Analysis of Behavioral Patterns in Five Cohorts of Patients Retained in Methadone Maintenance Programs

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Abstract

Background: Various techniques have been devised to evaluate the effectiveness of long-term methadone maintenance treatment. Traditional comparative analysis of behavior patterns at the time of admission and discharge would be inappropriate, because the majority of patients leave the programs prematurely and under unfavorable circumstances. One approach has been to collect available data on patients who are actively undergoing methadone treatment.

Methods: The sampling population for this study was limited to methadone maintenance patients in New York State who have remained in treatment for 1–6 years. Samples of active patients were drawn from five time-in-treatment cohorts (1–2 years, 2–3 years, 3–4 years, 4–5 years and 5–6 years). A total of 673 patients were included in the study.

Results: All five cohorts experienced significant reductions in the number of patients arrested, the number of patients incarcerated, and the number of days incarcerated per patient. Each cohort also experienced large reductions in arrests per patient and moderate increases in employment-related activities, although current rates of employment are still relatively low. A decreased number of child-protective cases were noted over time for those under treatment, along with higher rates of insurance and self-pay for treatment. The self-pay group, however, remained relatively small. No patterns were detectable in the areas of patient hospitalization or emergency room admissions, although the 5–6 year cohort experienced reductions on all measures.

Conclusions: Some favorable changes in the behavior of patients are associated with long-term methadone treatment.

Key Words: Methadone maintenance, evaluation.

Introduction

The New York State Office of Alcoholism and Substance Abuse Services (OASAS) is responsible for the licensing and/or funding of approximately 1300 treatment programs throughout the state. It monitors the effectiveness of these programs, utilizing a combination of ongoing evaluation systems, treatment outcome studies and analysis of data submitted by programs to the OASAS Client Data System (CDS). Through the data submitted on the admission and discharge forms of the CDS, OASAS obtains demographic and treatment progress information on all patients admitted into the system. In 1997, a report on the impact of alcohol treatment and non-pharmacological treatment for drug abuse was issued (1). It demonstrated the positive change in patient behaviors for those who remained in treatment at least six months prior to discharge (e.g., reduced arrests, reduced incarcerations, reduced emergency room [ER] admissions).

Methadone maintenance is a modality of treatment for those diagnosed with opiate dependence (primarily heroin dependence) of at least one year’s duration. After the patient consumes a clinically adjusted daily dose of methadone hydrochloride, a long-lasting analgesic, a stable opiate metabolic level is produced for 24–36 hours. A clinically adjusted dose is neither intoxicating nor does it impair motor or mental functioning or produce uncomfortable side effects. After beginning a methadone maintenance treatment (MMT) regimen, a heroin addict soon reaches a stable, non-euphoric state. Some individuals may become more amenable to counseling and other social services that can attempt to shift lifestyles away from the previous drug-seeking

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behaviors, including criminality, toward more productive, socially acceptable behaviors, such as furthering education and obtaining employment. In New York State, there are more than 40,000 patients in licensed methadone maintenance programs, of whom nearly 90% currently have been in treatment for six months or longer.

Unlike drug-free treatment programs, methadone maintenance programs encourage most patients to remain in treatment for extended periods, due to persistent physiological changes in brain functioning resulting from chronic use of heroin (2–4). Methadone maintenance acts as a corrective procedure, since changes reappear after methadone is withdrawn. It is known that high heroin relapse rates and death rates occur among those who leave methadone maintenance programs because of noncompliance, or against clinical advice prior to completing 6 months of treatment (5–8). This study collected data by surveying those patients who had been retained in methadone treatment programs.

**Methods**

Utilizing the OASAS CDS, the random sampling procedure available in the SPSS (Statistical Package for the Social Sciences) software package was used to sample 144 cases from each of the following cohorts:

1. Patients in treatment one year or more but less than two years (6,502)
2. Patients in treatment two years or more but less than three years (4,997)
3. Patients in treatment three years or more but less than four years (3,981)
4. Patients in treatment four years or more but less than five years (3,901)
5. Patients in treatment five years or more but less than six years (2,508)

It should be noted that of 12,264 patients discharged from methadone treatment during 1998, 8,531 (67.6%) had been in treatment less than two years; 1130 (9.0%) had been in treatment between 2 and 3 years; 738 (5.8%) had been in treatment between 3 and 4 years; 545 (4.3 %) had been in treatment between 4 and 5 years; and, 350 (2.8%) had been in treatment between 5 and 6 years.

Based on a statistical power analysis, it was determined that surveys of approximately 130 patients in each of the five cohorts would have to be obtained in order for the data to be generalizable to all patients fitting the criteria. A survey form was developed, and program and patient identifying data were inserted onto the forms. Programs in which the selected patients were active were identified, and letters were sent to the directors asking for their participation and requesting that the program designate a staff person to serve as a study liaison to facilitate the completion and return of the surveys. The study required the participation of 107 (out of a total of 126) methadone programs in New York State. All programs agreed to participate.

Once the liaisons were identified, 720 surveys were mailed (for 144 patients in each of the five cohorts). Most programs completed all the required forms promptly. For a few programs, repeated attempts were required in order to get them to comply. Several programs were excluded from the study (34) due to closure of the program or the fact that all patients selected had previously been discharged and were no longer active. Most of these programs had only one patient selected, however, so that only 47 of the original 720 patients were excluded, resulting in an actual sample of 673 patients in 73 programs. After 4.5 months, all completed surveys had been submitted.

Survey questions focused on several key variables believed to be good indicators of patient behavior. Data were collected in the following areas:

1. **Arrests.** The average number of patients arrested in the six months prior to admission, as compared to the six months preceding the survey; the change in the numbers of patients arrested during the comparable periods was then calculated.

2. **Incarceration.** The average number of days incarcerated in the six months prior to admission, as compared to the six months preceding the survey; the change in the numbers of patients incarcerated during the comparable periods was then calculated.

3. **Hospitalization.** The average number of days hospitalized per patient in the six months prior to admission, as compared to the six months preceding the survey; the change in the numbers of patients hospitalized during the comparable periods was then calculated.

4. **Emergency room utilization.** The average number of ER episodes per patient in
the six months prior to admission, as compared to the six months preceding the survey; the change in the numbers of patients with ER episodes during the comparable periods was then calculated.

5. Educational/vocational status. The total number of patients with a high school diploma or G.E.D. at admission and at the time of the survey; and the total number of patients employed, in training, or in school at the same points in time. Work Experience Program (WEP) data were collected on the survey (these data were not available in the admissions data).

6. Method of payment. Mode of patient payment for services at the time of the survey.

7. Child-protective cases. Number of active child-protective cases involving patients at the time of the survey or in the prior six-month period.


For patients in the one-year and two-year cohorts, current behavior, as determined by survey data, was compared to the same behaviors as assessed on the OASAS Client Admission Report. For those patients in treatment longer than three years, data on arrests, incarcerations, hospitalizations and emergency room use in the prior six months were not included in the Client Admission Report. In July 1995, the Client Admission Form, an OASAS standard form used throughout New York State, was modified to include the data on arrests, incarcerations, hospitalizations, and ER use during the prior six months. Because patients in the cohorts that were in treatment three to five years were admitted prior to July 1995, when collection of the information of interest began, it was necessary to devise an alternative method of estimating pre-admission experience for these cohorts. This was accomplished by assuming that the pre-treatment behavioral patterns for patients admitted to treatment prior to July 1995 were the same as for patients admitted subsequently. Based on this assumption, the in-treatment experience of patients in treatment three to five years was compared with the pre-admission experience of all patients admitted during the first year the pertinent data items were collected: that is, July 1995 through June 1996 (n = 4,085). This constitutes a representative admission cohort with respect to the ultimate length of time in treatment (albeit greatly censored at the time of the study). It also includes patients who would eventually have been eligible for inclusion in the longer-term cohorts with which they are being compared.

Results

In total, 673 completed surveys were received. The breakdown by cohort is presented in Table 1. The number of completed surveys ranged from a low of 129 for the one-year cohort to 144 for the two-year cohort. The number of completed surveys in each cohort was sufficient to conduct statistical analysis. The percentages of males and the different ethnic backgrounds of patients varied by cohort, although the actual percentages in the total methadone maintenance population remained very stable. The cohort variability was a function of the relatively small samples selected for analysis. It appears that the effect of excluded data from the original sample on the outcome was minimal, however, due to the relatively small number that were excluded. The age of the patients increased moderately with the length of time in treatment, from 40.4 for the 1–2 year cohort to 43.2 for the 5–6 year cohort.

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Number of Cases</th>
<th>% Males</th>
<th>% Black</th>
<th>% White</th>
<th>% Hispanic</th>
<th>Average Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–2 years in treatment</td>
<td>129</td>
<td>62%</td>
<td>30%</td>
<td>38%</td>
<td>32%</td>
<td>40.4</td>
</tr>
<tr>
<td>2–3 years in treatment</td>
<td>144</td>
<td>67%</td>
<td>25%</td>
<td>36%</td>
<td>38%</td>
<td>41.0</td>
</tr>
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<td>3–5 years in treatment</td>
<td>135</td>
<td>70%</td>
<td>29%</td>
<td>26%</td>
<td>46%</td>
<td>41.0</td>
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<tr>
<td>4–5 years in treatment</td>
<td>134</td>
<td>62%</td>
<td>37%</td>
<td>27%</td>
<td>36%</td>
<td>42.4</td>
</tr>
<tr>
<td>5–6 years in treatment</td>
<td>130</td>
<td>65%</td>
<td>29%</td>
<td>33%</td>
<td>38%</td>
<td>43.2</td>
</tr>
</tbody>
</table>
Arrests

A large majority of patients (80% and above) were not arrested in either period. In the cohorts for which we have both pre and post data, the maximum number of patients arrested is 23, or 19%.

Data suggest that admission into MMT has a favorable impact on the arrest rates for patients that remain at least one year. Although the level of change for the two-year cohort (−59%) is not significant, it is part of a pattern of decreasing arrest rates for the two-year through five-year groups. Significant changes range from −75% for the three-year cohort (from 0.17 per patient to 0.07 per patient) to −89% for the one-year cohort (from 0.47 per patient to 0.05 per patient). The above data are presented in Figs. 1 and 2.

Incarceration

A large majority of patients (84% and above) in all cohorts did not serve any time in prison during either period. In the cohorts for which we have both pre and post data, the maximum number of patients incarcerated is 18, or 15%. Changes in days incarcerated per patient ranged from −88% for the two-year cohort (from an average of 7.6 days of incarceration to an average of 0.9 days of incarceration) to −95% for the five-year cohort (from an average of 9.5 days to an average of 0.5 days).

All five cohorts demonstrated decreased numbers of patients incarcerated in the six-month period prior to the survey. Changes ranged from −52% for the three- and four-year cohorts (both going from 16% or 21 patients incarcerated in the six months prior to admission, to 7% or 10 patients incarcerated in the six months prior to the survey) to −83% for the two-year comparison group (from 15% or 12 patients incarcerated to 4% or 5 patients incarcerated). The above data are presented in Figs. 3 and 4.

Hospitalization

Only a small percentage of patients in either period were hospitalized. For those patients for whom we have both admission and survey data, the maximum number of patients experiencing a hospitalization is 19, or 15%. Thus, a great majority of these patients were not hospitalized during either period.

There is no discernable pattern in the change of the average number of days hospitalized per patient. None of the changes are significant.

Fig. 1. Average number of arrests per methadone patient. *Combined 1–3 year comparison group. p < 0.01 for 1, 3, 4, 5 year cohorts. (New York State Office of Alcoholism and Substance Abuse Services, Bureau of Planning and Evaluation)

Fig. 2. Percentage of methadone patients arrested. *See Fig. 1. p < 0.01 for all cohorts. (New York State Office of Alcoholism and Substance Abuse Services, Bureau of Planning and Evaluation)

Fig. 3. Average number of days incarcerated per methadone patient. *See Fig. 2. (New York State Office of Alcoholism and Substance Abuse Services, Bureau of Planning and Evaluation)
The pre/post change of patients hospitalized from the one-year cohort to the three-year cohort peaks at +83% and then drops until, for the five-year cohort, there is a 25% decrease in the percentage hospitalized (from 9% or 12 patients hospitalized during the six months prior to admission, to 7% or 9 patients hospitalized in the six months prior to the survey). However, since only the change for the three-year cohort reached significance, it is difficult to determine if this is a valid pattern.

Emergency Room Episodes

An examination of the data reveals that a large majority of patients did not use the ER. Among those patients for whom we have admission or survey data, the maximum is 16%. There is no particular pattern of changes in the average number of ER episodes from the six months prior to admission to the six months prior to the survey. In addition, none of the changes are statistically significant. The data on the number of patients using ERs displays the same lack of consistent patterns and statistical significance. However, for both measures, the five-year cohort experiences a reduction in the average number of ER episodes per patient and total number of patients using ERs. This is consistent with the findings for hospitalizations.

Educational/Vocational Status

In all cohorts other than the first, some patients appeared to “lose” educational achievement. In two cohorts (two-year and four-year), the percent losing was nearly as great as those gaining. In the five-year cohort, the number losing was more than four times that of those gaining. The “loss” of educational status can probably be attributed to inaccurate patient reporting at admission (e.g., patients saying that they completed high school when in fact they had not) or poor data recording.

The number of patients employed, in training or in school at admission and at the time of the survey were compared (see Fig. 5). All five cohorts demonstrated increases; only the increases for the three-to-five-year cohorts were significant. Admission rates ranged from 17% (four-year cohort) to 31% (two-year cohort). Survey rates ranged from 32% (one-year cohort) to 39% (two-year and five-year cohorts). Increases ranged from 6.4% for the one-year cohort to 18.3% for the four-year cohort. For the latter, the rate more than doubled (from 16.7% to 35%).

Relatively small percentages of patients in each of the five cohorts are currently in WEP, operated by county social services offices. Values ranged from 3% for the four-year cohort to 9.6% for the two-year cohort. At this time, there is no way of knowing whether these percentages represent the numbers of patients in each cohort actually screened, the number found eligible for WEP, or some other factors.

Method of Payment

The percent of patients self-paying or paying through insurance shows an increasing trend from a low of 16.3% for the one-year cohort to a high of 26.4% for the five-year cohort. Likewise, the percent of patients having governmental support pay for their
treatment displays decreasing trends from a high of 79.8% for the one-year cohort to 72.8% for the five-year cohort. Those patients with no source of payment (essentially treatment paid for by OASAS Local Services funds) display similar decreases, from a high of 3.9% for the one-year cohort to a low of 0.8% for the five-year cohort (see Table 2).

**Child Protective Cases**

The one-year cohort has a low level of child-protective cases (3.1%), with the rate peaking at 6.9% in the two-year cohort. Thereafter, the rate generally decreases back to the one-year cohort level.

**Current Living Arrangements**

All cohorts demonstrated slight, but non-significant increases in the percent of clients living alone at the time of the survey.

**Discussion**

This report describes the analysis of patient data submitted by methadone maintenance treatment programs (MMTPs) to the OASAS Client Data System. The data are based on patient self-report. Although an experimental design was not employed and a control group was not utilized, the data presented in this report convincingly demonstrate the effectiveness of methadone programs in reducing the negative consequences associated with the illegal use of opiates. The data also support the findings that long-term, uninterrupted MMT produces the best outcomes (9). Although the confirmation of long-term longitudinal outcomes of individual patients will have to await the results of the OASAS Treatment Outcome Study and its Treatment Outcomes Prospective Studies (TOPS) II Study, the positive patient status found in this study bodes well for such findings.

The findings of this study are consistent with other research that has been conducted. Research on the impact of drug and alcohol treatment on criminal activity reveals significant decreases at follow-up (10, 11). Almost all such studies demonstrate that the number of criminal activities of patients that remain in MMT is significantly lower than that for those who leave treatment (9). OASAS' expectation is that patients who remain in treatment would experience a decrease in their involvement with the criminal justice system. The examination of patient arrests was one way of measuring this involvement. Although the number of arrests can be impacted by factors other than criminal activity by the patient (e.g., variations in local police reporting regarding drug use in their community), it is one of the standard measures used in assessing the impact of drug and alcohol treatment. The findings demonstrate that patients who remain in methadone treatment for at least one year experience fewer arrests. Those who stay two years appear to experience decreases to a smaller degree. However, significant decreases continue to be demonstrated for those who have remained in treatment for between three and five years.

Along with arrest data, time spent in jail or incarceration is a commonly used measure of patient criminal justice involvement. The large reductions found in the percentages of patients incarcerated and the number of days of incarceration further demonstrate the effectiveness of long-term MMT in decreasing patient involvement with the criminal justice system.

Assessing the impact of drug and alcohol treatment on patient use of medical or

<table>
<thead>
<tr>
<th>Cohort</th>
<th>n (%) of patients with self or insurance payment</th>
<th>n (%) of patients with government support</th>
<th>n (%) of patients with no source of payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year</td>
<td>21 (16.3%)</td>
<td>103 (79.8%)</td>
<td>5 (3.9%)</td>
</tr>
<tr>
<td>2 years</td>
<td>37 (25.7%)</td>
<td>105 (72.9%)</td>
<td>2 (1.4%)</td>
</tr>
<tr>
<td>3 years</td>
<td>26 (19.3%)</td>
<td>102 (79.2%)</td>
<td>2 (1.5%)</td>
</tr>
<tr>
<td>4 years</td>
<td>29 (21.6%)</td>
<td>103 (76.9%)</td>
<td>2 (1.5%)</td>
</tr>
<tr>
<td>5 years</td>
<td>34 (26.4%)</td>
<td>94 (72.8%)</td>
<td>1 (0.8%)</td>
</tr>
</tbody>
</table>

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*OASAS Evaluation Systems: Methadone Maintenance*

*December 1998*

*Method of Payment*
psychiatric hospital (inpatient) services is a complex task. Many patients admitted into treatment for drug and alcohol abuse have been preoccupied with the acquisition and use of these substances. They are very likely to have neglected their physical health needs for extensive periods of time. Many had neither private insurance coverage nor Medicaid prior to admission to an MMTP. The primary problem that medical hospitalizations in the six months prior to treatment might reflect would be extreme situations brought on by extended neglect. This is particularly true for MMTP patients. These patients are primarily heroin injectors who present with a host of significant health problems and diseases, including sexually transmitted diseases, tuberculosis, hepatitis C and AIDS. In addition, many psychiatric symptoms are often masked by substance use or are misinterpreted as symptoms of use. As a result of both of these factors, patient utilization of hospital care may be relatively low in the six months prior to treatment. Upon treatment admission, methadone programs are required to provide patients with a physical examination. This increased attention to patient physical health may reveal serious medical problems that require hospitalization. Patient discontinuation of drug/alcohol use upon treatment admission may reveal or exacerbate serious existing mental health problems requiring psychiatric hospitalization. Thus, though seemingly counterintuitive, it is possible that patients may demonstrate increased use of hospitalization after they have been admitted to MMT. The expectation, however, is still that the longer the patient remains in treatment, the greater the long-term reduction in the use of hospitalization. The impact of MMT on hospitalizations is unclear based on the data found in this study. However, it appears that by the fifth year of treatment, there is a reduction in the percentage of patients hospitalized and the number of days spent in hospitals.

Inappropriate use of ERs is a major contributor to the spiraling costs of health care. Many persons without a family physician use the ER as a substitute for primary medical care. In addition, many persons with family physicians or access to a medical clinic may use an ER in the evenings or on weekends when the presenting medical condition is not critical. One of the goals of managed care is to reduce the inappropriate use of ERs, thereby reducing health-care costs. Although the findings regarding ER usage are consistent with those for hospitalizations, it is not clear whether this trend is real or due to chance.

Although there will always be a certain percentage of patients who, due to various psychological, physical or sociological factors, will remain “unemployable,” the majority of patients, given the appropriate level of education and training, can become gainfully employed. The long-term success of any treatment is in many ways dependent on such achievements. The “loss” of educational status apparent in a majority of cohort groups in this study can probably be attributed to inaccurate patient reporting at admission (e.g., patients saying they had completed high school when in fact they had not) or poor data recording. Given OASAS’ increased emphasis on improving the quality of data reporting over the last three years, the fact that most problems occurred with the five-year cohort and none with the one-year cohort, suggests that poor reporting may have been the dominant factor. At this time, there is no way of knowing whether the percentages reported for patients in WEP represent the numbers actually screened in each cohort, the number found eligible, or some other factors. The educational and employment data generally demonstrate improved patient status for those remaining in treatment for one to five years. However, the overall percentage of those employed is quite modest and suggests that methadone programs must place increased emphasis on these areas in order to obtain greater gains.

It is generally assumed that, as patients become rehabilitated, a change in their method of payment for treatment services will occur. The pattern expected is a decrease in payment by governmental support services — e.g., Social Security Insurance (SSI), Temporary Assistance for Needy Families (TANF), Safety Net — and an increase in self-payment and payment by insurance companies. TANF and Safety Net were created by the NY State legislature in 1997, replacing the prior welfare system. The data collected show the same modest positive trends demonstrated by the employment data. This is not surprising, since the two are closely linked. Unless patients become employed, there is no reason to expect an increase in their ability to pay for treatment themselves or through private insurance. Therefore, larger decreases in government support can only be expected if increased emphasis is placed on educational and employment-related services.
Some patients enter treatment in anticipation of, or as the result of, a child-protective case. The assumption is that the patient’s use of illegal drugs is contributing to the factors leading to the need for child protection and that drug treatment may contribute to the amelioration of those factors. The results suggest that patients may be entering treatment anticipating child-protective cases that do not actually occur until their second year of treatment. Since patients remaining in treatment begin to improve their behavior and stabilize their lifestyles, one might expect a more positive resolution of their child-protective cases. Thus, the positive impact of treatment might be demonstrated by the return to the low rate of child-protective cases at one year by the four- and five-year cohorts. However, since the cohorts consist of different patients, it cannot be determined whether this pattern would be valid in a longitudinal examination of the same patients. Such a determination would require further study of this specific issue.

A patient’s living arrangements can have a crucial impact on his or her ability to discontinue the use of illegal substances. However, the impact of living arrangements may be either positive or negative. If a client is living with someone who uses illegal substances or abuses alcohol and who is not in treatment, the patient’s ability to successfully rehabilitate may be compromised. Conversely, if the patient is living with someone who does not use illegal drugs or abuse alcohol and who is supportive of attempted rehabilitation, the patient’s chances at successful treatment are greatly enhanced. One of the frequent goals of drug or alcohol treatment is to get the patient to remove himself or herself from a destructive, drug-using living situation. Based on this study, it does not appear, however, that retention in MMT has a meaningful impact on a patient’s living arrangements.

Demographic data did not reveal any unexpected trends. It is interesting to note, however, that the information obtained regarding patient age suggests that most patients who enter treatment in their late thirties remain for longer periods of time.

There were a number of inherent weaknesses in our study. First of all, desirable changes identified pertain only to experiences of patients while in treatment; post-treatment experiences are not addressed. However, since the philosophy of methadone treatment is to keep patients in treatment for long periods, possibly for life, we do not believe that this limitation constitutes a serious flaw.

There is also the issue that patients in treatment for less than a year are excluded from the study. Although this constitutes only about 22% of the in-care population, more than one-half of the patients admitted to methadone treatment are discharged prior to spending a full year in treatment, meaning that a majority of patients who receive any methadone treatment would never be eligible for inclusion in this study. Again, we do not view this as a serious weakness. In fact, it was done deliberately, because it was felt that patients in methadone treatment less than one year would not have experienced enough treatment to produce a favorable outcome on the measures used in this study.

Perhaps the greatest weakness of this study is in the limitations of the methodology. Collection of admission data beginning in July 1995 allowed, for the two shorter-term cohorts, statistical analysis to be conducted using methods that took advantage of the fact that we had data points available for the same individuals at both points in time. The absence of some admission data for the three longer-term cohorts, however, meant that for these groups we had to use aggregate admission data as a proxy for what actual admission data would have looked like for the longer-term patients actually in the study. This seems a reasonable assumption, but one that did not have to be made for the shorter-term clients, for whom we had a more complete set of admission data.

The results of this study suggest that many favorable changes in client behavior occur, based on their remaining in MMT. Further research may be needed to more fully establish these relationships over time.

References