Implementation and Feasibility of an Auricular Acupuncture Intervention for Smoking Cessation in a Residential Spiritual Recovery Program: A Pilot Study

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The National Acupuncture Detoxification Association (NADA) protocol was used as part of the smoking cessation intervention (participants received auricular acupuncture for 40 minutes, 3 times per week for 1 month). Smoking cessation, adherence rate to the treatment plan, and percentages of those who decreased in nicotine dependence were measured as well as any associations between acupuncture beliefs and the previously mentioned variables.

In this hard-to-reach population of chemically dependent smokers 86 participants were recruited to participate in the study and 47% (n=40) were retained. Two participants achieved smoking cessation. There were no significant associations between beliefs about acupuncture and decrease in nicotine dependence or adherence to treatment. However, 40% decreased in nicotine dependence. This research demonstrated the feasibility of recruitment of participants and retention to an auricular acupuncture intervention for smoking cessation in a chemically dependent population.

Keywords: acupuncture, smoking cessation, feasibility, belief, chemically dependent

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ABSTRACT

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Keywords: Acupuncture, Smoking Cessation, Program Feasibility, Chemical Dependence, Recovery Programs

INTRODUCTION

Nationwide in the U.S, in 2012, 18% of adults aged 18 years or older were current smokers (Schiller, 2013). However, this number has dramatically decreased from 1965 when percentages were up to 42.4% for the same age group (Center for Disease Control, 1999). Unfortunately, a great public health concern is the disparity in smoking rates among communities of low Socioeconomic Status (SES) such that the smoking rates have been consistently higher than those of higher SES (Center for Disease Control, 2014). In addition, numerous studies have found as high as a 70%-90% smoking rate for people who use illicit drugs or alcohol (Ivie, Evans, Ndetan, Perko, & Fischer, 2010; Nahvi, Richter, Li, Modali, & Arnsten, 2006; Richter, Gibson, Ahluwalia, & Schmelzle, 2001; Sullivan & Covey, 2002; Wallace, 1986). This rate is about 4 times higher than the U.S. 2012 rate. Furthermore, this population tends to be highly nicotine dependent and the literature notes that in general there are low adherence rates to smoking cessation treatment.

Non adherence is another public health concern. The literature demonstrates that, in general, adherence to smoking cessation treatment is low (WHO, 2003). In addition, those who are chemically dependent have typically been non adherent particularly to chemical dependency treatments. In other words, the chemically dependent tend not to follow instructions to address their addiction. Furthermore, non-adherers are less likely to experience a positive health outcome (WHO, 2003). Also, retention in chemical dependency treatment centers tends to be low, particularly in the first few months from entering residential treatment centers (Agosti, Nunes, & Ocepeck-Welikson, 1996; Ivie et al., 2010; Rowan-Szal, Joe, & Simpson, 2000).

Acupuncture has been implemented in places such as chemical dependency treatment centers to treat substance use disorders such as heroin and cocaine addiction (Brumbaugh, 1993; Cui, Wu, Luo, & Han, 2008). Auricular acupuncture (acupuncture of the auricle) for addictions received great credibility in a landmarked, placebo-controlled, single blinded, randomized control trial (RCT) performed by Bullock, Cullinton and Olander (1989) with 80 "severe recidivist alcoholics" (Bullock, Culliton, & Olander, 1989). Forty of these participants were randomized into the auricular acupuncture group. The results demonstrated that, from the treatment group, 21 out of 40 completed the entire program compared to 1 of 40 in the control group. In addition, in the absence of any other treatment, 12 participants in the treatment group were totally abstinent from alcohol at least up to 6 months after treatment. Only 4 of the controls obtained this outcome ($p<0.05$).

A U.S. psychiatrist practicing at the Lincoln hospital located in the South Bronx, New York standardized the treatment in the United States. Micheal O. Smith, M.D., D.Ac. began treating addicts with auricular acupuncture in the early 1970's and his treatments became so successful that methadone treatments for addictions were eliminated at the Lincoln Hospital (Otto, 2003). This treatment has also been used in various community clinics and hospital settings to treat nicotine dependence (Bier, Wilson, Studt, & Shakleton, 2002; Margolin et al., 2002; National Acupuncture Detoxification Association, 2008; White, Rampes, & Ernst, 2009). However, the literature is sparse in studies that examine acupuncture use for residents of chemical dependency treatment centers for nicotine dependence (Cui et al., 2008; Witt et al., 2011). Its effectiveness is also questionable (Gillams, Lewith, & Machin, 1984; Wu, Chen, Liu, Lin, & Hwang, 2007).

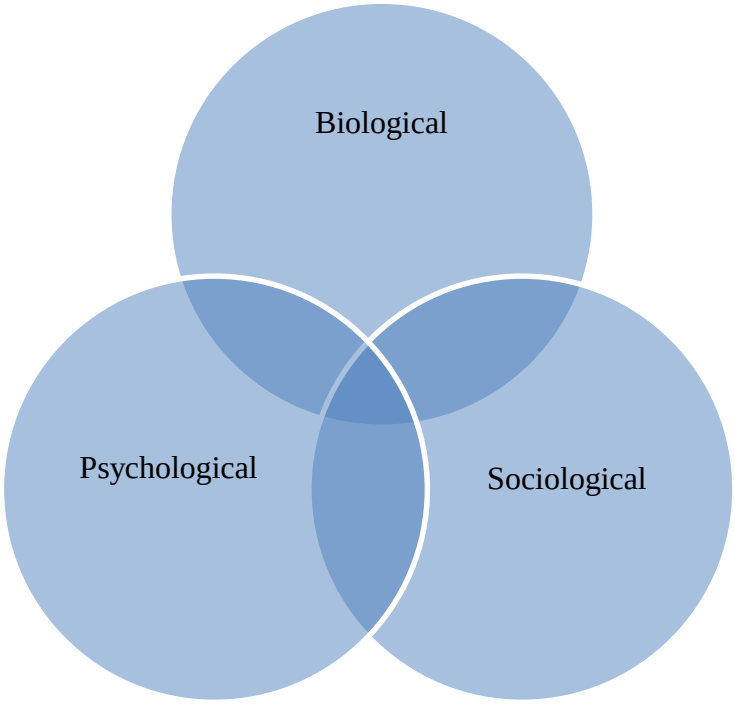
Although the literature is mixed about the effectiveness of acupuncture for nicotine dependence, several studies demonstrate a statistically significant reduction in number of

cigarettes smoked, p=.003 (Bier et al., 2002), p <0.002 (He, Berg, & Hostmark, 1997). In addition, in some cases acupuncture has been shown to be cost effective (Cui et al., 2008; Witt, Reinhold, Jena, Brinkhaus, & Willich, 2008).

Acupuncture's mechanism of action is not fully understood. However, the literature suggests the effectiveness of acupuncture as well as with other complementary and conventional treatments may be largely dependent upon contextual effects such as pre-existing beliefs or expectations about effectiveness. Studies indicate that belief in treatment effectiveness accounts for 35-75% of the treatment outcome, often exceeding the specific effects of the prescription drug or treatment intervention (Pariente, White, Frackowiak, & Lewith, 2005; Turner, Deyo, Loeser, Von, & Fordyce, 1994). Also, the belief effect is thought to play a role in the benefits experienced in sham acupuncture. Sham acupuncture differs from true acupuncture in that the points used for inserting acupuncture needles are non-traditional acupuncture points. However, research studies show that people unknowingly receiving sham acupuncture often experience benefits similar to true acupuncture (Kaptchuk et al., 2008; Kong et al., 2009; Linde et al., 2007). In addition, the literature also shows that those who have high expectations about the effectiveness of a treatment are more likely to adhere to the treatment recommendations. Apparently, the beliefs about a treatment affect decision making such that the individual decides to follow the recommended treatment regimen (Colloca & Miller, 2011). If the belief effect is as important as the literature suggests, then auricular acupuncture will be most effective among those who have higher expectancy or positive beliefs about the intervention as opposed to those who do not. The role of the belief factor and success in smoking cessation, reduction in nicotine dependence, and adherence to treatment with an auricular acupuncture intervention has not been examined in previous studies and may be a key factor in achieving success.

There are various models that can be used to explain the relationships between beliefs about acupuncture and smoking cessation, decrease in nicotine dependence, and adherence to treatment. However, for this study, the Biopsychosocial (BPS) Model (Engel, 1977) is used. BPS is an appropriate model for this study because it attributes health outcomes to aspects of the entire being or "whole" person. It illustrates how the biological, psychological, and sociological attributes of the acupuncture experience contribute to the health outcome (see Figure1).

Figure 1. Biopsychosocial Model



Covariates

Because various factors besides expectations of treatment effectiveness play a role in smoking cessation, decrease in nicotine dependence, and adherence or attendance to treatment, these factors must be controlled for in the statistical analysis. These variables will now be discussed.

The literature demonstrates that there is a positive association between depression and smoking (Anda et al., 1990). One particular study demonstrated that among psychiatric patients, smokers had higher rates of major depressive disorder (MDD) than nonsmokers (Acton, Prochaska, Kaplan, Small, & Hall, 2001). It also demonstrates a significant association between stress and smoking cessation. In some instances the literature shows cigarette smoking is used to alleviate stress (Haddock et al., 2009). In addition, not only is stress identified as a barrier to smoking cessation (Buchanan et al., 2004; Orleans & Hutchinson, 1993) but there is a positive association between decrease stress and success at smoking cessation. Depression and stress are both conceptualized in the "Mood" scale discussed in the "Methods" section.

The literature shows that there is a positive association between level of social support and smoking cessation and adherence to treatment. Cohen and Lemay (2007) found that social integration, a concept that describes a range of interpersonal relationships, was positively associated with positive health behaviors.

Along with the previously stated variables, the association between patient-practitioner interaction and treatment outcome is a pertinent discussion because the literature suggests that the success of many health interventions can be associated with this factor. Hence, health outcomes associated with the quality of the patient-practitioner interaction have been discussed extensively

in several studies (Benedetti, 2002; Cassidy, 1998; Di, Harkness, Ernst, Georgiou, & Kleijnen, 2001; Scherwitz, McHenry, & Herrero, 2005). The patient-practitioner interaction generates a response that is more than just psychological or social but encompasses physiological effects that are observed in conventional as well as Complementary and Alternative Medicine (CAM) treatments (Benedetti, 2002).

Concern about weight gain is also a noted cause for failure at smoking cessation. Not only did Berg et al. (2008) find that concern about weight gain after smoking cessation could be a factor in discouraging pregnant smokers from quitting, but military personnel used cigarette smoking to prevent the possible disciplinary action that could result from excess weight gain (Haddock et al., 2009). Several studies found that the absence of other smokers in the household was a predictor of smoking cessation (Hymowitz et al., 1997; Ramon & Bruguera, 2009; Siahpush, Borland, & Scollo, 2003).

Implementing acupuncture interventions with the chemically dependent for smoking cessation may be a feasible method to reduce smoking among this population. Hence, a study examining acupuncture for smoking cessation in this population is warranted. However, before we implement a large study examining this, we need to know the feasibility of recruitment, adherence or, attendance to acupuncture sessions, and retention. Unlike the typical resident of a chemical dependency residential center, a typical acupuncture user, according to the 2002 National Health Interview Survey, is an Asian female, living in the Western or Northwestern part of the United States and having a higher level of education (Burke & Upchurch, 2006). Therefore, a resident of a chemical dependency residential center is less likely to have used or experienced acupuncture. There is also a gap in the literature about the perceptions and beliefs of the low SES, chemically dependent population about acupuncture.

One possible approach to assessing feasibility in this population could be to use a Community Based Participatory (CBPR) approach. CBPR is a process of conducting research that involves community participants and other stakeholders in every step of the research process from defining the research questions to how the data will be collected and used (Minkler, 2005). This project was funded by the Communities Engaged and Advocating for a Smoke-Free Environment (CEASE) initiative. This initiative is a CBPR partnership formed with the Baltimore communities and a local Historically Black University research center located in Maryland. The CBPR approach can further enhance feasibility because the community and primary population can take ownership of the project. Therefore, this study aims to evaluate the feasibility of recruitment, attendance, and retention to auricular acupuncture sessions for smoking cessation with a residential, chemically dependent population; and also to determine their expectations of acupuncture, and the effect of their expectations on smoking cessation, nicotine dependence, and attendance to acupuncture sessions.

METHODS

This study was a small longitudinal pilot intervention following a CBPR approach. The methods were approved by the CEASE advisory board and reviewed by the IRB. The intervention took place during the months of February through July 2010, and 10 groups of participants received the intervention. Groups of greater than 10 participants were divided into two. This size allowed the practitioners to administer acupuncture more efficiently and was also consistent with the National Acupuncture Detoxification Association (NADA) auricular acupuncture protocol used in the project.

Participants

The participants of this study (n=86) were recruited among smokers attending a residential, spiritual recovery program for male patients classified as homeless or chemically dependent. A spiritual recovery program combines the traditional drug recovery approach with a faith-based, spiritual approach. The spiritual approach teaches trust in God or a higher power (Galanter et al., 2007; Miller & Kurtz, 1994). Information about current medications was not collected. However, the participants had already completed the drug detoxification process and should not have been using any medications for withdrawal symptoms.

Recruitment

Prior to the initiation of each group intervention, the client services manager of the center, who was also a member of the research team, made announcements and distributed flyers in the morning classes. Interested residents wrote their name on a sign-up sheet and later attended an orientation/information session. Because this population does not represent the typical acupuncture user, prior to the start of the intervention, and during the orientation, participants were educated about the process of acupuncture and its history. It was at this time that any questions or concerns about the process were addressed by the principal investigator. In addition, one of the CEASE initiative members, a medical doctor; acupuncturist; and community medical clinic director, was there to address questions and concerns. If the resident decided to participate in the study and he met the inclusion/exclusion criteria, his schedule would be modified to allow him to participate without missing other center classes or activities. This process was repeated for each new group.

Inclusion/Exclusion criteria

The inclusion criteria was that participants must be residents of the residential recovery program, addicted to nicotine (i.e., smoke regularly a minimum of 3 cigarettes per day), and have a desire for smoking cessation by receiving auricular acupuncture. They were excluded if they were unwilling to receive acupuncture, complete weekly questionnaires, or currently using Nicotine Replacement Therapy (NRT) or any other methods for smoking cessation. IRB approval was obtained from the hosting academic institution. Participants had to sign an informed consent form that highlighted their right to discontinue the study at any time with no negative consequences. They were also informed of any risks as well as possible benefits from the study.

Measures

After the participants completed the consent form they were given a baseline questionnaire to complete. This questionnaire assessed their beliefs about acupuncture as well as sociodemographics; the phase or amount of time at the center; baseline weight gain concerns; baseline nicotine dependence; the presence of other smokers in the household; the number of quit attempts; mood; and social support. Weekly questionnaires were administered that re-assessed their nicotine dependence. For the final session, nicotine dependence and the quality of the patient-practitioners' interactions were assessed.

Although no scale was used, demographics (e.g., age, race, education) were collected using standardized measures similar to that used in national studies such as the National Health and Nutrition Examination Survey (NHANES)(Center for Disease Control National Center for Health Statistics, 2014).

Expectations of acupuncture was defined by 2 questions adapted from the Acupuncture Credibility Scale with an internal consistency of $\alpha = 0.74$ (Borkovec & Nau, 1972; Vincent, 1990). The original tool measured two predictive factors: credibility and expectation of the intervention. Because this current study was not investigating the credibility of acupuncture as in studies examining the credibility of sham acupuncture, only the items associated with expectation were used. However, the two items used in this study are same as those used to examine beliefs about

acupuncture in a large clinical trial (Linde et al., 2007), yet, they were modified to address smoking cessation.

The scale items are as follows: "1. How effective do you consider acupuncture in general"? "2. How effective do you believe that acupuncture will be in helping you quit smoking"? Each question was based on a scale of 1-5, with "1" indicating, "don't know," and "5" indicating, "very effective," yielding a range of 2-10. The scale did not use "0" for a response of "don't know" because "0" would translate to indicate "not effective". However, "don't know" is better translated to indicate a minimal level of expectation of acupuncture, hence a response of "1". The scale was later collapsed such that a total score of 2-5 = "low belief," which included "don't know" and 6-10="high belief." Scores up to 5 were considered low because a score of 5 would mean that the highest response to each item would represent acupuncture as only "slightly effective."

Baseline nicotine dependence was measured by the Fagerstroms Test for Nicotine Dependence (FTND). This tool has been used extensively in the literature to measure nicotine dependence and has psychometric properties which reveal good test-retest reliability ranging up to 0.91 with a majority of values greater than .60 (Meneses-Gaya, Zuardi, Loureiro, & Crippa, 2009). The scale has a score ranging from 0-10. According to the original scale, scores 0-3 represent low nicotine dependence, 4-6 moderate, and 7-10 high. However, for this study, the categories were further collapsed such that 0-6 represented low nicotine dependence and 7-10 represented high. Decrease in nicotine dependence was defined as a change to a lower level of nicotine dependence measured by the baseline and final FTND score. Various studies use different scales to measure a change in nicotine dependence. For instance a decrease in number of cigarettes per day (cpd) smoked can indicate a reduction in nicotine dependence (Piper et al., 2008). Similarly, a decrease in withdrawal symptoms can also indicate a reduction in nicotine dependence (Piper et al., 2008). However, for this study a decrease in nicotine dependence was defined as changing from one level of nicotine dependence to a lower level at the end of the group session as determined by the FTND. Smoking cessation was a dichotomous variable defined by the question, "Have you quit smoking?"

Attendance to acupuncture sessions was determined by the number of days of recorded attendance on the sign in sheets for the acupuncture sessions. Attendance was coded as a continuous variable on a scale of 0-12. However, it was later dichotomized such that attending 0-6 days was classified as low attendance (also considered dropouts) and attending 7-12 days, high attendance. This coding is an accurate classification of the intentions of the participants to attend acupuncture sessions. For example, those attending 0-6 days did not come to any of the later classes and ceased attendance early during their cohort.

Social support was measured by the "Duke UNC Functional Support" questionnaire. This tool consists of 8 items that ranked various domains of social support. The items are based on a 5 point scale ranging from "1" indicating "much less than I would like" to "5" indicating "as much as I would like". The total score ranges from 0-40, a higher score indicates greater perceived social support (test –retest, 0.66) (Broadhead, Gehlbach, de Gruy, & Kaplan, 1988).

Mood was defined by 3 items. Two items were from the Patient Health Questionnaire 9 (PHQ-9)(Kronke, Spitzer, & Williams, 2001). The two items, asked if the participants were bothered by any of the following problems in the last two weeks; "Having little interest or pleasure in doing things in the last two weeks," and "Feeling down, depressed, or hopeless in the last two weeks?" The scores had a range of 0-9. These items highly correlated to the Diagnostic and

Statistical Manual of Mental Disorders (DSM) IV definition of depressed mood (Whooley, Avins, Miranda, & Browner, 1997). Also included in this scale was one screening question for stress; "How stressed have you been for the last 2 weeks?"

Weight gain concern was measured by 2 questions adapted from the Weight Concern Scale (internal consistency=0.87) (Borrelli & Mermelstein, 1998). This scale ranged from 2-10 and was categorized as low, moderate, or high such that a score of 2-3 represented low concern; 4-6, moderate; and 7-10, high.

The presence of other smokers was defined by one question widely used in studies addressing smoking; "Do others where you live smoke?" (Hymowitz et al., 1997). It is used to help determine contact with other smokers. For this scale, answering, "no" to the question received a score of "0", and "yes" received a score of "1".

Patient-practitioner interaction was measured as a continuous variable and based on the score from the Patient Guided Imagery Survey (internal consistency, 0.5-0.7) (Scherwitz et al., 2005). Scores from this scale had a possible range of 3-15.

Phase was a classification given to the residents based on the number of days spent at the residential center. The phase classifications were labeled as follows: seed, alpha, omega, and lifetimer. A seed is a resident who has spent ≤ 45 days at the center while those in other phases have spent >45 days. For this study "phase" was dichotomized as "seed" (≤45 days at the center) and "nonseed," (>45 days).

Recruitment was defined by the number of residents who signed up and attended the orientation session. Retention was measured by the number of participants that completed at least half (6) of the acupuncture sessions.

Intervention

After the baseline questionnaire was completed, participants began receiving auricular acupuncture according to the NADA protocol. The Protocol for the treatment of addictions originated from Dr. Micheal Smith, the practicing psychiatrist in New York (National Acupuncture Detoxification Association, 2008). Dr. Smith standardized the 5 point auricular acupuncture treatment to help relieve symptoms of withdrawal from substance dependence. According to this protocol, five acupuncture needles are inserted into the auricle of each ear. The needles remain in place for approximately 40 minutes. Treatments take place three times per week for 4 weeks. For this study treatments were administered by community practitioners who were trained and licensed in the NADA protocol. No counseling, NRT or other smoking cessation support was given so that confounding factors contributing to smoking cessation would be reduced.

To better understand the participants' acupuncture experience as well as their attendance rates, a discussion group was conducted after the final auricular acupuncture group ended. Study participants were selected such that each category of participants in the study was represented. For example, participants were selected from the high attendance category, those who completed 7 - 12 acupuncture sessions; the category of those who completed their sessions and continued to receive treatments with another cohort; and the low attendance category, those who dropped out of the study before completing at least 7 acupuncture sessions. However, after submitting the names of the randomly selected participants to the client services manager of Helping up Mission, it was determined that some of the selected participants were no longer at the center, some had scheduling conflicts and others did not wish to participate. Therefore, only four people participated in the hour long discussion group, two who completed the acupuncture sessions and

final questionnaires, and two who dropped out. During the discussion group, some of the questions asked specifically to understand the acupuncture experience and attendance rate included: "What made you decide to sign up for acupuncture sessions?", "While the needles were being inserted in your ears, what went through your mind?", "Why did you decide to discontinue", "How do you think things could have been done differently?"

The discussion group session was tape recorded. At the completion of the discussion group session, participants were given a $10 gift card that could be used at a local eatery. The discussion group moderator was the investigator of the project. Afterwards, the recording was transcribed by an outside source and ATLAS. ti (version 6.0, Berlin, Germany) was the software program used to codify and analyze the transcription.

Statistical Analysis

The statistical analyses used for the quantitative analysis were univariate, bivariate, and multistage-multivariate. Bivariate analysis in the form of the Fishers exact test for dichotomous variables or t test for continuous variables were performed with each of the three dependent variables: smoking cessation, decrease in nicotine dependence, and attendance and the independent variable and covariates. In addition, variables showing or approaching significance in the bivariate analysis were selected as variables for the logistic regression. Multistage-multivariate analysis was performed to examine the association between beliefs about acupuncture and decrease in nicotine dependence, and attendance, controlling for the covariates. Multistage-multivariate analysis involves first performing a regression analysis with the independent and dependent variables. This is the unadjusted model. Next, a regression analysis is performed with added covariates. The covariates are added in stages until all have been added to the model. This represents the fully adjusted model. STATA 9.0 was used to perform the analyses.

RESULTS

Recruitment

Although 87 residents signed up for the intervention and attended orientation, 1 interested resident disqualified to be part of the study because of not meeting the requirements for nicotine dependence (see Figure 2). Of the 86 who were eligible, 75 showed up for at least one session.

Attendance and Retention

The first group of auricular acupuncture intervention began in February 2010 (see Table 1). This group (n=30) was divided into two separate groups. However, by the 5th session less than half of the participants were attending therefore the two groups were combined into one group again. The attrition rate was discussed by the research and community advisory board after the group participation rate dropped to about half. It was decided that the client services manager would contact those who had not been in attendance. He found that reasons for their non-attendance could be divided into 4 categories: they had been discharged from the center; they were dissatisfied with the needling experience; it did not fit their schedule, or; no reason given.

To possibly encourage attendance, weekly drawings for door prizes were initiated. The door prizes were items that the client services manager suggested and had no monetary value but gave participants privileges such as advance placement in the lunch line or a day pass away from the facility. Ultimately, all participants had a chance to win something even if it were just a "goodie" bag with mints, gum, straws or something to chew on to help with nicotine cravings.

In the next 4 months, recruitment of interested participants had dwindled. This was primarily because the client services manager had been out of town or had other duties and was not able to be a liaison to facilitate and create interest in the morning classes. However, as his availability increased he was able to make morning announcements and once again create an interest.

Figure 2. Modified CONSORT Model

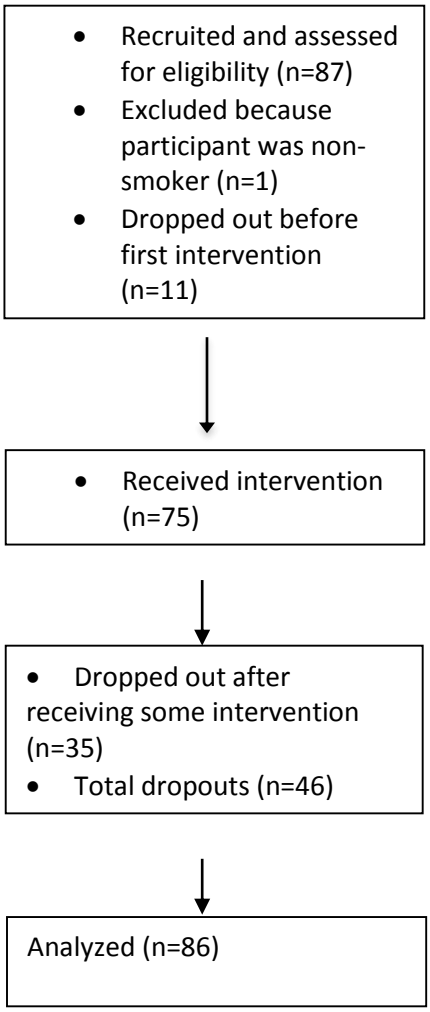


Table 1. Number of Participants Attending Each Session By Group

Group	Signed up and attended orientation	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Session 7	Session 8	Session 9	Session 10	Session 11	Session 12
1	30	26	23	30	19	14	11	13	6	11	12	11	10
2	9	9	7	9	6	8	5	5	4	5	4	4	6
3	4	4	3	2	1	0	2	2	3	3	2	3	2
4	8	8	6	6	6	5	2	5	4	2	3	3	1
5	4	4	4	4	3	4	1	4	4	4	4	4	4
6	1	1	1	-	-	-	-	-	-	-	-	-	-
7	5	3	3	3	3	1	3	3	0	2	1	2	2
8	2	1	1	1	-	-	-	-	-	-	-	-	-
9	2	2	2	2	2	1	1	1	1	1	1	1	1
10	22	18	11	9	11	10	9	8	6	7	9	9	10

By mid June, for group 10, 22 people showed interest and a large orientation took place. This was the largest orientation since the first one in February. Eighteen individuals were in attendance on the first session. Again, due to the large size, this group was divided into two. However, by the 3rd session, the attendance number was reduced by about half.

After the dramatic dropout rate from this group (10), an informal discussion was held with about 10 of the recruits who had not been attending. Reasons for their non-attendance included: a mix up in scheduling; ears being too sensitive; didn't like sitting still for 40 minutes because it allowed time to think about time spent out in the streets; really not interested in quitting smoking but interested in experiencing the relaxation effects of acupuncture.

Sample Characteristics

As illustrated by Table 2, almost half of participants (47%, n=40) were between the ages of 35 and 49 years. Fifty-six percent of the participants were racial/ethnic minorities (n=48) and 44% (n=38) were White. Most (79%, n=66) had less than or equal to a high school education or possessed a General Educational Development (GED) credential.

At baseline, from a total of 86, 70% (n=60) of the participants had low expectations or responded, "don't know" about acupuncture's effectiveness and 30% (n=26) had high acupuncture expectations. Only 20% (n=17) of the participants present at baseline reported ever having received acupuncture prior to this study. However, of those who attended the final session, (36), 81% (n=29) had high acupuncture expectations and only 19% (n=7) had low, with no one reporting "don't' know" about acupuncture expectations. When considering the 36 participants that were present for their last acupuncture session, 40% (n=14) reduced in nicotine dependence. When examining attendance rates, 47% (n=40) of the 86 participants present at baseline had high attendance. Those who had high attendance attended an average of 82% of the acupuncture sessions.

Two participants (6%) quit smoking. Although smoking status was self reported and not biochemically confirmed, the literature indicates that self reports of smoking are quite accurate (Patrick et al., 1994). Because smoking cessation rates were low (n=2), a logistic regression examining the association between beliefs about acupuncture and smoking cessation was not performed.

Table 2. Descriptive statistics for sociodemographics, baseline acupuncture beliefs and pre and post acupuncture treatment covariates of a sample of smokers at a residential recovery program (n=86).

	n (%)	Total
Age		**85**
18-34	25(29)	
35-49	40(47)	
50-64	20(24)	
Race		**86**
Racial/Ethnic minorities	48(56)	
White	38(44)	
Education		**84**
Less than or equal high school	66(79)	
Greater than high school	18(21)	
Phase[1]		**86**
Seed[2]	52(60)	
Non seed	34(40)	
Attendance		**86**
Low	46(53)	
High	40(47)	
Baseline weight gain concern		**86**
Low	32(37)	
Moderate	33(38)	
High	21(24)	
Baseline acupuncture expectations		**86**
Don't know/low	60(70)	
High	26(30)	
Final acupuncture expectations		**36**
Low	7(19)	
High	29(81)	
Ever had acupuncture		**86**
Yes	17(20)	
No	69(80)	
Baseline nicotine dependence		**85**
Low	27(32)	
Moderate	38(45)	
High	20(24)	
Final nicotine dependence		**33**
Low	18(55)	
Moderate	14(42)	
High	1 (3)	

[1]Phase is based on number of days spent at the residential recovery program

Table 2. Descriptive statistics for sociodemographics, baseline acupuncture beliefs and pre and post acupuncture treatment covariates of a sample of smokers at a residential recovery program (n=86). (continued)

	n (%)		Total
Decrease nicotine dependence at last session			**35**
Yes	14(40)		
No	21(60)		
Other smokers in household			**86**
Yes	73(85)		
No	13(15)		
Smoking cessation			**36**
Yes	2(6)		
No	34(94)		
Continuous variables	**Mean(SD)**	**Min/max (total)**	**Min/Max (observed)**
Number of quit attempts	3.0(1.6)	0-5	0-5
Mood[1]	3.6(2.2)	0-9	0-3
Social support	23.2(10.6)	1-40	1-40
Patient/Practitioner Interaction	14.0(2.1)	3-15	6-15

[1]**Lower score indicates better mood**

Multivariate Analysis

It will be noted that the sample size for the final questionnaire is quite reduced from that at baseline due to participants who were loss to follow up. As mentioned earlier, the study participants represented a hard to reach population that tends to have low adherence rates. However, there were no significant differences between baseline characteristics of participants who completed the project and those who did not.

When examining associations between expectations about acupuncture and decrease in nicotine dependence, Table 3 shows that there was no significant association (OR=10.9; CI=0.7-157; p=0.08). However, when examining the covariates in the full model, those with high baseline nicotine dependence were more likely to decrease in nicotine dependence compared to participants with low baseline nicotine dependence (OR=53.3; CI=1.2-2,335; $p<0.05$). The large confidence intervals are due to the small sample size.

In addition, in the fully adjusted models, there were non-significant associations between nicotine dependence and the covariates: demographics, age, race, mood and social support.

Table 4 shows the unadjusted, partial, and full models for the association between attendance, acupuncture beliefs, and the covariates. The data indicate that there was no significant association between beliefs about acupuncture and attendance. However, those between ages 50-64 years were significantly more likely to attend acupuncture sessions compared to ages 18-36 years as indicated by the unadjusted model (OR=3.5; CI=1.2-10.3; p=0.023) and the significance prevailed for the full model (OR=3.9; CI=1.0-15.6; p=0.049).

Table 3. Unadjusted, partially adjusted and fully adjusted logistic regression of the association between baseline acupuncture expectations and decrease in nicotine dependence (n=35).

	Unadjusted Model			Partially Adjusted Model			Fully Adjusted Model		
	OR	**95% CI**	**p-value**	**OR**	**95%CI**	**p-value**	**OR**	**95% CI**	**p-value**
Baseline acupuncture expectations									
Low *(reference)*	1.0	-	-	1.0	-	-	1.0	-	-
High	2.5	0.6-10.3	0.203	4.2	0.6-29.4	0.144	10.9	0.7-157	0.080
Age (in years)									
18 to 34 *(reference)*	1.0	-	-	1.0	-	-	1.0	-	-
35 to 49 years	8.0	1.7-37.1	0.008	12.7	1.0-157.1	0.048	15.1	0.6-352	0.091
50 to 64 years	0.4	0.1-1.7	0.198	1.2	0.1-18.8	0.902	1.1	0.03-40	0.947
Race									
Racial/Ethnic Minorities *(reference)*	1.0	-	-	1.0	-	-	1.0	-	-
White	0.6	0.2-1.5	0.253	1.1	0.2-6.1	0.948	0.5	0.06-4.4	0.532
Baseline nicotine dependence									
Low *(ref.)*	1.0	-	-				1.0	-	-
High	15.0	1.5-145.2	0.019				53.3	1.2-2335.4	0.039
Mood	0.8	0.6-1.2	0.305				1,4	0.8-2.4	0.226
Social support	1.0	1.0-1.1	0.386				1.1	0.9-1.3	0.152

Table 4. Unadjusted, partially adjusted and fully adjusted logistic regression of the association between baseline acupuncture expectations and attendance (n=86).

	Unadjusted Model			Partially Adjusted Model			Fully Adjusted Model		
	OR	**95% CI**	**p-value**	**OR**	**95% CI**	**p-value**	**OR**	**95%CI**	**p-value**
Baseline acupuncture expectations									
Low *(ref.)*	1.0	-	-	1.0	-	-	1.0	-	-
High	1.5	0.6-3.8	0.371	1.1	0.4-3.0	0.849	1.2	0.4-3.5	0.703
Age (years)									
18-34 *(ref.)*	1.0	-	-	1.0	-	-	1.0	-	-
35 to 49	0.7	0.3-1.6	0.428	1.1	0.4-3.4	0.812	1.0	0.3-3.1	0.959
50 to 64	3.5	1.2-10.3	0.023	3.6	1.0-13.1	0.057	3.9	1.0-15.6	0.049
Race									
Racial/Ethnic minorities *(ref.)*	1.0	-	-	1.0	-	-	1.0	-	-
White	0.6	0.3-1.4	0.246	0.6	0.3-1.7	0.365	0.7	0.2-3.1	0.425
Baseline level of nicotine dependence									
Low *(ref.)*	1.0	-	-				1.0	-	-
High	0.7	0.2-1.9	0.471				0.9	0.3-3.1	0.921
Mood	1.1	0.9-1.3	0.439				1.1	0.9-1.4	0.399
Social support	1.0	0.9-1.0	0.557				1.0	0.9-1.0	0.311

Discussion Group

From the discussion group 3 themes emerged which helped to explain how the participants experienced acupuncture for smoking cessation and the attendance rates. Theme 1, "Contextual factors leading up to acupuncture", provided insight about the participants' experience just prior to the initiation of the auricular acupuncture sessions. One participant mentioned that he was excited about the opportunity to receive acupuncture and that, "I didn't know anything about acupuncture but it was cool". Theme 2, "Acupuncture treatments": this theme described the participants' experiences throughout the early and later acupuncture sessions. One discussion group participant remarked "I tried to use it for good". While another remarked, "I sat back and meditated and tried to remember Bible verses that I need to work on, so that's what I did, I didn't feel any pain or anything like that".

Finally, Theme 3, "Program enhancements," described how the participants thought the acupuncture intervention could be improved. Participants made statements about the acupuncture room being uncomfortable, and a desire to have music played. This theme also provided reasons for why some participants dropped out and incorporated comments about, dislike of the acupuncture needles; changes in class schedule that conflicted with acupuncture sessions; and no longer being a resident of the facility.

DISCUSSION

This study was aimed at determining the feasibility of recruiting and retaining residents of a chemical dependency treatment center to an auricular acupuncture intervention for smoking cessation. It further aimed to determine the expectations of this population toward acupuncture and the association between their expectations and smoking cessation, decrease in nicotine dependence, and attendance to acupuncture treatments.

Description of Intervention Participants

The data show that the largest age group were middle aged adults between 35-49 years; racial ethnic minorities; with less than or equal to a high school education. At baseline, most had low or were unsure of their expectations about acupuncture's effectiveness and most had never experienced it. The low initial expectations were anticipated since only 20% ever had acupuncture and acupuncture use was not common in this population. Again, one study demonstrates that acupuncture is primarily used by highly educated, middle to upper class Asian women (Burke & Upchurch, 2006). However, by the end of the study of those who remained, 81% had high expectations about acupuncture and 53% changed from "don't know" or "low expectations" about acupuncture at baseline to "high expectations" at final (not shown in tables). This finding may demonstrate that exposure, experience, or knowledge may be helpful in increasing one's perceived usefulness or perceptions about the treatment.

Recruitment

Eighty-six residents were recruited and participated in the intervention which is 33% of the total population of the center (86 out of 260). These results show that residents are interested and willing to be recruited for an acupuncture intervention for smoking cessation. The key to recruitment was to educate them regarding the safety and potential benefits of acupuncture but not so much as to compromise their pre-existing expectations and jeopardize the validity of the baseline expectation measurement. Also, the size of recruitment was based primarily on the efforts of internal personnel such as the client services manager. This factor emphasizes the

importance of a CBPR partnership that has the community assisting and coordinating with the targeted population in every aspect. In this case the client services manager was an active stakeholder by providing access to the participants; distributing flyers and reminders; arranging the participants' schedules; and facilitating the practitioners so they could implement the treatments as needed.

In addition, implementation of the acupuncture intervention was facilitated by community practitioners of local clinics. Again, the CBPR model helped facilitate smooth implementation of the intervention.

Attendance and Retention

Review of Table 1 demonstrates that after groups completed orientation and began acupuncture sessions, there was a pattern in the smaller groups of 1 or 2 dropping out after the 1st or 2nd session and very few dropouts after that. However, with the larger groups, about half dropped out after the 4th session and afterwards the dropout rate decreased. Perhaps the large dropout rate in the initial acupuncture sessions resulted from the discomfort participants experienced or their transfer from the facility. The informal and formal discussion groups and follow up phone calls revealed a constant theme of reasons for dropping out related to dislike of the needling experience and room discomforts.

Also, the multivariate analysis demonstrated that participants between the ages of 50-64 were almost 4 times more likely to adhere compared to participants between the ages of 18-34. The finding of the association between age and adherence is supported by several studies (Ahluwalia et al., 2002). For example Bishop et al. (2008) found that among the various factors that predicted adherence to various CAM modality appointments, participants in their fifties were more likely to keep their appointments (OR=5.5; CI=1.60-18.92; $p<.01$) (Bishop, Yardley & Lewith, 2008) .

Although a few groups were reduced by about half by the end of their treatment, there was a 47% (n=40) retention rate at the conclusion of this study. In other words, almost half of the recruited participants remained in the study. This is a positive finding because although some participants expressed a dislike to the needling process, some continued to attend. Also, even though some participants found it challenging to sit for 40 minutes during the acupuncture sessions, many managed to continue to come and even look forward to the 40 minute time to meditate and relax. Their willingness to accept a non-chemical treatment such as acupuncture may be a result of the center's goal to reduce dependence on chemicals and its' emphasis on developing spirituality. The center is a Christ centered, 12-step program that emphasizes scripture memorization. Its' focus is on building Godly character to living responsibly. Hence, the contribution of a spiritual recovery program may be to help one focus on a higher power to address their weaknesses and mistakes. Because acupuncture is a non-chemical treatment, some participants may have been willing to accept it despite discomforts. Several studies demonstrate that a spiritually focused program increases drug abstinence success (Beitel et al., 2007; Galanter et al., 2007; Margolin, Avants, & Arnold, 2005).

The retention rate can be increased if some of the issues that were presented in the discussion group get addressed and schedules are arranged to facilitate attendance. In addition, some attrition will be expected due to the steady influx and outgoing of residents. Furthermore, the retention rate for this study is similar to other studies with the general population (those not residing in residential centers) implementing auricular acupuncture for chemical dependency

(Berman, Lundberg, Krook, & Gyllenhammar, 2004; Margolin, Avants, Chang, & Kosten, 1993). Reasons for dropouts in these studies are similar to this current study and include pain at needle insertion; time commitment; and perceived lack of benefit. However, findings from this study have more positive implications by demonstrating the utility of acupuncture for smoking cessation for chemically dependent patients in a residential recovery program.

Association between Expectations and Outcomes

The results demonstrated no significant association between expectations about acupuncture and decrease in nicotine dependence or attendance to acupuncture treatment. These non-significant findings may be attributed to several factors. First, it may be due to the sample size. Prior to the initiation of the study, the sample size calculation indicated that a maximum of 188 participants would be necessary to demonstrate a significant finding. However, after the data were collected the difference between those with high expectations and those with low was so small that it was determined that almost 1000 participants would be needed. Yet, this extensive recruitment was not feasible. Second, the scale used to measure "expectations in acupuncture," although implemented for a large clinical trial (Linde et al., 2007), has not been validated for this population and may not be an accurate measurement. Third, after beginning to receive acupuncture, participants may have perceived the usefulness of the treatment, hence, their expectations about acupuncture improved from baseline. Finally, it is quite possible that there is no association between expectations about acupuncture and smoking cessation outcomes in this population. However, this is also a meaningful finding because it may indicate that residents of a chemical dependency treatment center may attend and benefit from acupuncture, regardless of their expectations.

Forty percent decreased in nicotine dependence and two participants quit smoking. Although this rate of decrease is somewhat consistent with the literature (Ballal & Khawaji, 1992; Steiner, Hay, & Davis, 1982), this finding is meaningful because participants decreased in the midst of the numerous stressors in their lives. The literature indicates that stress can be a barrier to smoking cessation (Buchanan et al., 2004; Orleans & Hutchinson, 1993). Also, this is a positive finding because participants decreased in nicotine dependence while simultaneously practicing abstinence from their primary addiction. In addition, although the quit rate appears to be low, it is quite consistent with the literature of the quit rate following a smoking cessation program for the chemically dependent (Reid et al., 2008; Stein et al., 2006). Moreover, this finding is of great interest because participants quit smoking without the help of NRT or Behavioral Therapy (BT). In addition, 85% indicated that others in their household smoked and this can be a barrier to smoking cessation, nevertheless these two participants managed to quit smoking.

The Role of CBPR

The role of CBPR in the successful administration of this project can not be understated, particularly the role of one key team member, the client services manager. This individual was instrumental in various ways including recruitment; securing a room for the project; following up with participants who missed classes; and making suggestions for appropriate door prizes, to name a few. His role was evidenced by the decrease in recruitment during his absence. In fact Minkler (2005) lists "improvement of retention and recruitment efforts" as one of the benefits of CBPR. Other community members played important roles as well. For instance the medical director and community acupuncturists provided acupuncture treatments.

Limitations

There were some limitations to this study. During process evaluation, in uncovering the reasons for attrition, although various categories of reasons were given, the proportion of responses for each category is not known. Also, there was not a follow up with every drop out so some reasons were not revealed. In addition, the client services manager was the primary person responsible for recruitment. Perhaps if additional members of the research partnership performed this task, recruitment could have been increased. Finally, for those who reported to have quit smoking, there was no biochemical validation.

Although this study had some limitations, there were several strengths. First, this study was performed with an all male, chemically dependent population in a recovery program. This is a hard to reach population and the fact that we were able to engage them in a smoking cessation intervention is remarkable. Moreover, the fact that they were willing to experience acupuncture, an intervention that most had never experienced was also noteworthy.

This study examined the association of expectations in acupuncture as it relates to smoking cessation, an outcome of which few research studies have explored. In addition, the study was carried out among a population that has not previously been examined with regards to the belief in acupuncture and smoking cessation. Finally, the findings from this study were relayed to the community advisory board with the intent that this information will lead to changes that will increase recruitment and retention in future projects.

CONCLUSION

This study demonstrated the feasibility of recruitment and retention to an auricular acupuncture intervention, guided by CBPR, in a chemical dependency residential treatment program and has implications for implementation. Feasibility was demonstrated by recruitment of 33% of the population at this center. This demonstrates that the population is interested and willing to receive acupuncture treatments regardless of previous experience with the treatment or pre-existing expectations. Feasibility is also demonstrated by acceptability of the participants despite the fact that some were homeless and had a fear of needles and were skeptical about the process. In addition, almost half of those recruited were retained. However, retention may be challenging and will require innovative and creative methods.

Not only is it important to have internal and community support, but also constant formative evaluation allowing for feedback from participants. Also, modifications in the setting, as well as administration of the acupuncture procedure to make it more comfortable may help retain participants.

Finally, it is not evident of the role pre-existing expectations about acupuncture play in smoking cessation with this population. Additional research with a larger sample size may help determine this.

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