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The effect of rehabilitation on remission following detoxification treatment in alcohol and substance use disorders: A pilot study

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Abstract

Alcohol and substance use disorders (ASUD) are characterized by persistent substance use behavior despite their harmful effects, and they are chronic and recurrent disorders. In the treatment of ASUD, in addition to pharmacological treatment and the treatment of comorbid psychiatric disorders, the inclusion of rehabilitation in the treatment processes is also essential because of the high relapse rates after detoxification treatment. In our country, although the number of detoxification centers for ASUD has increased over the years, rehabilitation services have remained inadequate. This retrospective study aims to compare the remission periods of ASUD patients who received and did not receive rehabilitation services after completing their detoxification treatments in our clinic and to contribute to the literature in this field. In this study, we compared the remission periods of 33 patients who completed inpatient detoxification treatment in our clinic and then received inpatient rehabilitation services with 33 patients who did not receive rehabilitation services. The findings showed that patients who received rehabilitation treatment had longer remission periods. Rehabilitation services are of critical importance in combating addiction and need to be expanded in our country.

Keywords: Alcohol use disorder, detoxification treatment, substance use disorder, rehabilitation, remission

Introduction

Alcohol and substance use disorders (ASUD) are defined as chronic and recurrent disorders characterized by a person continuing to seek and use the substance despite its negative consequences [1]. The majority of individuals discharged from detoxification treatment for ASUD return to alcohol-substance use within 3 to 12 months after discharge, with a more significant majority returning within 30-90 days [2]. It has been shown that the remission rates after detoxification treatments lasting 2-6 weeks do not exceed 10%, but involving patients in the rehabilitation process and providing medical, social, and psychological support can increase remission periods [3].

The effects of alcohol-substance use disorders on the brain necessitate long-term approaches in their treatment [4]. In this context, rehabilitation must be included in the treatment

processes of ASUD, in addition to pharmacological treatment and the treatment of accompanying mental illnesses [5]. During the rehabilitation process, the aim is to help individuals diagnosed with ASUD manage their free time effectively, avoid risky environments, reduce the mental health problems caused by or resulting from addiction, develop social skills, and thus reduce the likelihood of relapse into alcohol-substance use [6].

Rehabilitation programs vary, including inpatient and outpatient treatments. Inpatient programs provide intensive, residential care for 30 to 90 days, while outpatient programs allow individuals to live at home and attend treatment sessions. Programs are also categorized as short-term, focusing on detoxification, or long-term, offering comprehensive support for sustained recovery. Generally, longer and more intensive programs tend to have better outcomes in terms of long-term sobriety [7].

CITATION

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Inpatient rehabilitation programs are an appropriate option for individuals with ASUD who have psychosocial needs and cannot sustain remission with outpatient treatment in their current environmental conditions [8]. An inpatient rehabilitation model can be beneficial for individuals who need pharmacological treatment but do not have acute withdrawal symptoms [8]. In inpatient rehabilitation services, there are various programs ranging from one month to over a year [9]. These centers, providing 24-hour care and treatment, accept a wide range of individuals with ASUD, from those with addiction and accompanying psychopathology to homeless individuals [10].

Today, the treatment of alcohol-substance use disorders is reduced mainly to a detoxification role due to the demand and needs far exceeding the available resources and the inadequacy of rehabilitation programs and extended social service and care systems [11]. In line with this role, since 2014, there has been a 350% increase in the number of substance addiction treatment centers and a 94% increase in bed capacity, with detoxification treatment being offered in a total of 135 treatment centers, 78 of which are outpatient, as of the end of 2022 [3]. On the other hand, the number of rehabilitation service centers in our country has not yet reached sufficient numbers; these include a total of 14 centers for adult patients, 10 of which are outpatient and four inpatient, and two outpatient rehabilitation centers for child-adolescent patients [3].

In our province, where our institution provides outpatient and inpatient detoxification treatment services for individuals with ASUD, although there are Green Crescent Counseling Centers (YEDAM) and Social Adaptation Centers offering outpatient rehabilitation services, there is still no institution providing inpatient rehabilitation services [7]. The nearest facility to our province is the "Huzur Village Addiction Fighting and Social Adaptation Center" in Kırıkkale, which, under the auspices of the Kırıkkale Governorship and managed by the Kırıkkale Provincial Health Directorate, has been providing inpatient social adaptation and rehabilitation services for individuals with ASUD since 02.02.2022 [12].

As in other rehabilitation centers in our country, voluntary individuals who have completed at least three weeks of detoxification treatment and participated in basic-level psychoeducation groups related to addiction are accepted into Huzur Village after evaluation by the treatment team [12]. In this center, vocational and hobby courses (such as greenhouse cultivation, mushroom growing, pastry making, music, computer skills, welding, ceramics, etc.) are provided by master instructors assigned by the Public Education Directorate, entrepreneurship training, spiritual counseling, sports activities (volleyball, football, swimming, fitness, etc.) by sports trainers, and various cultural trips are organized [12].

When reviewing the research on the effects of rehabilitation services on the remission process of substance addiction in our

country, it is understood that the only study conducted is the one that includes the 2-year follow-up results of the Erenköy BAHAR center [7]. This study examined the treatment processes of 179 individuals who applied to the Erenköy BAHAR Center since its opening and were enrolled in part-time (52%) and full-time (48%) programs. It was observed that 75 individuals completed the first three-month rehabilitation program, and 54 individuals completed the 3-6 months rehabilitation program in remission and compliance. It was found that 19 individuals completed the 1-year program and were in remission [7]. However, there is no study comparing ASUD patients who received and did not receive rehabilitation in our country. In another study, the effectiveness of the probation addiction rehabilitation program was examined. The study found that outpatient probation programs did not show significant improvements in sobriety compared to other patient groups (individual therapy and motivational therapy) [13]. Rehabilitation programs are applied to individuals using alcohol and substances all over the world. In recent years, in addition to motivational interviews, probation programs, bed rehabilitation programs, experimental rehabilitation programs such as Eye Movement Desensitization and Reprocessing (EMDR), Biofeedback Therapy, Profeedback Program, Pet Therapy, Tai Chi, Lyric Analysis, Music Therapy, 28 Days Inpatient Rehabilitation Program, and Episodic Future Thinking are also applied [14].

Detoxification centers are medical facilities that help individuals safely withdraw from substance abuse under medical supervision. The ideal characteristics of these centers include qualified medical staff, personalized treatment plans, holistic approaches, aftercare planning, and a clean, supportive environment [15]. The literature on the bed capacity of detoxification centers is limited. A study conducted in Merced, San Joaquin, and Stanislaus Counties in California found that there are 51 suitable beds available for clinically managed residential detoxification services, which amounts to 4.3 beds per 100,000 adults [16]. Another Sacramento, California study reported that 79 beds are available for clinically managed residential detoxification services, 6.5 beds per 100,000 adults [17]. In our facility, Alcohol and Substance Addiction Treatment Center (AMATEM), there are 34 suitable beds for detoxification patients. Although sports activities or occupational therapies are given as much weight as possible in our clinic, providing ideal detox and rehabilitation opportunities is not always possible.

This retrospective study aims to examine the effects of rehabilitation treatment on remission periods in patients diagnosed with ASUD after detoxification treatment. We hypothesize that ASUD patients who received rehabilitation services after detoxification have significantly longer remission periods compared to those who did not receive rehabilitation services. The study's findings could help addiction management strategies in our country by demonstrating the effectiveness of rehabilitation in prolonging remission.

Material and Methods

Sample and Data

The study was conducted by retrospectively examining medical records at the Alcohol and Substance Addiction Treatment Center (AMATEM) of Ankara Training and Research Hospital. The type of research is a retrospective comparative study. We scanned our clinic's medical records retrospectively and included the appropriate patients. The study included 33 patients diagnosed with ASUD who received detoxification treatment at AMATEM inpatient service in 2022-2023 and subsequently received rehabilitation treatment at Huzur Village (Rehab+ group) and 33 patients diagnosed with ASUD who did not receive rehabilitation treatment (Rehab- group). Both groups of patients underwent detoxification treatment in our clinic. After forming the Rehab+ group, patients matched with the Rehab+ group regarding age, gender, and diagnosis but did not receive rehabilitation treatment were included sequentially in the Rehab- group. We included individuals who received detoxification treatment at our clinic and were later referred to a rehabilitation program in the Rehab+ group. In the rehab- group, we included individuals who received detoxification treatment around the same time as those in the Rehab+ group but did not undergo rehabilitation. These individuals were matched in age, gender, and diagnosis with those in the Rehab+ group.

SUD treatment beds differ across facilities, with some providing short-term withdrawal management and others offering extended residential detoxification services [16]. Various settings cater to clients with diverse needs; for instance, some clients may require high-acuity, short-term care, while others might need longer-term support and return for treatment multiple times. Various service organization models (a one-stop-shop approach, community-based network approach, sustained recovery management) and treatment strategies (community-based outreach, specialized/not specialized outpatient treatments, specialized short-term and long-term treatments) were defined by WHO and UNODC [18]. Individuals who use substances and wish to seek treatment, as well as their relatives looking for solutions to these issues, can apply to Alcohol and Substance Treatment Centers (AMATEM) and psychiatry clinics affiliated with hospitals for treatment. The treatment, conducted through collaboration between the patient and the doctor, involves detoxification in the hospital for 2 to 6 weeks, followed by psychosocial treatment for one year [18]. The treatment system should ensure that treatment services for people with drug use disorders are accessible, affordable, evidence-based, diversified, and delivered with a focus on improved functioning and well-being towards the highest attainable standard of health.

The follow-up notes of the participants included in the study were scanned for 15 months from the start of their detoxification treatment in our hospital record system. Since the Huzurköy rehabilitation center is a new center, the follow-up period of our study was 15 months. Since all individuals in the Rehab+ group

were male, only male patients were included in the Rehab- group. Information such as age, diagnosis, primary substance used, whether they used multiple substances, age at which they started using substances, the longest period they did not use alcohol/substances before admission, and how long they remained in remission with detoxification treatment were obtained from medical records. Patients with incomplete or inconsistent records were excluded in the study.

Ethical Consideration

Ethical approval was obtained from the Clinical Research Ethics Committee of Ankara Training and Research Hospital for our study (date: 21.02.24, no: E-24-36). Additionally, necessary permissions were obtained from the Kırıkkale Governorship and Huzur Village authorities.

Data Collection and Analysis

Statistical analysis

The research data were evaluated using SPSS (Statistical Package for Social Sciences for Windows v.22.0, SPSS Inc. Chicago, IL). Descriptive statistics were presented as mean ($\pm$) standard deviation, frequency distribution, and percentage. The normality of data distribution was assessed using the Shapiro-Wilk test and histogram graphics. The Mann-Whitney U test was used since the variables did not show a normal distribution. The statistical significance level was accepted as $p < 0.05$. In addition to the primary analysis, an analysis of variance (ANOVA) was employed to compare continuous variables among three subgroups: patients who completed treatment, those who did not complete treatment voluntarily, and those discharged due to rule violations. This allowed for the examination of differences in key variables such as age, substance use history, and remission duration across these discharge statuses. A post-hoc power analysis was conducted to achieve 80% statistical power for detecting differences between the two groups. Given the sample size of the study ($n=33$ per group, total of 66 participants) and the calculated effect size (Cohen's $d=0.47$), the power of the study was initially found to be 46.6% at a significance level of $\alpha=0.05$. To increase the power, the significance level was adjusted to $\alpha=0.10$. With this adjustment, the power of the study increased to 59.4%.

Results

The study was conducted with 66 participants. Among the participants, 33 (50%) were patients who stayed at Huzur Village Rehabilitation Center after discharge (Rehab+ group), and 33 (50%) were control group patients who did not receive rehabilitation treatment after discharge from our service (Rehab- group). The average age of the participants was 31.5 ± 6.2 for the Rehab+ group and 31.9 ± 6.3 for the Rehab- group. All participants were male. The distribution of age and the age of first substance use were similar between the groups. Additionally, the number of days both groups were followed up in our inpatient service was similar. In the

Rehab+ group, 23 patients (69.7%) used multiple substances, whereas in the Rehab- group, 19 patients (57.6%) used multiple substances (Table 1). When looking at the types of substances used, heroin was the predominant substance in both groups. In the Rehab+ group, 63.6% (n=21) primarily used heroin, while in the Rehab- group, this rate was 66.7% (n=22). The sociodemographic and clinical data of the groups are presented in Table 1.

Table 1. Sociodemographic and clinical data of groups receiving and not receiving rehabilitation treatment

n=66	Rehab+ (n=33) Mean±SD / n (%)	Rehab- (n=33) Mean±SD / n (%)	p
Age	31.5±6.2	31.9±6.3	0.792 ^a
Marrital status / married	8 (24.2)	6 (18.2)	0.547 ^b
Age at first substance use	18.2±5.3	17.8±4.7	0.847 ^a
Days of inpatient detoxification treatment	25.3±10.8	20.1±11.4	0.058 ^a
Polydrug use	23 (69.7)	19 (57.6)	0.310 ^a
Primary substance	Heroin	21 (63.6)	-
	Methamphetamine	10 (30.3)	
	Alcohol	2 (6.1)	

a: Mann-Whitney U test, b: Chi-Square test, n: number, SD: standard deviation

The past longest alcohol/substance-free periods and the remission periods at the time of inclusion in the study were compared between the group that received rehabilitation at Huzur Village Rehabilitation Center and the control group that did not. While the past longest alcohol/substance-free periods were similar in both groups, the remission period of the Rehab+ group was significantly higher compared to the Rehab- group (p<0.05). The results are presented in Table 2.

Table 2. Comparison of the past longest abstinent periods and the current remission durations

n=66	Rehab+ (n=33) Mean±SD	Rehab- (n=33) Mean±SD	p
The past longest abstinent period (month)	8.3±14.4	8.6±11.4	0.201 ^a
The current remission duration (month)	8.7±5.9	4.3±4.4	0.001 ^a

a: Mann-Whitney U test, n: number, SD: standard deviation

When examining the discharge status of patients who were followed up as inpatients at Huzur Village Rehabilitation Center after being discharged from our service, 39.4% (n=13) left voluntarily without completing their treatment, 36.4% (n=12) completed their treatment and were discharged, and 24.2% (n=8) were discharged due to rule violations (Table 3).

Table 3. Comparison of discharge status of the groups

n=33	Completed the tx (n=12) (mean±SD)	Not completed the tx (n=13) (mean±SD)	Rule violation (n=8) (mean±SD)	p
Age	33.3±6.5	28.2±5.1	34.0±6.2	0.056 ^a
Age at first substance use	19.6±6.0	16.4±3.0	18.9±6.8	0.336 ^a
Polydrug, n	7	9	7	-
The past longest abstinent period (month)	10.2±21.6	8.1±9.9	5.7±6.0	0.542 ^a
The current remission duration (month)	12.6±5.2	8.5±5.5	3.1±6.0	0.001 ^a

a: ANOVA test, tx: treatment, SD: standard deviation, n: number

Discussion

According to the results of our study, it was found that patients with alcohol and substance use disorders who received rehabilitation treatment after detoxification had longer remission periods compared to those who did not receive rehabilitation. The Huzur Village Rehabilitation Center is one of the essential

centers in our country that provides inpatient social integration and rehabilitation for individuals with alcohol and substance use disorders. This study aimed to provide insights into the effectiveness of rehabilitation treatment by comparing the remission durations of patients who received rehabilitation treatment at this center with those who did not after detoxification treatment.

In our study, it was observed that heroin was the most commonly used substance in both groups. When looking at the diagnostic distributions in inpatient services at AMATEM in our country, it is seen that patients with alcohol use disorders are more frequent [19]. There may be multiple reasons for the low proportion of patients with alcohol use disorders among those receiving rehabilitation treatment. Patients with substance use disorders might have shown more demand for rehabilitation, possibly because they are younger and have more significant needs related to starting their professional lives.

Although the proportion of patients using multiple substances was higher in the Huzur Village Rehabilitation Center group compared to the control group, it was not statistically significant. It is known that the quality of life of patients using multiple substances is worse compared to those using a single substance [20]. Patients with lower quality of life might have shown more demand for rehabilitation treatment. Despite the higher rates of multiple substance use in the rehabilitation group, the longer remission periods indicate the importance of rehabilitation treatment in alcohol and substance use disorders.

The longer remission duration of patients who received rehabilitation treatment is consistent with literature findings that link longer treatment duration to better outcomes in substance use disorder patients [21]. It has been observed that leaving treatment before completion increases the risk of relapse, worsens physical health, and leads to more legal and financial problems. Some studies examining risk factors for leaving treatment indicate that treatment dropout often occurs within the first month [22]. The first month of treatment is considered a risk factor for dropout due to the intense craving for alcohol or substances during this period [23]. Considering the results of our study, it can be suggested that continuing treatment at the Huzur Village Rehabilitation Center after a 3-week detoxification treatment at the AMATEM Clinic may have contributed to longer remission by spending this risky period in a rehabilitation center [24].

In a study where substance use disorder patients were followed for four years after a 12-week rehabilitation program, it was found that those who completed the program had longer remission periods compared to those who did not, similar to our study [25]. Another study reported that completing both inpatient rehabilitation and inpatient detoxification programs predicted positive outcomes and was associated with a reduced risk of relapse [26].

Other studies examining risk factors for leaving treatment have identified the influence of age, gender, education level, craving intensity, and risk-taking behaviors [22,27,28]. In our study, there was no significant difference between the two groups in terms of average age, gender, marital status, age of first substance use, and the number of days spent in the detoxification service. The similarity in basic demographics and some clinical characteristics between the groups allows the results to be evaluated independently of these variables.

The longer remission periods in the Huzur Village Rehabilitation Center group could also be attributed to other factors besides spending the riskiest treatment period at the center. Being part of a community and supporting each other, being under the guidance of a health professional, and participating in various activities and workshops to develop skills could be related to positive outcomes. Indeed, integrating exercise programs, known to have positive effects associated with longer remission durations in substance use disorder treatments, into the rehabilitation process has significant impacts [29,30].

Various training sessions are organized to help patients find jobs during rehabilitation and support them in entrepreneurship. The literature also shows that individuals supported in professional activities alongside their treatment process for substance use disorders have higher employment rates, improved quality of life, and longer stay in treatment [31]. In the study by Snider and colleagues, the effects of episodic future thinking—specifically, the contemplation of unexperienced future events, decision-making, and goal setting—on alcohol consumption were investigated. The findings indicated that this type of rehabilitation intervention reduced alcohol cravings and intake [32]. There is also data in the literature indicating that education on spiritual values helps maintain abstinence from substances and alcohol [33]. In our study, one of the reasons for the longer remission period in patients who received rehabilitation could be the education and guidance provided in this area. Similarly, a study conducted in Sri Lanka found that relationships established with other members in the environment, spiritual counseling, and meditation were important in the treatment at the end of an inpatient rehabilitation process completed by patients with SUD [34].

It was found that among the patients who went to the Huzur Village Rehabilitation Center, 12 completed the rehabilitation program, 13 left the program voluntarily, and eight left due to rule violations. Notably, those who went to this center had longer remission periods than those who did not, even if they did not complete the entire program. When these groups were evaluated, those who completed the treatment had the longest remission period. This situation parallels studies showing that longer treatment duration positively affects remission duration [25].

In the literature, the number of studies comparing the characteristics of patients who continue with long-term substance-free programs or rehabilitation after the initial detoxification treatment is limited. A study conducted in Spain compared psychiatric comorbidity and clinical factors between patients who were able to complete a long-term substance-free program and those who were not. It was found that a more extended treatment duration and higher educational level were effective in completing the rehabilitation phase of treatment. Additionally, differences in dysfunctional impulsivity, anxiety symptoms, and employment problems were identified between the groups that continued to the advanced program and those that did not [35]. Among those who did not complete, it was observed that those who left voluntarily had longer remission periods than

those who left due to rule violations. Difficulty in adhering to rules, low impulse control, and certain personality traits may be common risk factors for leaving the center and returning to substance use [21].

Our study has some limitations that need to be stated. Its retrospective design, limited number of patients, being conducted only with male patients, and the inability to evaluate accompanying psychopathologies such as depression and anxiety limit the generalizability of the study. Second, the follow-up period of 15 months is relatively short, and this prevents us from truly understanding the treatment effects. Moreover, other variables than rehabilitation that could affect the patients' remission were not controlled, which is another limitation. Lastly, we measured the remission duration, but other important outcomes, such as quality of life, mental health status, and employment status, were not included, which could be a significant limitation.

Despite its limitations, our study contributes significantly to the literature due to the scarcity of such research in our country. According to our analysis, ASUD patients who continued their treatment in a rehabilitation center after the detoxification period stayed in remission longer compared to those who did not undergo rehabilitation. Our results highlight the importance of such centers in treating ASUD patients, where dropout rates are high. The multidisciplinary approaches offered at rehabilitation centers like Huzur Village play a crucial role in the recovery process from alcohol and substance addiction.

Expanding the reach of such, rehabilitation centers and improving the quality of services provided is critical in the fight against addiction. Larger sample sizes and comprehensive studies that include different types of addiction can provide more insightful results for combating addiction.

Conclusion

In conclusion, our findings underscore the need for effective rehabilitation programs following detoxification to enhance the long-term success of addiction treatment. By promoting the development and implementation of comprehensive rehabilitation services, we can better support individuals struggling with addiction and improve their chances of sustained recovery.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

Ethical approval was obtained from the Clinical Research Ethics Committee of Ankara Training and Research Hospital for our study (date: 21.02.24, no: E-24-36). Additionally, necessary permissions were obtained from the Kırıkkale Governorship and Huzur Village authorities.

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