



**GROUP THERAPY LESSONS ON THE NEUROBIOLOGY OF ADDICTION AND ITS
IMPACTS ON RECOVERY**

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Abstract

In the last 15 years there has been a surge in the amount medical emergencies and deaths related to opioid overdoses in Utah. With an increase in the magnitude of people seeking treatment, there is a concomitant need to provide a more holistic and efficient curriculum within drug treatment centers. There have been rapid advances in neurobiology which have illuminated cellular mechanisms associated with substance dependence and recovery. We aim to examine the treatment outcomes when education of the neurobiological basis of addiction and recovery is incorporated into the curriculum at the House of Hope treatment Center. A series of neurobiology group therapy lessons that focus on the neurobiological basis of addiction especially as it relates to trauma, and resiliency have been developed for the House of Hope treatment center whose current educational focus in on the psychosocial dynamics of addiction. Piolet data was collected using a qualitative assessment which surved participants experiences with the neurobiology group therapy lesson.

Introduction

Utah is ranked the 7th highest in the nation for drug overdose deaths [5]. In the last 16 years, there has been a surge in the amount medical emergencies and deaths due to prescription opioids and since 2002 the death toll from drug overdose has surpassed deaths caused by motor crashes, falls and firearms in Utah [4].

In comparison to all other categories of addictive substances, prescription opioids have outranked them all in the amount of lives lost due to overdose [5]. In 2015, 24 individuals died every month from a prescription opioid overdose in Utah [3]. The opioid crisis has increased the magnitude of people seeking lifesaving treatment and lack of funding on state and federal levels has left House of Hope unable to provide the most holistic curriculum.

At the House of Hope there is a current focus on the psycho-social dynamics of addiction in the curriculum and lack of acknowledgment of the biological component of addiction. This project aims to integrate the neurobiological underpinnings of addiction back into the curriculum and asses its impact on recovery rates.

Reintroduction of the neurobiological portion of the curriculum is important because addiction is an illness, that is better examined using the biopsychosocial model that incorporates and addresses each of the factors individual but recognizes them as part of complex interwoven meshwork[1]. Viewing addiction though just psychological, and/or social factors is an oversimplification of the complex truth, as there is a biological framework that it exists within [7]. Extensive research in addiction has demonstrated that there are genetic vulnerabilities that can lead addiction in some but not others that use the same substance, research suggests that up to 50% of the risk is heritable [6][7]. Therefore, there is a need for the curriculum at the House of Hope to reflect the biopsychosocial model in their approach by educating both the staff and clients in the biological dynamics of addiction, more specifically the neurobiological mechanisms of addiction especially as it relates to trauma and resiliency.

Literature Review

The Diagnostic and Statistical Manual of Mental Disorders-5, characterizes substance use disorder as a cluster of cognitive, behavioral, and physiological symptoms associated with continuation of substance use despite significant substance-related problems, such as interpersonal conflict, loss of ability to fulfill responsibilities, and physical health deterioration [11]. Diagnosis of substance use disorder is solely based on pathological behavioral patterns, despite addiction being a neurobiological pathology at its core [11][7].

Underlying the behaviors associated addiction there is neural circuit changes that persist even after detoxification [2][11]. The longevity observed indicates that there are structural modifications on a neuronal level. The molecular mechanism of many substance addictions are thought to begin with the activation of the mesolimbic dopamine system located in the ventral tegmental area (VTA) causing the release of dopamine. The limbic system is the area of the brain that rewards the body for behaviors such as drinking, eating, sex, etc. However commonly abused substances create stronger rewards than those that naturally occur which is thought to create stronger motivation to obtain the substance and thus addiction [2].

Anecdotal evidence from clinical practice research provides support for teaching the neurobiological basis of addictions. After even a brief introduction to the information, a patient stated, "I thought I felt this way and drank because I was weak-willed." Although there is anecdotal evidence supporting there has been little work done to scientifically confirm the benefits [8]. However, a study was conducted following the outcomes of a program that provided diabetes education and care management to patients with diabetes found there was significant improvement in patient outcomes, glycemic controls, and better quality of life in patients with diabetes mellitus[13]. By extension, teaching the neurobiological basis of addiction may have a similar impact on patients with addiction.

The rationale for emphasizing the addiction as it relates trauma was founded on basis that many of the women being treated for addiction report high levels interpersonal violence and maltreatment, such as sexual, physical, emotional, economic abuse in both childhood and/or adult life. This narrative has led to extensive research that has shown that chronic traumatic stress arising from childhood interpersonal violence and adult revictimization has maturational consequences, which lead to

increased vulnerability for addictive disorders [12]. Adults that were victimized have troubles with self-regulation systems that may mediate the relationship between trauma and the development of substance use disorder [12]. Neurobiological research indicates that adults with PTSD caused by trauma, demonstrate neurobiological changes in the volume and activity levels of major structures in the limbic system. These functional and structural changes in the limbic system can lead to dysregulation of arousal systems and the naturally occurring opioid systems within the human body, that are responsible for emotional regulation [12]. This is an example of the complex intertwining of psychosocial factors and biological factors that contribute to the addiction that clients should be aware of.

The purpose of emphasizing resiliency is the neurobiology group therapy lesson is to counter the feeling of hopelessness a client may feel in response to learning that prolonged use of a substance can significantly alters structure and function of neural circuitry such as those found in the limbic system [7][2]. Emphasizing that neural plasticity is a powerful biological process that allows new connections to grow and change throughout life and implies life-long learning and possibility of recovery [9]. Research successful recovery from alcohol addiction showed to be associated with changes in alcohol-induced neuroadaptation and brain network rewiring [14].

Assessment Methods

Assessment for macro-level impact was first considered. It was expected that by analyzing relapse/recovery rates of clients who had undergone the neurobiology group therapy lessons compared to those that did not would indicate the impact it has on recovery rate. However, after further exploration of this method of assessment it was found to be infeasible for a couple different reasons. First, collecting relapse data on clients is extremely difficult after they leave the program because they are a highly transitory population, they frequently relocate residence, change phone services, and jobs. Second, clients often do not truthfully self-disclose due to shame and perceived risk of re-incarceration. Third, there as a number of co-occurring variables and a large data set across different treatment centers and states would be needed to find a generalizable impact. These constraints on data make it nearly impossible to track the macro-level impact. Other modes of assessment were explored and assessing on a micro-level was found to be far more practical.

Assessment of micro-level impact was found to be the most feasible and will include two phases, first a quiz and then an open-ended question survey. The quiz will be administered concluding the lesson and will provide quantitative data that will be used to analyze the learning outcomes. It will also include a question asking about their preferred learning styles (auditory, visual, social, tactical, etc.) and to what level they felt their learning style was incorporated into the lesson.

The second phase will include a survey that gives open ended questions that will allow the clients to explain to what extent they felt each of the lesson topics (addiction, trauma, resiliency) were empowering, informative, and most important helpful for their recovery.

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