Substance Use & Misuse, 46:128–133, 2011

ISSN: 1082-6084 print / 1532-2491 online
DOI: 10.3109/10826084.2011.580233

informa
healthcare

ORIGINAL ARTICLE

Cognitive Behavioral Therapy-Based Brief Intervention for Volatile Substance Misusers During Adolescence: A Follow-Up Study

Kültegin Ögel[1] and Sibel Coskun[2]

[1]Department of Psychiatry, Medicine Faculty, Acibadem University, İstanbul, Turkey; [2]Fethiye Nursing High School, Mugla University, Merkez, Mugla, Turkey

Of 62 males admitted for treatment in Turkey in 2008 with a diagnosis of volatile substance misuse (VSM) dependency, half were randomly allocated to receive a cognitive behavioral therapy (CBT)-based brief intervention and an education program and half participated only in the education program. One year after treatment, 38.2% of the experimental group and 58.1% of the control group had continued VSM during the last three months. This statistically significant difference indicates that CBT-based brief intervention is associated with reducing VSM in adolescents. Factors associated with abstinence after treatment are identified and study limitations are noted.

Keywords inhalants, dependency, treatment, cognitive behavior therapy, brief psychotherapy

INTRODUCTION

Volatile substance misuse (VSM) is particularly prevalent among adolescents, and the condition is characterized by the use of various substances (Ramon, Ballesteros, Martinez-Arrieta, Jorrecilla, & Cabrera, 2003). VSM may be accompanied by other psychological problems such as misuse and addiction to other substances, physical/sexual abuse during childhood, period(s) of major depression during lifetime, and previous suicide attempts (Dinwiddie, 1997; Dinwiddie, Reich, & Cloninger, 1991; Fendrich, Mackesy-Amiti, Wislar, & Goldstein, 1997; Jacobs & Ghodse, 1987; Sakai, Hall, Mikulich-Gilbertson, & Crowley, 2004). In addition, prevalence of conduct disorder is particularly high among adolescents who misuse volatile substances (Crites & Shuckit, 1979; Sakai, 2006).

Although VSM is a rather common problem necessitating close monitoring, sufficient information is not available on the treatment of this condition (Martino, McCaffrey, Klein, & Ellickson, 2009). Due to the lack of effective treatment modalities and low remission rates, healthcare and "addiction" professionals are usually pessimistic about treatment of VSM.[1] These professionals complain about the lack of human and scientific resources available for the management of this problem (Beauvais, Jumper-Thurman, Plested, & Helm, 2002).

Current evidence suggests that VSM is associated with poor outcomes (Sakai, 2006). In the study by Dinwiddie, Zorumski, and Rubin (1987), all volatile substance users relapsed within 6 months after treatment. In another study, volatile substance users who received treatment were shown to be using other substances in even higher amounts within 4 years after treatment and had been incarcerated during that period (Simpson, 1997). On the other hand, success rates similar to other substance user treatments have also been reported for VSM (Dell & Hopkins, this issue; Sakai et al., 2006).

According to some authors, methods for the management of VSM should not substantially differ from the

Address correspondence to Kültegin Ögel, Department of Mental Health and Diseases, Acibadem University, Acibadem Maslak Hospital, Büyükdere Cad. No: 40, 34457 Maslak-Istanbul, Turkey. E-mail: ogelk@ogelk.net.

[1]Treatment can be briefly and usefully defined as a planned, goal directed, temporally structured change process of necessary quality, appropriateness, and conditions (endogenous and exogenous), which is *bounded* (culture, place, time, etc.) and can be categorized into professional-based, tradition-based, mutual-help-based (AA, NA, etc.) and self-help ("natural recovery") models. There are no unique models or techniques used with substance users—of whatever types and heterogeneities—which are not also used with nonsubstance users. This applies whether or not a treatment technique is indicated or contraindicated, and its selection underpinnings (theory-based, empirically based, principle of faith-based, tradition-based, etc., continue to be a generic and key treatment issue). In the West, with the relatively new ideology of "harm reduction" and the even newer Quality of Life (QOL) treatment-driven model, there are now a new set of goals in addition to those derived from/associated with the older tradition of abstinence-driven models. Treatment is implemented in a range of environments; ambulatory as well as within institutions which can include controlled environments. Treatment includes a spectrum of clinician–caregiver–patient relationships representing various forms of decision-making traditions/models; (1). the hierarchical model in which the clinician-treatment agent makes the decision(s) and the recipient is compliant and relatively passive, (2) shared decision-making which facilitates the collaboration between clinician and patient(s) in which both are active, and (3) the informed model in which the patient makes the decision(s). Editor's note.

treatments used for the general addictive-dependency behavior of adolescents (McCoy, Metsch, & Inciardi, 1995). In common with other addictions and substance use dependency, the tendency in therapy is to focus on the user, symptom relief, and short-term behavioral cognitive therapy in the community (McCartney, 1999; Westermeyer, 1987). However, one of the important issues requiring investigation is the optimal duration of an effective treatment for VSM (Beauvais, 1997).

VSM is closely related to socioeconomic conditions and accompanied by a range of social and psychological problems (Ives, 2006). Therefore, the impact of these factors on treatment outcomes needs to be investigated. This 1-year observational study aims to examine the efficacy of a brief cognitive behavioral therapy (CBT) for VSM in adolescent patients and to identify factors affecting remission.

METHODS

Study Sample

Adolescents aged between 13 and 18 years ($n = 146$), who were hospitalized in a clinic specializing in VSM in Istanbul, Turkey, between August 2008 and October 2008 with a diagnosis of "volatile substance dependence," or "polysubstance dependence with preference to volatile substances" according to DSM-IV criteria, were included in this study.

Eighty-four participants were excluded from the study due to following reasons: illiteracy ($n = 7$), coexistence of another psychiatric disorder ($n = 8$), being a non-Turkish citizen ($n = 1$), dropping out after the initial assessment ($n = 39$), exacerbation of symptoms leading to relapse during hospitalization period ($n = 29$). Thus, 57.6% of potential participants were excluded from the analyses and the study sample was composed of 62 participants, with 31 patients in the experimental group and 31 in the control group. They were assigned to the groups randomly according to their hospitalization sequence. No subject refused to take part in the study. The study sample included only male adolescents since female adolescents were not hospitalized, but rather followed in an outpatient setting at the clinic where the study was conducted. All of the participants who took part in the study were Muslims. The mean duration of hospitalization was significantly higher for the patients receiving intervention when compared to controls (51.51 ± 38.88 days vs. 31.61 ± 18.79 days, t: 2.57, $p = 0.01$).

The local ethics committee approved the study protocol. All patients were informed of study procedures and gave written and verbal informed consent at the time of hospitalization.

Instruments

The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I) was administered for the diagnosis of volatile substance dependency and the diagnosis was established according to DSM-IV-TR criteria. Patients without a diagnosis of dependency were not included in the study. A clinical psychologist who was trained on the use of SCID made the diagnoses.

Cases diagnosed with dependency were administered a questionnaire developed by the study investigators to provide information on educational status, place of residency, family characteristics, and details of substance use. This questionnaire included questions on the place where the adolescent lives, duration of being homeless (if applicable), structure of and relations with the family, duration of substance use, use of other substances, and previous hospitalizations (if any). Perception of family problems was rated using a 5-point analog scale with "no problem at all" and "many problems" at the two extremes of the scale.

Interventions

Adolescents in the experimental group participated in a CBT-based brief intervention with a focus on psychoeducation. This program was based on cognitive behavioral treatment and consisted of three sessions. During the first session, patients were informed about dependency and harmful effects of volatile substances. The second session was about high-risk conditions and on how to cope with the cravings. During the third session, adolescents were trained on how to resist drug offers and how to cope with emergency conditions. The experimental group also received an educational program about the harmful effects of drug use, which was a standard treatment procedure at the clinic where the study was conducted. This educational program comprises a single, 1-hr session. The control group received only the educational program about the harmful effects of drug use, and did not attend the CBT-based brief intervention program.

According to the standard treatment procedure of the treatment center, the length of hospitalization period is subject to the adolescents' own decisions. During this time, adolescents participate in vocational training programs. Both groups participated equally in these programs during their stay.

Procedures

Adolescents were contacted 1 year after the completion of their hospitalization period and were asked whether they had used any volatile substance during the preceding period. In addition to these self-reports, a cross-sectional examination was conducted through the review of medical records in order to find any evidence for ongoing substance misuse among patients in both the experimental and control groups. We were not able to contact 13 adolescents. No information could be obtained from five (16.1%) and eight (25.8%) adolescents in the experimental and control groups, respectively.

Statistical Analysis

Logistic regression with enter method was used to identify factors predicting remission. For the purpose of statistical analysis, subjects were categorized according to duration of living homeless ($<$ or $>$ 1 year), education level (previous school education or current school attendance), family type (nuclear or extended), previous history of

hospitalizations (present or absent), and duration of substance use (< or > 3 years). The adolescent was deemed to have a relationship with their parents even if contacts occurred rarely.

RESULTS

The mean age was 15.25 ± 1.18 years and 15.32 ± 1.42 years in the experimental and the control groups at treatment entry, respectively, without any significant difference between the groups ($p = 0.84$). Sociodemographic properties of the groups were also similar with no significant difference with regard to educational level, living place, income level, family characteristics, substance misuse, and previous hospitalizations (Table 1).

In the experimental group, the rate of VSM discontinuation during the follow-up period was higher than in the control group. At 1-year follow up, these groups differed significantly with regard to VSM ($\chi^2 = 11.8$, $p = .01$).

Variables of age, education level, living place, substance use, and family characteristics were included in logistic regression analysis to identify the factors predicting remission. Logistic regression revealed that living place and level of education were significant predictors of abstinence whereas duration of homelessness, duration of substance misuse, concomitant misuse of other substances, frequency of previous hospitalizations, presence of familial problems, relations with parents, and age did not affect remission (Table 2).

DISCUSSION

This study provided evidence supporting the role of CBT-based brief intervention as an effective treatment modality for VSM. The abstinence rate 1-year post-treatment was significantly higher among patients who received CBT-based brief intervention compared to the patients who did not. Findings of this study are parallel with the findings of studies that demonstrated the efficacy of brief intervention among adolescents. Previous studies have shown the effectiveness of motivation and brief intervention (Goti, Diaz, Serrano, & Gonzalez, 2010). In general, it is quite challenging to engage adolescent substance misusers in therapy.

Recent studies examining the trends in VSM have documented an increase in its frequency with decreasing educational level of the population (Spiller & Lorenz, 2009). Thus, level of education might serve as a potential risk factor for locating geographic areas of increased VSM. This study found a linear relationship between the level of education and abstinence, as evidenced by an increasing likelihood[2] of abstinence with increasing levels of education. The level of education may affect both VSM and its treatment. Active engagement of social network (Barnes, 1979), alternative positive reinforcements and environmental restructuring (Vaillant, 1988), and family therapy (Framrose, 1982) were all found to have beneficial contributions to therapy when VSM is a subcultural phenomenon. Thus, the level of education should be carefully addressed in treatment planning.

The importance of biological, psychological, and sociocultural domains in VSM has been emphasized. Each domain plays a different role or exerts a stronger influence at different stages of development and at different stages of drug use. The sociocultural dimensions represent the external elements that influence behavior (Segal, 1997). Living place is an important factor determining the social status of an individual. This study showed an unfavorable effect of duration of homelessness on abstinence, showing the importance of the site of social support during treatment.

VSM is known to be commonly associated with the misuse of other substances (Wu, Howard, & Pilowsky, 2008). In this study, concomitant use of nonvolatile substances negatively affected abstinence rate. Other studies also have found an association between concomitant use of nonvolatile substances and an increase in VSM-related problems (Peron & Howard, 2009; Simpson, 1997). Thus, concomitant misuse of other substances appears to increase the rate of problems related to VSM, complicating the treatment.

LIMITATIONS

The prolonged duration of hospitalization in the group receiving the intervention compared to the control group may be regarded as a bias. This may be due to increased motivation and improved treatment engagement associated with attending the CBT program. Increased engagement of adolescents in treatment has been shown to increase treatment success (McWhirter, 2008).

The sample size of this study is relatively small. Although statistical significance could be achieved, the low sample size should be taken into account while interpreting the results. Given the scarcity of outcome studies on treatment for VSM, even studies such as this with low sample sizes provide valuable preliminary findings on the issue.

Inclusion of only male subjects may also be considered as a limitation of this study and it should be borne in mind that study findings only apply to males. Several studies found high prevalence of VSM among female subjects and noted dissimilarities between the characteristics of the two genders (Bates, Plemons, Jumper-Thurman, & Beauvais, 1997). Treatment outcome studies of female volatile substance misusers are warranted.

Prevalence of conduct disorder is high among volatile substance misusers and this disorder has been shown to affect treatment outcomes (Howard, Perron, Vaughn, Bender, & Garland, 2010; Sakai et al., 2006). Presence of conduct disorder might have affected abstinence rates in this study. Thus, lack of a specific investigation for

[2]The reader is referred to Hills's criteria for causation which were developed in order to help assist researchers and clinicians determine if *risk factors* were causes of a particular disease or outcomes or merely associated. (Hill, 1965). The environment and disease: associations or causation? *Proceedings of the Royal Society of Medicine 58:* 295–300). Editor's note.

TABLE 1. Sociodemographic data of the study population at treatment entry and results of follow up

	Experimental group ($n = 31$)		Control group ($n = 31$)		
	n	%	*n*	%	χ^2/p
Educational level					
Literate	11	35.5	14	45.2	$\chi^2 = 2.86$
Primary school	15	48.4	14	45.2	$p = .44$
Secondary school	5	16.1	2	6.5	
High school	0	0	1	3.2	
Living place					
Homeless	3	9.7	5	16.1	$\chi^2 = 0.57$
Home	4	12.9	3	9.7	$p = .75$
Orphanage	4	12.9	4	12.9	
Orphanage/homeless	12	38.7	8	25.8	
Home/homeless	8	25.8	11	35.5	
Income status					
Not working	6	19.4	3	9.7	$\chi^2 = 2.20$
Begging	8	25.8	12	38.7	$p = .69$
Supported by family	4	12.9	4	12.9	
Working/begging	11	35.5	9	29	
Supported by an institution	2	6.5	3	9.7	
Frequency of contacts with the parents					
Not at all	7	22.6	9	29	$\chi^2 = 0.76$
A few times a year	9	29	8	25.8	p = .85
A few times a month	9	29	10	32.3	
Living with family	6	19.4	4	12.9	
Perception of relations with parents					
No problem at all	6	19.4	3	9.7	
Few problems	9	29	11	35.5	$\chi^2 = 1.32$
Many problems	16	51.6	17	54.8	$p = .54$
Type of volatile substance					
Thinner	11	35.5	13	41.9	$\chi^2 = 1.85$
Glue	6	19.4	9	29	$p = .39$
Thinner & Glue	14	45.2	9	29	
Other substances misused					
None	15	48.4	9	29	$\chi^2 = 3.50$
Cannabis	6	19.4	12	38.7	$p = .32$
Pills	2	6.5	2	6.5	
Cannabis and pills	8	25.8	8	25.8	
History of previous hospitalizations					
Absent	18	58.1	18	58.1	$\chi^2 = 0$
Present	13	41.9	13	41.9	$P = 1$
Follow up					
Continue volatile substance use	10	32.3	18	58.1	$\chi^2 = 11.8$
Discontinue volatile substance use	16	51.6	5	16.1	$p = 0.01$

TABLE 2. Logistic regression analysis of age, educational level, living place, substance misuse, and family characteristics in predicting recurrence during follow-up period

	B	*S.E.*	Wald	Significance	*R*
Age	−.0888	.3543	.0628	.8021	.0000
Level of education	−1.6291	.8443	3.7229	.0437	−.1604
Living place	−2.7731	1.4104	3.8660	.0493	−.1670
Duration of living homeless	1.1109	1.2161	.8343	.3610	.0000
Duration of volatile substance misuse	.5032	.9273	.2945	.5874	.0000
Concomitant use of other substances	1.9138	.8818	4.7108	.0300	.2013
Family problems	1.9176	1.1110	2.9790	.0844	.1209
Relations with the parents	.4591	1.0994	.1744	.6762	.0000
Type of the family	1.7297	1.1832	2.1370	.1438	.0452
History of previous hospitalizations	−.6586	1.0931	.3631	.5468	.0000

concomitant psychiatric disorders may represent another limitation of this study.

In addition to concomitant psychiatric disorders, illicit behaviors are also quite common among adolescent volatile substance misusers (Howard, Balster, Cottler, Wu, & Vaughn, 2008; Perron & Howard, 2009), an issue that was not addressed in this study. Some of the subjects that were lost to follow-up might have been imprisoned or arrested.

Unfortunately, double blinding was not possible as it was evident to participants whether they received or did not receive the additional CBT component of the treatment. In addition, participants who were lost during the follow-up period, about whom we could not retrieve any information, may affect the results of the study due to the small sample size.

CONCLUSIONS

This study documented the beneficial effects of CBT-based brief intervention in the treatment of adolescents with VSM. Obviously, there is need for comparative studies investigating the efficacy of different treatment modalities in a group of patients. Description of the factors affecting treatment outcomes in further studies would provide valuable information about the treatment of this multidimensional problem.

Declaration of Interest

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

THE AUTHORS

Kultegin Ogel, MD, is a Psychiatrist and Specialist in addiction treatment. He has worked in adult addiction treatment centers for more than 5 years and as a Director of a Volatile Addiction Treatment and Research Center in Istanbul. He has written eight books on addiction.

Sibel Coskun, Ph.D., is a Registered Nurse and has worked for 5 years as a Head Nurse in a Volatile Addiction Treatment and Research Center in Istanbul. She was trained in cognitive behavioral treatment and uses it in her practice. She is also experienced in the rehabilitation of psychiatric patients.

GLOSSARY

Cognitive behavioral therapy: It is based on the scientifically supported thesis that most emotional and behavioral reactions are learned, and that patients can *unlearn* their unwanted reactions and learn a new way of reacting.

DSM-IV-TR: A 2000 text revision of the Diagnostic and Statistical Manual of Mental Disorders, 4th edition, published by the American Psychiatric Association to update the text and correct errors identified in the 1994 edition (DSM-IV). DSM-IV-TR also changed diagnostic codes to comply with those adopted by the U.S. government.

REFERENCES

Barnes, G. (1979). Solvent abuse: a review. *International Journal of the Addictions, 14*(1), 1–26.

Bates, S. C., Plemons, B. W., Jumper-Thurman, P., & Beauvais, F. (1997). Volatile solvent use: Patterns by gender and ethnicity among school attenders and dropouts. *Drugs and Society, 10*(1), 61–78.

Beauvais, F. (1997). Research topics for the problem of volatile solvent abuse. *Drugs and Society, 10*(1), 103–107.

Beauvais, F., Jumper-Thurman, P., Plested, B., & Helm, H. (2002). A survey of attitudes among drug user treatment providers toward the treatment of inhalant users. *Substance Use and Misuse, 37*(11), 1391–1410.

Crites, J., & Schuckit, M. A. (1979). Solvent misuse in adolescents at a community alcohol center. *Journal of Clinical Psychiatry, 40*(1), 39–43.

Dinwiddie, S. H., Reich, T., & Cloninger, C. R. (1990). Solvent use and psychiatric comorbidity. *British Journal of Addiction, 85*(12), 1647–1656.

Dinwiddie, S. H., Reich, T., & Cloninger, C. R. (1991). The relationship of solvent use to other substance use. *American Journal of Drug and Alcohol Abuse, 17*(2), 173–186.

Dinwiddie, S. H., Zorumski, C. F., & Rubin, E. H. (1987). Psychiatric correlates of chronic solvent abuse. *Journal of Clinical Psychiatry, 48*(8), 334–337.

Fendrich, M., Mackesy-Amiti, M. E., Wislar, J. S., & Goldstein, P. J. (1997). Childhood abuse and the use of inhalants: Differences by degree of use. *American Journal of Public Health, 87*(5), 765–769.

Framrose, R. (1982). From structure to strategy with the families of solvent abusers. *Journal of Family Therapy, 4*(1), 43–59.

Goti, J., Diaz, R., Serrano, L., & Gonzalez, L. (2010). Brief intervention in substance-use among adolescent psychiatric patients: a randomized controlled trial. *European Child and Adolescent Psychiatry New York, 19*(6), 503–511.

Howard, M. O., Balster, R. L., Cottler, L. B., Wu, L. T., & Vaughn, M. G. (2008). Inhalant use among incarcerated adolescents in the United States: Prevalence, characteristics, and correlates of use. *Drug and Alcohol Dependence, 93*(3), 197–209.

Howard, M. O., Perron, B. E., Vaughn, M. G., Bender, K. A., & Garland, E. (2010). Inhalant use, inhalant-use disorders, and antisocial behavior: Findings from the national epidemiologic survey on alcohol and related conditions (NESARC). *Journal of Studies Alcohol and Drugs, 71*(2), 201–209.

Ives, R. (2006). Volatile substance abuse: A review of findings in ESPAD 2003. *Drugs: Education, Prevention and Policy, 13*(5), 441–449.

Jacobs, A. M., & Ghodse, A. H. (1987). Depression in solvent abusers. *Social Science and Medicine, 24*(10), 863–866.

Martino, S. C., McCaffrey, D. F., Klein, D. J., & Ellickson, P. L. (2009). Recanting of life-time inhalant use: How big a problem and what to make of it. *Addiction, 104*(8), 1373–1381.

McCartney, J. (1999). Reflections on volatile substance dependency treatment negotiating the boundary between inner and outer reality. *Journal of Substance Abuse Treatment, 16*(3), 255–264.

McCoy, C., Metsch, L., & Inciardi, J. (Eds.) (1995). *Intervening with drug-involved youth*. Thousand Oaks, CA: Sage.

McWhirter, P. T. (2008). Enhancing adolescent substance abuse treatment engagement. *Journal of Psychoactive Drugs, 40*(2), 173–182.

Perron, B. E., & Howard, M. O. (2009) Adolescent inhalant use, abuse and dependence. *Addiction, 104*(7), 1185–1192.

Perron, B. E., Howard, M.O, Maitra, S., & Vaughn, M. G. (2009). Prevalence, timing, and predictors of transitions from inhalant use to ınhalant use disorders. *Drug and Alcohol Dependence, 100*(3), 277–284.

Ramon, M. F., Ballesteros, S., Martinez-Arrieta, R., Jorrecilla, J. M., & Cabrera, J. (2003). Volatile substance and other drug abuse inhalation in Spain. *Journal of Toxicology, 41*(7), 931–936.

Sakai, J. T., Hall, S. K., Mikulich-Gilbertson, S. K., & Crowley, T. J. (2004). Inhalant use, abuse and dependence among adolescent patients: Commonly comorbid problems. *Journal of the American Academy of Child and Adolescent Psychiatry, 43*(9), 1080–1088.

Segal, B. (1997). The inhalant dilemma: A theoretical perspective. *Drugs & Society, 10*(1), 79–102.

Simpson, D. D.(1997). A longitudinal study of inhalant use: Implications for treatment and prevention. *Substance Use and Misuse, 32*(12–13), 1889–1894.

Spiller, H., & Lorenz, D. J. (2009). Trends in volatile substance abuse. *Journal of Addictive Diseases, 28*(2), 164–170.

Vaillant, G. (1988). What can long-term follow-up teach us about relapse and prevention in addiction? *British Journal of Addiction, 83*(10), 1147–1157.

Westermeyer, J. (1987). The psychiatrist and solvent–inhalant abuse: recognition, assessment and treatment. *American Journal of Psychiatry, 144*(7), 903–907.

Wu, L. T., Howard, M. O., & Pilowsky, D. J. (2008). Substance use disorders among inhalant users: Results from the national epidemiologic survey on alcohol and related conditions. *Addictive Behaviors, 33*(7), 968–973.