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Peer Review Report for "The Effectiveness of Family-Based Treatment on Craving in Girl Students with Substance Abuse"

Author(s): Zabihollah Abbaspour, Zahra Ghanbari

Review Timeline:

Submit Date: 20 Apr 2020
Revised Date: 18 Jan 2021
Accepted Date: 23 Jan 2021

Revision (0)

Here, you can see the **Reviewers**, **Associate Editors** and **EICs'** comments from the beginning to the end of the revision process.

REFEREE: Reviewer | Revision (0) — 11 Jun 2020

Dear AE,
The desired corrections are expressed in the comments form in the Word file of the article.
Thanks

REFEREE: Reviewer | Revision (0) — 30 Jun 2020

Dear AE,
Comments for the authors:
1) Proper Style for Medical Writing? fair, But it suggested improving the quality by re-editing
2) Define unique terms and acronyms the first time used? yes
3) Proper English Grammar and Writing? yes
7) Describe the three major weaknesses of this paper: Ethical considerations must write, and references are old.
8) What additional information would you need to reproduce this study? discussion, updated references,
9) Your Final Conclusion is: a minor Revision

Thanks

REFEREE: Reviewer | **Revision** (0) 14 Jul 2020

Dear AE,
I read the article with interest. However, some flaws dampen my enthusiasm regarding the manuscript for the authros:
1. Please check your Keywords with the Mesh database. it seems that the keywords need some revisions.
2. In the Introduction, the aim of the present study was the effectiveness of Family Based Treatment on Cravings in girl students with substance abuse. Please discuss more the necessity for female students, previous study, ….
3. In the Introduction, the sentence “Addiction exposes women to more dangerous side effects than men and is associated with a higher risk of recurrence for women. The interval between the first drug use experience and injection of drugs in women is on average two years and in men eight years.” and “this dependence has naturally more severe physical, psychological, and social consequences for women compared to men”, which might need the references.
4. In methodology, the author showed that they used a SCED method, which is a clinical trial. Even if that is a clinical trial it had the clinical registration number and informed consent, which should be included in the article.
5. In methodology, the sentences should be referenced, like “Unlike boys, drug abuse is something very different for girls and it is not considered only a high-risk behavior. While drug abuse in boys sometimes is considered as a symbol for adulthood and manhood, it is defined as a disgrace, shame, and ignominy, ruining the future.”
6. Even though, the author suggested that the lack of a larger sample in the study, so they performed the SCED method, it is not unreliable. As result, only first, third, and fourth adolescents showed a significant improvement, but not the second who had high scores indicated more craving. If that improvement had statistical differences, doubtfully.
Among 4 adolescents, the second student lacked the follow-up data and the fourth one increased the scores on the Craving Beliefs Questionnaire at the follow-up stage, which does not indicate the relatively stable reduction of craving in substance abuse at the follow-up stage.
7. You should have reliable comparisons between your findings with the other previous studies, your purpose focus on female students in the small sample study, what about the sentence “The participants in this study were adolescent girls. It is suggested that further studies examine the effect of the family-based treatment on boys” if further studies should focus on the statistical differences of the therapy in female students.
Furthermore, if there were any other confounding biases in the study for this bio-psychosocial disease, how about the treatment compliance of all participants. Are there any limitations to this study? If yes, please mention all limitations within the discussion section, too.
Thnaks

REFEREE: Associate Editor | **Revision** (0) 26 Jul 2020

Dear EIC,

The manuscript is studied, and there are some comments which should be addressed by the author. According to the comments, the document needs major revision.
Kind regards,

REFEREE: EIC | **Revision** (0) 26 Jul 2020

Dear author,
answer the comments one by one in reply to reviewers' file
highlight the changes in the main file
reconsider the ethical considerations, limitations, conclusion, and footnotes
regards,

OPEN PEER REVIEW

Revision (1)

Reply to Reviewers

Ideally, the reviewing process can significantly improve the submitted manuscripts by allowing the authors to take into account the advice of reviewers. Author(s) must reply to all reviewers' comments in a separate Word file, point by point. A "**Reply to Reviewers**" document is submitted along with revised manuscript during submission of revised files, summarizing the changes that the authors made in response to the reviewers' comments. The responses to reviewers' comments specifies how the authors addressed each comment the reviewers made.

You can read the authors' responses to the reviewers' comments in the next page.

The Effectiveness of Family Based Treatment on Craving in Female Students with Substance Abuse

Background: Substance abuse and addiction are serious problems in the world and increasing tendency to substance use in adolescents has attracted the researchers and therapists' attention.
Objectives: The aim of present study was the effectiveness of Family Based Treatment on Craving in female students with substance abuse.
Patients and Methods: Four families and their female adolescent who engaged in substance abuse were selected using purposive sampling. Multiple baseline experimental single case study was used as the method of the present study. Family Based Treatment was carried out in three phase of baseline, intervention and follow-up and students completed the Craving Beliefs Questionnaire.
Results: The results of this study showed that Family Based Treatment had significant effect in decreasing of craving (% 40.08 improvements).
Conclusion: The Family Based Treatment can be effective in changing dysfunctional cycle of family system and decreasing tendency to substance abuse in adolescents and therapists can use this intervention to improve substance abuse.

Keywords: **Family Based Treatment, craving, substance abuse**

Introduction

Ages 10 to 19 are the most critical ages for the first experience of substance abuse. Adolescent substance abuse has increased significantly in recent years (1) and a high percentage of adolescents are exposed to substance abuse (2). Of every 10 adult addicts, 9 experienced substance abuse before the age of 18 (3). What makes the situation more difficult is that adolescents with substance abuse often also exhibit psychiatric disorders (4).

The craving in substance use is considered the core of addiction, the continuance of substance abuse, and the return to addiction after treatment begins (5). The craving in substance use is a multidimensional, personal experience making a person inclined to acquire a pleasant feeling and to overcome an unpleasant feeling (6). Some researchers have limited the definition of craving to a strong desire while others, in addition to desire, have pointed to a range of characteristics, such as predicting the reinforcing effects of the drug, paying attention to engaging in drug use, and tendencies that drive the individual to perform a particular action (7). When an adolescent is in a high-risk situation and does not have effective and appropriate responses to that situation, he or she will experience a decrease in self-efficacy and will develop positive expectations in the face of craving, lapse, and return to substances (8).

Although individual therapies, such as the 12-step self-help groups, are useful and accessible programs, they have not been developed for families with teenage children, and parents of teenagers are usually not comfortable with these programs. Besides, individualized addiction treatment programs rarely continue to provide ongoing care for adolescents and their families (9).

Some studies have considered family-related factors as the most important factors influential in the intention of drug abuse (10, 11) . Therefore family based interventions are the most effective way of preventing or treating adolescents involved with substance abuse (12). In a meta-analysis study, of the 6 most effective substance abuse treatments for adolescents, five were family based interventions: Multidimensional family therapy, functional family therapy, multi-systemic therapy, behavioral strategic family therapy, and behavioral family therapy (9). In family based therapies, parents have an active role in encouraging the adolescent to continue the treatment; they help the adolescent during the recovery period, and resume treatment if they fail. Therefore, such participation is predictive of sustainable and satisfactory outcomes (9). Research findings have shown that family based interventions have a significant effect on improving attitudes toward drugs in students with addicted parents (13), reducing depression and anger in the addicted adolescent (14) increasing self-efficacy and self-esteem, decreasing recurrence rate (15), and prevention of adolescent addiction and failure (12).

The Community Reinforcement and Family Training (CRAFT) is a family based treatment developed by Smith and Myers (2007). This program has been effective for both adolescents who resist treatment initiation and for improving adolescent substance abuse (14). This program is the completed version of the Community Reinforcement Approach (CRA). The CRA is a type of individual treatment that is administered directly to the drug abuser. Therapists in the process found that the spouse of the drug abuser could play an important role in the treatment, and so the family education was added to this program. Particularly important was the drug abuser's resistance to treatment and the important role of family members in initiating treatment (16). Unlike many intervention programs, unilateral treatments can only be performed by a family member who has been engaged in drug abuse, and there is no need for the drug abuser to attend the treatment process. Although all family members are welcomed into treatment, their presence is not necessary even it is not an obstacle to treatment progress. Therefore, parental support for initiating treatment (regardless of the presence of other family members and even the presence of the addicted adolescent) can reduce barriers, reduce parental stress, improve parent-child relationships, and make parents more focused on difficult behaviors (9).

There have been numerous treatments and interventions developed with physical and psychological approaches to addiction, some of which have been confirmed by empirical evidence. However, because of the nature of this bio-psychosocial disease, none of these treatments alone can lead to the person's complete health (17). Despite the high effectiveness of family based therapies, a review of the literature suggests that very little research has been conducted on this treatment. On the other hand, only about 20 to 33 percent of parents who are aware of their child's substance abuse can treat their child without outside help (9). More importantly, attention, pathology, and substance abuse treatment focus more on boys and men than girls and women, and most treatments are based on patterns of drug abuse in men. Although the Substance Abuse and Mental Health Services Administration (2012) statistics show that boys aged 12 years and older are at greater risk of drug abuse than girls, the progress of drug dependence is faster in women (18). Addiction exposes women to more dangerous side effects than men and is associated with a higher risk of recurrence for women. The interval between the

first drug use experience and injection of drugs in women is on average two years and in men eight years. As a result, women become severely dependent on drug use six years earlier than men, and this dependence has naturally more severe physical, psychological, and social consequences for women compared to men (19). Therefore, the main question addressed in this study is whether family-based treatment of craving in substance use in female students with substance abuse is effective.

Methodology

This study used a single-case experimental design (SCED), also called a single-subject experiment, which is a clinical trial. The design has several types (AB, ABAB, Multiple Baseline, and Changing Criterion Designs) (20), with a multiple baseline design being employed in this study. Unlike boys, drug abuse is something very different for girls and it is not considered only a high-risk behavior. While drug abuse in boys sometimes is considered as a symbol for adulthood and manhood, it is defined as a disgrace, shame, and ignominy, ruining the future (19). Therefore, given the lack of access to a larger sample in the experimental and control groups, this method was employed in this study. Tables 1 and 2 show the demographic characteristics of the couples and adolescents participating in this study.

Participants

The research population consisted of all female students with substance abuse in Ahvaz and their families. Five adolescents and their families were selected as the participants using purposive sampling. The research sample included families who referred to a school counselor for their child's abuse and the school counselor referred them to the research team. The inclusion criteria were: 1) Both parents had to attend the intervention program, 2) The addicted adolescent did not attend other treatment programs, and 3) The addicted adolescent did not suffer from any severe cognitive impairment (e.g. severe psychiatric disorders). The exclusion criteria were: 1) One or both parents were involved in drug abuse in the last two years, 2) The parents did not involve in an intervention program for the last six months for treating their child; and 3) There was no physical violence between the parents and the adolescents. Since one of the families did not attend the program after four family therapy sessions, the treatment process continued with 4 families. All of the participants signed an informed consent form in order to participate in the study. They were also informed that their personal information and questionnaire results would remain anonymous and confidential.

Table 1: The participants' demographic characteristics

Couples	Gender	Age	Education	Type of counseling received	Addiction period	Notes
1	Male	39	Bachelor	Couple therapy	-	
	Female	36	Bachelor		-	
2	Male	35	Diploma	Addiction quitting & couple therapy	9 years	Remarriage
	Female	37	Bachelor		-	

3	Male	35	Master	Premarital counseling	-	
	Female	29	Master		-	
4	Male	47	Master	-	Smoking	History of psychiatric drug use
	Female	42	Bachelor		-	Remarriage

Table 2: Family and adolescent information

Families	Number of children	The mother's nonattendance in the sessions	The father's nonattendance in the sessions	Type of drug used	History of addiction (month)	Adolescent age	Number of individual sessions for the adolescent
1	2	-	2	Marijuana	8	17	12
2	1	-	5	Marijuana	13	16	12
3	2	-	1	Hashish	6	18	13
4	3	-	2	Marijuana	6	16	14

Intervention

This intervention program included two parts. The first part was a family intervention with the presence of the parents and the adolescent could attend some sessions if desired. Each family participated in 12 sessions over three months and could request up to 6 emergency sessions if needed. The first session lasted 90 minutes and the other 11 sessions approximately 60 minutes. The emergency sessions lasted between 30 and 60 minutes. The second family requested three emergency sessions, and the fourth family requested two emergency sessions under critical conditions. The sessions were held based on behavioral skills training standards. The therapist first instructed the skill himself, then asked the parents to practice the skill through role-playing, and during the practice, he admired the parents and provided feedback to them. Finally, the barriers and possibilities of implementing this skill at home were discussed with parents. Nevertheless, the therapist was very flexible during each session and tried to adapt the content of each session according to family circumstances. At each session, the homework from the previous session and parent-adolescent interactions were discussed for 5 and 10 minutes. The new skill was taught for approximately 40 to 45 minutes and was summarized for about 5 to 10 minutes followed by the homework assignment. Besides, the therapist responded to the parents' questions and concerns. During the program, the parents were instructed on how to offer treatment to addicted adolescents. After the adolescents entered treatment, they were asked to discuss their concerns and goals about education, family, parents, peers, future, etc. Through motivational interviewing, the therapist encouraged the adolescents to continue the treatment. The adolescents were then suggested to begin individual interventions along with these sessions. Individual interventions included at least 12 sessions of cognitive-behavioral therapy. Family interventions are summarized as follows:

1) The introductory orientation session, 2) The functional analysis, 3) Positive reinforcement, 4) Competing reinforcing activities, 5) Planned ignoring, 6) Natural consequences, 7) Communication skills training, 8) Treatment initiation training, 9) Life enrichment, 10) Role-playing with feedback, 11) Problem-solving, 12) Critical family members, 13) Safety training, and 14) Treatment termination (9).

Instrument

Craving Beliefs Questionnaire: The Craving Beliefs Questionnaire was developed by Beck and Clark (21) and is a self-rating scale that measures beliefs about the craving of substance use. The scale has 20 items, each scored based on a 7-point scale from strongly disagree (1) to strongly agree (7). The score range is from 20 to 140 and high scores indicate more craving and a lower score indicating less craving in substance use. The alpha coefficient of this scale was reported to be 0.95 and the face and content validity of the scale were confirmed. The reliability of this scale was 0.84 through Cronbach's alpha and 0.82 by the split-half method (21). Besides, the validity of the scale was confirmed through the Pearson correlation coefficient ($r = -0.28$).

Procedure

After the family was introduced by the counselor, family therapy began, and after training the family to ask the adolescent to participate in treatment, the adolescents underwent the treatment process. The questionnaire was administered to the adolescents only, and the first and second adolescents initiated the treatment after two baselines and the third and fourth adolescents after 3 baselines, respectively. The family and individual treatment programs were then carried out in parallel and at the same time. The questionnaire was completed in the 3rd, 6th, 9th and 12th sessions of the individual therapies for the adolescents. The adolescents were re-evaluated two months after treatment for follow-up. Clinical significance was used in this study. Clinical significance refers to the practical importance of the effects of an intervention program. The two main and most commonly used approaches in clinical significance are the reliable change index approach and the normative comparisons approach. Visual drawing or graphical analysis, and diagnostic accuracy improvement were also used for data analysis and performance evaluation.

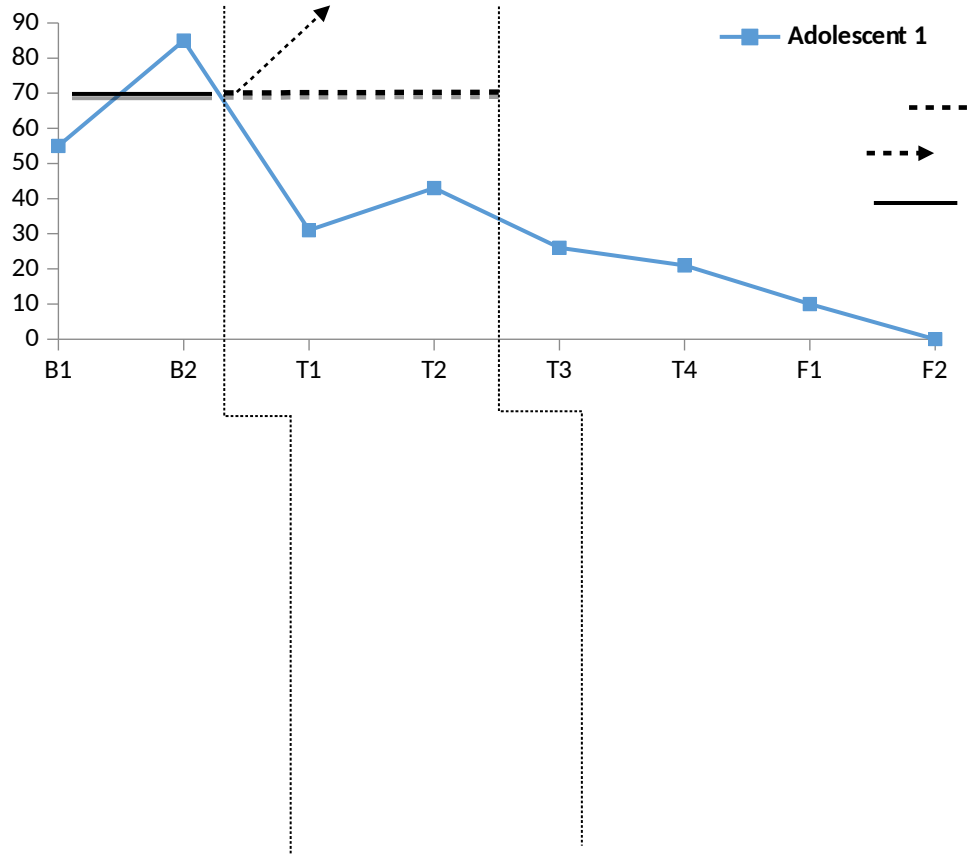
Results

Table 3 shows descriptive statistics of adolescent craving in substance use based on the Craving Beliefs Questionnaire in the three baselines, intervention, and follow-up stages:

	Reliable change index	Follow up 2	Follow up 1	Session 12	Session 9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	percentage of improvement
Adolescent 1	55	85	-	31	43	26	21	10	0	2.51	56.78
Adolescent 2	133	140	-	140	125	111	135	-	-	0.55	6.41
Adolescent 3	95	55	50	26	15	49	45	38	11	2.08	49.40
Adolescent 4	67	65	69	30	45	40	25	22	47	2.02	47.76

Figure 1 shows the trend of changing the scores of the Craving Beliefs Questionnaire:

Follow up **Intervention** **Baseline**


90
80
70
60
50
40
30
20
10
0
B1
B2
T1
T2
T3
T4
F1
F2
Adolescent 1

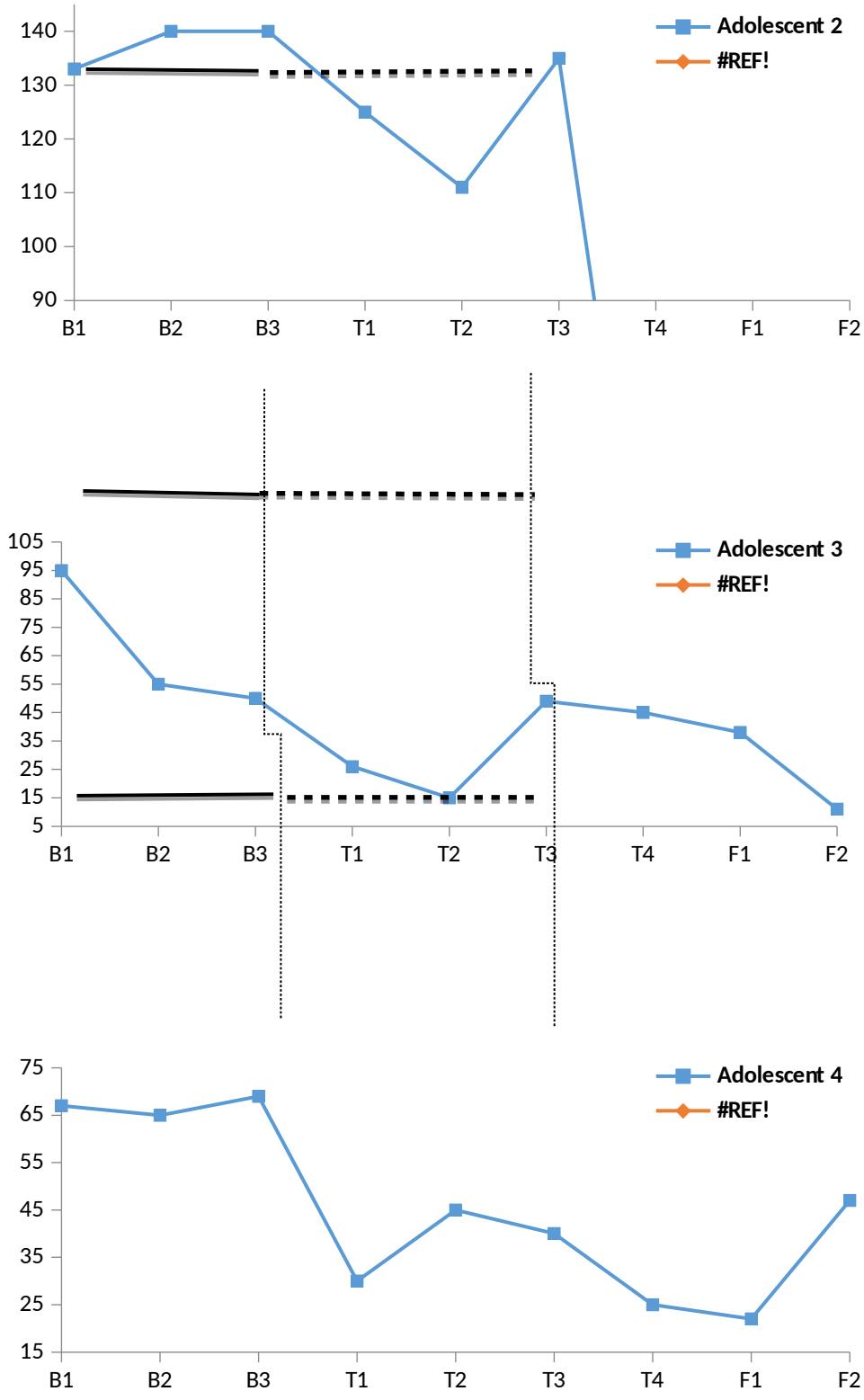


Figure 1: The trend of changing the scores of the Craving Beliefs Questionnaire

As can be seen in Table 3, the craving in substance use scores were significantly changed. The first, third, and fourth adolescents showed a significant improvement (56.78%, 49.40%, and 47.76%). However, the second adolescent had no significant improvement (6.41%). The reliable change index for the first, third and fourth adolescents was 2.51, 2.28 and 2.02, respectively, and since these three values were greater than Z=1.96, the changes in all three participants were significant, but this value was not significant for the second adolescent (0.55). The figure also shows that the craving in substance use was reduced in all three adolescents. However, based on the conservative dual-criteria (CDC) (22), the low number of drawing points for the second adolescent (3 out of 4 points) showed that the changes in this participant were not significant. According to Blanchard's taxonomy typology (23), family based treatment as a successful treatment reduces adolescent craving in substance use (40.08% improvement). Therefore, the family based treatment could reduce the craving in substance use among the participants and they were relatively stable at the follow-up stage.

Discussion

The purpose of the present study was to investigate the effectiveness of family based treatment on the tendency to substance abuse in female students with substance abuse. The results of the graphical analysis, the reliable change index, and improvement percentage showed that family based treatment reduced the craving in substance use by the female adolescents. These findings are in line with the results of previous studies (9, 14). Biestto Pons et al (14) showed the family based intervention program had a significant improvement in self-esteem, depression, and anger state and a decrease in negative moods in adolescents. Also, these results such as Kirby et al (9) showed involving parent in their adolescent’s substance abuse treatment would be effective.

The ultimate goal of family based treatment in treating adolescents with substance abuse is to empower family members to develop these skills. The immediate goal of this treatment was to reduce drug use, improve the functioning of the addicted person, and reduce side effects and social effects of drug use. This treatment helped the participants change their behavior and adapt to their normal lifestyle. The family based treatment was shown to help the adolescents to change substance-abuse thoughts and behaviors and to incorporate more rational coping and social skills in the family, school, and community (18). If adolescents find an opportunity to express their emotions and thoughts, they will accept responsibility for their decisions and the probability of risky behaviors is reduced. According to the results of this study, cognitive-behavioral therapy provided the adolescents with an opportunity to express their thoughts and challenge irrational beliefs about themselves, their family, and the world around them. Parents and other family members use reproach and threats when an adolescent is involved in substance abuse. These interactive patterns can exacerbate the adolescent's tendency to substance use and thus deepen adolescent addiction. The family based interventions in this study focused on changing patterns that worsen behavioral problems and the tendency to substance use. Family based therapy has helped the family members show the adolescent that the problem is a common, systemic issue and family members need to unite to solve it.

The family based treatment probably helped the adolescents to have a more realistic view of their existence and to consider leaving addiction as a factor in paving the way for a better future life and well-being. Adolescents are the most appropriate population to plan to promote healthy habits and change unhealthy habits such as substance abuse (18). The interventions performed with parents increased the emotional bond and love of parents. Usually, the family and other family members have no realistic attitude about quitting drug abuse and believe that the problem will be resolved if the adolescent wants to. However, the adolescent is involved in a variety of problems and difficult habits that manifest themselves in educational and communication issues. Family based treatment helps family members develop compassion and empathy rather than anger and hatred of adolescents and not evaluate them from a one-dimensional perspective and solely based on substance use.

This study has some limitations, which meant that we cannot deem its results to be conclusive. This is mainly due to the study design type, sample size, and the fact that a follow-up of the treatment at 12 months was not possible. One of the limitations of single-case study design is the repeated administrations of the research instruments in three baselines, intervention, and follow-up stages, which increases the likelihood of a transition effect. It is suggested that future studies include more participants and use group variance analysis research projects. The participants in this study were adolescent girls. It is suggested that further studies examine the effect of the family based treatment on boys. Of the four adolescents under study, three were marijuana users. It is suggested that further research explore the efficacy of this treatment on users of chemical substances.

Compliance with ethical guidelines

This research was approved by Shahid Chamran University of Ahvaz and was conducted under the code of ethics No. 381/328 dated July 9, 2019.

Funding

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Authors' contributions

Conceptualization and methodology: Zabihollah Abbaspour; Investigation and writing-review & editing: Zahra Ghanbari.

Conflict of interest

The authors certify that they have no affiliation with or involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials dismissed in this manuscript.

Acknowledgments

The authors appreciate the families who come to Nedaye Zendegy Center and for their active participation in this research.

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OPEN PEER REVIEW

Revision (1)

Here, you can see the **Reviewers**, **Associate Editors** and **EICs'** comments from the beginning to the end of the revision process.

REFEREE: EIC | **Revision (1)** 12 Jan 2021

Dear Authors,
- add to discussion in related part:
As mentioned, the second patient had much variations in intervention stage and in fact, treatment was not effective for her and even she was not agree to continue the treatment. Nonetheless, statistical inference is based on changes in baseline and intervention stages. However, trend of scores in follow-up stage in the fourth patient increased, but none of her scores in follow-up went above baseline scores.
Thanks

OPEN PEER REVIEW

Revision (2)

Reply to Reviewers

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Introduction

Ages 10 to 19 are the most critical ages for the first experience of substance abuse. Adolescent substance abuse has increased significantly in recent years (1) and a high percentage of adolescents are exposed to substance abuse (2). Of every 10 adult addicts, 9 experienced substance abuse before the age of 18 (3). What makes the situation more difficult is that adolescents with substance abuse often also exhibit psychiatric disorders (4).

The craving in substance use is considered the core of addiction, the continuance of substance abuse, and the return to addiction after treatment begins (5). The craving in substance use is a multidimensional, personal experience making a person inclined to acquire a pleasant feeling and to overcome an unpleasant feeling (6). Some researchers have limited the definition of craving to a strong desire while others, in addition to desire, have pointed to a range of characteristics, such as predicting the reinforcing effects of the drug, paying attention to engaging in drug use, and tendencies that drive the individual to perform a particular action (7). When an adolescent is in a high-risk situation and does not have effective and appropriate responses to that situation, he or she will experience a decrease in self-efficacy and will develop positive expectations in the face of craving, lapse, and return to substances (8).

Although individual therapies, such as the 12-step self-help groups, are useful and accessible programs, they have not been developed for families with teenage children, and parents of teenagers are usually not comfortable with these programs. Besides, individualized addiction treatment programs rarely continue to provide ongoing care for adolescents and their families (9).

Some studies have considered family-related factors as the most important factors influential in the intention of drug abuse (10, 11) . Therefore family based interventions are the most effective way of preventing or treating adolescents involved with substance abuse (12). In a meta-analysis study, of the 6 most effective substance abuse treatments for adolescents, five were family based interventions: Multidimensional family therapy, functional family therapy, multi-systemic therapy, behavioral strategic family therapy, and behavioral family therapy (9). In family based therapies, parents have an active role in encouraging the adolescent to continue the treatment; they help the adolescent during the recovery period, and resume treatment if they fail. Therefore, such participation is predictive of sustainable and satisfactory outcomes (9). Research findings have shown that family based interventions have a significant effect on improving attitudes toward drugs in students with addicted parents (13), reducing depression and anger in the addicted adolescent (14) increasing self-efficacy and self-esteem, decreasing recurrence rate (15), and prevention of adolescent addiction and failure (12).

The Community Reinforcement and Family Training (CRAFT) is a family based treatment developed by Smith and Myers (2007). This program has been effective for both adolescents who resist treatment initiation and for improving adolescent substance abuse (14). This program is the completed version of the Community Reinforcement Approach (CRA). The CRA is a type of individual treatment that is administered directly to the drug abuser. Therapists in the process found that the spouse of the drug abuser could play an important role in the treatment, and so the family education was added to this program. Particularly important was the drug abuser’s resistance to treatment and the important role of family members in initiating treatment (16). Unlike many intervention programs, unilateral treatments can only be performed by a family member who has been engaged in drug abuse, and there is no need for the drug abuser to attend the treatment process. Although all family members are welcomed into treatment, their presence is not necessary even it is not an obstacle to treatment progress. Therefore, parental support for initiating treatment (regardless of the presence of other family members and even the presence of the addicted adolescent) can reduce barriers, reduce parental stress, improve parent-child relationships, and make parents more focused on difficult behaviors (9).

There have been numerous treatments and interventions developed with physical and psychological approaches to addiction, some of which have been confirmed by empirical evidence. However, because of the nature of this bio-psychosocial disease, none of these treatments alone can lead to the person’s complete health (17). Despite the high effectiveness of family based therapies, a review of the literature suggests that very little research has been conducted on this treatment. On the other hand, only about 20 to 33 percent of parents who are aware of their child's substance abuse can treat their child without outside help (9). More importantly, attention, pathology, and substance abuse treatment focus more on boys and men than girls and women, and most treatments are based on patterns of drug abuse in men. Although the Substance Abuse and Mental Health Services Administration (2012) statistics show that boys aged 12 years and older are at greater risk of drug abuse than girls, the progress of drug dependence is faster in women (18). Addiction exposes women to more dangerous side effects than men and is associated with a higher risk of recurrence for women. The interval between the

first drug use experience and injection of drugs in women is on average two years and in men eight years. As a result, women become severely dependent on drug use six years earlier than men, and this dependence has naturally more severe physical, psychological, and social consequences for women compared to men (19). Therefore, the main question addressed in this study is whether family-based treatment of craving in substance use in female students with substance abuse is effective.

Methodology

This study used a single-case experimental design (SCED), also called a single-subject experiment, which is a clinical trial. The design has several types (AB, ABAB, Multiple Baseline, and Changing Criterion Designs) (20), with a multiple baseline design being employed in this study. Unlike boys, drug abuse is something very different for girls and it is not considered only a high-risk behavior. While drug abuse in boys sometimes is considered as a symbol for adulthood and manhood, it is defined as a disgrace, shame, and ignominy, ruining the future (19). Therefore, given the lack of access to a larger sample in the experimental and control groups, this method was employed in this study. Tables 1 and 2 show the demographic characteristics of the couples and adolescents participating in this study.

Participants

The research population consisted of all female students with substance abuse in Ahvaz and their families. Five adolescents and their families were selected as the participants using purposive sampling. The research sample included families who referred to a school counselor for their child's abuse and the school counselor referred them to the research team. The inclusion criteria were: 1) Both parents had to attend the intervention program, 2) The addicted adolescent did not attend other treatment programs, and 3) The addicted adolescent did not suffer from any severe cognitive impairment (e.g. severe psychiatric disorders). The exclusion criteria were: 1) One or both parents were involved in drug abuse in the last two years, 2) The parents did not involve in an intervention program for the last six months for treating their child; and 3) There was no physical violence between the parents and the adolescents. Since one of the families did not attend the program after four family therapy sessions, the treatment process continued with 4 families. All of the participants signed an informed consent form in order to participate in the study. They were also informed that their personal information and questionnaire results would remain anonymous and confidential.

Table 1: The participants' demographic characteristics

Couples	Gender	Age	Education	Type of counseling received	Addiction period	Notes
1	Male	39	Bachelor	Couple therapy	-	
	Female	36	Bachelor		-	
2	Male	35	Diploma	Addiction quitting & couple therapy	9 years	Remarriage
	Female	37	Bachelor		-	

3	Male	35	Master	Premarital counseling	-	
	Female	29	Master		-	
4	Male	47	Master	-	Smoking	History of psychiatric drug use
	Female	42	Bachelor		-	Remarriage

Table 2: Family and adolescent information

Families	Number of children	The mother's nonattendance in the sessions	The father's nonattendance in the sessions	Type of drug used	History of addiction (month)	Adolescent age	Number of individual sessions for the adolescent
1	2	-	2	Marijuana	8	17	12
2	1	-	5	Marijuana	13	16	12
3	2	-	1	Hashish	6	18	13
4	3	-	2	Marijuana	6	16	14

Intervention

This intervention program included two parts. The first part was a family intervention with the presence of the parents and the adolescent could attend some sessions if desired. Each family participated in 12 sessions over three months and could request up to 6 emergency sessions if needed. The first session lasted 90 minutes and the other 11 sessions approximately 60 minutes. The emergency sessions lasted between 30 and 60 minutes. The second family requested three emergency sessions, and the fourth family requested two emergency sessions under critical conditions. The sessions were held based on behavioral skills training standards. The therapist first instructed the skill himself, then asked the parents to practice the skill through role-playing, and during the practice, he admired the parents and provided feedback to them. Finally, the barriers and possibilities of implementing this skill at home were discussed with parents. Nevertheless, the therapist was very flexible during each session and tried to adapt the content of each session according to family circumstances. At each session, the homework from the previous session and parent-adolescent interactions were discussed for 5 and 10 minutes. The new skill was taught for approximately 40 to 45 minutes and was summarized for about 5 to 10 minutes followed by the homework assignment. Besides, the therapist responded to the parents' questions and concerns. During the program, the parents were instructed on how to offer treatment to addicted adolescents. After the adolescents entered treatment, they were asked to discuss their concerns and goals about education, family, parents, peers, future, etc. Through motivational interviewing, the therapist encouraged the adolescents to continue the treatment. The adolescents were then suggested to begin individual interventions along with these sessions. Individual interventions included at least 12 sessions of cognitive-behavioral therapy. Family interventions are summarized as follows:

1) The introductory orientation session, 2) The functional analysis, 3) Positive reinforcement, 4) Competing reinforcing activities, 5) Planned ignoring, 6) Natural consequences, 7) Communication skills training, 8) Treatment initiation training, 9) Life enrichment, 10) Role-playing with feedback, 11) Problem-solving, 12) Critical family members, 13) Safety training, and 14) Treatment termination (9).

Instrument

Craving Beliefs Questionnaire: The Craving Beliefs Questionnaire was developed by Beck and Clark (21) and is a self-rating scale that measures beliefs about the craving of substance use. The scale has 20 items, each scored based on a 7-point scale from strongly disagree (1) to strongly agree (7). The score range is from 20 to 140 and high scores indicate more craving and a lower score indicating less craving in substance use. The alpha coefficient of this scale was reported to be 0.95 and the face and content validity of the scale were confirmed. The reliability of this scale was 0.84 through Cronbach's alpha and 0.82 by the split-half method (21). Besides, the validity of the scale was confirmed through the Pearson correlation coefficient ($r = -0.28$).

Procedure

After the family was introduced by the counselor, family therapy began, and after training the family to ask the adolescent to participate in treatment, the adolescents underwent the treatment process. The questionnaire was administered to the adolescents only, and the first and second adolescents initiated the treatment after two baselines and the third and fourth adolescents after 3 baselines, respectively. The family and individual treatment programs were then carried out in parallel and at the same time. The questionnaire was completed in the 3rd, 6th, 9th and 12th sessions of the individual therapies for the adolescents. The adolescents were re-evaluated two months after treatment for follow-up. Clinical significance was used in this study. Clinical significance refers to the practical importance of the effects of an intervention program. The two main and most commonly used approaches in clinical significance are the reliable change index approach and the normative comparisons approach. Visual drawing or graphical analysis, and diagnostic accuracy improvement were also used for data analysis and performance evaluation.

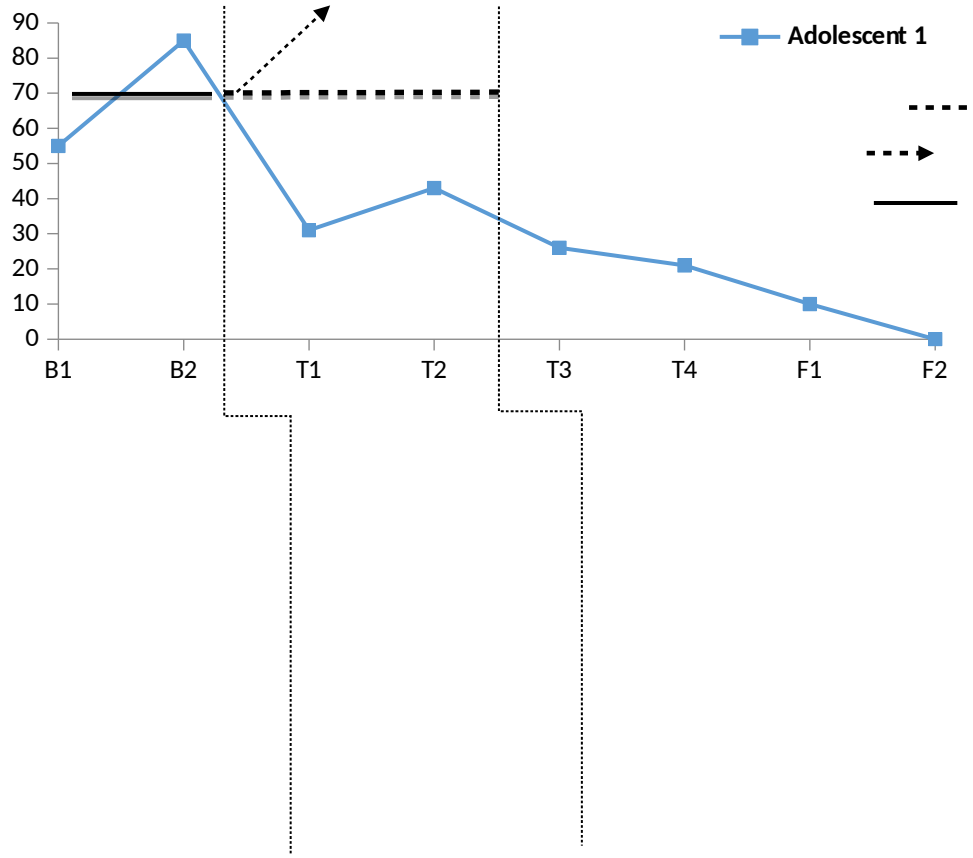
Results

Table 3 shows descriptive statistics of adolescent craving in substance use based on the Craving Beliefs Questionnaire in the three baselines, intervention, and follow-up stages:

	Baseline 1	Baseline 2	Baseline 3	Session 6	Session 9	Session 12	Follow up 1	Follow up 2	Reliable change index	percentage of improvement
Adolescent 1	55	85	-	31	43	26	21	10	0	2.51	56.78
Adolescent 2	133	140	-	140	125	111	135	-	-	0.55	6.41
Adolescent 3	95	55	50	26	15	49	45	38	11	2.08	49.40
Adolescent 4	67	65	69	30	45	40	25	22	47	2.02	47.76

Figure 1 shows the trend of changing the scores of the Craving Beliefs Questionnaire:

Follow up **Intervention** **Baseline**


90
80
70
60
50
40
30
20
10
0
B1
B2
T1
T2
T3
T4
F1
F2
Adolescent 1

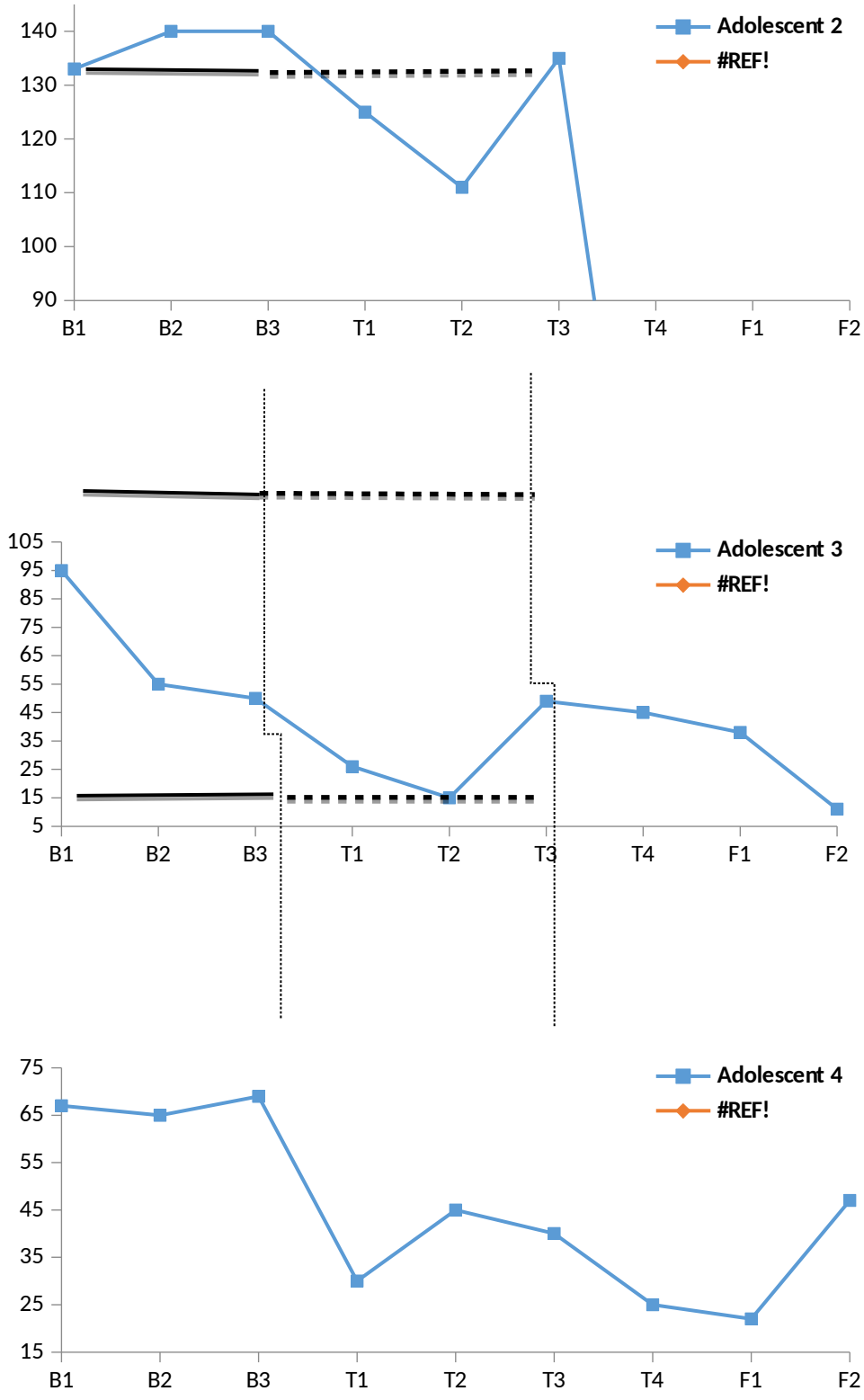


Figure 1: The trend of changing the scores of the Craving Beliefs Questionnaire

As can be seen in Table 3, the craving in substance use scores were significantly changed. The first, third, and fourth adolescents showed a significant improvement (56.78%, 49.40%, and 47.76%). However, the second adolescent had no significant improvement (6.41%). The reliable change index for the first, third and fourth adolescents was 2.51, 2.28 and 2.02, respectively, and since these three values were greater than Z=1.96, the changes in all three participants were significant, but this value was not significant for the second adolescent (0.55). The figure also shows that the craving in substance use was reduced in all three adolescents. However, based on the conservative dual-criteria (CDC) (22), the low number of drawing points for the second adolescent (3 out of 4 points) showed that the changes in this participant were not significant. As mentioned, the second patient had much variations in intervention stage and in fact, treatment was not effective for her and even she was not agree to continue the treatment. Nonetheless, statistical inference is based on changes in baseline and intervention stages. However, trend of scores in follow-up stage in forth patient increased, but none of her scores in follow-up went above baseline scores. According to Blanchard's taxonomy typology (23), family based treatment as a successful treatment reduces adolescent craving in substance use (40.08% improvement). Therefore, the family based treatment could reduce the craving in substance use among the participants and they were relatively stable at the follow-up stage.

Discussion

The purpose of the present study was to investigate the effectiveness of family based treatment on the tendency to substance abuse in female students with substance abuse. The results of the graphical analysis, the reliable change index, and improvement percentage showed that family based treatment reduced the craving in substance use by the female adolescents. These findings are in line with the results of previous studies (9, 14). Biestto Pons et al (14) showed the family based intervention program had a significant improvement in self-esteem, depression, and anger state and a decrease in negative moods in adolescents. Also, these results such as Kirby et al (9) showed involving parent in their adolescent’s substance abuse treatment would be effective.

The ultimate goal of family based treatment in treating adolescents with substance abuse is to empower family members to develop these skills. The immediate goal of this treatment was to reduce drug use, improve the functioning of the addicted person, and reduce side effects and social effects of drug use. This treatment helped the participants change their behavior and adapt to their normal lifestyle. The family based treatment was shown to help the adolescents to change substance-abuse thoughts and behaviors and to incorporate more rational coping and social skills in the family, school, and community (18). If adolescents find an opportunity to express their emotions and thoughts, they will accept responsibility for their decisions and the probability of risky behaviors is reduced. According to the results of this study, cognitive-behavioral therapy provided the adolescents with an opportunity to express their thoughts and challenge irrational beliefs about themselves, their family, and the world around them. Parents and other family members use reproach and threats when an adolescent is involved in substance abuse. These interactive patterns can exacerbate the adolescent's tendency to substance use and thus deepen adolescent addiction. The family based interventions in this study focused on changing patterns

that worsen behavioral problems and the tendency to substance use. Family based therapy has helped the family members show the adolescent that the problem is a common, systemic issue and family members need to unite to solve it.

The family based treatment probably helped the adolescents to have a more realistic view of their existence and to consider leaving addiction as a factor in paving the way for a better future life and well-being. Adolescents are the most appropriate population to plan to promote healthy habits and change unhealthy habits such as substance abuse (18). The interventions performed with parents increased the emotional bond and love of parents. Usually, the family and other family members have no realistic attitude about quitting drug abuse and believe that the problem will be resolved if the adolescent wants to. However, the adolescent is involved in a variety of problems and difficult habits that manifest themselves in educational and communication issues. Family based treatment helps family members develop compassion and empathy rather than anger and hatred of adolescents and not evaluate them from a one-dimensional perspective and solely based on substance use.

This study has some limitations, which meant that we cannot deem its results to be conclusive. This is mainly due to the study design type, sample size, and the fact that a follow-up of the treatment at 12 months was not possible. One of the limitations of single-case study design is the repeated administrations of the research instruments in three baselines, intervention, and follow-up stages, which increases the likelihood of a transition effect. It is suggested that future studies include more participants and use group variance analysis research projects. The participants in this study were adolescent girls. It is suggested that further studies examine the effect of the family based treatment on boys. Of the four adolescents under study, three were marijuana users. It is suggested that further research explore the efficacy of this treatment on users of chemical substances.

Compliance with ethical guidelines

This research was approved by Shahid Chamran University of Ahvaz and was conducted under the code of ethics No. 381/328 dated July 9, 2019.

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Authors' contributions

Conceptualization and methodology: Zabihollah Abbaspour; Investigation and writing-review & editing: Zahra Ghanbari.

Conflict of interest

The authors certify that they have no affiliation with or involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials dismissed in this manuscript.

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OPEN PEER REVIEW

Revision (2)

Here, you can see the **Reviewers**, **Associate Editors** and **EICs'** comments from the beginning to the end of the revision process.

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Dear Author,
The document is reviewed carefully by the reviewers. According to their comments and your revisions as requested, this manuscript is accepted.
Thanks.