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ORIGINAL RESEARCH

# Treatment Outcomes in a Specialized Opioid Maintenance Program for Prescription Opioid Use Disorder in Israel

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**Background:** A rapid increase in opioid prescriptions necessitated the implementation of a specific opioid maintenance treatment arm in the Methadone Maintenance Treatment clinic for opioid use disorder (OUD).

**Objective:** To characterize patients referred to this arm, those who initiated treatment and their outcomes.

**Methods:** Individuals referred between November/2019 and June/2025 were included. Patient characteristics, retention, and drug abstinence were studied.

**Results:** Of 184 referrals, 54 (29.3%) were admitted. They had a higher female proportion (50% vs. 32.3%, p=0.03) and more years of education (13.1±3.4 vs. 11.2±3.8, p=0.008) than those not admitted, with no significant age difference (50.5±15.8 vs. 52.0±16.4, p=0.6). Of the 54 admitted patients, 5 were transferred to the "regular" OUD arm. Of the remaining 49, 18.4% were treated with methadone and 40 with oral buprenorphine (21 switched later to a once-monthly injectable formulation). Overall, 42.9% used fentanyl: 44.4% of those on methadone, 42.1% on buprenorphine, and 42.9% on the injectable formulation. Ninety (51.4%) stayed one year; of them, 88.9% stopped prescription opioids. Cumulative retention was longer among females (2.3y, 95% CI: 1.8–2.9) than males (1.2y, 95% CI: 0.8–1.6, p=0.046). Retention among those treated with injectable buprenorphine (2.4y, 95% CI: 1.8–3.0) or methadone (1.7y, 95% CI: 0.9–2.4) was comparable, and both were longer than with oral buprenorphine (0.7y, 95% CI: 0.4–1.0, p<0.001 and p=0.039, respectively).

**Conclusion:** Positive treatment outcomes were observed in this specific population, particularly among those treated with methadone or injectable buprenorphine, but future follow-up and a larger sample are needed. Physicians' education is necessary to achieve more accurate referrals.

**Keywords:** opioid use disorder due to pain prescription, retention, opioid maintenance treatment

## Introduction

The opioid epidemic in the United States represents one of the most pressing public health emergencies of recent decades, with devastating consequences including widespread misuse, dependence, and escalating rates of overdose-related mortality. The crisis has complex origins, tracing back to the early 1990s when the American Pain Society and the International Association for the Study of Pain (IASP) promoted the recognition of pain as the "fifth vital sign".[1] This initiative, intended to improve pain management and patient care, was soon reinforced by the adoption of the same framework by the Joint Commission on Accreditation of Healthcare Organizations.[2]

At the same time, heavily commercialized and often misleading marketing campaigns – most prominently those led by Purdue Pharma – encouraged expansive opioid prescribing practices for non-cancer pain.[3] The convergence of these professional guidelines with aggressive pharmaceutical promotion created an environment in which opioid prescribing surged, setting the stage for widespread dependence and misuse. Physicians across the Western world adopted the "fifth vital sign" paradigm, yet the scale of harm varied considerably. Although opioid-related harms did extend beyond

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U.S. borders, the magnitude of the epidemic has been uniquely severe in the United States, dwarfing the still significant but comparatively less widespread impacts reported in Canada and parts of Europe.[4–7]

In Israel, between 2010 and 2020, use of high-potency opioids (eg, fentanyl) increased nationwide, particularly among younger non-oncology patients.[8,9] This rise in prescriptions has raised concerns about the potential emergence of a local opioid epidemic. During this time frame, reports of opioid use disorder (OUD) did not rise for individuals endorsing opium or heroin use but increased 2-fold for individuals endorsing fentanyl use.[9] Interestingly, unlike in the USA, according to the Ministry of Health's National Register, deaths due to heroin or related to opioid prescriptions decreased in Israel during that period.[10] However, a recent study found in Clalit Health Services data an increase in mortality due to all causes by those with opioid prescriptions in a dose-dependent manner.[11] In response to the rising prescription rates, Clalit Health Services implemented policy changes restricting initiation of high-potency opioid prescriptions. This policy was adopted by the Ministry of Health and expanded to the other HMOs so that fentanyl and other potent opioid ambulatory prescriptions now require approval from regional pain specialists, leading to an immediate decline in newly initiated cases.[12] Automatic renewals have also been blocked and replaced with a mandatory periodic review by a pain specialist. These policy changes have brought about an increase in referrals for opioid agonist maintenance treatments. To anticipate the storm approaching, the establishment of a specific opioid maintenance treatment arm for pain patients in the MMT clinic was carried out.

While maintenance treatment for all individuals with OUD is generally the same, specific modified guidelines are provided to those admitted through the "pain arm". Pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage;[1] hence, these guidelines must consider the level of pain management, as well as the frequency of drug in urine monitoring, take-home medication privileges, and the preferred type of maintenance medication. The similarities and differences between the "regular" and the "pain" arms are described in the methods.

The characteristics and outcomes of patients entering such treatments, particularly in relation to their pain profiles, remain underexplored. In this exploratory report, we characterize patients referred to this arm, those who initiated treatment, and their preliminary outcomes.

## Materials and Methods

All participants provided written informed consent. The study was approved by the Tel-Aviv Sourasky Medical Center (TASMC) Institutional Review Board (IRB) ("Helsinki Committee" Protocol no. 07–111).

This is an exploratory study that prospectively followed a cohort of referrals to maintenance treatment in a "pain arm". The primary aim was to characterize the proportion and characteristics of patients who were admitted to treatment among all referrals. Among those admitted, the study aimed to characterize treatment outcomes, including retention in treatment after one year, opioid abstinence after one year, and cumulative retention. In addition, preliminary associations between patient characteristics and treatment outcomes were explored.

### Study Population

The MMT Clinic is accredited by the Commission on Accreditation of Rehabilitation Facilities (CARF International) and is part of a large, tertiary university-affiliated medical center. The clinic treats around 300 patients who meet criteria similar to those of the US Federal Regulations for entering methadone treatment (ie, DSM-5 criteria of dependence with multiple self-administrations of heroin per day for at least 1 year, and, in accordance with Israeli Ministry of Health regulations, two institutional detoxification failures). The clinic's characteristics, demographics, and effectiveness (as measured by treatment adherence, specifically retention and substance discontinuation) have been reported elsewhere.[13]

The "pain arm" was initiated in November 2019, and all individuals (n=184) referred to the pain arm are included in the current analyses until June 2025.

### The "Regular" and the "Pain" Arms Protocols - Comparison and Similarity

Most newly admitted patients in the regular arm commonly begin with methadone; however, the first recommended medication for those in the pain arm is buprenorphine. Regular patients in MMT routinely undergo observed urine tests

twice a month throughout their treatment. One of the tests is done unexpectedly, and patients are required to arrive at the clinic within 24 hours hours. In contrast, patients in the pain arm undergo urine testing less frequently, only once a month, when they arrive at the clinic (not summoned), and are not observed.

Regarding take-home dose (THD) privileges, regular patients may receive their first THD after a minimum of three months in MMT with full abstinence (negative urine tests for all substances). To qualify for one-week THD privileges, they must maintain abstinence for an additional six months, and for two-week privileges, they must remain abstinent for two years.[13,14]

For patients in the pain arm, THD eligibility is highly accelerated. They attend the clinic for three consecutive days during the first week of buprenorphine induction, every other day in the second week, twice in the third week, once a week after one month, and once every two weeks thereafter. They may be eligible for the monthly injectable formulation of buprenorphine (Sublocade®) after attending the clinic for 2 months and stabilizing on oral buprenorphine/naloxone (Suboxone®).

Patients from both arms receive THD only if they meet the eligibility criteria, which require the recommendation of the primary counsellor, the assigned clinic physician, and the head nurse. While regular patients must be abstinent for at least 3 months to achieve the first THD privilege in the "pain arm", the eligibility for THD is immediate after the first 3 days of treatment, if the urine screening test shows abstinence. On special and rare occasions, patients may be allowed to use other opioid medications for breakthrough pain during the first weeks. Patients with prescribed benzodiazepine (BDZ) and pregabalin are reevaluated and may be approved, depending on the patients' needs. In case of medicinal cannabis (prescribed for medical indications), the THD is limited, and the patient must attend the clinic twice a week. If urine screening detects cocaine or other street drugs, the patient has most likely been misclassified for the pain arm, and the therapist may consider transfer to the regular arm treatment.

## Urine Toxicology

The "pain arm" patients undergo only once-per-month, non-observed, non-random urine tests. In contrast, regular patients in our MMT clinic undergo repeated observed random urine tests (around 2 per month) throughout the duration of their treatment. Opiates, cocaine metabolite (benzoylecgonine), benzodiazepine, cannabinoids (THC), and methadone metabolite are detected by enzyme immunoassay systems (DRI® and CEDIA®).[15] Fentanyl, OxyContin, Tramadol, Pregabalin, and Methylphenidate are tested by Rapid Test (JusCheck®). These substances are tested at admission to treatment, periodically in all current patients (four times per year), and upon request when suspicion arises. A positive result was defined as at least one positive urine sample for any of the substances listed above.

## Statistical Analyses

Data analyses were performed using SPSS version 29 (IBM SPSS Statistics, Chicago, Illinois). Continuous variables were compared using ANOVA and categorical variables using chi-square or Fisher's Exact Test. Retention was calculated from the first admission to treatment until the patient died, left, or until the end of follow-up (June 2025), using Kaplan-Meier survival analyses (results reported as mean and 95% confidence interval [95% CI]). The Log Rank test was used to assess the statistical significance of the results for the examined variables. The multivariate model (Cox) was not done due to a small sample size and a lack of statistical power.

# Results

## Reasons for Non-Admission to Treatment (Figure 1)

Of the 184 referrals, 54 (29.3%) were admitted to treatment, and 130 were not. The reasons for non-admission are described in Table 1. Specifically, 23.8% for no-show to the preliminary assessment appointment, and 16.2% had technical reasons (three individuals lived far away from the clinic, one asked for home treatment, one refused to come daily during the 3-day induction process (treatment initiation), two could not adhere due to notable cognitive impairment). Opioids had already been discontinued by 8.5%, were not detected in preliminary urine analysis by an additional

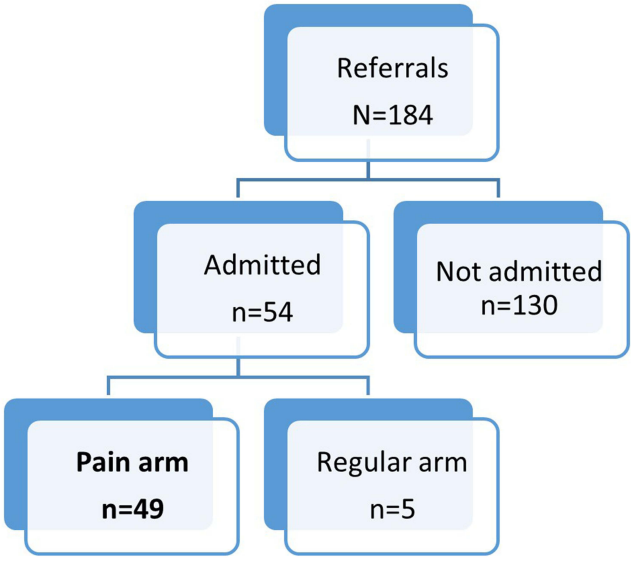


**Figure 1** Patients flow diagram Of the 184 referrals, 130 not admitted and 54 admitted of the 54, 5 refer to the regular arm, leaving 49 in the pain arm. The pain arm marked in bold.

8.5%, or were on very low doses in 1.5%. In 3.1%, the pain problem was unresolved. Some cases (5.4%) needed the regular OUD (MMT) arm as they were using multiple drugs.

## Comparison Between Admitted and Not-Admitted Referral Groups (TABLE 1)

Those who were admitted, as compared to those who were not, did not differ by age (50.5±15.8 vs. 52.0±16.4, p=0.6), nor by duration of opioid use (p=0.7), but those who were admitted had a higher proportion of female (50% vs. 32.3%, p=0.03) and had more years of education (13.1±3.4 vs. 11.2±3.8, p=0.008). Most referrals were by medical facilities (mostly pain clinics (n=58) and family physicians (n=39)), followed by self-referral and addiction facilities. Although no significant difference was observed between those who were admitted and those who were not, the former were referred twice as high by the addiction facility (13.2% vs. 5.1%) (Table 1) (or 14.6% vs. 5.2% if excluding those 5 who were referred to the regular arm). Reason for starting to use opioids was primarily chronic pain, and mostly started following acute pain (accident, injury, and or surgery, mostly orthopedic). Additional causes were cancer (already cured) or chronic diseases. Fibromyalgia and neuropathic pain, for whom opioids are not recommended, were also reported as a reason for having started opioids. Mental disorders were highly prevalent. Specifically, 74.1% of the admitted group, and 40.8% of

**Table 1** Characteristics Comparison Between Admitted and Non-Admitted Groups

| | **Admitted 54 (100%)** | **Not admitted 130 (100%)** | **p value** |
|---|---|---|---|
| **Age***, y | 50.5±15.8 | 52.0±16.4 | 0.6 |
| **Gender** (female) | 27(50.0) | 42(32.3) | 0.03 |
| **Education***, y | 13.1±3.4 | 11.2±3.8 | 0.008 |
| **Opioid usage***, y | 8.2±7.9 | 7.7±6.9 | 0.7 |
| **Referrals** | | | 0.1 |
| Medical facility | 37(69.8) | 98(83.8) | |
| Addiction facility | 7(13.2) | 6(5.1) | |
| Self | 9(17.0) | 13(11.1) | |
| Unknown | 1 | 13 | |

(*Continued*)

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**Table 1** (Continued).

| | Admitted 54 (100%) | Not admitted 130 (100%) | p value |
|---|---|---|---|
| **Reason start usage** | | | 0.4 |
| Chronic pain | 9(16.7) | 11(8.5) | |
| Accident/injury/surgery/orthopedic | 29(53.7) | 76(58.5) | |
| Fibromyalgia | 5(9.3) | 8(6.1) | |
| Neuropathic pain | 2(3.7) | 3(2.3) | |
| Cancer | 4(7.4) | 15(11.5) | |
| Chronic disease | 4(7.4) | 8(6.1) | |
| Stop alcohol/medication | 1(1.8) | 2(1.6) | |
| Unknown | 0 | 7(5.4) | |
| **Mental disorders** | | | |
| Yes | 40(74.1) | 53(40.8) | |
| No | 12(22.2) | 11(8.5) | |
| Unknown | 2(3.7) | 66(50.8) | |
| **Fentanyl use#** | | | 1 |
| Yes | 29(54.7) | 52(55.9) | |
| No | 24(45.3) | 41(44.1) | |
| Unknown | 1 | 37 | |
| **Reasons for Not admitted** | | | |
| Technical reasons | | 21(16.2) | |
| Not arrive | | 31(23.8) | |
| Stopped opioids | | 11(8.5) | |
| Not eligible | | 4(3.1) | |
| No opioids | | 11(8.5) | |
| Psychiatric cause | | 6(4.6) | |
| Unresolved pain | | 4(3.1) | |
| Low dose opioids | | 2(1.5) | |
| Need regular MMT | | 7(5.4) | |
| No OUD | | 2(1.5) | |
| Do not want | | 31(23.8) | |

**Notes**: Bold: subtitles. Chi-square or Fisher's Exact test. *Mean ±S.D. comparison done using ANOVA #self-report or urine detected.

the non-admitted had a mental disorder. However, in 50.8% of the non-admitted group, the mental disorder diagnosis was unknown.

Of the 54 admitted patients, 5 were referred directly to the regular (MMT) arm (as they had a long history of street drug use and only managed to obtain prescription opioids as a substitute).

## Characteristics of Admitted Referrals

Of the remaining 49 individuals, 9 (18.4%) were treated with methadone and 40 with buprenorphine (21 of whom transitioned, after 0.6±0.8 years, to the once-monthly injectable formulation). Fentanyl was reported and/or urine detected by 42.9% of patients overall, independent of medication usage: 44.4% of those on methadone, 42.1% on buprenorphine, and 42.9% on the injectable formulation (p=0.8). Drug abuse in urine at admission is reported in Table 2. Most patients (91.8%) had any opioids at admission, mostly OxyContin 66% (n=31), and fentanyl 29.8% (n=14). The 4 patients with no opioids entered, transferring from a private facility, with only buprenorphine in their urine tests.

Of the 49 patients admitted to treatment, 9(18.4%) had no other mental illness, 15 (30.6%) had depression, 4 (8.2%) had PTSD, 10 (34.7%) had other psychiatric conditions, and 6 (11.6%) had personality disorders. The higher proportion of patients with no other mental illness were treated with the injectable buprenorphine formulation 7(36.8%) compared with 1(6.7%) with oral buprenorphine, or methadone 1(11.1%) (p=0.064).

**Table 2** Substance Abuse at Admission

| | **Total Admitted Patients N=49 (100%)** |
|---|---|
| Drug abuse at admission | |
| Opiates | |
| Yes | 6(12.5) |
| No | 42(87.5) |
| Unknown | 1 |
| Fentanyl | |
| Yes | 14(29.8) |
| No | 33(70.2) |
| Unknown | 2 |
| Oxycontin | |
| Yes | 31(66.0) |
| No | 16(34.0) |
| Unknown | 2 |
| Tramadol | |
| Yes | 9(19.1) |
| No | 38(80.9) |
| Unknown | 2 |
| Pregabalin | |
| Yes | 5(10.6) |
| No | 42(89.4) |
| Unknown | 2 |
| Methylphenidate | |
| Yes | 1(2.1) |
| No | 46(97.9) |
| Unknown | 2 |
| Benzodiazepine | |
| Yes | 18(37.5) |
| No | 30(62.5) |
| Unknown | 1 |
| Amphetamines | |
| Yes | 1(3.4) |
| No | 28(96.6) |
| Unknown | 20 |
| Cannabis | |
| Yes | 12(25) |
| No | 36(75) |
| Unknown | 1 |
| Cocaine | |
| Yes | 1(2.1) |
| No | 47(97.9) |
| Unknown | 1 |
| Any opioids | |
| Yes | 45(91.8) |
| No* | 4(8.2) |

**Note**: *Already with buprenorphine.

## Outcome

One-year retention and drug use of the 37 patients who entered before June 2024 and followed up until June 2025, 19 (51.4%) stayed at least one year. Their drug use after one year is presented in Table 3. Specifically, 88.9% stopped all

**Table 3** Substance Abuse After One year

| | **Total Patients after 1y* N=19 (100%)** |
|---|---|
| Opiates | |
| Yes | 1(5.6) |
| No | 17(94.4) |
| Unknown | 1 |
| Fentanyl | |
| Yes | 1(10.0) |
| No | 9(90.0) |
| Unknown | 9 |
| Oxycontin | |
| Yes | 0(0) |
| No | 10(100) |
| Unknown | 9 |
| Tramadol | |
| Yes | 0(0) |
| No | 10(100) |
| Unknown | 9 |
| Pregabalin | |
| Yes | 1(10.0) |
| No | 9(90.0) |
| Unknown | 9 |
| Methylphenidate | |
| Yes | 0(0) |
| No | 10(100) |
| Unknown | 9 |
| Benzodiazepine | |
| Yes | 2(11.1) |
| No | 16(88.9) |
| Unknown | 1 |
| Amphetamines | |
| Yes | 1(5.3) |
| No | 18(94.7) |
| Cannabis | |
| Yes | 5(27.8) |
| No | 13(72.2) |
| Unknown | 1 |
| Cocaine | |
| Yes | 0(0) |
| No | 18(100) |
| Unknown | 1 |
| | |
| Any opioids | |
| Yes | 2(11.1) |
| No | 16(88.9) |
| Unknown | 1 |
| Any substance | |
| Yes | 8(44.4) |
| No | 10(55.6) |
| Unknown | 1 |

**Note**: * Of those who entered until June 2024.


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opioids, and 55.6% stopped any substance. Cannabis tested positive by 27.8%, and BDZ by 11.1% of the patients after one year.

Long-term retention cumulative retention was longer among females (2.3 years, 95% CI: 1.8–2.9) than males (1.2 years, 95% CI: 0.8–1.6, chi-square 4.0, p=0.046) (Figure 2). Compared to patients treated with oral buprenorphine (0.7 years, 95% CI: 0.4–1.0), cumulative retention was longer in those treated with injectable buprenorphine (2.4 years, 95% CI: 1.8–3.0, chi square 16.5, p<0.001) or methadone (1.7 years, 95% CI: 0.9–2.4, chi square 4.2, p=0.039), with no difference between injectable buprenorphine and methadone (p=0.3) (Figure 3). No other significant differences were found.

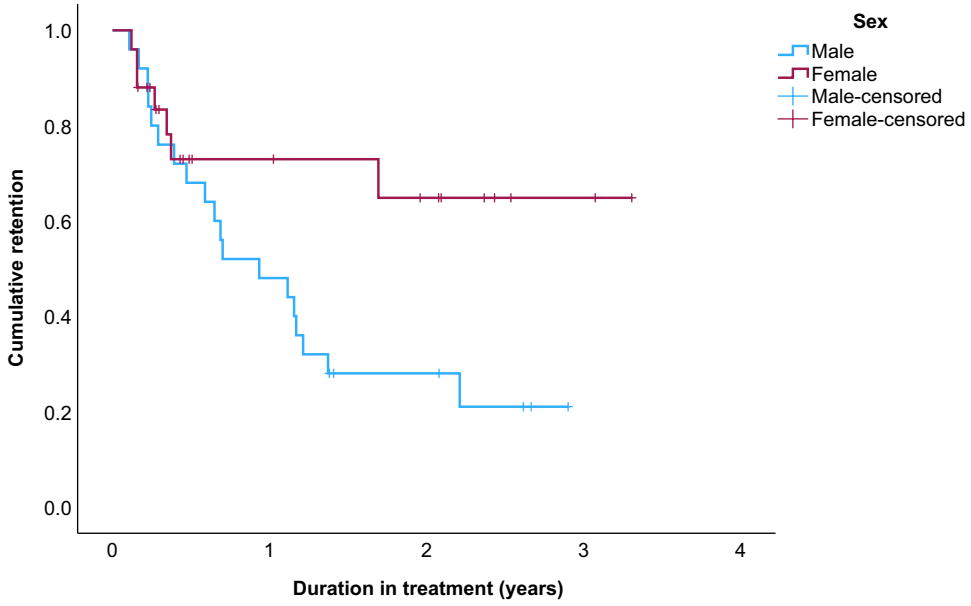


**Figure 2** Cumulative retention by gender (p=0.046).

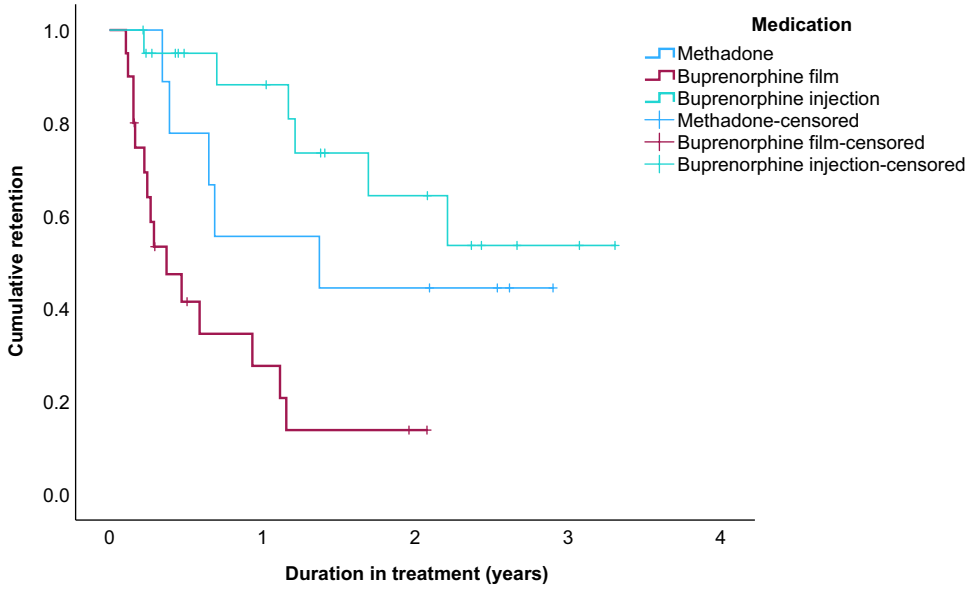


**Figure 3** Cumulative retention by maintenance medication (oral buprenorphine (film) vs. methadone, p=0.039, and vs. injectable buprenorphine, p<0.001).


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## Discussion

Over six years since opening the prescription arm in an MMT clinic in Tel Aviv, Israel, 184 individuals were referred, more than half of them from various medical facilities by different physicians, mainly pain and family. The individuals were in their 50s, and a third were female. They initiated opioids mostly because of chronic pain, which was initiated following an acute event (orthopedic surgery, diverse injuries, and accidents). Their characteristics are reflected by other studies; a cross-sectional study from New York identified that in individuals over the age of 50 Years of prescribing opioids for chronic pain, up to 35% reported misusing their prescription.[16] Older women appear to be at greater risk of problematic prescription opioid use, whereas older men are generally at greater risk of other forms of problematic substance use.[17] Opioids are common in individuals with chronic pain,[18] and particularly in the elderly; approximately 40% of community-dwelling older adults suffer from chronic pain.[19]

A noteworthy finding relates to the patients in this cohort who were originally prescribed opioids for conditions where current clinical guidelines do not recommend long-term opioid therapy. This included chronic non-cancer pain syndromes such as 13 cases with fibromyalgia, of whom 5 entered treatment,[20–23] and 5 neuropathic pains of whom 2 entered treatment,[24,25] as well as other non-malignant pain conditions.[26,27] In several cases, opioid initiation followed acute postoperative pain management; however, treatment was not discontinued after the acute phase resolved, ultimately leading to prolonged use and, years later, opioid dependence. These situations are also related to the ignorance regarding OUD risk among physicians, as was found in a national survey in Israel,[28] and may also be reflected by the low rate of referrals to treatment that were eligible and initiated treatment. Specifically, one hundred and thirty referrals did not start for several reasons among them some may have been mistakenly referred (ie. opioids were successfully discontinued before initiating treatment, some had other medications (eg., benzodiazepines, methylphenidate) but no opioids, others were treated with very low doses that indicated the need for gradual tapering-off and abstinence (not maintenance), and some yet had unresolved relapsing acute pain conditions.

One third of the referrals successfully initiated treatment. They were characterized by a higher female proportion and were more educated, with no other differences compared to the non-admitted group. Individuals who develop opioid use disorder following prescription opioid use may benefit from long half-life opioid maintenance treatments (eg, methadone, buprenorphine), which can reduce overdose risk and opioid-related acute care utilization.[29] For the pain arm, buprenorphine is recommended as a first-line agent over methadone,[30] as is recommended in the older adult population, due to a more favorable safety profile and relative accessibility.[31] Indeed, as recommended, 80% of the admitted patients were medicated with buprenorphine, and half of them achieved the long-acting injectable formulation. However, twenty percent were medicated with methadone (personal request, refused to undergo the three-day induction process, or contraindication).

With respect to outcome, cumulative retention was longer among females than males, and in those treated with methadone or with injectable buprenorphine than those with oral buprenorphine. However, the duration of follow-up and particularly the sample size do not have enough power to control for other covariates. Treatment outcomes by other studies, specifically of individuals with OUD due to prescription opioids only, have not been reported. With respect to studies on the elderly, which may reflect our pain arm, no clinical trial has been done in the elderly population; moreover, the elderly were consistently excluded from trials, but reports of both medications had good retention for elderly participants as well (see review).[32]

In Israel, at a private buprenorphine clinic,[33] between 2005 and 2012, 1,399 individuals were approached, and 87% attended at least two visits. Of those who attended at least twice, the one-year retention rate was 66.5%. However, there is no information regarding how many patients could be classified as belonging to the "pain arm." Other recent reports from Israel[34,35] primarily included regular patients and reported a one-year retention rate of approximately 75% and an opioid discontinuation rate of 69%; however, the majority of patients were treated with methadone.

However, retention in treatment among patients in the "pain arm" requires evaluation using criteria distinct from those applied to individuals with primary OUD treated with methadone or buprenorphine maintenance treatment. For patients with OUD, one-year retention in treatment is widely recognized as a critical quality indicator, as extended engagement is strongly associated with improved outcomes, including lower relapse rates, decreased mortality, and

enhanced quality of life and social functioning.[14,36] For patients whose opioid use originated from chronic pain management, the effectiveness of pain control is a significant outcome, coupled with the ability to achieve reasonable levels of functioning in daily life (vocational activities and activities of daily living) and improvement in overall quality of life.

While most individuals with OUD would benefit from chronic maintenance, and therefore longer retention reflects better outcomes, their proportion among the pain arm population is questionable. Patients admitted to the "pain arm" expressed, from the initial pre-admission stage, their motivation to discontinue opioid use altogether. They were informed that after an initial stabilization period, a gradual tapering off from buprenorphine could be attempted, with the possibility of either successful cessation or continuation on an individualized minimal effective maintenance dose.

In the current cohort, of those who stayed at least one year, 88.9% stopped their prescription opioids, a higher opioid discontinuation than in other studies from Israel.[34,35] Notably, one patient successfully tapered off and discontinued buprenorphine, while maintaining follow-up counseling support for several months thereafter. In comparison, 4 patients successfully tapered off but declined further counseling sessions, with their follow-up limited to telephone contact six months after discontinuation. A longer follow-up is needed to measure successful prolonged abstinence or relapse.

Notice that while cannabis in MMT is around 15%,[37] more than a quarter of the pain arm tested positive to cannabis after one year in treatment, as was at admission (n=12, 25%). The medicinal cannabis that was prescribed for pain is consistently used.

## Limitations

A limitation of the current report is the high proportion of missing data in the non-admitted group, the small sample size, and the missing information of those who "finished" treatment. A bigger cohort and a longer follow-up are needed. The comparison between medications is limited due to the small sample and follow-up, and could not control for several factors (as medication was either self-selected or clinician-assigned, depending on various conditions). Last but not least, we report here on 184 referrals to our facility. Future studies need to assess those referred elsewhere.

## Conclusions

Positive treatment outcomes were observed in this specific population, primarily by their high opioid discontinuation after one year. The longer retention was particularly among those treated with methadone or injectable buprenorphine, but this is a descriptive finding only, as the medication assigned was not randomized. These preliminary findings highlight the need for larger, prospective studies to confirm whether the observed differences in retention by medication type and gender are replicable.

## Data Sharing Statement

Data availability will be given upon personal request from the corresponding author.

## Ethics

The study complies with the Declaration of Helsinki.

## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or all these areas; took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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## Disclosure

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