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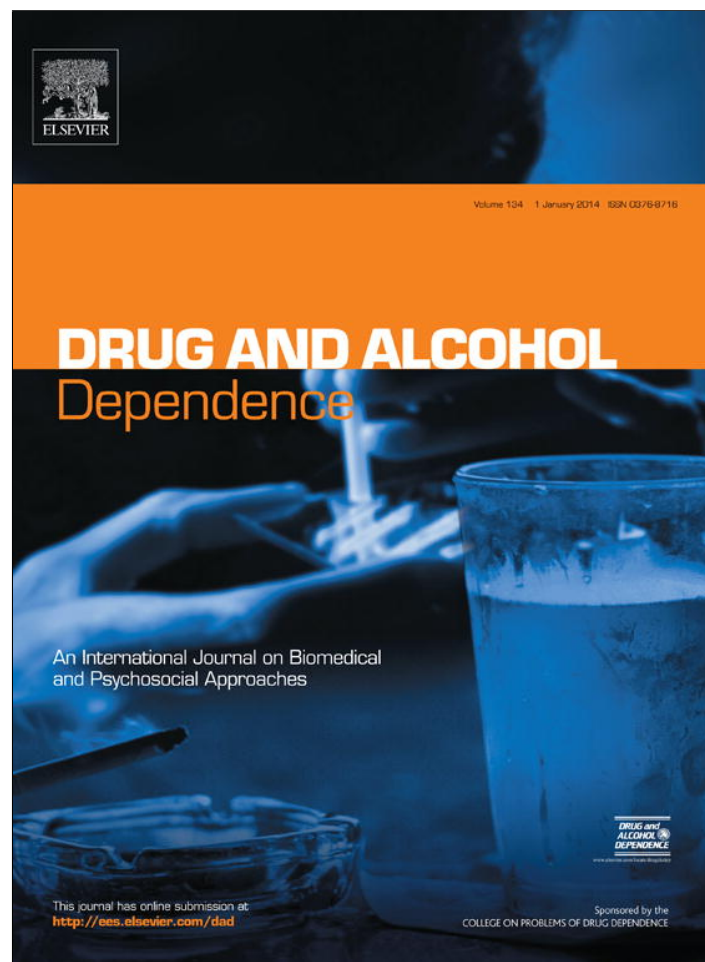
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Drug and Alcohol Dependence

journal homepage: www.elsevier.com/locate/drugalcdepCorrelated outcomes of a pilot intervention for people injecting drugs and their family members in Vietnam[☆]Li Li^{a,*}, Nguyen Tran Hien^b, Li-Jung Liang^c, Chunqing Lin^a, Nguyen Anh Tuan^b^a Semel Institute for Neuroscience and Human Behavior, Center for Community Health, University of California, 10920 Wilshire Blvd., Suite 350, Los Angeles, CA 90024, USA^b National Institute of Hygiene and Epidemiology, 1 Yersin, Hanoi 10000, Vietnam^c Department of Medicine Statistics Core, University of California, 911 Broxton Ave., Los Angeles, CA 90095, USA

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ABSTRACT

Background: The interrelationship between the well-being of injecting drug users (IDUs) and their family environment has been widely documented. However, few intervention programs have addressed the needs of both IDUs and their family members.

Methods: This study describes a randomized intervention pilot targeting 83 IDUs and 83 of their family members from four communes in Phú Thọ province, Vietnam. The IDUs and family members in the intervention condition received multiple group sessions, with the intent to improve psychological well-being and family relationships. The intervention outcomes (depressive symptoms and family relations) were evaluated at baseline, 3-month and 6-month follow-up assessments.

Results: Depressive symptoms and family relations reported by IDUs were found to be correlated to those reported by their family members. Overall, significant intervention effects on depressive symptoms and family relations were observed for both IDUs and family members. A similar improvement pattern in family relations emerged for both the IDU and family member samples, although the intervention effect of reducing depressive symptoms was more sustainable for family members at the 6-month assessment when compared to the IDU sample.

Conclusion: The intervention pilot addressed challenges faced by IDUs and their family members and revealed correlated outcomes for the two groups. Findings suggest a vital need to include family members in future drug prevention and harm reduction intervention efforts.

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1. Introduction

The interrelationship between the well-being of injecting drug users (IDUs) and their family environment has been identified in previous studies (Calabria et al., 2013; Fals-Stewart et al., 2005; Heinz et al., 2009; Lex, 1990; Mehta et al., 2012; Morita et al., 2011). Family contextual factors affect IDU behaviors, and IDU behaviors have fundamental consequences for a family's health and function (Calabria et al., 2013; Nagel and Thompson, 2010; Prado et al., 2012; Szapocznik and Coatsworth, 1999). In some countries, the family unit represents the principal source of financial support and care, which prevents IDUs from suffering serious social deprivation or ill health (Ogden and Nyblade, 2005; Rudolph et al., 2012;

Salter et al., 2010). Adverse family factors have been found to contribute to drug use initiation and relapse after treatment (Nomura et al., 2012; Ojeda et al., 2011; Sánchez-Hervás et al., 2012). Conversely, drug using behavior and its consequences also impact the well-being of the family as a whole (Salter et al., 2010). In Asian countries, which place more emphasis on family-oriented culture than Western nations, the link between drug treatment and family support is even more pronounced (Rudolph et al., 2012; Salter et al., 2010). Research has consistently suggested potential benefits for including families in an intervention for a drug-using population (Hammett et al., 2012; Maher et al., 2007).

Several interventions have been developed for the families of drug users. These interventions have proven the effectiveness of positive familial influences in reducing risky behavior and improving social and emotional well-being (Chau, 2006; Calabria et al., 2013; Miller and Wilbourne, 2002; Smit et al., 2008; Thompson et al., 2005). Although researchers usually acknowledge the important role family plays in a drug user's life and treatment outcomes (Thompson et al., 2005), studies often neglect to measure how the intervention affects the needs and well-being of family members.

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Given the close bond between most IDUs and their families, an intervention simultaneously targeting an IDU and his or her family members may result in improved well-being for both parties.

We conducted a pilot study to explore the complex and correlated outcomes of an intervention for both IDUs and their family members. The intervention contents were developed based on the Social Action Theory (Ewart, 1991) and Social Network Theory (Wasserman and Faust, 1994), which emphasize social interdependence and the impact of relationships on personal health. The study was conducted in Vietnam, which is experiencing a severe epidemic of drug use (Hoffman et al., 2011). In 2010, it was estimated that there were about 150,000 drug users in the country, 83% of whom were injecting heroin users (MOLISA, 2010). Vietnam has a strong family-oriented culture, and most IDUs live with their families (Rudolph et al., 2012; Salter et al., 2010). This is the first study to longitudinally analyze the correlated responses to an intervention from two separate yet related target populations: IDUs and their family members. We hypothesized that IDUs and family members might both benefit from the intervention, with possibly different trajectories in outcome measures.

2. Methods

2.1. Study design

The pilot study was conducted in Phú Thọ, a province in northern Vietnam with high rates of poverty, drug use, and HIV prevalence (Food and Agriculture Organization of the United Nations, 2013). The HIV prevalence among IDUs in Phú Thọ has been estimated to be about 20% (UNAIDS/WHO, 2008). We applied a cluster (or group) randomized trial (CRT) design with two study arms and three assessments (i.e., baseline assessment at study entry and 3-month and 6-month follow-up assessments). Four communes (a third-level administrative subdivision in Vietnam) were randomly selected from Phú Thọ. The number of IDUs in the communes was confirmed with local health institutes to ensure caseloads would be sufficient for the study. We also made an effort to make sure no other drug use or mental health intervention program was implemented at the selected study sites. The selected communes were matched into two pairs based on the number of IDUs in each commune. The two communes in each pair were randomized to either an intervention condition or a standard care condition after baseline using computerized random numbers. We considered the distance between the intervention and standard care communes to avoid potential contamination.

2.2. Participants

From August 2011 to February 2012, IDUs and their family members were recruited from the four communes with the assistance of healthcare providers at the local commune health centers (CHCs). In Vietnam, a large proportion of IDUs seek routine health service from their local CHC, thus the CHC health providers have direct contact with IDUs in their communes. Service providers at the CHCs introduced the study to their IDU clients through verbal explanation and a printed flyer. IDUs who were interested in participating called the project recruiter using contact information printed on the flyer; recruiters then met with prospective IDUs individually and screened them for eligibility. IDUs who were older than 18 years, had a history of injecting drug use, resided in the participating commune, and were willing to invite a family member to participate in the study were eligible for inclusion. Upon enrolling IDUs and with their consents, family members were recruited. The IDU chose the family member from spouse, mother, father, sibling (oldest to youngest), to other family members (oldest to youngest). To be eligible for inclusion, family members had to be an immediate or extended relation of the recruited IDU, be age 18 or over, live in the same household with the IDU, and have previous knowledge of the drug use status of the IDU.

Participants matching the inclusion criteria received detailed study information that included the study procedures, confidentiality agreement, and human subject protections. They were then asked to give written informed consent. Approval for the study design and data collection had already been obtained from the Institutional Review Boards of the University of California, Los Angeles, and the Vietnam National Institute of Hygiene and Epidemiology.

2.3. Intervention

The intervention was developed based on previous formative work with local commune stakeholders, service providers, and IDUs and their family members. Local health educators in Vietnam facilitated the intervention in order to ensure regional relevancy and cultural appropriateness. All facilitators received extensive training on research ethics, facilitation skills, intervention principles and delivery, and content-specific rehearsal. The intervention was conducted in a group format with

about 10 participants per group. Intervention activities were conducted in a private location such as a local CHC conference room. The IDUs and family members participated in intervention activities separately, each with four group sessions. Each group session was about 90 min. The group sessions featured interactive activities such as games, pair-share, discussion, and role-plays. Participants were taught how to overcome family challenges, manage negative emotion, build coping skills, deal with stigma, and integrate into communities. There were slightly different foci for the IDU and family member sessions. The sessions for IDUs mainly focused on setting realistic goals and making positive behavioral change, while the intervention for family members focused on coping with caregiver burdens and providing support. These contents reflected the challenges faced by the target populations that we identified in a previous formative study. The standard care group participants received routine health education and counseling services from the CHC. The dosage and time of services received by standard care group were not measured.

2.4. Baseline and follow-up assessments

The baseline assessments were administered face-to-face by trained interviewers in a private room of a local CHC or an alternative venue that the participant selected. Each assessment took about 45–60 min to complete. Study participants were followed up 3 and 6 months after the baseline assessment using the same questionnaire and the same format. For each assessment, participants received 80,000 dong (U.S. \$3.84) in compensation for their time. Fig. 1 illustrates the participant flow through the study.

2.5. Measures of background characteristics

Demographics and background characteristics included age, gender, marital status, employment, and annual income. For family members, we also recorded their relationship to IDU participants. The IDU's severity of drug use was measured using the Addiction Severity Index (ASI; McLellan et al., 1992). IDUs reported the frequency of their illicit substance use in the previous 30 days, and their perceived severity of drug using problem. A drug composite score was constructed, with a higher score indicating severer drug using behavior (McGahan et al., 1986).

2.6. Outcome measures

Depressive symptoms were measured using the short version of the Zung Self-Rating Depression Scale (Zung, 1965). This instrument consists of 10 items that record how often respondents feel a particular sentiment (e.g., "I feel down-hearted and blue" or "I get tired for no reason"). The participants evaluated the frequency of the sentiment using a four-point scale ranging from 1 (a little of the time) to 4 (most of the time). This measure has been utilized in our previous study in China (Li et al., 2011). An overall scale score was computed by summing all 10 items, with a higher score on the scale indicating a higher level of depressive symptoms ($\alpha = 0.84$ for IDUs and $\alpha = 0.75$ for family members).

Family relations were examined using questions adapted from the Family Functioning Scale (Bloom, 1985; Bloom and Naar, 1994). The original Family Functioning Scale consists of 15 subscales that represent various facets of a family relationship, including cohesion, expressiveness, conflict, intellectual-culture orientation, religious emphasis, and so on. For this study, we had a panel discussion with local experts and decided to only include the cohesion and conflict subscales because of their cultural relevancy. The two subscales contained a total of 10 items. Participants were asked how true each statement was for their family on a four-point Likert scale ranging from 1 (very untrue) to 4 (very true). Scores were determined by summing all 10 items, with a higher score indicating better family relation ($\alpha = 0.80$ for both IDUs and family members).

2.7. Statistical analysis

We found the study outcome measures reported longitudinally by both IDUs and their family members within families were likely to be correlated (Li et al., 2013). Thus, we used a hierarchical bivariate regression modeling approach (i.e., multi-level approach), rather than a stratified analysis approach, to assess whether the changes in the paired outcomes (i.e., those reported by IDUs and their family members) were different between the intervention and standard care groups at each follow-up assessment. The hierarchical modeling approach allowed us to address the following research questions simultaneously: (1) the overall intervention effects, (2) the intervention effects for IDUs and for family members, and (3) whether the intervention effects differed between IDUs and family members in a single model (with interaction terms) through the model contrasts. A stratified analysis approach is simpler for making inferences, but this approach did not allow us to address the three research questions in a single model. The modeling approach used in this study is essentially a bivariate longitudinal regression model (Weiss, 2005), which is a joint model for paired outcomes and useful to understand complex relationships between paired outcomes measured simultaneously over time (e.g., Comulada et al., 2010; Audrairie-McGovern et al., 2003). To provide valid analysis for a CRT study, a random intercept was included for each commune to account for clustering of individuals within the communes (Murray et al., 2004). In addition, the model included correlated random intercepts to account for the paired measures within

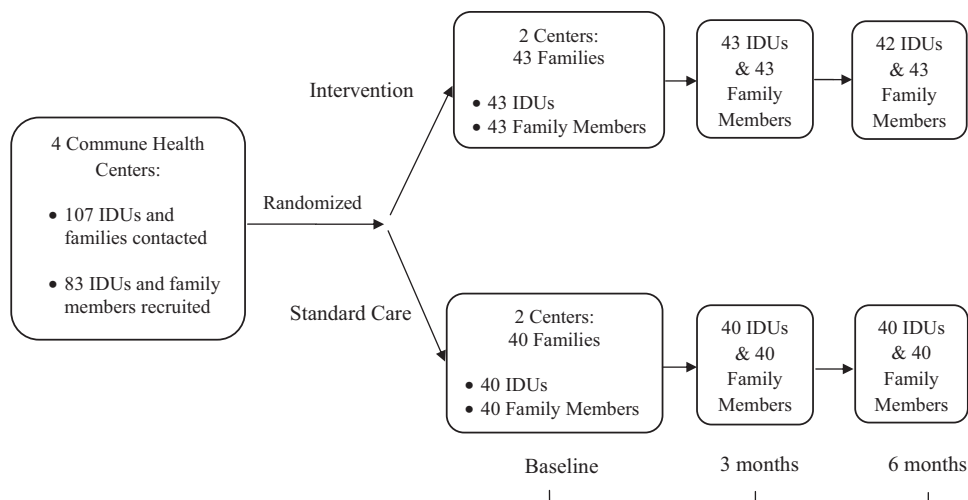


Fig. 1. Flow chart of the study.

families and repeated observations within participants. Models also included group (standard care vs. intervention), visit (baseline, 3-month, and 6-month), member (IDU vs. family member), gender, member-by-pre-selected demographic covariates (age at intake, marital status, employment, income, and year of education), member-by-drug severity index (time-varying family-level covariate), two two-way interactions (member-by-visit and member-by-group), and one three-way interaction (member-by-group-by-visit). The estimated intervention effects, including an overall, by type of member (IDU and family member), and difference in intervention effects between IDUs and family members at each follow-up assessment, were shown. Lastly, we reported the correlation for the paired measures and the commune-level intra-class correlation coefficient (ICC) for each outcome measure.

Descriptive statistics and frequencies for IDU and family member demographics and measures of interest at baseline are summarized by group. We examined the differences in these variables between intervention and standard care for the IDUs and the family members using ANOVA models. All analyses were conducted using SAS 9.3 software (SAS Institute, Cary, NC), and all of the graphs were generated using the publicly available statistical software R (R Development Core Team, 2013).

3. Results

3.1. Sample characteristics and baseline measures

Descriptive statistics and frequencies for sample characteristics and levels of depressive symptoms and family relations at baseline for IDUs and family members are shown in Table 1. The average age for IDUs and family members was respectively 33.8 and 43.6 years at baseline. No significant group differences in age at intake were found for IDUs or their family members. All of the IDU participants were men, and most of the family members were women. Thus, we did not include a member-by-gender measurement in the final model. A significant group difference in years of education was observed for the IDUs (10 vs. 12, $p=0.015$). The means of the IDU's drug severity index at baseline were similar between the groups. Slightly less than 60% of the IDUs were married, whereas more than 72% of the family members were married. We found no significant group differences in marital status within the IDUs or within the family members. More than 74% of the IDUs reported that they had been employed either part-time or full-time. The majority of family members in the intervention group reported having part-time or full-time employment, which was almost double the percentage reported by those in the standard care group (84% vs. 43%, $p<0.0001$). Sixty percent of the IDUs in the intervention group versus less than 33% of the IDUs in the standard care group reported having an annual income of 10 million dong (U.S. \$480) or less per year ($p=0.026$). Forty-five percent of the family members in the standard care group were spouses of their IDUs, which was 10% higher than those in the intervention group (45% vs. 35%, $p=0.008$).

Comparable levels of depressive symptoms between the IDU and family member groups were observed.

3.2. Intervention effects on correlated depressive symptoms

Table 2 presents the results from our hierarchical regression model for depressive symptoms. We found that the depressive symptoms reported by IDUs and their family members were positive correlated ($\rho=0.40$, $p=0.04$). The estimated commune-level ICC for depressive symptoms was 0.14, indicating that about 14% of variance in depressive symptoms that was attributed to the communes. In terms of the pre-selected covariates, we found that the depressive symptoms reported by IDUs were negatively associated with marital status ($p=0.05$) and individual income ($p=0.02$). Older age of family members was found to be significantly associated with a higher level of depressive symptoms ($p<0.0001$). Increased drug severity was significantly associated with higher levels of depressive symptoms for IDUs ($p=0.0003$), this association was significantly stronger than that for the family members ($p=0.0006$).

Given the depressive symptoms reported by IDUs and family members were correlated, we observed an overall significant intervention effect on depressive symptoms at both follow-up assessments. At 3 months, the estimated reduction in depressive symptoms in the intervention group was significantly higher than that of the standard care group (reductions: 3.18 vs. 0.11, $p<0.0001$). The difference in reductions became larger at 6 months (difference: 3.65 ± 0.17 , $p<0.0001$).

We observed a significant three-way interaction ($F_{(4,315)}$ statistic=9.81, $p<0.0001$), meaning that the patterns of depressive symptoms over time for IDUs and family members were different within and between groups, which can also be seen in Fig. 2(A). All of the study participants started at similar levels of depressive symptoms at baseline. For the IDUs in the intervention group, the level of depressive symptoms decreased at 3 months and then increased slightly by the end of the study; in contrast, the level of depressive symptoms for the IDUs in the standard care group increased at 3 months and then decreased slightly by the end of the study. However, the level of depressive symptoms for the family members in both groups decreased at 3 months, where the mean level of depressive symptoms for the intervention group decreased more than that of the standard care group. These two curves became separated from 3 months until the end of the study. For the IDUs, the reduction in depressive symptoms in the

Table 1
Sample characteristics (N = 166).

	IDUs		Family members	
	Intervention, N = 43	Standard care, N = 40	Intervention, N = 43	Standard care, N = 40
Age (year) mean ± SD	34.3 ± 7.09	33.0 ± 6.55	44.1 ± 15.5	43.0 ± 16.6
Education ^a (year) mean ± SD	9.88 ± 2.29	11.7 ± 2.14	9.63 ± 4.04	10.5 ± 4.21
Drug severity index mean ± SD	0.13 ± 0.08	0.15 ± 0.06		
Male (%)	43	40	0	8 (18.6)
Married (%)	25 (58.1)	22 (55.0)	37 (86.1)	29 (72.5)
Employment ^b (%)	32 (74.4)	31 (77.5)	36 (83.7)	17 (42.5)
Income ^a (×1000 Dong)				
10,000 or less	26 (60.5)	13 (32.5)	10 (23.3)	10 (25.0)
10,000 to 20,000	10 (23.3)	12 (30.0)	23 (53.5)	15 (37.5)
20,000 or higher	7 (16.3)	15 (37.5)	10 (23.3)	15 (37.5)
Relationship to IDU ^b (%)				
Spouse			15 (34.9)	18 (45.0)
Parents			11 (25.6)	17 (42.5)
Siblings			10 (23.3)	0
Others			7 (16.3)	5 (12.5)
Outcomes at baseline				
Depression symptoms mean ± SD	18.0 ± 5.93	16.9 ± 4.59	18.0 ± 4.83	18.9 ± 5.06
Family relations mean ± SD	30.4 ± 3.22	29.6 ± 3.29	32.5 ± 3.45	32.3 ± 3.48

ANOVA was used for continuous variables and Chi-square test was used for categorical variables.

^a A significant difference between intervention and standard care was found for IDUs ($p < 0.05$).

^b A significant difference between intervention and standard care was found for family members ($p < 0.05$).

Table 2
Bivariate longitudinal regression models for depressive symptoms and family relations.

	Depressive symptoms			Family relations		
	Estimate	SE	<i>p</i>	Estimate	SE	<i>p</i>
Male	-1.71	0.99	0.09	0.79	0.75	0.30
Married						
IDU	-1.45	0.74	0.05	-0.65	0.43	0.13
Family member	0.40	0.67	0.55	-1.33	0.52	0.01
Employment						
IDU	0.43	0.68	0.58	0.03	0.49	0.95
Family member	-0.12	0.55	0.91	0.05	0.43	0.91
Individual income						
IDU	-0.07	0.03	0.02	0.01	0.02	0.45
Family member	0.005	0.03	0.87	-0.04	0.02	0.06
Age (year)						
IDU	0.003	0.06	0.95	-0.001	0.03	0.97
Family member	0.11	0.02	<.0001	-0.01	0.02	0.55
Education (year)						
IDU	-0.11	0.17	0.54	-0.03	0.10	0.79
Family member	-0.07	0.09	0.44	0.11	0.07	0.11
Slope of drug severity index						
IDU	12.81	3.48	0.0003	-9.01	2.33	0.0001
Family member	5.57	3.06	0.07	-5.94	2.37	0.01
Member × visit			<.0001			0.02
Member × group			0.35			0.12
Member × group × visit			<.0001			<.0001
Comparison of interest						
Change from baseline to 3 months						
Overall intervention effect ^a	-3.08	0.68	<.0001	2.97	0.53	<.0001
Within group: IDU vs. family member						
Standard care	2.90	0.97	0.003	-0.45	0.75	0.55
Intervention	-0.23	0.93	0.81	-1.03	0.72	0.16
Intervention effect: INT-CTL						
IDU	-4.64	0.97	<.0001	2.69	0.75	0.0004
Family member	-1.51	0.96	0.12	3.26	0.75	<.0001
Intervention effect: IDU vs. family member	-3.13	1.36	0.02	-0.58	1.06	0.59
Change from baseline to 6 months						
Overall intervention effect ^a	-3.47	0.68	<.0001	2.14	0.53	<.0001
Within group: IDU vs. family member						
Standard care	1.73	0.97	0.08	0.04	0.75	0.96
Intervention	2.31	0.93	0.01	-1.19	0.72	0.10
Intervention effect: INT-CTL						
IDU	-3.18	0.96	0.001	1.53	0.74	0.04
Family member	-3.76	0.96	0.0001	2.76	0.75	0.0003
Intervention effect: IDU vs. family member	0.58	1.36	0.67	-1.23	1.06	0.25

^a Intervention effect: difference in change from baseline between the intervention and standard care conditions.

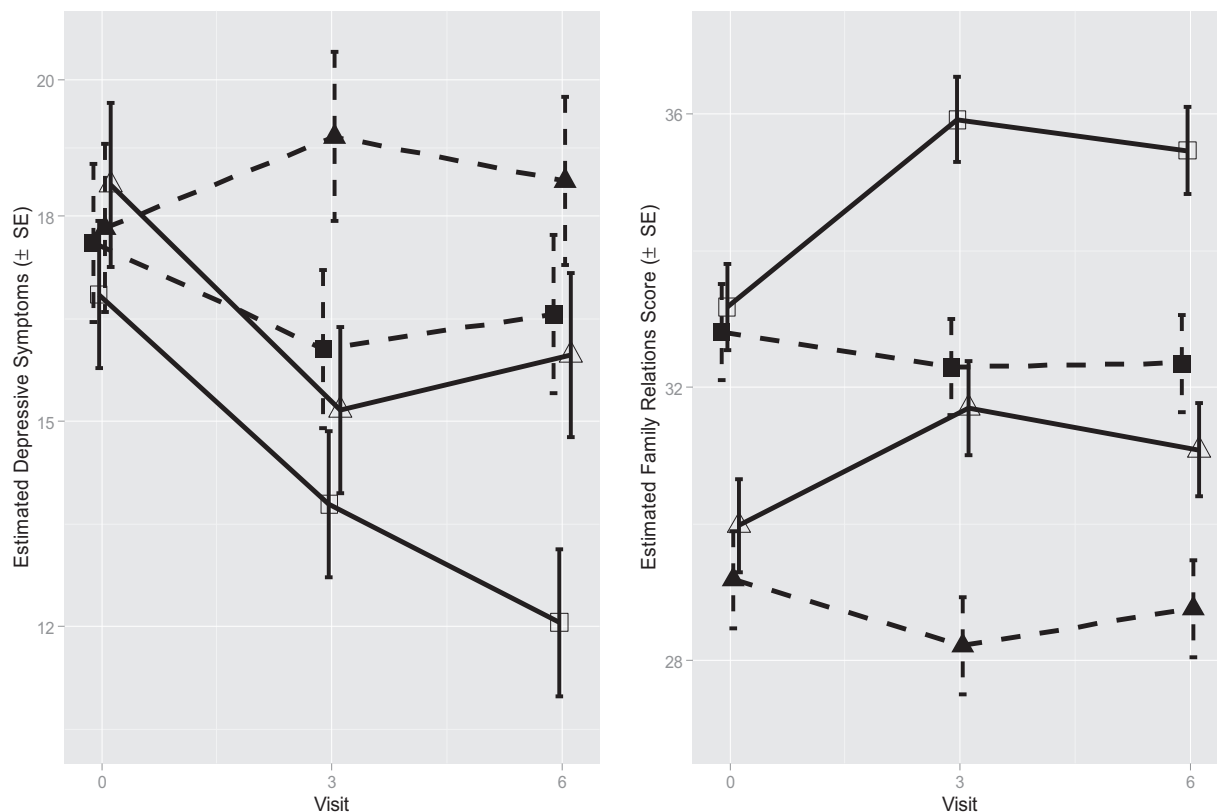


Fig. 2. Estimated mean \pm SE plot for (A) depressive symptoms and (B) family relations. Dashed line with solid symbol represents standard care; solid-line with non-filled symbol represents intervention; triangular symbol represents IDUs; square symbol represents family members.

intervention group (3.30 ± 0.66) was significantly greater than that of the standard care group (-1.34 ± 0.70) at the 3-month follow-up (difference in reductions = 4.64, SE = 0.97, $p < 0.0001$); however, the difference in reduction somewhat lessened at the 6-month follow-up (difference = 3.18, SE = 0.96, $p = 0.001$). For the family members, the reduction in depressive symptoms for the intervention group was higher than that for the standard care group at both follow-up assessments; however, the intervention effect reached significance only at 6 months (difference = 3.76, SE = 0.96, $p = 0.0001$).

Compared to the family members, we observed a significantly greater intervention effect (i.e., a difference in reduction of depressive symptoms) for IDUs at the 3-month follow-up (difference in intervention effects = 3.13, SE = 1.36, $p = 0.02$); however, the intervention effects became similar by the end of the study.

3.3. Intervention effects on correlated family relations

Results from the hierarchical bivariate regression model indicated that family relations reported by IDUs were positively correlated with that reported by family members (Table 2) ($\rho = 0.81$; $p = 0.0009$). We found a smaller ICC for family relations than for depressive symptoms, only 5% of variance in family relations that was attributed to the communes. The marital status of the family members was found to be significantly associated with a lower level of family relations ($p = 0.01$). No other demographic characteristics were found to be significantly associated with the family relations measure for either IDUs or family members. Increased drug severity was significantly associated with lower levels of family relations for both IDUs and family members ($p = 0.0001$ and 0.01 , respectively). Similar to depressive symptoms, the association for IDUs was significantly stronger than that for the family members ($p = 0.0002$).

An overall significant intervention effect on the correlated family relations was observed at both follow-up assessments. The intervention participants reported a significantly greater improvement in family relations than those in the standard care group at the 3-month follow-up assessment (improvement: 2.23 vs. -0.74 ; difference: 2.97 ± 0.53 , $p < 0.0001$). At 6 months, the intervention effect diminished slightly, but still reached significance (difference = 2.14, SE = 0.53, $p < 0.0001$).

Fig. 2(B) shows a similar pattern of family relations over time for IDUs and family members within each group (intervention or standard care), which was different from that of depressive symptoms. However, the patterns of change over time were different between the intervention and standard care groups (i.e., a significant three-way interaction, $F_{(4,317)}$ statistic = 8.61, $p < 0.0001$). The IDUs and family members had different levels of family relations at baseline (i.e., with family members reporting higher levels of family relations), but the starting level of family relations for the intervention and standard care conditions was similar within the IDUs and the family members. We observed an increasing level of family relations for the intervention IDUs at 3 months, which then dropped slightly toward the end of the study. In contrast, the level of family relations for the standard care IDUs decreased at 3 months and then increased slightly at 6 months. The estimated difference in improvement of family relations between the intervention and standard care IDUs was significant at 3 months (difference = 2.69, SE = 0.75, $p = 0.0004$) and became slightly less at the end of study (difference = 1.53, SE = 0.74, $p = 0.04$). Similarly, the level of family relations for the intervention family members increased at 3 months and then decreased slightly by the end of the study. However, the level of family relations for the family members in the standard care group was similar for both follow-up assessments. Compared to the family members in the standard care group, we observed a significantly larger improvement in family relations

for the intervention family members at 3 months (difference in intervention effects = 3.26, SE = 0.75, $p < 0.0001$) and at 6 months (2.76 ± 0.75 , $p = 0.0003$).

The estimated intervention effect on family relations for the family members was greater than that for the IDUs at both follow-up assessments. The estimated effects for both IDUs and family members, however, did not reach statistical significance.

3.4. Sensitivity analyses

Since slightly less than 40% of the family members were spouses, separate analyses were conducted for family members only (sub-group analyses), to evaluate whether the intervention effects differed for spouse vs. non-spouse. We observed less intervention effect on depressive symptoms for the spouses versus non-spouses, however, this difference did not reach statistical significance. The intervention effect on family relations was similar for spouses and non-spouses.

4. Discussion

Findings from this study not only provide evidence for desirable intervention effects in the improvement of mental health and family relations, but also demonstrate correlated outcomes between IDUs and family members. We observed a similar trajectory in the enhancement of perceived family relationships for both IDUs and their family members. As a family environment is an interactive system commonly shared by IDUs and their family members, the achievement of better family relations requires effort from both parties. In contrast to intervention programs that target family members only (Kermode et al., 2008; Santis et al., 2013), the positive outcome of this study might have resulted from our approach of involving both IDUs and family members simultaneously. This is especially true in Vietnam, where families are generally tight-knit.

The IDUs and family members both benefited from the intervention in regards to alleviation of depressive symptoms, but the pattern of change was different for these two populations. It is of note that even the family members in the standard care group showed decreased depressive symptoms at the 3-month follow-up, which might be due to the perceived attention from the reoccurring surveys (Tourangeau, 2003). The reduction in depressive symptoms was more sustainable at 6 months for family members, as compared to the IDUs. One possible explanation is that IDUs are likely to be targeted by existing intervention or prevention programs, which potentially results in a “ceiling effect” (Evins et al., 2008; Henggeler et al., 2008). Family members of IDUs might have less prior exposure to such programs, so that the benefits from intervention efforts could be more substantial.

It is important to recognize the limitations of this study. First, the pilot nature of the study, the small sample size, and short follow-up period do not allow for conclusive evidence of the intervention's efficacy. The small sample size also resulted in imbalances in some of the background characteristics between the intervention and control conditions, as well as inconclusive results in family configurations and the potential effects on the outcomes. Second, the measures relied on self-reported data that were subject to social-desirability bias and recall bias. Third, data were collected from IDUs who visited CHCs, so the findings might not be generalizable to IDUs who do not receive routine health care from CHCs.

In conclusion, this study contributes to the understanding of responses to an intervention from two related populations: IDUs and their family members. The findings have implications for future interventions targeting IDUs. When designing future harm-reduction programs, policymakers need to address the challenges faced by family members and enhance their role in support of

IDUs' improvement in mental health and general well-being. It is also important to evaluate various change patterns from different groups in the process of outcome assessment.

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Contributors

Li Li and Nguyen Tran Hien oversaw the design and implementation of the study. Nguyen Anh Tuan and Le Anh Tuan actively participated in overall coordination, staff training and quality assurance. Li-Jung Liang was responsible for statistical analysis, interpretation of the results, and writing the data analysis and results sections. Chunqing Lin participated in the interpretation of the findings and drafting the manuscript. All authors contributed to the preparation of the paper.

Conflict of interest

None.

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