New Treatment Success for Opioid Detox

Introduction:

Opioids are substances that bind to opioid receptors and relieve pain and/or cause a feeling of euphoria. The addiction to opioids is a serious problem and many people suffer complications from detox and routinely need medical treatment in order to relieve the side effects. Clonidine, the non-opioid treatment has been the standard detox medication however, there is new promise with the Buprenorphine/Naloxone (bup-nx). Six community based outpatient detoxification treatment programs participated in the study comparing the effectiveness of Clonidine vs. bup-nx in a short term 13 day trial. Participants were treatment-seeking adults at least 18 years of age in good general health, that met Diagnostic and Statistical Manual version IV (DSM-IV) criteria 2 for opioid dependence, and were in need of medical management for opioid withdrawal.

Using data collected from the outpatient treatment programs it was of interested to test whether or not the probability of treatment success was significantly different in the two treatment groups: bup-nx, and clonidine. In addition, within only the bup-nx treatment group, we are interested in knowing if there is a significant relationship between treatment success and each of the following variables: age, gender, race, marital status, level of education, and employment history.

Methods:

. The community centers determined a successful outcome of those participants who completed the detoxification schedule and provided a urine test that was negative for opioids. Success of the treatment is our outcome variable. Our predictor variables are age (less than 40, or over 40), gender (Male or female), race (white or nonwhite), marital status (married or not married), education level (did not graduate high school or receive a GED, those who did, and

those whose education goes beyond high school/GED) and employment status of the past three years (employed, non employed, other). Demographic variables were collected from a questionnaire provided to the participants before the trial, and were reviewed in order to find

Patients were assigned randomly to bup-nx or clonidine using a 2:1 ratio in favor of bup-nx. Participants were enrolled from January 9, 2001 to February 26, 2002. A total of 229 participants were randomized to the two treatment arms (bup-nx: n= 156, clonidine: n=73). The responses of treatment success (or not) were collected from the community centers**.** The sample is assumed to be representative, measurements taken from the participants in each group are assumed independent of each other, the treatment groups are assumed independent of each other, and the sample size is assumed to be large enough. This data was checked for normality, and by the central limit theorem our sample size is equal to or greater than 30, therefore our sample mean will follow a normal distribution. The proportion of these groups reporting success are summarized with sample proportions, and a 95% confidence interval. The difference in sample proportions is also presented as a 95% confidence intervals on the difference between the two groups. We test the null hypothesis between these two groups that there is no significant difference between success of bup-nx and clonidine (H_O: p1 - p1 = 0) against a two sided alternative hypothesis that the difference in success of bup-nx and Clonidine is significant and is not equal to zero (H_A: p1-p2 ≠ 0) by a two sample z-test, with significance level of a= 0.05. In addition, we will conduct a test of association with a null hypothesis that success in the bup-nx treatment group is unrelated to any of the following variables: age, gender, race, marital status, level of education and employment. While the alternative hypothesis is success of the program is associated with any one of those listed variables. A chi-square test, with 1 degrees of freedom with a significance level of a = 0.05 will be used in order to determine association between success and age, gender, race, marital

status. A chi-square test, with 3 degrees of freedom with a significance level of a = 0.05 will be used in order to determine association between success, and education and employment history. For both tests we will reject the null hypothesis if the p-value is less than a; otherwise we will not reject the null hypothesis. The R statistical software (Version 2.11.1) was used for all statistical analyses.

Results:

Table 1.0 summarizes the demographic characteristic of the participants for this study.The observed proportion of participants who were successful in completing the clonidine treatment (n=73) is 0.055 with a 95% Confidence Interval:0.002585,0.1070. The observed proportion of participants were were successful in the bup-nx treatment (n=156) is 0.2820 with a 95% Confidence Interval: 0.2114,0.3527. With an observed difference in proportions of 0.278.

The data is summarized in the table 2.0 below. The observed difference in proportions of patients who successfully completed the clonidine treatment group is less than the observed proportion of patients who successfully completed the bup-nx treatment group. The two-sided z-test yielded a p-value of 8.24e-05, p-value < 0.05, therefore we reject the null hypothesis in favor of the alternative hypothesis.

Table 1.0: Description of Variables

Variable	Level	BUP-NX	Clonidine	Overall
Age	Younger than 40	79 [74%]	28 [26%]	107 [47%]
	Older than 40	77 [63%]	45 [37%]	122 [53%]
Gender	Male	114 [69%]	51 [31%]	165 [72%]
	Female	42 [66%]	22 [34%]	64 [28%]

Race	White	62 [68%]	29 [32%]	91[40%]
	Not White	94 [68%]	44[32%]	138 [60%]
Marital Status	Married	29 [81%]	7 [19%]	36 [16%]
	Not Married	127[66%]	66 [34%]	193 [74%]
Education	Less than HS/GED	40 [66%]	21 [34%]	61[27%]
	HS/GED	59[67%]	29[33%]	88[38%]
	More than GED	57[71%]	23[29%]	80[35%]
Employment	(Past Three Years)	84 [68%]	40[32%]	124[54%]
	Employed	33[73%]	12[27]	45[45%]
	Unemployed	39[65%]	21[35]	60[26%]
	Other			

Table 2.0. Contingency table for bup-nx treatment success and clonidine treatment success

Treatment group	Success	Sample Size	Observed	95% confidence Interval
bup-nx	44	156	0.2820	0.2114,0.3527
clonidine	4	73	0.055	0.002585,0.1070

Total	48	229	Diff:	0.227	0.1394, 0.3150

Assuming that the data are representative, and subjects are independently measured within each group, each group is independent of each other, and the sample size is large enough to conduct statistical analysis as fewer than 20% of all cells have expected frequencies less than 5 (¼=0.25). Our analysis shows that success and gender had the least amount in difference in observed proportions, and greatest difference in observed proportions was success and age. Further analysis indicates that the observed difference in confidence interval greatest in success and age, and least in success and gender. The data is summarized in table 2.1. For the 156 participants in the bup-nx treatment group, the test for association to age produced the following results ($X_1^2 = 4.1406$, p-value= 0.04187), since the p-value is less than the alpha level we reject the null hypothesis in favor of the alternative, and claim there is a relationship between success of bup-nx treatment and age.

Table 2.1: Contingency table for Test of association and Age

	Observed Success							
Age	"Yes"	"No"	n	Observed	95% CI	Chi-square	p-value	df
Age below 40	28 17.95%	51 32.70%	79	0.3544	0.2489,0.4599	4.1406	0.04187	1
Age above 40	16 10.25%	61 39.10%	77	0.2077	0.1170, 0.2983			
Total	44	112	156 Diff:	0.1467	0.007575,0.2857			

The data is summarized in table 2.2. For the 156 participants in the bup-nx treatment group, the test for association to gender produced the following results (X_1^2 = 0.21421, p-value= 0.6435), since the p-value is greater than the alpha level we fail to reject the null hypothesis, and claim there is no relationship between success of bup-nx treatment and gender

Table 2.2: Contingency Table for Success and Gender

	Observed Success							
Gender	"Yes"	"No"	n	Observed	95% CI	Chi-square	p-value	df
Male	31	83	114	0.2712	0.1895, 0.3528	0.21421	0.6435	1
	19.87%	53.20%						
Female	13	29	42	0.3095	0.1696,0.4493			
	8.33%	18.59%						
Total	44	112	156	Diff: -0.0383	-0.1995,0.1243			

The data is summarized in table 2.3. For the 156 participants in the bup-nx treatment group, the test for association to race produced the following results (X_1^2 = 0.53554, p-value= 0.4643), since the p-value is greater than the alpha level we fail to reject the null hypothesis, and claim there is no relationship between success of bup-nx treatment and race

Table 2.3: Contingency Table for Success and Race

	Observed Success							
Race	"Yes"	"No"	n	Observed	95% CI	Chi-square	p-value	df
White	20	42	62	0.32	0.2039,0.4361	0.83465	0.3609	1
	12.82%	26.70%						
Non	24	70	94	0.25	0.1624,0.3375			

White	15.40%	44.90%				
Total	44	112	156	Diff	0.07	-0.0787, 0.2132

The data is summarized in table 2.4. For the 156 participants in the bup-nx treatment group, the test for association to marital status produced the following results (X_1^2 = 0.36464, p-value= 0.5459), since the p-value is greater than the alpha level we fail to reject the null hypothesis, and claim there is no relationship between success of bup-nx treatment and marital status.

Table 2.4: Contingency table for Success and Marital Status

	Observed Success							
Marital Status	"Yes"	"No"	n	Observed	95% CI	Chi-square	p-value	df
Married	10 6.41%	19 12.22%	29	0.3448	0.1718,0.5178	0.36474	0.5459	1
Not Married	34 21.80%	93 59.62%	127	0.2677	0.1906, 0.3447			
Total	44	112	156	Diff 0.0771	-0.1122, 0.2665			

The data is summarized in table 2.5. For the 156 participants in the bup-nx treatment group, the test for association to level of education produced the following results (X_1^2 = 1.1686, p-value= 0.5575), since the p-value is greater than the alpha level we fail to reject the null hypothesis, and claim there is no relationship between success of bup-nx treatment and level of education.

Table 2.5: Contingency table for Success and Education

	Observed Success

Group	"Yes"	"No"	n	Observed	95% CI	Chi-square	p-value	df
Less high school	10 6.41%	30 19.23%	40	0.25	0.1158,0.3842	1.1686	0.5575	2
High school graduate	15 9.61%	44 28.20%	59	0.25	0.140,0.3605			
More than high	19 12.18%	38 24.36%	57	0.33	0.2079,0.4521			
Total	44	112	156					

The data is summarized in table 2.5. For the 156 participants in the bup-nx treatment group, the test for association to employment status produced the following results (X_1^2 = 0.019734, p-value= 0.9902), since the p-value is greater than the alpha level we fail to reject the null hypothesis, and claim there is no relationship between success of bup-nx treatment and employment status.

Table 2.6: Contingency table for Success and Employment

	Observed Success							
Group	"Yes"	"No"	n	Observed	95% CI	Chi-square	p-value	df
Employed	24	60	84	0.2857	0.1891,0.3823	0.019734	0.9902	2
Not Employed	9	24	33	0.2727	0.1208,0.4246			
Other	11	28	39	0.2820	0.1408, 0.4232			

Total	44	112	156

Discussion:

There is enough evidence to conclude that there is a significant difference in the proportions of success in the bup-nx treatment group, and the clonidine treatment group. Interestingly, we found that there is enough evidence to conclude that there is a relationship between success and age, however there was not enough evidence to suggest a relationship between success and any other demographic variables. Our hope is that physicians who specialize in drug detox will consider the treatment success in bup-nx over clonidine before prescribing medicine, and we hope that physicians will take patients ages before starting bup-nx treatment.