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Psychedelic Use Among Psychiatric Medication Prescribers: Effects on Well-Being, Depression, Anxiety, and Associations with Patterns of Use, Reported Harms, and Transformative Mental States

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Abstract

Mental health problems including depression, anxiety, suicide, and burnout are common among health care providers. Resilience and well-being are factors thought to protect against these incidents. Clinical trials and naturalistic studies of psychedelic compounds have shown decreases in depression, anxiety, and suicidality while suggesting improvements in well-being. This secondary analysis of a large cross-sectional online survey consisting of participants with at least one lifetime psychedelic use sought to examine how use affects health care providers who treat psychiatric disorders with medications. In total, 228 respondents retrospectively completed measures of depression, anxiety, and well-being before and after psychedelic exposure. They also reported lifetime use, harms attributed to use, and preferred psychedelic agent. Psychedelic use was associated with improvements in depression, anxiety, and well-being. Reported suicidality decreased and resilience increased. A factor analysis suggested that a cluster of mystical, interpersonal, and personal items predicted improvement in depression, anxiety, well-being, suicidality, and resilience. Preferred psychedelic agent did not affect outcomes. Frequency of use was not associated with outcomes although differences in effect sizes were seen. Harm reported was consistent with the general population, with 13.2% ($n = 30$) reporting at least one harm. Pre-exposure alcohol use, aggressive impulses, and desire to die by suicide improved most often while marijuana use most often worsened or did not change. These results are consistent with clinical trials and naturalistic studies examining psychedelic use in the general

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population and suggest that health care providers who treat psychiatric disorders with medications may benefit from psychedelic use, although some harm was reported. Given the current mental health crisis among health care providers, further research is warranted to examine whether interventions utilizing psychedelics could improve well-being and effectiveness of health care providers while decreasing adverse mental health outcomes associated with working in health care. ClinicalTrials.gov (ID: NCT04040582).

Keywords: psychedelics, wellness, prescriber, depression, anxiety, psilocybin

Introduction

A mental health crisis among health care workers is a widely recognized phenomenon, affecting ~50% of this population.[1,2] It has worsened secondary to the COVID-19 pandemic, prompting the issuance of a 2022 public health advisory on health worker burnout and well-being by United States Surgeon General Vivek Murthy.[3] Rates of anxiety and depression are significantly elevated in health care workers,[4–6] and in a recent survey of >25,000 public health workers, approximately one-half reported symptoms of a mental health condition in the past 2 weeks.[4]

Furthermore, suicide rates are 44% higher in physicians than in the general population and almost twice as high when stratified to female physicians.[7] Deaths by suicide doubled from 2014 to 2018 across health care professions.[8] Strikingly, from the years 2000 to 2014, suicide was the first and second leading cause of death among male and female physician trainees, respectively.[9,10] Female nurses were found to have a suicide rate double that of the general female population.[11] Mental health clinicians seem to be at higher suicide risk than other providers, with both psychiatrists and psychologists in the top five health care professions most likely to die by suicide.[8]

Beyond higher rates of mental health diagnoses, health care providers also demonstrate decreased well-being and work satisfaction and higher rates of burnout. Burnout has overlap with depression[12] but may be a distinct, though heterogeneous, construct.[13] The most widely used definition is that of Christina Maslach, which characterizes burnout as having three primary criteria: (1) emotional exhaustion, (2) a state of depersonalization and/or cynicism, and (3) a sense of personal inefficacy.[14,15] This framing has been expanded to include physical and cognitive symptoms,[16] emergent interpersonal problems,[17] a sense of disconnection with self and others,[18] and loss of meaning.[19,20]

Maslach originally characterized burnout as ''an erosion of the soul,'' suggesting a deeper spiritual and existential phenomenon at play.[21] In addition to its devastating effects on the health of the affected health care worker, burnout is associated with poor patient outcomes,[22–24] increased medical errors,[25] and decreased productivity, exacting $4.6 billion annually.[26] With growing recognition of the above phenomena, there are increasing attempts to address health care workers' mental health at both the individual and institutional level.

Some authors have highlighted the need for organizational change.[27] There is also evidence that the cultivation of certain individual traits, such as psychological flexibility[28] and resilience,[29,30] may reduce burnout. Mindfulness practices may also decrease burnout, possibly by increasing psychological flexibility.[2,28,31] An effective approach to addressing burnout will likely require both institutional and individual changes.[32,33]

Amid these efforts to improve health care worker mental health and well-being, a renaissance in our understanding of psychedelic drugs has emerged, fueled by multiple studies suggesting these agents may hold promise as novel interventions for myriad mental health conditions.[34] Psychedelics are a broad class of consciousness changing agents characterized by an ability to engender deeply meaningful, psychologically insightful, and mystical-type experiences (e.g., connection to the universe or nature and sense of awe) in many users, particularly when taken in supportive settings.[35,36]

Psychedelics are also classified by their Serotonin 2a Receptor (5HT2aR) agonism, although not all such consciousness changing agents share this direct pathway.[37] In the past two decades, psychedelic-assisted psychotherapy (PAT) has demonstrated efficacy for a range of mental health conditions including depression,[38–42] anxiety,[43] existential distress,[44–46] addiction,[47–50] and post-traumatic stress disorder.[51] Moreover, psychedelics may enhance wellness and other characteristics associated with human flourishing in individuals not currently struggling with a mental health condition.

A large cross-sectional survey, called *the Psychedelics and Wellness Study (PAWS)*, observed that psychedelic use was associated with improvements in well-being and resilience in a general population of naturalistic psychedelic users.[52] Most respondents also reported beneficial long-term changes in attitudes, self-perceived altruism, and prosocial behavior.[52]

Another recent analysis suggests that lifetime psychedelic use may result in lower distress for those who are employed.[53] These observations suggest that psychedelics could help improve mental health of prescribers. Indeed, two clinical trials evaluating PAT for burnout

and traumatic stress in health care providers are planned (National Library of Medicine, NCT05557643, NCT05163496). Given concerns surrounding the legal and professional repercussions of self-disclosure, little is known about the benefits and harms of naturalistic psychedelic use in this population.

Therefore, we sought to analyze the potential effects of naturalistic psychedelic use on depression, anxiety, and emotional well-being on prescribers of psychiatric medication through a survey. As a secondary measure, we investigated whether these effects could extend to improvements in resilience and decreases in suicidal ideation. Finally, consistent with PAWS, we analyzed psychedelic preference, total lifetime psychedelic use, and psychedelic-related harms in this subpopulation. We hypothesized that respondents would generally report improvements in the measures assessed with harms less commonly reported. We included primarily 5HT2aR agonists (e.g., psilocybin, lysergic acid diethylamide [LSD]) but also other consciousness changing agents often classified as psychedelics, such as ketamine, salvia, and iboga.

Materials and Methods

Ethical considerations

The survey was conducted completely anonymously. There was no collection of personal identifying data. No effort was made to specifically recruit prescribers into the PAWS survey. All survey questions from the PAWS database included in the current study pertained to past use, with no assessment of potential future use. There was no endorsement of psychedelic use. Participants were not compensated. As a survey with anonymous participants asking about past behavior, the Western Institutional Review Board determined it to be exempt under 45 CFR § 46.104 (d).[2] The PAWS is registered on clinicaltrials.gov (ID: NCT04040582).

Recruitment and study design

This study was a secondary analysis of data from the larger *PAWS* survey, which is detailed in a prior publication[52] and registered on clinicaltrials.gov (ID: NCT04040582). The *PAWS* is an anonymous cross-sectional retrospective survey designed to assess perspectives on mental health effects of past naturalistic psychedelic use. Potential effects on depression, anxiety, wellness, predictors of positive and negative outcomes, and specific harms often referenced in relation to psychedelic use were assessed.

The tools used to assess each of these are described in detail below and include Patient Health Questionnaire-9 (PHQ-9),[54] General Anxiety Disorder-7 (GAD-7),[55] Happiness Enthusiasm Resilience Optimism (HERO) Wellness Scale,[56] Psychedelic Change Questionnaire (PCQ-26),[52] and Negative Consequences Inventory-8 (NCI-8).[52] For the PHQ-9, GAD-7, and HERO Wellness Scale, participants were asked to retrospectively rate their average score before ever taking a psychedelic and as a result of their psychedelic use.

The survey did not specify what point in time ''after their psychedelic use'' they should reference (i.e., after their first use or after their last use). The PCQ-26 and the NCI-8 were both designed for the PAWS and asked participants to rate change in variables they considered to be impacted by their psychedelic use. Both instruments utilize a 7-point Likert scale ranging from ''very much improved'' to ''very much worse.''

Participants were recruited through online platforms, social media, word-of-mouth, in-person, flyers/postcards, e-mail, and snowball sampling. Recruitment material guided interested individuals to (www.psychedelicsandwellness.com). People aged 18 years and older who had used a psychedelic at least once and had internet access were eligible to participate. Qualified individuals who elected to enroll were provided standard consent information before enrollment. After acceptance of consent, participants were directed to the online survey. Participants were only included in this study if they checked a box indicating they were a ''health care provider who treats psychiatric disorders with medications.''

Participant demographics, psychedelic use, and preferences

We collected data on participants' age, identified gender, education level, whether they were a health care provider who treated psychiatric disorders with medications (yes/no), estimated lifetime number of psychedelic uses, preferred psychedelic, and history of microdosing (yes/no).

Overview of measures: HERO Wellness Scale, PCQ-26, and NCI-8

The HERO is a self-report measure that assesses the strength of individual mental wellness. Participants are asked to rate their average sense of happiness, enthusiasm, resilience, optimism, and individual wellness from ''not at all'' (0) to ''extremely'' (10). The HERO has an internal consistency of 0.93 and corrected item-total correlations of 0.67 for resilience to 0.86 for overall mental wellness.[56] The HERO is sensitive to improvements in mental health after interventions in those with and without psychiatric disorders. To measure resilience, question 3 (''On average, during the past 7 days, how resilient have you felt?'') was independently analyzed.

The PCQ-26 is a questionnaire created for the *PAWS* that assesses the persistence of emotional states after a psychedelic experience.[52] Participants rate 26 queries of changes in domains that have been associated with psychedelic experiences, wellness, functioning, and mental disorders. Reponses are ranked on a 7-point Likert scale from ''very much improved'' (1) to ''very much

worse'' (7), with the option of ''does not apply.'' Changes assessed include feelings of empathy, joy, contentment, compassion, calm, peace, love, openness, gratitude, purpose, altruism, philanthropy, sexual intimacy, fear of death, connection to others, the universe, and to nature, mindfulness, quality of sleep and relationships, changes in eating, ruminative thinking, and irritability.

Coauthors A.P. and S.J. served as content experts and chose items from the PCQ-26 that at face value might have content validity in relation to resilience. In total, 18 items were selected, and a resilience scale based on these items was assessed for reliability and validity.

The NCI-8 is an inventory also created for the *PAWS* that assesses potential harms after a psychedelic experience.[52] Participants rate change in eight areas on a 7-point Likert scale from ''very much improved'' (1) to ''very much worse'' (7), with the option of ''does not apply.'' Changes are assessed in the domains of suicide, criminal and aggressive impulses, and misuse of the following: alcohol, cigarettes, cannabis, benzodiazepine, and opiates.

Statistical analyses

Frequency distributions were calculated for all measures and means, and standard deviations were computed for all continuous measures. Distributions of the outcome measures were examined for outliers and for significant deviations from normality. For post and post–pre residualized scores for HERO, PHQ-9, and GAD-7 measures, Kolmogorov–Smirnov and Shapiro–Wilk tests indicated significant deviations from normality. However, bootstrap simulations based on 1000 samples demonstrated that the underlying distributions were normally distributed (Kolmogorov–Smirnov and Shapiro–Wilk tests $p > 0.05$), indicating that use of parametric tests was appropriate.

Exploratory factor analysis using principal components was applied to the 18 PCQ-26 items judged to be associated with resilience to examine potential underlying structures and to reduce dimensionality and the corresponding risk for type 1 error. To determine the number of factors to be extracted, we performed a Monte Carlo simulation of normal random samples that parallel the observed data in terms of sample size and number of variables used. This parallel analysis served as a comparison against the observed eigenvalues. Following standard procedure, loading scores were categorized as follows: >0.71 (50% overlapping variance) as excellent; 0.63–0.71 as very good; 0.55–0.62 as good; 0.45–0.54 as fair; and 0.32–0.44 as poor.[57]

Items that cross-load onto more than one factor were considered significant if the difference in loading scores is ≥0.2. As described in the Results section, a one-factor solution was identified and included as a predictor in regression models with residualized change scores outcomes.

Paired sample *t* tests were used to compare HERO, PHQ-9, and GAD-7 scores before (pre), and after (post), psychedelic use. Effect sizes for these comparisons are expressed as Cohen's *d*. Effect sizes from 0.2 to <0.5 are considered small, effect sizes from ≥0.5 to <0.8 are considered medium, and effect sizes ≥0.8 are considered large.[58] To evaluate variables (e.g., demographic variables, PCQ-26 factor) that might impact the outcomes, a linear regression was run on residualized change scores. Using the regression line equation, predicted scores were calculated for each participant, after which a residual was calculated for each participant (e.g., postscore minus the predicted score).

The residual scores were standardized so that the mean of the residuals = 0 with a standard deviation = 1.0. This residual change measure was used as the dependent variable for a multiple regression in which scores on variables of interest were used as predictor variables. This strategy allowed us to estimate the association between a given predictor variable and the outcome holding all other variables constant, thereby providing a method of adjusting for potential confounding variables that have been included in the model. Standardized beta coefficients were used to compare the strength of the effect of each individual predictor variable on the dependent variable.

Statistical significance was set at an alpha <0.05 (two-tailed). Analyses were conducted using SPSS version 28 (IBM Corp, Armonk, NY, USA).

Results

Demographics

Table 1 presents demographic information on the 228 prescriber respondents. Participants ranged in age from 23 to 82 years, with a similar representation of men and women. The study sample averaged 25.24 (range 1–500) lifetime uses of a psychedelic, with most participants identifying psilocybin or LSD as their preferred psychedelic (psilocybin 45.6%; LSD 26.8%). Eighteen participants (7.9%) reported a single use and a large minority (41.2%, $n = 94$) reported a history of psychedelic microdosing.

Association of lifetime psychedelic use with emotional well-being, depression, and anxiety

Table 2 displays pre- and post-psychedelic usage mean scores for HERO, PHQ-9, and GAD-7 in providers. Based on retrospective self-report, HERO (32.73 vs. 40.14; $p < 0.001$), PHQ-9 (6.03 vs. 3.02; $p < 0.001$), and GAD-7 (6.11 vs. 2.74, $p < 0.001$) scores significantly improved from average values before any lifetime psychedelic use to average values post-psychedelic exposure. HERO item 3 (resilience) mean scores also significantly increased (6.66 vs. 8.23; $p < 0.001$).

Table 1. Sample Characteristics ($N = 228$)

Variables	N	%	*M*	*SD*	*Range*
Age (years)	228		49.61	15.17	23–82
Gender					
Female	117	51.3			
Male	109	47.8			
Other	2	0.9			
Preferred psychedelic					
Psilocybin (magic mushrooms)	104	45.6			
LSD	61	26.8			
Ketamine	18	7.9			
Mescaline/peyote/ San Pedro/other mescaline containing cacti	12	5.3			
Other: designer/synthetic	11	4.8			
Ayahuasca	9	3.9			
5-MeO-DMT	7	3.1			
Salvia	3	1.3			
Iboga/Ibogaine	1	0.4			
2-CB	1	0.4			
	1	0.4			
Total number of times taken any psychedelic in lifetime	228		25.24	51.48	1–500
Ever microdosed a psychedelic substance					
Yes	94	41.2			
No	134	58.8			

2-CB, 4-Bromo-2,5-dimethoxyphenethylamine; 5-MeO-DMT, 5-methoxy-N,N-dimethyltryptamine; LSD, lysergic acid diethylamide; M, mean; SD, standard deviation.

PHQ-9 item 9 (suicidality) mean scores significantly decreased (0.36 vs. 0.14; $p < 0.001$). The results for the overall HERO scale represent a large pre- to post-exposure effect size ($d = 0.84$), whereas PHQ-9 ($d = 0.60$), GAD-7 ($d = 0.68$), and HERO item 3 ($d = 0.72$) had medium effects. The result for PHQ-9 item 9 represented a small effect ($d = 0.32$).

Resilience as measured by PCQ-26 items

Exploratory factor analysis was applied to the 18 resilience items to examine potential underlying structures and unidimensionality. Only item 5 ''Relationship with your life partner'' had missing data. For 46 of the 228 providers (20.2%), this question was not applicable. To include applicable data for item 5, a mean substitution of missing data procedure was used. Two analytic methods were employed to determine the number of factors to be extracted. A standard criterion for exploratory factor analysis based on principal components is to identify factors with eigenvalues ≥1.[59]

We also performed a Monte Carlo simulation of normal random samples that paralleled the 228 observations for 18 items. This parallel analysis served as a comparison against the observed eigenvalues.[60] There were two factors with eigenvalues ≥1.0 that together accounted for 66.5% of the scale variance. Factor 1 with eigenvalue = 10.86 accounted 60.4% of the variance and Factor 2 with eigenvalue = 1.10 accounted 6.1% of the variance. Items that loaded onto each factor are presented as a pattern matrix in Table 3. Factor loading values displayed are regression coefficients from the pattern matrix.

The Monte Carlo parallel analysis of normal random samples revealed that the second factor had an eigenvalue smaller than a randomly generated one that indicated that only the first should be kept, that is, a one-factor solution. Thus, our subsequent analyses focused only on Factor 1.

Factor 1 comprised 11 items with loadings ≥0.32 with differences in cross-loaded values ≥0.20. Nine of the 11 items had excellent loadings (>0.71), with 3 of them >0.90: connection to the universe, connection to nature, and sense of awe. One item had a loading considered very good (0.65) and one was good (0.56). Factor 1 reliability was excellent with a Cronbach's $\alpha = 0.94$. All corrected item-total correlations were acceptable and ranged from 0.72 to 0.82. In essence, Factor 1 appears to reflect a combination of mystical, interpersonal, and personal items.

Because the scoring for each item was 1 = very much improved and 7 = very much worse, a lower factor score indicates a higher value for the construct. For example, a respondent with a negative score for Factor 1 would have more improved connection to nature, sense of mindfulness, and feelings of empathy and compassion. To

Table 2. Well-Being, Depression, and Anxiety Scores for Pre- and Postpsychedelic Usage

	Pre		*Post*					
Measure	*Mean*	*SD*	*Mean*	*SD*	*Mean difference*	t	p	*Cohen's* d
HERO	32.73	9.36	40.14	7.45	7.41	12.68	<0.001	0.84
Item 3	6.66	2.24	8.23	1.72	1.57	10.90	<0.001	0.72
PHQ-9	6.03	5.38	3.02	3.89	-3.01	9.05	<0.001	0.60
Item 9	0.36	0.67	0.14	0.46	−0.22	4.78	<0.001	0.32
GAD-7	6.11	5.22	2.74	3.49	−3.38	10.30	<0.001	0.68

GAD-7, Generalized Anxiety Disorder Scale; HERO, HERO Wellness Scale; Item 3, On average how resilient have you felt?; Item 9, thoughts that you would be better off dead or hurting yourself in some way?; PHQ-9, Patient Health Questionnaire.

Table 3. Factor Loadings for Resilience Items

Item	*Item no.*	*Factor 1*	*Factor 2*
Connection to the universe	10	**0.960**	−0.135
Connection to nature	11	**0.959**	−0.212
Sense of awe	1	**0.939**	−0.201
Sense of mindfulness	4	**0.749**	0.105
Altruistic desire	21	**0.746**	0.036
Feelings of empathy	2	**0.746**	0.038
Feelings of gratitude	16	**0.740**	0.111
Feelings of social connectedness	3	**0.702**	0.110
Feelings of joy	13	**0.702**	0.212
Feelings of compassion	18	0.**650**	0.215
Sense of purpose	17	**0.557**	0.251
Feelings of contentment	15	0.504	0.428
Quality of sleep	7	−0.392	**1.054**
Feelings of irritability	26	0.506	**0.764**
Sense of calm	9	0.233	**0.668**

Using standard exploratory factor analysis criteria, 11 of the 18 items best reflected the construct of resilience (Factor 1). Factor loading values are regression coefficients from the pattern matrix. Loadings in bold font are ≥0.32 with differences in cross-loaded values ≥0.2.

determine the impact of psychedelic usage on Factor 1, we scored the cumulative percentage of participants entering minimally improved, much improved, and very much improved responses for each item and then averaged these responses. Based on this method, 84.5% of the providers reported improvements on Factor 1.

PCQ-26-derived Factor 1 independently associated with change in PHQ-9, GAD-7, HERO, resilience, and suicidality

Factor 1 was significantly correlated with decreased scores for PHQ-9 ($r=0.38$, $p<0.001$), GAD-7 ($r=0.36$, $p<0.001$), and suicidality ($r=0.26$, $p<0.001$), and increased scores for HERO ($r=-0.57$, $p<0.001$) and resilience ($r=-0.50$, $p<0.001$). Multiple regression was used to identify demographic, Factor 1, and patterns of use variables independently associated with change in PHQ-9, GAD-7, and HERO scores from pre- to post-lifetime psychedelic use. Predictors in the regression model were total lifetime psychedelic usage, number of negative responses, gender, age, psilocybin, LSD, and Factor 1.

For PHQ-9, decreased scores were associated with Factor 1 ($B=0.36$, $p<0.001$), fewer number of negatives ($B=0.33$, $p<0.001$), higher age ($B=-0.20$, $p<0.001$), and LSD being the preferred psychedelic ($B=-0.14$, $p=0.037$). For GAD-7, decreased anxiety scores were associated with Factor 1 ($B=0.33$, $p<0.001$), fewer number of times taken a psychedelic ($B=0.13$, $p=0.020$), fewer number of negatives ($B=0.42$, $p<0.001$), and higher age ($B=-0.17$, $p=0.004$).

For HERO, the only statistically significant predictor was Factor 1: it was associated with increased HERO scores ($B=-0.57$, $p<0.001$), indicating improved well-being. For HERO item 3, increased resilience was associated with Factor 1 ($B=-0.49$, $p<0.001$). For PHQ item 9, reduction in suicidality was associated with Factor 1 ($B=0.21$, $p=0.002$) and fewer number of negatives ($B=0.25$, $p<0.001$).

Associations between patterns of psychedelic use and PHQ-9, GAD-7, and HERO

Correlations between total number of times taken any psychedelic and change in PHQ-9 ($r=0.09$), GAD-7 ($r=-0.06$), HERO ($r=0.06$), resilience ($r=0.06$), and suicidality ($r=-0.05$) were not statistically significant. Table 4 presents associations between lifetime use (parceled out in groups of number of uses, e.g., 1–5, 6–10, …, 50+) and mean change scores, as well as the effect sizes of the scores for PHQ-9, GAD-7, HERO, resilience, and suicidality. The extent of lifetime psychedelic use was not significantly associated with pre-exposure, post-exposure, or residualized change for any of the measures.

However, there were statistically significant decreases in PHQ-9 and GAD-7 scores from pre- to post-psychedelic exposure for all usage groups with medium to large effect sizes except for the 16–20 usage group. There were significant increases in HERO scores with medium to large effect sizes for each usage group. For resilience, there were significant increases in all usage groups except for group 31–50 with moderate to large effect sizes in all usage groups except for groups 1–5 and 31–50. For suicidality, there were significant decreases in scores for usage groups 6–10, 11–15, 21–30, and 50+ with a medium effect size for the 50+ usage group.

Table 4. Change in Study Outcomes By Lifetime Psychedelic Usage

		PHQ-9		*GAD-7*		*HERO*		*Resilience*		*Suicidality*	
No. of uses	n	*Mean*	d	*Mean*	d	*Mean*	d	*Mean*	d	*Mean*	d
1–5	75	−2.57	0.61	−2.79	0.63	5.08	0.64	0.97	0.47	−0.11	0.19
6–10	46	−3.70	0.69	−3.65	0.80	8.87	1.07	1.96	1.01	−0.39	0.46
11–15	30	−3.07	0.79	−4.23	0.87	8.10	0.95	1.80	1.00	−0.17	0.36
16–20	22	−1.05	0.13	−1.96	0.26	6.05	0.49	1.55	0.54	−0.14	0.12
21–30	19	−3.16	0.79	−5.47	1.06	10.16	1.10	2.14	0.89	−0.21	0.39
31–50	16	−4.06	0.65	−3.88	0.80	4.94	0.67	1.19	0.50	−0.19	0.35
50+	20	−4.15	1.12	−2.85	0.87	12.65	1.89	2.20	1.21	−0.50	0.73

Table 5. Number and Percentages of Negative Responses to NCI Items

No. of responses	*Frequency*	*Percent*	*Cumulative %*
0	198	86.8	86.8
1	19	8.3	95.2
2	6	2.6	97.8
3	3	1.3	99.1
4	1	0.4	99.6
6	1	0.4	100.0

NCI, negative consequences inventory.

The majority of respondents identified either psilocybin (45.6%) or LSD (26.8%) as the psychedelic they felt had been most beneficial (Table 1). The next most preferred psychedelic was ketamine (7.9%). When comparing psilocybin versus all others and LSD versus all others, no differences were seen on residualized change scores.

Negative and positive responses

The NCI-8 queried participants regarding potential psychedelic-associated harms, with these harms being divided between behavioral disturbance (e.g., suicidal desire and criminal behavior) and substance misuse. Table 5 gives the counts for participants who responded to an increasing number of NCI items with ''minimally worse'' through ''very much worse.'' Altogether, 30 participants (13.2%) endorsed at least 1 negative outcome they attributed to psychedelic use, and some participants endorsed multiple negative outcomes, leading to a total of 50 negative item responses.

Table 6 gives the relative frequency of each of the eight negative items in the population of participants who endorsed at least one negative outcome. For each behavior, the number of participants who improved (very much, much, or minimally), did not change, or worsened (very much, much, or minimally) is displayed.

Discussion

To our knowledge, this is the largest study examining patterns of naturalistic psychedelic use among prescribers of psychiatric medication. Our findings are consistent with findings from the larger *PAWS* in demonstrating a robust association between lifetime psychedelic use and improvements in mental health and well-being.[52] Self-reported scores on validated rating scales for depression, suicidal ideation, and anxiety significantly decreased from pre- to post- any lifetime psychedelic use. HERO wellness scores, including resilience, significantly increased. An 11-item resilience construct (Factor 1) derived from the PCQ-26 was found to be reliable and valid. Factor 1 represents a cluster of mystical, interpersonal, and personal items.

Furthermore, Factor 1 was determined to correlate with decreases in depression, anxiety, and suicidality and improvements in well-being and resilience. Improvement in PHQ-9, GAD-7, HERO, resilience, and suicidality measures was seen across most frequency of use groups. Finally, 13.2% of respondents reported harms attributed to psychedelic use, consistent with the 13% in *PAWS*.

Our findings are consistent with recent clinical trials demonstrating therapeutic efficacy of PAT in depressive and anxiety disorders,[38–43] as well as with findings from other large survey studies demonstrating similar mental health benefits in naturalistic settings.[52,61,62] Furthermore, numerous controlled trials[38,63,64] and studies on naturalistic psychedelic use[65–68] have suggested a benefit to user well-being. Finally, evidence from multiple clinical trials investigating psychological distress in patients with cancer demonstrates enhancements in psycho-social-spiritual well-being and quality of life after PAT.[44,69]

Several of our findings are worth highlighting in the context of the unique mental health challenges faced by prescribers of psychiatric medications. In addition to decreases in overall depression scores, we found significant decreases in participant ratings of the PHQ-9's suicidal ideation item, though the effect size was small. This finding is consistent with those from a large survey study in which naturalistic psychedelic use was associated with reduced odds of past year suicidal planning, thinking, and suicide attempt.[70] The possibility that psychedelics could ease or change suicidal ideation is especially noteworthy given this high-risk population.[7–9]

Table 6. NCI-8 Item Frequencies ($N = 228$)

Behavior	*Number improved*	*Number no change*	*Number worse*	*Total who responded item applied to them*	*% Who responded item applied to them*
Alcohol misuse	70	72	9	151	66.2
Aggressive impulses	67	71	4	142	62.3
Desire to die by suicide	66	60	5	131	57.5
Marijuana misuse	24	89	15	128	56.1
Criminal impulses	23	76	7	106	46.5
Cigarette smoking	21	58	8	87	38.2
Benzodiazepine misuse	8	42	1	51	22.4
Opiate/opioid misuse	4	41	1	46	20.2

NCI-8, negative consequences inventory-8.

In contrast, a small number of respondents ($n=5$; 2.2%) in our survey reported an increase in suicidal ideation after psychedelic use. This is an important area of surveillance for psychedelic medicine since the profound nature of the psychedelic experience may be destabilizing for some vulnerable individuals. A 1960 survey of providers of LSD-assisted therapy reported rates of 1.2 suicide attempts and 0.4 completed suicides per 1000 patients treated, though no comparative data were reported for patients not being treated with LSD.[71]

Concerns have recently emerged relating to the prevalence of adverse events in PAT trials, including suicidal thoughts and behaviors.[40] Although the conceptualization and reporting of these events have been questioned,[72] the potential harms of psychedelics should continue to be investigated as their use extends to broader populations.[73]

The composition of Factor 1 leads to several interesting hypotheses regarding the potential for psychedelics to improve wellness and resilience. Factor 1 offers a novel perspective when considering the relationship between factors known to impact resilience and factors seemingly unrelated to resilience. Mindfulness and a sense of purpose have been correlated with improvements in resilience.[20,29,31,74] Mystical factors are not known to positively impact resilience, yet these items loaded the highest on Factor 1. How the various items from Factor 1 interact and contribute to improvement in well-being and resilience is unclear.

We propose two possible paths to consider: (1) ''sense of the bigger picture,''[75] as exemplified by feelings of awe[76] and connectedness to the universe and nature, and (2) through a realization of the preciousness of the ''everyday'' or ''mundane,'' as exemplified by a renewed sense of purpose, gratitude, and altruistic desire, and leading to a *reconnection* with the work of being a health care provider. Such progressions, from the transcendent to the immanent, emerge in various spiritual traditions, for example, in Zen Buddhism, in which the final stage of training is marked by a return from the heights of spiritual achievement to the ''marketplace'' of everyday life ''with gift-bestowing hands.''[77]

Indeed, in both clinical trials and naturalistic settings, the quality and degree of the mystical-type experience occasioned by psychedelics have consistently been linked to improvement in many outcomes,[78] including prosocial attitudes and behaviors in the short and long term.[79,80] Furthermore, connectedness might mediate improvements in mental health by reducing experiential avoidance.[81]

This study raises the question of how psychedelic use could impact, positively or negatively, the effectiveness and well-being of prescribers of psychiatric medication. This was, in fact, a significant line of investigation explored in the ''first wave'' of psychedelic research, and several recent reviews and analyses have attempted to define the potential role of psychedelics in provider training and practice.[82,83] With data indicating that psychiatric prescribers are divided about psychedelics' therapeutic potential[84] and feel largely unprepared to deliver PAT,[85] the degree to which they might employ psychedelics in their own healing attempts and the efficacy of this approach remain to be seen.

Limitations

This study has several limitations. The survey is subject to population and recall bias, likely resulting in an over-representation of positive outlooks on psychedelics. Further influencing this positive outlook is the risk to a professional's license. Recent literature supports the presence of this bias, as health care provider enthusiasm regarding psychedelics may be amplified by prior use.[86] Recruitment-targeted populations thought to utilize psychedelics and it is likely that those with negative experiences are under-represented. The study was retrospective and so recall bias, whether negative or positive, is present.

We did not differentiate between types of prescribers (i.e., DO, MD, NP, PA, and PhD). Furthermore, we did not ask for details related to the intention, set, or setting of psychedelic use, all of which might have impacted outcomes. LSD and psilocybin are likely the most preferred because they are probably the most available and well studied. The potential harms represented in the NCI-8 may not have captured all potential adverse events related to psychedelics and a free-text option was not available. Finally, items selected from the PCQ-26 for factor analysis correlation with resilience are based on expert opinion and should be viewed as exploratory.

Conclusion

Naturalistic psychedelic use was associated with multiple mental health benefits for psychiatric prescribers based on retrospective self-report. Measures of depression, anxiety, and suicidal ideation were lower after psychedelic use, whereas emotional well-being and resilience were reported to be higher. Consistent with literature, these effects might be mediated by mystical aspects of the psychedelic experience, given the strong representation of mystical experience type items in Factor 1. In addition, numerous interpersonal and personal items (i.e., empathy, compassion, and personal meaning) may also mediate these effects.

Harms associated with naturalistic psychedelic use, including reported worsening of suicidal ideation in some individuals, were consistent with those found in a general population of psychedelic users. Our findings support further research into how psychedelics could affect burnout, mental health, and overall wellness in psychiatric prescribers.

Authors' Contributions

Z.H. contributed to project administration (lead), conceptualization (equal), writing–original draft (equal), and writing–review and editing (equal). A.W.L. was involved in conceptualization (equal), writing–original draft (equal), and writing–review and editing (equal). S.P.C. carried out conceptualization (supporting), writing–original draft (equal), methodology (lead), formal analysis (lead), and writing–review and editing (equal). S.S. carried out conceptualization (equal), writing–original draft (equal), and writing–review and editing (equal).

B.B. took charge of conceptualization (equal) and writing–review and editing (equal). A.P. was in charge of conceptualization (equal), writing–original draft (supporting), writing–review and editing (supporting), and methodology (supporting). R.J. was in charge of conceptualization (equal) and investigation (equal). C.R. was involved in writing–review and editing (equal). B.R. was involved in conceptualization (supportive). S.J. was in charge of conceptualization (equal), writing–review and editing (supportive), methodology (supporting), and investigation (equal).

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A.P. receives research funding from MAPS, Usona Institute, Filament; he is on the advisory board for Tactogen, Osmind; he consults for Alexander Shulgin Research Institute, Compass Pathways, and MindMed; he has stock in Osmind and Tactogen. C.R. serves as a consultant for Usona Institute, Novartis, Sage/Biogen, and Emory Health care. B.B. holds stock options in CB Therapeutics. He also serves on advisory boards for CB Therapeutics and Compass Pathways. He receives monetary compensation from DynaMed Plus (EBSCO Industries, Inc.) for editorial work. He has consulted for Cerebral within the past year, though this relationship is no longer active. He is also a primary investigator on a clinical trial sponsored by MindMed. Z.H., A.W.L., S.P.C., S.S., R.J., B.R., and S.J. have none to disclose.

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