number of family rules for children's behavior [28]. Two years later, there were trend-level differences in children's rates of drug use and delinquent behavior that favored children in the intervention condition, and intervention children were significantly less likely to report picking fights in the prior six months [1]. The power to detect intervention effects on children in the original study was limited because over 50% of the children were under the age of 11 at the two-year follow-up and thus had not entered the developmental period when rates of substance abuse are substantial. Several studies of preventive interventions have found evidence of effects that emerge or grow stronger as the participants reach late adolescence and early adulthood [34,35,36,37].

This study reports on the impact of the FOF intervention 12 to 15 years after the intervention, when the children were from 15 to 29 years old. We use an intent-to-treat design to compare participants in methadone treatment plus the Focus on Families intervention to a methadone treatment-as-usual control condition on diagnoses for substance

abuse disorders measured with the Composite International Diagnostic Interview (CIDI) [38]. In addition, differential effects of the intervention are examined with respect to the age children were enrolled in the study and their gender. With respect to age, some parenting interventions have been demonstrated to be more efficacious with younger children [39] and there was some early evidence that the FOF intervention had stronger positive effects on parent-child involvement for younger children [1]. Therefore, we examine whether the long-term effects of the intervention were stronger for younger children. Some prevention programs have also shown evidence that prevention effects were stronger for males than females [40]. Like FOF, such programs emphasize strategies for managing childhood externalizing behaviors, such as aggression or disruptive behavior, which are more common for boys than girls. Reducing these early forms of antisocial behavior may have stronger effects for boys than girls on later problem behaviors such as violence, delinquency, and substance use [40,41].

Methods

Participants

One hundred thirty families (representing 144 parents and 177 children) were recruited from two Seattle-area methadone clinics during the course of 2.5 years from 1991 to 1993. To be eligible to participate, parents had to have been in methadone treatment for a minimum of 90 days and have one or more children between the ages of 3 and 14 years residing with them at least 50% of the time. Seventy-five percent of eligible parents consented to be involved in the study. Children actively assented to their participation in all the interviews. The parents in the original study were primarily mothers (75%, mean age 35.3 s.d. = 5.8), were married or living with a partner (80%), were Caucasian (77%) and had at least a high school diploma (78%).

Families were randomly assigned to the experimental or control condition after blocking on parents' race, parents' age at first drug use, whether parents lived with a spouse or partner, and ages of children. The parents in the control condition received the same standard services from the methadone clinic as the parents in the Focus on Families condition. These services included daily visits to the clinic for methadone dose, at least monthly counseling sessions, random urine analysis, and relapse and recovery groups held at the clinic. Because of anticipated attrition from the experimental program, a higher proportion of families were assigned to the Focus on Families experimental condition ($n = 75$, including 82 parents and 95 children) than the methadone treatment-as-usual control condition ($n = 55$, including 62 parents and 82 children).

Beginning in 2005, a locating strategy that included internet searches and in-person visits was employed, locating 98% of the original sample [42]. One hundred and fifty-one (85.3%) of the 177 children originally enrolled in the study completed an interview between March 2005 and May 2006. Interviews were conducted in person at the participant's home or at a convenient location such as a coffee shop or library. The interview took approximately 90 minutes and participants were paid \$60.

Average age at baseline among the children was 8.21 years (s.d. = 3.9), with no difference between treatment and control condition children (8.2 vs. 8.2, n.s.), or between males and females (8.0 vs. 8.4, n.s.). On average, girls assigned to the intervention were younger than those assigned to the control group (7.9 vs. 8.9, n.s.) and boys assigned to the intervention were slightly older than boys in the control group (8.4 vs. 7.6, n.s.). Average age at follow-up was 22.0 (s.d. = 3.8). At the long-term follow-up time point, 29% of the children were high school age, 37% were emerging adults (19–24 years old), and 34% were young adults (25–29 years old). Fifty-five percent were male (57% of treatment, 54% of control, n.s.).

Although the parent sample was blocked on race in the assignment to condition, a higher percentage of the children in the treatment condition identified themselves as Caucasian (67%) than in the control group (48%, $p < .01$). Those who completed the long-term follow-up interview ($n = 151$) did not differ from noncompleters ($n = 26$) in terms of race, gender, age, experimental condition, or cigarette, alcohol, or marijuana use at baseline.

Compared to a general population sample of young adults age 19–28 years surveyed in 2004 [33], the FOF children at the long-term follow-up reported higher rates of past-30-day marijuana (40% vs. 16%) and cocaine use (7% vs. 2%), as well as a higher rate of lifetime heroin use (7% vs. 2%). Compared with 18- to 25-year-olds in 2004 [43], the FOF children at the long-term follow-up had twice the rate of illegal substance abuse or dependence in the past year, including nearly three times the rate for marijuana use (17.2% vs. 5.9%) and twice the rate for cocaine use (3.3% vs. 1.5%). Of those in the FOF sample meeting criteria for any substance use disorder, the average age of onset was 16.89 years, considerably younger than in a nationally representative sample [44].

Focus on Families Intervention

Focus on Families combined relapse prevention [45] and parenting skills training [46,47,48,49,50] with home-based case management services [1,28,51]. Based on the social development model [11], it included components that addressed risk and protective factors for adolescent substance abuse [52] and factors associated with parent relapse after drug treatment [53,54].

The FOF parent training curriculum began with a five-hour family retreat (attended by both parents and their children) followed by twice-weekly 1.5-hour parent and family training sessions. Sessions were conducted with groups of six to eight parents for 16 weeks by master's-level therapists with a background in addiction. Training sessions were co-led by a two-person team to allow for effective demonstration of the skills being instructed. Parents were taught positive family management practices (including monitoring, limit setting, and using positive and negative consequences for socially appropriate and antisocial behavior), how to more effectively communicate with their children, how to hold family meetings to increase children's involvement in family tasks and activities, how to teach children problem-solving and drug-refusal skills, and strategies to help their children succeed in school. Children attended 12 of the sessions so that parents could have supervised practice in parenting skills. Home-based case managers worked with families in their homes, helping parents generalize the skills learned in the training to the home environment and taking advantage of naturally occurring situations to practice and reinforce skills. A more detailed description of the FOF intervention is provided in Catalano et al., 2002 [1].

Intervention Exposure

Of those families assigned to the program condition ($n = 75$), 86.7% initiated participation in the parenting groups. When all those assigned to the experimental condition are included, families had a parent attend 46.8% of the sessions on average. Excluding the 10 families (13.3%) who did not have a parent attend a single session, the average attendance was 54.0% of the sessions. Missed sessions for those who initiated treatment were made up through home visits by case managers. The average number of case management contacts with families who initiated the program was 63 over nine months (range = 4 to 291 visits). Case managers conducted an average of 17 home visits (range = 0 to 39 visits) per family.

Measures

The Diagnostic and Statistical Manual (DSM) IV diagnoses for substance use disorders (SUDs) (abuse or dependence in eight categories including alcohol, marijuana, opiates,

sedatives, amphetamines, cocaine, hallucinogens, and inhalants) were measured using the Composite International Diagnostic Interview (CIDI). The CIDI is a fully structured diagnostic interview developed, validated, and used by the World Health Organization [44,50]. In studies comparing diagnoses with the CIDI to clinical appraisals, 82.0% to 98.7% of substance disorders were confirmed [55], and Cohen's kappa was acceptable (.60–.70). The measure is widely used to diagnose clinical levels of substance use disorders [43,44]. For each type of substance use, respondents received no diagnosis or a diagnosis of one of two types of SUDs: abuse or dependence. If respondents met the criteria for abuse or dependence, they were asked how old they were when their use of that substance first interfered with their work, school, or relationships (age of onset of abuse). We examined onset of SUDs for any substance and then separately for alcohol, marijuana, opiates, and amphetamines/cocaine.

Child's age at baseline was calculated based on birthdates obtained from parents and the date of enrollment in the project. Average age at baseline was 8.21 years, (age 3 to 14 years, s.d. = 3.9). Gender was self-reported in the 2005 interview. Race was coded as White (n = 101, 57%) or non-White (n = 76, 43%), based on self-reports in the 2005 interview. If children were not interviewed in 2005, data from the 12- or 24-month follow-up interview were used.

Baseline substance use was measured using three items. "Have you ever tried cigarettes?", "... alcohol?", and "... marijuana?" Respondents were coded as having no substance use if they answered No to all three questions. Children six years of age or younger were not interviewed at baseline and were coded as noninitiators.

Death of an addicted parent was included as a control variable. Thirty-four (24%) of the parents in the original study died before the long-term follow-up. In 32 cases, death was confirmed with public records, while the deaths of the other two were confirmed by family members. Surprisingly, the mortality rate was higher among parents in the intervention condition (32% vs. 13%, $p = .009$). There was no evidence that more exposure to the intervention resulted in higher mortality among those in the intervention condition. Among the intervention condition families, the mortality rate was highest among parents who attended no sessions (5 of 11, or 45.5%), second highest among parents with exposure to 1–24 sessions (18 of 49, or 36.7%), and lowest among parents who attended 75% or more of the parenting sessions (3 of 22, or 13.6%).

Overall, the lowest mortality rate was among controls (8 of 62, or 12.9%). Due to the difference in mortality rate of the parents by experimental condition, death of an FOF parent was added as a control variable.

Analyses

A Cox proportional hazard model [56] was used to estimate the hazard of meeting criteria for a substance use disorder at a given age, allowing the hazard to vary with age. These models make best use of censored data where risk is believed to change over time. By accounting for varying lengths of exposure to risk (i.e., age), it is possible to include FOF children of all ages, including those who did not complete a young adult interview. These models also estimate the proportional difference in hazard of onset of an SUD with respect to independent variables, with the proportional hazard assumption that the ratio of the hazard of onset with respect to independent variables does not vary over time. In this respect, hazard ratios express the difference in the probability of experiencing an SUD attributable to the predictor variable at any age after taking into account that some FOF children have had more time to experience the event than others.

Intent-to-treat analyses of intervention versus control differences were conducted, modeling the hazard of onset of any SUD, controlling for child age at baseline, race, gender, death of the addicted parent, and respondent's substance use reported at baseline. Additional models were then estimated on the hazard of SUD for alcohol, marijuana, opiates, and cocaine/amphetamines. For each outcome, models were estimated to test for differential effects of the FOF intervention. Then terms representing interactions between intervention and child's age at baseline and between intervention and gender were added in separate analyses. Where interactions were indicated, additional models were estimated to aid in the interpretation of the interactions.

Data for these models were right-censored for those who did not meet criteria for an SUD before the long-term follow-up interview. For the 26 children who did not complete a long-term follow-up interview, data was right-censored at the time of their 24-month follow-up interview, with the assumption that they had not met criteria for an SUD by that time. Secondary analyses were conducted excluding the 26 children who did not complete a long-term follow-up interview and the results were equivalent in terms of direction and statistical significance of model parameters.

Results

As shown in Table 1, 59% of the children who completed the long-term follow-up interview met criteria for an SUD some point in their life. The most common substances abused were alcohol and marijuana, followed by cocaine/amphetamines. Rates of SUDs were higher for males than females. Overall, rates of abuse and dependence were similar for those assigned to intervention and control conditions. Average age of onset of substance use disorders is provided in Table 2.

Hazard ratios for survival models estimated for all 177 FOF children are presented in Table 3. The models indicate a significantly greater hazard of developing an SUD for males than females for any substance, and for alcohol and marijuana in particular. Males were three times more likely to develop an alcohol use disorder and twice as likely to develop a marijuana use disorder as females. Intervention versus control differences were nonsignificant for any substance, and for alcohol, marijuana, cocaine or amphetamines, and opiates modeled separately.

Interaction terms were added to assess differential effects of the intervention by age or gender. The interaction between intervention and age was not significant when added to any of the models (Wald chi square = 0.37, hazard ratio = .97, $p = .54$ for any substance). However, the intervention-by-gender interaction was significant (Wald chi square = 16.87, hazard ratio = .35, $p = .02$), reflecting gender differences in the impact of the intervention.

Survival models predicting any SUDs estimated separately by gender revealed a significant reduction in the risk for intervention group males compared to control group males ($HR = .53$, $p = .03$). The intervention versus control difference among females indicated higher risk of SUDs among girls in the intervention group, although this difference was not statistically significant ($HR = 1.73$, $p = .15$). Figure 1 illustrates the predicted hazards separately by intervention group for males. The solid line for males in the control condition starts to climb at age 12 and increases at a faster rate than for the controls until all cases are exhausted by age 18. The dotted line for the males in the treatment condition indicates their hazard of developing an SUD increases more slowly, and all cases are not exhausted until age 25.

Interactions between intervention and gender were significant at a trend level for alcohol (Wald chi square = 22.90, $p = .002$; $HR = 0.33$, $p = .06$) and marijuana (Wald chi-square = 16.87, $p = .02$; $HR = 0.40$, $p = .09$). Intervention males were less likely than control males to

develop alcohol (HR = .50, $p = .03$) and marijuana (HR = .51, $p = .04$) disorders. The risk of alcohol and marijuana disorders was nearly twice as high for control males as intervention males. The intervention increased the likelihood of SUDs for girls, but not significantly (alcohol HR = 1.69, $p = .30$; marijuana HR = 1.42, $p = .44$).

The 177 participants from the analysis sample come from 130 families and thus include some siblings. Because outcomes for siblings may potentially violate assumptions of independence, the analyses reported above were repeated using one randomly selected child from each family. These analyses reduced the total number of children with complete data to 126 (71 experimental, 55 control condition). The results were equivalent to those reported above, with no changes in direction or significance levels of parameters assessing intervention versus control differences.

Discussion

This study examined the long-term effects of a family-based preventive intervention on substance use disorders among the children of heroin-addicted parents in methadone treatment. We know of no other studies that have assessed the effects of a family preventive intervention at this extensive follow-up interval at ages where substance use disorders are more likely [57]. Although there were no overall intervention effects, there was evidence that the impact of the intervention was different for boys and girls. The intervention significantly reduced the diagnosis of a substance abuse disorder for males in the FOF intervention compared to males in the control condition. These differences were also evident when specific substances were examined: males in the intervention condition were at lower risk of developing alcohol and marijuana disorders than males in the control condition. Among girls, differences between intervention and control participants were in the opposite direction, although not statistically significant. The contrasting results for boys and girls are puzzling, but perhaps suggest that the parenting strategies taught in the intervention were better suited to handling boys who typically exhibit more externalizing problem behaviors in childhood and adolescence. Long-term positive intervention effects among girls in this population may require interventions that focus more on working with parents and children to handle internalizing behaviors.

There are several notable strengths of this study. Families were randomly assigned to intervention and control conditions and long-term follow-up data were obtained on a high proportion of the sample of children (over 85%), with no evidence of attrition differences. Additionally, exposure to the intervention was strong, with families attending 52% of the sessions on average. The CIDI diagnostic measure of substance abuse disorders is a valid and reliable measure of serious alcohol and drug problems, and bears more relevance to policy and treatment than less rigorous measures or measures of initiation or substance use frequency.

The results reported here come with some limitations. First, the sample size is small, which limits power to detect small effects and also limits the number and complexity of the tests we can conduct. However, the effects on males were significant and showed a medium effect size (OR = 0.53). Size of the sample limited investigation of potential race differences in the impact of the intervention. Additionally, the assumption was made that subjects who were not interviewed at the long-term follow-up did not meet the criteria for an SUD at the age of their two-year follow-up interview. However, analyses omitting the 'missing' cases produced almost identical results. Likewise, eliminating dependencies within the data due to siblings within families did not influence the results.

An additional limitation to the study is the differential mortality rate in the experimental and control groups. This was of particular concern to the research team. High mortality is typical of longitudinal studies with samples of methadone clients, and the mortality rate among those assigned to the control group was consistent with other studies [58,59]. Yet, a significantly higher percentage of parents assigned to the intervention condition died. The focus of the intervention was on teaching relapse prevention and parenting skills. It is difficult to conceive of a reason why this would increase mortality, particular since evidence from the one-year follow-up of the intervention indicated positive intervention effects on parents, including significantly lower rates of drug use. There is no evidence that higher levels of exposure to the intervention were related to greater mortality among those assigned to the intervention. As noted earlier, the highest mortality rate was among the 11 families who were assigned to the intervention but never initiated skills training or case management, while those attending 75% or more of the sessions had about the same mortality rate as the control condition (13.5% vs. 12.9%). We have explored other factors that might explain intervention versus control differences in mortality (e.g., demographic characteristics, depression, legal or financial problems, frequency and severity of drug or alcohol use, family conflict/violence, and social support). The only statistically significant predictors of higher mortality were being male and having reported a chronic illness at baseline of the project, neither of which accounted for the intervention assignment difference.

The intervention was designed to capitalize on parents wanting the best for their children. Early results of the FOF intervention demonstrated changes in parenting practices and behavior and these changes were followed by trend level differences in children's drug use and delinquent behavior at 24-month follow-up [1]. With a relatively small sample and such a long period between follow-up assessments, how the intervention reduced substance use disorders for males is hard to say. Although we would expect the potential mediating effects to be positive for female children as well, effects on substance use disorders might be stronger for males because they were more likely to develop substance use disorders in our sample and in epidemiological samples [44]. Furthermore, the emphasis on reducing externalizing problem behaviors and early antisocial behavior may favor improvements for males more than for females.

It is clear that children of opiate addicts are at elevated risk for substance use disorders. Early results from this study suggested that children were powerful motivators for parents in their own recovery. Helping parents in recovery focus on improving their parenting skills using this particular intervention seems to have a long-term impact on their male children's development of substance use disorders, but not on their female children.

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Figure 1.
Cumulative hazard function for onset of any substance use disorder among males by treatment condition

Table 1

Prevalence of substance use disorders by gender and experimental condition for FOF children completing long-term follow-up interview.

Substance	Control Female (n = 34) n (%)	Treatment Female (n = 37) n (%)	Control Male (n = 35) n (%)	Treatment Male (n = 45) n (%)	Total (N = 151) N (%)
Any Substance					
Abuse	4 (12)	3 (8)	6 (17)	10 (22)	23 (15)
Dependence	11 (32)	16 (43)	19 (54)	20 (44)	66 (44)
Alcohol					
Abuse	5 (15)	5 (14)	8 (23)	11 (25)	29 (19)
Dependence	3 (9)	6 (16)	14 (40)	12 (27)	35 (23)
Marijuana					
Abuse	8 (24)	6 (16)	8 (23)	9 (21)	31 (21)
Dependence	2 (6)	7 (19)	13 (37)	9 (21)	31 (21)
Opiates					
Abuse	2 (6)	0 (0)	3 (9)	6 (13)	11 (7)
Dependence	1 (3)	3 (8)	4 (11)	2 (4)	10 (7)
Cocaine/amphetamine					
Abuse	2 (6)	4 (11)	3 (8)	0 (0)	9 (6)
Dependence	4 (12)	5 (14)	6 (17)	10 (22)	25 (17)

Table 2

Average age of onset of substance use disorders by gender and experimental condition.

Substance	n	Control Female		Treatment Female		Control Male		Treatment Male		Total	
		m	(sd)	m	(sd)	m	(sd)	m	(sd)	M	(sd)
Any Substance	87	17.53	(3.29)	16.64	(2.20)	15.72	(2.49)	17.26	(3.77)	16.89	(3.18)
Alcohol	64	19.25	(4.62)	17.93	(2.22)	17.41	(3.16)	17.88	(3.86)	18.01	(3.50)
Marijuana	62	17.20	(2.86)	16.75	(3.39)	15.67	(2.65)	16.17	(3.77)	16.41	(3.27)
Opiates	21	18.67	(5.03)	17.33	(4.93)	16.50	(1.38)	18.13	(3.04)	17.79	(3.10)
Cocaine/amphetamine	34	18.00	(2.45)	17.62	(2.56)	18.33	(3.24)	17.50	(3.41)	18.03	(2.89)

Table 3

Hazard ratios for onset of substance abuse.

Effect	Post hoc tests on specific substances			
	Any substances	Alcohol	Marijuana	Opiates Cocaine or amphetamines
Gender (male)	1.98**	3.03***	2.00*	2.20 1.43
Age at baseline	.97	1.02	0.96	0.92 0.94
Earlier drug use	1.16	1.01	1.18	1.41 2.25†
Death of addicted parent	0.81	1.23	0.67	1.17 0.65
Race (non-White)	0.86	0.70	0.63†	0.45 0.72
Intervention	0.85	0.70	0.72	0.83 0.99

† $p < .10$ * $p < .05$;** $p < .001$ *** $p < .0001$