

Determinants of relapse and re-admission among alcohol abusers after intensive residential treatment

by

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Abstract

Little information is available in Belgium on the number and characteristics of alcohol abusers who contact treatment agencies and on the effectiveness of these services. International research has identified some determinants of relapse and recovery after treatment, but additional research is needed in order to better tailor services to the needs of service users.

This study aimed at measuring abstinence and relapse among alcohol abusers (n=249) after intensive, residential treatment in specialized units in five Belgian psychiatric hospitals. Six month outcomes concerning substance use, psychological health, social support and integration were studied using the EuropASI. Logistic regression analyses were performed to identify predictors of relapse and readmission.

Significant reductions in the severity of alcohol and psychological problems were observed, but six months after the initial treatment episode more than half of all respondents (54%) had been using alcohol regularly. The domains 'psychiatric problems' and 'patients' personal perspectives' were the best predictors of relapse and readmission. Also, 'patients' living situations' predicted relapse. Specific variables that independently predicted relapse were 'satisfaction with day activities' and 'number of days with problems due to alcohol'. Less severe psychiatric problems at the start of treatment and more severe psychiatric problems and negative feelings of wellbeing at the time of follow-up were independent predictors of readmission.

We conclude that treatment agencies need to recognize the relapsing nature of alcohol abuse and have to organize their services from a continuing care perspective, including specific attention for individuals' psychological needs and day/leisure activities.

Keywords

Alcohol abuse, treatment, relapse, recovery, continuity of care, aftercare, case management

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Introduction

Prevalence of alcohol abuse in Belgium

The global prevalence of alcohol-related disorders (harmful use and dependence) has been estimated to be around 1.7% worldwide (1). Significantly higher rates have been reported in North America and Europe. For example, the prevalence of DSM IV-alcohol abuse in the United States was estimated to be around 4.7% in 2001-2002, with prevalence rates nearly three times as high among men than among women (6.9% vs. 2.6%) (2). Also, age and race/ethnicity are important mediators of alcohol (ab)use. Based on the most recent Belgian Health Interview Survey (HIS) carried out in 2004, nearly one fifth (18%) of all Belgians older than 15 years had used at least once during the past month six or more glasses of alcohol (3). According to the CAGE assessment (4), a screening instrument included in the HIS, 8% of all past year alcohol users could be classified as 'problematic alcohol users'. The number of persons indirectly affected by alcohol abuse (e.g. partner, parents, children) is probably many times larger (2,5).

In Belgium, little information is available on the number and characteristics of alcohol abusers who contact treatment agencies or seek informal help (e.g. attendance at self-help groups) (6,7). The registration of service users is limited to specific regions (e.g. Flanders, the Walloon Region, Brussels) or to specific types of services (e.g. psychiatric hospitals), resulting in a lack of overall information on the number of persons treated for alcohol problems (8). Based on outdated and fragmented treatment utilization data, it can be estimated that every year about 10,000 persons are treated for alcohol problems in psychiatric hospitals, psychiatric wards of general hospitals, outpatient mental health care centers and other specialized services (9,10). Despite the call for more evidence-based practice in the field of substance abuse treatment (11,12), no empirical evidence is available about the outcomes and effectiveness of treatment programs for alcohol abusers in Belgium. Existing evaluations are limited to medical and pharmacological interventions, such as treatment with acamprosate and/or disulfiram (13-16).

Effectiveness of residential alcohol abuse treatment

Various authors have studied the effectiveness of residential treatment for alcohol abusers, predominantly in non-randomized and uncontrolled pre-post tests, leading to little evidence about its efficacy/effectiveness. Although various studies have reported positive findings, uncertainty remains about the extent and length of these effects and the role of mediating variables. It has been demonstrated that persons who received formal (outpatient or inpatient) or informal help (e.g. attendance at AA-meetings) had significantly better alcohol-related outcomes than untreated individuals after 8 years (17). While treated and untreated persons showed similar outcomes after one year, only the group that received help improved during the following years: 54% of the treated individuals were abstinent after 8 years, as opposed to 26% of the untreated persons. Spontaneous recovery is possible, but most authors

agree that participation in some kind of treatment is more effective for becoming abstinent than no formal help (18-19).

Studies that have evaluated residential programs based on the Minnesota-model have reported abstinence rates between approximately 40 and 70% (20-23). This is a widespread treatment model for the recovery from addiction to alcohol and other drugs, based on a holistic and multidisciplinary approach and AA's 12-step method that was established in the 1950s in the state of Minnesota (USA). Similar successful outcomes have been demonstrated in both short- and long-term follow-up studies (20, 23). Overall, residential programs have generated better outcomes than outpatient programs. Also, residential treatment in a therapeutic community (TC), a long established rehabilitation method for drug addicts based on a hierarchical structure, peer support and social learning, has been associated with similar positive outcomes and was found to be significantly more effective than treatment in a psychiatric hospital (24). Other treatment programs, not based on a widely accepted concept like the Minnesota- or TC-model, are associated with abstinence rates between approx. 40 and 60%. However, the study of Booth and colleagues (25) showed significantly lower success rates (27%). Besides alcohol-related outcomes, several of the above-mentioned studies have shown positive effects on other outcome indicators such as living status, physical condition, psychosocial well-being and hospitalization rates (20, 26).

Treatment retention and continuing care after treatment are clearly associated with improved outcomes (18, 27-28). The intensity of the treatment program seems to affect initial successful recovery (20), but the length of the treatment program itself is of minor importance, as long as it is followed by aftercare (25, 29-30). Continuous monitoring is needed for consolidating recovery over time (22). Participation in some type of aftercare is one of the best predictors of beneficial outcomes (21, 25, 27, 31). Attendance at AA-meetings was found to be associated with more years of abstinence, improved psychosocial functioning, better quality of life and lower mortality rates (20, 32-35). Further, specific patient characteristics such as a high socio-economic status, absence of psychiatric co-morbidity, long treatment history, stable family situation, employment, and a supportive social network are related to successful outcomes (19, 22, 36-37). Finally, specific treatment programs (including a theoretical concept, specialized and trained staff, and regular supervision) appear to generate better outcomes than non-specific or standard treatment programs (18).

No consensus exists about what type of treatment is needed for what type of client and little evidence is available for an effect of treatment matching (38-39). Most authors agree that intensive residential treatment programs should be reserved for socially disadvantaged persons who are severely affected by alcohol abuse, while less intensive outpatient treatment is indicated for socially supported patients without psychiatric problems (18, 40). The positive impact of motivational interviewing, individualized treatment planning and involvement of clients' social network on treatment outcomes has been demonstrated (18, 41-43). On the other hand, no association has been found between clients' personal treatment objectives (e.g. abstinence, controlled drinking) and successful outcomes (25).

Aims of the study

Given the lack of evaluation studies about residential treatment for persons with alcohol-related disorders in Belgium and given the dearth of literature on determinants of relapse and readmission after long-term alcohol treatment, this study aimed at measuring abstinence and relapse after intensive, residential treatment in specialized units in five Belgian psychiatric hospitals. We studied short-term effects (e.g. substance use, psychological health, social support and integration) of intensive residential treatment among alcohol abusers and independent predictors of relapse and readmission to treatment. Identification of these determinants may help to better tailor these services to the needs of service users and to improve their effectiveness. Up to now, such information is rather sparse. Already identified determinants of relapse are: persons' situations, bodily changes (e.g. in the brain), contextual factors, and staff, treatment and program characteristics (44-47).

Methods

Sample

This study was set up in five specialized wards of psychiatric hospitals that offer detoxification and intensive, residential treatment for alcohol abusers in Flanders, Belgium. Treatment objectives of these specialized wards are abstinence-oriented. The postulated length of stay is 6 to 12 weeks. Treatment consists of group counseling, occupational activities, education and therapy. In addition, family groups and aftercare are organized. Dependence on illicit drugs is an exclusion criterion at all five centres.

All patients who were admitted between December 2004 and July 2005 in one of the participating treatment units were eligible for the study, if they had completed the initial detoxification program (approx. 2-3 weeks) and gave informed consent for participation. Our objective was to involve 50 patients in each hospital. Patients that met eligibility criteria were asked by the treatment staff if they were willing to participate. Only some patients (n=7) refused to participate and in a few cases (n=3) the interview had to be interrupted due to the clients' psychological status. After quality control of the data, three interviews were excluded from the data-analysis. Therefore, this paper is based on interviews with 249 patients.

The study sample consisted of 78 (31.3%) women and 171 (68.7%) men. The average age was 45 years. Half of the respondents (51%) lived together with their partner and 49.2% were (part-time) employed at the time they entered treatment. Many patients had a small social support network to rely on: 30.9% had less than 3 persons that they could count on for emotional or financial support.

More than three in four patients (77.1%) had been in treatment for alcohol problems before, but for almost two thirds abstinence after a previous treatment episode did not last longer than six months. Regardless whether they had followed treatment, 22.1% of the patients had never been sober for more than one month. Prevalence of psychological problems the month before they entered treatment was relatively high among this population of alcohol abusers:

59.8% experienced depressive feelings, 64.7% had feelings of tension or anxiety and 28.5% had suicidal thoughts. Eight percent of the patients had tried to commit suicide during that period. About half of all clients (47%) had been treated before for psychological problems in an in- or outpatient setting.

In total, 181 patients (72.7%) participated in the follow-up study, while more than a quarter of the patients did not. Eight persons (11.8%) refused to participate any longer at the time of the follow-up, three persons (4.4%) had deceased, but the majority of the non-response group ($n=52$; 76.5%) could not be retrieved although they had nominated one or more contact persons. We consider a response rate of 72.7% as satisfactory, since less than 30% attrition is generally accepted as sufficient for generalizing results from follow-up studies (48).

Comparison of the response and the non-response group showed few significant differences: the non-response group had a significantly earlier onset of heavy drinking ($t(239)=-2.460$, $p=0.015$), they had fewer significant others to rely on ($t(247)=-2.527$, $p=0.012$) and significantly more persons from the non-response group had attempted suicide during the 30 days before the first interview ($U=5679.5$, $Z=-2.038$, $p=0.042$). Both groups were highly similar with respect to the severity of their alcohol and psychological problems. We assume that the observed differences were related to individuals' social support and isolation. Since we attempted to retrieve patients for the follow-up study by contacting their social network, persons with a less extensive social network were less likely to be retrieved. This assumption was illustrated by the fact that the non-response group reported less significant others (4 vs. 6) to rely on. Moreover, the relative social isolation of the non-response group may be an explanation for the higher prevalence of attempted suicide among this group (49).

Procedure

All patients were interviewed after their second week at the detoxification ward (between the 15th and 21st day after admission) using a structured questionnaire based on the European version of the Addiction Severity Index (EuropASI) (50). Baseline interviews were administered by staff members of the treatment units involved and by trained Master students in Educational Sciences (Ghent University). Interviews lasted between 20 and 60 minutes, with an average of 30 minutes.

Follow-up interviews took place six months after patients had finished the treatment program, i.e. approximately 8 months after the initial interview (between July 2005 and May 2006). Participants had been asked an informed consent for participating in the follow-up study during the baseline interview and they had to nominate and provide contact details of three persons that could help to retrieve them at the time of the follow-up study. Six months after they had left the residential program, the participating patients were called by an administrative worker of the hospitals and asked whether they were willing to further participate. If so, the telephone interview was administered directly or an appointment was made for an interview within the same week. In case patients were re-hospitalized at the treatment unit at the

time of the follow-up study, a face-to-face interview took place. Follow-up interviews lasted between 15 and 45 minutes, with an average of 25 minutes.

Instrument

The structured interview included the 'alcohol' and 'psychological, emotional problems' section of the Dutch translation of the European version of the Addiction Severity Index (EuropASI) (51). The ASI is a widely used self-report assessment and research instrument tested in numerous treatment settings with diverse groups of substance abusers (50, 52-53). It is a one-hour structured interview that measures lifetime and recent (past 30 days) severity of problems on a 10-point scale (0-9) in seven areas of bio-psychosocial functioning: medical status, employment and self-support, alcohol use, drug use, legal status, family and social relationships, and psychiatric symptoms (54). It is a valid procedure to use only specific sections of the ASI (51-52). Each section starts with a number of objective questions asking for factual information and concludes with two subjective questions. The section on 'alcohol problems' consists of questions concerning individuals' substance use (e.g. number of days of alcohol use during the last month), treatment history (e.g. number of treatments in a detoxification unit), longest period of abstinence and the number of days with problems due to alcohol use. The section on 'psychological, emotional problems' contains objective questions about individuals' psychiatric treatment history (e.g. ever been in outpatient treatment), the presence of psychological symptoms (e.g. ever had depressive feelings), and the number of days during the last month they have experienced psychological problems. Besides these objective items, each section includes two subjective questions that need to be scored on a 5-point scale (from 'not at all' to 'extremely'). These subjective items refer to patients' subjective perception of the domain concerned: "to which extent are you bothered about these problems" and "to which extent do you need help for these problems". Based on the objective and subjective questions, a composite score is computed for each section which illustrates the severity of individuals' problems and their need for treatment (51). In addition to both ASI-domains, the questionnaire consisted of some general (multiple choice) questions that were selected from the other sections of the ASI such as individuals' living, employment and family situations, their drug use, social network and leisure activities, etc. At the end, some multiple choice questions were added concerning patients' motivation, treatment goals and personal well-being.

The follow-up (FU) interview was built on the analogy of the baseline version, with that difference that all items refer to the period since the first interview. Again, the interview included the integral 'alcohol' and 'psychological problems' ASI-sections (51), specific (multiple choice) items from other sections of the follow-up version of the ASI and additional multiple choice questions concerning patients' motivation, treatment goals and personal well-being. Moreover, some multiple choice items were incorporated concerning dismissal, aftercare and (re)lapse. Finally, two open questions were added in order to understand what patients liked most about the treatment program and what they perceived as their personal challenges after treatment.

Data analysis

The interview questionnaires were coded and imported into SPSS 15.0, a statistical software program. Quality of the data was controlled using frequencies and crosstabs. Descriptive statistics were used to describe the study sample. Between-group and time-effects were studied using t-tests, in case of continuous dependent variables. Non-parametric tests (the Mann-Whitney U test for independent samples and the Wilcoxon matched pairs test) were used for comparing ordinal dependent variables. The answers to the two open questions were grouped and coded afterwards and were analysed quantitatively. Finally, logistic regression analyses were performed to detect which variables predicted (re)lapse and readmission after intensive, residential treatment (43). Relapse and readmission were used as binary dependent variables: individuals did (=1) or did not (=0) relapse; individuals were (=1) or were not (=0) readmitted to residential treatment. A series of hierarchic logistic regression analyses were conducted to evaluate the independent influence of six different domains: 1) client characteristics (gender and age); 2) living situation (4 variables: number of significant others, living situation (FU), employment (FU), leisure activities (FU)); 3) alcohol severity (5 variables: ASI-severity score, polysubstance use, outpatient treatment history, inpatient treatment history, longest period of abstinence); 4) psychiatric severity (4 variables: ASI-severity score (baseline), psychiatric treatment history, previous suicide attempt, ASI-severity score (FU)); 5) treatment-related aspects (4 variables: length of stay in treatment, way of dismissal, participation in aftercare, continued aftercare); 6) respondents' personal perceptions (9 variables: motivation, personal abstinence rule, readiness for dismissal, satisfaction with day activities (FU), satisfaction with leisure activities (FU), satisfaction with living situation (FU), number of days of alcohol problems (FU), number of days of psychological problems (FU), personal sense of well-being (FU)).

Results

Six-month treatment outcomes

On average, respondents stayed in treatment for 11.6 weeks (SD=6.1), which is longer than the postulated treatment period in most treatment units. Less than one fifth of the respondents (18.3%) left the treatment unit early or against the advice of the treatment staff. Consequently, two thirds of the respondents (67.1%) stated they felt ready for dismissal, while about 20% thought they were not. After they had left the residential program, the majority of the respondents (54.2%) followed some kind of aftercare. Most of them did so in the treatment facility where they followed the residential program and some still followed aftercare at the time of the follow-up study.

Alcohol use

A significant reduction in the severity of alcohol problems was observed six months after the respondents had finished residential treatment (Table 1). This is illustrated by a significant reduction in the number of days of alcohol use and problems due to alcohol abuse. Also, sig-

nificantly fewer persons felt bothered by or needed help for alcohol problems, although – according to the ASI-criteria – 32% had an alcohol severity score ≥ 4 , indicating that some type of treatment was still indicated. The majority of the respondents (53%) had been drinking regularly some alcohol during the follow-up period and 37% regularly consumed more than 5 drinks/day. 39.8% had been drinking during the last 30 days, most of them (28.7% of all respondents) in an excessive way. Also, some persons were regularly using other substances: tranquilizers (23.8%), antidepressants (37.6%), cannabis (6.6%), multiple substances (37%). Analysis of respondents' drinking patterns revealed that 40.9% did not use any alcohol during the follow-up period and that 5.5% had seldom used alcohol. The latter two groups can be considered as the 'non-relapse' group (46.4%) or the number of successful outcomes. Another 12.2% regularly used alcohol but in a controlled way, while 8.8% occasionally abused alcohol. On the other hand, excessive alcohol use occurred periodically among 8.8% of the respondents, while nearly a quarter (23.8%) used excessively during almost the entire follow-up period. Given these high relapse rates, it may not surprise that nearly one third of the respondents (32.6%) had been readmitted to residential treatment during the follow-up period, while 17.1% had followed outpatient treatment for their alcohol problems.

According to respondents' personal estimation, half of them (53.9%) did not experience any problems with alcohol during the 30 days preceding the follow-up interview, while 16.7% stated they experienced such problems almost daily. Similarly, 53.3% felt not bothered at all by their alcohol problems, but the vast majority (76.1%) said they still needed help to further overcome their alcohol problems.

Psychological health

The severity of psychological problems was obviously lower at the time of follow-up (Table 1), which was further illustrated by the fact that significantly (according to the Wilcoxon matched pairs test) fewer respondents experienced depressive symptoms ($T=56$, $T+=17$; $Z=-4.565$; $p=0.000$), feelings of anxiety/tension ($T=63$, $T+=25$; $Z=-4.051$; $p=0.000$) or problems with aggression control ($T=26$, $T+=9$; $Z=-2.874$; $p=0.004$). Moreover, less persons were prescribed medication for psychological problems ($T=42$, $T+=9$; $Z=-2.794$; $p=0.005$), had suicidal thoughts ($T=42$, $T+=20$; $Z=-3.938$; $p=0.000$) or attempted to commit suicide ($T=37$, $T+=10$; $Z=-2.111$; $p=0.035$). In addition, the number of days that respondents experienced psychological problems reduced significantly (Table 1). Also, significantly fewer persons felt bothered by or needed help for psychological problems, but 30.3% had an ASI-severity score ≥ 4 for psychological problems, indicating that some kind of treatment was still recommended.

Since the end of the residential treatment episode, 25.1% of the respondents had followed outpatient treatment and 17.3% had been treated residentially for psychological problems. Half of all respondents (52%) expressed they had experienced at least some days of psychological problems during the past 30 days, mainly feelings of anxiety/tension (42.5%), depressive feelings (39.7%) and suicidal thoughts (12.8%). 27.9% had been prescribed medication for these psychological problems.

Table 1: Comparison of the number of days and severity of substance use and psychological problems at baseline and 6 months after the residential treatment episode (n=181)

	T0	T1	Probability	
Substance use problems				
Number of days of any alcohol use	24.12	6.63	0.000	(t=16.553; df=179)
Number of days of heavy alcohol use (5/day)	22.84	4.80	0.000	(t=17.766; df=178)
Number of days with use of tranquillizers	12.31	6.15	0.000	(t=4.431; df=141)
Number of days with use of antidepressants	13	12.79	0.885	(t=0.145; df=132)
Number of days with use of cannabis	2.73	1.75	0.157	(t=1.423; df=112)
Number of days with illicit drug use	0.63	0.06	0.128	(t=1.536; df=103)
Number of days with poly substance use	11.67	8.26	0.021	(t=2.340; df=147)
Number of days with alcohol problems	21.60	6.49	0.000	(t=14.153; df=178)
Severity of alcohol problems (composite score)	0.77	0.25	0.000	(t=19.976; df=177)
Psychological problems				
Number of days with psychological problems	19.03	7.44	0.000	(t=10.602; df=178)
Severity of psychological problems (composite score)	0.46	0.24	0.000	(t=10.321; df=178)

Living situation and respondents' subjective perception of it

The Wilcoxon matched pairs test showed significant improvements in patients' living situation (T-=22, T+=36; Z=2.522; p=0.012) and in particular their satisfaction with it (T-=24, T+=67; Z=4.029; p=0.000) at the time of the follow-up interview. Moreover, significantly more persons were satisfied with the way they spent their day (T-=12, T+=94; Z=7.781; p=0.000) and leisure time (T-=12, T+=98; Z=7.828; p=0.000). Also, respondents' feelings of personal well-being improved significantly (T-=11, T+=148; Z=10.345; p=0.000). At the time of the follow-up interview, 71% of the respondents stated they had felt "rather or very well" during the past 30 days. Finally, the number of significant others respondents could rely on, increased only marginally as compared with the beginning of the treatment episode (t=-0.541, df=180, p=0.589).

Individuals' subjective evaluation of the treatment

Two open questions explored the patients' subjective evaluation of the treatment episode: one asked for the treatment components they appreciated most, the other assessed individuals' personal challenges and difficulties after treatment. Many persons stated they had gained a clearer understanding of their own personality (28.6%) and alcohol use (16.5%) during treatment. Also, specific aspects of the treatment program (e.g. sports, relaxation, group therapy) (17.6%), the support by the treatment staff (14.8%) and the contacts with peers with alcohol problems (14.3%) were explicitly mentioned. Other important aspects individuals had learnt were how to stay sober (13.2%) and how to spend their leisure time (13.2%).

When asked for their personal challenges six months after treatment, answers were less univocal. Most individuals' responses (27.6%) related to their self-image or personality, such as "learning to cope with stress", "being more self-confident", "becoming more assertive", "not running away from my problems". Other important issues that these persons identified were to stay (or become) sober (21.9%) and to find a job or some structured day activity (12.8%).

Determinants of relapse and re-admission after intensive residential treatment

To assess the relative contribution of the above-mentioned six domains on the dependent variables 'relapse' and 'readmission' (cf Data analysis), the following procedure was followed: first, a base model was fitted including only characteristic variables (gender and age). Next, for each of the five remaining domains, corresponding variables were added to the base model and the improvement of the fit was examined. The model fits are presented in table 2 (dependent variable: relapse) and table 4 (dependent variable: readmission).

In the first row of both tables, the base model is compared to the null model (including an intercept only). In the additional rows, domain variables are added to this base model and this extended model is compared to the base model. The last column contains the percentage correct predictions of relapse/readmission according to the model.

Table 2: Model fits for various logistic regression models (n=181); dependent variable: relapse

Model	Included domains	Δdf	$\Delta \chi^2$	p	% correct
1	Client	2	5.048	0.080	58.6%
1+2	Client Living situation	10	20.311	0.026*	61.5%
1+3	Client Alcohol severity	11	18.014	0.081	63.5%
1+4	Client Psychiatric severity	6	49.748	0.000**	71.8%
1+5	Client Treatment aspects	6	9.484	0.148	62.4%
1+6	Client Clients' personal perceptions	13	85.544	0.000**	78.8%

Three domains resulted in a significant improvement of fit, if they were added to the base model: 1) living situation; 2) psychiatric severity; 3) respondents' personal perceptions. The domain alcohol severity nearly reached significance (p=0.08).

To assess which variables from the fitted domains were important, we fitted a final model including the base variables and all the variables of the three significant domains. The fit of the final model (with 17 variables) was excellent ($\chi^2(25)=103.346$, p=0.000) (81.4% correct), but only two variables within this model reached statistical significance (Table 3). Those who stated to be satisfied with the way they spent their day were more than 5 times less likely to relapse. The likelihood of relapse increased with 1.4 with each day respondents' had experi-

enced alcohol problems during the 30 days preceding the follow-up interview. In addition, those who said they spent their leisure time mostly with friends were more than 12 times as likely to relapse than those who said they spent their leisure time mostly with family. Other important variables in the equation model were gender and severity of psychiatric problems at follow-up. Women were two times less likely to relapse than men and the likelihood of relapse increased with 1.04 times with every increase in the severity of psychological problems at follow-up.

Table 3: Regression coefficients for the (nearly) significant variables in the final model (n=181); dependent variable: relapse

	β	Wald	probability	Exp(β)
Satisfied with day activities	-1.671	5.391	0.020	0.188
Number of problem days due to alcohol	0.336	7.474	0.006	1.400
Leisure time with friends vs. family	2.521	3.424	0.064	12.438

If added to the base model for readmission, two domains resulted in a significant improvement of fit: 1) psychiatric severity; 2) respondents' personal perceptions (Table 4). To assess which variables from the fitted domains were important, we fitted a final model including the base variables and all the variables of the two significant domains. The fit of the final model was excellent ($\chi^2(217)=62.438$, $p=0.000$) (78.7% correct), but only three variables within this model were significant independent predictors of readmission (Table 5).

Table 4: Model fits for several logistic regression models (n=181); dependent variable: readmission to treatment

Model	Included domains	Δdf	$\Delta \chi^2$	p	% correct
1	Client	2	1.522	0.467	67.8%
1+2	Client Living situation	10	15.938	0.101	66.9%
1+3	Client Alcohol severity	11	12.959	0.296	69.5%
1+4	Client Psychiatric severity	6	40.626	0.000**	72.8%
1+5	Client Treatment aspects	6	8.417	0.209	68.3%
1+6	Client Clients' personal perceptions	13	52.648	0.000**	74.7%

The likelihood of readmission decreased by 0.7 times with every increase in the severity of psychological problems at the start of the residential treatment episode, while it increased by 1.6 times with every increase in the severity of psychological problems at follow-up. Those

respondents who said they did not feel very well during the 30 days before the second interview were almost twice as likely to be readmitted for residential treatment. In addition, the odds of being readmitted to residential treatment increased (not significantly) by 1.04 every year.

Table 5: Regression coefficients for the (almost) significant variables in the final model (n=181); dependent variable: readmission to residential treatment

	β	Wald	probability	Exp(β)
Severity of psychological problems at start	-0.344	7.282	0.007	0.709
Severity of psychological problems at follow-up	0.448	4.382	0.036	1.565
Feeling of personal well-being	-0.598	4.828	0.028	0.550
Age	0.038	2.920	0.087	1.038

Discussion

The results of this study show that 46% of all alcohol abusers that could be interviewed six months after they had completed intensive, residential treatment had been abstinent from alcohol during this period (or 33.7% of the intent-to-treat sample). Although this number is in line with outcomes from other studies, abstinence rates only provide a selective view on the outcomes of alcohol abuse research. Several authors have stated that when evaluating substance abuse treatment, alternative outcomes should be considered besides abstinence (55-56). Recovery should be regarded from a broader perspective than just 'cure' and is rather about gaining control about one's own life, including 'ups' and 'downs' (57-58).

Also, reductions in (heavy) drinking have a positive effect on clients' lives and result in clinical benefits. If we apply such a less stringent definition of 'relapse', the number of persons who never used any alcohol or never used more than 5 glasses/day (ASI-criterion for excessive use) mounts to 58.6%, or 42.5% of the intent-to-treat sample. Consequently, the relapse rate in this study six months after treatment was 53.6% or 41.4%, depending on the criteria used. This relapse rate is relatively high, when compared with other studies (20-24), in particular since these studies usually had longer follow-up periods. However, it has been demonstrated that short-term (e.g. 6 months) alcohol outcomes are good predictors for longer-term outcomes (19, 34). Given the nature of substance use disorders and the frequent prevalence of relapse after intensive treatment, it is important to incorporate psycho-education and relapse prevention in residential programs. Providing less intensive continuing care after the residential phase may further help to sustain the gains accrued during treatment (27, 59). Respondents' answers to the question what helped them to stay sober after treatment revealed that the post-treatment period is at least as important as the treatment period itself for consolidating abstinence. If continuity of care is provided (e.g. aftercare, case management), it appears to be easier to monitor and track patients after they have left treatment and to address (re)lapse more adequately (48, 60). Unfortunately, not all patients are willing or able to take up aftercare services offered by the treatment program, e.g. because they live too far or because they dropped out of treatment early (61). Still, the beneficial ef-

fect of participation in aftercare should not be exaggerated, since its effectiveness may be biased by substance abusers' motivation to participate in aftercare activities (27).

About one third (32.6%) of all interviewees had been re-admitted to residential treatment six months after the initial residential treatment episode, which is an indication of the extent of relapse among the sample. However, we should not necessarily interpret readmission as treatment failure, since service users may have learned to act promptly and address appropriate services in case of abstinence violation. Immediate hospitalization after a (re)lapse may protect them from further relapse and deterioration. Research has shown that for many substance abusers one single treatment episode does not lead to recovery, but that further treatment episodes were necessary to reach stable abstinence over a longer period of time (8, 19). However, it can be questioned if a residential readmission was the most cost-effective relapse intervention in one in three cases. Besides hospitalization, less intensive interventions (e.g. relapse groups, case management) should be made available in these residential centers to address adequately the needs of alcohol abusers who relapse.

Although much theoretical work has been done on relapse prevention (62-63), the number of empirical studies on determinants of relapse after residential alcohol treatment is limited. Our data show that respondents' psychological health status and their subjective perception of their situation are the best predictors of relapse and readmission after intensive residential treatment. In addition, individuals' living situation was a significant domain predicting relapse in our final model. Specific variables that independently predict relapse are 'not being satisfied with the way you spend your day activities' and the number of days someone experienced alcohol problems at follow-up. Also, individuals who mainly spent their free time with family were less likely to relapse. These observations illustrate the importance of supporting (family) persons during (residential) treatment and of looking for satisfying day and leisure activities and for continuing these after treatment (18). Highly effective interventions for alcohol abusers like Community Reinforcement Approach (CRA) (64) are based on these components. Of course, it will be important that these activities involve non-substance abusers and that they do not have an obvious relation with alcohol or drugs (65). (Re)building the relationship with the family appears to be another protective factor for recovery (43).

Given the close link between relapse and readmission, it may not surprise that the same domains predicted relapse and readmission in our regression models. While relapse was independently predicted by spending one's leisure time mostly with friends, dissatisfaction with day activities and days troubled by alcohol problems, readmission was mainly explained by persons' psychological health (22). Readmission was independently predicted by the severity of psychiatric problems at follow-up and, reversely, with less severe psychological problems at the time treatment started. Although the Addiction Severity Index measures the severity of various problems separately (51), the former observation can be explained by the fact that the choice for an alternative alcohol-free lifestyle may cause negative feelings which urge people to contact treatment services again (63). This hypothesis is supported by the finding that persons' subjective perception of well-being affected the probability of being re-

admitted to treatment. On the other hand, individuals who reported less severe psychological problems when starting treatment may also have been the ones who were the least likely to receive any psychological support during treatment, negatively affecting their coping skills afterwards. Therefore, targeted screening, comprehensive treatment and continuous monitoring of psychological problems are recommended (66). Although the participating services offer alcohol treatment, they should be aware of the fact that a large majority of alcohol-abusing patients also have psychiatric problems (67). Consequently, an integrated approach should be encouraged in which substance abuse, as well as psychiatric problems, is addressed adequately through a combination of pharmacotherapy, psychotherapy and milieu therapy (68).

Finally, individuals' personal perceptions and subjective appreciation of their situations are related to and may even predict success or failure after treatment. Listening to clients' narrative stories, assessing their strengths and abilities and their quality of life, and involving them in treatment planning may help to enhance treatment retention and outcomes (41). Besides interpersonal factors, intrapersonal variables play an important role in relapse prevention. Individuals' self-efficacy to deal with high risk situations has been identified as a significant predictor of post-treatment alcohol use (65). It can be enhanced by participation in aftercare, including self-help groups (69).

Limitations of the study

Although the attrition rate in this study was acceptable (48), a substantial number of patients could not be retrieved at the time of the six-month follow-up (n=68). For some patients (=17), minimal information could be collected based on contacts with the contact persons the participants had nominated at baseline. These informal talks revealed that, except one, all these persons had been using alcohol again. However, the extent of their alcohol use was unclear. If we assume (based on the findings among this subsample of study drop-outs) that over 90% of the non-response group relapsed into alcohol use, relapse rates in this study would drop down to 66% for the intention-to-treat sample. Moreover, only clients who intended to participate in further treatment after initial detoxification were included in the study. If clients who intended to leave the program after initial detoxification would also have been interviewed or if the follow-up period would have been longer, one could have expected the observed relapse rates to drop further.

To maximize the response rate at follow-up, we made use of a relatively short questionnaire that focused on alcohol use and psychological health. The quality of the data could have been improved if – instead of self-reported data only – objectives measures (e.g. breath or urine tests) had been used too. Further, we used telephone instead of face-to-face follow-up interviews to assess clients' alcohol use and psychiatric problems. Although the reliability of administering the ASI by telephone has been demonstrated (51), this may have resulted in underscoring the severity of some problems in the absence of the possibility to make direct observations. On the other hand, respondents as well as interviewers stated participants

liked this approach as it gave them the opportunity to talk freely to someone about the challenges they faced and about the program they had followed.

In the absence of a control condition, it is impossible to make any conclusions about the effectiveness of these residential programs. This pre-post design has demonstrated that at least a third of all treated individuals did not use any alcohol six months after initial treatment, but we have no information about how alcohol abusers with similar problems evolved who just followed detoxification treatment or who followed another type of treatment or no treatment at all.

Conclusion

The findings from this study show that relapse rates are high among alcohol abusers, even shortly (six months) after intensive residential treatment. Almost one third of the respondents had been readmitted to the unit during the follow-up period. Treatment agencies should recognize the chronic and relapsing nature of substance abuse problems and organize services from a continuing care perspective, including continuous monitoring and assertive outreach strategies. Moreover, active cooperation and networking with other institutional partners (e.g. employment, mental health services) and self-help groups will be necessary to support substance abusers after initial treatment on their way towards recovery. Besides attention for psycho-education and relapse prevention during the treatment phase, this research has demonstrated that essential support should include assessment and monitoring of psychological health and of persons' subjective well-being and quality of life. Finding pleasurable and satisfying day and leisure activities appear to be other key challenges in the recovery process. Participation in aftercare needs to be encouraged and made more attractive (e.g. accessibility, frequency, flexibility) and should address the afore-mentioned issues in order to maximize the benefits accrued during treatment.

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