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Personality traits and early maladaptive schemas in methadone maintenance patients *vs.* healthy controls: a comparative study

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Abstract

This research investigated the differences in personality traits and early maladaptive schemas between patients undergoing methadone maintenance treatment and healthy controls in Zahedan, Iran. The study involved 81 patients in methadone maintenance treatment and 81 healthy controls, assessing them using the Big Five Inventory - Short Version and the Young Schema Questionnaire 90-item. Data analysis using independent *t*-tests and Chi-square tests in SPSS v25 revealed significant differences in both personality traits and early maladaptive schemas between the study groups. The methadone group was more extroverted and neurotic, with no differences in openness to experience, conscientiousness, or agreeableness. They scored significantly higher in early maladaptive schemas (395.4±36.5) than the control group (317.9±32.8), indicating a higher likelihood of maladaptive schemas. Significant differences were found in specific schemas, such as "abandonment/instability", "social isolation", "negativity/pessimism", "defectiveness/shame", "mistrust/abuse", "insufficient self-control", "enmeshment", and "failure to achieve", with the methadone maintenance group exhibiting more maladaptive schemas. The findings highlight the importance of incorporating personality traits and early maladaptive schemas in therapy for substance users to enhance treatment outcomes.

Introduction

Drug addiction is recognized as a significant global crisis, alongside environmental issues, poverty, and nuclear threats. It is a complex biopsychosocial disorder characterized by compulsive drug seeking, loss of control over drug use, and negative emotional states when access to drugs is prevented. This chronic relapsing condition consists of three stages: binge/intoxication, withdrawal/negative affect, and preoccupation/anticipation (craving).[1] Substance use disorder is a complex condition involving the uncontrolled use of substances like alcohol, tobacco, or illegal drugs despite harmful consequences. Individuals with substance use disorder often exhibit an intense focus on substance use, impairing their daily functioning. Even when aware of the problems caused by the substance, they continue its use.[2] Substance use disorder can also lead to distorted thoughts and behaviors, physiological symptoms, and changes in brain structure and function. Brain imaging studies have shown alterations in areas related to judgment, decision-making, learning, memory, and behavior control.[3]

There are ten categories of substance-related disorders: alcohol, caffeine, cannabis, hallucinogens, inhalants, opioids, sedatives, stimulants, tobacco, and other unknown substances. Except for caf-

feine, all can be diagnosed as substance use disorders, classified by severity based on the number of symptoms present (mild: 2-3 symptoms; moderate: 4-5 symptoms; severe: 6 or more symptoms).[4] Numerous studies have examined addiction's harms, contributing factors, and secondary prevention.[5] In this context, personality may play a role in both chemical and behavioral addictions, as suggested by the five-factor model of personality, which includes neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness.[6-8] These traits have been validated across cultures and are linked to solving social adaptive problems.[9] Research indicates that alcohol use disorder is associated with higher neuroticism and lower agreeableness and conscientiousness.[10] Additionally, individuals with substance use disorders often score higher in neuroticism and openness to experience, but lower in extraversion, agreeableness, and conscientiousness compared to those with other mental disorders.[11] Additionally, early maladaptive schemas (a concept in schema therapy developed by Jeffrey Young) are considered a core component of substance use disorders.[12,13] These schemas are self-defeating emotional and cognitive patterns formed early in development and are repeatedly activated throughout life. Early maladaptive schemas are deep cognitive structures comprising beliefs about oneself, often established during childhood. They serve as filters for perceiving, organizing, and processing information.[13] Understanding these schemas is crucial for developing effective interventions for treating substance use disorders, as they are linked to substance abuse and its treatment.[12,13] In light of this context, the current study aimed to compare early maladaptive schemas and personality traits among patients undergoing methadone maintenance treatment and healthy controls in Zahedan, Iran.

Materials and Methods

Study design and participants

This study employed a case-control design to examine early maladaptive schemas and personality disorders in patients undergoing methadone maintenance treatment at the Baharan Psychiatric Hospital's addiction treatment clinic in Zahedan, comparing them with healthy controls from the city. The case group consisted of patients aged 18 to 65, possessing basic literacy, without acute physical or mental disorders, intellectual disability, or recent psychotherapy history. The control group comprised age-matched, non-addicted residents of Zahedan with verified mental health, scoring below 23 on the Goldberg General Health Questionnaire (GHQ-28) and confirmed healthy by psychiatrists using the Structured Clinical Interview for DSM-5 – Clinician Version and the Structured Clinical Interview for DSM-5 Personality Disorders assessments. The study calculated the necessary sample size using G*power software, aiming for 80% power with an alpha of 0.05 and an effect size of 0.3, resulting in an initial requirement of 71 participants per group.[14] Considering a potential 15% dropout, the final sample included 81 individuals in each group. Participants for the case group were selected through non-random convenience sampling from methadone patients at the clinic. In contrast, the control group was randomly selected and matched for age, gender, marital status, and education level, ensuring no history of addiction or methadone use.

Measures

The method of data collection involved interviews, and the tools used for data collection were questionnaires and information forms. The forms or questionnaires included the Big Five Inventory - Short Version (BFI-10), the Young Schema Questionnaire 90-item (YSQ-S3), and the GHQ-28 to confirm health in the control group.[15-17]

Big Five Inventory - Short Version

The BFI-10 consists of 10 questions scored on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree". The five personality domains measured by this scale are: "openness to experience", "conscientiousness", "extraversion", "agreeableness", and "neuroticism". The reliability and validity of this tool have been confirmed in a previous study in Iran.[15]

Young Schema Questionnaire 90-item

The YSQ-S3 is designed to measure 18 schemas. This scale includes 90 items answered on a 6-point Likert scale (from completely false to completely true). A high score on a specific scale indicates a higher likelihood of the presence of a maladaptive schema for that individual. In previous studies, the reliability and validity of this tool and its application have been confirmed.[16]

Goldberg General Health Questionnaire

The GHQ-28 was used to determine and confirm the entry criteria for the control group, which had to score less than 23. This test consists of 28 questions divided into four subscales, each containing seven questions. The first subscale includes items about individuals' feelings regarding their health status and fatigue, encompassing physical symptoms. This subscale evaluates bodily sensory perceptions often associated with emotional arousal, covering questions 1 to 7. The second subscale includes items related to anxiety and insomnia, covering questions 8 to 14. The validity and reliability of this questionnaire have also been confirmed in Iran.[17]

Procedure

This study was approved under the code IR.ZAUMS.REC.1401.404 by the Ethics Committee of Zahedan University of Medical Sciences. Following approval from the University's Research Council and Ethics Committee, initial information regarding the study's aims and informed consent forms were provided to the patients or their companions, as well as to healthy controls, by an assistant. These participants were asked to complete demographic information forms, BFI-10, and YSQ-S3 questionnaires. The confidentiality of participants' identities was maintained throughout the research process. The healthy controls consisted of residents from Zahedan and other individuals who did not use methadone. They were randomly selected by the researcher to complete the questionnaire. Both the patient group and the control group were matched for age, gender, marital status, and education level to ensure group compatibility. Importantly, the control group did not have any history of addiction or methadone use and was selected based on specific inclusion criteria.

Statistical analysis

The data were analyzed using SPSS version 25 software (IBM, Chicago, IL, USA) at a significance level of <0.05. Descriptive statistics, including measures of central tendency and dispersion such as mean and standard deviation, as well as statistical tables, charts, frequencies, and percentages, were used to describe the data. Given the normality of the data in the Kolmogorov-Smirnov test, independent *t*-test and Chi-square test were used for data analysis.

Results

Participants had an average age of 28.7±7.56 years, with 59.9% being male. Most participants had secondary education (45.7%), and

29% were married. The study used the Chi-square test and independent *t*-test to confirm that there were no significant differences in age, gender, education level, and marital status between the two groups, indicating homogeneity (p>0.05) (Table 1).

The study assessed personality traits using a threshold score of 7 to categorize individuals. In the methadone maintenance group, 38.2% were open, 41.9% conscientious, 17.3% extroverted, 27.1% agreeable, and 60.4% neurotic. In the healthy control group, these figures were 41.9% open, 54.3% conscientious, 48.1% extroverted, 39.5% agreeable, and 48.1% neurotic. Some participants fell into multiple personality categories, accounting for more than the total number of individuals (Figure 1).

The groups also differed significantly in the traits of "extraversion" and "neuroticism", with the methadone maintenance group being more extroverted and neurotic (p=0.001). However, there were no significant differences between the groups in "openness to experience", "conscientiousness", and "agreeableness" (p>0.05) (Table 2).

Table 1. Distribution of demographic characteristics in the two study groups.

Variables		A (n=81)		B (n=81)		p
		n	%	n	%	
Gender	Male	54	66.7	43	53.1	0.07
	Female	27	33.3	38	46.9	
Marital status	Married	20	24.7	27	33.3	0.2
	Single	61	75.3	54	66.7	
Education level	Non-degree	26	32.1	28	34.6	
	High school diploma	39	48.1	35	43.2	0.8
	Academic degree	16	19.8	18	22.2	
Age (mean±SD)		29.5±6.4		28±6.7		0.1

A, methadone maintenance group; B, healthy control group; SD, standard deviation.

Table 2. Mean scores of types of personality traits in the two groups under study.

Personality traits	A (n=81) Mean±SD	B (n=81) Mean±SD	p
Openness to experience	8.4±2.4	3.1±8.9	0.69
Conscientiousness	6.2±2.3	6.8±3.3	0.63
Extraversion	3.2±2.1	8.7±4.6	0.001
Agreeableness	5.4±1.2	6.6±2.1	0.23
Neuroticism	8.4±2.7	3.4±1.1	0.001

A, methadone maintenance group; B, healthy control group; SD, standard deviation.

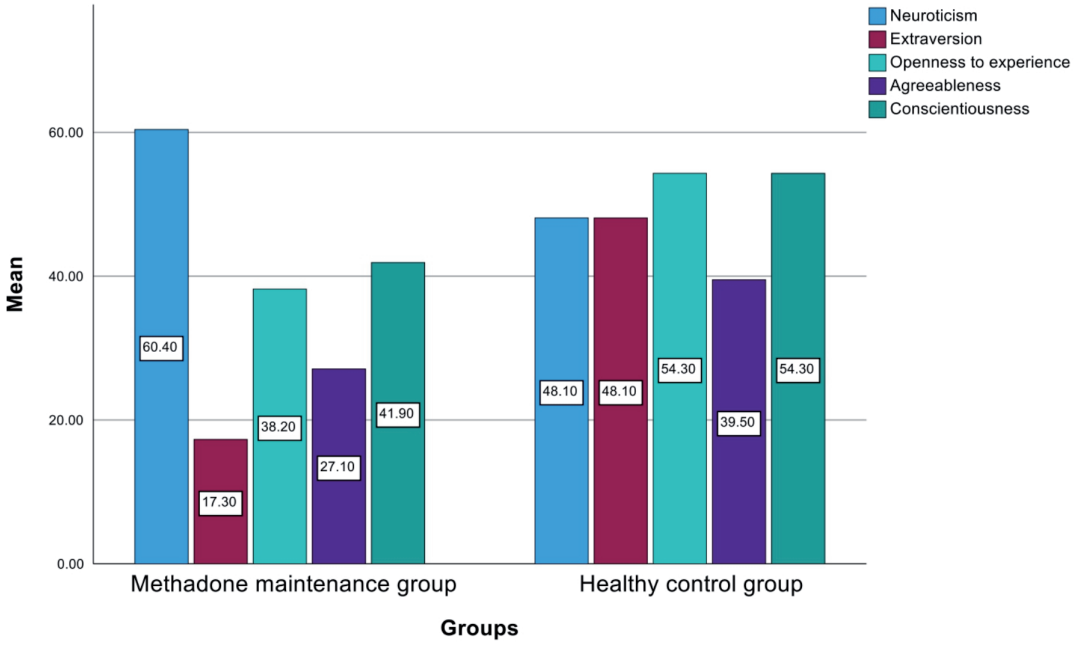

Figure 1. The prevalence of personality traits in the two study groups.

Early maladaptive schemas were measured, with the methadone maintenance group scoring 395.4±36.5 on average, compared to 317.9±32.8 in the healthy control group. This significant difference (p=0.001) suggests that individuals undergoing methadone maintenance treatment have more early maladaptive schemas. High scores indicate a greater likelihood of having a maladaptive schema. The study found significant differences between the two groups in specific maladaptive schema factors: "abandonment/instability", "social isolation/alienation", "negativity/pessimism", "defectiveness/shame", "mistrust/abuse", "insufficient self-control/self-discipline", "enmeshment/undeveloped self", and "failure to achieve". The methadone maintenance group exhibited more maladaptive schemas in these areas than the healthy control group (Table 3).

Discussion

The present study compared 81 patients undergoing methadone maintenance treatment with 81 healthy controls regarding personality traits and early maladaptive schemas. The results indicated significant differences between the groups in terms of personality traits. An independent *t*-test showed that the methadone group was more introverted and neurotic compared to the control group. However, there were no significant differences in openness to experience, conscientiousness, and agreeableness between the two groups. Previous studies have suggested that most addicts exhibit numerous psychological and personality deficiencies before addiction, which become more destructive after addiction. Therefore, addiction is not just about substance abuse but also the interplay between personality and addiction. Psychological variables, particularly personality traits, are significant factors associated with substance use disorder.[18-21]

The study also suggested that "extraversion" and "neuroticism" play a more crucial role than other traits in the inclination towards or control of substance use disorders. This finding aligns with studies by Hokm Abadi *et al*.,[22] and Lachner *et al.*,[18] which showed lower levels of openness to experience and higher levels of neuroticism in the methadone group compared to normative samples. Additionally, poly-drug users exhibited lower levels of "agreeableness" and "conscientiousness" compared to the general population.

In our study, using a score of 7 or above as a personality label in a given dimension, the methadone group showed 38.2% "openness to experience", 41.9% "conscientiousness", 17.3% "extraversion", 27.1% "agreeableness", and 48.1% "neuroticism". The control group had 41.9% "openness to experience", 54.3% "conscientiousness", 48.1% "extraversion", 39.5% "agreeableness", and 60.4% "neuroticism". These results are consistent with studies by Aghaii *et al.*,[23] and Pournaghash-Tehrani *et al.*,[19] though Aghaei's study focused solely on women.

The study also found significant differences in early maladaptive schemas between the groups. The methadone group had a higher overall score (395.4±36.5) compared to the control group (317.9±32.8), indicating more maladaptive schemas. The methadone group scored higher on dimensions like "abandonment/instability", "social isolation/alienation", "negativity/pessimism", "defectiveness/shame", "mistrust/abuse", "insufficient self-control/self-discipline", "enmeshment/undeveloped self", and "failure to achieve". These findings align with studies by Aghaeii *et al.*,[23] Shiranian *et al*.,[24] and Tobi *et al*.[25] The study by Toby *et al.,* in the United States, indicated that increased neuroticism and early maladaptive schemas predicted higher substance use severity, while increased conscientiousness predicted lower severity. Neuroticism and maladaptive schemas may be potential risk factors for increased substance use, whereas conscientiousness may be a protective factor. Furthermore, Purmohammad *et al.* demonstrated significant differences in maladaptive schemas and lifestyle between research groups.[26] The findings suggest that individuals dependent on substances suffer from high levels of maladaptive schemas and lead incompatible lifestyles. Schemas comprise cognitive, emotional, and behavioral components. When activated, maladaptive schemas trigger levels of emo-

Table 3. Mean scores of early maladaptive schemas in the two study groups.

Early maladaptive schemas	A (n=81) Mean±SD	B (n=81) Mean±SD	p
Total score	395.4±36.5	317.9±32.8	0.001
Abandonment/instability	25.4±5.5	15.4±4.3	0.001
Social isolation/alienation	27.1±6.4	17.4±6.2	0.001
Negativity/pessimism	24.7±5.8	15.1±4.8	0.001
Emotional inhibition	19.1±5.4	18.4±6.1	0.22
Dependence/incompetence	20.1±6.3	19.3±5.2	0.23
Approval/recognition-seeking	19.3±5.7	18.4±5.5	0.19
Emotional deprivation	21.1±6.4	20.4±6.9	0.12
Vulnerability to harm/illness	18.6±7.4	18.9±5.2	0.49
Enmeshment/undeveloped self	25.1±6.5	14.4±5.9	0.001
Subjugation	20.1±6.4	19.4±6.2	0.19
Unrelenting standards	21.1±6.5	17.4±5.2	0.09
Punitiveness	19.5±6.4	19.5±6.2	0.89
Defectiveness/shame	25.1±6.1	16.4±4.9	0.001
Mistrust/abuse	26.2±7.5	16.1±6.3	0.001
Failure to achieve	24.4±5.9	13.7±4.8	0.001
Self- sacrifice	20.1±7.4	19.4±5.2	0.38
Entitlement/grandiosity	17.1±6.4	15.4±6.1	0.24
Insufficient self-control/self-discipline	25.8±5.9	15.9±4.9	0.001

A, methadone maintenance group; B, healthy control group; SD, standard deviation.

tion that can lead to various psychological disturbances, such as depression, anxiety, occupational inability, and substance abuse. The high scores of maladaptive schemas in the methadone-maintained group likely indicate that these individuals experienced traumatic experiences during childhood and adolescence, leading to negative and maladaptive views of themselves and the world. High scores in specific domains suggest that these individuals have maladaptive beliefs regarding a lack of support and guidance from significant others, distrust of others, extreme pessimism towards surroundings, feelings of rejection and worthlessness, and a sense of alienation from others.[27,28]

Limitations and future directions

The study encountered several methodological limitations. Firstly, the small sample size and selection of participants from a single geographic area limit the generalizability of the findings. Secondly, being a cross-sectional study, it fails to establish a definitive cause-and-effect relationship. Lastly, the study relied on self-report scales, which may not accurately capture participants' true emotions due to potential biases. Future research should address these limitations by diversifying the sample, incorporating longitudinal designs to better understand causal relationships, and employing more objective measures to assess emotions.

Clinical implications

The clinical implications of these findings are significant for tailoring treatment approaches in methadone maintenance programs. Understanding the specific personality traits and maladaptive schemas present in patients can guide clinicians in developing personalized interventions that address these underlying psychological factors. For example, cognitive-behavioral therapy can be employed to modify dysfunctional thought patterns associated with maladaptive schemas, while dialectical behavior therapy may be beneficial for individuals with high impulsivity or emotion regulation difficulties. Moreover, integrating schema therapy into methadone maintenance treatment could help patients identify and alter deep-seated beliefs that contribute to their addiction behaviors. By addressing these core issues alongside pharmacological treatment with methadone, there is potential for improved treatment adherence and better long-term outcomes.

Conclusions

The study highlights the significant role of personality traits and early maladaptive schemas in individuals undergoing methadone maintenance treatment. The methadone group demonstrated higher levels of extroversion, neuroticism, and maladaptive schemas compared to the control group, with notable differences in early maladaptive schemas such as "abandonment/instability", "social isolation/alienation", "negativity/pessimism", "defectiveness/shame", "mistrust/abuse", "insufficient self-control/self-discipline", "enmeshment/undeveloped self", and "failure to achieve". These findings highlight the necessity of integrating psychological interventions, such as cognitive-behavioral therapy and schema therapy, into treatment programs to address these underlying issues. By focusing on these psychological components alongside pharmacological treatment, there is potential for enhanced treatment adherence and improved long-term outcomes for substance users. However, the study's limitations, including a small sample size and reliance on self-report measures, suggest that future research should adopt more diverse samples and longitudinal designs to establish causal relationships and improve the accuracy of emotional assessments.

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