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ORIGINAL ARTICLE

Six-Month Outcomes of a Randomized, Motivational Tele-intervention for Change in the Codependent Behavior of Family Members of Drug Users

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ABSTRACT

Families of substance abusers may develop maladaptive strategies, such as codependency, to address drug-related problems. It is important for families to receive specialist treatment in order to contribute to the recovery process. The Tele-intervention Model and Monitoring of Families of Drug Users (TMMFDU), based on motivational interviewing and stages of change, aims to encourage the family to change the codependents' behaviors. A randomized clinical trial was carried out to verify the change in codependent behavior after intervention with 6 months of follow-up. Three hundred and twenty-five families with high or low codependency scores were randomized into the intervention group ($n = 163$) or the usual treatment (UT) ($n = 162$). After 6 months of follow-up, the family members of the TMMFDU group were twice as likely to modify their codependency behavior when compared to the UT group (OR 2.08 CI 95% 1.18–3.65). TMMFDU proved to be effective in changing codependent behaviors among compliant family members of drug users.

KEYWORDS

Codependency; family relations; motivational interviewing; telephone

The families of people with substance use disorders have deficits in physical and emotional health and in personal relationships, which impacts their quality of life (Moreira et al., 2013). Several of these deficits are related to codependency, which is characterized by counterproductive attitudes, permissive behaviors, feelings of guilt, and low self-esteem (Daire, Jacobson, & Carlson, 2012; Denning, 2010). These features are usually accompanied by suffering and denial and feelings such as anger, helplessness, and sadness. Thus, family members may develop maladaptive strategies to manage their relationship with most drug users (Denning, 2010). We have recently identified that more than 60% of family members of psychoactive substance users that sought help through a telephone service in Brazil had codependency (Bortolon et al., 2016). Furthermore, women seen in primary healthcare who had alcoholic fathers/partners were more likely to be codependent than those who did not have alcoholic family members (Noriega, Ramos, Medina-Mora, & Villa, 2008). The cultural role of females as caregivers of the elderly, children, and sick people is an important reason for understanding the relationships of the majority of women to their family members (Sakiyama et al., 2015) and the factors that may be related to codependency (Bortolon et al., 2016).

The construct of codependency has been described in different ways over time: as a personality disorder described in the Diagnostic and Statistical Manual of Mental Disorders—III R (Cermak, 1986), as a problem that arises in the families of alcoholics as a standard family dynamic (Wegscheider-Cruise, 1981), or as an interactional problem (Noriega et al., 2008). In this study, codependency was considered as an interactional problem that is postulated as a model of relationship established early on between the family and the drug user. It is a complex of maladaptive alternatives to solving a problem, that create negative emotions for the individual experiencing codependency, who is and feels out of control, and may enable the user's using behavior (Dear & Roberts, 2005; Noriega et al., 2008). This construct of codependency seems the most appropriate to define codependency because it values the aspects of interaction, showing potential patterns of behavior learned from family members and the drug user. These patterns can then be changed via the intervention. Considering codependency as a model learned it can be changed by an intervention.

It is important to invite family members to participate in the treatment of chemical dependence because of the importance of family interactions (Fang & Schinke, 2013; Yandoli, Eister, Robbins, Mullady, & Daire, 2002).

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However, family involvement in the drug user's treatment is often difficult (Yandoli et al., 2002). Living with someone who misuses drugs or alcohol is commonly very stressful for both the user and family members. These families are likely to show strain such as physical and psychological ill-health (Arcidiacono et al., 2010). The origin of codependency might occur in social interactions (Wright & Wright, 1991), with the family members who present codependent behaviors are usually those who gained responsibilities towards other very early in life (Noriega et al., 2008), and may repeat this behavioral pattern towards the drug user who may be seen as needing care. These requirements can trigger behavior family overhead tasks and self-neglect (Bortolon et al., 2016). Thus, the cycle of addiction and codependency is configured. Consequently, family members with these "responsibility" characteristics may be in a high risk of codependency (Bortolon et al., 2016). Therefore, it is important that not only the drug user but also their family members receive specialized care to facilitate the recovery process (Substance Abuse & Mental Health Services Administration, 2005). The Tele-intervention Model and Monitoring of Families of Drug Users (TMMFDU) proposes a way of involving family members who have resistance to change due to the characteristics of codependency through a motivational approach. This tele-intervention used open-ended questions and empathy to understand family functioning and applied reflective listening and decisional balance techniques as the methods for changing codependent behaviors. Summaries were made throughout the follow-up. The application of the motivational interview method to the family members of drug users has not been evaluated yet; hence its effectiveness must be investigated.

The TMMFDU is based on the theoretical perspective on motivational interviewing (Miller & Rollnick, 2013) and stages of change (Prochaska, Diclemente, & Norcross, 1992). The motivational interview (MI) is widely used for users of alcohol and other drugs and has been shown to be effective for cessation of use regardless of the population or the drugs used (Fernandes et al., 2010; Newton et al., 2013; Signor et al., 2013). It has been suggested that the motivational interview assists in modifying codependent behaviors due to its collaborative spirit and empathy and evocation of the reasons for the change in addition to the use of specific strategies according to the family's motivational stage (Faris, Cavell, Fishburne, & Britton, 2009; Sim, Wain, & Khong, 2009). When family members are at the pre-contemplation stage, change is seen as an issue exclusive to the user, and family members believe it is only the user who should make the change happen. In the contemplation stage, the family starts to consider that they may also be involved in the family member's

drug use and, therefore, they also need to change. In the preparation stage, the family begins the process of preparing for change, which is understood as a window of opportunity, with the family commonly seeking guidance and help. The action stage of change is the moment at which the family is involved in actions aimed at changing behaviors that can be performed individually or accompanied by counseling, psychotherapy, or self-help. In the maintenance stage, the focus is to sustain the behavioral change already adopted by the family. This approach can help family members of drug users to conduct changes in their interactions with the user (Miller & Rollnick, 2013; Miller, Rollnick & Butler, 2010).

This study proposed a tele-intervention program based on the principles of motivational interviewing and stages of change conducted collaboratively, encouraging decision-making by the family members to change their behavior towards the drug user, with an understanding that they also need assistance. The aim of this study was to determine whether the families' codependent behaviors changed in relation to drug users when they followed the TMMFDU at 6 months.

Methods

Study Design: randomized clinical trial comparing the Tele-intervention Model and Monitoring of Families of Drug Users—TMMFDU, and the usual telephone-based treatment—UT.

Interventions

TMMFDU (Bortolon, Machado, Ferigolo, & Barros, 2013) was constructed based on previous phone calls made by families who had requested help from the drug-prevention information service "VIVAVOZ—call 132" to deal with a drug user in the family. The family's needs regarding difficulties in interacting with the drug user, suffering, and ignorance of the abused substances and their effects were identified. These needs reported by the family members were later used as the basis for a structured service model, based on motivational interview and on the transtheoretical model of stages of change in which different goals were presented over different days (Table 1; Bortolon et al., 2013). TMMFDU was conducted by focusing on changing the codependent behaviors of families of drug users. This model was organized in such a way that each call had a specific goal to stimulate the family in their process of change. The three components of codependency (focus on others, self-sacrifice and reactivity) are targeted in TMMFDU. In addition, TMMFDU aims to encourage the family to move from the early stages of motivation to the final stage or to remain in the final stage.

Table 1. Tele-intervention model and monitoring of families of drug users and usual treatment.

First call and follow-ups	Objective of the intervention	Objective of the usual treatment
First call	Attend to demand. <ul style="list-style-type: none"> – Welcome the family. – Inform how phone follow-up for the family operates. – Explain chemical dependency and its complications. – Schedule the dates of follow-up. – Thank the family. 	Attend to demand and talk about substances. <ul style="list-style-type: none"> – Welcome the family. – Identify doubts and acknowledge the suffering of the family. – Inform how phone follow-up for the family operates. – Inform and explain the basics of the substances used by the user. – Report informational materials sent to the family member. – Schedule the dates of follow-up. – Thank the family.
Second call 7th day	Understand how the family functions. <ul style="list-style-type: none"> – Understand how the family functions and identify behaviors such as rules, authority, limits, overprotection, neglect, strictness, permissivity, and guilty feeling. 	Informative. <ul style="list-style-type: none"> – Inform and objectively answer the questions of the family with information data. <p>For example: Information about treatment sites for drug users when requested. Give objective and straightforward answers to “What to do to help my family user? “What do I do when my son is intoxicated?” And verify/check if the family received the written information.</p>
Third call 14th day	Attend to the family depending on the motivational stage of call current. <ul style="list-style-type: none"> – Attend to the family depending on the motivational stage reported after answering the scale. 	Guidance of effects of substances. <ul style="list-style-type: none"> – Advice on the effects of the substances used, addiction, and withdrawal syndrome.
Fourth call 21st day	Working the motivational stage of preparation goals. <ul style="list-style-type: none"> – Foster the targets of the motivational stage according to codependent behaviors (HCI assessment scale) that the family reported after answering the scale. – Inform on the risk and protective factors in the family for drug abuse. 	Attend to demand. <ul style="list-style-type: none"> – Provide emotional support and psychoeducation and listen to the family.
Fifth call 28th day	Working the motivational stage of action goals. <ul style="list-style-type: none"> – Foster the targets of the motivational stage according to codependent behaviors (HCI assessment scale) that the family reported after answering the scale. – Help the family identify steps and skills required to change. – Encourage the family to change their behavior and put into action what has been agreed on. 	Attend to demand. <ul style="list-style-type: none"> – Provide emotional support and psychoeducation and listen to the family.
Sixth call 35th day	Working the motivational stage of action goals. <ul style="list-style-type: none"> – Verify the execution of the planning. – Assist the family that failed to perform the tasks and understand the reasons for not being able to do so. 	Attend to demand. <ul style="list-style-type: none"> – Provide emotional support and psychoeducation and listen to the family.
Seventh call 2nd month	Working the motivational stage of maintenance goals. <ul style="list-style-type: none"> – Maintenance session. – Check how the family is regarding changes in behavior. – Attend to the family depending on the motivational stage reported after answering the scale. 	Attend to demand. <ul style="list-style-type: none"> – Provide emotional support and psychoeducation and listen to the family.
Eighth call 4th month	Working the motivational stage of maintenance goals. <ul style="list-style-type: none"> – According to the aims of the 2nd month of follow-up. 	Attend to demand. <ul style="list-style-type: none"> – Provide emotional support and psychoeducation and listen to the family.
Ninth call 6th month	Working the motivational stage of maintenance goals. <ul style="list-style-type: none"> – According to the aims of the 2nd month of follow-up. 	Attend to demand. <ul style="list-style-type: none"> – Provide emotional support and psychoeducation and listen to the family.

Model created by Bortolon et al. (2013).

The third call to the Service is oriented toward the family according to the shift stage shown in the current call, and the following calls address the stages of preparation, action and maintenance.

UT for family members was conducted in an informative way and focused on awareness through reading informational materials sent to the family (bibliotherapy). The material dealt with how family members can address

possible situations and limits of living with drug users. In all segments, when necessary and/or requested, both the family members and users were informed of the treatment centers (address and telephone numbers).

Table 1 provides more information on the objectives and differences in each call and in each treatment modality.

Procedures

Sample recruitment and participants

The Brazilian National Information and Intervention for Substance Abuse is a telemedicine service that offers counseling, brief motivational intervention to drug abusers and general information on drug abuse to the community. Many family members of drug users call the toll-free number to receive counseling and information on how to deal with a relative who is a problem substance user or to request information about treatment centers to which they can take their family members. The toll-free number is advertised nationwide via the internet and through radio and television broadcasts.

The sample consisted of family members of drug users from all five Brazilian regions who reactively called (made the call) the toll-free phone line for help regarding a family member who is a drug user and requested information regarding treatment centers for drug users. Parents, siblings, children, second- and third-degree relatives and spouses who voluntarily called the toll-free number were invited to participate in this study. The study included drug users' family members who agreed to participate, completed the first call and answered in the codependency assessment and motivational stage scales. The other inclusion criteria involved giving their free and informed consent and completing all the proposed follow-up monitoring (Figure 1). The sample selection excluded families of tobacco-only users, individuals under the age of 15, family members who refused to participate in the study or those who did not wish to continue in the follow-up, and individuals who lacked the cognitive ability to complete the questionnaires.

Data collection and follow-up were conducted from August 2008 to February 2013 by college students in health sciences (consultants) who were adequately trained for motivational interviewing and on how to care for family members of drug users. For family monitoring, continuous training meetings were held on systemic therapy, motivational interviewing, and strategies according to the motivational stage in addition to discussing clinical cases and providing support from consultants when confronted with difficult demands. The consultants were supervised by professional experts in substance abuse, all of whom had postgraduate training in health sciences (Barros, Santos, Mazoni, Dantas, & Ferigolo, 2008).

Participants were randomized using a software program developed internally by the Service that randomly assigned the call from the family to the usual treatment (UT) or TMMFDU groups (Bloch & Medronho, 2008).

At the beginning of the first call, the families' informed consent was sought so that the data could be used for

research and, by the end of the call, eight phone calls were scheduled. After the first call, each family in the study received a letter sent by the Service containing an agreement with the family to return the calls, informational material for awareness, and the protocol number for the continuity of care (Bortolon et al., 2013). The phone calls lasted for approximately 60 minutes and were largely made by family members or proactively by the service staff when the family did not return a phone call as promised. The first contact by all family members was reactive, the family members were asked to continue giving reactive calls to the service and a family member only received a proactive call when they did not give the expected calls for follow-up. The proactive attempts to contact the families were made on at least five occasions on different weekdays, including weekends, and at different times of the day (in the morning, afternoon or evening). After 5 unsuccessful attempts to proactive calls on a given session, the participants were considered dropped independent of which group the family member had been included. A session was considered skipped when further contact was reactively or proactively made in a subsequent day of the missed protocol contact. If two or more skipped sessions occurred to the same family member, loss to follow-up was considered. During the different sessions, the participants could be interacting with different consultants. Each session was accompanied by only one consultant.

Instruments

The instruments used were: a) A questionnaire regarding sociodemographic characteristics, which was a computerized instrument for the general characterization of the family members' data, which include gender, age, marital status, occupation, family income, and educational level. b) The Holyoake Codependency Index (HCI) (Dear & Roberts, 2000) to evaluate codependency with thirteen items grouped under three elements (subscales): focus on other, self-sacrifice, and reactivity. The instrument was designed to measure an individual's tendency to endorse codependency beliefs and attributions (Dear, Hardie & Hall, 1990). The total score is calculated as the sum of the elements divided by the number of questions for each element and can vary from 3 to 15 points with equal weight for each subscale (Dear & Roberts, 2005). The scores closest to 15 points indicate a characteristic focus on others, self-sacrifice and reactivity, while those closer to 3 points (low codependency) indicate a lower tendency toward these characteristics. In other words, the high codependency scores reflect behaviors denoting the a) need to obtain approval and sense of identity through focusing their attention on the behaviors, opinions and

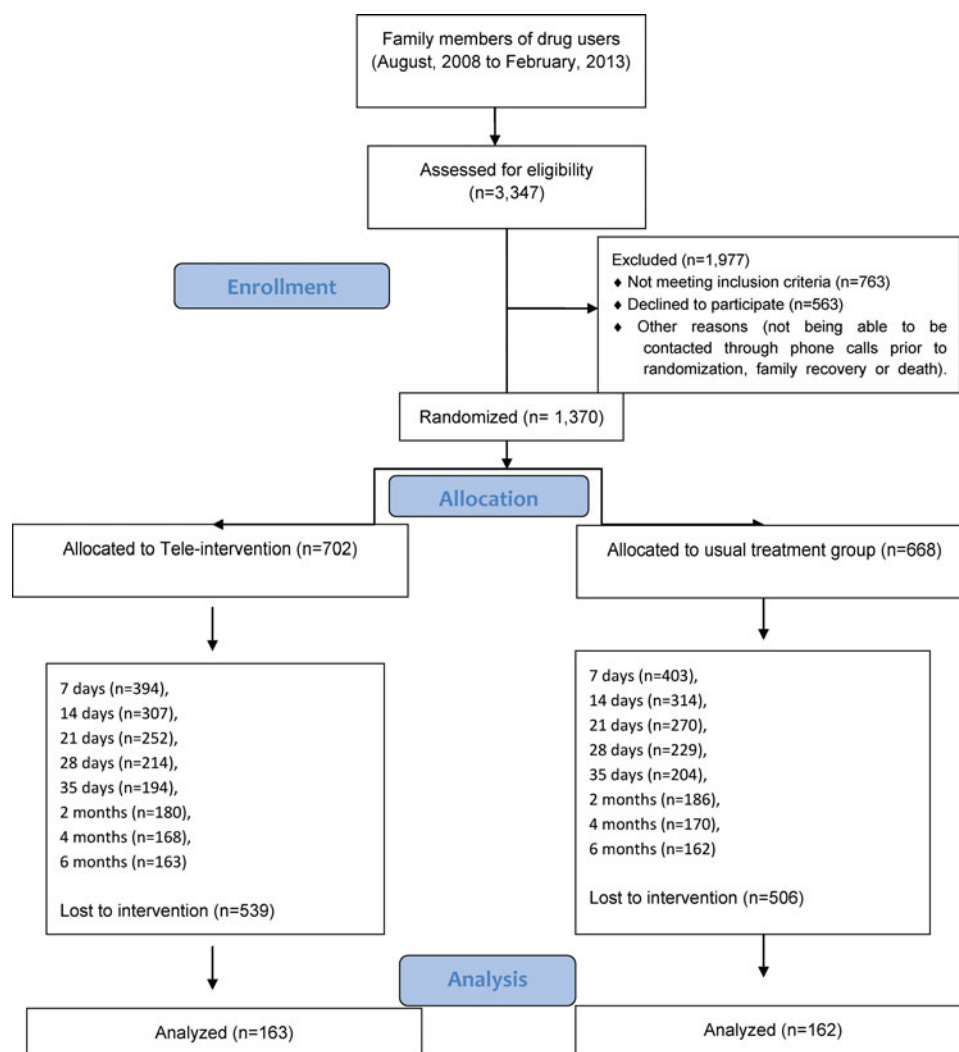


Figure 1. Flowchart of the progress shown by families of drug users during the study.

expectations of the other family members b) in addition to considering the needs of others, especially of the drug users, as more important than their own, which can lead to self-neglect. Low codependency is a less pronounced tendency toward codependency characteristics (Bortolon et al., 2016; Dear et al., 2000). A score of 9.7 or higher was considered high codependency for this study. This value was created from the average of codependency in a study of family members of drug users that was conducted in 2010 in Brazil (Bortolon et al., 2010). This scale was translated by a Brazilian researcher who is proficient in the English language and counter-translated by a native English speaker with knowledge of Portuguese to determine that the content of the questions had not been modified. The study for the cultural validation has been submitted for publication. c) The Contemplation Ladder (Biener, 1991) to evaluate the stage of readiness for behavior change using an adapted form with five statements (Fernandes et al., 2010; Signor et al., 2013). The self-assessment was carried out by reading statements to the

family members and asking them which statement best represented what they thought at the moment in relation to their behavior towards the use of drugs. The stage of change was characterized according to the choice of statement as follows: pre-contemplation (statements 1 and 2), contemplation (statement—st. 3), preparation (st. 4), and action and maintenance (st. 5).

Ethics

Ethical approval for the study was granted by the Research Ethics Committee of the Federal University of Health Sciences of Porto Alegre (UFCSPA) (Approval protocol no. 339/07).

Statistical analyses

Since the intervention occurs in steps and is considered complete only if the family member is in contact throughout all sessions in this study we wanted to reflect the effect

of the planned intervention taken in an optimal manner and having the non-inferiority concept in mind. Therefore we implemented *per protocol* data analysis in which only the participants who completed the entire clinical trial according to the protocol are counted towards the final results.

Initially, a descriptive analysis of subjects' sociodemographic characteristics was performed. Qualitative variables are presented as frequencies and percentages, while quantitative variables are presented as the mean and standard deviation. Bivariate analyses were performed by using the Chi-square test expressed as an odds ratio and 95% confidence interval for the eight scheduled phone calls (7 days to 6 months).

For multivariate analyses, participants were categorized as having either high or low codependency. The variables "age of family member," "gender of the family members," "gender of the user," "family income," "stage of change," "type of kinship," and "treatment modality" that had values $p = .2$ were included in the logistic regression analysis for the outcome. Multivariate analyses were also performed by means of the Cox regression model to verify the association between interventions to change codependent behavior outcome.

To verify the main effect of each variable (intervention and follow-up time) and the interaction effect between them on the means of codependency, two-way analysis of variance (ANOVA) of repeated measures was performed.

The analyses were carried out using IBM SPSS Statistics 19.0 software. Values of $p < .05$ were considered statistically significant.

Results

Family members were randomly assigned to the TMMFDU group ($n = 702$) or the UT group ($n = 668$). Similar loss to follow-up occurred after 6 months in both groups (approximately 76%), therefore analysis was performed "per protocol" to analyze changes in the codependent behavior of families in relation to users (Figure 1). There were no sociodemographic data or codependency differences between family members lost to follow-up versus those who remained until the final session of follow-up.

In the study, 1,370 family members (Figure 1) were initially randomized into the two groups, but only 325 family members who were included in the 6-month follow-up completed the monitoring—individuals completed all follow-ups (Table 2). Most family members (60%) who called for help had not sought assistance elsewhere to manage the drug abuse problem of their family member. At the last monitoring session, this ratio of family members who sought for additional assistance increased

Table 2. Sociodemographic characteristics, motivational stages of change, and codependency of family members of drug users who completed all sessions during the 6 months of follow-up—Comparison between the Usual Treatment (UT) and Tele-intervention Model and Monitoring of Families of Drug Users (TMMFDU) groups. Data collected during the first call (baseline).

Sociodemographic data ($n = 325$)	UT ($n = 163$) n (%)	TMMFDU ($n = 162$) n (%)	p
Kinship			
Mother ($n = 208$) or wife ($n = 63$)	133 (49)	138 (51)	.554
Others [#]	29 (54)	25 (46)	
Sex of the family members			
Female	148 (50)	149 (50)	1.000
Male	14 (50)	14 (50)	
Sex of the drug users			
Male	150 (51)	147 (49)	.554
Female	12 (43)	16 (57)	
Age of family members			
> 41 years	120 (53)	105 (47)	.071
< 40 years	42 (42)	58 (58)	
Marital status of family members			
Married	105 (52)	98 (48)	.724
Single	55 (49)	57 (51)	
Occupation			
Without paid work	64 (51)	62 (49)	1.000
With paid work	94 (51)	90 (49)	
Family income			
1–5 minimum wages	125 (55)	103 (45)	.022*
Over 5 minimum wages	34 (40)	51 (60)	
Education			
< 8 years	62 (49)	65 (51)	.647
> 8 years	96 (52)	90 (48)	
Have you sought any help			
No	101 (53)	91 (47)	.304
Yes	59 (46)	68 (54)	
Motivational stages ^{&}			
Initial stages	49 (62)	30 (38)	.904
Final stages	113 (46)	133 (54)	
Codependency			
High ($n = 220$)	113 (51)	107 (49)	.104
Low ($n = 105$)	49 (47)	56 (53)	

Data collected during the first call (baseline).

* $p \leq .05$

[#]Others: fathers, siblings, grandparents, cousins and uncles

[&]Initial stages (pre-contemplation contemplation and preparation). Final stages (action and maintenance)

to 51%. This increase in seeking for help did not show significant differences between treatment modalities ($p = .819$). Similarly, the ratio of individuals seeking for help had no difference between high and low codependency ($p = .336$). Therefore, seeking for help does not affect the main result of the study.

Mainly women who called were seeking help for young men in their families ($N = 271$). The first contact by the family members with the hotline revealed a high prevalence of codependency at 68%, a percentage that dropped to 24% by the end of the follow-up. The bivariate analyses of the first contact (baseline) showed that having family income of less than five times the minimum wage is a factor that potentially interacts with the results of the

Table 3. Adjusted odds ratios (OR) for high codependency and low codependency behaviors associated with TMMFDU in comparison to usual treatment among family members of drug users who completed the 6 months follow-up.[#]

Sociodemographic data	6 months of follow-up		OR (CI 95%)	OR (CI 95%)
	High codependency (n = 79) n (%)	Low codependency (n = 246) n (%)		
Kinship (n = 325)			Bivariate	Adjusted
Mother or wife	70 (26)	201 (74)	1.74 (0.81 to 3.74)	1.38 (0.53 to 3.56)
Others ^{##}	9 (17)	45 (86)	1.0	1.0
Sex of the family members (n = 325)				
Female	76 (26)	221 (74)	2.86 (0.84 to 9.7)	2.20 (0.53 to 9.08)
Male	3 (11)	25 (89)	1.0	1.0
Sex of the drug users (n = 325)				
Male	70 (24)	227 (76)	0.65 (0.28 to 1.5)	0.53 (0.21 to 1.32)
Female	9 (32)	19 (68)	1.0	1.0
Age of family members (n = 325)				
> 41 years	52 (23)	173 (77)	0.81 (0.47 to 1.89)	
<40 years	27 (27)	73 (73)	1.0	
Marital Status of family members (n = 315)				
Married	50 (25)	153 (75)	1.19 (0.68 to 2.08)	
Single	24 (21)	88 (79)	1.0	
Occupation (n = 310)				
Without paid work	35 (28)	91 (72)	1.47 (0.87 to 2.50)	1.30 (0.74 to 2.27)
With paid work	38 (21)	146 (79)	1.0	1.0
Family income (n = 313)				
1–5 minimum wages	58 (25)	170 (75)	1.73 (0.90 to 3.30)	1.56 (0.78 to 3.12)
5 minimum wages	14 (16)	71 (84)	1.0	1.0
Education (n = 313)				
<8 years	32 (25)	95 (75)	1.15 (0.68 to 1.95)	
>8 years	42 (23)	144 (77)	1.0	
Have you sought any help (n = 302)				
No	30 (20)	120 (80)	0.75 (0.43 to 1.26)	
Yes	38 (25)	114 (75)	1.0	
Motivational stages ^{&} (n = 325)				
Initial stage	28 (28)	72 (72)	1.32 (0.77 to 2.26)	1.32 (0.73 to 2.37)
Final stage	51 (23)	174 (77)	1.0	1.0
Treatments (n = 325)				
Usual treatment	49 (30)	113 (70)	1.92 (1.14 to 3.23)*	2.08 (1.18 to 3.65)*
TMMFDU	30 (18)	133 (82)	1.0	1.0

[#] Total family members who completed the 6 months follow-up is 325

* $p \leq .05$

^{##} Others: fathers, siblings, grandparents, cousins and uncles CI 95%—Confidence interval

[&] Initial stage (pre-contemplation, contemplation and preparation). Final stage (action and maintenance)

intervention. However, when logistic regression analyses were carried out to verify factors that interfere with behavioral change in family members over the period of 6 months, only the treatment modality variable was considered important for changing codependent behaviors ($p = .007$). This result demonstrated that, after 6 months of follow-up, the family members of the UT group were twice as likely to not modify their behavior from high codependency to low codependency when compared to the TMMFDU group (Table 3). In other words, the family members decreased the behaviors of high codependency (82%), as seen through the decreased codependency average. A statistically significant difference in codependency scores for high codependency was observed only after 6 months (ninth call) of follow-up when comparing treatment modalities. No significant differences were identified between high and low codependents in the UT and experimental intervention in previous sessions, from second to eighth calls.

The calls were made reactively (52%) by and proactively (48%) to family members after 6 months. There was no statistically significant difference in proactive versus reactive calls between the treatment modalities, when comparing high and low codependency at 6 months of follow-up ($p = .059$). We tried to contact the family members with the proactive calls, without many successes. Besides collecting follow up information we tried to understand why the follow up calls were not given and the answers given by a few ones in this process were vague and without scientific results.

Cox analysis revealed that the TMMFDU decreased codependency among the family members of drug users after 6 months compared with UT (OR = 0.585, CI 95% 0.37 to 0.92; $p = .020$).

The comparison of the means between the evaluation of codependency from the first call and the final 6 months of follow-up showed a significant reduction in codependency over time in both groups ($F_{\text{time}}(1;649) = 222.7$,

$p < .001$) although no significant interaction was found between the follow-up time and the decrease in codependency in the TMMFDU and UT groups ($F_{\text{interaction}}(1;646) = 0.6, p = .422$).

Discussion

Most participants in this study who sought and adhered to follow-up were mothers and wives of users. Thus, the sample was predominantly made up of female relatives of users. For women are the family members who mainly seek help facing difficulties in living with substance users, which has been shown to be common in similar studies (Bortolon et al., 2010; Noriega et al., 2008). Women originally exert cultural functions of care and protection within their families, consequently tend to be caregivers, which influenced them to most frequently seek help for drug users due to the responsible role they play (Edmundson, Byrne, & Rankin, 2000). One implication of this study is the more prevalent participation of mothers and wives in interventions of this type, but the study sample is limited. So these may limit the generalization of findings to male caregivers or codependent male family members, even though the intervention was not planned to focus only in women. However, as seen in other studies, the majority of the participants that sought help to deal with a substance-abusing relative were women (Noriega et al., 2008; Sakiyama et al., 2015), and many other mental health illnesses and chronic diseases tend to be more often assisted by female rather than male caregivers (National Alliance for Caregiving, 2009).

In the present study, codependent family members of drug users who received the TMMFDU treatment underwent an important behavioral change, which was confirmed by the decrease in codependency when compared to family members who received the usual treatment. Furthermore, when the survival curve was analyzed over a period of up to 6 months, it was observed that the TMMFDU increased the chance to reduce high codependency when compared with the UT. The TMMFDU was conducted in a brief, collaborative, and innovative way and played a key role in changing the codependent behaviors of family members when dealing with the user (Bortolon et al., 2013; Sim, Wain, & Khong, 2009).

It also led to maintenance—the final stage (action and maintenance) of motivation in family members with low codependency after 6 months of follow-up. In our sample, the majority of families were in the action stage in the first call, so the main TMMFDU task was to keep them in the final stages because it is known that the motivation for the change is buoyant (Faris, Cavell, Fishburne, & Britton, 2009). It is possible that in both groups, the families that finished the intervention are those who are more receptive

to intervention and more likely to self-criticize regarding their codependence. Also, in the final stages of change, the family members are facing the demands of treatment and are thus more susceptible to changing their codependent behaviors (Miller & Rollnick, 2013) and one may expect that the family members' change may promote changes in the attitudes of the drug users (Costa, 2010). Our model contributed to ensuring that the family members did not return to the early stages.

Despite the high level of loss in the study, as is common for effectiveness studies of telephone-based interventions, the losses were similar to those of other studies that employed tele-health interventions to treat alcohol addiction, with a range of loss from approximately 16% to 92% (Muench, 2014). The high loss to follow-up might be consequence of the fact that a different consultant could be interacting with the family member in subsequent calls. We believe that the Brazilian population is used to the procedure, because this is the method most frequently used in the public healthcare system. However, the impact of the change of consultants at each session needs to be evaluated in further studies.

Thus, the TMMFDU has shown to be useful for this population by facilitating access by family members who could not do a face-to-face treatment. It is also an effective, economical and efficient strategy that is used in other countries (Smith & Gray, 2009).

Losses were similar between groups; it seems that TMMFDU did not lead to greater retention of patients, but it did appear to have more impact on families who remained at follow-up. The intervention invoked the reasons for the change of codependent behaviors, while the usual care was based on psychoeducation methods (Burke, 2011). These characteristics may have been one of the reasons for the differences between the groups regarding the decrease in codependent behaviors. Even so, the families with no adherence seem to be a public to be worked as future prospects, to increase the effectiveness of the telephone-based intervention.

In both groups, a significant change in the mean codependency was found between the start of treatment and after 6 months of follow-up. These results highlight that following the family members by phone decreases codependency, helping them to better manage the chemical dependence regardless of the model used—UT or TMMFDU (Lyman et al., 2014), although the TMMFDU potentiated the change. The follow-up calls with a specific goal, to stimulate the family members in the process of change, were important for the performance of the TMMFDU. A previous study has shown that psychoeducation is associated with improvement in family-oriented strategies for dealing with drug users (Lyman, et al., 2014), so it was chosen as the Usual Treatment modality. The

accessibility of families with lower educational index and purchasing power to the TMMFDU reflected the utility of a free hotline because the phone is an important means of communication and intervention that favors clarification of issues that would be extremely difficult to expose face-to-face (Ferigolo et al., 2002; Mazoni et al., 2008).

The codependent family members often experience problems and demands that do not have a positive outcome, which can interact with the severity of the user's addiction, relapse, and treatment dropout (Alvarez, Gomes Oliveira, & Xavier, 2012), a process that makes the family suffer (Daire, Jacobson, & Carlson, 2012). The reduction in codependency means that the family members get more involved with their own feelings and problems and have an increased awareness of the interaction between the family and the substance use. The present results highlight the importance of interventions that encourage changes in attitudes that help in the synergy of behavioral change by both the family and the user (Bortolon et al., 2013).

A possible limitation in this study may be the fact that the initial enrollment in the study relied on the comprehension of what was being asked both in the codependency assessment and stage of change scales. Those who did not show minimal cognitive ability for understanding the questions and the scales are not represented in this study. In addition, a further study with equal numbers of male and female family members might identify any gender difference that was not detected in this study.

Other limitation is that the power of the sample was not calculated for the separation of the three elements of codependency (focus on others, self-sacrifice and reactivity), but for the overall mean codependency score. Future studies should examine this issue and consider the elements separately. In addition, the HCI scale should be validated for the Brazilian population.

The loss of family members during the follow-up was another limitation of the study. Nevertheless, the losses were similar to those seen in other studies employing similar methodology with drug users (Moreira et al., 2014; Signor et al., 2013). Reiners, Azevedo, Vieira, & Arruda (2008) mention that the family members try to solve the problem quickly and thus minimize the importance of follow-up because the treatment is usually centered on the user. Psychiatric disorders could also be associated with greater losses (Madigan et al., 2012), but this was not evaluated in the present study. In addition, most families that called the hotline requested help for the drug user. In contrast, the discourse of the family described the problematic attitudes, apart from wear of coexistence. The present approach proposed modifying the usual logic of the family of talking about and focusing only on the user. Furthermore, they were encouraged to speak out

about themselves, including how they relate with the user, their feelings, as well as assessment of their codependent behaviors. This proposal to talk about themselves may have been a factor that contributed to loss, because being actively involved with chemical dependency is a difficult task (Sakiyama et al., 2015; Yandoli et al., 2002). Another possible reason for the majority of the families not adhering to the 6-month follow-up may have been that TMMFDU induces that the family members think about their problems, and often the family members are seeking immediate answers to solve their problems.

Family members needed help to be ready to assist drug users in stopping the substance use process. Thus, interventions that help families become more aware of their own needs and difficulties (Alvarez, Gomes Oliveira, & Xavier, 2012) should be further explored in future research. Moreover, it is possible that the families that finished the intervention are those more receptive to intervention, and the effectiveness of TMMFDU in family members who are less motivated and more refractory should be evaluated in future studies.

This study was conducted primarily for codependent mothers and wives, so the TMMFDU was validated for Brazilian women, which will contribute to a better understanding of the little explored issue of codependency in the Brazilian culture (Vasconcellos & Prati, 2013). Future studies could be designed to verify if the TMMFDU for family influences the abstinence of drug abusers, and the severity of their substance use problem, the length of the problem, and treatment success. In addition, the effectiveness of TMMFDU in family members who are less motivated and more refractory to intervention could be examined.

Conclusion

In this study, the TMMFDU, based on motivational interviewing and stages of change, with intervention, care, and information about addiction, helped family members to decrease their codependent behavior. The follow-up calls with a specific goal, to stimulate the family members in the process of change, were important for the performance the TMMFDU. Moreover, tele-interventions are recognized as an affordable and economical strategy to reach this population. However, more studies should be conducted regarding the factors influencing adherence in tele-health services for family members of drug users.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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