

## Research Paper

## Effectiveness of Addiction Treatment Programs in Iran in Terms of Social, Psychological, Economic, and Therapeutic Outcomes: An Appraisal



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**ABSTRACT**

**Objectives:** In recent years, various treatment programs have been implemented in Iran aimed at rehabilitation and improvement of drug-dependent patients but so far, few studies have been conducted on the effectiveness of different treatment programs in terms of different outcomes. This study was conducted to determine the differences among patients participating in three therapeutic programs, outpatient, mid-term residential program, and therapeutic community (TC) in terms of social, psychological, economic, and therapeutic outcomes.

**Methods:** The present study was conducted using a descriptive design and ex post facto method. Data were collected from patients participating in three treatment plans (outpatient treatment=49; mid-term residential treatment=49; and TC plan=49). Patients participating in the TC program were all enumerated and patients participating in the outpatient and mid-term residency treatment plan were selected by random sampling. Data collection tools were a socio-demographic characteristics checklist, researcher-made questionnaire for relapse, a general health questionnaire (GHQ), a world health organization quality of life (WHOQOL) questionnaire, and a family relationship index (FRI). The data were analyzed by one-way analysis of variance (ANOVA), chi-square, and Scheffé's post hoc test.

**Results:** Significant differences were observed between the three treatments in terms of the rate of relapse ( $P<0.01$ ), participation in criminal activities ( $P<0.01$ ), changes in drug use in the treatment process or after treatment ( $P<0.01$ ), employment status ( $P<0.01$ ), mental health ( $P<0.01$ ), quality of life ( $P<0.01$ ), and family relationships index (FRI) ( $P<0.01$ ).

**Discussion:** The TC program showed more positive outcomes in terms of the rate of relapse and quality of life compared to the other two therapeutic programs. The outpatient treatment program was more effective in terms of participation in criminal activities, changes in drug use, employment, and quality of family relationships. The mid-term residency program showed a low or negative impact on all studied outcomes. Therefore, it is necessary to reevaluate the programs presented in the mid-term residential program.

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## Highlights

- The rate of relapse/recidivism among patients participating in the mid-term residential treatment program was higher than in the therapeutic community (TC) and outpatient programs.
- The rate of criminal activity patients participating in the mid-term residential treatment program was higher than in the TC and outpatient programs.
- Patients participating in outpatient treatment had better general health and overall quality of life.
- Patients in the TC program reported more problems on the family relationship index (FRI) compared to the outpatient and TC treatment programs

## Plain Language Summary

Drug addiction has many side effects for both the individual and the community. A wide range of treatment and support programs and services exists for people with drug problems in Iran. The main support programs for quitting addiction in Iran are the therapeutic community (TC) program (TC, mid-term treatment program, and outpatient treatment program). The present study showed that the rate of relapse/recidivism and criminal activity among patients participating in the mid-term residential treatment program was higher than the TC and outpatient programs while the mental health status and quality of life of the participants in the outpatient treatment program were better. Also, patients in the TC program reported more problems on the family relationship index (FRI) compared to the outpatient and TC treatment programs.

## Introduction

**D**rug addiction is a complex psychosocial problem that is often associated with major problems in other areas of life, including unemployment, homelessness, communication conflicts, divorce, suicide, criminal behavior, and psychiatric comorbidities [1]. One of the major challenges facing drug treatment and rehabilitation organizations on the one hand and drug addicts themselves on the other hand is the tendency for drug users to abandon treatment and rehabilitation programs, which is a phenomenon called recidivism [2, 3]. The high prevalence rate of treatment abandonment in different countries indicates this problem. For example, some researchers reported a prevalence of treatment failure and dropout ranging from 4.5% to 70% [1-8]. In Iran, the prevalence of drug recidivism or relapse has been reported in the range of 20% to 90% [9-11]. Unsuccessful treatment can have very negative consequences for the individual and society. Some of the outcomes of unsuccessful treatment include relapse and recidivism after treatment [12-14], negative psychological and social performance, poor educational or occupational status [15], participation in criminal behavior [16, 17], and social costs, for example, pressure on family and society [7].

Various treatment programs have been implemented in different countries around the world, including Iran, for treatment and rehabilitation of drug addicts, including detoxification programs, non-drug outpatient treatment, methadone maintenance treatment, long-term residential treatment plans, and risk-reduction services. These programs can be divided into three groups, long-term residential treatment programs or therapeutic community (TCs), mid-term treatment programs, and outpatient treatment programs. While each individual may have short or long-term goals for treatment, all treatment plans share three general goals. These goals include reducing substance abuse or achieving a life free of substance use, promoting multiple aspects of life function, and preventing or reducing the incidence and severity of relapse [18].

Currently, in most countries of the world, four treatment modalities are used in the treatment of addiction based on the three models described above. These models include the Minnesota model of residential chemical dependency treatment, drug-free outpatient treatment, methadone maintenance or opioid substitution treatment, and TC residential treatment. Minnesota model emphasizes avoidance as the primary therapeutic target and utilizes the 12-step program of anonymous alcohol as a major tool to improve and prevent relapse. This approach requires 28 to 30 days of out-

patient treatment, followed by community-based care [19]. The drug-free outpatient treatment model utilizes a variety of counseling techniques, skills training, academic support, and little or no medication to meet the individuals' needs to move from active substance abuse to avoidance and abstinence [18]. Methadone maintenance or opioid substitution treatment is used in particular for chronic heroin addiction or drug addiction that may not benefit from other therapeutic approaches. This treatment involves the replacement of authorized or unauthorized derivatives with longer-lasting, medically safer, potent, and purified alternatives that are regularly used orally [20]. Finally, the TC-based residential treatment approach is suitable for patients with substance dependency who suffer from severe psychosocial adjustment problems and need to be re-socialized in a highly structured environment. This treatment emphasizes negative patterns of thinking and behavior that can be altered through realistic individual and group therapy, peer-to-peer meetings, and community-based therapy with hierarchical roles, privileges, and responsibilities [21]. In this model, enrollment is relatively long-term and extensive, ranging from at least 3 to 9 months of residual life to gradual entry into the social environment.

In Iran, three therapeutic options for drug addicts exist. The first method is TC-based residential treatment. The TC program is a structured, supervised, and residential program to assist and support the recovery of substance-dependent individuals who have the potential to relapse and have not made significant progress in early treatment [22]. In this way, patients receive services between 3 and 6 months. The mid-term treatment approach is based on mid-term recovery centers operated by legal entities (for example non-governmental organization [NGOs]) working for health and social services purposes, and their statutes refer to treatment, rehabilitation, or recovery activities [23]. These centers operate in the mid-term style (30 to 90 days) and under the supervision of the welfare organization. The main services of these centers include helping to cope with the symptoms of drug deprivation and detoxification, holding recovery sessions, holding family sessions, and following and continuing recovery after discharge and referral. Short-term or outpatient treatment programs include pharmaceutical services (detoxification and maintenance) provided at inpatient centers. These centers provide inpatient detoxification and ongoing outpatient psychotherapy and social work [24].

## Objectives

Although various therapies have been reported to be successful, different researchers have shown contradictory results on their effectiveness. For example, while some researchers have emphasized the effectiveness of

TC programs compared to other programs [25-28], other researchers [29] questioned the effectiveness of residential treatments. Therefore, on the one hand, healthcare users, treatment providers, and policymakers need to be aware of the effectiveness of residential programs, and on the other hand, given the lack of agreement on the effectiveness of residential treatments and the lack of research in this area in Iran, this study was conducted to compare three addiction treatment programs, including long-term residential treatment, mid-term treatment, and short-term treatment in terms of major treatment outcomes, such as recidivism, completion of treatment, participation in criminal activity, change in substance use pattern, mental health, quality of life, family relationships, employment, and economic activity, and avoidance of substance use.

## Materials and Methods

### Study design

The present study was conducted in an ex-post facto design. Based on this method, a sample of three groups of substance abusers who participated in one of the three treatment modalities, namely long-term residential, mid-term, and outpatient treatment were compared for therapeutic outcomes. To minimize the effects of intervening variables, homogenous sampling was used in the process of comparing people in three therapeutic methods. The statistical population of this study included all people with a history of drug abuse in Guilan Province, Iran who participated in one of the long-term residential, mid-term residential, and outpatient rehabilitation programs and passed these courses in 2018. Guilan Province had 75 outpatient addiction treatment centers, 50 mid-term care centers, and 1 community-based long-term care center. Using the modified Cochran formula and the variance value equal to 0.5 and confounding error equal to 0.05, and good probability accuracy ( $d$ ) equal to 0.08, the required sample size was determined to be 150 individuals. Then, 49 patients were selected from each group of treatment plans due to the limited population of TC patients (49 available). Because the number of patients participating in the TC treatment program was 50, all these patients were counted. Then, based on the homogenization principle, 49 patients in the mid-term residential treatment program and 49 patients in the outpatient treatment program were selected by simple random sampling. The selected samples included all patients participating in two outpatient and mid-term residential treatment programs in Guilan Province, 1 mid-term residential center and 1 outpatient center in Rasht City (as representative of west Gilan Province) and 1 mid-term residential center and 1 outpatient treatment center selected in Astana Ashrafieh City (as representative of East Guilan).

### Inclusion and exclusion criteria

The inclusion criteria included the participation of substance abusers in one of the community-based therapeutic programs, outpatient and mid-term residential programs. Therefore, all drug addicts who had recently entered one of the three drug treatment centers were excluded from the study. Some information was given to the respondents about the aims of the study by the interviewer and then their approval was obtained for this study using written consent.

### Measuring instruments

#### Socio-demographic characteristics checklist

Characteristics, such as age, education, marital status, monthly income, type of drug used, and type of treatment received were measured using the socio-demographic checklist. Also, employment status, with 1 question of current job status (full-time, part-time, and unemployed), and patient participation in criminal activity with 1 question, has the patient committed a crime or crime after participating in the treatment plan? (Yes, No) were measured.

#### Family relationship index (FRI)

This index measures the severity of clients' personal or social performance problems with family adjustment [30]. The family relationship index (FRI) describes the severity of family relationship problems in a general way and can be used as a tool to diagnose stress within the family. The short form of FRI is a composite family relationship index (FRI) of 25 items that are scored in a 7-degree range (1=never to 7=all times). The scoring range of this scale is 25 to 175. The cut-off score on the 25-item scale is considered to be 70. A score above 70 indicates severe family stress and a lower score indicates no problem in family relationships. Hodson confirmed the reliability and validity of the FRI [30]. The reliability coefficient of FRI in Hudson's study was calculated at 0.95 using Cronbach's  $\alpha$  method. In Iran, the FRI in Masoudnia and Farahani's study [31] was validated in a study on the relationship between family relationship indices and the incidence of myocardial infarction. The reliability coefficient of FRI was 0.89 using Cronbach's  $\alpha$  method and its validity and reliability were confirmed.

#### General health questionnaire (GHQ) (12-items)

The general health questionnaire (GHQ) consists of 28 items that measure the four components of anxiety/in-

somnia, physical symptoms, social dysfunction, and depression [32]. All items in this questionnaire are scored in a four-degree range (not at all, no more than usual, rather more than usual, and much more than usual). A higher score on this scale indicates general poor health. The reliability and validity of the GHQ have been confirmed in several studies in Iran [33, 34]. For example, in Yaghubi et al's study [33], the best cut-off point of GHQ-12 was 9, and the sensitivity, and specificity, and overall classification for the best cut-off point were 81.5%, 77.1%, and 17.8% respectively. Also, Cronbach's  $\alpha$  coefficient was 0.92 and the split-half and Spearman-Brown reliability was 0.91.

#### The World Health Organization quality of life (WHOQOL-BREF)

The World Health Organization quality of life (WHOQOL) questionnaire consists of 26 questions measuring 4 components with physical health (7 questions), mental health (6 questions), social relationships (3 questions), and environmental health (8 questions). Also, one item assesses quality of life, and 1 item assesses health status. All questions in this questionnaire are scored on a 5-point Likert scale. In Iran, the WHOQOL was validated by Nejat et al. [35]. In their study, the reliability of the four components of physical health, mental health, social relationships, and environmental health were 0.77, 0.77, 0.75, and 0.84, respectively. Also, the validity of the WHOQOL was confirmed by the structural factors method.

#### Relapse inventory

The questionnaire consisted of 1 item measuring the frequency of return to substance use over the past year in three options (1 to 10 times, 10 to 15 times, and regular consumption).

#### Statistical methods

After collecting and extracting data, SPSS software, version 22 was used for data analysis. At the level of descriptive statistics, statistical characteristics, such as percentage, frequency, variance, Mean $\pm$ SD, range, etc. were used. To compare the social, therapeutic, economic, and psychological outcomes of treatment programs, one-way analysis of variance (ANOVA), chi-square, and Scheffe's post hoc test were used. Also, the Kalmogorov-Smirnov statistic was used to test the normality of data distribution.

## Results

### Socio-demographic characteristics of patients

One hundred and forty-seven patients were studied from 3 treatment plans (outpatient treatment=49 patients; mid-term residential treatment=49 patients; TC treatment program=49 patients) (Table 1). The Mean±SD age of outpatient treatment patients was 22.49±56.5 years, the Mean±SD age of mid-term residential patients was 31.6±7.9 years, and the Mean±SD age of TC patients was 38.2±8.7. From the educational point of view, most outpatient treatment and mid-term residential treatment patients had middle education (51.0% and 32.7%, respectively). On the other hand, most TC patients had middle school (26.5%), and high school education (24.5%). In terms of marital status, most patients of mid-term residential (55.1%) and TC treatment plan (51.0%) were single while most patients in outpatient treatment programs were married (34.7%). In terms of employment status, the percentage of unemployment among TC patients was higher than among outpatient and mid-term residential patients (63.3% compared to 41.3% for mid-term and 12.2% for patients, respectively). The mean monthly income of TC patients was higher than patients in both outpatient and mid-term residential plans. Regarding the type of drug used, the highest opium consumption was related to patients participating in outpatient treatment (83.7%) and the least opium consumption was related to mid-term residential patients (24.5%). In terms of heroin use, the most frequent users were patients in the TC program (44.9%) and then in intermediate stay patients (38.8%), respectively. In terms of cannabis use, the highest intake of this drug was in TC patients (44.9%) and the least in outpatients (4.1%). Regarding the use of morphine, the highest rate of use was in TC patients (28.6%) and the least in outpatients (0.2%). In the case of cocaine, the most frequent use was in the mid-term residential patients (26.5%) and the least used in the outpatients (0%). Regarding ecstasy, the highest rate of use was for mid-term residential patients (6.1%) and the least use was for outpatients (0.0%). Regarding methadone, the highest use was for TC patients (46.9%) and the least was for outpatients (0.9%). In the case of amphetamines, the highest rate of use was in TC patients (42.9%) and the least use was in outpatients (8.2%). Finally, no significant difference was observed in the use of other substances between patients.

### Comparison of three addiction treatment plans in terms of relapse rate, participation in criminal activity, and employment status after participating in treatment plan

A significant difference was observed between the three treatment plans, outpatient, mid-term residential, and TC in terms of patients' relapse ( $P<0.01$ ). The highest rate of relapse was in patients who participated in mid-term residential treatment plan (Table 2). A significant difference was observed between outpatient, mid-term residential and TC patients in participation in criminal activities ( $P<0.01$ ). The highest rate of participation in criminal activities was related to patients in the mid-term residential plan. A significant difference was observed between the patients participating in the three treatment plans regarding the employment status after participating in the treatment plan ( $P<0.01$ ). The unemployment rate among mid-term residential treatment patients was higher compared to the other two treatment plans (55.1% compared to 13.6% for outpatient and 53.3% for TC patients).

### Comparison of three addiction treatment plans in terms of mental health of patients

A significant difference was observed between patients in the three treatment plans in terms of overall mental health ( $P<0.01$ ) (Table 3). Outpatient treatment plan patients had lower average symptoms of mental disorders than the other two groups and had better mental health (recall that higher scores on the GHQ indicate poorer mental health). The results of Scheffe's post hoc test showed (Table 4) that the outpatient treatment plan patients had a significant difference of the patients in the mid-term residential plan regarding mental health ( $P<0.01$ ) but no significant difference was observed between outpatient and TC patients ( $P>0.05$ ) and between mid-term residential patients and TC patients ( $P>0.05$ ).

A significant difference was observed between patients in the three treatment plans, outpatient, mid-term residential and TC for physical symptoms ( $P<0.05$ ). Outpatient patients had fewer physical symptoms than the other two groups (Table 3). The results of Scheffe's post hoc test (Table 4) showed that the outpatient treatment plan patients had a significant difference with the TC patients for physical symptoms ( $P<0.001$ ) but no significant difference was found between outpatient plan patients and mid-term residential patients ( $P>0.05$ ) and between mid-term residential patients and TC patients regarding physical symptoms ( $P>0.05$ ).

**Table 1.** Socio-demographic characteristics of patients participating in outpatient, mid-term, and therapeutic community programs

Variables	Mean±SD/No. (%)			
	Treatment Types			
	OP (n=49)	MTRP (n=49)	TC (n=49)	
Age (y)	22.4±56.6	31.6±7.9	38.2±8.7	
Education	Illiterate	2(4.1)	3(6.1)	2(4.1)
	Elementary	5(10.1)	9(18.4)	7(14.3)
	Middle school	25(51.0)	16(32.7)	13(26.5)
	High school	12(24.5)	9(18.4)	12(24.5)
	Associate degree	5(10.2)	6(12.2)	4(8.2)
	Bachelor's degree	0(0.0)	5(10.2)	6(12.2)
	Master's degree and over	0(0.0)	1(2.0)	5(10.2)
Occupation status	Employed	6(12.2)	19(41.3)	319 (63.3)
	Unemployed	43(87.8)	27(58.7)	18(36.7)
Marital status	Single	17(34.7)	27(55.1)	25(51.0)
	Married	30(61.2)	16(32.7)	13(26.5)
	Divorced	2(4.1)	5(10.2)	10(20.4)
	Dead wife	0(0.0)	1(2.0)	2(2.1)
Monthly income (Rial)	10,183,670±660,073.7	10,083,670.3±2,398,943.64	28,141,830.6±14,203,416.3	
Type of drug used before entering the program	Opium	41(83.7)	12(24.5)	21(42.9)
	cannabis	2(4.1)	12(24.5)	22(44.9)
	Heroin	0(0.0)	19(38.8)	22(44.9)
	Morphine	0(0.0)	9(18.4)	14(28.6)
	Cocaine	0(0.0)	13(26.5)	1(2.0)
	Ecstasy	0(0.0)	3(6.1)	1(2.0)
	Methadone	0(0.0)	5(10.2)	23(46.9)
	Amphetamine	4(8.2)	16(32.7)	21(42.9)
	Other	2(4.1)	1(2.0)	2(4.1)

Abbreviations: TC: Therapeutic community; OP: Outpatient program; MTRP: Mid-term residential program.

**Table 2.** Comparison of three treatment plans in terms of therapeutic outcomes

Variables	No. (%)			$\chi^2$	P	
	Treatment Programs					
	OP	MTRP	TC			
Relapse status	No relapse	16(32.7)	4(8.2)	16(32.7)	33.76	0.000**
	1 to 10 times	33(67.3)	23(46.9)	19(38.8)		
	10 to 15 times	0(0.0)	14(28.6)	7(14.3)		
	Regular consumption	0(0.0)	8(16.3)	7(14.3)		
Participation in criminal activities	Yes	0(0.0)	25(55.1)	6(12.2)	11.45	0.003**
	No	49(100)	22(44.9)	43(87.8)		
Occupation status	No jobs	8(16.3)	27(55.1)	24(53.3)	42.12	0.000**
	Full time job	13(26.5)	18(36.7)	6(13.3)		
	Part time job	28(57.1)	4(8.2)	15(33.3)		

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Abbreviations: TC: Therapeutic community; OP: Outpatient program; MTRP: Mid-term residential program.

\*\*P<0.01.

A significant difference was observed between patients in three treatment plans for anxiety/insomnia symptoms ( $P<0.05$ ). Outpatient patients had fewer anxiety/insomnia symptoms compared to the other two groups (Table 3). Scheffe's post hoc test (Table 4) showed that outpatient treatment plan patients had a significant difference with mid-term residential program patients in terms of anxiety and insomnia symptoms ( $P<0.05$ ) but no significant difference was found between outpatient program

patients and TC patients ( $P>0.05$ ) and between mid-term residential patients and TC patients ( $P>0.05$ ) (Table 4).

A significant difference was observed between patients in the three treatment plans for social dysfunction symptoms ( $P<0.05$ ). Patients in the TC program had less social dysfunction symptoms compared to the other two groups (Table 3). The results of Scheffe's post hoc test also showed that the outpatient treatment patients had a

**Table 3.** Comparison of patients in therapeutic community, mid-term residential and outpatient treatment program regarding to mental health and its components

Mental Health	Mean±SD			F	P
	Treatment Programs				
	OP	MTRP	TC		
Somatic symptoms	1.6±0.52	1.7±0.61	1.9±0.53	3.25	0.041*
Anxiety/insomnia	1.7±0.55	2.1±0.82	1.8±0.77	3.57	0.031*
Social dysfunction	2.7±0.90	2.6±0.50	2.4±0.54	4.37	0.014*
Depressive symptoms	1.1±0.13	1.9±0.85	1.6±0.74	11.24	0.000**
Total	1.7±0.33	2.1±0.50	1.9±0.38	7.6	0.001**

Abbreviations: TC: Therapeutic community; OP: Outpatient program; MTRP: Mid-term residential program.

\*P<0.05, \*\*P<0.01.

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**Table 4.** Scheffe's post hoc test on the difference of patients in therapeutic community, mid-term residential and outpatient treatment programs for mental health

Mental Health	Treatment Type (I)	Treatment Type (J)	Mean±SD (I-J)	P
Somatic symptoms	OP	MTRP	-0.13±0.11	0.52
		TC	-0.28±0.11	0.042*
	MTRP	OP	-0.13±0.11	0.52
		TC	-0.15±0.11	0.38
	TC	OP	0.28±0.11	0.042
		MTRP	0.15±0.11	0.38
Anxiety/Insomnia	OP	MTRP	-0.38±0.14	0.037*
		TC	-0.10±0.14	0.76
	MTRP	OP	-0.38±0.14	0.037*
		TC	0.27±0.14	0.18
	TC	OP	0.11±0.14	0.76
		MTRP	-0.27±0.14	0.18
Social dysfunction	OP	MTRP	0.15±0.13	0.52
		TC	0.40±0.13	0.015*
	MTRP	OP	0.15±0.13	0.52
		TC	0.24±0.13	0.20
	TC	OP	-0.40±0.13	0.015*
		MTRP	-0.24±0.13	0.205
Depressive symptoms	OP	MTRP	-0.95±0.13	0.000**
		TC	-0.56±0.13	0.000**
	MTRP	OP	0.95±0.13	0.000**
		TC	0.38±0.13	0.016*
	TC	OP	0.56±0.13	0.000**
		MTRP	-0.38±0.13	0.016*
Mental health (total)	OP	MTRP	-0.32±0.08	0.001**
		TC	-0.13±0.08	0.255
	MTRP	OP	0.32±0.08	0.001**
		TC	0.18±0.08	0.08
	TC	OP	0.13±0.08	0.255
		MTRP	0.18±0.08	0.08

\*P&lt;0.05, \*\*P&lt;0.01

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Abbreviations: TC: Therapeutic community; OP: Outpatient program; MTRP: Mid-term residential program.



**Table 5.** Comparison of patients in outpatient, mid-term, and therapeutic community treatment plans regarding the quality of life and its components

Quality of Life	Mean±SD			F	P
	Treatment Programs				
	OP	MTRP	TC		
Physical health	3.1±0.26	2.7±0.69	3.3±0.59	12.7	0.000**
Mental health	3.4±0.54	2.6±0.88	3.5±0.84	17.7	0.000**
Social relationships	3.3±0.74	2.6±0.97	2.9±0.79	9.37	0.000**
Environmental health	2.8±0.46	2.7±0.87	3.1±0.70	4.1	0.018*
The quality of life	3.7±0.9	2.5±1.4	3.3±1.1	15.0	0.000**
The quality of health	3.2±0.93	1.0±1.3	3.4±1.3	1.4	0.24

\*P<0.05, \*\*P<0.01.

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Abbreviations: TC: Therapeutic community; OP: Outpatient program; MTRP: Mid-term residential program.

significant difference with the patients in the TC treatment plan for social dysfunction symptoms ( $P<0.05$ ) but no significant difference was found between outpatient and mid-term residential patients ( $P>0.05$ ) and between mid-term residential and TC patients ( $P>0.05$ ) (Table 4).

A significant difference was observed between patients in three treatment plans for depression symptoms (Table 3). Outpatient treatment program patients had fewer depressive symptoms compared to the other two groups. Scheffe's post hoc test (Table 4) showed that the outpatient treatment plan patients had a significant difference with the patients in the TC patients ( $P<0.01$ ) and mid-term residential patients ( $P<0.01$ ), mid-term residential patients had a significant difference with TC patients in terms of depressive symptoms ( $P<0.05$ ).

### Comparison of three addiction treatment plans in terms of quality of life

Significant differences were observed between patients in the three treatment plans in terms of quality of life ( $P<0.01$ ). Outpatient treatment plan patients reported a higher quality of life compared to the other two treatment plan patients (Table 5). Scheffe's post hoc test showed that outpatient treatment patients had a significant difference with mid-term residential plan patients ( $P<0.01$ ), and mid-term residential patients had a significant difference with TC patients ( $P<0.01$ ) in terms of quality of life. No significant difference was observed between patients in the three treatment plans in terms of overall health quality ( $P>0.05$ ) (Table 6).

Regarding the physical health component, a significant difference was observed among the patients in the three treatment plans. Patients in community-based treatment plan reported higher mean physical health than patients in the other two treatment plans (Table 5). Scheffe's post hoc test showed that outpatient treatment patients had a significant difference between the mid-term residential plan ( $P<0.05$ ) and TC patients plan ( $P<0.05$ ). On the other hand, patients in the TC treatment plan had a significant difference with patients in mid-term residential ( $P<0.01$ ) and outpatient plan patients for physical health ( $P<0.01$ ) (Table 6).

Significant differences were observed between the patients in the three treatment plans in terms of mental health (Table 5). Patients in TC treatment plans reported higher average mental health than patients in the other two treatment plans. Scheffe's post hoc test showed a significant difference between patients in mid-term residential treatment plan with outpatient ( $P<0.01$ ) and TC patients in terms of mental health ( $P<0.01$ ) (Table 6).

Significant differences were observed among the patients in the three treatment plans regarding the quality of social relationships ( $P<0.01$ ). Outpatient treatment plan patients had better mean quality of social relationships compared to the other two treatment plan patients (Table 5). Scheffe's post hoc test showed that outpatient program patients had a significant difference with mid-term residential plan patients ( $P<0.01$ ) and TC patients regarding social relationships ( $P<0.05$ ) (Table 6).

**Table 6.** Scheffe's post hoc test on the difference of patients in therapeutic community, mid-term residential and outpatient treatment programs for quality of life

Quality of Life	Treatment Type (I)	Treatment Type (J)	Mean±SD (I-J)	P
Physical health	OP	MTRP	0.29±0.11	0.03*
		TC	-0.26±0.11	0.05
	MTRP	OP	-0.29±0.11	0.03*
		TC	-0.56±0.11	0.000**
	TC	OP	0.26±0.11	0.05
		MTRP	0.56±0.11	0.000**
Mental health	OP	MTRP	0.73±0.15	0.000**
		TC	-0.12±0.15	0.72
	MTRP	OP	-0.73±0.15	0.000**
		TC	-0.86±0.15	0.000**
	TC	OP	0.12±0.15	0.72
		MTRP	0.86±0.15	0.000**
Social relationships	OP	MTRP	0.73±0.17	0.000**
		TC	0.41±0.17	0.05
	MTRP	OP	-0.73±0.17	0.000**
		TC	-0.32±0.17	0.16
	TC	OP	-0.41±0.17	0.05
		MTRP	0.32±0.17	0.16
Environmental health	OP	MTRP	0.09±0.14	0.79
		TC	-0.29±0.14	0.12
	MTRP	OP	-0.09±0.14	0.79
		TC	-0.39±0.14	0.025*
	TC	OP	0.39±0.14	0.12
		MTRP	0.39±0.14	0.025*
Overall quality of life	OP	MTRP	1.2±0.23	0.000**
		TC	0.42±0.23	0.18
	MTRP	OP	-1.2±0.23	0.000**
		TC	-0.81±0.23	0.002**
	TC	OP	-0.42±0.23	0.18
		MTRP	0.81±0.23	0.002**

Quality of Life	Treatment Type (I)	Treatment Type (J)	Mean±SD (I-J)	P
Overall quality of health	OP	MTRP	0.18±0.24	0.75
		TC	-0.22±0.24	0.65
	MTRP	OP	-0.18±0.24	0.75
		TC	-0.41±0.24	0.24
	TC	OP	0.22±0.24	0.65
		MTRP	0.41±0.24	0.24

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Abbreviations: TC: Therapeutic community; OP: Outpatient program; MTRP: Mid-term residential program.

\*P<0.05, \*\*P<0.01.

**Table 7.** Comparison of patients in outpatient, mid-term, and therapeutic community treatment plans regarding the FRI

Quality of Relationships in the Family	Treatment Programs, No. (%)			$\chi^2$	P
	OP	MTRP	TC		
Having problems in family relationships	3(6.1)	21(42.9)	25(51.0)	25.22	0.000**
Having no problems in family relations	46(39.9)	28(57.1)	24(49.0)		

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Abbreviations: TC: Therapeutic community; OP: Outpatient program; MTRP: Mid-term residential program.

\*\*P<0.01.

Significant differences were observed among the patients in the three treatment plans in terms of environmental health quality (P<0.05) (Table 5). Patients in the TC treatment plan reported better mean environmental conditions compared to patients in the other two treatment plans. Scheffé's post hoc test showed that patients in the TC program had a significant difference from patients in the mid-term residential plans in terms of satisfaction with environmental conditions (P<0.05) (Table 6).

### Comparison of three addiction treatment plans in terms of family relationship index (FRI)

A significant difference was observed between patients in the three treatment plans regarding the quality of relationships in the family (P<0.01) (Table 7). Patients in TC treatment plans reported more problems in family relationships than patients in the other two treatment plans (51.0% compared to 42.9% for mid-term residential and 6.6% for outpatient patients).

## Discussion

This study was conducted to compare the patients participating in three-drug treatment plans, namely TC,

mid-term residential, and outpatient treatment in terms of social, psychological, economic, and therapeutic outcomes. Three groups of patients participating in outpatient, mid-term residential, and TC treatment plans were compared regarding variables, such as relapse situation, participation in criminal activities, mental health, family relationships, and quality of life. In terms of socio-demographic characteristics, the mean age of outpatient patients was 22.49 years, the mean age of patients with mid-term residential treatment was 31.65 years, and the mean age of TC treatment plan patients was 38.16 years. This result was consistent with previous results [36]. Due to the therapeutic arrangement, and considering that substance-dependent patients participate in outpatient treatment plans before entering the mid-term and TC treatment plans, the average age of outpatient treatment patients was less than patients of the mid-term residential and TC plan.

Most drug-dependent patients in all three treatment plans had very low education (guidance levels). This result was also consistent with previous results. Moulavi and Rasoulzadeh found that low education and academic failure with a coefficient of 57.5 has the greatest impact on people's tendency to drug abuse [37]. In terms of

marital status, most outpatients were married. This result is consistent with previous results [36]. On the other hand, most patients in the mid-term residential and TC treatment plan were single. This condition can be related to the marital separation of drug-dependent patients during periods of addiction. In terms of job status, the unemployment rate among the patients in the TC treatment plan was higher than the outpatient and mid-term residential patients. This condition can be attributed to the gradual loss of employment by drug-addicted patients during addiction. One study found that people with a permanent job had a lower chance of developing drug abuse than those with a temporary job [38].

Most patients in all three treatment plans had a history of drug abuse. Most patients in the outpatient treatment plan consumed substances, such as opium, cannabis, and amphetamine while patients participating in the mid-term residential treatment plan had a history of heroin, cocaine, and amphetamine use, and patients in the TC treatment plan had a history of substance use, such as cocaine, ecstasy, morphine, heroin, cannabis, opium, and amphetamine.

A significant difference was observed between outpatient, mid-term residential, and TC treatment plans in terms of patients' relapse in substance use. The highest rate of relapse for substance use was in patients participating in mid-term residential treatment plans. Relapse rates among TC plan patients were lower than among outpatient and mid-term residential treatment plan patients. These results are consistent with the previous results [22, 23]. In a meta-analysis of 29 studies (21 nonrandomized studies and 8 randomized controlled trials) [25], the strong positive effect of the TC-related therapies on staying in treatment and non-recidivism was shown. In another study, Malivert et al. performed a systematic meta-analysis on 12 studies of TC process and outcomes [26]. They showed that treatment completion rates varied widely (from 9% to 56%), and treatment abandonment in the above studies occurred more frequently in the first 15 to 30 days of treatment. All studies reviewed showed a decrease in drug abuse during the follow-up period. According to Bandura's social cognitive theory, the community-based TC creates the environment for drug-dependent patients to learn healthy behaviors and facilitates the learning of cognitive and behavioral skills to resist drug abuse [39].

Significant differences were observed between outpatients, mid-term residential, and TC patients in terms of participation in criminal activities. Participation rates in deviant and criminal activities among patients in the mid-term residential plan were higher than in outpatient and TC

plans. Patients in mid-term residential plan reported greater involvement in criminal activity, such as drug trafficking, harassment of others, and theft compared to the outpatient and TC treatment plans. This result is consistent with the results of De Leon, Melnick, and Kressel's study on the effectiveness of TC-based therapies in reducing participation in criminal activities [40]. In his meta-analysis of 8 controlled studies, it was shown that seven of the above studies conducted by a randomized controlled trial method proved the effectiveness of a TC program in reducing drug addicts' participation in criminal activity. Also, the results of the present study on the effectiveness of community-based treatment in the reduction of criminal activity are consistent with the results of Vanderplasschen, Vandevelde, and Broekaert [27]. Their meta-analysis of 16 studies demonstrated the effectiveness of therapeutic communities in indicators related to improvement, such as substance abuse, participation in criminal behaviors, employment, mental health, and social and family relationships compared to other sustained interventions. According to social pressure theory, as a form of social learning theory, the effective role of peers in adopting risky behaviors, such as criminal behavior is undeniable. For example, participation in criminal activity is affected by what is called "explicit social pressure" [41]. Under normal circumstances, drug-dependent patients are affected by peer pressure to engage in criminal activity, but in a structured and controlled environment, such as a TC, patients are affected by peer pressure to reduce or disengage from deviant behaviors. Also, they teach the cognitive and behavioral skills needed to resist peer pressure regarding abusive behaviors in an environment, such as a TC.

A significant difference was observed between patients in outpatient, mid-term, and community-based treatment plans regarding employment status after participating in the treatment plans. The percentage of unemployed patients in the mid-term residential treatment plan was higher than the other two treatment plans. These results were consistent with the results of De Leon, Melnick, and Kressel's study [40]. Their meta-analysis of 8 controlled studies showed that the outcomes of the TC program in terms of job outcomes were significantly better than the non-TC group. Another meta-analysis of 16 studies also showed that the status of patients in a TC treatment plan was better in terms of job outcomes than in other intervention plans [27]. According to social learning theory, environmental conditions are vital in encouraging individuals to engage in a particular behavior, for example creating or acquiring jobs, as well as learning job skills from their peers. Given the potential for job creation in the TC, patients participating in this project will be more likely to gain or create jobs than outpatient and mid-term residential programs.

A significant difference was observed between patients in three outpatient, mid-term, and TC treatment plans for mental health. Outpatient treatment plan patients had better overall mental health than in the other two groups. Also, a significant difference was observed between patients in the three treatment plans regarding physical, anxiety/insomnia, social dysfunction, and depression symptoms. Patients participating in the outpatient treatment program reported fewer physical symptoms (such as feeling sick, and needing effective medication), fewer anxiety and insomnia symptoms (such as decreased sleep, fear, and anxiety), and fewer depressive symptoms (such as hopelessness, worthlessness) compared to mid-term residential and TC program patients. On the other hand, patients in the TC program had fewer symptoms of social dysfunction (such as dissatisfaction with daily activities, inappropriate performance, and feeling unhappy) compared to outpatient and mid-term residential program patients. The results of the present study were consistent with previous results only about one component of mental health, namely social dysfunction. For example, in the meta-analysis of Vanderplasschen, Vandeveld, and Broekaert [27] on 16 studies, the effectiveness of the TC program compared to other interventionists was shown concerning the mental health indicators. One possible reason for this may be related to different ways of assessing mental health. Another possible reason may be related to the lower distance of patients participating in outpatient treatment from the mental health phase (before the onset of addiction) to after the onset of addiction. In other words, if it is assumed that an inverse relationship is observed between substance abuse and mental health, it can be concluded that as the duration of the addiction period increases, the individual's mental health declines further. Also, a possible explanation for why participants in the TC treatment plan had poorer mental health was that they had more severe problems due to a longer experience of substance use than other participants.

A significant difference was observed between patients in three treatment plans of outpatient, mid-term, and TC in terms of quality of life. Patients participating in outpatient treatment plan reported higher quality of life compared to patients in TC and mid-term residential treatment plans. Regarding the components of quality of life, a significant difference was observed between patients in three treatment plans in terms of physical health, mental health, quality of social relations, and quality of environmental health. First, patients in the TC plan reported better physical health (for example, lower physical pain, less need for medical treatment, lower energy intake, and higher ability to perform) compared to patients in

outpatient and mid-term residential treatment plans. Second, patients participating in the TC plan reported better mental health (for example, higher life satisfaction, higher focus on work, more self-satisfaction and physical well-being, lower hopelessness, anxiety and depressive symptoms) compared to the two outpatient and mid-term residential plans. Third, patients participating in the outpatient treatment plan reported higher satisfaction in personal relationships, sexuality, and support received from friends than patients in the mid-term and TC treatment plan. Finally, patients participating in the TC plan reported better environmental conditions (such as higher security, higher environmental health, access to daily information and more leisure activities, greater satisfaction with their living environment, and greater satisfaction with access to medical services) than patients with the outpatient and mid-term residential plans. These results were consistent with the results of some previous studies. In a study conducted in Iran, Nazari et al. showed that participation in the treatment-avoidance program had a significant effect on interpersonal sensitivity, one of the personality traits [42]. They studied 12 patients with symptoms of attention deficit hyperactivity disorder (ADHD) before TC interventions. After participating in TC treatment, the number of patients decreased to 1 person. In another study conducted in Iran, Bavi and Borna showed that the psychological services of community-based rehabilitation therapy had a significant effect on pre-test self-esteem of clients compared to post-test [43]. In the present study, the status of patients participating in an outpatient treatment plan was only better for one component of quality of life, namely social relationships than the other two plans. One possible reason for this is that outpatients had less history of drug use; therefore, their social relationships had not yet been significantly harmed. Given that the TC treatment program provides a space for the growth of coping mechanisms and prepares the individual for living in the outside world through the acquisition of successful experiences for living in a small community, therefore it can be a good way to increase the quality of life, mental health, self-esteem, and life skills promotion through problem-solving, communication skills, self-awareness, emotion management and self-care for substance-dependent people.

A significant difference was observed between patients participating in outpatient, mid-term residential, and TC treatment programs in terms of quality of family relationships. The prevalence of problems in family relationships was higher among patients receiving TC treatment services. TC therapy patients reported more problems in family relationships (for example, lack of family-friendly relationships, family disputes, lack of understanding in

family relationships, disagreement among family members, and inattention to family members) compared to outpatient and mid-term residential treatment plans. The results of this study were inconsistent with many previous results. A study conducted in Iran found that the residents' daily program at the TC center had a significant impact on the social and family relationships of addicts, and the more people involved in these programs, the better their social relationships [44]. In the meta-analysis of Vanderplasschen et al. on 16 studies, the efficacy of therapeutic communities compared to other interventions was shown according to the social and FRI [27]. In addition to cultural differences, one possible reason may be related to differences in family relationship measurement tools. The effect of the study design may also be another possible reason for the differences in the results of the present study with previous studies. Since the present study was conducted as a survey design, its results will likely be different from those of a randomized controlled trial.

## Conclusion

The rate of relapse/recidivism and criminal activity among patients participating in the mid-term residential treatment program was higher than in the TC and outpatient programs. On the other hand, patients participating in outpatient treatment had better health and quality of life. Finally, patients in the TC program reported more problems on the FRI compared to the outpatient and TC treatment programs.

## Limitations

The present study has limitations that should be cautious when generalizing the results of this study. The first limitation of the present study was access to all patients participating in the outpatient treatment plan. Clinical information on patients previously on outpatient treatment was not available due to a lack of follow-up. The second limitation of the present study was related to the measurement instruments. This limitation was related to the indirectness of the instrument for measuring variables. Because the use of self-meters may be influenced by people's preferences [45], many respondents may be reluctant to present their true attitudes about the quality of relationships in the family or about variables, such as participation in criminal activity or exaggeration of their health and quality of life. Therefore, it is recommended for future researchers to use self-report with more indirect scales that are less sensitive to these effects to measure the variables associated with the outcomes of treatment plans. The third limitation was related to the relatively few samples in the present study. This limita-

tion was due to the small size of the patient population attending the TC program (approximately 50). Therefore, the patients in these three designs needed to match each other in terms of sample size to accurately compare patients in the three treatment plans. Therefore, it is recommended that future researchers increase the sample of other treatment plans by selecting patients participating in TC programs in several provinces of Iran.

## Ethical Considerations

### Compliance with ethical guidelines

All ethical principles are considered in this article. The participants were informed of the purpose of the research and its implementation stages. They were also assured about the confidentiality of their information and were free to leave the study whenever they wished, and if desired, the research results would be available to them. A written consent has been obtained from the subjects. principles of the Helsinki convention was also observed.

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### Conflict of interest

The author declared no conflict of interest.

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