

The Use of Sobriety Nutritional Therapy in the Treatment of Opioid Addiction

Patrick M Cunningham*

College of Health, School of Social Work, University of Alaska Anchorage, USA

*Corresponding author: Patrick M Cunningham, Associate Professor, College of Health, School of Social Work, University of Alaska Anchorage, USA, Tel: 9073378690; E-mail: pmcunningham@uaa.alaska.edu

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Abstract

Background: This paper describes a pilot project research methodology design to be used at a narcotic drug treatment Centre with patients, addicted to opioids, who are enrolled in a Methadone maintenance program.

Materials and method: The research question is, will sobriety nutritional therapy reduce the desire for opioids among patients who are participating in a methadone maintenance program, resulting in improved health, social functioning, and quality of life? An experimental group of 10 patients and control group of 10 patients will be selected from among the 121 patients currently served by the agency. Pre-testing and post-testing will occur with the study lasting for a six month period. The nutritional interventions will be individualized based upon the assessed needs of each participant in the experimental group. Review of the literature responding to the nutritional difficulties experienced by people who abuse opioids and various interventions inform how the study is conducted.

Conclusion: It is believed that the intervention proposed will be successful in improving not only the nutritional levels of patients but also resulting in improved social functioning in their environment.

Keywords: Opioid abuse; Biological mechanisms of addiction; Methadone maintenance; Malnutrition; Substance craving; Relapse; Whole food nutrition

Introduction

Opioid addiction is a biological disease, and results in serious negative consequences for the individual and the social environment. Among the consequences are serious physical and emotional difficulties, legal, and negative social ramifications. In a study of drug harms in the United Kingdom [1] heroin was found to be the most harmful to the individual, and in contrast, alcohol was the most harmful to others.

This research proposal will concentrate upon the physical health of the person with addiction, noting that addiction is a very complicated process with many layers and ramifications impacting individuals, families, groups, organizations and communities. The effects of malnutrition and changes in the neurochemistry of persons resulting from opioid addiction, and interventions to improve nutrition, neurotransmitter functioning, reduce craving, and promote social functioning is the focus of this proposal. The hypothesis is that providing nutritional food to patients enrolled in a methadone maintenance program will improve their health status, reduce craving, improve relapse rates, resulting in higher levels of social functioning. This paper will cover a review of the literature regarding the negative health effects resulting from opioid addiction, metabolic and emotional craving of the substance, and nutritional interventions. This will be followed by a discussion of the literature review findings, and how it applies to the proposed pilot study; a description of the study and methodology; rationale for the approach selected; followed by references cited.

Literature Review: Effects of Substance Abuse

Physical effects of opioid addiction include

- Organ damage: brain, kidney, heart, liver
- Hormone imbalance
- Cancer
- Gastrointestinal Diseases
- Decreased pain tolerance
- Death

Neurological and emotional effects include

- Depression
- Anxiety
- Memory loss
- Aggression
- Mood swings
- Paranoia
- Neuropathy and dementia [2]

The biological mechanisms of addiction

Research finds that changes made to neural networks may result in abnormal and addictive behaviour [3-5]. Individuals turn to drugs eliciting a level of arousal in responding to stress. Opiate drugs are chosen by those who tend to withdraw from stress in the environment. Addiction results when to achieve the desired state of arousal brought about by a change in the rate of neurotransmission, the individual increases the level of the activity. Any removal of the activity or drug will result in withdrawal symptoms. These changes in neurotransmission often result in social problem behaviours. Koob

[6,7] found that brain stress systems may contribute to the compulsive behaviour of using drugs resulting in the development and persistence of addiction. Chronic opioid exposure creates a range of neuroadaptations often resulting in compulsive use and relapse [8]. Bradizza [9] found that people in treatment programs that used heroin had a relapse rate of 60% after 3 months and 75 to 85% at 12 months following discharge. Those who are successful in a treatment program where methadone is no longer needed averages from twelve months to three years.

It is essential to understand the molecular and cellular action of addictive drugs in order to develop treatment modalities to treat the problem. Kopnisky [10] found that after some time of drug abstinence, relapse remained frequent. This is due to changes in the brain because of chronic opioid abuse. There may be abnormalities in the pre frontal cortex of the brain that regulates emotions, judgement, planning, and executive functions. It reduces the ability to use judgment to restrain impulses, and a predisposition to compulsive drug-taking behaviours [11].

Patients who are informed of how changes in the brain are brought about by opioid addiction may understand the biological aspects of their addiction and how biological interventions may assist them in remaining sober and avoid relapse. It is important to stress that addiction is complex, and also involves the environment, such as stress, triggers, and genetic predispositions that may have created cognitive deficits.

Nutrition

Malnutrition is a major consequence due to substances not only replacing nutrients but interfering with the metabolism of nutrients. In chronic opioid abuse, B vitamin folate deficiency occurs and has a disastrous effect on the digestive system. Studies have shown that this contributes to colorectal cancer [12]. It also plays a role in liver disease [13]. Pellagra, characterized by diarrhoea, dermatitis, mental disorientation, and depression is another condition resulting from substance abuse [14].

The liver is the organ impacted the most by opioid use. Resulting complications are fatty liver, hepatitis, fibrosis, and cirrhosis [15]. Gut porousness, activating Kupffer cells, and inflammation contributes to liver disease [16]. Chronic liver disease will result in cirrhosis which is an end stage disease, and the 12th leading cause of death [17]. Ascites may develop consisting of fluid building up in the abdominal cavity. Changes in personality, mental abilities, and motor functions occur when hepatic encephalopathy develops. Protein energy malnutrition and wasting, the reduction of muscle tissue, is common [18]. Overdose and death are all too common, as reflected in recent media coverage.

Craving phenomenon

Craving of the substance is the result of both psychological and neurobiological factors. It may be due to stress and neuroadaptation. Brain changes may lead to uncontrollable cravings that become more important than anything else in the person's life. Chronic use alters brain functioning by a wear and tear process often resulting in negative behavioural responses until the substance is ingested, obtaining a temporary balance [19]. Nutritional deficiencies and biochemical imbalances, may add to the craving phenomenon. Kavanagh [20] reviewed craving literature and found that cravings are cognitive-emotional events with frequency, duration, and intensity. Daily assessment of frequency and peak craving intensity may have high

utility. He suggested that refinement of measures that capture both desires for opioids and for its control may have substantial practical importance. The above are representative of the negative health effects that occur in the body due to substance abuse. Examples of how to respond to these difficulties follows.

Literature Review: Nutritional Interventions for Substance Abuse

From a historical perspective, the most preponderant interventions for substance abuse are total abstinence, psychological and behavioural counseling, 12-step programs, and medication. It is viewed as a mental disorder. However, The American Medical Association and World Health Organization classify it a physical disease. Rather than an either or, it may be a combination of each given the complexity that surrounds addiction [21].

Although traditional recovery programs have helped people throughout the world, there are some lesser known programs that follow a holistic model focusing upon the use of nutrition to respond to substance abuse. In 1987, Larson [22] published findings of a study of 100 patients that concentrated on restoring depleted biochemicals with supplements, combined with psychotherapy. The results demonstrated that 85 of the 100 reported not returning to substance abuse and maintaining stable functioning at 12 and 42 months, post treatment. A brain researcher, Dr. Kenneth Blum, viewed substance abuse as a biochemical disease, and conducted a study restoring neurotransmitters and natural endorphins that were destroyed resulting in the restoration of normal moods. DesMaisons [23] reports a 92% success rate using a nutrition based program with people who abuse substances. Siple [24] has written a self-help book providing information intended to assist a person recover from substance abuse and maintain sobriety through the eating of certain foods. It lists recover foods and provides over 300 recipes and 21 days of menus to follow. This book identifies health goals for the reader to achieve. The nutritional program helps prevent and reverse the development of a wide range of ailments linked to substance abuse from digestive problems and fatty liver to degenerative diseases such as heart disease, osteoporosis, and cancer. Recovery foods are identified that will stabilize blood sugar levels, improve digestion, and enhance the absorption of nutrients. McClain [25] emphasized the need for aggressive nutritional support for patients with liver disease. The study emphasized that a snack at night was more effective to prevent muscle wasting than if offered during the day.

The standard treatment for liver disease has not changed in the last 40 years. New, more novel approaches include the use of amino acids, micronutrients, and antioxidants [26]. Providing folate in the form of whole foods may improve the health of the person and increase the antioxidant defence system [27]. A 2012 study found that environmental and educational nutrition interventions resulted in improved nutritional habits and a better state of well-being [28]. Wiss [29] found that patients with substance use disorders often developed disordered and dysfunctional eating patterns during abstinence. He described specific macro and micronutrient supplementation treatment in detail and protocols for re-feeding in selected cases. He recommended that nutrition therapy address the most serious medical and nutrition conditions first, and then target the psychological aspects.

Vera-Ramirez [30] describes how the use of curcumin may ameliorate symptoms of liver disease in animal studies. Curcumin

exerts potent antioxidant and anti-inflammatory properties which may account for its protective effect in chronic liver diseases. Curcumin also possesses anti-fibrogenic properties, mediated by the inactivation of different processes involved in liver damage. It has the ability to increase glutathione tissue levels. Glutathione is a major nutrient involved in liver detoxification. Individuals with substance abuse have poor fatty acid balance that may lead to inflammation, low brain levels of DHA (Docosahexaenoic acid), and altered neurotransmitter balance.

Johnson [31] recommends nutritional management based upon fluid, protein, fat, and carbohydrate needs. Symptoms of a psychiatric nature may be found in persons who have water-soluble vitamin deficiencies. Badawy [32], in her study of pellagra and substance abuse, recommended the use of brewer's yeast to exacerbate symptoms in a person with drug dependence.

Zhou [33] found that opioid addiction results in the balance between oxidation and antioxidation in addicts being seriously destroyed. The plasma values of lipoperoxidation, erythrocyte values of lipoperoxidation, and nitric oxide increased, whereas glutathione peroxidase and superoxide dismutase were gradually decreased. Also, addictive behaviours may increase due to low dopamine levels. To control this, providing amino acids and nutrients involved in the production of dopamine may be highly beneficial. Animal studies have demonstrated that increasing brain serotonin levels may reduce craving. Antioxidant balance may be supported with nutrients such as selenium, vitamin A, C, E, quercetin, and zinc.

Rebecca Place Miller, a science writer associated with Many Hands Sustainability Centre in Barre, Maine, has published an online manual entitled "Nutrition in Addiction Recovery" [34]. She drew from many nutritionists, dieticians, and health care providers concentrating on nutrition and addiction. She identifies common nutritional deficiencies found in people who abuse substances, and the recovery foods to correct them. Many recovery programs recommend supplements to correct the deficiencies. Most notable is the Health Recovery Centre of Joan Larson, referenced earlier. She reports that just eating nutritious foods won't correct the problem because of absorption issues. Following an assessment of the damage using a number of tests, she proposes a detox formula that is a combination of vitamins, minerals, amino acids and other nutrients to remove negative effects, eliminate craving, and reduce any withdrawal symptoms. Body repair follows with lists of supplements based upon test results. She recommends a six-month nutrient maintenance plan listing 56 supplements.

Recent attention has focused upon the microbiome found in the gut and its relationship to the brain and psychiatric illness. [35]. Vulnerability to mental illness may be associated with neuroinflammation and elevation of certain inflammatory serum cytokines. The gut microbiome is a key component of our immune system and mediates a lot of the communication along the HPA axis. Animal studies have shown that you can change a rodent's behaviour just by changing the microbiome. There are numerous ways to do this, including probiotics, antibiotics, prebiotics (fibers that feed the microbiota), and fecal transplants. In human studies, probiotics have been shown to reduce negative thinking in healthy human subjects [36] and reduce anxiety in subjects undergoing cancer treatment. [37]. It is believed that this dietary interaction with the microbiome may explain why people who eat a traditional whole foods diet are up to 40% more resilient to stress and developing mental illness than those who eat a processed Western foods diet.

The gut microbiome, a dynamic feature of the gastrointestinal system, has the potential to dramatically influence health outcomes. Through complex interactions with the host immune system and signaling pathways, the gut microbiome can significantly influence the pathogenesis of disease states such as cancer, metabolic syndrome, inflammatory bowel disease, and non-alcohol fatty liver disease [38].

A Google search for nutritional addiction recovery Centres identified eight who provided either nutritional supplement or whole food formulas for substance abuse addiction. (List and Internet URL provided at the end of the reference list).

Discussion

There is ample evidence available in the literature reporting the negative effects of substance abuse on the body resulting in damage to major organs, gastrointestinal disease, cancer, malnutrition, neurological, and emotional disorders. Despite this evidence, treatment for substance abuse disorders is primarily psychological. Medical treatment is provided for the various medical problems stemming from substance abuse, but is primarily reactive in nature and only targeting the medical disorder. In searching the literature, it was very difficult to find recent responses to opioid addiction using nutritional therapy. What was found occurred much earlier and sporadically? Only a few reported results using nutrition therapy. Lacking are scientific studies using control and experimental groups. Claims of success were mostly the person self-reporting. Interventions were suggested to find what the person was lacking nutritionally, and supply it. What happened when this occurred using pre-testing and post-testing are not reported? In terms of what nutrient intervention has better results, there were no studies comparing the use of supplements to the use of whole foods to replace nutrients. A question from all of this is "what may happen when a person with a substance abuse addiction participates in an intervention intended to improve their physical state using whole food identified as nutritious for the body and specifically targeting nutritional deficiencies"?

Pilot study and methodology

Research question: Will sobriety nutritional therapy reduce the desire for opioids among patients who are participating in a methadone maintenance program, resulting in improved health, social functioning, and quality of life?

Hypothesis: The experimental group will experience a higher level of improved health, reduced drug craving, reduced relapse rates, and a higher quality of life than the control group.

The project will be conducted in a narcotic drug treatment Centre. Participants will be drawn from the 120 patients who are participating in the Centre's methadone maintenance program for patients addicted to opioid drugs and other substances. The project will be a pilot experimentally designed study assessing the participation effects of 10 patients who each morning will be drinking liquid nutrients specifically created to respond to nutritional deficiencies determined by test results, over a six month period of time. Blood will be drawn at the beginning of the study, 3 months in, and when the study ends at six months. The test results will be provided by Spectra Cell Laboratories. Micronutrient testing will return results showing the nutritional deficiencies of each participant. It will also recommend whole foods and natural supplements to replenish the deficiency. A second measure will be sequencing the microbiome of each participant. A gut sample will be obtained and sent to UBiome, Inc. at the beginning of the

project and at the end. Results will determine what is necessary to improve the gut health of the patient in the experimental group.

Twenty participants will be randomly selected from the 120 patients, and 10 will be randomly selected to participate in the experimental group. The remaining 10 will be placed in the control group. When the 20 participants arrive to receive orally provided methadone, they will then be given a liquid drink to consume. The experimental group will receive an individually determined nutrient drink, and the control group will receive low sugar, un-concentrated fruit juice that will vary each day.

Prior to the beginning of the project, the necessary permission will be obtained from each patient and test results recorded from their initial physical examination. Demographic data will also be obtained along with the initial social history information and treatment plan. An allergy and diet history questionnaire will be completed at the beginning of the project. Participants will also complete a food journal every other week during the project. Each patient's response to their treatment plan will be recorded during the study and at the end of the project. A quality of life measure will be completed drawing from the case notes of counsellors for each participant. Each participant will complete a diet history questionnaire at the end of the project. All data will be placed into an SPSS data file. Craving levels will be determined by the amount of methadone required by each patient during the project, the length of time on methadone, and relapse rates.

IRB permission will be obtained prior to commencing the study. A record of the nutrition provided to each experimental participant will be recorded each day and whether the person consumed the nutrient at the Centre will be noted. Periodic testing will occur consistent with the Centre's protocol. All 20 participants in the study will continue regular programming at the Centre. The nutrients will be whole food blended into liquid form. Liquid was selected because of the ease of administration. The patient is acclimated to consuming liquid methadone on a daily basis and the introduction of a second liquid may be the less intrusive method. Data will be collected throughout the study until the end of the study in six months. If the results are successful, the control group will be offered the opportunity to participate in nutritional therapy.

It is anticipated that the findings of this study will result in not only improving the nutrition of the participants but also eliminate the substance craving, providing an opportunity for achieving treatment goals, and higher levels of social functioning. The effects of substance abuse are often so devastating for the person and the social environment, and developing effective interventions for the amelioration of these effects remain a challenge for service providers.

Conclusion

As noted, the treatment of addiction and substance abuse has been relegated to a narrow intervention strategy. Psychological intervention and support groups have been the primary treatment modality. Medication is used and varies from methadone maintenance to unpleasant side effects when the substance is consumed, and drugs to respond to symptoms of mental illness. Medical response is limited to detoxification programs and treating metabolic illnesses and other morbidities caused by the abuse of substances.

Nutritional deficiencies have been found to be related to a variety of behavioural problems and problematic mental states. Among these are restlessness, irritability, impulsivity and a proneness to violence.

Anxiety, depression, sleeplessness, and panic attack are also numerous. Often the person seeks relief by self-medicating which often compounds the problem rather than providing relief. The proposed pilot project is intended to assess these deficiencies and provide the necessary nutrient to return the person to a more stable state that may improve social functioning. This however, should not be a standing alone program but rather part of a holistic response to substance abuse that includes counselling, skill training, and other interventions that returns the person to high levels of social functioning.

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