
Article

Integrated Treatment at the First Stage: Increasing Motivation for Alcohol Patients with Comorbid Disorders during Inpatient Detoxification

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Abstract

Aims: Co-occurring mental disorders can complicate the detoxification treatment process and outcome. The aim of this study is to examine whether a brief psychoeducational group counseling session during detoxification treatment can increase the motivation for and utilization of subsequent treatments.

Short summary: Interventions increased utilization of post-detoxification treatment and reduced alcohol-related readmissions. Higher depression or trauma scores were associated with higher rates of utilization of treatment.

Methods: Patients received either a brief manualised group intervention on the interrelation of alcohol use disorder (AUD) and major depression (MD) or AUD and post-traumatic stress disorder (PTSD) or a cognitive training session (control group). Of the 784 patients treated in the study period, 171 participants were quasi-randomly allocated to groups. Self-reported motivation was measured before and after intervention, transition into AUD treatment and readmissions were collected after detoxification treatment.

Results: Participating in any of the intervention groups increased the utilization of AUD treatment after inpatient detoxification ($\chi^2 = 6.15$, $P = 0.02$) and decreased readmissions 6 months after discharge ($\chi^2 = 7.46$, $P = 0.01$). Depression and trauma scores moderated the effect: associations with the utilization of post-detoxification treatment were found in participants with higher depression (OR = 5.84, 95% CI = 1.17–29.04) or trauma scores (OR = 10.17, 95% CI = 1.54–67.1).

Conclusions: An integrated intervention approach for dual diagnosis at the beginning of the treatment can increase motivation for continued AUD treatment. Especially affected dual diagnosis patients can benefit from this treatment.

INTRODUCTION

Alcohol use disorder (AUD) is a prevalent, highly disabling disorder that is associated with many co-occurring psychiatric disorders (Grant *et al.*, 2015). It has devastating consequences on the health and social life of sufferers and carries a high risk of mortality (Roerecke and Rehm, 2013). AUD is a chronic relapsing disorder and premature treatment termination can lead to the ‘revolving door phenomenon’, which is defined, by frequent relapse and readmission to psychiatric units (Mark *et al.*, 2006).

Detoxification treatment is the most frequently provided form of treatment and is considered the first of several necessary treatment steps. According to the guidelines of the Centre for Substance Abuse Treatment (2006), three steps are necessary in the process of detoxification: (1) evaluation of AUD and other co-occurring disorders, (2) stabilization and guidance through detoxification and (3) guiding patients into treatment. In order to reduce the risk of relapse and the revolving door phenomenon, retention in treatment is of high importance. Patients who utilize subsequent treatment following detoxification have better outcomes (Carroll *et al.*, 2009). A recent meta-analysis confirmed the benefit of continued treatment utilization after initial treatment (Blodgett *et al.*, 2014). For example, subsequent treatment is associated with higher rates of abstinence and lower relapse (McCusker *et al.*, 1995), longer periods of abstinence (Sannibale *et al.*, 2003), decreased readmissions (Lee *et al.*, 2014) and higher employment rates (Ford and Zarate, 2010). Thus, a main target of detoxification is to motivate the participant to utilize specialized subsequent care (Stetter *et al.*, 1995).

Research over the last years has shown that AUD patients very often have a history of trauma exposure (Fetzner *et al.*, 2010). Additionally, AUD patients’ comorbidity rates are high, especially for depressive disorders (Kessler *et al.*, 2005) and post-traumatic stress disorder (PTSD; Debell *et al.*, 2014). On a symptomatic level, comorbid depressive and post-traumatic phenomena are greatly influenced by alcohol use as well as withdrawal from it (Liappas *et al.*, 2002). However, the rates of mood disorders in AUD patients that develop independently from intoxication and withdrawal are still among the most prevalent comorbid psychiatric disorders (Hasin and Grant, 2015). A recent study reported the stability of PTSD symptoms through acute withdrawal (Herzog *et al.*, 2015).

These co-occurring disorders can complicate the substance treatment process and contribute to poorer outcomes (Sterling *et al.*, 2010). They serve as a complicating factor and can cause premature treatment termination (Sacco *et al.*, 2015), poor treatment response (Brunette *et al.*, 2004), low adherence (DeMarce *et al.*, 2008), more relapse (Waldrop *et al.*, 2007) and more readmissions (Chi *et al.*, 2006). Associations between the severity of psychopathology with the negative outcomes and the rates of relapse have been reported (Engel *et al.*, 2015). Furthermore, dual diagnosis patients experience a worse prognosis across both disorders when compared to individuals with substance use disorders only (Myrick and Brady, 2003). Overall, it seems that AUD patients with a dual diagnosis are at a higher risk of recovery failure.

There have been attempts to facilitate transition into treatment for patients with a comorbid psychiatric disorder (Santa Ana *et al.*, 2007). An intervention targeting to improve treatment adherence was found to be more effective in patients with a comorbid disorder (DeMarce *et al.*, 2008). In a first study, we showed that the brief educational program PAST (psychoeducational group intervention on alcohol drinking related to stress and trauma) for patients with AUD reduced dropout from inpatient detoxification and increased

motivation (Odenwald and Semrau, 2012, 2013). The effect has been moderated by trauma load: patients with more traumatic experiences profited more from the intervention.

The aim of the current study was to test whether a brief psychoeducational group intervention during alcohol detoxification treatment increases treatment motivation and prompts patients to utilize continued treatment. We wanted to replicate our earlier studies on trauma load and extend this knowledge by including depression as a comorbid disorder. Therefore, we hypothesized that group counseling with the aim of raising awareness of the co-occurrence and functional relationship between substance use and comorbid psychiatric problems would have the following effects on outcomes of detoxification treatment: (1) an increase in treatment motivation, (2) an increase in continued utilization of subsequent treatments and (3) a reduction in alcohol-related readmissions during the follow-up period. Furthermore, we hypothesized that (4) depression and (5) trauma load are moderators of psychoeducation-induced improvements of detoxification outcome variables.

METHODS

Design and setting

This controlled quasi-experimental intervention study was implemented in the alcohol detoxification ward of a public psychiatric hospital (Centre of Psychiatry Reichenau) located in southern Germany serving a catchment area of ~500,000 inhabitants. The study was conducted from March 2015 to June 2016. The unit has 29 beds and had 930 admissions in 2015. The average length of detoxification treatment in the study period was 10.8 days.

All participants received treatment as usual (TAU) and one additional group therapy (intervention or control groups). Medical staff consistently monitored withdrawal symptoms in the first days after admission. Participants terminated withdrawal-related medication before study participation. Inclusion criteria were alcohol dependence according to ICD-10, the occurrence of another psychiatric disorder was not required for participating in study groups. Exclusion criteria were on-going severe withdrawal syndrome, treatment for crisis intervention only, main problem substance other than alcohol, acute suicidality, lifetime history of psychosis and difficulties to understand the German language. The group therapies were implemented one after the other, each for 1 month in a sequential order: Months 1 and 2 intervention, Month 3 control; in the fourth month this sequence started again. Participants were quasi-randomly allocated to study groups, in the sequence of group appearance. Each week the nursing-team selected patients who fit study-criteria for attendance. We could single blind the study and patients were not aware of treatment groups.

The longitudinal design included three assessments: before (baseline) and after the additional therapy groups (post) and a follow-up assessment 6 months after the post-assessment.

Intervention

An interdisciplinary team provided TAU for AUD including psychiatric care and psychopharmacological medication and the therapeutic elements recommended for ‘qualified detoxification’ according to Mann *et al.* (2006), for example, group therapy sessions, ergotherapy, movement therapy and especially psychotherapeutic treatment aiming at motivation for subsequent treatment (Stetter *et al.*, 1995).

Study interventions were closed groups and consisted of three sessions (60 min) that were conducted within 1 week by the clinical psychologist in charge or a trained and supervised BA-level psychologist. All therapists carrying out intervention groups were trained in Motivational Interviewing. The number of group participants ranged from 3 to 8. All study interventions used guided exercises and discussions and fostered the sharing of experiences between group members.

Control group members received three cognitive training sessions. The three sessions included the building of awareness of neuropsychological deficits and the training of functions in the domains of memory, divergent thinking and attention. The exercises were based on a manual (Finauer, 2009).

The two experimental groups attended to a manualised standardised psychoeducational program either for the dual diagnosis of AUD with PTSD (PAST) or AUD with MD (PASD; psychoeducational group intervention on alcohol drinking related to stress and depression). Intervention manuals were both based on the original version of the PAST program (Odenwald and Semrau, 2012, 2013), but the four 45-min sessions were reorganized and merged into three 60-min sessions. The aim of the intervention was to give participants the opportunity to develop recognition of the co-occurrence of AUD with the other diagnosis (i.e. MD or PTSD) and to exchange their experiences in coping with them. Furthermore, the intervention intended to increase use of treatment, to motivate for detoxification completion and to accept subsequent treatment for their AUD and/or comorbid disorder. Participants of the PAST group received to following intervention elements: The first session highlighted the connection between major life problems and the use of alcohol. Session two defined a traumatic life event, informed patients about typical PTSD symptoms and showed the functional use of alcohol to cope with the trauma-related symptoms. In the third session, possibilities to get out of this vicious circle were developed by introducing

different subsequent treatment options and discussing the participants' experiences with them.

Patients in the PASD group received a comparable program. In Session 1, the interconnection between major life problems and alcohol use was conveyed, highlighting mood problems as a risk factor for alcohol use. The second session defined an MD, informed participants about typical depressive symptoms through the DSM-V criteria and discussed alcohol use as an attempt to cope with depressive symptoms. In Session 3, ways out of the vicious circle were discussed and further treatment opportunities were shown.

Besides session contents the manual defined the role and the attitudes of the therapist. Groups were conducted using elements from Motivational Interviewing, i.e. techniques for the interaction with group members (e.g. express empathy or support change talk) and the therapist attitudes (accepting and neutral, leaving autonomy and decisions with the patient).

For the present study, we pooled both experimental groups (PAST and PASD) together as one intervention condition because there were no substantial differences between intervention conditions.

Participants

Over the 9-month study period, 784 patients were admitted to detoxification treatment and received TAU. Of these patients, 171 were selected for study participation. Of these, 134 gave informed consent and completed the first interview. 12 patients were excluded because of a diagnosis other than AUD or because of their second admission during the study period. The final sample consisted of $n = 122$ participants who matched inclusion criteria and participated in at least one intervention session: $n = 77$ participated in the intervention condition ($n = 33$ in PAST and $n = 44$ in PASD), the remaining $n = 45$ patients attended a control condition. Of the final sample, $n = 92$ participants attended the post-interview following study

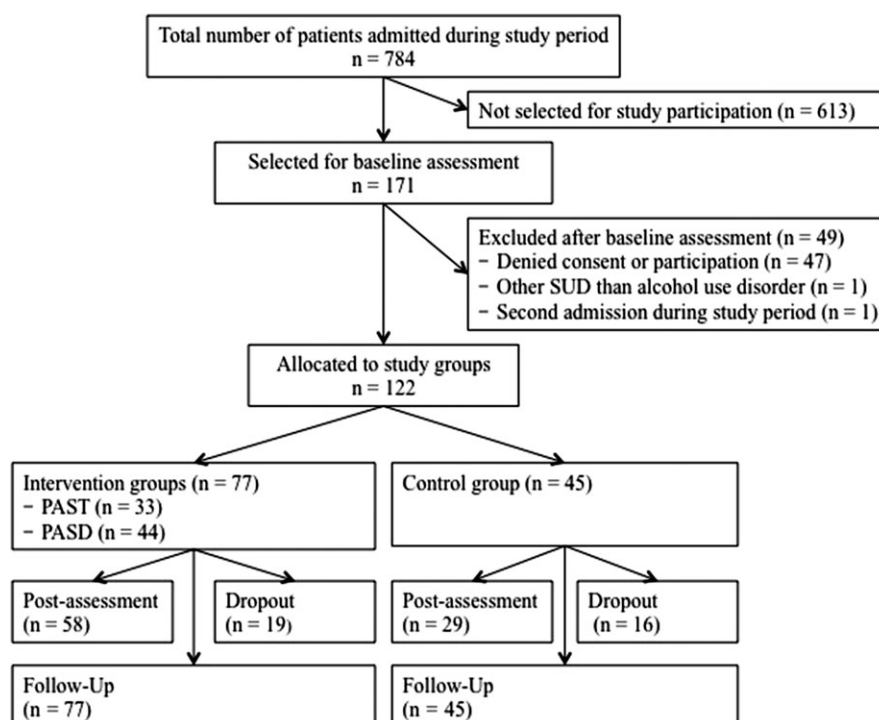


Fig. 1. Flow of participants

intervention. We received $n = 53$ self-reported data packages at follow-up; the remaining data packages ($n = 69$) were collected from patient files 6 months after discharge. For the analysis reported here, all participants included in study completed the self-rating instruments for moderator analysis (Fig. 1).

On average, participants took part in the first assessment 8.55 (SD: 8.33) days after admission to the ward; the post-assessment was 10 days afterwards.

The final sample had an average age of 45.79 years (SD = 9.37) ranging from 27 to 67. Most participants were males ($n = 87$, 71.3%) and German nationals ($n = 99$, 82.7%). About 80.3% reported to have graduated from formal vocational training, but most of them were unemployed (41%) at the time of the study. Of the sample, $n = 20$ (16.8%) were married, and $n = 99$ (81.2%) reported to live alone. On average, the participants had participated in 5.41 (SD = 8.99) detoxification treatments prior to the current admission. There were no differences between intervention and control group regarding the number of previous detoxifications or other treatments (7.77 vs. 10.09, $t = 0.99$, $P = 0.32$).

Assessments and instruments

Before and after participation in study group sessions, participants attended a diagnostic assessment session conducted by research staff. Clinical staff and group therapists were unaware of assessment outcome. Additionally, closely defined variables were taken from patient files as indicated below.

Socio-demographic information

The following socio-demographic information has been collected at baseline: age, sex, nationality, education, employment situation and previous treatments.

Depression

The German version of the Beck Depression Inventory second revision (BDI; Beck *et al.*, 1996; Hautzinger *et al.*, 2009) is a self-report measure that evaluates symptoms of a depression. It consists of 21 items, which are statements to describe several phenomena of MD (e.g. suicidality). In the current study, we used the cut-off scores described by Beck *et al.* (1996) and created a positive screening diagnosis at a sum score of >20 . In our sample, we measured a good reliability with Cronbach's $\alpha = 0.91$.

Trauma

The German version of the Childhood Trauma Questionnaire (CTQ; Bernstein and Fink, 1998; Gast *et al.*, 2001) is a self-rating instrument for the retrospective assessment of traumatic events in childhood and adolescence. The 28 items can be summed to the subscales Emotional Abuse, Emotional Neglect, Physical Abuse, Physical Neglect and Sexual Abuse. Each subscale has five items and scores can range from 5 (no history of abuse or neglect) to 25 (very extreme history of abuse and neglect). An overall sum score was calculated by adding all subscales to represent the overall burden of a patient. We found a sufficient internal consistency with Cronbach's $\alpha = 0.71$.

We used the German version of the Trauma History Questionnaire (THQ; Maercker, 2002; Hooper *et al.*, 2011). The THQ comprises a list of 24 traumatic event types, such as catastrophes or physical abuse. The response mode is binary, meaning that the subject report whether they have experienced the event type

ever in their lives (yes or no). Following the suggestion of Odenwald and Semrau (2012), a sum score was computed and groups were constructed by the median split that indicated a high or low trauma load (high trauma ≥ 6 ; low trauma ≤ 5). We achieved good internal consistency of the sum score (Cronbach's $\alpha = 0.77$).

Post-traumatic stress symptoms

The German version of the PTSD Checklist for DSM-5 (PCL-5; Weathers *et al.*, 2013; Ehling *et al.*, 2014) is a self-report screening tool. Its 20 items correspond to the symptoms included into the DSM-5 and belong to the following clusters (subscales): intrusion symptoms (B), avoidance of stimuli associated with the trauma (C), negative alterations in cognitions and mood (D) and trauma-related alterations in arousal and reactivity (E). A screening PTSD is defined by the DSM-5 diagnostic rule, which requires at least 1 B item, 1 C item, 2 D items and 2 E items. The Criterion A assessment was conducted with the THQ. In the current assessment, we had a very good reliability, with Cronbach's $\alpha = 0.96$.

Treatment motivation

We used the German short form of the University of Rhode Island Change Assessment (URICA; McConaughy *et al.*, 1983) and the 'Veränderungsstadien-Skala' (VSS-K; Ficht *et al.*, 1998) to measure treatment motivation. Its subscales are related to the Stages of Change according to Prochaska and DiClemente (1992): Precontemplation, Contemplation, Action and Maintenance. We computed the Readiness to Change (RTC) score by adding up the subscales Contemplation, Action and Maintenance and subtracting the Precontemplation score (Project Match Research Group, 1997). In our sample, we achieved a Cronbach's Alpha of 0.74, indicating an acceptable internal consistency. We assessed the URICA at both points of measurement (baseline and post) and analyzed the change from baseline to post-assessment.

Readmission

The rate of readmissions to the same detoxification unit was determined for the period of 6 months after post-assessment and was taken from the electronic patient record. It was defined as a dichotomous variable (readmitted vs. not readmitted).

Utilization of subsequent treatment

In order to have a reliable measure of subsequent treatment utilization, clinicians recorded the direct transfer to a subsequent care institution to the patient file at the day of discharge from detoxification treatment. In Germany, specialized residential rehabilitation clinics for long-term AUD treatment are the standard subsequent treatment after detoxification. This variable was operationalized as the use of the clinic's patient transport or of a taxi to the subsequent residential or day-clinic treatment for AUD and/or a co-occurring disorder. We registered the utilization of subsequent treatment as a dichotomous variable: whether or not patients were directly transferred to treatment after detoxification.

Ethical considerations

The IRB of the University of Konstanz approved the study. All individuals attended voluntarily gave their written informed consent and were free to withdraw from study participation at any time.

Statistical analysis

All analysis was performed with SPSS (version 20) to test the effect of treatment between intervention and the control group. Student's *t*-tests or Mann–Whitney *U* statistics were used to investigate baseline differences as a statistical randomization check. Analyses for main outcomes were conducted with χ^2 -tests.

Alterations in treatment motivation from baseline to post-assessment were tested using mixed repeated measures analysis of variance (rmANOVA). The RTC at baseline and post-assessment was entered into the model as a within-subject factor (time), treatment condition was entered as between-subject factor (group).

We used logistic regression modeling to analyze the moderating effect of the variables depression and trauma burden on the

association between the independent variable treatment condition (intervention vs. control) and the dependent variable treatment outcome (i.e. utilization of subsequent treatment). Therefore, we calculated two separate hierarchical binary logistic regression models, i.e. the first with BDI as moderator variable and the second with THQ. Both potential moderator variables were entered as bivariate variables. In the first model, we entered treatment condition and depression in Step 1; in Step 2, we additionally entered the interaction term treatment condition by depression. In the second model, we used the parallel approach with the potential moderator trauma burden. We report odds ratios with CI 95% and improvement of model fit with R^2 according to Cox & Snell and Nagelkerke.

Table 1. Baseline assessment. We report group characteristics (mean, SD) and differences between intervention groups and control group

Scale	Intervention groups N = 77		Control group N = 45		Test statistic	P
	M	SD	M	SD		
Male	51 ^a		36 ^a		2.63 ^b	0.15
Age	44.91	9.66	47.29	8.74	1.36	0.18
BDI	21.73	10.52	21.02	11.11	−0.35	0.73
THQ	5.75	3.79	5.71	3.76	1725.0 ^c	0.97
CTQ	70.39	20.45	70.32	22.16	−0.02	0.96
CTQ emotional abuse	11.15	5.52	10.99	5.77	−0.15	0.88
CTQ physical abuse	8.93	5.07	8.55	4.76	−0.41	0.68
CTQ sexual abuse	6.58	3.86	7.15	4.54	0.72	0.47
CTQ emotional neglect	13.94	4.70	13.94	4.48	0.00	0.99
CTQ physical neglect	9.47	3.55	9.04	4.00	−0.60	0.55
PCL	31.11	19.88	29.23	20.23	−0.49	0.63
PCL intrusion	7.42	5.82	7.01	6.07	−0.36	0.72
PCL avoidance	3.37	2.24	3.38	2.83	0.02	0.98
PCL negative alteration	11.11	7.82	9.80	7.64	−0.88	0.38
PCL alteration in arousal & reactivity	9.34	6.14	9.09	6.25	−0.21	0.83

Note. Test statistic = students *t*-test.

^aHere, we report frequency.

^b χ^2 statistic.

^cMann–Whitney *U* test; BDI, Beck depression inventory; CTQ, Childhood Trauma Questionnaire; PCL, PTSD Checklist.

Table 2. Motivation assessment. We report motivation scores (mean, SD) and differences between interventions groups and control group between baseline and post-assessment.

Scale	Intervention groups N = 58		Control group N = 29		Test statistic	P
	M	SD	M	SD		
Baseline Assessment						
VSS Readiness to Change	8.40	1.46	8.42	1.29	0.09	0.93
VSS Precontemplation	3.87	0.64	4.01	0.60	1.00	0.32
VSS Contemplation	3.84	0.57	3.99	0.55	1.26	0.21
VSS Action	4.18	0.72	4.12	0.75	−0.39	0.69
VSS Maintenance	4.24	0.74	4.32	0.69	0.46	0.65
Post-Assessment						
VSS Readiness to Change	8.71	1.32	8.22	1.58	−1.56	0.12
VSS Precontemplation	3.82	0.67	3.96	0.67	0.87	0.38
VSS Contemplation	3.94	0.59	3.89	0.65	−0.35	0.73
VSS Action	4.20	0.66	3.89	0.91	−1.34	0.18
VSS Maintenance	4.39	0.64	4.30	0.72	−0.58	0.56

Note. Test statistic, Students *t*-test; VSS, Veränderungsstadien–Skala.

RESULTS

Baseline group differences

The baseline assessment revealed $n = 68$ (55.7%) AUD patients of the whole sample who screened positive for a co-occurring depressive disorder ($BDI \geq 20$) and $n = 70$ (57.4%) for a screening PTSD. In the whole sample, trauma scores were high, with an average THQ sum score of 5.74 ($SD = 3.77$) and a CTQ sum score of 70.37 ($SD = 21.00$). At baseline, there were no group differences in the self-reported traumatic experiences and in the severity of PTSD and depression symptoms between patients in intervention and the control group (each $P > 0.5$). Motivation scores on all scales were comparable between the conditions ($P > 0.2$). Sample baseline characteristics are described in Table 1.

Treatment outcomes

About 119 patients filled the URICA at T1 and 88 at T2; for 87 participants data was available for both measurements and were included in this analysis. There was no difference between intervention and control group regarding the RTC at baseline (8.37 vs. 8.33; $t = -0.13$, $P = 0.90$). The mixed ANOVA revealed a non-significant interaction effect (Time * Intervention: $F = 3.04$, $P = 0.08$, $\eta^2 = 0.04$, $n = 87$) for the RTC score. There was a non-significant main effect of Intervention, $F(1, 85) = 0.48$, $P = 0.49$ (Table 2).

From the final sample of $n = 122$ participants, $n = 95$ patients (77.87%) had no readmissions in the follow-up period. However,

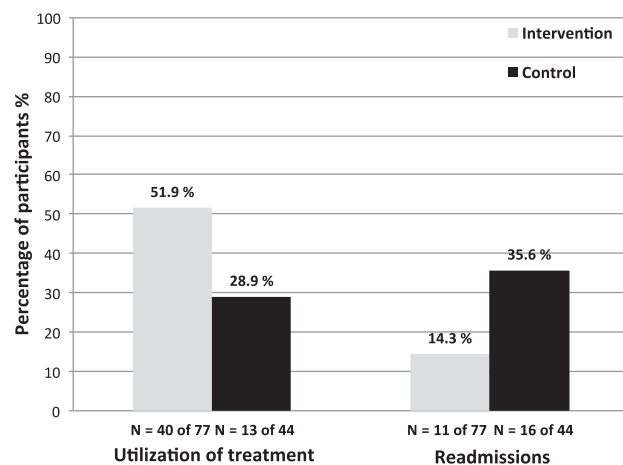


Fig. 2. Main outcome. *Note.* Below the bars, we report the number of subjects. Bars represent percentage of participants in intervention or control condition for utilization of subsequent treatment after detoxification or readmissions 6 months after discharge.

$n = 27$ patients (22.13%) had been admitted at least once for another detoxification treatment in the 6 months following post-assessment. Comparing the conditions, the control group had $n = 16$ (35.6%) and the intervention condition had $n = 11$ (14.3%) readmissions; this effect was statistically significant ($\chi^2 = 7.46$, $P = 0.01$).

Regarding the utilization of treatment, $n = 69$ participants (56.56%) were released after detoxification without utilization of subsequent treatment, and $n = 53$ participants (43.44%) were directly transferred into the next treatment. Participants in the intervention condition were significantly more likely to begin treatment after detoxification ($n = 40$; 51.9%), compared to control condition ($n = 13$; 28.9%; $\chi^2 = 6.15$, $P = 0.02$) (Fig. 2).

Moderator analysis

Depression

In the first step, we entered the intervention and depression screening variables into the binary logistic model to predict the utilization of subsequent treatment, showing a good model fit ($\chi^2(2) = 9.12$, $P = 0.01$; $R^2 = 0.10$). Participating in the intervention condition significantly predicted the utilization of subsequent treatment ($P = 0.01$). In Step 2, we additionally entered the interaction term intervention*depression screening, which resulted in a slight improvement of model fit ($\chi^2(3) = 13.80$, $P < 0.01$; $R^2 = 0.14$), a significant interaction term ($P = 0.03$; OR = 5.84, CI 95% = 1.17–29.04) and loss of significance for main effects. Participants in the intervention groups with a high depression score were more likely to utilize subsequent treatment. For the control group there is no difference in regarding depression screening (Table 3 and Fig. 3).

Trauma burden

After the first step, entering intervention and trauma load to predict the utilization of subsequent treatment, the model achieved a good fit ($\chi^2(2) = 6.88$, $P = 0.03$; $R^2 = 0.07$), and intervention showed to be a significant predictor ($P = 0.01$). The second step improved the model fit ($\chi^2(3) = 13.73$, $P < 0.00$; $R^2 = 0.14$) and the interaction term intervention*trauma load achieved statistical significance ($P = 0.02$; OR = 10.17, CI 95% = 1.54–67.1). Participating in intervention groups was more likely to be associated with a utilization of subsequent treatment if they had high trauma load. This effect could not be shown for participants in the control group (Table 4 and Fig. 4).

DISCUSSION

The present study investigated the effect of brief psychoeducational group interventions on outcomes of alcohol detoxification treatment. We compared patients who participated in manualised

Table 3. Logistic regression of moderator BDI for utilization of treatment; we report the final model.

Scale	B	SE	P	95% CI for odds ratio		
				LL	Odds ratio	UL
Constant	−0.62	0.47	0.19		0.54	
Intervention	0.01	0.59	0.98	0.32	1.01	3.22
Depression screening	−0.53	0.66	0.42	0.16	0.59	2.15
Depression screening by Intervention	1.76	0.82	0.03	1.17	5.84	29.04

$R^2 = 0.11$ (Cox & Snell), 0.14 (Nagelkerke). Model $\chi^2(3) = 13.80$, $P < 0.00$. Correct classification 67.2%.

Note. Intervention: experimental group = 1, control group = 0. Depression screening: positive screening yes = 1; negative screening no = 0. CI = confidence interval. LL = lower limit. UL = upper limit.

interventions with a control group in regard to treatment transition, readmissions and treatment motivation. We found that patients participating in the intervention groups were more likely to utilize subsequent treatment, had a smaller risk of readmission in a 6-month follow-up period, and had a tendency to increase their Readiness to Change score. We also found support that this effect is moderated by comorbid depressive symptoms and trauma load.

As Choi *et al.* (2013) demonstrated, the Readiness for Change can be a predictor of treatment retention. There was no improvement in the motivation scores of participants in the intervention condition. A significant change of the RTC score in our study might be more difficult to achieve than behaviors (e.g. accepting subsequent treatment) because of the relatively brief period between pre- and post-assessment (10 days).

The overall rate of transition into treatment after detoxification was low. For the control group, this figure was <30%, which is comparable to previous studies (e.g. 21%; McCusker *et al.*, 1995). The brief group interventions increased the rate in such a way that more than 50% of the patients continued treatment after detoxification. Our data revealed that this effect is more likely for patients with a co-occurring depressive disorder indicated by higher BDI scores or with a high trauma load indicated by higher THQ scores. Results support a moderator effect of the depressive symptoms and trauma load on the outcome of the intervention: higher BDI and THQ scores led participants to utilize post-detoxification treatment

in the intervention but not in the control group. Based on our data, it can be hypothesized that patients affected by comorbid MD or high trauma load who did not receive an intervention aimed at raising awareness on comorbid problems were more likely to terminate treatment after detoxification. We can speculate for reasons, for instance, that higher symptom load can be a barrier for treatment utilization such that comorbid disorders require greater efforts by the patients to cope with the demands of subsequent treatment. This is in line with previous findings showing that AUD patients with comorbid mental disorders are more likely to be noncompliant or dropout of treatment (Odenwald and Semrau, 2012; Kelly and Daley, 2013). Our results also support the finding that patients with high depression symptoms or high trauma load can be easily encouraged to utilize treatment after detoxification by participating in a group intervention that requires relatively few resources. A recent analysis revealed that recognition of the interaction of dual diagnosis (e.g. between mental health problems and substance use disorder) predicts higher treatment intentions (Vella *et al.*, 2015). With our data, it can be concluded that increasing awareness and exploring interactions between disorders during detoxification has the potential to increase motivation for treatment. This result replicates our previous work (Odenwald and Semrau, 2012) and is in line with other studies (Santa Ana *et al.*, 2007).

During detoxification, patients typically experience an exacerbation of psychiatric symptoms—a problem that makes reliable diagnostics difficult during the first days of abstinence until withdrawal effects disappear (Driessen *et al.*, 2001; Liappas *et al.*, 2002; Herzog *et al.*, 2015). A possible explanation for treatment maintenance or attrition in the sensitive early phase of alcohol treatment could be the load of symptomatic stress. We propose that depressive symptoms and traumatic experience load might be factors with independent effects on treatment completion and utilization outcome. Further studies should test whether AUD patients with comorbid MD and high trauma load benefit differentially from specific interventions on comorbid MD or PTSD.

This study highlights the need for screening diagnosis and recognition of co-occurring disorders in AUD patients as early as during detoxification. Other studies have shown that patients whose comorbidity was not addressed were less likely to retain treatment (Schulte *et al.*, 2010). In contrast to other studies, our focus on motivation-enhancing interventions was on comorbid disorders. In our experiences, this approach is well accepted by most AUD patients because it corresponds better to their self-concepts and facilitates acceptance of the negative effect of alcohol on their lives. This demonstrates the challenges for group therapists –avoiding resistance (Miller and Rollnick, 2012) and to reinforce the precontemplation stage (Prochaska and DiClemente, 1992) and at the same time

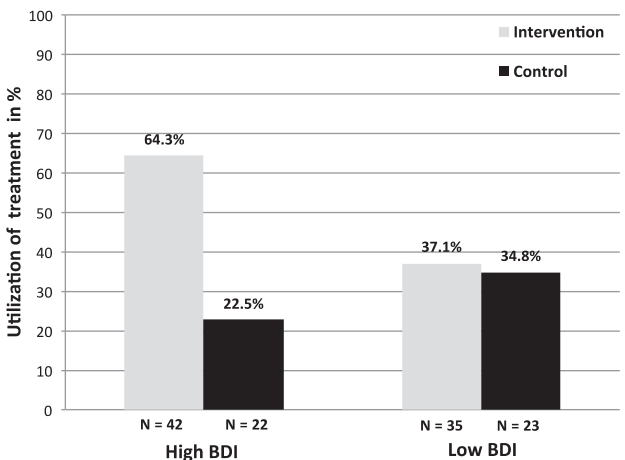


Fig. 3. Moderation of depression scores on utilization of treatment. *Note.* Below the bars, we report the number of subjects. High BDI ≥ 20; Low BDI ≤ 19. Bars show percentage of participants in intervention or control condition with high vs. low BDI score for utilization of treatment.

Table 4. Logistic regression of moderator THQ for utilization of treatment; we report the final model

Scale	B	SE	P	95% CI for odds ratio		
				LL	Odds ratio	UL
Constant	−0.24	0.40	0.55		0.78	
Intervention	0.14	0.52	0.79	0.42	1.15	3.16
Trauma burden	−1.96	0.85	0.02	0.03	0.14	0.74
Trauma burden by Intervention	2.32	0.96	0.02	1.54	10.17	67.1

$R^2 = 0.11$ (Cox & Snell), 0.14 (Nagelkerke). Model $\chi^2(3) = 13.77$, $P < 0.00$. Correct classification 60.7%.

Note. Intervention: experimental group = 1, control group = 0. Trauma burden: high trauma burden = 1; low trauma burden = 0. CI = confidence interval. LL = lower limit. UL = upper limit.

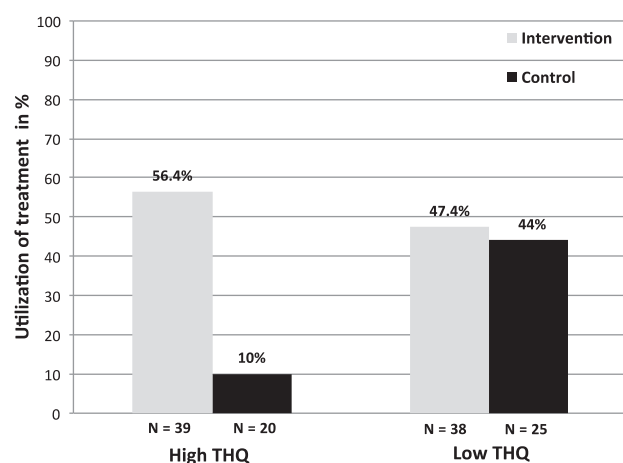


Fig. 4. Moderation of trauma scores on utilization of treatment. *Note.* Below the bars, we report the number of subjects. High THQ ≥ 6 ; Low THQ ≤ 5 . Bars represent percentage of participants in intervention or control condition with high vs. low THQ score for utilization of treatment.

working towards a better acceptance of the alcohol-related problems and reducing perceived self-stigmatization (Keyes *et al.*, 2010). Further studies are needed to identify change trajectories and potential mechanisms to explain the effects of brief interventions in this group of patients. For example, one study demonstrated a significant early change after a single intervention session (Baker *et al.*, 2013).

There are several limitations to this study. First, the study is not a randomized controlled trial because single patients could not be randomized to different treatment groups. Our data can be criticized because we relied on self-rating scales that can be biased due to social desirability and memory effect and by the effect of withdrawal symptoms. We used listwise deletion to handle missing data. We did not follow-up with participants after detoxification to confirm if they really participated in subsequent treatment, the variable was measured only through direct transport to the subsequent treatment facility. We did not control therapist fidelity so it is of high importance for future studies to control for the fidelity by measuring the implementation of interventions or by rating videotapes of the sessions.

In sum, this study supports further research in the field of brief interventions during detoxification. Currently, this approach seems to be a promising addition to existing detoxification regimes.

CONFLICT OF INTEREST STATEMENT

None declared.

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