

**THE USE OF A SERIES OF RELATED NUTRITION AND HEALTH
EDUCATION SESSIONS, IN CONJUNCTION WITH SELF-
DETERMINATION THEORY, TO ENCOURAGE HEALTHY
BEHAVIORAL CHANGE—A PRELIMINARY STUDY FOR SMOKING
CESSATION IN SUBSTANCE ABUSE TREATMENT FACILITIES**

A Thesis

by

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ABSTRACT

Currently, tobacco addiction is not commonly treated as other addictions during substance abuse treatment. This has been suggested as a substantial contribution to poor success rates of sobriety frequently seen after treatment. Self-determination theory posits that high intrinsic motivation is key for behavioral change and the Health Belief Model suggests that high perceive competency in one health behavior may yield increases in perceived competency with other health behaviors. The objective of the following study is to show that the introduction of a series of nutrition and health education sessions, which emphasizes the relationships between smoking, substance abuse, and nutrition, will result in increased self-determination (i.e. intrinsic motivation) and intentions to quit smoking for current smokers while in treatment for substance abuse addiction.

Data was collected for 32 weeks at an addiction treatment facility for adults. The intervention lasted 12 weeks and consisted of a series of nutrition and health education sessions and minor changes to facility staff protocol designed to encourage autonomy, competency, and relatedness for smoking cessation.

Results indicated significant increases in intention to quit smoking as well as intrinsic and extrinsic motivation towards cessation. After adjusting for age and income, results indicated differences were only associated with the top two age and income groups.

Based on our findings the intervention did increase both intentions and motivations to quit smoking. However, these results were isolated to adults over the age of 35 and those with income levels higher than \$30,000 a year.

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INTRODUCTION

Without question, the role of behavior has been demonstrated to play a substantial role in human health. Frequently, this is announced through elevated healthcare costs, morbidity and mortality rates (1). According to Kushi et al., lifestyle behaviors are the cause for nearly 2/3 of all cancers, up to 40% of mortality in industrialized countries, and approximately 3/4 of all healthcare costs of chronic diseases associated to such health behaviors (poor diet, tobacco use, and physical inactivity) (1, 2). Currently, tobacco use is the leading cause for non-infectious related death and disease worldwide, represents 5 million deaths each year, and one half of all tobacco users are expected to die a tobacco-use related death (3, 4).

Effects of Smoking

Physiology of Nicotine

When cigarette smoke is inhaled, nicotine, along with various other toxins, is almost instantly absorbed into the circulatory system through the capillaries lining the alveoli of the lungs. Once nicotine is in the blood stream it is quickly carried to the central and peripheral nervous system binding to nicotinic acetylcholine receptors. Upon binding, the nicotine creates a depolarization followed by excitation precipitating the release of several neurotransmitters including noradrenalin, beta-endorphin, dopamine, serotonin and NO (5). Concurrently, a desensitization phenomenon occurs creating an increasing tolerance towards nicotine (6). Through this mechanism nicotine is considered to be highly addictive comparable to that of amphetamines and cocaine (7). Nicotine itself may not be harmful in

reasonable dosages (8-10), however many of the byproducts that are also absorbed in the body as a result of smoking impose significant oxidative stress attributed with cardiovascular disease (CVD), respiratory diseases, and many cancers (11, 12).

Malnutrition and Disease

Although CVD and cancer hold most attention when discussing the chronic health ramifications of tobacco smoking, tobacco-use related malnutrition should not be overlooked. Smoking is associated with trends of decreased levels alpha- and beta-carotene (13-15), vitamin B-6, B-12 and folate (6, 13, 14, 16, 17), vitamin C (13-16, 18-20), vitamin D (21, 22), vitamin E (12, 23, 24), and selenium (15). Additionally, lower red blood cell counts of Omega-3 (n-3) fatty acids have been found in tobacco-using patients with schizophrenia (25). Similarly, trends of lower levels of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) have been discovered in certain smoking populations (26-28), however these may be attributed to dietary differences (26).

Smoking, in its own right, poses significant health concerns, however when combining it with other forms of substance abuse, smoking becomes an intricate behavioral component to both the physical and mental wellbeing of a patient seeking substance abuse treatment. Respectively, the scope of this paper is focused on the health behavior(s) associated with, the comorbidities related to, the relevance and significance for, and future application and practices for treating tobacco-using behavior.

Economic Cost and Prevalence of Smoking

In the United States (U.S.) alone substance abuse is attributed to over \$484 billion per year (29). Of that, \$138 billion, \$185 billion, and \$161 billion are attributed with

smoking, alcohol abuse, and illicit drug use respectively (29). The U.S. Department of Health and Human Services attributes excessive drinking to account for 2.3 million years of potential life lost, which represents a mere half of life lost due to smoking (3, 30). This illustrates a significant financial burden on the U.S. healthcare system and has not gone unnoticed. In recognition, social stigmas towards the behavior have grown substantially (31) contributing to adoption of community and institutional policies banning, and regulating, smoking (31-33). As a result, smoking rates since the mid 1960s in the U.S. have dropped nearly fifty percent from 42% to 20.8% in 2006 (34). However, this decrease in smoking rates represents the general U.S. population and not those seeking treatment for substance abuse. The prevalence of smoking among alcohol dependent individuals is approximately 85% (35) and between 80% to 98% of those seeking substance abuse treatment (3, 36). These statistics alone suggest an important relationship between smoking and other categories of substance abuse, and warrant further attention.

Smoking, Alcoholism, and Substance Abuse

Psychological Relationships

Similar to alcohol and substance abuse, smoking is commonly used as a coping mechanism for coping with negative affect and stress (5, 37-39), and has been frequently associated with higher rates of neuroticism, depression, and anxiety (40). Additionally, smoking initiation is associated with drinking and increased smoking is related to an increase in alcohol consumption (3). Further, for individuals who are both dependent on alcohol and smoking, smoking has been shown to significantly correlate with urges to drink

(3, 35), and visa versa. A possible explanation for this is cross-cue reactivity, or the conditioning of one mechanism with repeated use of another (41). Moreover, smoking may encourage a change from moderate drinking to heavy drinking during relapse (5, 41). In the physiology realms, nicotine may play a role in mitigating withdrawals from alcohol contributing to relapse, and may weaken the cognitive and physiological effects of drug and alcohol abuse (i.e. promoting tolerance) (42). Further, studies of both human and animals have suggested there are common genes that may influence cross-addictions for tobacco and alcohol (42).

Physiology and Malnutrition

The links between malnutrition and alcoholism are currently well researched and reported. Chronic alcohol use has been shown to have a strong effect on the absorption, storage, and excretion of micronutrients in the small intestine leading to significant deficiencies in water-soluble vitamins including folic acid (also associated with significant increased risk of benign breast disease in women of ages 18-22 years (43)), thiamin, ascorbic acid, magnesium, vitamin B-12, and overall decreases in antioxidant absorption (14, 44-49). In addition, the oxidative stress on bone cells from ethanol (50) result in an over-all increase of oxidative stress on the body; and when further combined with the oxidative burden of smoking a synergistic effect is manifested, which may lead to substantially greater risks of cancer, neurodegenerative disorders, and CVDs (3, 51-54). Additionally, smoking has been shown to have a substantial impact on the mechanistic functionality of calcium and vitamin D. This has been shown to result from lowered parathyroid hormone and calcitriol levels (55) leading to deficiencies in both calcium and

vitamin D putting individuals at increased risk of bone fracture (56-59). Similar patterns of dietary habits for low dairy and vitamin D intake amongst both smokers and alcoholics further increase potential for vitamin D and calcium deficiencies (56, 58, 60). Studies have also shown evidence of increased bone reabsorption occur in alcoholics (50). This results in a compounding effect of increased risks of osteoporosis, osteomalacia, and other calcium related diseases (56).

Evidence has demonstrated that chronic alcohol abusers partially eat meals and that alcohol likely supplies nearly half of their total daily caloric needs (44). Additionally, chronic and binge alcohol consumption is related to poor quality of diet (61) and adherence to the food guidelines (62). In a study analyzing patterns of alcohol consumption and diet quality, increased consumption of alcohol was associated with lower Healthy Eating Index (HEI) scores while the lowest HEI scores were demonstrate by those with the highest quantity and lowest frequency of alcohol consumption, or binge drinking (61). Similarly, Valenia-Martin et al. also identified various relationships in eating behaviors among both excessive and binge drinkers. These relationships included: excessive alcohol consumption without binge drinking was associated with insufficient milk intake and excessive intake of eggs, fish, and meat; excessive drinkers with binge drinking was associated with a greater likelihood for insufficient intake of milk products, fruits and vegetables as well as meat; binge drinking alone was associated with excessive meat consumption; and those who drank excessively, regardless of binge status, had a higher likelihood to skip meals (62). In particular, this exposes chronic alcohol users to malnutrition and when combined with increased vomiting, diarrhea, and gastrointestinal and hepatic conditions, which are

frequently associated with excessive alcohol consumption, risks of malnutrition increases significantly (44, 63). Along these lines, drug use plays a large role on dietary habits, as drug use is associated with strong cravings for ‘empty-calorie’ foods, or foods that contain little nutritional value as they are lacking components such as amino acids, vitamins and minerals. (64-66). Drug use is also associated with low BMI, occurrences of protein-energy malnutrition and anemia, and low hemoglobin, protein, and antioxidant values—all of which significantly contribute to immunonutritional deficiencies (64, 67).

Similar to the reinforcing properties of food, drug, alcohol, and nicotine also impact the release of the neurotransmitter dopamine. Among its many roles, dopamine is an inhibitor of appetite and, when over-stimulated during drug use, is associated with a decrease in food intake. Further, when the drug-induced dopamine effect wears off, dopamine levels decrease followed by an elevation of hunger. This results in associated dysfunctional eating patterns, including skipping meals, that may further lead to malnutrition (68) for chronic drug abusers and increased risks of overweight, metabolic syndrome, and obesity for chronic alcohol abusers (62). Finally, substance abuse is considered to be strongly associated with high impulsivity (69-71) of which has been universally linked to other self-destructive behaviors such as impulsive eating (obesity), gambling, and even suicide (70, 72-74). Malnutrition causes a variety of physical and mental health issues ranging from depressive mood and inhibited cognition to neurodegenerative and cardiovascular disease (53, 75, 76). These provide an overwhelming need for addressing smoking cessation in this population.

When taking into account the numerous significant relationships and effects between smoking and substance abuse, the act of smoking becomes less of a pervasive addiction-

driven behavior and more of intricate component to a deadly, and much greater fundamental health behavior.

Tobacco Use in Substance Abuse Treatment

Given the relationship between smoking and substance abuse it is an unfortunate reality that tobacco cessation is frequently excluded from substance abuse treatment programs. A 2008 study showed that of substance abuse treatment facilities in the U.S., 41% offered a smoking cessation program, 38% offered group or individual counseling for smoking cessation, and only 17% offered smoking cessation medication (3, 77). In other studies, 69% of facilities offered no nicotine dependence treatment (3, 78), and of the facilities surveyed in Canada only 54% offered any cessation support, and claimed they “placed ‘very little’ emphasis on smoking compared to other substances” (3, 79). The prevalence of smoking among alcoholic dependent individuals and methadone patients remain extremely high at more than 85% (35) and 77-90%, respectively (36). In fact, many patients seeking substances abuse treatment find themselves initiating smoking during, or sometime shortly after, treatment (3, 80). A meta-analysis by Friend & Pagano showed that 15% of non-smokers entering treatment end up leaving as smokers and half of those maintain smoking after finishing treatment (80). This is common in smoking-permitted substance abuse treatment facilities as smoking is frequently used as a normalized means of socializing and/or is substituted for other addictions (i.e. cross-addiction) (80). Moreover, it is also common for staff to be smokers themselves. It has been reported that 30 to 40% of staff in Canadian substance abuse treatment facilities smoke (3, 81).

This is not to say that the common perception of substance abuse treatment does not, or should not include, tobacco dependence treatment. Some states have begun to implement smoke free policies for hospital settings including substance abuse facilities (3, 81), and the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-V) now includes tobacco use disorder (3, 82). However, obtaining support from both staff and administrators for tobacco cessation treatment, or prohibition, is seemingly difficult. Baca and Yahne suggest that such barriers to these policies include: few tobacco treatment resources, unfounded fears within staff and administrators regarding policy, staff attitudes about and the use of tobacco, and inadequate training (3). Common notions held regarding the inclusion of tobacco treatment, or policy, include the idea that quitting smoking may jeopardize obtaining and maintaining sobriety, that smoking cessation should be delayed until an individual has been sober for a period of time, and that administrators fear facilities will experience decreased patient enrollment as a result of stricter and less desirable smoking policies (3, 83, 84). Of course, these notions are completely unfounded as sobriety outcomes have been shown to be enhanced by smoking cessation (3, 41), smoking cessation does not jeopardize sobriety (3), and that discontinuing tobacco may help with discontinuing other substances (3, 83, 84). Additionally, several studies have shown that over 70% of patients in substance abuse treatment express interest in smoking cessation, with only 20-30% having any actual intention to quit (3, 83, 85). Accompanying this, in a meta-analysis of smoking cessation success amongst the substance abuse treatment population, cessation rates ranged from 4.7% (6-month follow up) to 23.4% (1-week follow-up)(3). Although a seemingly low number, 23.4% may have substantial implications for future increases in

cessation rates amongst this population. For example, when comparing the reported quit attempt of 24.4% to the reported 20% to 30% intention to quit, this might suggest that increasing patients' intentions to quit may reflect actual quit attempts and given the significant relationship between smoking cessation and sobriety, this may also reflect an increase in sobriety as well. With this in mind, it has become apparent that including tobacco cessation both in addition to, and of equal value with, drug and alcohol treatment is essential to more effectively treat substance abuse addiction.

Smoking Cessation Interventions

Currently, several studies have shown the effectiveness of tobacco cessation interventions within substance abuse treatment facilities. However, such interventions have focused on application of the Transtheoretical Model assessing patient stage of change for application of intervention intensity, brief cognitive behavioral therapy, or pharmaceutical based therapy (83, 84, 86). Such interventions produced modest, yet positive result suggesting both potential benefits, and negligible harm, for encouraging tobacco cessation during substance abuse treatment. That said, none of these studies attempted to approach smoking cessation using the principles from Self-Determination Theory, Health Belief Model, and Perceived Health Competency (PHC) theory to promote motivation for underlying health behavior change.

Self-Determination Theory

According to Self-Determination Theory (SDT) there are two types of motivation: Extrinsic and Intrinsic. Intrinsic motivation is the motivation based on the personal desire to act or behave a certain way because the individual enjoys it. Whereas extrinsic motivation is motivation from the outside environment and can be perceived as controlling and confining, ultimately undermining self-determination for a task (87). Obtaining intrinsic motivation requires three components: relatedness—the sense that individuals must hold a meaning to a behavior that personally relates to their individual or group identity, competence in the action or behavior, and autonomy in their behavior to perform the task (88). Expected rewards, threats, imposed goals, pressured evaluations, and directives decrease intrinsic motivation because they are considered externally controlling and non-autonomous (88).

At this time, the design of smoking interventions at most substance abuse facilities do address the need to increase motivation, however they do not value SDT to structure their interventions (89, 90). That said, smoking interventions outside of substance abuse facilities that are designed around SDT have been shown to result in increased cessation (91) suggesting that its application is viable.

Health Belief Model

The Health Belief Model posits four key components to health behavior which include: health-related action depends on the presence of a concern making a health issue relevant (perceived susceptibility to and perceived severity of a health issue), the outcome expectations towards addressing a health issue (the perceived benefits of and perceived barriers to changing a health behavior to address the health issue), a belief that one is

capable of correcting the health issue (self-efficacy) (92, 93), and some form of trigger to start the decision making process (93). With respect to other antecedents for motivation and learning, self-efficacy seems to hold the most solidarity for impact amongst behavioral motivation theories (94, 95). According to Zimmerman, perceived self-efficacy is the perception of one owns “capability to fulfill different levels of challenges in specified domains of functioning” (95, 96). In other words, people’s judgments on their own ability to perform a particular task (97). Amongst many other impacts of behavior influenced by self-efficacy, studies have shown that self-efficacy influences greater task attempt, task completion, aspiration levels, goal commitment, work attitudes, and task competency (95, 96, 98). For example, higher self-efficacy towards both smoking cessation and nutritional health have been linked with greater tobacco cessation rates and healthier eating habits (99, 100). Additionally, increased perceptions of self-efficacy can be taught and can be continually increase over time (98) suggesting that increasing self-efficacy of one behavior may influence the self-efficacy of another.

Self-Competency

Closely related to perceived self-efficacy is perceived self-competency, and is the first key component of SDT. Perceived self-competency plays an intricate role in the development of efficacy and is measured more generally, as it is the individual’s overall perception of their ability to perform in specific realms of behavior (i.e. “How good are you at sports?”) (95, 96, 101). Further, perceived self-competency has frequently been shown to be predictive of self-efficacy and the Perceived Health Competency Scale (PHCS) has been developed to demonstrate this in health behaviors (96, 98, 101-103). With these principle

insights for the impact of perception of self-efficacy and self-competency on behavior, came the development and application of PHC theory (104). PHC theory states that the greater the competency an individual has in any aspect of their health, the more control they have over their entire health (104, 105). As a result of its intimate relationship with self-efficacy, and in concordance with PHC's reliability predicting health behaviors (105), it is plausible to infer that by increasing the perceived self-competency of one particular health behavior, then the result may be an increased self-competency, and self-efficacy, of another health behavior.

Autonomy

As mentioned previously, autonomy is the second key component for intrinsically driven motivation. According to Williams et al., "SDT uniquely predicts and demonstrates that only when perceived competence is accompanied by the experience of autonomy will it motivate sustained change" (106). Autonomously driven behavior is considered as originating within one's true sense of self, completely uninhibited by outside influences, and experienced for a sense of personal satisfaction (107). However, this is not to say external cues cannot influence autonomous behavior as a process of internalization may occur, in which individuals integrate external values of behaviors and transform them into their own (107). For example, an athlete will only partake in behavior in which they find of equal to their values and as enjoyable (i.e. doing a particular weight-lifting exercise which they enjoy in order to improve strength for a relevant sport-related task) (108). This has not gone unsubstantiated, as many studies have shown that autonomy-supported events are a strong predictor of emotional tone (i.e. pleasurableness), creativity, cognitive activity (i.e.

concentration), and behavior initiation and maintenance (109-111). Even in studies with limited autonomy-supported behavior, the perception of autonomy is associated with health status (112), physical activity (108, 113), involvement with smoking cessation counseling (114), and diabetic glucose regulation (115).

Relatedness

The third principle in SDT is a need for relatedness among others. This concept is highly regarded as uncontroversial and widely accepted in contemporary motivational theory (116). Relatedness is the instinctual need for one to find social support and belongingness with others in their environment such as emotional connections and support from family members when dealing with a life-threatening illness (116). This enables an individual to have access to additional resources that they would otherwise not have, which may include informational, monetary, and emotional resources (1, 116). Such resources are necessary for behavioral initiation and maintenance.

As stated earlier, treating smoking cessation with equal significance as substance abuse is essential for both overall health and sobriety. However, as a result of the high prevalence of ambivalence towards smoking cessation within substance abuse treatment, it has become necessary to gather new data illustrating both the application and validation for a systemic change in how tobacco addiction is addressed during substance abuse treatment. It is with this that through the following application of SDT, and the other concepts listed above, such systemic change can be manifested without creating additional supposition and resistance from both staff and patients. The following study will attempt to demonstrate this by using these principles as the functional foundation for the inclusion of a series of nutrition

and health education sessions provided to patients during a low-intensity smoking cessation intervention at a substance abuse treatment facility.

Nutrition and Health Education

The process of learning and adapting behaviors that include choosing nutritious and healthy food choices are a core part of caring for oneself and should be incorporated into the psychological and social re-education process, especially in light of the many nutrient deficiencies, malnourishments, and related symptoms associated with chronic alcohol and substance abuse (117). Grant et al. suggests nutrition education leads to positive substance abuse treatment outcomes and that nutrition education services should be included in substance abuse treatment (118, 119). Of those studies, albeit few in number, that have incorporated nutritional education in treatment, success has been a standard (119, 120). Nutrition education is a common theme in educational environments ranging from grade school to medical school yielding more precedence as our understanding of nutrition's impact on human health, and behavior, grows. Education is psychologically empowering and providing nutrition education encourages people to analyze their situations and make informed decisions about their nutritional situation (121). Nutrition education interventions among the adult population have consistently resulted in increased nutritional knowledge and nutrition-efficacy (122-124). In line with SDT, nutrition and health education can be provided in manner that gears teaching methods to increase autonomy, self-efficacy, and relatedness towards nutrition. For example, a nutrition educator may provide students with pertinent information regarding a nutritional problem and allow the student to interact with other students to create a solution (121). This may encourage autonomy in regards by means

of self-directed learning (125) and develop a sense of relatedness amongst one's peers through socialization with others in similar circumstance (121). Further, this may enhance perceived self-efficacy in nutrition-related health applications (i.e. nutritional self-efficacy) as they successfully solve the problem(s)(126, 127) and ultimately increase perceptions of health competency.

We therefore suggest that a STD-based smoking cessation intervention that incorporates a series of nutrition and health education sessions, which is designed to enhance self-determination for positive health behaviors (i.e. nutritional self-efficacy and the relationships between smoking, alcohol consumption, and substance abuse as they relate to each other and nutritional health), would increase intrinsic motivation for other health behaviors—more specifically smoking cessation.

Based on the preceding studies and theoretical evidence, this study examines the pre and post-intervention prevalence of smoking, motivation towards smoking cessation (intrinsic and extrinsic), perceived nutritional self-efficacy and perceived health competence of patients enrolled at a substance abuse treatment center as a result of the a SDT based smoking intervention. We predicted that of those who participate in the nutrition and health education session series as well as are exposed to an autonomous, self-competency, and relatedness enhancing environment that promotes smoking cessation would report an increase in nutritional self-efficacy, an increase in perceived health competency, elevated intrinsic motivation towards smoking cessation, and greater intention to quit smoking.

MATERIALS AND METHODS

Description of Treatment Facility

The investigation was a cross-sectional intervention study performed at Memorial Hermann Prevention and Recovery Center (MHPaRC) located in Houston, Texas. MHPaRC is a drug rehabilitation and alcohol treatment facility offered to both adults and teenagers. At the time of the study, their treatment program was centered around the Minnesota Model of treatment (128). The Minnesota Model is a commonly used treatment design incorporating the Twelve Step method used in Alcoholic Anonymous as well as additional individual, group, and family counseling (128). MHPaRC treatment programs respectively includes: detoxification treatment, thirty to ninety day residential treatment, four to seven day outpatient treatment, and a weekly aftercare program.

For the purposes of this study, the intervention and assessments were conducted on patients enrolled in residential treatment. Residential treatment was 24 hour, seven days a week inpatient treatment. Patients enrolled in residential treatment were required to follow a daily schedule between the times of 8:00AM and 9:00PM. This schedule includes routine 30 minute to 90 minute activities including meals, group and individual counseling, education groups, gender specific grief groups, spiritual activities, Alcoholics Anonymous, Narcotics Anonymous, meditation and reflections groups.

Participants

Subjects for the study were male and female patients participating in a 3- to 4-week inpatient/outpatient program at MHPaRC. Subjects consisted of all consenting adults within the MHPaRC's adult program (19 years of age and older). Because we were measuring perceived health competency, motivation for smoking cessation, intentions to quit smoking, and nutritional self-efficacy for the general substance abuse treatment-seeking adult population, such a large age discrepancy was acceptable. Acquisition of subject consent for participation was not difficult, as patients at the MHPaRC had historically provided willing approval for participation of survey-based research.

Patient admission into the MHPaRC was continuous creating variability in subject cohort. To account for this, cohorts were assessed and grouped after completion of MHPaRC treatment program with respect to stage of the intervention.

Subject Recruitment

A script was read out loud to patients informing them of a study assessing the effects of a series of nutrition and health education sessions on participants' nutritional food competency by the lead researcher (Appendix D-3). They were then presented with an informed consent form (Appendix D-1) in addition to all pre-assessment surveys. During stage one, surveys presented to all patients once a week (every Wednesdays) during the 'Goals Group', which was the first activity of the day (8:00AM). During stage two, surveys were presented at the end of the nutrition and health education session twice a week (Wednesdays and Thursdays). The nutrition and health education sessions replaced the

already scheduled 'Healthy Living and Life Skills' class twice a week (Wednesdays and Thursdays from 3:00PM-4:00PM). The 'Goals Group' and 'Healthy Living and Life Skills' classes were already part of facility treatment and therefore all patients are expected to attend. All residential patients were asked to complete the Smoking Prevalence/Cessation Motivation, Nutritional Self-Efficacy, and PHCS Questionnaires. As the MHPaRC incorporated the intervention procedures as new facility protocol, patient willingness to participate was only reflected in individual choice to complete assessment surveys.

Exclusion criteria for participants included diagnosis of dementia or schizophrenia, inability to comply with intervention procedures due to severe cognitive deficits or psychiatric symptoms, and unwillingness to attend intervention procedure education sessions.

Intervention Procedures

The purpose of the following intervention procedures was to increase patient autonomy, competency, and relatedness towards smoking cessation at MHPaRC. In order to accomplish this, patients were enrolled in a series of biweekly nutrition and health education sessions while at MHPaRC; and staff was trained to provide a supportive role towards patient smoking cessation and autonomy. Intervention procedures were concurrent with MHPaRC adult treatment and would effectively be MHPaRC adult treatment policy for the duration of the intervention.

Staff

The structure of MHPaRC treatment provided patients with frequent access to patient-counselor/staff (patient interacting staff) interaction and was therefore key for counselors and staff to encourage relatedness, autonomy, and self-efficacy growth towards smoking cessation amongst patients.

Prior to the study beginning, counselors and staff were provided a study protocol (Appendix D-2) and forty-five minute informal informational regarding the study including justification, protocol/procedures, and question/answers.

Similar to study performed by Geoffrey Williams using SDT as a basis for his intervention regarding smoking cessation and high cholesterol in low-income Americans, staff must support autonomy towards smoking cessation by not aligning to either side of ambivalence towards cessation while encouraging patients to reflect on their feeling towards cessation and act autonomously (107). Similar to patients' feelings towards behavior change, with respect to drug and alcohol use, counselors and staff were encouraged to provide positive feedback as well as empathy to enhance efficacy and relatedness towards smoking cessation. In the case of smoking relapse, counselors and staff were encouraged to hold a neutral and nonjudgmental stance on smoking cessation while reassuring the patient that it was normal to relapse and assist with individual problem solving in order to aid in the prevention of future relapse (107). Counselors and staff were encouraged to maintain a supportive position on patient decisions while encouraging positive health behavior change. Counselors and staff were also encouraged to promote participation in the already-available MHPaRC Smoking Cessation group for any patient expressing interest in smoking cessation.

In respect to the relatedness with healthy-lifestyle behaviors, counselors and staff who smoke were asked to not smoke within sight of designated patient smoking areas and were asked to not reveal to patients that they currently partake in smoking behavior. Further, to help take focus off of the act of smoking, counselors and staff were ask to identify the time between classes as “inter-activity periods” with no mention of the words “smoke” or “break”.

Staff members were provided a script to be read to patients at the beginning of Community Group (Appendix D-2). The Community Group was a biweekly group provided to patients as an opportunity for patients and staff to address problems as well as to identify “what is working” for them in their treatment. The script was also read at the beginning of Goals Group. The script was composed of six questions designed to enhance salience of the similarities between smoking cessation and substance abuse as well as provide reliable source (the counselor) from which it could be introduced. This was thought to help encourage relatedness within treatment without interfering with staff autonomy and apprehension. The script was as follows: “Please quietly reflect on what I’m about to say. Although this is a smoking allowed facility, I would like to take a minute to remind you that smoking, alcohol, and substance abuse are very closely related and that the use of one will make it much more difficult to quit the other. Because smoking does not directly make your life ‘unmanageable’ and is not illegal, we don’t prevent you from smoking here at the PaRC. However, I want you to think about the reasons you are choosing to smoke and how it is similar to your drug and/or alcohol use the next time you go out for a smoke. Try asking yourself these six questions: Does my urge to smoke reflect my urge to relieve emotional

stress similar to when I would drink or use? Am I using smoking as a coping mechanism instead of addressing the underlying issue? Am I smoking because others around me are smoking and I feel it necessary to do in order to socialize with them? Do others think it is necessary to smoke in order to socialize with them? Are my reasons for smoking worth the risk to my sobriety? Are my reasons for smoking worth the risks to my health and the health of those around me?”

Nutrition and Health Education Session Series

A series voluntary nutrition and health education sessions were added to patient schedules. These sessions were open-discussion based, led by the lead researcher, and occurred twice a week for one hour. There were a total of six sessions on a repeating cycle allowing for participant exposure to each session.

As shown as successful by Glasson et al., a peer education intervention designed to focus on modifiable factors such as attitude, perceived barriers and threats, self-efficacy, knowledge and awareness, and social support was shown to yield positive results in improving nutrition efficacy (129). Additionally, the sessions included key concepts from adult learning principles (130) to help encourage enhancement of nutritional competency, autonomy, and relatedness. More specifically and according to these key concepts presented by Russell, adults use previous person experience, such as education or work experience, to create connections between new and old concepts within a particular subject matter. These previous experiences can create biases that both create and remove obstacles to learning (130, 131). To account for this, each session allowed and encouraged patients to openly discuss their experiences and perception on topics covered simultaneously with their peers

and the instructor. The instructor would use this feedback to relate and empower patients with accurate information on topics while promoting both relatedness and self-competency to the associated health behavior.

Each session also included the concept that adults require control over the nature and direction of the education process to promote active learning (130, 132). In other words, adults need a sense of autonomy for active learning. The sessions accomplished this by allowing patients to both provide and lead topic discussions based off perceptions and questions created from their intragroup interactions.

Russell as suggests that adult learning requires the opportunity for demonstrating an understanding of a skill and/or knowledge learned, or enhanced perception of self-competency (130, 133). The design of each session promoted this by encouraging patients to interact with their peers and instructor during both their group and class setting. Such interactions were the result of questions provided to patients about content previously known and new content acquired during each nutrition and health session.

The structure of each nutrition and health education session involved patient-patient peer-interaction led by the lead researcher of the study. At the beginning of each session the researcher provided the patients with the topic of the session. The researcher then provided the patients with a worksheet (Appendix C) and instructed them to gather in small groups ranging from three to four people with the expectation of groups consisting of an additional two to three people. Patients worked relatively quietly with one another to answer the questions on the worksheet for fifteen to twenty minutes. Questions included knowledge of the nutrition-related topics in addition to meal planning scenarios and coping skills such as:

“What is a lean protein and what is a fatty protein?”, “What are some myths about fat?”, and “How can you tell when a vegetable is ripe?”. After discussing with their groups, a classroom wide discussion followed to reinforce correct information and provide explanations for misunderstandings. Patients were encouraged to openly share their answers and discuss alternative views. The patients were allowed to keep their worksheets as reference material for personal use (Appendix C).

Topics for each session were chosen by commonly presented types of nutritional misinformation frequently observed in the US population as well as their relevance to the physiological and psychological relationships with addictive behaviors (134-139). Discussion topics were as follows (in order): Meal Planning, Proteins and Fat, Nutritional Myths (emphasis on correct nutritional behaviors and provide tools for distinguishing between unhealthy nutritional behaviors), Fruits and Vegetables, Nutritional Barriers, and Smoking/Alcohol/Drug Use and Nutrition. Session content reflected the Total Diet approach recommended by the American Dietetic Association (ADA) when communicating food and nutrition information (140) and the report of the 2010 Dietary Guidelines for Americans by the Dietary Guidelines Advisory Committee (141).. The topics, goals, and key messages for each nutrition and health session are provided in Figure 1.

MHPaRC’s current voluntary smoking cessation group was continued, remain available, and voluntary, during the intervention. This group focused on smoking strategies, encouraging smoking cessation, a resource as a support group, and providing additional counselor support. This cessation group also strongly encouraged the use of

FIGURE 1 Nutrition and Health Education Session Schedule: Topics, Goals, and Key Messages have been listed for each session. Each session was approximately one hour in length and occurred in the preceding order.

Session A:

Topic: Meal Planning

Goal: To provide patients with the tools and confidence need to plan meals and eat less impulsively.

Key Message: Everyone is capable of planning healthy foods to eat, whether it be immediately or in far into the future.

Session B:

Topic: Proteins and Fats

Goal: To inform patients of portion sizes and qualities of protein and fats found in various types of foods.

Key Message: Fats and proteins are in just about every food product, and with the correct distinction and moderation of each, choosing the healthiest foods for me is easy.

Session C:

Topic: Nutritional Myths

Goal: Provide patients with the tools to distinguish common food facts from fiction.

Key Message: Though the use of MyPlate and other governmental resources, distinguishing nutritional fact from fiction is pretty simple.

Session D:

Topic: Fruits and Vegetables

Goal: To provide patients with the confidence in choosing, purchasing, and preparing fruits and vegetables, which are most healthful for them.

Key Message: Including fruits and vegetables into my diet is a very easy and a good thing to do.

Session E:

Topic: Nutritional Barriers

Goal: To acknowledge, assess, and derive easy solutions to individual and environmental barriers to eating healthfully among patients.

Key Message: Once I recognize my barriers to eating healthfully, I am capable of overcoming them.

Session F:

Topic: Smoking, Alcohol, Drug Use, and Nutrition

Goal: To informed patients of the nutritional consequences of smoking, abusing alcohol, and drug use.

Key Message: Smoking, misusing alcohol, and drug abuse greatly affect my nutritional wellbeing.

nicotine replacement therapy (NRT) as a strategy for cessation. Participation in the smoking cessation Group was recorded and accounted for as part of data collection.

Data Collection

Study Stages

Stage one consisted of non-intervention baseline data gathering and continued for nineteen weeks. This functioned as the study control. Individualized patient data was gathered once a week on Wednesday. Those within their first week of treatment must have completed detoxification prior to completing a survey. Data gathering procedures followed standard data gathering procedures for this study later described in the *Assessment Tools* section.

Stage two consisted of all intervention procedures and implementation of the nutrition and health education sessions. Stage two began on week 20 and continued for twelve weeks. Individual data collection was gathered once a week from either the Wednesday or Thursday health and nutrition education sessions. Those within their first week of treatment must have completed detoxification prior to completing a survey. Data gathering procedures followed standard data gathering procedures for this study later described in the *Assessment Tools* section.

A graphical representation of the timeline for intervention procedures and assessments is shown below in Figure 2.

FIGURE 2 Timeline of Intervention Procedures and Assessments: Shaded regions represent the beginning of the intervention procedures. Session A scheduled for week 26 was cancelled due to a facility special event. Refer to Table 1 for more information on Sessions A through F.

Date	8/7/13	8/14/13	8/21/13	8/28/13	9/4/13	9/11/13	9/18/13	9/25/13	10/2/13	10/9/13	10/16/13	10/23/13	10/30/13	11/6/13	11/13/13	11/20/13	11/27/13	12/11/13	12/18/13	8/20/14	8/21/14	8/27/14	8/28/14
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	20	21	21
Session	No Intervention: Control Data Collection Only																			A	B	C	D
Date	9/4/14	9/5/14	9/10/14	9/11/14	9/17/14	9/18/14	9/24/14	9/25/14	10/1/14	10/2/14	10/8/14	10/9/14	10/15/14	10/16/14	10/22/14	10/23/14	10/29/14	10/30/14	11/5/14	11/6/14	11/12/14	11/13/14	
Week	22	22	23	23	24	24	25	25	26	26	27	27	28	28	29	29	30	30	31	31	32	32	
Session	E	F	A	B	C	D	E	F	*	B	C	D	E	F	A	B	C	D	E	F	A	B	

*Session cancelled due to facility special event

Assessment Tools

Smoking Prevalence/Cessation Motivation Questionnaire (“Smoking Prevalence and Nutrition Questionnaire”)

Gender, age, ethnicity, type of substance abuse and status, smoking prevalence, smoking history, general motivation towards smoking cessation, and intrinsic/extrinsic motivation towards smoking cessation was measured each week of the MHPaRC treatment. This five-section assessment included a 13-question smoking prevalence and gender assessment (Section 1), the Readiness to Quit Ladder (Section 2) (35) for measuring one’s intention to quit smoking, the Reasons for Quitting Scale (Section 3) (35) for distinguishing intrinsic and extrinsic influence towards smoking cessation, PHCS (Section 4), and Perceived Nutritional Competency Scale (PNCS) (Section 5). This questionnaire was provided to every participant each week of MHPaRC treatment. Patients were instructed that the questionnaire was designed to assess their opinions on smoking and asked if they wanted

to participate. Participants were also instructed that names and results of the survey would be confidential and they could choose to not answer any questions without reason or harm.

(Appendix B-1)

Intention to quit smoking was measured using the Readiness to Quit Ladder (RTQL). RTQL scores were assessed on a value of 1 to 10 based on participant's selection. 10 being the highest and most motivated to quit smoking and 1 being the least motivated (35).

Extrinsic and intrinsic motivation for smoking cessation was measured using the Reasons For Quitting (RFQ) scale. RFQ scores were divided into subscales for intrinsic motivation (1-6) and extrinsic motivation (7-12). Subscale scores were averaged and then compared (35, 142). (Appendix B-1)

PHC was measured using the PHCS. The PHCS is a clinical measure of domain-specific health competence (105, 142). It is an 8-question Likert-scaled test designed to assess an individual's perception of self-competence on personal health. Participants were instructed to answer eight questions ranging from 'strongly disagree' (1) to 'strongly agree' (5). Scoring was calculated by adding the items together after reverse coding negatively keyed items (e.g. items 2, 3, 6, and 7). Score totals ranged from 8 to 40 with 40 illustrating greater PHC. This scale was included with the Smoking Prevalence/Cessation Motivation Questionnaire. (Appendix B-1)

Nutritional self-efficacy (NSE) was measured using the PNCS. After reverse coding the negatively keyed items, responses were summed and compared between control and experimental groups. The Perceive Nutritional Competency Scale is a 12-question Likert-scaled survey designed to assess participant nutritional self-efficacy. Participants were

instructed to answer 12 questions, three questions relating to topics of each of the six nutrition and health education sessions, ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (5). This questionnaire contained questions regarding personal attitude, beliefs, and barriers to healthy meal planning and nutritional competence similar to study done by Clifford et al regarding vegetable intake (143). Example questions included, “I know how to distinguish between a high fat cut of meat and lean cut of meat.” and “I feel I have enough time in the day to prepare a healthy meal.” Scoring was calculated by adding the items together after reverse coding negatively keyed items (e.g. items 2, 5, 6, 8, 9, and 11). Score totals ranged from 12 to 60 with 60 illustrating greater PHC. This scale was included with the Smoking Prevalence/Cessation Motivation Questionnaire. (Appendix B-1)

Data Analysis

Statistical analyses were performed using Stata 13.1 (StataCorp LP, 4905 Lakeway Drive, College Station, Texas). Descriptive statistic (e.g. mean, standard deviation) were calculated using standard summary statistics. Regression analysis and T-tests were used to detect relationships between intervention stage, PHC, nutritional self-efficacy, motivation towards smoking cessation, age, substance abuse type and status, ethnicity, and sex. One-way frequency tables were used to determine frequency of substance use both during and prior to treatment.

RESULTS

Demographic Information

The study consisted of 496 total participants over 32 weeks. Demographic information includes age, sex, ethnicity, and yearly income. Mean age was 37 years with a standard deviation of 12.4 years. Age was divided into three groups by age ranges of 18 to 35 years (47%) for young adults, 36 to 55 years (43%) for middle adults, and 56 years and older (10%) for aging adults. Males represented 62% and females represented 38% of total participants. Self-identified Caucasians represented the greatest numbers at 84% followed by Latinos at 8%, African Americans at 2%, Asian Americans at 2%, and unidentified [other] at 4%. Income was divided into six group based on annual ranged. Group one (less than \$10,000), represented 16%, group two (\$10,000 to \$30,000) represented 14%, group three (\$30,000 to \$60,000) represented 20%, group four (\$60,000 to \$100,000) represented 17%, group five (\$100,000 to \$150,000) represented 14%, and group six (greater than \$150,000) represented 17% of total participants. Range of time in treatment was 1 to 74 days.

Data collection for the control group occurred every Wednesday between 8:00AM and 8:30AM for 19 weeks. The control group consisted of 283 participants with a mean age of 37 years and a standard deviation of 14 years. Age group one represented 51% with 144 participants, age group two represented 38% with 108 participants, and age group three represented 11% with 31 participants. Males represented 64% with 181 participants and females represented 36% with 102 participants. Those who self-identified as Caucasian represented 82%, Latino represented 11%, African American represented 2%, Asian

American represent 2%, and other represented 4% of the participants. Income group one represent 14%, group two represented 17%, group three represented 22%, group four represented 17%, group five represented 14 and group six represented 15% of the control group.

TABLE 1 Demographic Information

	Combined		Control		Experimental	
Participants (<i>n</i>)	496		283		212	
Demographic Information	Mean	SD	Mean	SD	Mean	SD
Age (years)	37	12.4	37	14.0	38	12.7
Time in Treatment (days)	13	10.9	14	11.4	12	10.2
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Age Group						
18 - 35	234	47	144	51	90	42
36 – 55	211	43	108	38	103	48
56+	51	10	31	11	20	10
Sex						
Male	307	62	181	64	126	59
Female	188	38	102	36	86	41
Ethnicity						
African American	12	2	5	2	7	3
Latino	39	8	30	11	9	4
Caucasian	418	84	232	82	186	87
Asian American	8	2	5	2	3	1
Other	18	4	10	4	8	4
Income (yearly)						
<\$10,000	76	16	40	14	36	17
\$10,000 - \$30,000	76	16	48	17	28	13
\$30,000 - \$60,000	97	20	61	22	36	17
\$60,000-\$100,000	84	17	46	17	38	18
\$100,000-\$150,000	71	14	40	14	31	15
>\$150,000	86	17	43	15	43	20

Data collection for the experimental group occurred every Wednesday and Thursday between 3:30PM to 4:00PM for 12 weeks. The experimental group consisted of 212 participants with a mean age of 28 years and a standard deviation of 12.7 years. Age group one represented 42% with 90 participants, age group two represented 48% with 103 participants, and age group three represented 10% with 20 participants. Males represented 59% with 126 participants and females represented 41% with 86 participants. Those who self-identified as Caucasian represented 87%, Latino represented 4%, African American represented 3%, Asian American 1%, and other represent 4% of the participants. Income subgroup one represented 17%, subgroup two represented 13%, subgroup three represented 17%, subgroup four represented 18%, subgroup five represented 15%, and subgroup six represented 20% of the participants. For statistical analysis, income subgroups were combined to larger groups representing low income (<\$30,000), middle income (\$30,000-\$100,000), and high income (>\$100,000). Table 2 illustrates all demographic information.

Frequency of Use

For all participants (control and experimental groups combined), 49% identified as actively abusing alcohol and 77% identified as actively abusing drugs. Prior to treatment, 67% used tobacco products and 67% reported using tobacco products during treatment. Of those who reported using tobacco products during, 25% intend to quit during treatment. For those whom reported intention to quit after treatment, 33% reported intentions to quit within 30 days, 9% within 60 days, and 17% within 90 days after treatment. Additionally, 67% of those currently using tobacco products have attempted to quit outside of treatment and 11% have attempted to quit during treatment. Self-reported smoking frequency prior to treatment

indicated that 30% smoked less than one cigarette a day, 15% between 1 and 5 cigarettes, 14% between 5 and 10, 13% between 10 and 15, 14% between 15 and 20, 12% between 20 and 30, and 4% for more than 30. Self-reported smoking frequency prior to treatment indicated that 26% smoked less than one cigarette a day, 17% between 1 and 5 cigarettes, 21% between 5 and 10, 18% between 10 and 15, 12% between 15 and 20, 5% between 20 and 30, and 1% for more than 30. Average cigarette smoked per day was calculated by averaging each cigarette frequency group after multiplying the top number of cigarettes per group range with the number of participants in each category (Categories <1 and >31 were omitted). Combined average cigarette frequency prior to treatment was 15 cigarettes per day and 13 cigarettes per day for those in treatment. Finally, of those that smoked during treatment, 5% participated in the facility sponsored Tobacco Recovery Group.

TABLE 2 Frequency of Use. Drug, alcohol, and smoking status of all participants. Note: *indicates of those who currently smoke during treatment.

	Combined		Control		Experimental	
	n	%	n	%	n	%
Participants (n)	496		283		212	
Drug/alcohol/tobacco inventory						
Substance abuse status						
Actively abused alcohol	236	49	146	53	90	43
Actively abused drugs	380	77	225	97	155	73
Tobacco						
Used tobacco prior to treatment	324	67	179	65	145	69
Used tobacco during treatment	321	67	181	66	140	67
Intend to quit during treatment*	81	25	51	28	30	22
Intend to quit after treatment*						
Within 30 days	105	33	66	37	39	28
Within 60 days	29	9	16	9	12	9
Within 60 days	54	17	31	17	23	17
Do not intend to quit	130	50	67	37	63	46
Attempted to quit prior to treatment*	216	67	128	71	88	63
Attempted to quit during treatment*	35	11	23	13	12	9
Frequency prior to treatment (cigarettes/day)						
<1	123	30	78	32	45	26
Between 1 and 5	61	15	35	15	26	15
Between 5 and 10	57	14	32	13	25	14
Between 10 and 15	52	13	31	13	21	12
Between 15 and 20	60	14	41	17	19	11
Between 20 and 30	48	12	19	8	29	16
>30	15	4	4	2	11	6
Averaged number of cigarettes smoked per day	Mean =	15	Mean =	15	Mean =	16
Frequency during treatment (cigarette/day)						
<1	107	26	67	28	40	23
Between 1 and 5	69	17	43	18	26	15
Between 5 and 10	88	21	53	23	35	20
Between 10 and 15	73	18	40	17	33	19
Between 15 and 20	49	12	24	10	25	14
Between 20 and 30	19	5	6	3	13	7
>30	5	1	2	1	3	2
Averaged number of cigarettes smoked per day	Mean =	13	Mean =	12	Mean =	14
Participated in Tobacco Recovery Group*	16	5	7	4	9	6

Results were combined into two groups: control and experimental. As no intervention procedures were employed for the control, this was used as baseline.

RFQ scores revealed that in comparison to the control group, both extrinsic and intrinsic motivation increased after nutrition education (24%- $t=-4.64$, $P<0.001$ and 25%- $t=-3.82$, $P<0.001$, respectively) (Table 3). After isolating for age, age groups two and three increased in extrinsic (46%- $t=-3.96$, $P<0.001$ and 64%- $t=-2.5$, $P=0.016$, respectively) and intrinsic (57%- $t=-5.76$, $P<0.001$ and a 56%- $t=-2.50$, $P=0.016$, respectively) motivation compared to the control (Table 4). After isolating for income, income groups two and three also increased in extrinsic (16.7%- $t=-1.98$, $P=0.049$ and 58%- $t=-3.086$, $P<0.001$, respectively) and intrinsic (18.8%- $t=-1.98$, $P=0.049$ and 69%- $t=-5.50$, $P<0.001$, respectively) motivation compared to the control (Table 4).

TABLE 3 Variable t-Tests. t-tests for the five main variables of interest. Results revealed significant increases in extrinsic and intrinsic motivation to quit compared to the control. In all measures, higher scores represent greater competency, motivation, or intention.

	Control		Experimental		t	P
	n	Mean (SD)	n	Mean (SD)		
Perceived Nutrition Competency Scale	283	39.6 (9.83)	213	39.4 (8.51)	0.22	0.8282
Perceived Health Competency Scale	283	27.1 (6.82)	213	26.3 (8.01)	1.24	0.2158
Reasons for Quitting: Extrinsic Motivation	282	1.6 (1.07)	172	2.0 (0.83)	-3.82	0.0002
Reasons for Quitting: Intrinsic Motivation	282	2.5 (1.51)	175	3.1 (1.06)	-4.64	<0.0001
Readiness to Quit Ladder	283	5.8 (3.43)	170	6.3 (2.53)	-1.61	0.1092

RTQL scores revealed no significant difference was found between control and experimental groups. However, in comparison to the control, age groups one and two increased in intention to quit (19%- $t=-2.32$, $P=0.021$ and 60%- $t=-2.44$, $P=0.019$, respectively) (Table 4). Additionally, income group three increased (42%- $t=-3.53$, $P<0.001$) and income group one decreased (21%- $t=2.35$, $P=0.0205$) in intention to quit as compared to the control (Table 4).

No significant difference was found between control and experimental groups in PHCS scores. However, income group one did decrease compared to the control (11.5%- $t=2.4$, $P=0.018$) (Table 4).

Results from PNCS scores revealed no significant difference was found between control and experimental groups. However, there was a decrease nutritional self-efficacy compared to the control within income group one (8.3%- $t=2.08$, $P=0.039$) (Table 4).

TABLE 4 Age and Income Variable t-Tests. t-test for the five main variables of interest isolated by age and income groups. Age groups were divided into three groups (18 to 35 years of age, 36 to 55 years of age, and 56 years of age and older). Income groups were divided into three groups (less \$30,000 a year, between \$30,000 and \$100,000 a year, and greater than \$100,000 a year). In all measures, higher scores represent greater competency, motivation, or intention.

	Control		Experimental		t	P
	n	Mean (SD)	n	Mean (SD)		
Perceived Nutrition Competency						
Age Group						
18 - 35	144	39.4 (10.45)	90	37.3 (8.73)	1.62	0.1067
36 - 55	108	39.74 (9.04)	103	40.7 (8.08)	-0.84	0.4046
56+	31	40.0 (9.75)	20	42.3 (7.75)	-0.90	0.3722
Income						
< \$30,000	93	38.9 (9.66)	64	35.7 (9.17)	2.08	0.0393
\$30,000 - \$100,00	107	39.1 (10.98)	74	39.8 (7.41)	-0.45	0.6561
> \$100,000	83	42.3 (7.85)	74	42.3 (7.85)	-1.01	0.3117
Perceived Health Competency						
Age Group						
18 - 35	144	28.5 (6.41)	90	27.3 (5.92)	1.41	0.1607
36 - 55	108	25.9 (6.93)	103	26.2 (8.40)	-0.32	0.7456
56+	31	24.8 (7.02)	20	21.8 (12.13)	1.13	0.2622
Income						
< \$30,000	93	28.0 (6.93)	64	25.2 (7.87)	2.4	0.0177
\$30,000 - \$100,00	107	26.7 (7.18)	74	26.1 (7.41)	0.5456	0.586
> \$100,000	83	26.7 (6.15)	74	27.5 (8.68)	-0.71	0.4767
Reasons for Quitting: Extrinsic Motivation						
Age Group						
18 - 35	144	2.0 (0.86)	81	2.1 (0.96)	-1.01	0.3149
36 - 55	108	1.3 (0.11)	77	1.9 (0.73)	-3.96	0.0001
56+	30	1.4 (1.27)	14	2.3 (0.70)	-2.5	0.0164
Income						
< \$30,000	93	1.9 (0.78)	57	2.0 (0.85)	-0.92	0.3617
\$30,000 - \$100,00	106	1.8 (1.15)	61	2.1 (0.79)	-1.98	0.0494
> \$100,000	83	1.2 (1.14)	53	1.9 (0.87)	-3.086	0.0002
Reasons for Quitting: Intrinsic Motivation						
Age Group						
18 - 35	144	2.9 (1.22)	81	2.9 (1.03)	0.07	0.9463
36 - 55	108	2.1 (1.62)	78	3.3 (1.07)	-5.76	<0.0001
56+	30	2.3 (1.89)	16	3.6 (0.93)	-2.50	0.0163
Income						
< \$30,000	93	3.0 (1.24)	57	2.7 (0.99)	1.25	0.2119
\$30,000 - \$100,00	106	1.75 (1.15)	61	2.08 (0.79)	-1.98	0.0494
> \$100,000	83	2.0 (1.65)	55	3.38 (1.09)	-5.50	<0.0001
Readiness to Quit Ladder						
Age Group						
18 - 35	144	6.1 (2.97)	76	5.4 (2.41)	1.62	0.1066
36 - 55	108	5.7 (3.72)	79	6.8 (2.33)	-2.32	0.0212
56+	31	4.8 (4.28)	15	7.7 (2.76)	-2.44	0.0190
Income						
< \$30,000	93	6.4 (2.99)	53	5.3 (2.26)	2.35	0.0205
\$30,000 - \$100,00	107	5.7 (3.28)	60	6.1 (2.40)	-0.83	0.4072
> \$100,000	83	5.2 (4.00)	56	7.4 (2.52)	-3.53	0.0006

SUMMARY AND DISCUSSION

Self-Determination Theory suggests that in order to promote smoking cessation among patients, patients' intrinsic motivation towards cessation must first be enhanced. SDT also states that enhancing intrinsic motivation requires patients to first have a sufficient sense of autonomy, relatedness, and self-competency in the action of smoking cessation (88). Promoting smoking cessation during substance abuse treatment is neither highly endorsed or practiced, and is frequently met with ambivalence creating a less than desirable environment in which a smoking cessation intervention can thrive (3)(83, 84). The Health Belief Model provides us with a complimentary approach to addressing health behavior perceptions (92, 93) and through our understanding of the Perceived Health Competency Theory (104, 105) we are able to transform behaviors and perceptions from a different health issue to another health issue. In the case of this study, the health issue specifically addressed was smoking cessation and this was catalyzed by participation in a series of nutrition and health education sessions designed to enhance nutritional self-efficacy and perceived health competency. These sessions, in addition to an environment designed to promote autonomy and relatedness in smoking cessation, were predicted to increase both intrinsic motivation and intention to quit smoking.

Based on the results of this study we were unable to establish a definitive link between our intervention procedures and an increase in perceived nutritional self-efficacy and perceived health competency. Additionally, no reliable conclusion was observed in regards to a relationship between perceived health competency and motivation as well as

intention to quit smoking. That aside, this study did show an increase in intention and motivation to quit smoking suggesting a possible positive impact of these intervention procedures on smoking cessation.

As shown in numerous other studies, higher income and age was associated with an increase in extrinsic and intrinsic motivation as well as an increase in intention to quit smoking (144-147). This may be frequently attributed to a relationship between age and income with education level (148-151). Several studies have suggested that this is a result of general factual knowledge, cognitive ability, taste differences, and a conceptual understanding and behavioral application of risk aversion, discounting, and values of future (152, 153). However, there is limited evidence suggesting that education level is the determining factor for health behavior; it has been acknowledge that it does play a role, particularly in relation to cognitive ability and one's own capacity to process and attribute information to motivation and intention (152). Although this study did not measure education level specifically, this could provide an explanation for why higher income groups show greater motivation and intention. Further, it is commonly shown that a positive relationship between increasing age and greater income (154-156) exists, and our results demonstrated this as well. Another explanation for this effect within higher income and age groups may be related to the greater availability of personal resources for managing stress and the ability to handle additional stressors associated with smoking cessation (155-157).

Although our data show a trend of increasing income with age, an explanation for its determining factors on these variables are not as commonly demonstrated by prior associations as compared to higher income. Research has revealed that older age is

associated with greater prevalence of cognitive impairments that may have a negative effects on health choices (157). However, this association is generally seen within the elderly population and the age composition of our study did not reflect high proportions of elderly participants (156) (Appendix A-1). On the other hand, age is associated with growing salience of increased illness and a sense of loss of control over one's health (102, 158). This may contribute to one's perception of a health threat and promote greater motivation and intention towards positive health behaviors (92, 159). Yet to our knowledge, age has not been specifically linked to smoking cessation motivations, or behaviors, and warrants further investigation (160-162).

Our results did not indicate a change in NSE or PHC. However, it should be noted that the lowest income group appeared to be less receptive to intervention procedures as they demonstrated a decrease in NSE and PHC. This is not an unfamiliar phenomenon, however its isolated occurrence is perplexing. When commenting on several studies that found a decline in perceived academic competence during the advancement in grade school years, Zimmerman attributed this phenomenon with an increase in self-efficacy and the growing sense of one's own ability to gain academic competence (163-166). In other words, as students become more educated, they begin to realize how uneducated they actually are. Although our results demonstrate this occurring within two measures (PHC and PNCS), it only occurred in one isolated income group (<\$30,000 per year) in which no further explanation can be provided at this time.

Limitations

This study held several limitations in which might have had a substantial impact on the effectiveness of the study design. First to be noted is staff acceptance. The intervention required specific policies for the staff to follow in order to encourage intrinsic and discourage extrinsic motivating influences. The study included a 45-minute discussion-based intervention informational to introduce the research study and its implementation procedures. Although this informational allowed the researcher to have an open discussion regarding project justification and staff concerns, further reflection and review of staff fidelity revealed inadequate training and researcher oversight. One barrier to be addressed was the significance of discouraging smoking cessation among patients. As previously suggested as common within substance abuse treatment programs, it was observed that many staff members involved in patient treatment actively discouraged smoking cessation. This also included physicians who had not been informed of the study. In order for future studies or interventions similar to this to achieve its designed impact, staff compliance must be observed and practiced appropriately prior to intervention procedure implementation.

Another major limitation of the study was the possible inconsistency within the nutrition and health concepts emphasized within the nutrition and health education sessions. Due to the design of the sessions, which relied heavily on peer-led discussion, certain content within the scope of each lesson was emphasized in varying depth on different dates. Based on verbal feedback from patients, the overall tone of the sessions appeared to be positive and inclusive to nutrition and health related concepts suggesting a successful education series design. However, future implementations of this design should retain more

structure in topic depth as to prevent the exclusion of key concepts due to running out of session time. Another related limitation associated with the nutrition and health education series was the reliability of the PNCS. The PNCS was composed of two questions based on the content for each of the six different nutrition and health education sessions. Since many of the participants did not participate in every session, reliable measuring of nutritional efficacy may have been substantially impacted. In order to reliably obtain accurate measures of nutritional efficacy, a new or different measurement tool should be used. Further, all five variables of interest contained identical subjective measurement tools to account to varying participation and consistency in data collection which left results vulnerable to response bias, test-retest reliability, and underreporting (167, 168). We used these measurement tools for two reasons: they allowed us to provide a single identical measurement for all participants minimizing confusion during survey distribution and it provided consistency for comparisons when analyzing our data. Although, each of these measurement tools has been proven reliable and valid in previous studies, this is still a notable limitation.

Non-response bias could be considered as another limitation. During stage one data collection it was observed that when a staff member informally introduced the researcher, a seemingly greater receptive atmosphere was promoted which encouraged patient participation. This may have been a result staff mitigating patient perception of a trivialized disruption in patient daily routine through an informal validation of both the study and the researcher.

With respect to the facility in which the study was performed and patient treatment schedules, the nutrition and health education sessions were scheduled on two consecutive

days every week. This may have muffled the effects of the sessions on patients as well as limited participation. The sessions may have had a greater reach if it had been scheduled three to four days apart (i.e. Mondays and Thursdays versus Wednesdays and Thursdays). Further, although the nutrition and health education sessions were scheduled as the main and default treatment group for patients at that time of day, there were other conflicting groups that mitigated attendance and participation. This limitation ultimately affected both the impact of the sessions, participation, and data collection.

Another limitation to the study was the 8-month gap from the completion of stage one to the beginning of stage two. The cause of this gap was a serious circumstance that was beyond the control of the investigators. Although no identifiable variables within facility procedures or treatment atmosphere had changed within this time frame, it is still possible that non-intervention confounders may have impacted results. Ideally, stage one should have been immediately followed by stage two. Additionally, participant population was overwhelmingly Caucasian yielding insufficient power for analyzing differences in ethnicity, which may result in an inaccurate representation for these findings in different subpopulations.

A final limitation of this study was the overall intensity of the intervention design. Due to facility policies and protocols, the study was designed to best promote the desired effect with minimal conflict and interference with pre-existing program treatment. This resulted in a less thorough intervention relying primarily on the nutrition and health education sessions as well as the script reading during Goals Group. Factors necessary for promoting competency, autonomy and relatedness in smoking cessation that were not

implemented in this study included: altering the physical features of the location in which patients were allowed to smoke such that the location would minimize the social element of smoking (i.e. relocating the smoking area by a loud and hot air conditioning system); the inclusion of tobacco abuse as part of core program treatment; and the elimination of times specifically designated for smoking.

Implications

Notwithstanding the limitations for the study, two key implications can be drawn from our results. First, the implementation of nutrition and health education sessions designed to encourage peer participation and discussion about the relationship of nutritional concepts, smoking and other forms of substance abuse, may significantly increase motivation and intentions towards smoking cessation. Although we were unable to identify the specific link between the education sessions and these increased rates of motivation and intention, it is clear that there is precedent of its effectiveness. That said, this educational series design could be used for linking other health behaviors and nutritional relevance as an attempt to promote behavioral change.

The second key implication of this study is the need to better identify the determinants for the relationship of older age and higher income with increased motivation and intentions for cessation. Published reports of such investigations were not identified in literature searches conducted for this study. Such an explanation may help redesign future health behavior interventions for specific demographics thereby increasing its impact.

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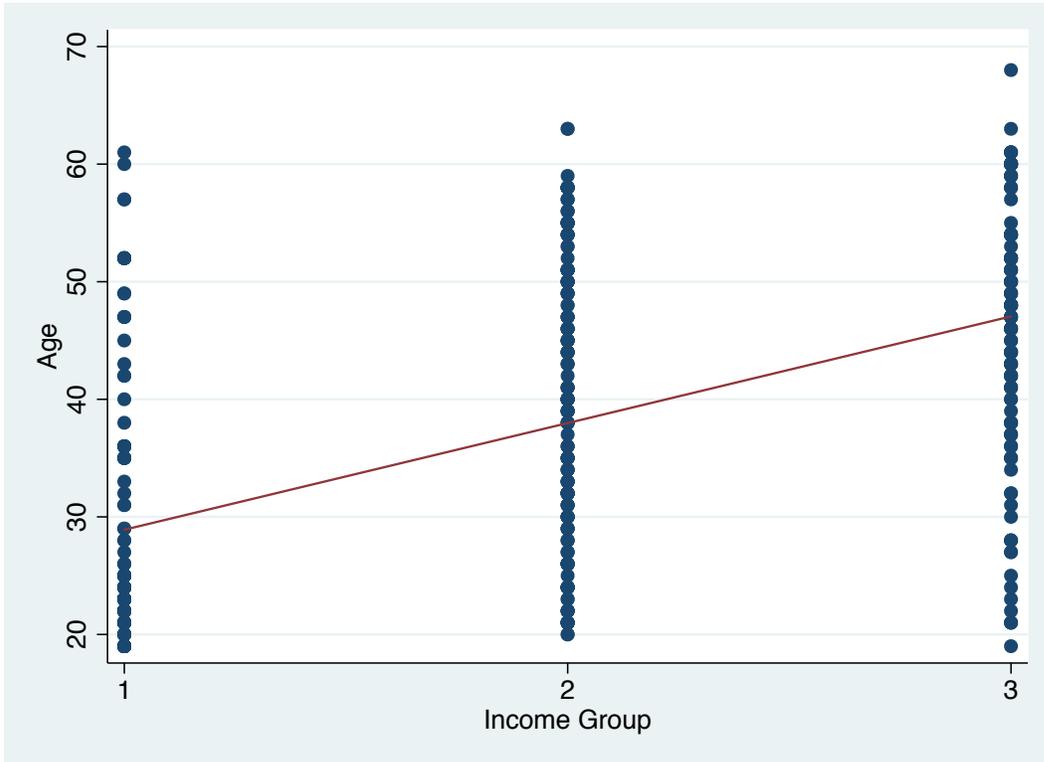
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APPENDIX A

FIGURES

A-1 Age vs Income Group: Income increases with age.



APPENDIX B

DATA COLLECTION MATERIALS

B-1 Smoking prevalence/Cessation Motivation Questionnaire (“Smoking Prevalence and Nutrition Questionnaire”)

Name: _____

Date: _____

Date of first day at the PaRC: _____

Smoking Prevalence and Nutrition Questionnaire

Section 1:

INSTRUCTIONS: Please circle yes or no.

- 1) Male or Female (*please circle one*)
- 2) What is your age? _____
- 3) Which ethnicity do you best describe yourself? (*Please circle one*)
 - a. African American
 - b. Latino
 - c. Caucasian
 - d. Asian American
 - e. Other
- 4) Which income level do you best describes you? (*Please select one*)
 - a. <\$10,000
 - b. \$10,000 - \$30,000
 - c. \$30,000 - \$60,000
 - d. \$60,000 - \$100,000
 - e. \$100,000 - \$150,000
 - f. >\$150,000
- 5) Have you ever drank alcohol?
YES NO
- 6) Do you currently drink alcohol (*Prior to treatment*)?
YES NO
- 7) Have you ever abused stimulants?
YES NO
- 8) Do you currently abuse stimulants (*Prior to treatment*)?

B-1 Continued

- YES NO
- 9) Have you ever abused opiates?
Yes NO
- 10) Do you currently abuse opiates (*Prior to treatment*)?
YES NO
- 11) Have you ever abused marijuana?
YES NO
- 12) Do you currently abuse marijuana (*Prior to treatment*)?
YES NO
- 13) Have you ever used hallucinogens?
YES NO
- 14) Do you currently use hallucinogens (*Prior to treatment*)?
YES NO
- 15) Have you ever abused depressants (*not including alcohol*)?
YES NO
- 16) Do you currently abuse alcohol (*Prior to treatment*)?
YES NO
- 17) Do you currently use tobacco products?
YES NO
- 18) Have you ever used tobacco products (at least 100 cigarettes total)?
YES NO
- 19) Did you use tobacco prior to admission to the PaRC?
YES NO
- 20) Have you used tobacco while at the PaRC?
YES NO
- 21) Do you intended to quit tobacco usage while at PaRC?
YES NO
- 22) Do you intend to quit tobacco usage after you leave the PaRC? *Please select one.*
- a. Within 30 days?
 - b. Within 60 days?
 - c. Within 90 days?
 - d. I do not intend to quit smoking

B-1 Continued

23) Have you ever attempted to quit using tobacco outside the PaRC?

YES NO

How many times? _____

24) Have you attempted to quit using tobacco while at the PaRC?

YES NO

25) How frequently would you say you smoked cigarettes prior to coming to the PaRC? *Please select one.*

- a. Less than 1 per day
- b. Between 1 and 5 per day
- c. Between 5 and 10 per day
- d. Between 10 and 15 per day
- e. Between 15 and 20 per day
- f. Between 20 and 30 per day
- g. More than 30 per day

26) How frequently would you say you smoke cigarettes while in treatment at the PaRC? *Please select one.*

- a. Less than 1 per day
- b. Between 1 and 5 per day
- c. Between 5 and 10 per day
- d. Between 10 and 15 per day
- e. Between 15 and 20 per day
- f. Between 20 and 30 per day
- g. More than 30 per day

27) Have you participated in the Tobacco Recovery Group at the PaRC?

YES NO

28) How long since your last cigarette? _____

29) What was the date when you began residential treatment at the PaRC? _____

30) What is today's date? _____

B-1 Continued

Section 2:

INSTRUCTIONS: Below are some thoughts that smokers have about quitting. On the ladder, circle the one number that shows what you think about quitting. Please read each sentence carefully before deciding.

10	I have quit smoking and I will never smoke again.
9	I have quit smoking, but I still worry about slipping back, so I need to keep working on living smoke free.
8	I still smoke, but I have begun to change, like cutting back on the number of cigarettes I smoke. I am ready to set a quit date.
7	I definitely plan to quit smoking within the next 30 days,
6	I definitely plan to quit in the next 6 months
5	I often think about quitting smoking, but I have no plans to quit.
4	I sometimes think about quitting smoking, but I no plans to quit,
3	I rarely think about quitting smoking, and I have no plans to quit.
2	I never think about quitting smoking, and I have no plans to quit.
1	I enjoy smoking and have decided not to quit smoking for my lifetime. I have no interest in quitting.

Section 3:

INSTRUCTIONS: This scale is about reasons for quitting smoking. Read each of the following reasons that smokers may have for quitting and decide how true each is for you right now. If you are not thinking of quitting right now, decide which would be for you if you were to decide to quit. Please use the following scale to answer each item.

<i>How true for you is each of the following reasons for quitting?</i>	Not at all true	A little true	Moderately true	Quite true	Extremely true
1. Because I am afraid that I will get very sick if I don't quit smoking.	1	2	3	4	5
2. To prove that I can quit if I really want to.	1	2	3	4	5
3. Because I feel like smoking is hurting my health.	1	2	3	4	5
4. To feel in control of my life.	1	2	3	4	5
5. To show that I can do other things that are important to me.	1	2	3	4	5
6. Because I am afraid that smoking will shorten my life.	1	2	3	4	5
7. So other people will stop nagging me.	1	2	3	4	5
8. To save money that I spend on cigarettes.	1	2	3	4	5
9. Because someone is making me quit.	1	2	3	4	5
10. So I won't burn holes in clothes or furniture.	1	2	3	4	5
11. Because people I am close to will be mad at me if I don't quit.	1	2	3	4	5
12. So my house or car won't smell.	1	2	3	4	5

B-1 Continued

Section 4:

INSTRUCTIONS: This is a questionnaire designed to determine the way in which different people view certain important issues related to their health. Each item is a belief statement with which you may agree or disagree. Under each statement is a scale that ranges from strongly disagree (1) to strongly agree (5). Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully and make your answers as true FOR YOU as you can. Please answer every item. There are no “right” or “wrong” answers, so choose the most accurate answer for YOU—not what you think most people would say or do.

Strongly Disagree

Strongly Agree

1-----2-----3-----4-----5

- _____ 1. I handle myself well with respect to my health
- _____ 2. No matter how hard I try, my health just doesn't turn out the way I would like.
- _____ 3. It is difficult for me to find effective solutions to the health problems that come my way.
- _____ 4. I succeed in the projects I undertake to improve my health.
- _____ 5. I am generally able to accomplish my goals with respect to my health.
- _____ 6. I find my efforts to change things I don't like about my health are ineffective.
- _____ 7. Typically, my plans for my health don't work out well.
- _____ 8. I am able to do things for my health as most other people.

Section 5:

INSTRUCTIONS: This is a questionnaire designed to determine the way in which different people view issues regarding nutrition. Each item is a belief statement with which you may agree or disagree. Under each statement is a scale that ranges from strongly disagree (1) to strongly agree (5). Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully and make your answers as true FOR YOU as you can. Please answer every item. There are no “right” or “wrong” answers, so choose the most accurate answer for YOU—not what you think most people would say or do.

Strongly Disagree

Strongly Agree

1-----2-----3-----4-----5

- _____ 1. I do not understand what the nutrition labels on food products mean.
- _____ 2. I cannot distinguish between a high calorie and low calorie vegetable.
- _____ 3. I have a strong understanding of why people who abuse alcohol suffer from malnutrition
- _____ 4. I can distinguish between a food fact and a food myth.
- _____ 5. I do not know how to distinguish between a high fat cut of meat and lean cut of meat.
- _____ 6. I do not know how many fruits and vegetables I should eat a day.
- _____ 7. I can afford to eat healthy.

B-1 Continued

- _____ 8. Planning a well balance meal is a difficult thing to do.
 - _____ 9. I cannot identify food items higher in cholesterol.
 - _____ 10. I can find something quick and healthy to eat when I'm in a hurry.
 - _____ 11. I do not understand how drinking alcohol causes me to put on a lot of weight.
 - _____ 12. I feel confident that a governmental source of information on nutrition is true.
-

Worksheet: Proteins and Fats

INSTRUCTIONS: There are 10 questions. There are two parts to each question, in the first part, please answer the question as truthfully as possible before class discussion with your group. In the second part, please add any information you found interesting, different, or helpful during the class discussion.

1) What is a protein and what are they used for?

Part 1

_____ Class Discussion _____
Part 2

2) How large is a serving of protein?

Part 1

_____ Class Discussion _____
Part 2

3) Where can I find protein?

Part 1

_____ Class Discussion _____
Part 2

4) What is a complete protein?

Part 1

_____ Class Discussion _____
Part 2

5) What is a lean protein and what is a fatty protein?

Part 1

_____ Class Discussion _____
Part 2

C-2 Continued

6) What is cholesterol and where is it found?

Part 1

_____ Class Discussion _____
Part 2

7) What are fats used for?

Part 1

_____ Class Discussion _____
Part 2

8) What are the different types of fats?

Part 1

_____ Class Discussion _____
Part 2

9) What are good fats and what are bad fats?

Part 1

_____ Class Discussion _____
Part 2

10) How much protein and fat should I have in my diet?

Part 1

_____ Class Discussion _____
Part 2



Worksheet: Nutritional Myths

INSTRUCTIONS: There are 6 questions. There are two parts to each question, in the first part, please answer the question as truthfully as possible before class discussion with your group. In the second part, please add any information you found interesting, different, or helpful during the class discussion.

1) Please list at least three different types of diets and how you feel they work.

Part 1

_____ Class Discussion _____

Part 2

2) What are some myths about dieting?

Part 1

_____ Class Discussion _____

Part 2

3) What are some myths about sugar?

Part 1

_____ Class Discussion _____

Part 2

4) What are some myths about fat?

Part 1

_____ Class Discussion _____

Part 2

5) List some things your friends have told you in the past about nutrition, food, or 6) dieting that you had a hard time believing.

Part 1

C-3 Continued

Class Discussion

Part 2

6) List as many facts as you can about nutrition, food, or dieting that you think most people do not know.

Part 1

Class Discussion

Part 2

Worksheet: Fruits and Vegetables

INSTRUCTIONS: There are 12 questions. There are two parts to each question, in the first part, please answer the question as truthfully as possible before class discussion with your group. In the second part, please add any information you found interesting, different, or helpful during the class discussion.

1) What are some starchy vegetables? (Please list as many as you can think of)

Part 1

_____ Class Discussion _____

Part 2

2) What are some non-starchy vegetables? (Please list as many as you can think of)

Part 1

_____ Class Discussion _____

Part 2

3) What are some high calorie vegetables? (Please list as many as you can think of)

Part 1

_____ Class Discussion _____

Part 2

4) How can you tell when a vegetable is ripe?

Part 1

_____ Class Discussion _____

Part 2

C-4 Continued

5) What are some ways to cook vegetables, which are your favorite, and why? (Please list as many as you can think of)

Part 1

_____ Class Discussion _____

Part 2

6) Which vegetables have the greatest amount of vitamins and minerals and which have the least? (Please list as many as you can think of)

Part 1

_____ Class Discussion _____

Part 2

7) Why are vegetables good for you? (Please list as many reasons as you can think of)

Part 1

_____ Class Discussion _____

Part 2

8) What are some citrus fruits? (Please list as many as you can think of)

Part 1

_____ Class Discussion _____

Part 2

9) How can you tell when a fruit is ripe?

Part 1

_____ Class Discussion _____

Part 2

C-4 Continued

10) Which fruits have the highest amount of calories in them and which have the least? (Please list as many as you can think of)

Part 1

_____ Class Discussion _____
Part 2

11) What is your favorite fruit and why?

Part 1

_____ Class Discussion _____
Part 2

12) How many fruits and vegetables should you have daily?

Part 1

_____ Class Discussion _____
Part 2

Worksheet: Nutritional Barriers

INSTRUCTIONS: Please answer the following questions as truthfully as possible.

What are 4 barriers that prevent you from eating nutritiously? Barriers can include, but not limited to: time, money, access, work, and nutritional knowledge.

- 1)
- 2)
- 3)
- 4)

For each barrier that you list please describe ways in which you could overcome those barriers.

- 1)
- 2)
- 3)
- 4)

-----Class Discussion-----

After discussion of nutritional barriers with others in the class, for each of the barriers you listed, what are some new ways you could overcome them?

- 1)
 - 2)
 - 3)
 - 4)
-

Worksheet: Smoking, Alcohol, Drug Use, and Nutrition

INSTRUCTIONS: There are two sections. Section 1 has six questions to answer. Please answer each question as thoughtfully and honestly as possible. You may confer similarities among your group members for answers. If a question doesn't apply to you, please answer what you think happens to other people which the question applies. Section 2 has three questions to answer. Please answer section 2 questions during class discussion.

Section 1:

- 1) List the ways smoking affects your diet.

- 2) List the ways alcohol affects your diet.

- 3) List the drugs you are familiar with and the ways they affect your diet.

- 4) When you don't smoke, what are your eating habits like?

- 5) When you don't drink, what are your eating habits like?

- 6) When you don't use drugs, what are your eating habits like?

Section 2:

- 1) How does smoking affect your body's nutrition?

 - 2) How does alcohol affect your body's nutrition?

 - 3) How does drug use affect your body's nutrition?
-

APPENDIX D

PROJECT DOCUMENTS

D-1 Informed Consent Each participant received an Informed Consent form with each survey to be completed in order to participate and submit a survey to the study.

Texas A&M University Informed Consent of Participant for Texas Smoking Prevalence and Nutritional Competency Study

The *Texas Smoking Prevalence and Nutritional Competency Study* is a study developed to assess smoking prevalence and nutritional confidence among substance abuse treatment seeking individuals within the state of Texas. This is being conducted by the Department of Nutrition at Texas A&M University and will measure smoking prevalence and confidence in one's ability to apply nutritional knowledge before, during, and after substance abuse treatment.

This study includes the addition of nutrition classes to your weekly schedule. There are individual benefits for participating in the study including increased nutritional knowledge and meal preparation knowledge. Potential risks for this study are minor at worst which may include emotional or social discomfort. If you feel uncomfortable with this study you may drop out at any time.

Participation in the study only requires you answer a smoking prevalence and nutrition questionnaire upon day one of non-detox Memorial Hermann Prevention and Recovery Center (MHPaRC) treatment and on the final day of MHPaRC treatment. These surveys will be distributed during the Healthy Living Skills Education Group, completed individually, and returned by the end in which it was received. These surveys will take you approximately twenty minutes to complete. Follow up surveys will occur during regular MHPaRC follow-up interviews at one month, three months, and twelve months from completion of MHPaRC treatment.

All information linking you to the study will not be published but instead be held in a secure location only available to the research team. Upon study completion any data linking you to the study will be destroyed.

Your participation is voluntary. You can refuse to answer any questions. If you refuse to participate there will be no penalty or adverse consequences from either MHPaRC or Texas A&M University. You may also stop participating at anytime without penalty or negative consequences.

If you have any questions about the study, please email Greg Hercules. If you have any questions regarding your rights as a research participant please call Texas A&M University Human Subjects Protection Program 979.458.1467.

D-1 Continued

If you choose to participate in this study, please sign and date this page (page 2) and return it along with your survey to Steven Halterman or Greg Hercules. You may keep page 1 of this consent form for your records.

Signature:

I have read and understand the information provided to me about participating in the research study, *Texas Smoking Prevalence and Nutritional Competency Study*.

My signature below indicates that I agree to participate in this research project.

Printed name: _____

Signature: _____

Date: _____

You will be given a copy of this consent form for your records.

D-2 Staff Protocol A copy of the staff protocol was provided to each staff member during the study informational. The protocol was discussed and a Q&A session was provided. The Methods section provided staff with a brief justification and explanation for the study. The Outline section provided staff with a list of procedures to follow during the intervention.

Staff Protocol

Staff Protocol (Methods)

The structure of MHPaRC treatment provides patients with frequent access to patient-counselor/staff (patient interacting staff) interaction and is therefore key for counselors and staff to encourage relatedness, autonomy, and self-efficacy growth towards smoking cessation amongst patients.

Prior to study beginning, counselors and staff will be provided a study protocol and thirty minute to one hour informal informational regarding the study including justification, protocol and procedures, and question/answers.

Similar to study performed by Geoffrey Williams using Self-Determination Theory as a basis for an intervention regarding smoking cessation and high cholesterol in low-income Americans, staff must support autonomy towards smoking cessation by not aligning to either side of ambivalence towards cessation while encouraging patients to reflect on their feeling towards cessation and act autonomously (107). Similar to patients' feelings towards behavior change with respect to drug and alcohol use, counselors and staff will encourage change and will provide positive feedback as well as empathy to enhance efficacy and relatedness towards smoking cessation. In the case of smoking relapse, counselors and staff will hold a neutral and nonjudgmental stance on smoking cessation while reassuring the patient that it is normal to relapse and help with individual problem solving in order to aid in prevention of future relapse (107). Counselors and staff will maintain a supportive position on patient decisions while encouraging positive health behavior change.

Counselors and staff will encourage participation in the Smoking Cessation group for any patient suggesting interest in smoking cessation.

In respect to smoking healthy-lifestyle relatedness, counselors and staff who smoke will not smoke within sight of designated patient smoking areas and will not reveal to patients that they currently partake in the smoking habit. Further, to help take focus off of the act of smoking, counselors and staff will identify the time between classes as "inter-activity period" with no mention of the words "smoke" or "break".

Staff will be provided a script to be read to patients at the beginning of Community Group. The Community Group is a biweekly group provided to patients as an opportunity for patients and staff to address problems as well as to identify "what is working" for them in their treatment. Additionally, this script will be read at the beginning of Goals Group by a PaRC staff member. This script is composed of six questions designed to enhance relatedness regarding the similarities smoking cessation and substance abuse as well as provide reliable source (the counselor) from which it is introduced. The script is as follows: "Please quietly reflect on what I'm about to say. Although this is a smoking allowed facility, I would like to take a minute to remind you that smoking, alcohol, and substance use are very closely related and that the use of one will make it much more difficult to quit the other. Because smoking does not directly make your life 'unmanageable' and is not illegal, we don't prevent you from smoking here at the PaRC. However, I want you to think about the reasons you are choosing to smoke and how it is similar to your drug and/or alcohol use the next time you go out for a smoke. Try asking yourself these six questions: Does my urge to smoke reflect my urge to relieve emotional stress similar to when I would drink or use? Am I using smoking as a coping mechanism instead of addressing the underlying issue? Am I smoking because others around me are smoking and I feel it necessary to do in order to socialize with them? Do those others think it is necessary smoke in order to socialize with them? Are my reasons for smoking worth the risk to my sobriety? Are my reasons for smoking worth the risks to my health and the health of those around me?"

D-2 Continued

Staff Protocol (Outlined)

Autonomy – Do not align to a particular side. Do not punish failure in cessation. Do not push smoking cessation. Cessation attempts must be entirely of one’s own will.

Provide positive feedback for healthy decisions

Categorize smoking cessation as a “healthy decision”.

Encourage healthy decisions

Display empathy towards the development of self-efficacy in making “healthy decisions” such as smoking cessation.

Relatedness – Provide explanation how smoking relates to substance abuse.

Read script at the beginning of each Community Group

6-Questions to ask oneself before smoking

Encourage Participation in Smoking Cessation Group.

Self-Competency – Help provide encouragement and tools towards smoking cessation if approached by a patient seeking advisement towards cessation.

Encourage patients to reflect on their feelings towards behavior change with respect to drug/alcohol use (in response to smoking cessation failure).

Smoking relapse is normal

Staff must not smoke around patients or voluntarily reveal they currently smoke

“Smoke Break” is to be referred to as “Inter-activity Period”. No use of “Smoke” or “Break”

Script:

“Please quietly reflect on what I’m about to say. Although this is a smoking allowed facility, I would like to take a minute to remind you that smoking, alcohol, and substance use are very closely related and that the use of one will make it much more difficult to quit the other. Because smoking does not directly make your life ‘unmanageable’ and is not illegal, we don’t prevent you from smoking here at the PaRC. However, I want you to think about the reasons you are choosing to smoke and how it is similar to your drug and/or alcohol use the next time you go out for a smoke. Try asking yourself these six questions:

Does my urge to smoke reflect my urge to relieve emotional stress similar to when I would drink or use?

Am I using smoking as a coping mechanism instead of addressing the underlying issue?

Am I smoking because others around me are smoking and I feel it necessary to do in order to socialize with them?

Do those others think it is necessary smoke in order to socialize with them?

Are my reasons for smoking worth the risk to my sobriety?

Are my reasons for smoking worth the risks to my health and the health of those around me?”

For more information or clarification, please contact Greg Hercules.

D-3 Recruitment Document The following script was read at the beginning of each Goals Group to patients for eliciting participation in the study.

Recruitment Document

Only one recruitment document will be used in the study Self-Determination Theory Based Smoking and Nutritional Intervention at One Substance Abuse Treatment Facility Memorial Hermann Prevention and Recovery Center. This document will be a verbal script read to all adult patients at Memorial Hermann Prevention and Recovery Center (MHPaRC or “the PaRC”).

During Bridge the Gap and Discharge Planning Groups (9:00AM-10:00AM every Wednesday) patients will be addressed by Steven Halterman (MHPaRC staff/co-researcher) or Greg Hercules:

"[Hi everyone, my name is Greg Hercules and I am a grad student at Texas A&M. {If Greg}] or [As you guys may or may not already know, {If Steven}] The PaRC and Texas A&M University are working together on a study regarding smoking prevalence and nutrition. I would like to take this time to ask for your participation in this study by handing you out a consent form and a survey. Your participation in this study only requires that you sign this consent form and complete the survey attached on your first, third, and fourth week of residential treatment during this group.

Also, as this is a research study I want you to know that if you do not wish to participate you do not have to. All data are confidential and only I and two other researchers from Texas A&M may view them.

You can withdrawal at any point in time. Please let me know if you want to opt out and you will not be given a follow-up survey at the end of PaRC treatment.

If you have any questions please let me know. Thank you very much for your time. [Take questions]

Please raise your hands if you are in your first, third, or fourth week of treatment at the PaRC.”