

Effect of Education on Perception of Ketamine in Primary Care and Mental Health Providers

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Abstract

Background: Mental illness is a major healthcare problem. Depression is the leading cause of premature death and disability among adults aged 18-44 worldwide. In the United States, 21% of adults are afflicted by a mental illness. Ketamine therapy is a promising treatment for many mood disorders including treatment-resistant depression, yet is underutilized in US healthcare.

Purpose: This project aimed to explore the perspectives of primary care providers and mental health providers toward ketamine therapy. **Implementation:** Surveys and an educational presentation were developed to identify providers' perspectives of ketamine therapy before and after education. These were distributed to primary care practices and mental health practices from the 84015 ZIP code and surrounding areas. The surveys included open-ended qualitative questions and quantitative questions using Likert scales to evaluate views. **Results:** A small number of providers participated, limiting generalizability of results. Statistical analysis was performed to evaluate changes in quantitative responses, finding an increased rating of familiarity with ketamine and its psychoactive effects, as well as increased perception of safety, though there was a decreased likelihood to recommend ketamine therapy for patients or to utilize for themselves or loved ones among medical providers. Qualitative analysis was done in an iterative review revealing themes associated with ketamine in participants perspectives, with medical terminology comprising the bulk of initial perspectives and shifting post-education responses toward different themes. **Discussion:** The findings of this study suggest that medical providers may be less inclined to recommend ketamine therapy after education discussing its psychoactive effects despite evidence of its efficacy, whereas mental health providers show much more openness to both aspects. Future research should aim to clarify factors influencing this discrepancy and to develop more effective educational approaches.

Introduction

The human mind is wondrously complex. As stated by James D. Watson, “The brain is the last and grandest biological frontier, the most complex thing we have yet discovered in our universe. It contains hundreds of billions of cells interlinked through trillions of connections. The brain boggles the mind” (Ackerman, 1992, Foreword).

The importance of mental health and the impact of illness is often minimized in the United States (US). This is curious considering it is with the mind that each person experiences and navigates the world. An individual’s concept of the world exists entirely within their mind, which can only interact with the outside world through the senses. Sensory information, in turn, is received and subjectively interpreted by the mind. When the mind suffers from illness, every aspect of a person’s life is affected, including their perceptions, thoughts, behaviors, relationships, and happiness.

Literature Review

The effects of mental illness impact society beyond the individual through interactions with family, friends, coworkers, or otherwise. The rates of mental illness in the US show the significance of the problem. According to the results from the 2020 National Survey on Drug Use and Health performed by the Substance Abuse and Mental Health Services Administration (SAMHSA) (2021), 17% of US adolescents ages 12-17 and 8.4% of US adults aged 18 or older had at least one Major Depressive Episode. In that same year, 21% of US adults suffered from at least one mental illness of any kind and 5.6% suffered from a serious mental illness, 4.9% had serious thoughts of suicide, 1.3% made a suicide plan, and 0.5% had attempted suicide in the

past year (SAMHSA, 2021). Worldwide, depression is the leading cause of disability and premature death among adults aged 18-44 (Epocrates, 2022).

Suicide is one of the leading causes of death in the US, with nearly 45,000 documented deaths by suicide in 2020 (SAMHSA, 2021). There has also been a notable increase in mental health problems during the COVID-19 pandemic, with over 21% of adults reporting suicidal ideation in 2020 identifying the pandemic as the cause (SAMHSA, 2021).

The current treatment standards for depression leave much to be desired. In the current standards for moderate depression, defined as severe depressive symptoms and significant functional impairment without psychotic features or suicidal ideation, antidepressant medications are considered necessary but often lack efficacy (Epocrates, 2022). Guidelines for severe depression are more dismal, still necessitating antidepressant medications but also more extreme measures such as chemical sedation and involuntary commitment to inpatient psychiatric care units. Antidepressant medication options include Selective Serotonin-Reuptake Inhibitors (SSRIs) such as citalopram, escitalopram, fluoxetine, paroxetine, and sertraline; Serotonin-Norepinephrine Reuptake Inhibitors (SNRIs) such as desvenlafaxine, duloxetine, levomilnacipran, and venlafaxine; Bupropion, a dopamine-reuptake inhibitor; Mirtazapine, a 5-HT₂ receptor antagonist; Vilazodone, an SSRI and partial 5-HT_{1A} receptor agonist; and Vortioxetine, a serotonin-reuptake inhibitor with serotonin receptor modulation properties (Epocrates, 2022). For a medication to be considered effective, the patient must demonstrate a 50% reduction in symptom severity after titrating to the maximum tolerated dose over a 4-8 week period, though only 60-70% of patients respond after four different medication trials (Epocrates, 2022). Patients should exhibit some response during the first two weeks or switching to another medication should be considered. Treatment-resistant depression, defined as failure to

adequately respond to two or more conventional antidepressant treatments, describes approximately one out of three patients with Major Depressive Disorder (MDD) (Epocrates, 2022; Lent et al., 2019; Ng et al., 2021).

Ketamine was originally created as an anesthetic and is known for its high level of safety regarding cardiovascular and respiratory function (World Health Organization, 2016; Moghaddam, 2021). Today, ketamine continues to be one of the most commonly used anesthetics for pediatric, veterinary, and battlefield sedation, and is a critical medication for medical procedures requiring sedation in underdeveloped countries as it may be used without access to advanced monitoring or life support equipment (World Health Organization, 2016). Ketamine has also been used recreationally due to its psychedelic effects and strong safety profile (Moghaddam, 2021). Ketamine was added to the U.S. Controlled Substances Act in 1999 as a Schedule III substance due to the view that it was being improperly used as a recreational substance (Drug Enforcement Administration, 2012), though the World Health Organization recommends that it not be labelled a controlled substance due to the limited harms caused by its use and the imperative need to have an adequate supply available at all times (World Health Organization, 2016).

Ketamine therapy has been shown to be beneficial in rapidly treating many mental illnesses, such as various forms of depression including treatment-resistant depression, suicidal ideation, anxiety, bipolar disorder, PTSD, OCD, addiction, and more (Moghaddam, 2021; Wolfson & Hartelius, 2016). Though ketamine therapy may require repeat dosing of an average of six treatments and maintenance dosing approximately once a month for most patients, its remarkable speed and efficacy mark a new era in mental health treatment (Moghaddam, 2021; Wolfson & Hartelius, 2016). Patients suffering from these debilitating conditions may see

improvement within the first few treatments with ketamine therapy, even those who have been resistant to several other forms of pharmacologic treatments and mental health therapy interventions (Moghaddam, 2021; Wolfson & Hartelius, 2016).

The rapid onset of ketamine's antidepressant effects could mean patients may no longer need to wait weeks to see if each attempted antidepressant medication will be effective, a time during which traditional antidepressant medications leave them vulnerable to an increased risk of suicide after beginning treatment (Epocrates, 2022). The rapid onset could also be used to augment or supplement the current standard medications rather than replace them. This could be done by initiating ketamine therapy concurrently with traditional antidepressants such as an SSRI to achieve immediate improvement while waiting for the longer-term effect of the SSRI. As ketamine therapy becomes more recognized for its remarkable benefits, strong safety profile, and lack of side effects, there is reason to hope that it will be incorporated into the guidelines for depression and other mood disorders. Increased awareness and utilization will likely lead to new and creative ways to achieve even greater benefit.

Another emerging area of mental health treatment is psychedelic-assisted psychotherapy, in which psychedelic substances are utilized to facilitate psychotherapy. When using ketamine as the pharmacologic agent, this assisted psychotherapy is more specifically referred to as ketamine-assisted psychotherapy (KAP). KAP provides an opportunity for accelerated and more effective therapy through ketamine's psycholytic effects at lower doses (Moghaddam, 2021). Psycholysis is the breakdown of the mental defenses and is useful in psychotherapy when attempting to address and process repressed, difficult, or painful emotional content. In this use, psychedelic substances have been described by Stanislav Grof, a major pioneer in the psychiatric

use of altered states of consciousness, as “comparable to the value the microscope has for biology or the telescope has for astronomy,” (Hofmann, 2005). He continues his description:

These substances function as unspecific amplifiers that increase the cathexis (energetic charge) associated with the deep unconscious contents of the psyche and make them available for conscious processing. This unique property of psychedelics makes it possible to study psychological undercurrents that govern our experiences and behaviors to a depth that cannot be matched by any other method and tool available in modern mainstream psychiatry and psychology. In addition, it offers unique opportunities for healing of emotional and psychosomatic disorders, for positive personality transformation, and consciousness evolution. (Hofmann, 2005, Foreword)

Outside of anesthesia, sedation, or psychiatric use, ketamine has another major application in the treatment of pain, including acute pain (Pescatore, 2021; Schwenk et al., 2018), chronic pain (Cohen et al., 2018), neuropathic pain syndromes such as fibromyalgia (Pastrak et al., 2021) and chronic regional pain syndrome (Cohen et al., 2018), and other neuropathic disorders (Moghaddam, 2021, p.21). The use of ketamine for pain gives us a tool to help reduce the use of opioid pain medication, an important consideration as prescription pain medication abuse continues to be a problem in the U.S. (Cohen et al., 2018; Pescatore, 2021). Despite the evidence of its efficacy and safety, ketamine therapy is not well known and not regularly utilized. The use of ketamine for anything other than the Food and Drug Administration (FDA) approved indications of sedation and analgesia continues to be considered off label and is rarely covered by insurance (Beebe et al., 2021).

The optimal treatment of mental illness requires an interdisciplinary approach. Primary Care Providers (PCPs) are often the first line in mental health treatment as they see a wide

variety of patients and manage their overall health. They may be the first to encounter any healthcare issue a patient experiences and will either treat the problem or refer care out to a more specialized provider. Mental Health Providers (MHPs) provide specialized care and therapeutic services that are often beneficial in treating mental illness and promoting mental health. For this reason, participant recruitment aimed for a mixture of PCPs and MHPs.

By understanding principles of adult learning theory, effective education modalities can be utilized to provide ongoing learning for practicing clinicians. Adult learning theory was established by Kapp and later emphasized by Knowles (Mukhalalati & Taylor, 2019), describing that adults have different experiences, motivations, orientations, and learning needs than children. When developing the educational content for this project, more modern theories were also considered and ideas were incorporated which focus on exploring feelings and motivations as well as providing practical and applicable knowledge (Mukhalalati & Taylor, 2019) by ensuring educational content was concise, relevant to the needs of the audience, and immediately applicable. Knowles's ideas which focus on identifying and dealing with differences between what learners already know and what they learn through experience (Mukhalalati & Taylor, 2019) were considered in structuring the initial survey and post-education surveys, which were designed to encourage self-reflection in participants.

Purpose

PCPs and MHPs seek to use the best tools available to help patients. Ketamine therapy provides a fast and effective option in treating depression for most individuals, including the roughly 30% of patients who do not respond to the current standard treatments or who cannot tolerate the side effects of traditional antidepressants (Moghaddam, 2021). The benefits of

ketamine therapy could significantly impact mental health treatment approaches, potentially improving the quality of life for millions of individuals; therefore, it is in the interest of the medical community to embrace this treatment option and to recommend its use for our patients whose quality of life it may improve.

One explanation for the reluctance of the medical community to adequately utilize ketamine therapy appears to be due to a lack of education and awareness of the potential benefits of ketamine therapy among both providers and patients (Beebe et al., 2021). Providers' perceptions of ketamine may also play a role in hesitance to utilize ketamine therapy as a tool for patients. Increased awareness of ketamine therapy and its potential benefits may lead to increased acceptance and utilization in mental health treatment. Further, increased utilization of ketamine therapy will help promote insurance coverage of treatment.

Theoretical Framework

The project was structured using the framework of the ACE Star Model of Knowledge Transformation (Stevens, 2004). The Star Model was an appropriate model for this project as it provides a framework with which to organize Evidence-Based Practice (EBP) processes and approaches, depicting the process through which newly discovered knowledge is integrated into practice. The Star Model conceptualizes the idea of knowledge transformation, the conversion of primary research results into EBP (Stevens, 2004).

The Star Model's success is predicated on a series of underlying premises incorporating many ideas from EBP (Stevens, 2004). Stevens (2004) established these premises as it was apparent that various forms of knowledge held different relative value for EBP. Knowledge transformation is considered necessary before using research results to make clinical decisions.

Knowledge comes from many sources (e.g. research evidence, experience, authority, trial and error, theoretical principles), but the most generalizable knowledge is discovered through systematic processes that control bias (i.e. the research process). Evidence can be classified into a hierarchy of strength based on its scientific rigor, which increases confidence in the cause-and-effect relationships identified. Knowledge exists in a variety of forms which complement each other through integration. As research evidence is converted through systematic steps, knowledge from other sources (expertise, patient preference) is added, creating yet another form of knowledge. Different forms of knowledge are more useful in clinical decision making (e.g. results from primary research are less useful than evidence-based clinical practice guidelines in clinical decision making). Knowledge is transformed through summarization into a single statement about the state of the science; translation of the state of the science into clinical recommendations, with addition of clinical expertise, application of theoretical principles, and client preferences; integration of recommendations through organizational and individual actions; and evaluation of impact of actions on targeted outcomes (Stevens, 2004).

This project utilized the Discovery Research and Evidence Summary stages of the Star Model. Evidence Summary was utilized in establishing the current state of the science on ketamine therapy by using literature review and expert consultation to create an educational presentation on ketamine's history, uses, efficacy, safety, and to describe the psychedelic experience. Once the educational presentation was complete, survey materials were developed for distribution to participants. The surveys constituted the Discovery Research stage utilized by this project, which endeavored to probe a new area of information on perceptions, attitudes, and beliefs surrounding ketamine therapy. Discovery Research was done by exploring provider

perceptions of ketamine before education, then identifying the impact of the education on provider perceptions.

Objectives

This project aimed to assess and compare perceptions of ketamine by PCPs and MHPs, as well as to explore the effect of an educational supplement on perceptions. By comparing views of individual providers before and after an educational module, it was hoped to determine if education is effective at influencing utilization, and comparing mental health to primary care was hoped to reveal focused areas of knowledge gaps or bias that may be addressed. The results may be used to develop potential strategies to improve implementation of ketamine therapy and create recommendations for future research. The overall intent of this project was to assess provider perceptions of ketamine to determine if preconceptions, misconceptions, lack of awareness, or lack of knowledge may be barriers to the utilization of ketamine therapy.

Implementation

After obtaining approval from the Westminster College Institutional Review Board, participant selection was accomplished by searching for primary care practices and mental health practices from the 84015 ZIP code and surrounding areas. Recruiting was accomplished through office visits, emails, and telephone calls. Inclusion criteria included licensed independent medical practitioners such as Nurse Practitioners (NPs), Doctors of Allopathic Medicine (MDs), Doctors of Osteopathic Medicine (DOs), and Physician's Assistants (PAs) practicing in Primary Care; and licensed mental health providers such as Psychiatrists, Psychologists, Psychiatric and Mental Health Nurse Practitioners (PMHNPs), Licensed Marriage and Family Therapists

(LMFTs), Licensed Clinical Social Workers (LCSWs), Licensed Mental Health Counsellors (LMHCs), and others. Exclusion criteria included non-licensed individuals, medical providers who do not offer primary care services (e.g. urgent care only, specialty providers), and providers not practicing in the 84015 ZIP code or surrounding areas. No incentives were offered for participation.

The sample size for this study aimed to be more than 30 participants, but depended on voluntary participation without incentives for completion. Nine locations were solicited for participation, four primary care practices and five mental health practices. Solicitation efforts were made once a week for four weeks and comprised telephone calls initially with an offer to visit in person if that would be helpful and emailing out the materials for participation if the practice agreed to participate.

An educational presentation was developed to educate providers on ketamine therapy using research-based information. The presentation consists of a PowerPoint presentation with voice-over narration which was reviewed by the project chair and a ketamine expert in the anesthesia field prior to delivering the education to project participants. Educational content included a summary of the available information on ketamine therapy including history, efficacy, safety, psychoactive effects, indications, contraindications, legality, and insurance coverage. The presentation focused on only the most important information for clinicians in consideration that brevity would encourage completion by more participants. The presentation is under ten minutes long and may be found on YouTube at <https://youtu.be/9-KmOkxen-M> (Swahn, 2022).

Providers' views of ketamine were assessed prior to watching the educational presentation using a web-based questionnaire survey designed using SurveyMonkey (see Appendix A), then views were assessed again using a post-education questionnaire survey (see

Appendix B) immediately following education and again four to six weeks later to assess retention of the information and further evolution of perspectives over time. Survey data were collected using a mixed methods approach with some questions answered using a Likert scale and some open-ended questions answered using a text box.

Participation in this study was completely voluntary and participants were free to withdraw at any time. No incentive or coercion was applied to encourage participation. A consent form was attached to the project materials indicating that participation implied consent (see Appendix C). All information was de-identified and kept on password protected laptops. There were no perceived risks to participants prior to initiation of the project and no risks or harms were noted throughout completion. There were no sources of funding involved in this project and all work was completed by the authors without compensation. No conflicts of interest were identified.

Results

Of the four primary care practices solicited, one practice agreed to participate. The other three practices took messages each time with a promise to follow up but failed to do so. Of the five mental health practices solicited, two agreed to participate, two refused, and the last took messages each time but failed to follow up.

The participating primary care practice had 51 primary care providers to whom the materials were distributed. The participating mental health practices had 18 mental health providers who received the materials. Final counts for completed surveys were 13 providers (five PCPs, eight MHPs) for the initial survey, eight providers (three PCPs, five MHPs) for the post-education survey, and four providers (two PCPs, two MHPs) for the four-week follow-up survey.

The overall response rate of individuals receiving the materials was 13 of 69 (18.8%) for the initial survey, 8 of 69 (11.6%) for the post-education survey, and 4 of 69 (5.8%) for the four-week follow-up survey (see Table 1).

	Total	PCPs	MHPs
<i>Distributed surveys</i>	69	51	18
<i>Initial Response Rate</i>	13 (18.8%)	5 (9.8%)	8 (44.4%)
<i>Post-Education Response Rate</i>	8 (11.6%)	3 (5.9%)	5 (27.8%)
<i>4-wk Follow-Up Response Rate</i>	4 (5.8%)	2 (3.9%)	2 (11.1%)

Table 1: Survey response rates

The impact of the educational presentation was assessed through a combination of qualitative analysis of the answers given to open-ended questions and quantitative answers to questions utilizing a Likert scale. These responses were analyzed in the context of the overall themes that emerged, as well as compared with individual pairing of responses to the initial survey and change in responses to the post-education survey and four-week follow-up survey. It is assumed that any changes in the initial survey and post-education surveys are due to the educational presentation.

Qualitative measures were selected for a portion of the data collection due to a lack of available data from prior studies and to facilitate an exploration of potential viewpoints which may provide direction for future research. Qualitative exploration of responses was done to discover insights and meaning among responses. This process allows for refining the potential meanings behind individual and group responses (Srivastava & Hopwood, 2009).

On questions with a narrower range of potential responses, a Likert scale was used to provide quantitative data that may be analyzed using statistical techniques. This will aim to provide a clearer picture of the current perceptions of the average provider. Respondents were asked questions such as “How familiar are you with ketamine?” They would then select from five available answers such as “Not at all familiar,” “Not so familiar,” “Somewhat familiar,” “Very familiar,” and “Extremely familiar.” These responses were assigned a number value (e.g. a value of one for “Not at all familiar,” a value of five for “Extremely familiar) for quantitative analysis.

Qualitative data was evaluated in a reflexive iterative framework, exploring themes that emerged from participant responses, then using themes to reevaluate responses. Data comparison was done to identify differences between PCPs and MHPs. Statistical analysis was completed for appropriate quantitative questions through comparison of descriptive statistics and paired t-test analysis to explore changes in individual providers’ perceptions after the educational presentation. All statistical analysis was completed using data analysis tools in Microsoft Excel (Microsoft, 2022).

Response rates broken down by provider type show a PCP response rate of 5 of 51 (9.8%) for the initial survey, 3 of 51 (5.9%) for the post-education survey, and 2 of 51 (3.9%) for the four-week follow-up. These are far lower than the MHP response rates of 8 of 18 (44.4%) for the initial survey, 5 of 18 (27.8%) for the post-education survey, and 2 of 18 (11.1%) for the four-week follow-up survey. No other categorical breakdown provides immediately meaningful insights into demographic groups more inclined to respond and follow through given the low response rates (see Table 2 and Figure 1).

	Initial Survey	Post-Education Survey	4wk Follow-Up Survey
<i>Total Responses</i>	13	8	4
<i>Female</i>	6	4	1
<i>Male</i>	7	4	3
<i>Other Gender</i>	0	0	0
<i>Age 30-39</i>	4	4	1
<i>Age 40-49</i>	5	3	3
<i>Age 50-59</i>	3	1	0
<i>Age 60-69</i>	1	0	0
<i>Primary Care</i>	5	3	2
<i>Mental Health</i>	8	5	2
<i>MD</i>	3	2	1
<i>DO</i>	1	1	1
<i>PA</i>	1	0	0
<i>LMFT</i>	2	1	1
<i>LCSW</i>	4	3	0
<i>LMHC</i>	1	1	1
<i>Psychiatrist</i>	1	0	0

Table 2: Participant demographics

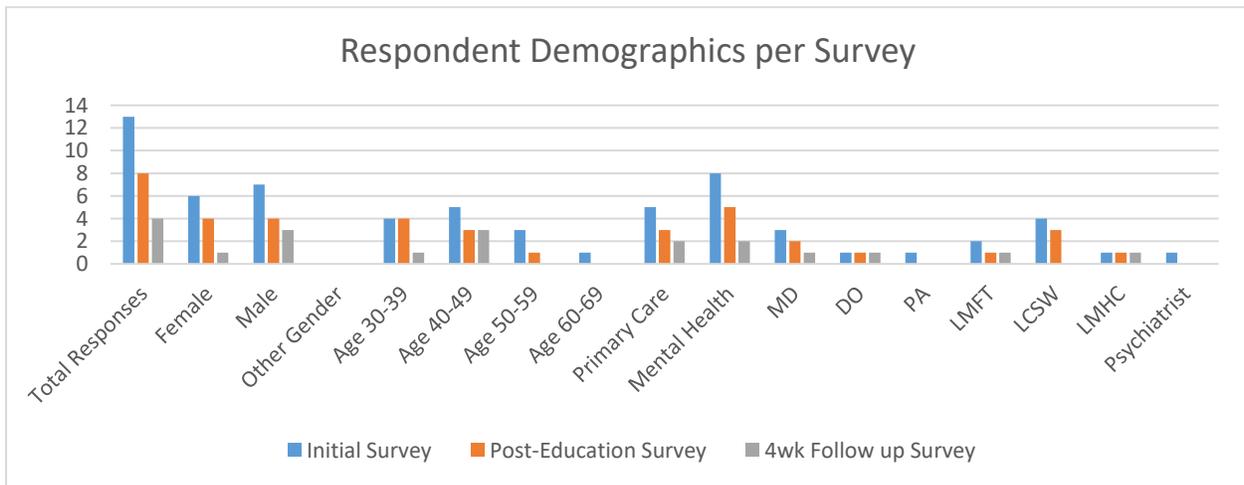


Figure 1: Participant demographics

When pairing respondents' answers for paired t-test analysis, eight respondents completed both the initial survey and the post-education survey, four respondents completed both the initial survey and four-week follow-up survey, and three respondents completed all three surveys.

Five questions were asked using Likert scale responses. Response options for the questions "How familiar are you with ketamine?" and "How familiar are you with the psychoactive effects of ketamine?" included extremely familiar (given a value of five), very familiar (value four), somewhat familiar (three), not so familiar (two), and not at all familiar (one). Response options for the question "How safe do you believe ketamine is?" included very safe (value five), safe (four), neither safe nor unsafe (three), unsafe (two), and very unsafe (one). Response options for the questions "How likely would you be to recommend ketamine therapy for a patient?" and "If suffering from a condition treatable with ketamine therapy, how likely would you be to utilize it for yourself or a loved one?" included very likely (value five), likely (four), neither likely nor unlikely (three), unlikely (two), and very unlikely (one) (See Table 3).

<i>Descriptive Statistics</i>	Initial	Post	4wk
<i>How familiar are you with ketamine?</i>			
<i>Responses</i>	12	8	4
<i>Mean</i>	2.917	3.625	3.250
<i>Range</i>	2	2	1
<i>How safe do you believe ketamine is?</i>			
<i>Responses</i>	13	8	4
<i>Mean</i>	4.077	4.500	4.250
<i>Range</i>	2	1	2
<i>How familiar are you with the psychoactive effects of ketamine?</i>			
<i>Responses</i>	13	8	4
<i>Mean</i>	2.692	3.875	3.250
<i>Range</i>	1	2	2
<i>How likely would you be to recommend ketamine therapy for a patient?</i>			

<i>Responses</i>	13	8	4
<i>Mean</i>	4.000	4.125	4.250
<i>Range</i>	3	3	2
<i>If suffering from a condition treatable with ketamine therapy, how likely would you be to utilize it for yourself or a loved one?</i>			
<i>Responses</i>	13	8	4
<i>Mean</i>	4.154	4.250	4.000
<i>Range</i>	2	3	3

Table 3: Relevant descriptive statistics by survey

The initial survey question “How familiar are you with ketamine,” received 12 responses (one respondent skipped this question) ranging from a value of two to four with an average value of 2.917. The post-education survey, reworded for context to “How familiar do you now feel with ketamine,” received eight responses ranging from a value of three to five with an average value of 3.625. The four-week follow-up survey received four responses ranging from three to four with an average of 3.25. The eight paired responses between the initial survey and the post-education survey showed an increase in the average value from 2.75 to 3.625, a change of 0.875. The four paired responses between the initial survey and the four-week follow-up showed an increase from 3 to 3.25, a change of 0.25. The three paired responses between the post-education survey and the follow-up survey showed a decrease from 3.667 to 3.333, a change of -0.334.

The initial survey question, “How safe do you believe ketamine is,” received 13 responses ranging from a value of three to five with an average value of 4.077. The post-education survey, reworded to say, “How safe do you now believe ketamine is,” received eight responses ranging from a value of four to five with an average value of 4.5. The four-week follow-up survey received four responses ranging from three to five with an average of 4.25. The eight paired responses between the initial survey and the post-education survey showed an

increase in the average value from 4.125 to 4.5, a change of 0.375. The four paired responses between the initial survey and the four-week follow-up showed a decrease from 4.5 to 4.25, a change of -0.25. The three paired responses between the post-education survey and the four-week follow-up survey showed a decrease from 4.667 to 4.333, a change of -0.334.

The initial survey question, “How familiar are you with the psychoactive effects of ketamine,” received 13 responses ranging from a value of two to three with an average value of 2.692. The post-education survey, reworded to say, “How familiar do you now feel with the psychoactive effects of ketamine,” received eight responses ranging from a value of three to five with an average value of 3.875. The four-week follow-up survey received four responses ranging from two to four with an average of 3.25. The eight paired responses between the initial survey and the post-education survey showed an increase in the average value from 2.75 to 3.875, a change of 1.125. The four paired responses between the initial survey and the four-week follow-up showed an increase from 2.75 to 3.25, a change of 0.5. The three paired responses between the post-education survey and the follow-up survey showed a decrease from 3.667 to 3.333, a change of -0.334.

The initial survey question, “How likely would you be to recommend ketamine therapy for a patient,” received 13 responses ranging from a value of two to five with an average value of 4. The post-education survey, reworded to say, “How likely would you now be to recommend ketamine therapy for a patient,” received eight responses ranging from a value of two to five with an average value of 4.125. The four-week follow-up survey received four responses ranging from three to five with an average of 4.25. The eight paired responses between the initial survey and the post-education survey showed a decrease in the average value from 4.25 to 4.125, a change of -0.125. The four paired responses between the initial survey and the four-week follow-

up showed an increase from 4 to 4.25, a change of 0.25. The three paired responses between the post-education survey and the follow-up survey showed no change in the average of 4.

The initial survey question, “If suffering from a condition treatable with ketamine therapy, how likely would you be to utilize it for yourself or a loved one,” received 13 responses ranging from a value of three to five with an average value of 4.154. The post-education survey, reworded to say, “If suffering from a condition treatable with ketamine therapy, how likely would you now be to utilize it for yourself or a loved one,” received eight responses ranging from a value of two to five with an average value of 4.25. The four-week follow-up survey received four responses ranging from two to five with an average of 4. The eight paired responses between the initial survey and the post-education survey showed a decrease in the average value from 4.375 to 4.25, a change of -0.125. The four paired responses between the initial survey and the four-week follow-up showed no change in the average of 4.333. The three paired responses between the post-education survey and the follow-up survey showed a decrease from 4.333 to 4, a change of -0.333.

Paired responses between the initial survey and post-education survey when broken down by PCPs and MHPs reveal differences between the groups, though there were only eight responses, and this small pool is further limited to three PCPs and five MHPs. When asked to rate their familiarity with ketamine, the PCPs averaged 3 on the initial survey and 3.667 on the post-education survey, a change of 0.667, while mental health providers averaged 2.6 on the initial survey and 3.6 on the post-education survey, a change of 1. Regarding the safety of ketamine, the average rating given by PCPs was 3.667 on the initial survey and 4.333 on the post-education survey, an increase of 0.666, while MHPs averaged 4.4 on the initial survey and 4.6 on the post-education survey, a smaller increase but a significantly higher starting point.

When asked to rate their familiarity with the psychoactive effects of ketamine, PCPs averaged 2.667 on the initial survey and 4 on the post-education survey, an increase of 1.333, and MHPs averaged 2.8 on the initial survey and 3.8 on the post-education survey, an increase of 1. The responses become more divergent between the groups when asked to rate their likelihood of recommending ketamine therapy to patients, with PCPs averaging 3.667 on the initial survey and 3.333 on the post-education survey, a change of -0.333, while MHPs averaged 4.6 on both surveys, leaving the MHPs at a much higher likelihood. When asked to rate their likelihood of utilizing ketamine therapy for themselves or loved ones, PCPs averaged 4 on the initial survey and 3.333 on the post-education survey, a change of -0.667, while MHPs averaged 4.6 on the initial survey and 4.8 on the post-education survey, an increase of 0.2. On this question, MHPs began with a higher likelihood which increased after the education while the likelihood for PCPs decreased, resulting in a much higher likelihood for MHPs than PCPs to utilize ketamine therapy.

The remainder of the questions were more exploratory or open-ended, seeking to explore a qualitative view of the state of providers' perceptions toward ketamine therapy.

In response to the initial survey question, "Have you ever been involved in administering ketamine," none of the respondents indicated previous experience with ketamine administration.

In response to the initial survey question, "Do you feel that any aspect of your personal life (such as life events, upbringing, education, relationships, religion, etc.) influences your perceptions of ketamine therapy? If so, please explain," five participants indicated "yes." Their explanations include the following statements:

- "I'm more open to out of the box thinking when it comes to mental health."

- “Due to my upbringing and religious beliefs, I do believe ketamine is fairly ‘natural’ and would prefer over traditional medications.”
- “My life experiences suggest that ketamine is the first of many chemically assisted/enhanced psychotherapy treatment modalities.”
- “I work closely with TMS and it has amazing results for treatment-resistant depression. I like the non-invasive approach.”
- “Religious.”

In response to the question, “Do you feel that the information gained from an educational module is likely to change your perceptions of ketamine,” only one respondent answered “no,” with the explanation, “Already am in favor of it.” The remaining 12 answered “yes,” with explanations including:

- “The education increases confidence.”
- “Help inform me more.”
- “More information, better one can make decisions and support others.”
- “I have heard many patients with successful Ketamine treatment and am open to all the evidence and research on pros/cons of Ketamine treatment.”
- “Education can always enlighten.”
- “I would prefer to say there is a possibility because information always increases my perspective.”
- “Whenever I learn about anything, I am influenced by it.”
- “Education seems to open one’s perception.”
- “Being more informed will allow decision on use.”

- “I don’t know enough about it to feel strongly one way or the other.”
- “Don’t know much.”

In response to the question, “Do you feel the information in the provided educational module changed your perceptions of ketamine,” three respondents indicated “no,” including the respondent who indicated they were already in favor of it prior to the educational presentation, citing the same reason here. Of the other two respondents, one stated, “I feel like I need to experience a ketamine treatment to fully understand.” The other respondent stated, “I’ve considered it an alternative treatment option that lacks rigorous trials and have hallucinogenic properties. The presentation seemed to endorse that view.”

The remaining five responded yes, giving explanations such as:

- “Just more information on how it works.”
- “Increased my desire to advocate for ketamine availability through insurance.”
- “Understanding the benefits.”
- “Better understanding of the ketamine experience.”

In response to the same question on the four-week follow-up survey, all four respondents indicated yes, explaining:

- “I was interested before. Now, I am a cautious advocate.”
- “It helped me address some of my clients’ fears.”
- “More likely to refer for treatment.”
- “A little more knowledge able about what it is.”

When asked on the initial survey, “What three words come to mind when you think of ketamine,” the following responses were given: depression (8 times), drug (2 times), alternative (2 times), experiential, trauma, horse tranquilizer, special K, micro-dosing, recreational, change, experimental, help, helpful, innovative, unknown, hallucinogen, medical, medication, harsh, last resort, suicidal ideation, infusion, pain, chronic pain, sedating, sedation, anesthesia, abusible, Emergency Room, and IV (See Figure 1).

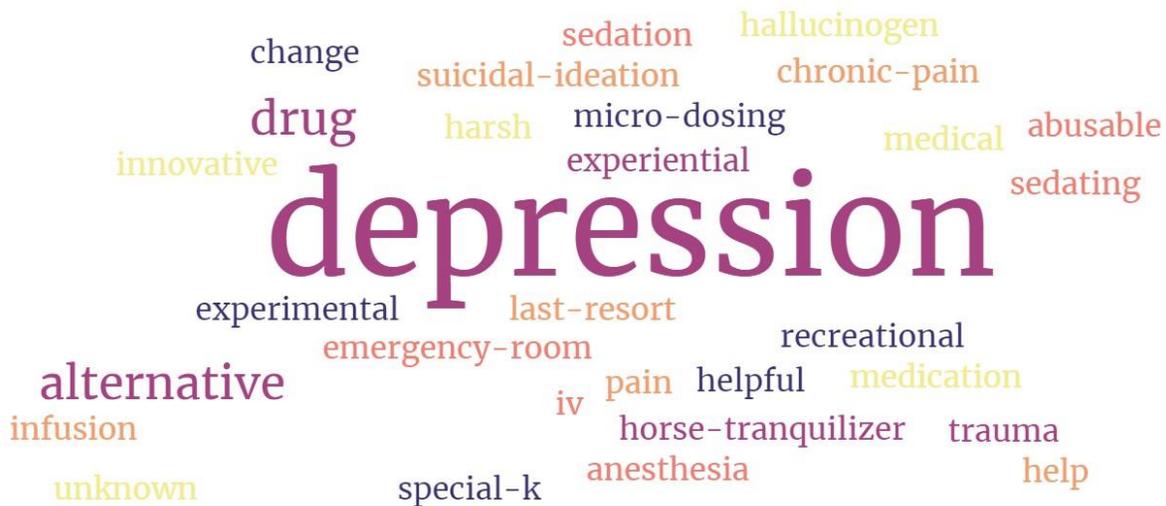


Figure 1: Word cloud for Initial Survey responses to the question, “What three words come to mind when you think of ketamine?” Made at

<https://www.freewordcloudgenerator.com/generatewordcloud>

When asked on the post-education survey, “What three words now come to mind when you think of ketamine,” the responses included: safe (2 times), experiential (2 times), effective (2 times), helpful (2 times), micro-dosing, recreational, hallucinogen, hallucinogenic,

personal/unique, uncertain, exciting, curious, depression, chronic pain, anesthesia, psychoactive, underutilized, psychogenic, off label, and infusion (see Figure 2).



Figure 2: Word cloud for Post-Education Survey responses to the question, “What three words now come to mind when you think of ketamine?” Made at

<https://www.freewordcloudgenerator.com/generatewordcloud>

When asked, “What three words now come to mind when you think of ketamine,” on the four-week follow-up survey, responses included: new, unknown, helpful, healing, deep, options, anesthetic, hallucinogenic, depression, infusion, treatment, and mental health (see Figure 3).



Figure 3: Word cloud for Four-Week Follow-Up Survey responses to the question, “What three words now come to mind when you think of ketamine?” Made at <https://www.freewordcloudgenerator.com/generatewordcloud>

Respondents were asked on the post-education survey, “Would you recommend this educational module to other providers?” All eight respondents indicated yes, with four offering the explanations: “It is a good, brief, run-down of basics of ketamine,” “To help people understand other options,” “Well done summary,” and “Nice brief overview.”

When asked the same question on the four-week follow-up survey, all four respondents indicated yes, with three respondents explaining: “Yes, very helpful information to understand more about a new and helpful treatment for suicidal ideation,” “It may be an option for others,” and “Short, concise explanation.”

Respondents were asked on the initial survey, “Is there any other information you would like to share regarding your perceptions of ketamine?” Four responded, “Very interested in

alternative methods of treatment outside scope of pharmaceuticals,” “I have had 3 clients use ketamine that were fairly treatment resistant, non-receptive to medications and have seemed to benefit from ketamine in the sense of being more open, less anxious, less rigid,” “How can I advocate for insurance coverage of ketamine treatment,” and “How long do benefits last? How safe is it? Side effects? Access to insurance coverage?”

Respondents were asked on the post-education survey, “Do you have any recommendations, comments, or concerns regarding the educational module or additional information you would like noted by the researchers?” Two responded, “More information, personal stories and impacts of ketamine from people who have used it would be great,” and “I may have missed the info regarding the average cost to the patient if they seek treatment at a ketamine clinic.” There were no responses to the same question on the four-week follow-up survey.

Discussion

From this author’s personal experience, the growing body of evidence for many psychedelic medicines as promising treatments do little to change the preconceived perceptions held by many providers. Instead, their focus tends to be on personal moral views of the psychoactive effects of the medication. This research project aimed to explore the effect of an evidence-based educational supplement on providers’ views to assess whether viewpoints were rigid when presented with evidence or were able to be influenced with more information.

The educational supplement increased reported familiarity with ketamine and its psychoactive effects. The overall ratings of perceived safety of ketamine and the likelihood that respondents were willing to refer patients for ketamine therapy or utilize it themselves was surprisingly high prior to the educational supplement (average scores 4.077, 4.0, and 4.154

respectively) with small increases in the post survey (4.5, 4.125, and 4.25 respectively). When respondents to the initial survey who failed to complete the post survey are removed, the average scores for the initial survey change to 4.125, 4.25, and 4.375 respectively. This change resulted in a smaller apparent increase in perception of safety and a small decrease in likelihood to refer patients or utilize ketamine for self or family. Interestingly, a closer look at the paired responses to the questions with decreases from the initial survey to the post-education survey reveals consistent responses for most respondents and that the overall decrease was mediated by two male medical providers who reported decreased likelihood.

The limited number of respondents prohibits drawing meaningful conclusions about the larger population of providers, but may indicate trends and directions for future research. Despite this limitation, it is interesting to note that when results of the initial survey were divided into PCPs and MHPs, MHPs reported similar levels of familiarity with ketamine (PCP average: 3 vs MHP average: 2.875) and familiarity with the psychoactive effects (2.6 vs 2.75), moderately higher perceived safety (3.8 vs 4.25), and substantially higher willingness to recommend for patients (3.4 vs 4.375) or utilize for themselves or loved ones (3.6 vs 4.5).

The baseline data combined with the paired responses between the initial survey and post-education survey broken down by PCPs and MHPs illustrates an interesting picture in which the educational presentation that addressed both the medical information and the psychoactive effects had differing effects on the different types of providers. For PCPs, it would seem that the educational information actually has a detrimental effect on their willingness to either view ketamine therapy as a good treatment for patients or use it for themselves and their loved ones, whereas MHPs demonstrate an unhampered interest in using it for patients and an increased interest in having an experience themselves. Future research should explore reasons for

this discrepancy, such as increased open-mindedness in MHPs vs PCPs, and explore methods for eliminating this barrier in PCPs.

These results suggest that ketamine is generally viewed as a safe medication by both types of providers, but holds a more favorable view as a treatment for mental health conditions by mental health providers than by medical providers. Future research could validate the finding and investigate the underlying reasons for this discrepancy, such as whether medical providers would prefer to use traditional medications or whether mental health providers have simply encountered more patients with mental health issues who have had beneficial outcomes with ketamine therapy. It is also worth noting that the Western medicine ethos in the United States has a negative view of psychoactive substances that generate a “high.” It is a common occurrence to hear healthcare workers denigrate any patient who enjoys the effects of psychoactive substances and “euphoria” is commonly listed as an adverse effect of such substances. This aspect of U.S. medical culture undoubtedly contributes to the reluctance to view a substance with such a profound psychoactive effect as an acceptable or beneficial treatment, despite data supporting that conclusion. In this regard, such perspectives appear to be more about comfort than about knowledge. This is an interesting phenomenon in a society that views the psychoactive effects from alcohol use as accepted and normal for relaxation and inebriation across all social classes despite well-known dangers and harms from alcohol use.

Of the two respondents who mention that religion influenced their views toward ketamine, one indicates a positive viewpoint and cites experience with their clients having positive responses from ketamine treatment. It is interesting to note that this respondent also mentions their perception of ketamine as “natural” compared to traditional medications. This conflicts with the synthetic nature of ketamine which is chemically synthesized (Moghaddam,

2021). The other respondent held a slightly positive regard toward ketamine therapy that became more neutral in the post-education survey and less favorable in the 4-week follow-up survey, though they reported they were more knowledgeable about the ketamine experience and would recommend the educational supplement to other providers.

The respondent who stated, “I’ve considered it an alternative treatment option that lacks rigorous trials and have [sic] hallucinogenic properties. The presentation seemed to endorse that view,” indicated their familiarity with ketamine and its psychoactive effects went from “somewhat familiar,” in the initial survey to “extremely familiar,” in the post-education survey. The respondent’s impression of ketamine’s safety remained at “safe,” though their likeliness to refer patients for ketamine therapy or utilize it for themselves or their families decreased from “neither likely nor unlikely,” to “unlikely.” This respondent’s assessment of their familiarity with ketamine as “extremely familiar” from the short educational supplement along with their other statements and responses seem to indicate that they felt they had learned all they needed to know about the subject to make their judgement. They are certainly not alone in this position on psychoactive substances, though it is worth considering if this prejudicial viewpoint is more harmful than helpful. From this author’s personal experience, individuals who undergo a ketamine experience nearly universally remark about how incredible and ineffable the experience is, circumventing their expectations and changing their view of the treatment even in cases where they were initially hesitant or apprehensive prior to the experience.

Analysis of the responses to the question, “What three words come to mind when you think of ketamine,” reveal some potential themes. Word themes identified include medical terms, psychoactivity, illicit/recreational, positive, negative, and ambiguous terms (See Table 4).

Themes	Initial Survey Responses	Post-Education Survey Responses	Four-Week Follow-Up Survey Responses
Medical	Anesthesia Chronic pain Depression (x8) Drug (x2) Emergency room Infusion IV Medical Medication Pain Sedating Sedation Suicidal ideation Trauma	Anesthesia Chronic pain Depression Infusion Off label	Anesthetic Depression Infusion Mental Health Treatment
Psychoactivity	Experiential Hallucinogen	Experiential (x2) Hallucinogen Hallucinogenic Psychoactive Psychogenic	Hallucinogenic
Illicit/Recreational Use	Horse tranquilizer Micro dosing Recreational Special K	Micro dosing Recreational	N/A
Ambiguous	Alternative (x2) Change Experimental Unknown	Curious Personal Uncertain Unique	Deep New Options Unknown
Positive	Help Helpful Innovative	Effective (x2) Exciting Helpful (x2) Safe (x2) Underutilized	Healing Helpful
Negative	Abusable Harsh Last resort	N/A	N/A

Table 4: Word association responses organized by theme.

The initial survey responses were primarily medical terms such as diagnoses comprising 23 of the 39 responses (59%) with the next most common category being ambiguous terms with 5 responses (13%). The post-education survey showed a marked departure from this theme, with medical terms making up 5 of 24 responses (21%), positive terms comprising the largest category with 8 of 24 responses (33%) followed by psychoactivity terms with 6 of 24 responses (25%), and no responses with a negative connotation. A majority of responses to the four-week follow-up survey belonged to the medical category with 5 of 12 (42%), followed by ambiguous terms with 4 of 12 (33%), then positive terms with 2 of 12 (17%). When comparing responses of the individuals who completed all three surveys, the nature of responses tended to remain in similar themes to their original responses even if the specific words changed.

When examining responses of participants who only completed the initial survey, it is notable that the participant who listed “harsh” and “last resort” held a relatively unfavorable view of ketamine at baseline and the respondent who listed “horse tranquilizer” and “Special K” held a relatively positive view of ketamine at baseline. The failure of these participants to complete the educational module sparks curiosity regarding whether their strong baseline views affected their likelihood of completing the education and remaining surveys.

When examining the responses to this question on the initial survey broken down by PCPs and MHPs, it is interesting to note that the responses for PCPs are almost exclusively medical terms with the only exceptions being the responses “alternative” and “abusable,” which were categorized as ambiguous and negative respectively, though could easily be considered medical terms as well. The responses for MHPs are characterized by much more variation in response category (see Table 5). This may simply be due to the contexts in which different providers are likely to have encountered ketamine, or could potentially be an indicator that

MHPs hold a more open-minded perspective toward unconventional or psychoactive therapies than medically trained providers.

	PCPs	MHPs
Medical	Anesthesia Depression (x4) Drug Emergency room Infusion IV Pain Sedating Sedation Suicidal ideation	Chronic pain Depression (x4) Drug Medical Medication Trauma
Psychoactive	N/A	Experiential Hallucinogen Horse Tranquilizer Special K
Illicit/recreational	N/A	Micro dosing Recreational
Ambiguous	Alternative	Alternative Change Experimental Unknown
Positive	N/A	Help Helpful Innovative
Negative	Abusable	Harsh Last resort

Table 5: Initial survey word association responses by PCPs and MHPs.

Conclusions and Summary

The key finding of this project is that the original hypothesis that an educational module would not change providers' perspectives of ketamine therapy appears to be incorrect. Further, this original hypothesis appears to be incorrect in different directions for PCPs and MHPs on

certain measures. The average responses of all providers who participated indicate that the educational module resulted in an increased sense of familiarity with ketamine and its psychoactive effects, as well as an increased perception that ketamine is safe. PCP and MHP perceptions diverged regarding providers' likelihood to recommend ketamine therapy for patients or utilize it for themselves after completing the education, however, with MHPs rating much higher at baseline than PCPs and maintaining or increasing further, while PCPs likelihood decreased on both measures following the education.

Strengths of this project include the opportunity for readers to utilize the ketamine therapy teaching tool created, the unique insights it provides into providers' perspectives of this growing treatment, and in the variety of areas for future research its mixed-methods approach provides.

The promising results of prior research on ketamine therapy for mental health demonstrate the importance of this treatment. Increased awareness and utilization of ketamine therapy could potentially improve the quality of life of millions of people struggling with depression and other mood disorders. Objective examination of personal views and biases regarding psychoactive substances may reveal personal prejudices serving as barriers to increased utilization of this and other promising treatments. If awareness and utilization can be increased, ketamine therapy may influence current approaches to treatment of mental illness and could be integrated into treatment guidelines.

This study was limited in scope and resources, but larger studies with sources of funding would have greater ability to investigate the factors that may have influenced the findings of this project such as the discrepancy between PCPs and MHPs in their perspectives of ketamine therapy.

The primary limiting factor for this project is the small sample size. With the limited sample, results cannot provide statistical significance or reliable generalizability. There is also the potential that the results were skewed by participation bias among individuals more or less likely to participate. The lack of widely accepted clinical guidelines for ketamine therapy among professional ketamine providers may potentially reduce confidence in the therapy among providers as well. Efforts were made to provide a well-rounded view of ketamine therapy, though future research may illuminate factors that impede or promote acceptability of ketamine therapy for different types of providers, though the educational presentation was condensed to less than 10 minutes in consideration that a longer presentation would require more investment of time and energy by participants and would likely discourage participation. It is also likely that a more interactive educational module would engage learners more effectively, but this would have required time, knowledge, and resources outside of the scope of this project.

Ketamine therapy is one of many emerging therapies involving psychedelic substances showing promising results in the treatment of mental health. By providing a convenient tool to educate providers, it was thought that awareness and utilization of this therapy could potentially be increased and openness to psychedelic medicine could be gauged. The findings of this project suggest that the educational tool created promotes self-reported familiarity with ketamine and its safety and effects, though its effect in promoting utilization seems divided by different types of providers. It is hoped that the educational supplement developed here may be used as a convenient tool for those interested in learning more about ketamine therapy or as a template for creating improved educational tools. Future studies should investigate reasons for differences between provider types and if different educational approaches or types of information have different effects on influencing providers' views and behaviors.

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References

- Ackerman, S. (1992). Foreword. In *Discovering the Brain*. National Academies Press (US).
<http://www.ncbi.nlm.nih.gov/books/NBK234155/>
- Beebe, M., Maestas, S., & Swahn, T. K. (2021). *Barriers to using ketamine for the treatment of depression* [Unpublished Master's Thesis]. Westminster College.
https://www.swahnbalancedhealth.com/files/ugd/b19c2f_463e0247683643a9b12accee40661e31.pdf
- Cohen, S. P., Bhatia, A., Buvanendran, A., Schwenk, E. S., Wasan, A. D., Hurley, R. W., Viscusi, E. R., Narouze, S., Davis, F. N., Ritchie, E. C., Lubenow, T. R., & Hooten, W. M. (2018). Consensus guidelines on the use of intravenous ketamine infusions for chronic pain from the American Society of Regional Anesthesia and Pain Medicine, the American Academy of Pain Medicine, and the American Society of Anesthesiologists. *Regional Anesthesia and Pain Medicine*, 43(5), 521–546. <https://doi.org/10.1097/AAP.0000000000000808>
- Drug Enforcement Administration. (2012, July 9). *United States Controlled Substances Act, section 812*. <https://www.deadiversion.usdoj.gov/21cfr/21usc/812.htm>
- Epocrates. (2022) Depression, adult. In *Epocrates+ medical reference* (Version 22.1.2) [Mobile App]. App Store. <https://apps.apple.com/us/app/epocrates/id281935788>
- Hofmann, A. (2005). Foreword. In *LSD: My problem child* (4th edition). Multidisciplinary Association for Psychedelic Studies.
- Lent, J. K., Arredondo, A., Pugh, M. A., & Austin, P. N. (2019). Ketamine and treatment-resistant depression. *AANA Journal*, 87(5), 411–419.
- Microsoft. (2022). *Excel* (Version 2205) [Computer software]. Microsoft Store.
www.microsoft.com/store

Moghaddam, B. (2021). *Ketamine*. MIT Press.

Mukhalalati, B. A., & Taylor, A. (2019). Adult learning theories in context: A quick guide for healthcare professional educators. *Journal of Medical Education & Curricular Development*, 6, N.PAG-N.PAG. <https://doi.org/10.1177/2382120519840332>

Ng, J., Rosenblat, J. D., Lui, L. M. W., Teopiz, K. M., Lee, Y., Lipsitz, O., Mansur, R. B., Rodrigues, N. B., Nasri, F., Gill, H., Cha, D. S., Subramaniapillai, M., Ho, R. C., Cao, B., & McIntyre, R. S. (2021). Efficacy of ketamine and esketamine on functional outcomes in treatment-resistant depression: A systematic review. *Journal of Affective Disorders*, 293, 285–294. <https://doi.org/10.1016/j.jad.2021.06.032>

Pastrak, M., Abd-Elseyed, A., Ma, F., Vrooman, B., & Visnjevac, O. (2021). Systematic review of the use of intravenous ketamine for fibromyalgia. *The Ochsner Journal*, 21(4), 387–394. <https://doi.org/10.31486/toj.21.0038>

Pescatore, R. (2021). Nebulized ketamine effective and safe for pain. *Emergency Medicine News*, 43(9). https://journals.lww.com/em-news/Fulltext/2021/09000/What_to_D_O_Nebulized_Ketamine_Effective_and.2.aspx

SAMHSA. (2021). *Key substance use and mental health indicators in the United States: Results from the 2020 National Survey on Drug Use and Health*. Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. <https://www.samhsa.gov/data/sites/default/files/reports/rpt35325/NSDUHFFRPDFWHTMLFiles2020/2020NSDUHFFR1PDFW102121.pdf>

Schwenk, E. S., Viscusi, E. R., Buvanendran, A., Hurley, R. W., Wasan, A. D., Narouze, S., Bhatia, A., Davis, F. N., Hooten, W. M., & Cohen, S. P. (2018). Consensus guidelines on the use of intravenous ketamine infusions for acute pain management from the American

- Society of Regional Anesthesia and Pain Medicine, the American Academy of Pain Medicine, and the American Society of Anesthesiologists. *Regional Anesthesia and Pain Medicine*, 43(5), 456–466. <https://doi.org/10.1097/AAP.0000000000000806>
- Srivastava, P., & Hopwood, N. (2009). A practical iterative framework for qualitative data analysis. *International Journal of Qualitative Methods*, 8(1), 76–84. <https://doi.org/10.1177/160940690900800107>
- Stevens, K. R. (2004). *ACE Star Model of EBP: Knowledge Transformation*. The University of Texas Health Science Center at San Antonio.
- Swahn, T. K. (2022). *Ketamine Educational Presentation*. <https://www.youtube.com/watch?v=9-KmOkxen-M>
- Wolfson, P., & Hartelius, G. (Eds.) (2016). *The ketamine papers: Science, therapy, and transformation*. Multidisciplinary Association for Psychedelic Studies.
- World Health Organization. (2016). *Fact file on ketamine*. <https://sa1s3.patientpop.com/assets/docs/55947.pdf>

Appendices

Appendix A: Initial Survey

Initial Provider Perceptions of Ketamine

1. What is your current age?

- Under 18
- 18-29
- 30-39
- 40-49
- 50-59
- 60-69
- 70 or older

2. What is your gender identity?

- Female
- Male
- Genderqueer or non-binary
- Agender
- Not specified above, please specify _____

3. Are you a medical provider or mental health provider? (Question triggers either question 4 or question 5)

- Medical provider
- Mental health provider

* 4. What is your therapeutic role? (Conditional question: Triggered by answering “Mental health provider” to question 3)

- Psychiatrist
- Psychologist
- Psychiatric Mental Health Nurse Practitioner
- Licensed Marriage and Family Therapist
- Licensed Mental Health Counsellor
- Licensed Clinical Social Worker
- Other (please specify) _____

* 5. What is your clinical role? (Conditional question: Triggered by answering “Medical provider” to question 3)

- Nurse Practitioner
- Doctor of Osteopathic Medicine
- Doctor of Allopathic Medicine

- Physician's Assistant
- Other (please specify) _____

6. How familiar are you with ketamine?

- Extremely familiar
- Very familiar
- Somewhat familiar
- Not so familiar
- Not at all familiar

7. What three words come to mind when you think of ketamine?

Word 1: _____

Word 2: _____

Word 3: _____

8. How safe do you believe ketamine is?

- Very safe
- Safe
- Neither safe nor unsafe
- Unsafe
- Very unsafe

9. Have you ever been involved in administering ketamine?

- Yes
- No

10. How familiar are you with the psychoactive effects of ketamine?

- Extremely familiar
- Very familiar
- Somewhat familiar
- Not so familiar
- Not at all familiar

11. How likely would you be to recommend ketamine therapy for a patient?

- Very likely
- Likely

- Neither likely nor unlikely
- Unlikely
- Very unlikely

12. If suffering from a condition treatable with ketamine therapy, how likely would you be to utilize it for yourself or a loved one?

- Very likely
- Likely
- Neither likely nor unlikely
- Unlikely
- Very unlikely

13. Do you feel that any aspect of your personal life (such as life events, upbringing, education, relationships, religion, etc.) influences your perceptions of ketamine therapy?

- Yes
- No

If yes, please explain: _____

14. Do you feel that the information gained from an educational module is likely to change your perceptions of ketamine?

- Yes
- No

Why or why not? _____

15. Is there any other information you would like to share regarding your perceptions of ketamine?

Appendix A: Initial Provider Perceptions of Ketamine Survey

Appendix B: Post-education survey/four-week follow up survey**Post-Education Provider Perceptions of Ketamine**

1. How familiar do you now feel with ketamine?

- Extremely familiar
- Very familiar
- Somewhat familiar
- Not so familiar
- Not at all familiar

2. What three words now come to mind when you think of ketamine?

Word 1: _____

Word 2: _____

Word 3: _____

3. How safe do you now believe ketamine is?

- Very safe
- Safe
- Neither safe nor unsafe
- Unsafe
- Very unsafe

4. How familiar do you now feel with the psychoactive effects of ketamine?

- Extremely familiar
- Very familiar
- Somewhat familiar
- Not so familiar
- Not at all familiar

5. How likely would you now be to recommend ketamine therapy for a patient?

- Very likely
- Likely
- Neither likely nor unlikely
- Unlikely
- Very unlikely

6. If suffering from a condition treatable with ketamine therapy, how likely would you now be to utilize it for yourself or a loved one?

- Very likely
- Likely
- Neither likely nor unlikely
- Unlikely
- Very unlikely

7. Do you feel the information in the provided educational module changed your perceptions of ketamine?

- Yes
- No

Why or why not? _____

8. Would you recommend this educational module to other providers?

- Yes
- No

Why or why not? _____

9. Do you have any recommendations, comments, or concerns regarding the educational module or additional information you would like noted by the researchers?

Appendix B: Post-Education Provider Perceptions of Ketamine Survey

Appendix C: Consent form

Westminster College
Institutional Review Board (IRB)
For the Protection of Human Subjects

Form B Consent Form for Adults

Before agreeing to participate in this study, it is important that the following explanation of the proposed procedures be read and understood. It describes the purpose, procedures, benefits and risks of the study. It also describes alternative procedures available and the right to withdraw from the study at any time. It is important to understand that no guarantee or assurance can be made as to the results. See below.

You have been invited to participate in a research study, the purpose of which is to assess the effect of an educational module on perceptions of ketamine by primary care and mental health providers.

You have been invited to participate in a research study, the purpose of which is to assess and compare the perception of ketamine by primary care providers and mental health providers and to determine if an educational module about ketamine therapy influences how they perceive ketamine.

The study procedure(s) have been identified as completion of a survey questionnaire before completing an educational module, then repeating the survey immediately after the module and again 4 weeks after.

The duration of the study is expected to be 4 weeks. You will be notified of any significant variance from the stated duration of the study.

Benefits that may occur from participation in this study have been identified as: an increased knowledge surrounding ketamine therapy, which may result in a change in treatment and referral behavior for patients who may benefit from ketamine therapy; an increased openness to the changing landscape of mental health therapies; identification of personal perceptions, beliefs, and attitudes surrounding ketamine.

There are no foreseeable side effects/risks associated with this project, other than the possibility of emotional reaction to educational content based on personal beliefs. However, some side effects/risks may be unforeseeable.

Your participation in this study is entirely voluntary, and you may withdraw from the study any time you wish without any penalty to you.

If you have any questions about this study or wish to withdraw, please contact:

Julie Balk, DNP, APRN, FNP-BC

801-832-2172

Principal Investigator

Phone:

If you have any questions regarding your rights as a research participant, please contact:

Sheryl Steadman, PhD, APRN, PMHNP

801-832-2164

Chair of IRB

Phone:

All personally identifiable study data will be kept confidential. However, the results of this study may be made available to you upon request or used in formal publications or presentations.

If you feel that you have received a satisfactory explanation as to the risks and benefits of this study as well as your rights as a research participant and you would like to participate, then please proceed to complete the surveys and educational module provided. By completing these activities, your consent to participate is implied.

Appendix C: IRB Consent Form