



Six- and Twelve-Month Abstinence Rates in Inpatient Alcoholics Treated with Aversion Therapy Compared with Matched Inpatients from a Treatment Registry

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Introduction

Two hundred forty-nine patients who were treated for alcoholism in an inpatient multimodal treatment program that included aversion therapy were matched post hoc on 17 baseline variables with patients from a national treatment outcome registry. The latter patients received inpatient treatment that emphasized individual and group counseling as the primary therapeutic elements but did not include aversion therapy for alcohol. Six- and 12-month abstinence rates from alcohol and all mood-altering chemicals are reported. The patients treated with aversion therapy for alcohol had higher alcohol abstinence rates at 6 and 12 months ($p < 0.01$). The abstinence rates from all mood-altering chemicals were higher in the aversion group at 6 months ($p < 0.05$) but not at 12 months. The largest differences between treatment groups in 6-month alcohol abstinence rates were noted for males ($p < 0.001$), those over 35 ($p < 0.001$), daily drinkers ($p < 0.001$), and those with alcohol-related work performance problems ($p < 0.05$).

Keywords: aversion therapy; alcoholism; treatment outcome; matched groups; database

Evidence for the efficacy of the treatment of alcoholism has been criticized for poor research design.¹ The research that is available has led some to the conclusion that most treatment seems to be better than no treatment, but that methodological problems make it difficult to conclude that any one specific treatment is more effective than any other treatment.² Others have lamented that treatment that research has shown to be effective is often not used, while less proven methods are the most commonly used.³ Recently, attempts have been made to focus attention on how to best match patients to specific treatments.^{4,5}

Research on the efficacy of aversion therapy for alcoholism has been reviewed by Bandura,⁶ Saxe et al.,² McLellan and Childress,⁷ and the AMA Council on Scientific Affairs.⁸ Chemical aversion therapy, in particular, has received the most attention⁹⁻¹³. (Smith J W, Frawley P J, Request for Confirmation, Health Technology Assessment Report, 1987, No. 4; Chemical Aversion Therapy for the Treatment of Alcoholism. Letter to E. Carter, MD, September 23, 1988.) The research on aversion therapy has been criticized for lack of adequate control groups, small size of studies, lack of attention to appropriate research procedures, and other problems. Howard and Jensen¹³ have responded to these criticisms. Aversion therapy has been shown in non-controlled trials to result in high abstinence rates.¹⁴⁻²¹ In two controlled trials, chemical aversion therapy was shown to be associated with improved abstinence measures. However, in the first study²¹ of poor prognosis patients, the control group was criticized for being non-randomly selected and sequentially treated with the possibility that other intervening variables might be having an effect. However, the study *did* show that those patients in the aversion group who became nauseated to the point of vomiting had better outcomes than those who did not. In the second study²² the greater number of days abstinent in the first 6 months in the chemical aversion group reached statistical significance only when the control group and the faradic group (which did worse than the control group) were combined. However, by 12 months there

was no difference in number of days abstinent between the chemical aversion group and the control group. Both were better than the faradic group. The usefulness of this study is also limited due to the small number of patients (seven in each aversion group and six in the control) and the fact that patients had to drink alcohol when it was not associated with an aversive stimulus as part of the research testing. This consumption could interfere with the aversion conditioning.

Baker and Cannon²³ and Cannon et al.²⁴ showed that the pulse response to an alcohol stimulus, a measurable correlate of a conditioned response, is predictive of the length of time to relapse but not of total abstinence per se. Reviews of faradic aversion for alcoholism have, in general, concluded that evidence supporting the efficacy of this modality is weak.⁸ Cannon et al.²² in a very small controlled trial, found patients treated with faradic aversion did worse than controls treated with routine milieu therapy or those treated with chemical aversion. Cannon and Baker²⁵ found evidence of conditioning in patients treated with chemical aversion, but not those treated with faradic aversion. In contrast, Jackson and Smith,²⁰ in a study of Schick Shadel patients, showed that patients receiving faradic aversion did as well as those receiving chemical aversion. However, the two groups were not similar. The faradic patients were significantly older and had more medical disabilities (which was the reason that faradic aversion, rather than chemical aversion, was prescribed.)

Difficulties With Randomized Trials

Randomized studies are considered the ideal way to test hypotheses in clinical medicine and have been carried out in the alcoholism field.²⁶⁻³⁰ However, there are several problems with conducting such trials, especially in the private sector. The percentage of patients appropriate for treatment and willing to be randomized can vary widely. In previous studies, this percentage has reached a high of 57% of those eligible for study and who want detoxification (in the Veterans Administration system where patients may have few choices of providers³¹ and a low of 2% in the private sector (where patients have a great deal more choice).³²

A second, perhaps more important, problem with randomization is the effect of patient self-selection. Miller^{33,34} and Alterman³⁵ have pointed out that patients who are involved in choosing their form of alcoholism treatment do better than those who are assigned to a particular treatment. When patients agree to random assignment to treatment, they may perceive this as giving up the ability to choose treatment. The equivalent abstinence rates for inpatient versus outpatient group therapy treatment in randomized studies have also raised the unproven speculation that it may be more difficult to demonstrate differences in treatment efficacy in those willing to accept randomization, due to the possibility of lower motivation.³⁶ On the other hand, a study by Strohmets et al.⁷⁷ suggested that those accepting randomization were more impaired and more desperate for help than those refusing this procedure. Treatment efficacy itself has, in some studies, been shown to be correlated with the degree of pressure/coercion (a form of motivation) that the patient is under.^{34,37} Finally, it has been our experience that other providers in the private sector have been unwilling to participate in randomized clinical trials. (Kerr D, 1985; Letter to James W. Smith, MD, regarding attempts to get programs to participate in randomized trials.)

Clinical Data Bases Or Registries: An Alternative

Clinical databases or registries are important data banks that can effectively give information about a large number of patients treated in a variety of settings.^{38,39} The usefulness of registries to assess treatment has been reviewed elsewhere.⁴⁰⁻⁴⁴ The principle argument against using registries to assess treatment efficacy is that one may not have taken into account items involved in patient selection of therapies or other variables that are predictive of outcome. When the two or more populations receiving treatment are quite different, when important known objective prognostic variables are missing, when assignment may be made on many unmeasured subjective criteria and when data is entered in an inconsistent manner, then conclusions about the efficacy of a treatment may be erroneous.

The Chemical Abuse/Addiction Treatment Outcome Registry (CATOR) (now named Comprehensive Assessment and Treatment Outcome Research) was developed under the auspices of the Ramsey Clinic in St. Paul, Minnesota. Its history has been reported elsewhere.^{45,46} It provides a standardized history, treatment, and discharge database on

patients entering many different types of facilities and provides a standardized independent telephone follow-up at 6, 12, 18, and 24 months post discharge or until the patient refuses further follow-up or cannot be otherwise contacted. This registry is privately funded by fees for services. Each treatment facility in the registry pays a set fee per patient for the development of the computerized database and the follow-up. A report is sent to each participating facility that compares the patient data from that facility to the average for all the other registry participants. Facilities may then request further detailed analyses of their own programs. CATOR began in 1979 and has undergone several modifications. At the time of this study, CATOR was in its third generation (CATOR III). CATOR was selected by Schick as one forum in which to evaluate the relative effectiveness of its program because of the standardized database and standardized independent follow-up.

CATOR has reported elsewhere on the validity of its responses.⁴⁵ Categorical questions such as whether or not a patient has drunk in a certain time period have patient concordance with significant other reports of over 85%. This concordance rate is in line with other reports.^{47,48} Phone follow-up is used instead of mail follow-up because the contact rate is higher and other registries have noted that more relapses are identified through phone follow-up than through a mailed questionnaire.⁴⁹

The Question Of Better Treatment Versus Better Patients

One of the presumptions that have been repeated often in the literature is that the results of aversion therapy programs may be better because the patients are from a higher socioeconomic class and have higher functioning to start with.^{2,8} In reality, the only study that has specifically compared a private aversion therapy program to a private 30-day group model found that those entering the aversion program had a lower percentage of employed persons than those entering the other program, but a higher percentage of patients over 50 years of age.¹⁶ We, therefore, determined that it would be important to assess the outcome of treatment in matched populations. There are many variables that are believed to influence the ability of the patient to achieve abstinence following treatment. These include demographic variables such as age, marital status, employment status, ethnicity, as well as drug use, psychiatric impairment and previous treatment history.^{36,50} CATOR was able to provide the data base for matching a large number of the Schick patients with patients from other treatment facilities on these seven categories (and 10 others).

This study reports on the abstinence rates at 6 and 12 months post treatment for patients in two treatment groups. One group was treated at Schick with aversion therapy as part of a multimodal treatment program. The comparison group was a matched sample of patients within the CATOR registry. The matched CATOR sample was treated in other facilities that did not use aversion therapy.

Methods

Schick Shadel Treatment Program

Schick Shadel Hospital is one of the oldest hospitals in the United States specializing in the treatment of alcoholism. It has been in continuous operation since 1935. Publications of Voegtlin and Brotz¹⁴ and Lemere et al.⁵¹ documented the results of this program long before the general acceptance of alcoholism as a disease by the American Medical Association in 1956.

Description of Aversion Treatment Program

Patients are voluntarily admitted to Schick Shadel Hospital. Nearly all patients (87%) have all or part of their care paid for by third party payers. The treatment has been described in detail elsewhere.⁵² Briefly, the program components include detoxification, if indicated, followed by 10 days of a multimodal treatment program that combines five alcohol aversion sessions (either chemical or faradic aversion) that alternate over the 10 days with 5 sodium pentothal interviews. Daily group counseling and drug specific information is provided. Individual counseling and family counseling are also provided. Each patient has an individualized treatment plan and continuing care plan. After completion of the initial 10 days, the patient is discharged and is then scheduled to

return at 1 and 3 months post initial discharge for two 2-day reinforcement treatments that consist of an aversion treatment, a pentothal interview, a counseling session to review the continuing care plan, and participation in group counseling. Patients are also introduced to and prepared for participation in support group activity following discharge.

Data Collection for CATOR

All patients entering treatment at the Schick Shadel Hospital of Seattle from August 1, 1984 through July 31, 1985 had a CATOR initial intake data form completed by the treatment staff. This form gives basic demographic information. Once post detoxification treatment was about to begin, all patients were invited to participate in a systematic follow-up with CATOR. Those who agreed to participate completed a CATOR history form that summarized information about alcohol and drug use, and legal, social, emotional, medical and employment status. At the time of discharge, the hospital staff completed a CATOR discharge form that summarized information on treatment, family participation, and post-discharge referrals.

Description of Other Match Programs

At the time that Schick entered its patients into CATOR III, there were 33 other inpatient facilities in the registry, none of which provided aversion therapy. The inpatient stay for these programs ranged from 3 to 4 weeks and the modality of treatment for most patients consisted principally of modifications of the “Minnesota Model,” with some patients receiving elements of a psychiatric model of care.⁵³⁻⁵⁶ The CATOR database did not record the number of hours of various treatment interventions each patient received. CATOR has reported that the reason for this is that: “Directors of participating programs had concurred that their programs were more similar than dissimilar.”⁴⁵ “All utilize the steps of Alcoholics Anonymous (AA) in the treatment process, and all are based on a model of total abstinence. The facilities utilize certified counselors for most group and individual counseling, with physicians, psychiatrists, and psychologists serving primarily as consultants and resource backup counselors. The typical inpatient program lasts 25 to 28 days during which the patient works on at least the first four steps of AA. Considerable attention is directed also to family and other interpersonal relationships.⁴⁵ Lecture and group sessions are the primary components of the rehabilitative format with the basic subject material presented to patients at most units being virtually identical. Programming may extend up to 12 h per day 7 days a week.³²

Treatment and Follow-up Populations

In the course of the study year, Schick had 754 patients who completed the CATOR intake. The Registry also had intake information on 9832 patients from the combined other facilities.⁵⁷ Some of these patients refused follow-up or left against medical advice prior to day 5 of treatment when consent was requested. Schick had 607 (81%) patients who agreed to be followed up. The combined other facilities in the Registry had 8381 (85%) who agreed to be followed up. The difference in percentages agreeing is statistically significant (χ^2 , 1 df, $p < 0.01$) because of the large numbers of patients in the registry. At 6 months post-treatment, 455 (75%) of the 607 Schick patients were contacted and 7214 (77%) of 9368 patients (number in the Registry at the time of matching who had agreed to follow up) were contacted for the combined other facilities.⁵⁸ These follow-up rate differences are not statistically significant.

The Matching Process and Sample Populations

For each Schick patient, CATOR sought a matching patient from the rest of the registry. There were 17 matching variables—documented at the time of initial inpatient treatment—and the additional requirement of a follow-up at 6 months post-treatment. The matching assured that both the baseline characteristics and the 6-month follow-up rates for the matched populations would be identical. The matching variables and the categories used for matching are summarized in Table 1. The same categories were used in the statistical analysis.

The matching was performed by a computing consultant associated with the CATOR registry (Professional Data Analysts, Minneapolis, MN.) Each of the 17 baseline variables to be matched was converted to a single digit so

TABLE 1 - Distribution of 249 Pairs of Matching Variables

Baseline variable	Category	No	(%)*
Sex	Male	213	86
	Female	36	14
Age	< 24	8	3
	25-34	68	27
	35-44	65	26
	45-54	56	23
	55-64	35	14
	>65	17	7
Marital Status	Single	26	10
	Divorced/separated	26	10
	Married	197	79
Education	< 12 years	39	16
	High school graduate	169	67
	College	41	17
Worked full time in past year	Hasn't worked	52	21
	1-11 months	33	13
	9-12 months	164	66
Performance problem	No	193	78
	Yes	56	22
Missed work	No	202	81
	Yes	47	19
Work problems in past year			
Lost job	No	245	98
	Yes	4	2
Alcohol use pattern	< 1-3 months	11	4
	Weekly	58	23
	Daily	180	72
Marijuana use	≤ 3 per month	224	90
	Weekly/daily	25	10
Cocaine use	< 1 per month	236	95
	≥ 1 per month	13	5
Any prior treatment	None	179	72
	Yes	70	28
Psychiatric hospital in past year	No	249	100
Medicine for psychiatric problems	No	248	99
	Yes	1	1
Last alcohol use	< 1 week	246	99
	1-2 weeks	3	1
Ethnicity	Caucasian	244	98
	Other	5	2
Detoxification admittance	No	237	95
	Yes	12	5

* Percentages may not add up to 100 due to rounding

that what was matched was a string of 17 digits from the Schick group with an identical string from the rest of the Registry. In this process, the missing value variables were merged with the “none” or lowest occurrence category of each match variable, before the match was carried out. This treatment of missing values has had, at most, a small effect on the data. For nine of the match variables, less than 1% of the 498 Schick and CATOR patients had missing values. For three additional match variables, 5% or fewer of the patients had missing values. For the last five match variables, from 8 to 19% of the patients had missing values. However, for each of these five variables, the “none” or lowest occurrence category with which missing values were merged included the vast majority of patients, minimizing the influence of patients with missing data. The five variables and their percent missing are: work performance problems (8%), marijuana use (10%), cocaine use (10%) missed work (14%), and lost job (19%). Both the Schick and match data were subject to the same treatment of missing values and both had close to 2% missing values on all 17 match items pooled across all patients. Except for the missing values, both groups were perfectly matched on all 17 variables.

A review of other recorded baseline variables not used for the matching process shows that the patients were very similar in many other respects such as: drug use other than marijuana or cocaine, employment category, medical care in past year, complaints about emotional symptoms in the past year, or legal problems in the past year. None of the minor differences between the Schick and matched populations on these measures were statistically significant at the $p < 0.05$ level.

These results support the adequacy of the matching process and reflect a homogeneity of the two populations in terms of prospectively measured bio-psycho-social factors (such as socioeconomic status, alcohol pattern, complications and treatment efforts, drug history, and severity of psychiatric dysfunction) likely to influence response to treatment for chemical dependency.

Both Schick and match groups had 249 patients with 6 months follow-up. At 12 months 207 (83%) Schick and 205 (82%) match patients could be followed-up. At 18 months 193 (78%) Schick, but only 167 (67%) match patients, had follow-up data (χ^2 , 1 df, $p < 0.05$). At 24 months, 189 (76%) Schick, but only 142 (57%) match patients, had follow-up data (χ^2 , 1 df, $p < 0.001$).

At the time that the matching process was requested, 18- and 24-month follow-up data was not yet due to be collected on certain patients in the match group because they had entered into the database up to a year and a half later than the last of the Schick group. However, to have excluded this group would have decreased the number of possible matches. Because of the significantly lower follow-up rates in the matched samples at 18 months ($p < 0.05$) and 24 months ($p < 0.001$) post-treatment, we decided to focus the analysis on the results of the 6- and 12-month follow-up times.

Focus on Abstinence as the Dependent Variable

Abstinence from alcohol is the most important outcome measure to assess efficacy of alcoholism treatment and is the single best correlate with improvements in other life areas.⁵⁹⁻⁶² Abstinence from all other mood-altering chemicals is also generally accepted as a primary goal of treatment.³⁶ While CATOR does assess outcome multi-dimensionally, the focus of this study was to assess abstinence from alcohol and all mood-altering chemicals.⁵³ Abstinence is defined as *total continuous* abstinence during the time interval specified (e.g., 0-6 months or 7-12 months). It should be noted that it is, therefore, possible (and, in fact, it did happen) that the abstinence rate in the second 6-month study period could be higher than in the first 6-month period. The “one-year abstinence” (0-12 months) data reported required complete abstinence in both the 0 to 6 months and the 7 to 12 months time periods.

Statistical Analysis

The statistical analyses consisted of cross-tabulations and determination of statistical significance (p values) based on χ^2 . Yates correction was used for analyses with 1 df. A p value of 0.05 or less was used to denote statistical

TABLE 2 - Percent Abstinence from Alcohol During Specified Follow-Up Periods

Follow-up period	Schick (%)	Match (%)	95% Confidence interval		p Value (χ^2 , 1 df)
			Schick	Match	
0-6 months	85	72	5-20		0.01
7-12 months	86	74	3-19		0.01
0-12 months	79	67	3-20		0.05

TABLE 3 - Percent abstinence from All Mood-Altering Chemicals During Specified Follow-Up Periods

Follow-up period	Schick (%)	Match (%)	95% Confidence interval		p Value (χ^2 , 1 df)
			Schick	Match	
0-6 months	79	70	2-17		0.05
7-12 months	77	73	-4-12		NS*
0-12 months	69	65	-6-12		NS

* NS, not significant

significance. In the analysis of Table 5 where Schick and match abstinence rates were compared for 29 different categories, a modified procedure was used to take account of the multiple hypothesis tests. The nominal level of significance of 0.05 was divided by 29 so that a conservative level of 0.0017 was used to denote statistical significance.⁷⁶ In Table 2 and Table 3, which summarize the main findings of the paper, 95% confidence intervals were calculated for the difference in abstinence rates between the two treatment groups for all mood-altering chemicals and for alcohol specifically. The confidence intervals were calculated as recommended by Simon.⁶³

Results

Dropouts from the 6-Month to the 12-Month Follow-Up

Forty-two (42) patients from Schick and 44 patients from the matched group were lost to follow-up at the 12-month follow-up point. There was no statistically significant difference in rate of abstinence at 6 months between these two “drop-out” groups. Among the “drop-outs,” abstinence from all mood-altering chemicals at 6 months was reported in 59.5% of the Schick patients and 54.5% of the match patients. Abstinence from alcohol was reported in 66.7% of Schick patients and 59.1% of match patients. These 6-month abstinence rates were lower than those who did not drop out and were later followed-up at 12 months. For the Schick group those who did not drop out had 83% abstinence from all chemicals (χ^2 , 1 df, $p < 0.01$ when compared with Schick dropouts) and 89% abstinence from alcohol (χ^2 , 1 df, $p < 0.001$ when compared with Schick dropouts) at 6 months. For the match group, those who did not drop out had 73% abstinence from all chemicals (χ^2 , 1 df, $p < 0.05$ when compared with match dropouts) and 75% abstinence from alcohol (χ^2 , 1 df, $p = NS$ when compared with match dropouts) at 6 months.

Table 2 summarizes the abstinence rate from alcohol. These results show that the Schick group had significantly higher levels of total abstinence from alcohol than the match group for each 6-month interval and throughout the entire 1st year.

Table 3 summarizes the rates of abstinence from all mood-altering chemicals. Schick did not use aversion therapy for any drugs other than alcohol. Instead, education, counseling, and support modalities were used at Schick to treat other drug dependency or use. These results demonstrate a significantly higher rate of total abstinence from all mood-altering drugs in the first 6 months in the Schick group than in the match group. In the second 6 months and the pooled 12 months, the Schick Group also had a higher abstinence rate but it was not statistically significant.

TABLE 4 - Pattern of Alcohol Relapse

	Schick	Match
0-6 Months		
Total (N)	100% (248)	100% (248)
Abstained	85%	72%
< 1 time per month	4%	8%
≥ 1 per month	11%	20%
(χ^2 , 2 df)	p < 0.01	
7-12 Months		
Total (N)	100% (207)	100% (205)
Abstained	86%	74%
< 1 time per month	3%	6%
≥ 1 per month	11%	20%
(χ^2 , 2 df)	p < 0.05	

Pattern of Alcohol Relapse

The pattern of alcohol relapse can also be reviewed for the 0 to 6 and 7 to 12 months time period. During the follow-up, if a patient has used alcohol, he/she is asked to characterize the frequency with which alcohol has been used during the follow-up period. Table 4 shows these results. These results show that the improved total abstinence rates noted for alcohol at Schick are reflected in a greater percentage of patients from the match group in each of the relapse categories. Hence the percentage of both “brief” (less than one time per month) and “serious” (more than one time per month) relapses are increased in the match group.

Baseline Patient Characteristics Predictions of Outcome

In order to determine whether certain sub-populations would respond better to one treatment method than another, we evaluated outcome according to categories of the 17 baseline variables used for patient matching.

When the predictive value of a single variable on abstinence was examined, all 16 other variables were still matched since all patients had been matched one-to-one on each of 17 variables. Each of the subcategories of the 17 variables listed in Table 1 was evaluated for significant differences in outcome between the Schick and match patients. Seven variables were omitted from this analysis because over 95% of patients were in only one category, resulting in small cells for comparison. The results for the 10 remaining variables are reported in Table 5.

Table 5 includes 29 comparisons (not all independent) of abstinence rates from all mood-altering chemicals and alcohol specifically across categories of 10 variables. On the average, Schick all-chemical abstinence at 6 months was 9% higher than the match rate and alcohol abstinence was 13% higher (Tables 2 and 3). Large departures from these differences indicate categories of patients where aversion therapy may be especially appropriate, or conversely, where it has little edge over the “Minnesota model.” Statistical significance for this table is reserved for p values <0.001, because of the use of 29 comparisons. For either “all chemicals abstinence” or “alcohol abstinence,” Schick has a notably higher success rate than average in the following categories (all of which have substantial numbers of patients): (1) older persons (age 35-64), (2) college graduates (all chemicals), (3) people who are not-working (alcohol) or those working 12 months (all chemicals), (4) persons with work performance problems, or problems missing work (all chemicals), (5) people with a daily drinking pattern.

It should be noted that the differences noted above do not all reach statistical significance. The Schick-match differential in abstinence rates is smaller than average among: (1) females, (2) persons under 35, (3) persons with a part-time work pattern, and (4) weekly drinkers.

TABLE 5 - Abstinence Rates (%) at 6-Month Follow-Up by Categories of Matching Variables

Variable	# Pairs	Total abstinence All chemicals			Total abstinence Alcohol		
		Schick (%)	Match (%)	p Value*	Schick (%)	Match (%)	p Value*
Sex							
Male	213	79	68		85	70	0.001
Female	36	81	83		86	86	
Age							
10-24	8	63	63		75	63	
25-34	68	63	68		75	69	
35-44	65	84	72		91	77	
45-54	56	85	73		86	73	
55-64	35	97	71		97	74	
65+	17	77	65		76	65	
35-64	156	88	72		90	74	0.001
Marital							
Single	26	62	54		73	61	
Divorced/separated	26	85	77		89	77	
Married	197	81	72		86	73	
Education							
<High School	39	80	69		80	69	
High school graduate	169	79	71		85	73	
College Graduate	41	83	68		88	73	
Work FT							
0 Months	52	81	71		87	71	
1-11 Months	33	70	76		76	79	
12 Months	164	81	69		86	71	
Perf. Problem							
No	193	79	75		85	76	
Yes	56	80	55		84	60	
Miss Work							
No	202	82	73		87	74	
Yes	47	70	57		77	63	
Marijuana							
<1-3/month	224	83	72		86	73	0.001
Weekly/daily	25	52	56		72	64	
Prior Tx							
No	179	81	73		87	74	
Yes	70	76	64		79	67	
Alc Pattern							
<1-3/month	11	91	64		100	64	
Weekly	58	79	90		85	90	
Daily	180	79	64		84	67	0.001

* For each comparison of rates between Schick and Match, $\chi^2, 1$ df, $p > 0.001$ unless noted

TABLE 6 - Reinforcement Utilization and Percent Abstinence in the Schick Group

	0-6 Months Abstinence			0-12 Months Abstinence		
	All Chem Alcohol			All Chem Alcohol		
	N	Chem. (%)	Alcohol (%)	N	Chem. (%)	Alcohol (%)
0 Reinforcements	24	67	67	16	47	47
1 Reinforcement	45	53	64	30	47	60
2 Reinforcements	178	88	92	159	75	86
Total	247			205		
p Value*		0.00001	0.00001		0.001	0.0001

* Statistical significance of number of reinforcements by abstinence rate, χ^2 , 2 df

TABLE 7 - Association of Pattern of AA Participation in the First 6 Months and Abstinence from All Mood-Altering Chemicals During First and Second 6 Months Following Treatment

AA Attendance	0-6 Months Abstinence		7-12 Months Abstinence	
	Schick % (N)	Match % (N)	Schick % (N)	Match % (N)
In first 6 months				
None	79 (193)	51 (72)	77(162)	54 (54)
1-Several/month	83 (18)	75 (38)	67 (12)	79 (28)
Weekly	79 (38)	80 (138)	84(31)	81 (122)
p Value*	NS†	0.001	NS	0.001

* p Values for a difference in abstinence rates by category of AA participation within each patient group, χ^2 , 2 df.
NS, not significant.

For other categories not mentioned, Schick has an average increase in abstinence rates compared with the match group. All subgroups for which there was a significant difference favored Schick over match, none the reverse.

Post-Treatment Compliance with Therapeutic Recommendations

Scheduled Reinforcements. The Schick program emphasizes the importance of the patient taking at least two reinforcement treatments; the first at approximately 1 month after discharge from initial treatment and the second at approximately 3 months. Table 6 shows the level of compliance with these recommendations in the Schick sample as well as the association between reinforcement usage and abstinence from all chemicals.

The data in Table 6 support two points. First, the majority of the patients complied with the recommendation of two reinforcement treatments. Second, a dramatic increase in abstinence rates following treatment is associated with the usage of two reinforcement treatments.

Use of Alcoholics Anonymous and Other Support

During the first 6 months after treatment, match patients used more AA (71% participation) and other support (40% participation) than Schick patients (22% and 26% participation, respectively.) Abstinence rates increased in the match group with increasing AA usage (χ^2 , 2 df, $p < 0.001$), but not in the Schick group. Table 7 summarizes this information. In the Schick group, those who participated in other support groups (which includes program-sponsored aftercare) during the first 6 months following treatment had a higher 6-month abstinence rate from all chemicals (86%) than those who did not (77%) (χ^2 , 1 df, $p > 0.05$.) In the match group those who used support during the first 6 months after treatment also had higher 6-month abstinence rates from all chemicals (81 %) than those who did not use such support (64%) (χ^2 , 1 df, $p < 0.01$). The gap between Schick and match patients narrowed with increasing AA or other support group usage. These continuing care activities affected the match abstinence rate more than the Schick abstinence rate and probably account for the fact that 91% of match patients received the recommendation to attend AA following discharge.⁵⁷

Discussion

In this study we found that total abstinence from alcohol at both 6- and 12-month follow-ups was significantly higher in patients from a program that used aversion therapy (Schick) when compared with well-matched patients from other programs using variations of the “Minnesota Model.” The patients in the Schick program also had significantly higher abstinence rates from all mood-altering chemicals in the first 6 months following treatment. In the second 6 months, the Schick group continued to have higher total abstinence rates from all mood-altering chemicals, but the difference was not statistically significant.

Counseling, support, and education were the principal modalities of treatment to deal with non-alcohol chemicals in the Schick program as well as the match programs. This may explain the similarity of abstinence from all mood altering chemicals after the first 6 months.

While aversion therapy is the most commonly cited difference between the Schick program and other programs, there may be other factors that could account for the differences in outcome. Interviews from people on sodium pentothal were added to the aversion program at Schick in the 1940s and were found to enhance the outcome of certain patients at that time.⁶⁴⁻⁶⁶ Evidence for the role of aversion alone comes from Wiens et al.¹⁸ and Wiens and Menustik,¹⁹ who reported high abstinence rates in an aversion program that did not use sodium pentothal interviews.

The Schick program also differs from the match programs in not requiring the 12 steps of AA as core elements of the treatment, but rather introduces patients to and encourages the use of self-help programs as ongoing supports to recovery. Patients may use a variety of supports. Some patients use AA, others use Schick-sponsored graduate groups, others use their church and/or other resources. Support (e.g., AA) and treatment (e.g., aversion) are seen as complementing one another, and one does not substitute for the other.

Despite the differences between the Schick program and other inpatient treatment programs, there are also many similarities. Schick has always emphasized the necessity of total abstinence from alcohol for the alcoholic, the disease nature of addiction and the genetic aspects of alcoholism.⁶⁷⁻⁶⁹

Schick patients who completed both reinforcement treatments and patients in the match group who attended some level of AA had better outcomes than those who did not complete these post-treatment recommendations. In the Schick group, the association of fewer reinforcement treatments with lower success rates is partly due to the fact that a patient who relapses may not be eligible for the 2-day reinforcement. The patient may instead be readmitted for a longer period of stay or may simply not return for treatment. However, in a study of patients who maintained abstinence during the first 6 months following treatment for cocaine dependence alone or cocaine and alcohol dependence (6 months is well beyond the 3 months post-discharge time period when reinforcements are taken), abstinence at 18 months was associated with use of both reinforcement treatments during the first 6 months.⁷⁰ In the Schick group, the pattern of AA attendance in the first 6 months did not affect the abstinence rate at 6 or 12 months. However, the timing of a relapse and the use of support were not reported and, therefore a benefit from support might have been obscured by this. However, the lack of association between AA usage in the first 6 months and abstinence in the second 6 months for the Schick group could indicate that this finding is significant. Other studies controlling for the timing for relapse and the use of support have demonstrated in our population an association between AA and other types of support usage and abstinence following treatment.⁷¹

The use of a registry to measure treatment efficacy has been well-reviewed, and the principle limitation is that there are always possible unrecognized important selection factors that may influence results. These factors may more than offset attempts to match patients on known prognostic variables.^{40,43,44} We recognize that difficulty with this study and hope that it will serve to support future randomized studies of treatment efficacy and patient matching to treatment. On the other hand, randomized studies have been difficult to do in the private sector when major therapeutic changes are the choice.³² Some of the problems with randomized trials in behavioral and psychotherapeutic interventions have been reviewed.^{72,77} There are several factors that favor CATOR or a

similar type of registry as a resource to study treatment outcome: standardized collection of data during the initial treatment period, the independence of the follow-up from the provider, the ability to carry out detailed extensive matches as was done in this study and the routine collection of abstinence information as part of follow-up. The data would be even more useful if detailed descriptions of the interventions each patient received could be quantitated in the database. Perhaps, as approaches to the treatment of chemical dependency continue to evolve and individualized treatment planning continues to be stressed, specific treatment information will be perceived as important data to collect for each individual.

This study evaluated subcategories of each of the baseline variables to assist in answering patient matching questions. For the sample at 6 months follow-up, the Schick program had statistically significant better abstinence from all chemicals ($p \leq 0.05$) and alcohol ($p \leq 0.01$). Some sub-populations had sufficient numbers of patients to allow comparison of Schick and match abstinence rates. The Schick aversion program showed the greatest enhancement of abstinence from all mood-altering chemicals and from alcohol in those over the age of 35, daily drinkers, and those who had work performance problems.

The results of both types of treatment were similar for abstinence from all chemicals and alcohol for females, and those who had worked 1 to 11 months in the year prior to treatment. Weekly drinkers showed a non-significant trend toward better abstinence in the matched group. All subcategories of marital status, education, prior treatment, and whether the patient had missed work in the past year showed superior outcomes at Schick.

Finally, it should be noted that there were no aversion therapy programs located in the areas where the matched programs were located. Thus, patients who might have selected an aversion program in these areas did not have one available to them. On the other hand, there are several treatment facilities in the Seattle area that offer treatment similar to the match programs. Hence, patients entering Schick had both choices available to them.

These findings reinforce the fact that inpatient treatment refers only to a setting, not a treatment program. Miller and Hester⁷³ have challenged the treatment field to justify the inpatient setting for the treatment of alcoholism after determining that most studies show no difference in drinking outcome between treatments that consisted of counseling provided in an inpatient setting and counseling provided in other settings. Wallace³⁶ and Nace⁷⁴ have challenged these findings, but there has been little new data to support the superiority of inpatient counseling programs over outpatient ones in controlled studies. This study provides data on a large number of patients. While one cannot unequivocally conclude from this study that the addition of aversion to a multimodal inpatient program was the reason for the improved outcomes in the Schick population, the results are consistent with this hypothesis. Gordis et al.⁷⁵ have suggested that effective programs for dealing with alcoholism and alcohol problems should include a combination of reducing individual appetite and effective social policy. Improved abstinence with aversion is one way to demonstrate effective reduction of individual appetite. Ideally, these findings should be replicated as part of a randomized trial so that the role of aversion therapy vis-a-vis important unmeasured patient characteristics and other treatment components, including, agency treatment philosophy, can be more clearly delineated.

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