Associated Factors of Maintenance in Patients under Treatment with Methadone: A Comprehensive Systematic Review and Meta-Analysis

Farzaneh Farmani MSc¹, Hadi Farhadi PhD², Younes Mohammadi PhD³

Abstract

Background: This comprehensive systematic review and meta-analysis were performed to assess the associated factors of maintenance in patients with methadone therapy in the world.

Methods: A systematic literature review was performed from several scientific databases; these include PubMed, Scopus, ISI Web of Science, and MEDLINE. We searched the following keywords: “Methadone”, “Maintenance”, “Retention”, “Meta-analysis” and “Associated factors”. Data were selected based on the inclusion and exclusion criteria. The purpose of this study was to assess the associated factors of maintenance in patients under treatment with methadone by an overall effect size, odds ratio (OR) [95% confidence interval (CI)] using meta-analysis.

Findings: We selected 24 researches out of 94413 for our study based on the inclusion and exclusion criteria for systematic review and meta-analysis. The pooled recognized five significant positive associations of age, marital status, employment status, gender, and length of treatment with methadone usage (OR age = 3.566, 95% CI = 3.296-3.836, P < 0.001; OR marital status = 1.101, 95% CI = 1.028-1.175, P = 0.025; OR employment = 1.157, 95% CI = 1.060-1.254, P = 0.015; OR gender = 4.686, 95% CI = 4.434-4.939, P < 0.001; OR duration of treatment = 1.543, 95% CI = 1.443-1.647, P < 0.001; respectively). However, education and injection status showed a non-significant positive association with methadone usage (OR education level = 1.279, 95% CI = 0.976-1.583, P = 0.266; OR injection status = 1.205, 95% CI = 0.725-1.658, P = 0.442).

Conclusion: This systematic-review and meta-analysis study displayed that factors such as age, marital and employment status, gender, and duration of treatment are effective on maintenance in patients under treatment of methadone.

Keywords: Methadone; Maintenance; Associated factors; Meta-analysis

Citation: Farmani F, Farhadi H, Mohammadi Y. Associated Factors of Maintenance in Patients under Treatment with Methadone: A Comprehensive Systematic Review and Meta-Analysis. Addict Health 2018; 10(1): 41-51.

Received: 04.09.2017 Accepted: 09.11.2017

1- MSc Student, Department of Psychology, School of Educational Sciences and Psychology, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, Iran
2- Assistant Professor, Department of Psychology, School of Educational Sciences and Psychology, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, Iran
3- Assistant Professor, Modeling of Noncommunicable Diseases Research Center AND Department of Epidemiology, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran

Correspondence to: Hadi Farhadi PhD, Email: farhadihadi@yahoo.com

Addict Health, Winter 2018; Vol 10, No 1

http://ahj.kmu.ac.ir, 5 January
Introduction

The illicit opioids use continues to present a problem both at the individual and societal levels. Increased tolerance and continued use despite personal and social problems can be named as characteristics of opioid use disorder, as well as withdrawal and tolerance among other behavioral changes; furthermore, increased human immunodeficiency virus (HIV) risk and susceptibility to other opportunistic infections such as hepatitis C and tuberculosis (TB) has been associated with opioid use, as well as infection, medical and psychiatric comorbidities, polysubstance consumption, criminal and illegal behavior, and a growth in opioid-related deaths.

Methadone maintenance treatment (MMT), first synthesized in Germany as a substitute analgesic for morphine prior to World War II, is the most widely used harm-reduction approach to treating opioid. Americans discovered that it could be used to treat 1949 heroin withdrawal symptoms. Methadone is a safe, low-cost, and convenient generic drug for treatment of opioid dependence. Methadone is a synthetic analgesic with the ability to inhibit the euphoric effects of opioids and provide relief of withdrawal symptoms due to its longer duration of action. Studies have shown that this treatment is effective in decreasing illicit opioid use, reducing criminal activity, and reducing mortality rates among patients.

Studies have shown that many different factors are effective on the survival rate of patients in maintenance treatment. In general, they consist of three main categories: factors related to the patients, factors related to the treatment plan, and the characteristics of the community. Moreover, studies have shown that MMT attitude is one of the factors related to the treatment that is effective on the survival rate of patients in MMT. Maintenance and commitment to treatment are two of the basic principles of MMT and often are known as criteria for its success and effectiveness.

Based on the database review, the numerous studies are carried out on the epidemiological features and related factors of maintenance in patients under treatment with methadone in the world. An authentic measurement for these epidemiological and associated factors can be developed through a combination of the research findings using meta-analysis. The present study aimed to comprehensively and systematically review the published data on the associated factors of maintenance in patients under treatment with methadone, using a meta-analysis.

Methods

Our research question was based on population/intervention (or predictor in observational study)/comparison/outcome (PICO) principle which is as follows:

Population = methadone treated patients
Predictors = age, gender, employment, education, marital status, duration of treatment
Outcome = maintenance

Search strategy: A number of international databases (including ISI Web of Science, PubMed, Scopus, and MEDLINE) were searched for relevant articles (up to June 2017); the target keywords included “Substance-Related Disorder”, “Drug Dependence”, “Drug Addiction”, “Drug Habituation”, “Substance Use Disorder”, “Substance Abuse”, “Substance Dependence”, “Substance Addiction”, “Drug Abuse”, “Drug Use Disorder”, “Opioid-Related Disorder”, “Opiate Dependence”, “Opiate Addiction”, “Narcotic Abuse”, “Narcotic Dependence”, “Narcotic Addiction”, “Addiction”, “Methadone”, “Maintenance”, “Retention”, “Relapse”, “Marital Status”, “Educational Status”, “Gender”, “Sex”, “Injections”, “Employment”, “Employment Status”, “Occupational Status”, “Treatment Outcome”, “Clinical Effectiveness”, “Treatment Effectiveness”, “Patient Relevant Outcome”, “Clinical Efficacy”, “Patient Relevant Outcome”, “Rehabilitation Outcome”, “Opiate Substitution Treatment”, “Opioid Substitution Treatment”, “Opioid Substitution Therapy”, “Opiate Replacement Therapy”, “Opioid Replacement Therapy” with combination “OR”, “AND” and “NOT” Boolean Operators in the title, abstract and keywords field (Table 1). No limitation was set while searching databases. Reference lists of all related studies were also reviewed for other related publications. The search results were evaluated randomly by a group of researchers, and it was reported that no relevant study was ignored. We also tried to identify any gray literature in the ProQuest database.
Table 1. Search strategy

| Search strategy                                                                 |
|--------------------------------------------------------------------------------|
| ("Substance-Related Disorders" [MeSH Terms]) OR ("Drug Dependence" [Text Word]) OR ("Drug Addiction" [Text Word]) OR ("Drug Habitation" [Text Word]) OR ("Substance Use Disorder" [Text Word]) OR ("Substance Abuse" [Text Word]) OR ("Substance Dependence" [Text Word]) OR ("Substance Addiction" [Text Word]) OR ("Drug Abuse" [Text Word]) OR ("Drug Use Disorder" [Text Word]) OR ("Opioid-Related Disorders" [MeSH Terms]) OR ("Opiate Dependence" [Text Word]) OR ("Opiate Addiction" [Text Word]) OR ("Narcotic Abuse" [Text Word]) OR ("Narcotic Dependence" [Text Word]) OR ("Narcotic Addiction" [Text Word]) OR ("Addiction" [Text Word]) AND ("Methadone" [MeSH Terms]) AND ("Maintenance" [MeSH Terms]) OR ("Retention" [Text Word]) NOT ("Recurrence" [MeSH Terms]) OR ("Relapse" [Text Word]) AND ("marital status" [MeSH Terms]) AND ("Educational Status" [MeSH Terms]) AND ("Gender" [Text Word]) OR ("sex" [MeSH Terms]) AND ("Injections" [MeSH Terms]) AND ("Employment" [MeSH Terms]) OR ("Employment Status" [Text Word]) OR ("Occupational Status" [Text Word]) AND ("Treatment Outcome" [MeSH Terms]) OR ("Clinical Effectiveness" [Text Word]) OR ("Treatment Effectiveness" [Text Word]) OR ("Patient Relevant Outcome" [Text Word]) OR ("Clinical Efficacy" [Text Word]) OR ("Patient Relevant Outcome" [Text Word]) OR ("Rehabilitation Outcome" [Text Word]) AND ("Opiate Substitution Treatment" [MeSH Terms]) OR ("Opioid Substitution Treatment" [Text Word]) OR ("Opioid Substitution Therapy" [Text Word]) OR ("Opiate Replacement Therapy" [Text Word]) OR ("Opoid Replacement Therapy" [Text Word]) AND (Filters: Publication date up to June 2017) AND (Filters: English Language) |

The search was limited to original articles and abstracts which were published in English language that stated related features and predictive factors of maintenance treatment in patients under treatment with methadone in different regions of the world. All of these steps were taken by two authors (Farmani and Farhadi) and any disagreements with article selection were resolved through discussion, and a third author was available to resolve the disagreement. Additionally, as an agreement on effect size, Kappa coefficient was reported between two authors.

Inclusion and exclusion criteria: Inclusion criteria were: 1) studies published between 2008-2017; 2) studies on associated features and predictive factors of maintenance treatment in patients under treatment with methadone in different countries of the world; and 3) case-control and cohort studies.

The exclusion criteria were as follows: 1) case reports, review articles, and congress abstracts; 2) studies published in languages other than English; 3) studies without extractable data; 4) meta-analysis, systematic reviews, and duplicate publication of a study (or a study published both in English and another language) with the exception of duplicate and matching studies for which the most sample sizes and complete detailed results were provided.

Data extraction: From all of the previous studies, the author’s name, publication date, study setting and country, sample size, journal, and risk factors were extracted (Table 2). These data were reviewed and confirmed by three researchers, independently. Furthermore, when data were unclear, before recording an entry in the dataset, the other authors were consulted and consensus was achieved.

Quality assessment and risk of bias: As a basis for reporting systematic reviews of other types of research, Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and The Newcastle-Ottawa Scale (NOS) can be used. In addition, NOS could be used to assess the methodological quality of any outcome. For the primary research, a score was assigned to each item related to study type, sample size, research objectives, population, and inclusion/exclusion criteria; In addition, the method of analysis and appropriate presentation of results were determined as follows: studies assigned 0-3, 4-6, or 7-9 were considered as low, moderate, or high-quality studies, respectively. Based on a NOS checklist, articles with scores less than 5 were excluded from the current study. The average score for all articles in this study was 7.1.

In order to evaluate the strength of the associated factors of maintenance in patients under treatment with methadone, pooled odds ratio (OR) and its corresponding 95% confidence interval (CI) were used. In the present study, Cochran's Q test and I-squared (I²) were used to assess the heterogeneity and the variation in the pooled estimations; the significance was considered at P < 0.1 level. When heterogeneity existed between the individual studies, the pooled ORs were derived from a random effect model; otherwise, the pooled effect sizes were derived by a fixed effect one. Meanwhile, for sensitivity analysis, a particular study or group of studies (if
any) with the highest impact on the heterogeneity test were removed successively. A funnel plot was established for checking the existence of publication bias. The funnel plot asymmetry was measured by Egger’s linear regression test and Begg’s test (P < 0.05 level was considered statistically significant publication bias).15 All statistical analyses were conducted using STATA software (version 11.0; Stata Corporation, College Station, TX).

**Results**

**Eligible studies:** Figure 1 shows the process of including or excluding potential studies. In the first screening process, 94413 papers were excluded due to duplication, and not including the searched terms in their keywords or titles. For abstract assessment, 4101 articles were retained. In the secondary screening process based on abstract evaluation, 4024 of publications were excluded; this resulted in retaining 77 articles for detailed full-text evaluation. After full-text evaluation, 24 articles describing associated factors of maintenance treatment were retained.

**Main results, meta regression and sensitivity analysis:** A summary of pooled results, heterogeneity, and publication bias test of the association between risk factors of maintenance and methadone usage is shown in table 3. Meta-analysis results recognized five significant positive associations of age, marital status, employment status, gender, and duration of treatment with methadone usage (OR age = 3.566, 95% CI = 3.296 -3.836, P < 0.001; OR marital status = 1.101, 95% CI = 1.028-1.175, P = 0.025; OR employment = 1.157, 95% CI = 1.060-1.254, P = 0.015; OR gender = 4.686, 95% CI = 4.343-4.939, P < 0.001; OR duration of treatment = 1.543, 95% CI = 1.443-1.647, P < 0.001; respectively) (Figure 2). However, education and injection status showed a non-significant positive association with methadone usage (OR education level = 1.279, 95% CI = 0.976-1.583, P = 0.26; OR injection status = 1.205, 95% CI = 0.725-1.658, P = 0.44). The results of meta regression analysis showed that year of publication and location of study (country) have not statistically significant effect on the association between risk factors of maintenance and methadone usage.

Table 2. Characteristics of studies included in the systematic review and meta-analysis

| First author          | Magazine                                      | Country       | Number of participants |
|-----------------------|-----------------------------------------------|---------------|------------------------|
| Horyniak et al.16     | International journal of drug policy          | Australia     | 145                    |
| Johnson and Richert17 | International journal of drug policy          | Sweden        | 277                    |
| Bacinreddy et al.18   | Drug and Alcohol Dependence                   | Malaysia      | 460                    |
| Roux et al.19         | Clinical Infectious Diseases                  | France        | 113                    |
| Burns et al.20        | Addiction                                     | Australia     | 15600                  |
| Roux et al.21         | Addiction                                     | France        | 1558                   |
| Hoszafi and Furst22   | Neuropsychopharmacol Hung                     | Greece        | 3320                   |
| Wei et al.23          | Journal of Addiction Medicine                 | China         | 5849                   |
| Kimber et al.24       | Lancet Psychiatry                             | Northern Vietnam | 32033              |
| Van Nguyen et al.25   | Harms Reduction Journal                       | Canada        | 397                    |
| Socis et al.26        | Drug and Alcohol Dependence                   | China         | 10398                  |
| Zhou et al.27         | Journal of Addiction Medicine                 | Sweden        | 441                    |
| Ledberg28             | Journal of Substance Abuse Treatment         | UK            | 511                    |
| Ratcliffe et al.29    | Heroin Addiction and Related Clinical Problem | Ireland       | 228                    |
| Keegan et al.30       | Heroin Addiction and Related Clinical Problem | USA           | 1269                   |
| Peles et al.31        | The American journal of drug and alcohol abuse| UK            | 293                    |
| Holland et al.32      | Addiction (Abingdon, England)                | UK            | 758                    |
| Jiao et al.33         | AIDS care                                     | Israel        | 106                    |
| Mitchell et al.34     | Journal of psychoactive drugs                 | China         | 288                    |
| Peles et al.31        | Drug and Alcohol Dependence                   | Canada        | 351                    |
| Comiskey and Snel35   | Substance use and misuse                      | Taiwan        | 758                    |
| Lee et al.36          | Scientific reports                            | China         | 648                    |
| Zhang et al.37        | AIDS care                                     | Ireland       | 189                    |
| Darker et al.38       | Irish Journal of Medical Science              | Australia     | 32033                  |

UK: United Kingdom; USA: United States of America; AIDS: Acquired immune deficiency syndrome

44 Addict Health, Winter 2018; Vol 10, No 1

http://ahj.kmu.ac.ir, 5 January
We did sensitivity analysis by sequential omission of individual studies. For each of the risk factors of maintenance, after omission, there was no alternation in the pooled OR of methadone usage; this indicates our statistically robust results in all of the risk factors of maintenance.

**Heterogeneity and publication bias:** The heterogeneity analysis was conducted by $I^2$ test, and $P$ heterogeneity $< 0.10$ and $I^2 > 50\%$ was considered as significant heterogeneity among the studies. The heterogeneity between studies were observed in all of the risk factors of maintenance except marital status; age ($I^2 = 100\%; P < 0.001$), education level ($I^2 = 84.5\%; P < 0.001$), injection status ($I^2 = 99.8\%; P < 0.001$), employment status ($I^2 = 90.1\%; P < 0.001$), gender ($I^2 = 100\%; P < 0.001$), and duration of treatment ($I^2 = 100\%; P < 0.001$). Accordingly, the fixed effects model and random effects model were applied to pool the results. In order to evaluate the publication bias, we used the funnel plot and also the Egger’s and Begg’s tests. No publication bias was found in all analyses (Figure 2).

### Discussion

Drug addiction can be considered as a chronic relapsing disease. There are numerous pathways to addiction and in the real world, poly-drug use is common.

### Table 3. Meta-analysis of the pooled association between associated factors of maintenance and methadone usage

| Associated factors of maintenance | No. of studies | P     | Pooled OR (95% CI) | Heterogeneity test ($I^2$, $P$) | Publication bias | Effect model |
|----------------------------------|----------------|-------|--------------------|---------------------------------|-----------------|--------------|
| Age                              | 15             | < 0.001 | 3.566 (3.296-3.836) | (100, < 0.001) | 0.920 | 0.550 | Random |
| Education                        | 4              | 0.260 | 1.279 (0.976-1.583) | (84.5, < 0.001) | 0.730 | 0.360 | Random |
| Marital status                   | 4              | 0.025 | 1.101 (1.028-1.175) | (44.4, 0.145) | 0.990 | 0.820 | Fixed   |
| Injection                        | 5              | 0.440 | 1.205 (0.725-1.658) | (99.8, < 0.001) | 0.990 | 0.270 | Random |
| Employment                       | 7              | 0.015 | 1.157 (1.060-1.254) | (90.1, < 0.001) | 0.760 | 0.340 | Random |
| Gender (female as reference level) | 12           | < 0.001 | 4.686 (4.434-4.939) | (100, < 0.001) | 0.050 | 0.780 | Random |
| Duration of the treatment        | 3              | < 0.001 | 1.543 (1.443-1.647) | (100, < 0.001) | 0.990 | 0.290 | Random |

OR: Odds ratio; CI: Confidence interval
Considering the harmful physical, psychological, and social effects of opiate drugs, it is necessary to pay attention to this disease and its treatment. Due to the high incidence of relapse and the increased risk of lethal poisoning after detoxification, maintenance treatment for the agonist is considered as the first phase of treatment sessions. Methadone is a long-acting agonist with a half-life of about 24 to 36 hours. In scientific literature, methadone maintenance has been consistently shown to effectively decrease drug use and improve social functioning. Patients receiving methadone maintenance have much greater treatment retention than those receiving other treatments,\(^4\) therefore, methadone can be considered as the first phase of opioid substitution therapy.\(^2\)

The long-term maintenance of patients in treatment is very important and other positive MMT outcomes, such as reducing the risk of

---

**Figure 2.** (A) Forest plot of meta-analysis for duration of treatment, (B) Forest plot of meta-analysis for gender, (C) Forest plot of meta-analysis for employment status, (D) Forest plot of meta-analysis for married status, (E) Forest plot of meta-analysis for age
recurrence of drug use, have been shown to be positively associated with the length of time when patients are treated.\textsuperscript{44} Shelf life is one of the most important indicators in MMT.\textsuperscript{42} In a national and prospective study in which a group of methadone clinics participated, the maintenance rate was reported to be 81% in the first month and 52% after six months. In another study, examining 492 patients in a MMT clinic, the maintenance rate for treatment after one year was reported to be 74.4%.\textsuperscript{43} Studies in New York, Italy, and Eastern Europe have reported maintenance rates for treatment of 23 months, 7 months, and 2.5 months, respectively.\textsuperscript{44}

Various factors are effective in maintenance therapy with methadone.\textsuperscript{45} The results of maintenance analysis show that factors predicting the maintenance rate on treatment, including age, marital status, housing status, type of substance use, and family history, have a positive and significant relationship with maintenance rates on treatment.\textsuperscript{46,47} We reviewed 24 articles published until 2017. These studies were conducted in various countries like France, Malaysia, China, etc. In the current investigation, variables like age, education, gender, etc. were considered in the study. The findings revealed that age, gender, and marital status had statistically significant relationships with maintenance in methadone treatment. However, it was found that there is not any statistically significant relationship between variables like education and injection in maintenance treatment with methadone; therefore, the retention rate is one of the best indicators of MMT efficiency.\textsuperscript{48,49}

As treatment through methadone maintenance has numerous advantages such as decreasing the use of illegal substance, stabilizing the patient's life, reducing the arbitrary use of drugs, reducing unlawful actions, reducing dangerous behaviors (common injection which may lead to transfer of illnesses resulting from blood pathogens like acquired immune deficiency syndrome (AIDS) and hepatitis). Hence, treatment through methadone maintenance and shelf life in this treatment is effective both for the individual and for the society.

This research had some limitations like lack of access to the full text of some papers which prevented us from including their results into the current study. Furthermore, in this investigation, there was a linguistic limitation as only studies written in English were reviewed and studies in other languages were not included.

Age, as one of the factors, was considered as an important factor in this study. In earlier years, because of hysteria and sexual issues, risk of tendency to substance and as a result, failure in treatment is higher. As a result, paying attention to younger's morale and mood in this treatment method is of great significance; moreover, being married and having family, both as permanent supporting factors and as motivators, can help the patient under treatment with methadone. Single and divorced individuals are in the exposure to the relapsing use because of lack of common marriage sense, lack of commitment and attachment.

One of the other factors which is important for these patients is job. Having job is effective in reducing failure of treatment because of making an appropriate mental environment, providing social status, and increasing self-confidence.

With regard to various factors, education was more challenging. With increase in literacy level, maintenance in treatment did not improve. As shown, the degree of relapse in individuals in higher education was reported to be more than illiterate individuals. The reason is that individuals with higher educational degrees thought that they can control the issue and it seems that they are reluctant to receive information regarding prevention of relapsing from treatment center employees. This point should be considered in MMT for individuals who have higher educational degrees. Hence, paying more attention to them and selecting appropriate techniques for communicating with them are necessary.

It seems that using other treatment methods like group treatment, family treatment, and consulting with individual can be effective besides methadone treatment. However, effectiveness or lack of it and the degree of effectiveness of these methods need further research.

Conclusion

Since addiction treatment is an important issue, it is important to pay attention to the factors that lead to maintenance in the treatment of patients undergoing methadone treatment. In this study, various factors were investigated. The factors such as age, marital status, employment status, gender, and duration of treatment were effective in treating, but education
and injection did not make any significant difference in this study. Therefore, it is necessary to do more research and studies on their effectiveness and how effective they are.

**Conflict of Interests**

The Authors have no conflict of interest.

**References**

1. Okie S. A flood of opioids, a rising tide of deaths. N Engl J Med 2010; 363(21): 1981-5.
2. Marek RJ, Ben-Porath YS, Ashton K, Heinberg LJ. Impact of using DSM-5 criteria for diagnosing binge eating disorder in bariatric surgery candidates: Change in prevalence rate, demographic characteristics, and scores on the Minnesota Multiphasic Personality Inventory-2 restructured form (MMPI-2-RF). Int J Eat Disord 2014; 47(5): 553-7.
3. Dennis BB, Naji L, Bawor M, Bonner A, Varenbut M, Dailer J, et al. The effectiveness of opioid substitution treatments for patients with opioid dependence: A systematic review and multiple treatment comparison protocol. Syst Rev 2014; 3: 105.
4. Firestone Cruz M, Fischer B, Patra J, Kalousek K, Newton-Taylor B, Rehm J, et al. Prevalence and associated factors of hepatitis C infection (HCV) in a multi-site Canadian population of illicit opioid and other drug users (OPICAN). Can J Public Health 2007; 98(2): 130-3.
5. Brooner RK, King VL, Kidorf M, Schmidt CW Jr, Bigelow GE. Psychiatric and substance use comorbidity among treatment-seeking opioid abusers. Arch Gen Psychiatry 1997; 54(1): 71-80.
6. Hall W, Bell J, Carless J. Crime and drug use among applicants for methadone maintenance. Drug & Alcohol Dependence 1993; 31(2): 123-9.
7. Bawor M, Dennis BB, Bhalerao A, Plater C, Worster A, Varenbut M, et al. Sex differences in outcomes of methadone maintenance treatment for opioid use disorder: A systematic review and meta-analysis. CMAJ Open 2015; 3(3): E344-E351.
8. Mattick RP, Breen C, Kimber J, Davoli M. Methadone maintenance therapy versus no opioid replacement therapy for opioid dependence. Cochrane Database Syst Rev 2009; (3): CD002209.
9. Isbell H, Vogel VH. The addiction liability of methadon (amidone, dolophine, 10820) and its use in the treatment of the morphine abstinence syndrome. Am J Psychiatry 1949; 105(12): 909-14.
10. Tran BX, Ohinmaa A, Duong AT, Do NT, Nguyen LT, Nguyen QC, et al. Changes in drug use are associated with health-related quality of life improvements among methadone maintenance patients with HIV/AIDS. Qual Life Res 2012; 21(4): 613-23.
11. Effective medical treatment of opiate addiction. National consensus development panel on effective medical treatment of opiate addiction. JAMA 1998; 280(22): 1936-43.
12. Caplehorn JR, Lumley TS, Irwig L. Staff attitudes and retention of patients in methadone maintenance programs. Drug Alcohol Depend 1998; 52(1): 57-61.
13. Strike CJ, Gnam W, Urbanoski K, Fischer B, Marsh DC, Millson M. Factors predicting 2-year retention in methadone maintenance treatment for opioid dependence. Addict Behav 2005; 30(5): 1025-8.
14. Huedo-Medina TB, Sanchez-Meca J, Marin-Martinez F, Botella J. Assessing heterogeneity in meta-analysis: Q statistic or I2 index? Psychol Methods 2006; 11(2): 193-206.
15. Egger M, Davey Smith G, Schneider M, Minder C. Bias in meta-analysis detected by a simple, graphical test. BMJ 1997; 315(7109): 629-34.
16. Horyniak D, Dietze P, Larance B, Winstock A, Degenhardt L. The prevalence and correlates of buprenorphine inhalation amongst opioid substitution treatment (OST) clients in Australia. Int J Drug Policy 2011; 22(2): 167-71.
17. Johnson B, Richert T. Diversion of methadone and buprenorphine by patients in opioid substitution treatment in Sweden: Prevalence estimates and risk factors. Int J Drug Policy 2015; 26(2): 183-90.
18. Bachireddy C, Bazazi AR, Kavasery R, Govindasamy S, Kamarulzaman A, Altice FL. Attitudes toward opioid substitution therapy and pre-incarceration HIV transmission behaviors among HIV-infected prisoners in Malaysia: Implications for secondary prevention. Drug Alcohol Depend 2011; 116(1-3): 151-7.
19. Roux P, Carriere MP, Cohen J, Ravaux I, Poizot-Martin I, Dellamonica P, et al. Retention in opioid substitution treatment: A major predictor of long-term virological success for HIV-infected injection drug users receiving antiretroviral treatment. Clin Infect Dis 2009; 49(9): 1433-40.
20. Burns L, Gisev N, Lanney S, Dobkins T, Gibson A, Kimber J, et al. A longitudinal comparison of retention in buprenorphine and methadone treatment

**Acknowledgements**

The authors are greatly thankful to Roya Vafaemehr for her help with the English language version of this paper. Furthermore, we should like to thank Shayan Mostafaei who helped us in this study.

http://ahj.kmu.ac.ir, 5 January
for opioid dependence in New South Wales, Australia. Addiction 2015; 110(4): 646-55.

21. Roux P, Carrié MP, Villes V, Dellamonica P, Poizot-Martin I, Ravaux I, et al. The impact of methadone or buprenorphine treatment and ongoing injection on highly active antiretroviral therapy (HAART) adherence: Evidence from the MANIF2000 cohort study. Addiction 2008; 103(11): 1828-36.

22. Hosztafi S, Furst Z. Therapy in heroin addiction. Neuropsychopharmacol Hung 2014; 16(3): 127-40.

23. Wei X, Wang L, Wang X, Li J, Li H, Jia W. A study of 6-year retention in methadone maintenance treatment among opioid-dependent patients in Xi'an. J Addict Med 2013; 7(5): 342-8.

24. Kimber J, Larney S, Hickman M, Randall D, Degenhardt L. Mortality risk of opioid substitution therapy with methadone versus buprenorphine: A retrospective cohort study. Lancet Psychiatry 2015; 2(10): 901-8.

25. Van Nguyen H, Nguyen HL, Mai HT, Le HQ, Tran BX, Hoang CD, et al. Stigmatization among methadone maintenance treatment patients in mountainous areas in northern Vietnam. Harm Reduct J 2017; 14(1): 1.

26. Socias ME, Wood E, Small W, Dong H, Shoveller J, Kerr T, et al. Methadone maintenance therapy and viral suppression among HIV-infected opioid users: The impacts of crack and injection cocaine use. Drug Alcohol Depend 2016; 168: 211-8.

27. Zhou K, Li H, Wei X, Li X, Zhuang G. Medication adherence in patients undergoing methadone maintenance treatment in Xi'an, China. J Addict Med 2017; 11(1): 28-33.

28. Ledberg A. Mortality related to methadone maintenance treatment in Stockholm, Sweden, during 2006-2013. J Subst Abuse Treat 2017; 74: 35-41.

29. Ratcliffe K, Chopra B, Day E. Understanding diversion of prescribed opioid agonist medications in Birmingham, UK-prevalence and predictors of diversion. Heroin Addict Relat Clin Probl 2017; 27-40.

30. Keegan D, Crowley D, Laird E, Van Hout MC. Prevalence and risk factors for Hepatitis C viral infection amongst a cohort of Irish drug users attending a drug treatment centre for Agonist Opioid Treatment (AOT). Heroin Addict Relat Clin Probl 2017; 19(1): 45-55.

31. Peles E, Sason A, Schreiber S, Adelson M. Newborn birth-weight of pregnant women on methadone or buprenorphine maintenance treatment: A national contingency management approach trial. Am J Addict 2017; 26(2): 167-75.

32. Holland R, Maskrey V, Swift L, Notley C, Robinson A, Nagar J, et al. Treatment retention, drug use and social functioning outcomes in those receiving 3 months versus 1 month of supervised opioid maintenance treatment. Results from the Super C randomized controlled trial. Addiction 2014; 109(4): 596-607.

33. Jiao M, Gu J, Xu H, Hao C, Lau JT, Mo P, et al. Resilience associated with mental health problems among methadone maintenance treatment patients in Guangzhou, China. AIDS Care 2017; 29(5): 660-5.

34. Mitchell SG, Gryniewski J, Schwartz RP, Myers CP, O'Grady KE, Olsen YK, et al. Changes in Quality of Life following Buprenorphine Treatment: Relationship with Treatment Retention and Illicit Opioid Use. J Psychoactive Drugs 2015; 47(2): 149-57.

35. Comiskey CM, Snel A. Using client's routine urinalysis records from multiple treatment systems to model five-year opioid substitution treatment outcomes. Subst Use Misuse 2016; 51(4): 498-507.

36. Lee SY, Chen SL, Chang YH, Chen PS, Huang SY, Tzeng NS, et al. Low-dose memantine attenuated methadone dose in opioid-dependent patients: A 12-week double-blind randomized controlled trial. Sci Rep 2015; 5: 10140.

37. Zhang X, Xu H, Gu J, Lau JT, Hao C, Zhao Y, et al. Depression, suicidal ideation, and related factors of methadone maintenance treatment users in Guangzhou, China. AIDS Care 2016; 28(7): 851-6.

38. Darker C, Sweeney B, El Hassan H, Kelly A, O’Connor S, Smyth B, et al. Non-attendance at counselling therapy in cocaine-using methadone-maintained patients: Lessons learnt from an abandoned randomised controlled trial. Ir J Med Sci 2012; 181(4): 483-9.

39. Le Moal M, Kooob GF. Drug addiction: pathways to the disease and pathophysiological perspectives. Eur Neuropsychopharmacol 2007; 17(6-7): 377-93.

40. O’Connor PG. Methods of detoxification and their role in treating patients with opioid dependence. JAMA 2005; 294(8): 961-3.

41. Fareed A, Casarella J, Amar R, Vayalapalli S, Drexlner K. Benefits of retention in methadone maintenance and chronic medical conditions as risk factors for premature death among heroin addicts. J Psychiatr Pract 2009; 15(3): 227-34.

42. Liu J, Dilixiati Y, Li F, Zhang F, Mo L, Jiao L, et al. Cox regression analysis on maintenance duration and affecting factors of methadone maintenance treatment. Chin J AIDS STD 2007; 13(2): 160-1.

43. Peles E, Schreiber S, Adelson M. Factors predicting retention in treatment: 10-year experience of a methadone maintenance treatment (MMT) clinic in Israel. Drug Alcohol Depend 2006; 82(3): 211-7.

44. Liang T, Liu EW, Zhong H, Wang B, Shen LM, Wu ZL. Factors influencing the rate on retention to
methadone maintenance treatment program among heroin addicts in Guizhou, China. Zhonghua Liu Xing Bing Xue Za Zhi 2009; 30(2): 131-5.
45. Lin C, Wu Z, Rou K, Yin W, Wang C, Shoptaw S, et al. Structural-level factors affecting implementation of the methadone maintenance therapy program in China. J Subst Abuse Treat 2010; 38(2): 119-27.
46. Langendam MW, van Brussel GH, Coutinho RA, van Ameijden EJ. Methadone maintenance and cessation of injecting drug use: Results from the Amsterdam Cohort Study. Addiction 2000; 95(4): 591-600.
47. Strang J, Tober G. Methadone matters: Evolving community methadone treatment of opiate addiction. Boca Raton, FL: CRC Press; 2003.
48. Simpson DD. The relation of time spent in drug abuse treatment to posttreatment outcome. Am J Psychiatry 1979; 136(11): 1449-53.
49. Zhang Z, Friedmann PD, Gerstein DR. Does retention matter? Treatment duration and improvement in drug use. Addiction 2003; 98(5): 673-84.
چکیده
مقدمه: مطالعه حاضر به صورت سیستماتیک و فراتحلیل و با هدف ارزیابی عوامل مرتبط با ماندگاری در درمان بیماران تحت درمان با متادون در چهار انجام شد.
روش‌ها: در این پژوهش، مقالاتی از پایگاه‌های اطلاعاتی MEDLINE و Scopus, ISI Web of Science, PubMed و MEDLINE با مطالعه سیستماتیک به صورت سیستماتیک و همچنین به صورت تحلیل خروجی منتشر شده در ژورنالهای انگلیسی به‌کمک نرم‌افزار VESNU انتخاب شد. در این مطالعه تلیفی، به پنج عامل مرتبط مثبت معن‌دار شناخته شد که شامل سن (OR = 0.95 درصد = 95 CI)، اشتغال (OR = 1/157 درصد = 95 CI)، مدت درمان (OR = 1/43 درصد = 95 CI)، جنسیت (OR = 1/1/157 درصد = 95 CI) و وضعیت تاهل (OR = 1/157 درصد = 95 CI) بودند.
نتایج: نتایج تحقیق نشان داد که عوامل مرتبط مثبت معنی‌دار با ماندگاری در درمان بیماران تحت درمان با متادون در مورد بیماران تحت درمان با متادون مؤثر می‌باشد.
واژگان کلیدی: ماندگاری، متادون، عوامل مرتبط، فراتحلیل

ارجاع: فرزانه فرمانی، فرهادی هادی، محمدی یونس، عوامل مرتبط با ماندگاری در درمان بیماران تحت درمان با متادون: یک مور سیستماتیک و فراتحلیل. مجله اعتیاد و سلامت 1395/1/1: 51-55

DOI: http://dx.doi.org/10.22212/ahj.v10i1.488
Published by Vesnu Publication

http://ahj.kmu.ac.ir, 5 January