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Registered Nurses' Knowledge and Attitudes Towards Psychedelics in Healthcare: Statewide Survey Results

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ABSTRACT

Introduction: Psychedelic science is re-emerging to address mental health conditions, of which certain populations in the United States experience disparities. However, the perspectives of registered nurses (RNs), who have important roles within mental health care, towards psychedelics are largely unknown.

Aim/Question: To assess attitudes, knowledge, and beliefs of a large, state-wide sample of RNs towards psychedelics in health-care settings.

Method: RNs were randomly selected from a statewide directory to participate in a cross-sectional, multi-method online survey.

Results: 793 RNs completed all items, with generally positive attitudes towards psychedelics but mixed opinions regarding the legal landscape, including decriminalisation. Few (12.7%) reported psychedelic content in their training, and most expressed low confidence in their knowledge.

Discussion: Findings generally align with previous research regarding provider attitudes towards psychedelics. Participants in this study had slightly more favourable attitudes and higher knowledge scores.

Limitations: The study has potential selection bias, lacks a priori power analysis, and is limited to one state.

Implications: As psychedelic science emerges as a potential treatment option for several mental health conditions, RNs must be prepared to support individuals and communities.

Recommendations: Additional education in this emerging area of mental health nursing is warranted to ensure RN competence and confidence.

1 | Background

Mental health conditions and substance use disorders in the United States population have significantly expanded since the onset of the COVID-19 pandemic, with certain populations being disproportionately affected. Nearly a third of all adults reported symptoms of anxiety or depressive disorder (Panchal et al. 2023), and women, LGBTQ+ people, adolescents, young adults, and those who experienced a household

job loss were more likely than other adults to experience mental health symptoms (Lopes et al. 2022; Panchal et al. 2023). Additionally, substance use and substance-related deaths increased during the pandemic, with a 50% increase in the overall drug overdose death rate and a 38% increase in alcohol-induced deaths in 2021 (Panchal et al. 2023). Men and people of colour experienced a larger increase in substance use-related deaths than women and white people, respectively (Panchal et al. 2023).

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Summary

- What is known on the subject
 - As the largest segment of the healthcare workforce, nurses are essential in efforts to improve the current mental health crisis in the United States (US).
 - Despite being Schedule I substances in the US, psychedelics are re-emerging as promising treatment options for a variety of mental health conditions.
 - Existing research has examined attitudes of healthcare providers (e.g., psychologists and psychiatrists) towards psychedelics. However, little is known about the attitudes and knowledge of nurses, who play an important role in mental health care, towards psychedelics in healthcare settings.
- Originality
 - This study provides insight into what a large sample of registered nurses (RNs) in one Midwestern state think about psychedelic science in healthcare settings.
 - Participants in this study had generally positive attitudes towards psychedelics but had mixed opinions about whether psychedelics should be decriminalised or legalised.
 - Few RNs in this sample reported having any content related to psychedelics in their nursing education; the majority reported having low confidence in their knowledge about psychedelics.
- Significance
 - There is a desperate need for new mental health treatments for difficult-to-treat mental health problems, including depression, anxiety, PTSD and addiction.
 - Psychedelics are becoming more common in the personal use of patients and may enter health care settings if they are approved by the US Food and Drug Administration and decriminalised.
 - RNs need thorough education on the potential risks and benefits of psychedelics in order to feel competent and prepared to care for the mental health of patients and communities who might benefit from these therapies.

Registered nurses (RNs) are key players in addressing gaps in healthcare service delivery in the US (National Academies of Sciences, Engineering, and Medicine [NASEM] 2021). However, although nurses are the largest sector of the US healthcare workforce, only 3.5% of RNs currently work in psychiatric mental health or substance abuse settings (NASEM 2021). This creates an opportunity for bolstering mental health content in nursing education and growing the mental health nursing workforce to address growing mental health and addiction needs. A projected shortage of primary care providers in the next decade also highlights the need for RN provision of patient education, case management, care coordination, and direct therapeutic interventions to help bridge the gap between mental health needs and services (NASEM 2021).

Psychedelics, including psilocybin, lysergic acid diethylamide (LSD), 3–4 methylenedioxymethamphetamine (MDMA), ibogaine, ayahuasca and ketamine, are re-emerging in biomedical

healthcare research and treatment. Psychedelic plants and fungi have been used by Indigenous peoples as sacred ceremonial and healing medicines for centuries (Celidwen et al. 2023). After decades of promising scientific research on the use of psychedelics for the treatment of mental health issues and addiction in the mid-20th century (Emerson et al. 2014), psychedelics were criminalised in the US in the 1970s, which effectively halted all research and treatment with these substances (Lamkin 2022; Multidisciplinary Association for Psychedelic Studies [MAPS] n.d.). The US Food and Drug Administration (FDA) rejected applications for MDMA research around this time, citing potential for neurotoxicity (Emerson et al. 2014). Researchers persisted, believing that the FDA rejections were more related to the anti-drug culture in the US at the time rather than actual risks and benefits (Emerson et al. 2014). In the mid-1980s, researchers from major universities and organisations such as the Multidisciplinary Association of Psychedelic Science (MAPS) (n.d.) slowly resumed psychedelic research following standard FDA procedures for drug development as their MDMA studies began showing no more than usual risk (Emerson et al. 2014; MAPS n.d.).

Despite slow progress over the decades, growing evidence has reduced concerns of potential toxicity and demonstrated evidence of therapeutic effect in randomised controlled studies, resulting in renewed interest in psychedelic science (Emerson et al. 2014). In addition to MAPS, organisations such as the National Institute of Health's National Institute of Mental Health (n.d.), the National Institute of Nursing Research (National Institute of Health: Clinical Centre n.d.), and numerous universities across the US and in Europe are currently leading research on psychedelics. Public perception of risks and benefits is still debated today, as is whether studies are of high enough quality (Schlag et al. 2022). However, a recent systematic review of historic and recent studies found that the perceptions that psychedelics are neurotoxic or can lead to addiction are largely unfounded in research and that instances of psychosis and overdose are rare (Schlag et al. 2022).

Recently, psychedelic medicines have shown therapeutic effectiveness for multiple mental health conditions, including posttraumatic stress disorder (Bahji et al. 2023), primary and secondary (treatment-resistant) depression (Bahji et al. 2023; Ko et al. 2022; Leger and Unterwald 2022; Li et al. 2022), anxiety (Leger and Unterwald 2022), substance use (Sicignano et al. 2023), and pain from conditions such as cancer (Maia, Beussant, and Garcia 2022), fibromyalgia, tension headaches, migraines, arthritis, and sciatica (Cavarra et al. 2023). Psychedelics are also used outside of scientific and healthcare settings for healing and ceremonial purposes (Keyes and Patrick 2023; Livne et al. 2022; Celidwen et al. 2023).

The regulatory and legal environment surrounding psychedelics impacts their role in research and healthcare around the world (Chesak 2024). For example, ibogaine, which comes from the sacred iboga plant native to Central Africa, is used by Indigenous communities in many African countries for ceremonial purposes and healing (Chesak 2024). Ibogaine regulation varies globally, such as being legal and protected in Gabon and being considered a medication that can be provided by licensed professionals in South Africa (Chesak 2024). According

to the British Broadcasting Corporation, Australia became the first country in the world to regulate MDMA and psilocybin as medications (Wertheimer 2023). The European Union Clinical Trials Registers (n.d.-a, n.d.-b) currently list trials in progress using psilocybin, MDMA, and LSD. The global landscape of psychedelics for treatment of mental health conditions continues to evolve.

Nationally, the US FDA approval of some psychedelics for treatment of psychiatric conditions appears likely in the next few years, which, along with additional phase III clinical trials, could trigger the Drug Enforcement Agency to reassess the scheduling and level of regulation for some psychedelics (Lamkin 2022; Siegel et al. 2023). Psychedelics are following the trend of reform at the state level but not yet at the federal policy level, as similarly occurred with marijuana in the US (Siegel et al. 2023). On a local government level, decriminalisation for personal use and regulation of psychedelic substances is on the rise, with both Colorado and Oregon voters passing ballot initiatives for licensure and regulation of psilocybin for adult use (Colorado Department of Regulatory Agencies n.d.; Oregon Health Authority, Public Health Division 2022). In other states, such as Minnesota (MN), task forces have been established by the legislature to advise on therapeutic efficacy, policy implications, and other legal matters related to psychedelics (Minnesota Department of Health 2024).

With the renaissance in clinical trials and exploratory studies, the potential for psychedelics becoming approved for further medical use, and the prevalence of personal use of psychedelics, there is a growing need for a nursing workforce that is knowledgeable about psychedelic science and can support patients in the safe use of psychedelics for health and healing. Psychiatric and mental health RNs already work alongside certified registered nurse anaesthetists and psychiatric mental health nurse practitioners (distinct roles in the US) to support therapeutic ketamine infusion treatment for patients with depression, anxiety, and posttraumatic stress disorder in clinics in the US (American Association of Nurse Anaesthesiology and American Psychiatric Nurses Association 2023). Future RN roles related to psychedelics in healthcare settings are yet to be defined but may include supporting treatment, such as preparing patients for psychedelic sessions, cultivating safe therapeutic environments and 'sitting' with patients during their psychedelic experiences, and helping patients integrate lessons from their psychedelic experience into their day-to-day life (Penn et al. 2021). Mental health RNs may also play a role in educating the public and shaping psychedelic policy decisions to protect safe and sustainable use of the medicine.

Little is known about nurses' baseline knowledge and attitudes regarding psychedelics and psychedelic healthcare. In research examining the attitudes of other healthcare professionals, including psychiatrists, psychologists, counsellors, and medical students, providers held mixed attitudes towards the potential risks and benefits of psychedelic use (Barnett, Siu, and Pope 2018; Hearn, Brubaker, and Richardson 2022), the promise of therapeutic treatment (Barnett, Siu, and Pope 2018), and whether psychedelics should be legal (Davis et al. 2022; Hearn, Brubaker, and Richardson 2022). At the same time, recent research has suggested that health professionals have positive

attitudes towards the use of psychedelic treatment in healthcare (Hearn, Brubaker, and Richardson 2022) and even for legal recreational use (Wang et al. 2023). In studies assessing healthcare provider knowledge, providers were no more knowledgeable about psychedelics than the general public (Žuljević et al. 2022) and were only somewhat knowledgeable about the potential risks and benefits of use (Davis et al. 2022). Of these studies, only Žuljević et al. (2022) included nurses within their sample, and findings of nurses' attitudes and knowledge levels were aggregated with all other health care providers.

In preparing nurses for the potential integration of psychedelic-assisted treatment for therapeutic care of mental health conditions in interdisciplinary teams, understanding nurses' attitudes and knowledge regarding the use of psychedelics in healthcare is essential. Therefore, the purpose of this study was to explore the attitudes towards and knowledge about the use of psychedelics in healthcare settings among nurses in a representative US state.

2 | Methods

This internet-based multi-method study assessed MN RNs' attitudes, knowledge, and beliefs towards the use of psychedelics in healthcare using a primarily quantitative, anonymous self-report survey. This study was reviewed and approved by the University of Minnesota's Institutional Review Board. The STROBE checklist for reporting cross-sectional studies was used (von Elm et al. 2007).

3 | Participants

Participants were recruited from lists of all RNs and advanced practice registered nurses with a current license in the state of MN, obtained from the MN Board of Nursing in September 2022. Both RNs and advanced practice registered nurses were eligible to participate in the study. This manuscript specifically describes the attitudes and knowledge of the subset of RNs within the parent study. Duplicate entries for individuals with multiple email addresses, and/or phone numbers were condensed, as were duplicate entries for those holding multiple licenses.

Invitations were sent to 10% of randomly selected RNs in each of two unique rounds of sampling. Initial invitations were sent via email using Qualtrics in February and March of 2023. Each round of potential participants received two follow-up reminders. Inclusion criteria for RN participants were: (1) over the age of 18; (2) capable of completing the survey in English; and (3) have an active RN license in the state of MN.

4 | Procedures

After completing the online consent form, participants completed an online Qualtrics survey consisting of 71 closed-ended items, one open-ended response item, and 18 socio-demographic items. After completing the survey, participants were asked if they would like to be included in a drawing for one of fifty \$50 e-gift cards and if they would like to be

contacted about future research opportunities. The drawing and future research questions were anonymously linked to the main survey.

5 | Survey Instruments

The survey included six sections regarding attitudes towards psychedelics, social norms, confidence in knowledge, exposure to education, knowledge, attitudes towards decriminalisation, and demographics. The survey was developed from a review of existing literature in order to potentially harmonise findings and was largely based on the validated Attitudes on Psychedelics Questionnaire (APQ) and accompanying supplemental questions from Žuljević et al. (2022). APQ consist of four five-item sub-scales: (1) Legal Use of Psychedelics; (2) Effects of Psychedelics; (3) Risk Assessment of Psychedelics; and (4) Openness to Psychedelics. Additional questions in our survey were developed using the Integrated Behavioural Model (IBM) to assess Minnesotan nurses' perceived norms, personal agency, knowledge, and skill regarding the use of psychedelics in healthcare settings (Montaño and Kasprzyk 2015). The IBM posits that behavioural intention is determined by attitude, perceived social norms, and personal agency (including self-efficacy and perceived control) (Montaño and Kasprzyk 2015).

Section one of the survey, attitudes on psychedelics, included all four APQ sub-scales and Žuljević and colleagues' seven-question modified Barnett et al. questionnaire to assess attitudes towards psychedelics (Barnett, Siu, and Pope 2018; Žuljević et al. 2022). These items included a Likert-scale five-point range: 'Strongly Disagree' (1) to 'Strongly Agree' (5). The theoretical score range for the APQ is 20–100, while the range of the adapted Barnett, Siu, and Pope (2018) questionnaire is 7–35, with higher scores indicating more positive attitudes towards psychedelics for each scale (Žuljević et al. 2022).

Section two of the survey assessed social norms around psychedelics, including a five-item healthcare worker supplement created by Žuljević et al. (2022) and six items on perceived norms, developed using the IBM. Section three of the survey explored confidence in knowledge using three personal agency items developed using the IBM. Sections two and three used the same Likert-style five-point scale response options as section one. Section four of the survey assessed exposure to education about psychedelics using seven knowledge and skills items developed using the IBM with response options: 'Yes', 'No', and 'Unsure/Prefer not to answer'.

Section five of the survey assessed knowledge on psychedelics using a 22-item basic knowledge test developed by Žuljević et al. (2022). Within this section, participants were asked to indicate which of 22 substances are classified as psychedelics. Participants were shown the correct answers and the drug class for each substance on the next page of the survey. The knowledge test was scored by assigning points for correct answers while subtracting points for incorrect answers, then normalised to a scale from 0 (incorrect) to 100 (correct).

Section six of the survey included 18 basic demographic questions and questions to ascertain if participants (1) were aware

of Colorado's recent vote to decriminalise the personal use, possession, growth, and transport of certain psychedelic plants and fungi, including dimethyltryptamine (DMT), ibogaine, mescaline (excluding peyote), psilocybin, and psilocybin in November 2022; (2) would support similar decriminalisation legislation efforts in MN; and (3) an open-ended question to explain why or why not.

6 | Analysis

The data were analysed using RStudio Desktop for MacOS. Descriptive statistics were used to examine nurse sociodemographic characteristics. For demographic items in which participants could select more than one response, the total number of cases was counted. Number (*n*), frequency (%), mean, and standard deviation were used for each scale, with higher scores indicating more positive attitudes. For individual items, median, interquartile range, and % agree or disagree were calculated. Chi square and *t*-test analyses were used to assess differences between nurse characteristics and their attitudes and knowledge about psychedelics. A $p < 0.05$ was considered statistically significant. Thematic analysis was used for the open-ended item to identify common qualitative themes. Participants who completed all main survey items were included in the analysis. Not all participants who completed the main survey items answered all demographic items, though their data was included in survey analysis. All tests of statistical significance were conducted at the $\alpha = 0.05$ level.

7 | Results

A total of 793 RNs completed all survey items. These respondents appeared to be generally representative of MN RNs, with most identifying as women (87.9%), white (93.8%), and non-Hispanic (95.8%) (Table 1).

RNs held generally favourable attitudes towards psychedelics based on the APQ (mean = 71.3, SD = 15.3) and Barnett et al. (mean = 25.8, SD = 5.5) measures, scoring highest in the openness to psychedelics subscale of the APQ (Table 2). Openness and interest in learning more was also expressed in open ended responses, such as an RN working in clinical care: 'If [psychedelics] help people with chronic and/or mental health diagnoses, I am open to broadening resources and research'.

RNs reported mixed opinions regarding support for decriminalisation efforts (i.e., similar to Colorado), with 46.0% responding 'Yes', 19.6% 'No', and 34.4% 'Unsure'. Themes within the open-ended responses included a range of statements of support, statements of opposition, and statements of not knowing enough about the subject to either support or oppose decriminalisation. For example, one RN who worked in research responded that she would support decriminalisation due to the benefits she had witnessed in practice, stating: 'I have patients who have benefitted greatly from microdosing. I have had patients (experience) great benefit from Ketamine infusions combined with trauma therapy. The laws need to catch up with what research is proving to be beneficial'. Another RN in favour and working in administration responded, 'Psychedelics should be used in medicine; they are too stigmatised'. However, an RN working

TABLE 1 | RN Demographics.

Demographic category	n (%)
Age	Mean = 46.5 (SD = 14.0)
Gender	
Agender	3 (0.4%)
Genderqueer or genderfluid	3 (0.4%)
Man	83 (10.5%)
Non-binary	3 (0.4%)
Woman	697 (87.9%)
Prefer not to respond	9 (1.1%)
Race	
American Indian or Alaska Native	8 (1.0%)
Asian	13 (1.6%)
Black or African American	11 (1.4%)
Native Hawaiian or other Pacific Islander	2 (0.3%)
White	744 (93.8%)
Prefer not to answer	23 (2.9%)
Another	8 (1.0%)
Reporting more than one race	17 (2.1%)
Missing	1 (0.1%)
Hispanic, Latino, or Spanish origin	
Yes	16 (2.0%)
No	760 (95.8%)
Prefer not to respond	16 (2.0%)
Another	1 (0.1%)
Missing	1 (0.1%)
Highest education completed	
Associate's degree	161 (20.3%)
Bachelor's degree	481 (60.7%)
Master's degree (MSN, MPH or MHA)	126 (15.9%)
DNP	9 (1.1%)
PhD	12 (1.5%)
Post-doc	1 (0.1%)
Other	3 (0.4%)
Decade completed highest education	
1970s	33 (4.2%)
1980s	72 (9.1%)

(Continues)

TABLE 1 | (Continued)

Demographic category	n (%)
1990s	105 (13.2%)
2000s	150 (18.9%)
2010s	309 (39.0%)
2020s	118 (14.9%)
Missing	6 (0.8%)
Currently seeing patients	
Yes	375 (47.3%)
No	412 (52.0%)
Missing	6 (0.8%)
Primary daily practice activity	
Clinical care	523 (66.0%)
Research	24 (3.0%)
Teaching	57 (7.2%)
Administration	93 (11.7%)
Retired	56 (7.1%)
Another	123 (15.5%)
Missing	6 (0.8%)

Note: N = 793 for each category.

TABLE 2 | Attitudes towards psychedelics.

Survey scales and items	Mean (SD)
APQ full scale ^a	71.29 (15.31)
Legal use of psychedelics subscale	19.08 (3.98)
Effects of psychedelics subscale	15.65 (4.62)
Risk assessment of psychedelics subscale	16.04 (4.62)
Openness to psychedelics subscale	20.51 (4.41)
Barnett et al. scale ^a	25.83 (5.50)

^aBoth the APQ and modified Barnett et al. questionnaire demonstrated high reliability ($\alpha = 0.95$ and $\alpha = 0.85$ accordingly).

in clinical care and administration and in opposition to decriminalisation stated, 'I am worried about the general public using these substances more openly and how that will affect the job force, educational journey of some individuals, and long-term effects on society'.

Some concerns regarding safety were considered among other RNs who were unsure or opposed to decriminalisation, with some indicating that they may be open to use in medical settings but not general decriminalisation. One such RN working in clinical care stated, 'I would support the use of psychedelics in the clinical practice setting, under supervision, to ensure patient safety. I believe patients also need coaching as they experience the side effects, which should be delivered by a licensed professional'.

TABLE 3 | Confidence and previous exposure/education.

Item	n (%)
Confidence	
I feel confident in my knowledge about how psychedelics work ^a	155 (19.5%)
I feel confident in my knowledge about who might benefit from psychedelic-assisted therapy ^a	207 (26.1%)
I feel confident that I could facilitate a psychedelic session for a patient ^a	82 (10.3%)
Previous exposure/education	
I had content in my health/medical training about psychedelics ^b	101 (12.7%)
I have had continuing education content about psychedelics since becoming a nurse ^b	95 (12.0%)
I have read peer-reviewed articles about psychedelics ^b	258 (32.5%)
I have read Michael Pollan's book 'how to change your mind' ^b	57 (7.2%)
I have watched Michael Pollan's Netflix series 'how to change your mind' ^b	84 (10.6%)
I have watched the documentary 'fantastic fungi' ^b	154 (19.4%)
I have personally witnessed a psychedelic session ^b	67 (8.4%)

Note: *N* = 793 for all items.

^aReflects the number and percentage of participants answering 'agree' or 'strongly agree' for the item.

^bReflects the number and percentage of participants answering 'Yes' for the item.

Respondents' mean score on the knowledge test was 76.2 (SD = 14.1), and they reported low confidence in their knowledge (Table 3). Few RNs (12.7%) reported having content in their training regarding psychedelics or in their continuing education (12.0%). Within the open-ended question, response themes also reflected the lack of knowledge and education, with responses such as 'I don't feel I have enough education or information on the benefits of [psychedelics] use', 'I know nothing about it and need to learn more, and I don't know enough about the subject to weigh in on its legality at this point. I'm interested to see the research and potential for patients, but concerned at the same time about side effects and interactions'. A weak positive correlation was noted between Knowledge Test Score and APQ Score ($r = 0.32$), suggesting that increased knowledge may correlate with slightly more positive attitudes.

Those who completed their healthcare education since 2000 had more positive attitudes towards psychedelics (APQ mean = 73.7 vs. 65.0, $t(785) = -7.4$, $p < 0.001$), Barnett scale (mean = 26.6 vs. 23.8, $t(785) = -6.7$, $p < 0.001$), showed greater support for decriminalisation (51.8% 'Yes' vs. 30.1%, $X^2(2) = 40.9$, $p < 0.001$), higher Knowledge Test score (mean = 77.2 vs. 73.1, $t(785) = -3.6$, $p < 0.001$), and more confidence in their knowledge (see Table 4)

compared to those who completed their education prior to the 2000s. Between these two groups, there was no significant difference in reporting of whether or not they had any content regarding psychedelics in their healthcare training (15.3% 'Yes' vs. 12.8%, $X^2(1) = 0.6$, $p = 0.46$). There was also a weak negative correlation between age and APQ score ($r = -0.29$), Barnett et al. score ($r = -0.26$), and Knowledge Test score ($r = -0.16$).

8 | Discussion

This study marks an initial attempt to ascertain RNs' attitudes towards and knowledge about the use of psychedelics as a therapeutic modality to treat mental health issues and addiction. It adds to a small existing body of literature exploring other healthcare providers' attitudes towards psychedelics, including psychiatrists, psychologists, counsellors, and medical students. Findings within this study generally align with previous research regarding these healthcare providers, which describe conflicting attitudes about whether psychedelics should be legal to use (Davis et al. 2022; Hearn, Brubaker, and Richardson 2022), higher knowledge being associated with more favourable attitudes (Wang et al. 2023), and younger respondents expressing more favourable attitudes than older respondents (Barnett, Siu, and Pope 2018; Hearn, Brubaker, and Richardson 2022; Žuljević et al. 2022).

Attitudes towards psychedelics among this survey of RNs (according to the APQ and the modified Barnett et al. questionnaire) appear to be more favourable than in the healthcare provider sample surveyed by Žuljević et al. (2022), in which the reported median score was 65.0 and 23.0 accordingly. RNs within this study scored higher on the Knowledge Test than the providers from Žuljević et al. (2022), whose median score was 63.6. This may reflect quickly evolving attitudes as more research emerges or could simply reflect a different study population between the two studies (e.g., conducted in different countries, different provider sample).

Despite more favourable attitudes towards psychedelics and higher knowledge scores as compared to Žuljević et al. (2022), RNs within this study reported low confidence in their knowledge about psychedelic substances generally, as well as the indications for their use and their potential risks and benefits. The low confidence in knowledge about risks and benefits was further highlighted in the qualitative responses. This finding aligns with previous studies among healthcare providers who reported low knowledge and confidence about the therapeutic use of psychedelics (Davis et al. 2022; Žuljević et al. 2022). In this study, only 12.7% of participants reported any psychedelics-related content in their health/medical training. To bolster knowledge and confidence regarding nursing roles within therapeutic psychedelic-assisted care, additional targeted content regarding psychedelics is needed in prelicensure preparation and in continuing education.

Within this study, the decade when participants completed their education was not associated with whether the participants received any psychedelics training. This suggests that the lack of psychedelic-related education in nursing has remained similar across time and nurse generations and that the amount of training is likely little to none in nursing education programs.

TABLE 4 | Comparisons between decades of completed highest education.

Scale or item	1970s–1990s results	2000s–2020s results	<i>p</i>
Attitudes			
APQ full scale ^a	Mean = 65.0	Mean = 73.7	< 0.001
Barnett scale ^a	Mean = 23.8	Mean = 26.6	< 0.001
Support for decriminalization ^{b,c}	30.1%	51.8%	< 0.001
Knowledge and confidence			
Knowledge test ^d	Mean = 73.1	Mean = 77.2	< 0.001
I feel confident in my knowledge about how psychedelics work ^{b,d}	15.7%	21.0%	0.005
I feel confident in my knowledge about who might benefit from psychedelic-assisted therapy ^{b,d}	17.6%	29.5%	< 0.001
I feel confident that I could facilitate a psychedelic session for a patient ^{b,d}	7.1%	11.6%	0.03
Education			
I had content in my health/medical training about psychedelics ^{b,c}	15.3%	12.8%	0.46
I have had continuing education content about psychedelics since becoming a nurse ^{b,c}	13.7%	11.6%	0.50

^a*t*-test used to compare means.^bChi-square comparison used to compare response categories.^cReflects the percentage of 'Yes' responses.^dReflects the percentage of 'agree' or 'strongly agree' responses.

Despite this reported consistency in education, those who completed their education more recently had more favourable attitudes towards psychedelics, higher knowledge test scores, and higher confidence in their knowledge about psychedelics. Therefore, factors outside of education, such as age or shifting cultural norms, may contribute to differing scores.

9 | Relevance to Mental Health Nursing Practice

As psychedelic science continues to emerge as a potential therapeutic treatment option for a variety of mental health conditions, additional education in this area is indicated across all levels of nursing education. With RNs being called upon to address gaps in patient access to care, nurses desire more education in mental health to better support their practice (NASEM 2021). Nurses are eager to develop knowledge to implement holistic healing practices and multiple ways of healing while fostering trusted relationships with patients (Denis-Lalonde and Estefan 2020; Penn et al. 2021). However, as indicated in qualitative responses in this study, additional education regarding potential risks and benefits is indicated. Should psychedelic medicines enter further into treatment plans, mental health RNs, especially, must be prepared to take on new roles and practice competencies (Denis-Lalonde and Estefan 2020). Therefore, it is critical that psychedelic science be integrated into nursing curricula, with emphasis in the areas of mental health, pharmacology, and public health.

Advancing equitable population health and upholding ethical principles are key goals within Bachelor of Science RN education (American Association of Colleges of Nursing 2021). Psychedelic science could be integrated into equitable population health content areas, for example, by exploring the historical context of psychedelics in the US. Psychedelics were made illegal with the War on Drugs, which was the result of social and political pressure in the 1960s and 1970s (Denis-Lalonde and Estefan 2020). Some nurses within this study commented on the historic stigma surrounding psychedelics. The stigma and social norms surrounding psychedelics must be re-examined if they are limiting care for patients and communities who could benefit from their use (Denis-Lalonde and Estefan 2020). Nursing programs can consider incorporating topical legislative happenings related to psychedelics to weave policy-focused competencies into curriculum. Psychedelic science content could also be integrated into ethical discussions, for example, through examining historical and cultural uses of some psychedelics and potential consequences and implications of broader use in mainstream society and Western healthcare. See the concerns raised by Celidwen et al. (2023) about Indigenous rights and traditional knowledge and practice surrounding psychedelics.

10 | Limitations

Within this study, there was a risk for selection bias, as those who held either strong negative or positive opinions may have

been more likely to participate in the study, which could have skewed the results positively or negatively. Additionally, the survey did not ask about the respondent's personal use of psychedelics, which may influence individual attitudes. As an exploratory study, we did not do a priori power analysis for our hypothesis testing, instead aiming for a proportional goal of licensed nurses in the state to reach generalizability. Finally, the study was conducted in a singular, Midwestern state. While our study team includes investigators from two other states on the spectrum of enacted natural medicine legislation (in the Northeast and West), rapidly developing legal and policy differences regarding psychedelics means that these results may not be generalisable to other US states or outside of the US.

11 | Conclusion

Nurses play an essential role in addressing mental health inequities and gaps in care across the US. With the growing scientific interest and use of psychedelics for the treatment of mental health conditions, RNs and other nurses must be sufficiently knowledgeable about psychedelics to provide education regarding potential treatment risks and benefits and to work in mental health settings that may include psychedelics in treatment plans. In this first study of nurse attitudes towards psychedelics, RNs were open to the idea of psychedelic use in clinical settings but reported low knowledge and confidence regarding psychedelics. Significant evidence-based and culturally responsive education and training within nursing schools will be needed as this science moves forward. Findings from this study support the call for nursing education programs and faculty to consider planning for and implementing learning opportunities to reduce stigma towards these medicines and build competence related to psychedelic benefits, risks, treatment support, ethics, and policy implications at individual, community, and population levels.

12 | Relevance Statement

Psychedelics are a growing area of interest for the potential treatment of a variety of mental health conditions. With a rapidly changing policy environment, psychedelics are likely to continue to become more integrated into mental healthcare settings and patient education. Registered nurses may hold many roles related to psychedelic healthcare provision, including direct patient care, creating therapeutic environments, patient education, and influencing policy. Understanding the attitudes, knowledge, and education needs of nurses related to psychedelics is warranted to better prepare mental health nurses for potential upcoming developments in their practice such that they can best support patients and communities.

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Ethics Statement

The study was reviewed and approved by the University of Minnesota Institutional Review Board.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

References

- American Association of Colleges of Nursing. 2021. "The Essentials: Core Competencies for Professional Nursing Education." <https://www.aacnursing.org/Portals/42/AcademicNursing/pdf/Essentials-2021.pdf>.
- American Association of Nurse Anesthesiology, and American Psychiatric Nurses Association. 2023. "AANA and APNA Joint Position Statement on Ketamine Infusion Therapy for Psychiatric Disorders." <https://issuu.com/aanapublishing/docs/apna-aana-joint-statement-on-ketamine?fr=sY2VIZjU2NDAxMjU>.
- Bahji, A., I. Lunsy, G. Gutierrez, and G. Vazquez. 2023. "Efficacy and Safety of Four Psychedelic-Assisted Therapies for Adults With Symptoms of Depression, Anxiety, and Posttraumatic Stress Disorder: A Systematic Review and Meta-Analysis." *Journal of Psychoactive Drugs* 1-16: 2278586. <https://doi.org/10.1080/02791072.2023.2278586>.
- Barnett, B. S., W. O. Siu, and H. G. Pope. 2018. "A Survey of American Psychiatrists' Attitudes Towards Classic Hallucinogens." *Journal of Nervous and Mental Disease* 206, no. 6: 476-480. <https://doi.org/10.1097/NMD.0000000000000828>.
- Cavarra, M., N. L. Mason, K. P. Kuypers, et al. 2023. "Potential Analgesic Effects of Psychedelics on Select Chronic Pain Conditions: A Survey Study." *European Journal of Pain* 28, no. 1: 153-165. <https://doi.org/10.1002/ejp.2171>.
- Celidwen, Y., N. Redvers, C. Githaiga, et al. 2023. "Ethical Principles of Traditional Indigenous Medicine to Guide Western Psychedelic Research and Practice." *Lancet Regional Health: Americas* 18: 100410. <https://doi.org/10.1016/j.lana.2022.100410>.
- Chesak, J. 2024. *What Psychedelics Legalisation and Decriminalisation Looks Like Around the World*. British Broadcasting Corporation. <https://www.bbc.com/future/article/20240320-legal-status-of-psychedelics-around-the-world>.
- Colorado Department of Regulatory Agencies. n.d. "Natural Medicine Health Act FAQs." <https://dpo.colorado.gov/NaturalMedicine/FAQ>.
- Davis, A. K., G. Agin-Liebes, M. España, B. Pilecki, and J. Luoma. 2022. "Attitudes and Beliefs About the Therapeutic Use of Psychedelic Drugs Among Psychologists in the United States." *Journal of Psychoactive Drugs* 54, no. 4: 309-318. <https://doi.org/10.1080/02791072.2021.1971343>.
- Denis-Lalonde, D., and A. Estefan. 2020. "Emerging Psychedelic-Assisted Therapies: Implications for Nursing Practice." *Journal of Mental Health and Addiction Nursing* 4, no. 1: e1-e13. <https://doi.org/10.22374/jmhan.v4i1.40>.
- Emerson, A., L. Ponté, L. Jerome, and R. Doblin. 2014. "History and Future of the Multidisciplinary Association for Psychedelic Studies (MAPS)." *Journal of Psychoactive Drugs* 46, no. 1: 27-36. <https://doi.org/10.1080/02791072.2014.877321>.
- European Union Clinical Trials Register. n.d.-a. "Clinical Trials." <https://euclinicaltrials.eu/search-for-clinical-trials/?lang=en>.

- European Union Clinical Trials Register. n.d.-b. "EU Clinical Trials Register." <https://www.clinicaltrialsregister.eu/ctr-search/search?query=LSD>.
- Hearn, B. G., M. D. Brubaker, and G. Richardson. 2022. "Counselors' Attitudes Toward Psychedelics and Their Use in Therapy." *Journal of Counseling & Development* 100, no. 4: 364–373. <https://doi.org/10.1002/jcad.12429>.
- Keyes, K. M., and M. E. Patrick. 2023. "Hallucinogen Use Among Young Adults Ages 19–30 in the United States: Changes From 2018 to 2021." *Addiction* 118, no. 12: 2449–2454. <https://doi.org/10.1111/add.16259>.
- Ko, K., E. I. Kopra, A. J. Cleare, and J. J. Rucker. 2022. "Psychedelic Therapy for Depressive Symptoms: A Systematic Review and Meta-Analysis." *Journal of Affective Disorders* 322: 194–204. <https://doi.org/10.1016/j.jad.2022.09.168>.
- Lamkin, M. 2022. "Prescription Psychedelics: The Road From FDA Approval to Clinical Practice." *American Journal of Medicine* 135, no. 1: 15–16. <https://doi.org/10.1016/j.amjmed.2021.07.033>.
- Leger, R. F., and E. M. Unterwald. 2022. "Assessing the Effects of Methodological Differences on Outcomes in the Use of Psychedelics in the Treatment of Anxiety and Depressive Disorders: A Systematic Review and Meta-Analysis." *Journal of Psychopharmacology* 36, no. 1: 20–30. <https://doi.org/10.1177/02698811211044688>.
- Li, N., Y. Hu, W. Chen, and B. Zhang. 2022. "Dose Effect of Psilocybin on Primary and Secondary Depression: A Preliminary Systematic Review and Meta-Analysis." *Journal of Affective Disorders* 296: 26–34. <https://doi.org/10.1016/j.jad.2021.09.041>.
- Livne, O., D. Shmulewitz, C. Walsh, and D. S. Hasin. 2022. "Adolescent and Adult Time Trends in US Hallucinogen Use, 2002–2019: Any Use, and Use of Ecstasy, LSD and PCP." *Addiction* 117, no. 12: 3099–3109. <https://doi.org/10.1111/add.15987>.
- Lopes, L., A. Kirzinger, G. Sparks, M. Stokes, and M. Brodie. 2022. *KFF/CNN Mental Health in America Survey*. Kaiser Family Foundation. <https://www.kff.org/report-section/kff-cnn-mental-health-in-america-survey-findings/>.
- Maia, L. O., Y. Beausant, and A. C. M. Garcia. 2022. "The Therapeutic Potential of Psychedelic-Assisted Therapies for Symptom Control in Patients Diagnosed With Serious Illness: A Systematic Review." *Journal of Pain and Symptom Management* 63, no. 6: e725–e738. <https://doi.org/10.1016/j.jpainsymman.2022.01.024>.
- Minnesota Department of Health. 2024. "Psychedelic Medicine Task Force." <https://www.health.state.mn.us/people/psychmed/index.html>.
- Montaño, D. E., and D. Kasprzyk. 2015. "Chapter 6: Theory of Reasoned Action, Theory of Planned Behavior, and the Integrated Behavioral Model." In *Health Behavior: Theory, Research, and Practice*, edited by K. Glanz, B. K. Rimer, and K. Viswanath, 5th ed., 95–124. San Francisco, CA: Jossey-Bass.
- Multidisciplinary Association for Psychedelic Studies. n.d. "About MAPS: Our History." <https://maps.org/about-maps/#history>.
- National Academies of Sciences, Engineering, and Medicine [NASEM]. 2021. *The Future of Nursing 2020–2030: Charting a Path to Achieve Health Equity*. Washington, DC: National Academies Press.
- National Institute of Health: Clinical Center. n.d. "Protocol Details: A Proof-of-Concept Trial on the Effect of Ketamine on Fatigue." <https://clinicalstudies.info.nih.gov/ProtocolDetails.aspx?id=20-NR-0003>.
- National Institute of Health: National Institute of Mental Health. n.d. "NIH/NIMH Therapeutics Discovery Research." <https://www.nimh.nih.gov/research/research-funded-by-nimh/therapeutics>.
- Oregon Health Authority, Public Health Division. 2022. "Oregon Psilocybin Services." <https://www.oregon.gov/oha/PH/PREVENTION WELLNESS/Documents/OPS-Fact-Sheet.pdf>.
- Panchal, N., H. Saunders, R. Rudowitz, and C. Cox. 2023. *The Implications of COVID-19 for Mental Health and Substance Use*. Kaiser Family Foundation. <https://www.kff.org/mental-health/issue-brief/the-implications-of-covid-19-for-mental-health-and-substance-use/>.
- Penn, A., C. G. Dorsen, S. Hope, and W. E. Rosa. 2021. "Psychedelic-Assisted Therapy: Emerging Treatments in Mental Health Disorders." *American Journal of Nursing* 121, no. 6: 34–40. <https://doi.org/10.1097/01.Naj.0000753464.35523.29>.
- Schlag, A. K., J. Aday, I. Salam, J. C. Neill, and D. J. Nutt. 2022. "Adverse Effects of Psychedelics: From Anecdotes and Misinformation to Systematic Science." *Journal of Psychopharmacology* 36, no. 3: 258–272. <https://doi.org/10.1177/02698811211069100>.
- Sicignano, D., A. V. Hernandez, B. Schiff, N. Elmahy, and C. M. White. 2023. "The Impact of Psychedelics on Patients With Alcohol Use Disorder: A Systematic Review With Meta-Analysis." *Current Medical Research and Opinion* 1-10: 293–302. <https://doi.org/10.1080/03007995.2023.2296968>.
- Siegel, J. S., J. E. Daily, D. A. Perry, and G. E. Nicol. 2023. "Psychedelic Drug Legislative Reform and Legalization in the US." *JAMA Psychiatry* 80, no. 1: 77–83. <https://doi.org/10.1001/jamapsychiatry.2022.4101>.
- von Elm, E., D. G. Altman, M. Egger, S. J. Pocock, P. C. Gotsche, and J. P. Vandembroucke. 2007. "The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: Guidelines for Reporting Observational Studies." *Lancet* 370, no. 9596: 1453–1457. [https://doi.org/10.1016/S0140-6736\(07\)61602-X](https://doi.org/10.1016/S0140-6736(07)61602-X).
- Wang, K., Y. Sun, B. Nava, L. Sampiere, and R. J. Jacobs. 2023. "Predictors of Medical students' Perceptions of Psilocybin-Assisted Therapy for Use in Medical Practice." *Cureus* 15, no. 4: e37450. <https://doi.org/10.7759/cureus.37450>.
- Wertheimer, T. 2023. *Australia Legalises Psychedelics for Mental Health*. British Broadcasting Corporation. <https://www.bbc.com/news/world-australia-66072427>.
- Žuljević, M. F., I. Buljan, M. Leskur, M. Kaliterna, D. Hren, and D. Duplančić. 2022. "Validation of a New Instrument for Assessing Attitudes on Psychedelics in the General Population." *Scientific Reports* 12, no. 1: 18225. <https://doi.org/10.1038/s41598-022-23056-5>.