



Interest in receiving psychedelic-assisted therapy among marginalized women: Implications and findings from a community-based study in Canada

Elena Argento^{a,b,c,*}, Shira Goldenberg^{b,d}, Kathleen Deering^{a,b}, Jennifer Lavalley^{c,e},
Melissa Braschel^b, Brittany Bingham^{b,f}, Kate Shannon^{a,b}

^a Department of Medicine, University of British Columbia, 5804 Fairview Avenue, Vancouver V6T 1Z3 BC, Canada

^b Centre for Gender & Sexual Health Equity, 1081 Burrard, Vancouver V6Z 1Y6, BC, Canada

^c BC Centre on Substance Use, 1045 Howe Street, Vancouver V6Z 1Y6, BC, Canada

^d Faculty of Health Sciences, Simon Fraser University, 8888 University Drive, Burnaby V5A 1S6, BC, Canada

^e Interdisciplinary Studies Graduate Program, University of British Columbia, 2357 Main Mall, Vancouver V6T 1Z4, BC, Canada

^f Vancouver Coastal Health, Aboriginal Health, 2750 East Hastings Street, Vancouver V5K 1Z9, BC, Canada

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ABSTRACT

Background: Psychedelic-assisted therapies are receiving mounting attention for their therapeutic potential. However, little is known about interest among women who experience elevated risk of mental health and substance use disorders. This study examined interest in receiving psychedelic-assisted therapy and socio-structural factors associated with interest among marginalized women.

Methods: Data (2016–2017) were drawn from two community-based, prospective open cohorts of >1000 marginalized women in Metro Vancouver, Canada. Bivariate and multivariable logistic regression examined associations with interest in receiving psychedelic-assisted therapy. Among women who used psychedelics, additional data were collected to describe ratings of personal meaningfulness, sense of wellbeing, and spiritual significance. **Results:** Of 486 eligible participants (aged 20–67 years), 43% ($n = 211$) were interested in receiving psychedelic-assisted therapy. Over half identified as Indigenous (First Nations, Métis or Inuit). Factors independently associated with interest in psychedelic-assisted therapy in multivariable analysis included: daily crystal methamphetamine use in the last six months (Adjusted Odds Ratio [AOR] 3.02; 95% Confidence Interval (CI) 1.37–6.65), lifetime mental health conditions (depression, anxiety, post-traumatic stress disorder) (AOR 2.13; 95%CI 1.27–3.59), childhood abuse (AOR 1.99; 95%CI 1.02–3.88), lifetime psychedelic use (AOR 1.97; 95%CI 1.14–3.38), and younger age (AOR 0.97 per year older; 95%CI 0.95–0.99).

Conclusions: Several mental health and substance use-related variables that have been demonstrated to be amenable to psychedelic-assisted therapy were associated with interest in receiving psychedelic-assisted therapy among women in this setting. As access to psychedelic-assisted therapies continues to expand, any future approaches to extend psychedelic medicine to marginalized women should integrate trauma-informed care and broader socio-structural supports.

1. Introduction

In recent decades, research into the therapeutic uses of psychedelic, such as lysergic acid diethylamide (LSD), psilocybin (or ‘magic mushrooms’), ayahuasca/dimethyltryptamine (DMT) as well as the ‘entactogen’ or ‘empathogen’ methylenedioxymethamphetamine (MDMA), has re-emerged worldwide, yielding promising findings for address-

ing several mental health and substance use issues. Evidence from both the early era of study in the 1950s and 1960s and recent clinical trials demonstrate the probable safety and feasibility of delivering psychedelic-assisted therapy, including for individuals with treatment-resistant depression, end-of-life anxiety, post-traumatic stress disorder (PTSD), and substance use issues such as stimulant, alcohol, tobacco, and opioid use disorders (Agin-Liebes et al., 2020; Bahji et al., 2020; Bogenschutz et al., 2018; Davis et al., 2020a, 2020b; dos Santos et al., 2016; Johnson et al., 2017; Mithoefer et al., 2019; Sessa, 2012; Tupper et al., 2015; Weston et al., 2020; Wheeler and Dyer, 2020). However, psychedelic research, as with the broader fields of medicine

* Corresponding author.

E-mail address: bccsu-ea@bccsu.ubc.ca (E. Argento).

and mental health, faces ongoing challenges to foster a more equitable, diverse and inclusive research ecosystem to reduce health disparities and ensure equitable access to care among marginalized populations. For instance, a review and pooled analysis of psychedelic studies from 1993 to 2017 found that >80% of study participants were white (Michaels et al., 2018). Notably, Indigenous peoples around the world have a long history of traditional practices with plant and fungi medicines for a wide range of spiritual and healing purposes, upon which modern psychedelic medicine has been built (George et al., 2020; Williams and Labate, 2020). Further, there remains uncertainty as to whether marginalized populations most at risk of mental health and substance use-related harms will be interested in receiving psychedelic-assisted therapy should it become available.

Structurally marginalized women, such as street-involved sex workers, women who use illicit drugs, Indigenous women, and women living with human immunodeficiency virus (HIV), experience a disproportionate burden of overlapping social and health inequities that significantly elevate risk of mental health issues and substance use-related harms (El-Bassel et al., 2005; Rhodes et al., 2012; Shannon et al., 2015; Ulibarri et al., 2013). The complex convergence of individual, social and environmental factors, such as experiences of violence, trauma, social stigma, racialization, criminalization, and limited access to gender- and culturally-appropriate health services and supports, plays a major role in perpetuating health and social harms, with few research and intervention programs tailored to meet the needs of structurally marginalized women (Argento et al., 2020; Benoit et al., 2003; Shannon et al., 2015).

Preliminary findings from a small number of psychedelic research studies among women and structurally marginalized groups, such as people who identify as sexual minorities and Indigenous peoples (Cavnar, 2014; Espinoza, 2014; Thomas et al., 2013), signal potential therapeutic benefits for these populations. For example, research by members of our team demonstrated that naturalistic psychedelic use was associated with a 60% reduced hazard of suicidality and had a protective moderating effect on the association between pharmaceutical opioid use and suicide among marginalized women in Vancouver, Canada (Argento et al., 2018, 2017b). Despite promising preliminary findings, interest in, as well as the potential therapeutic benefits of, psychedelic-assisted therapy among marginalized and underserved communities remains under-investigated.

Psychedelics were widely researched as adjuncts to psychotherapy throughout the 1950s, 60s, and 70s, and considered to achieve major breakthroughs in the treatment of mental health and substance use disorders (Dyck, 2015; Rucker et al., 2018; Sessa, 2012). The early research established a robust body of evidence, including some 40,000 individuals who received LSD therapy (Garcia-Romeu and Richards, 2018), and over 500,000 doses of MDMA administered in the context psychotherapy by approximately 4000 psychiatrists and psychologists (Mithoefer et al., 2016; Shulgin and Shulgin, 1991). Although the precise mechanisms of therapeutic action remain under investigation, psychedelics act primarily as agonists of serotonin receptors (e.g., 5-HT_{2A}) in the brain (Nichols, 2016) and are known to increase neural plasticity (Ly et al., 2018). The effects of psychedelics are highly variable and can produce profound changes in sensory perception, mood, cognition and behavior, including experiences of awe and ego-dissolution associated with meaningful 'mystical experiences' (characterized by a sense of unity, sacredness, insight, deeply felt positive mood, and ineffability), particularly when administered in supportive settings (Griffiths et al., 2006; Hendricks, 2018). Increased psychological flexibility is hypothesized to be an important mediator of positive therapeutic outcomes among individuals suffering from depression and anxiety (Davis et al., 2020a, 2020b). While past research yielded findings that deemed psychedelics generally safe and promising medications, US regulations, the War on Drugs (Marshall, 2015; Wood et al., 2009), and fears around recreational use, led to a nearly half century-long hiatus in psychedelic research (Dyck, 2015; Oram, 2016).

Currently, psychedelic research has been revived around the globe. The consistency of clinical findings alongside a growing body of evidence from populational studies citing related benefits (e.g., reductions in suicidality/psychological distress, recidivism, and intimate partner violence) (Argento et al., 2017b; Hendricks et al., 2015, 2014; Krebs and Johansen, 2013; Thiessen et al., 2018; Walsh et al., 2016) has encouraged the development of larger clinical trials and leading centers for psychedelic research, such as Johns Hopkins University and Imperial College London (Nutt et al., 2020; Rubin, 2019), recently established in various locations globally. Further, the US Food and Drug Administration (FDA) has designated both psilocybin- and MDMA-assisted psychotherapy 'breakthrough therapy' status for treatment-resistant depression and PTSD, respectively. Notably, multisite phase 3 clinical trials of MDMA-assisted psychotherapy continue to demonstrate safety and efficacy for treating PTSD in the US, Canada and Israel (Feduccia et al., 2019; Mitchell et al., 2021).

While these studies importantly lend support to psychedelics as promising adjunctive medications, little is known about the interest in receiving psychedelic-assisted therapy or potential impacts among structurally marginalized women. The present study sought to examine interest in psychedelic-assisted therapy, as well as socio-structural factors associated with interest, among marginalized women in Vancouver, Canada. Among women with a history of psychedelic experience, this study also aimed to describe the impacts of those experiences on ratings of personal meaningfulness, sense of wellbeing, and spiritual significance.

2. Methods

2.1. Design and sample

This study drew on a merged dataset of two community-based, open prospective cohorts of over 1000 cis and trans marginalized women in Metro Vancouver, Canada who completed harmonized interview questionnaires since 2010: AESHA (An Evaluation of Sex Workers Health Access) and SHAWNA (Sexual Health and HIV/AIDS: Women's Longitudinal Needs Assessment). AESHA, which has been previously described in detail (Shannon et al., 2007), was developed through community collaboration with sex work agencies and operates under continuous monitoring by a Community Advisory Board. SHAWNA operates as a partnership of women's HIV and community services providers and is also guided by a Community Advisory Board as well as a Positive Women's Advisory Board, as described in further detail (Duff et al., 2018).

Eligibility for participation in both cohorts was cis and trans women, aged 14 years or older and able to provide informed consent. For AESHA, additional eligibility was active engagement in sex work at baseline, and for SHAWNA eligibility included living with HIV. AESHA was initiated in 2010 while SHAWNA began recruitment in 2014, and both cohorts include staff and co-authors with lived experience to reflect the communities (e.g., sex workers, people living with HIV, people who use drugs). For AESHA, as previously described by Shannon and colleagues (Shannon et al., 2007), participants were recruited using community mapping strategies, with day and late-night outreach to street, indoor and online sex work venues, and time-location sampling, which is considered a useful method of recruitment among hidden/hard-to-reach populations (Stueve et al., 2001). Recruitment for SHAWNA includes self-referrals, referrals by providers, AIDS service organizations and via outreach by Peer Research Associates (Duff et al., 2018).

Consenting participants in both cohorts completed interviewer-administered questionnaires by a trained community interviewer at enrollment and biannually. The main questionnaire elicits responses related to socio-demographics (e.g., gender identity, sexual orientation, race, housing), sex work variables (e.g., work environment, solicitation, social cohesion, access to services, violence/safety, policing, incarceration, types of services, condom use), intimate partners (e.g., sexual

history, cohabitation, financial support), trauma and violence (e.g., lifetime and childhood trauma, exposure to intimate partner and workplace violence), and comprehensive injection and non-injection drug use patterns. The clinical questionnaire asks about overall physical, mental, and emotional health, and HIV testing and treatment experiences to support education, referral, and linkages with care. Participants were offered voluntary HIV/STI serology testing by a project nurse and clinical monitoring of CD4 and VL if HIV positive. Participants were given the option to visit a study office or complete the questionnaire and clinical component at a safe location identified by them, including work or home locations.

All participants receive an honorarium of \$40–50 CAD at each bi-annual visit for their time, expertise and travel. The studies hold ethical approval through Providence Health Care/University of British Columbia Research Ethics Board.

2.2. Psychedelic supplement

A Psychedelic Supplement was added to the harmonized interview questionnaire in 2016 to elicit further information and provide descriptive context around marginalized women's psychedelic experiences. The Psychedelic Supplement consisted of a short series of questions asking women about their history and types of psychedelic use and interest in receiving psychedelic-assisted therapy. For those who had a history of psychedelic use, three additional questions were asked about potential impacts of these experiences on personal meaningfulness, spiritual significance, and overall wellbeing adapted from Griffiths et al.'s extension to the Persisting Effects Questionnaire (Griffiths et al., 2011). The Psychedelic Supplement was developed in consultation with interview, outreach, and nursing teams.

2.3. Study variables

The dependent variable was interest in receiving psychedelic-assisted therapy, defined as responding “yes” to the following question:

There is increasing interest in the potential to use psychedelics to help treat conditions like anxiety/depression, PTSD, addiction and other mental health issues. If you ever experience any of these challenges/conditions, would you be interested in being treated with one of these therapies?

Demographic characteristics derived from the harmonized questionnaire included: age, gender minority/trans (transgender, gender diverse or two-spirit vs cisgender), sexual minority (lesbian, gay, bisexual, queer, or asexual vs heterosexual), Indigenous ancestry (participants self-identified as Indigenous by responding “yes” to the question “Do you identify yourself as an Aboriginal person, that is, First Nations, Métis, or Inuit?”), education (high school or greater), HIV serostatus, and physical and/or sexual childhood abuse (before age 18). Lifetime socio-structural and substance use-related factors included: ever experienced an overdose, self-reported mental health issues (diagnosed with, treated, or monitored for depression, anxiety, PTSD), suicidality and psychedelic use. The variable for lifetime psychedelic use included any LSD, psilocybin/magic mushrooms, DMT, ayahuasca, ibogaine/iboga, mescaline/peyote/San Pedro, MDMA/ecstasy, salvia, sassafras/MDA, morning glory, and ketamine. All other socio-structural and substance use-related factors considered in the analysis reflected recent occurrence within the last six months, including: current medication for opioid use disorder, access to drug treatment, homelessness, sex work, barriers to accessing counselling for trauma, experiences of physical/sexual violence, benzodiazepine use, binging on alcohol, and frequency of heroin, pharmaceutical opioid, crystal methamphetamine, cocaine, and crack use (daily, less than daily, none).

2.4. Statistical analyses

Data for the present analysis were collected from the Psychedelic Supplement questionnaire between September 2016 and October 2017. All participants were asked about their lifetime psychedelic use and interest in psychedelic-assisted therapy. Participants who responded ‘No’ or ‘Don’t know’ to being interested in receiving psychedelic-assisted therapy were asked about their reasons (Fig. 1). Participants who responded ‘Don’t know’ were then excluded from remaining analyses in order to compare those who were interested in psychedelic-assisted therapy to those who were not. Descriptive statistics were calculated for independent variables, stratified by interest in receiving psychedelic-assisted therapy. Differences were assessed using the Wilcoxon rank-sum test for continuous variables and Pearson’s chi-square test (or Fisher’s exact test for small cell counts) for categorical variables. Bivariate (unadjusted) logistic regression was used to estimate associations with interest in receiving psychedelic-assisted therapy. Variables significantly associated at $p < 0.05$ in bivariate analysis were subsequently considered for inclusion in a multivariable (adjusted) logistic regression model. Manual backward stepwise selection was used to identify the most parsimonious and best fitting model, as indicated by the lowest Akaike information criterion (AIC). Unadjusted (OR) and adjusted odds ratios (AOR) and 95% confidence intervals (CI) are reported, and all p-values are two-sided. Statistical analyses were performed using SAS software version 9.4 (SAS Institute, Cary, NC, USA).

3. Results

3.1. Descriptive findings

A total of 519 women completed the psychedelic supplement questionnaire. Of these, 33 responded ‘Don’t know’ to being interested in receiving psychedelic-assisted therapy and were excluded from stratified descriptive statistics and logistic regression analyses, resulting in a sample of 486 (age range 20–67 years; median age 44 years [IQR:35–50]). Reasons provided by participants who indicated ‘No’ or ‘Don’t know’ to interest in psychedelic-assisted therapy are displayed in Fig. 1. Socio-structural characteristics among women who responded ‘yes’ to interest in psychedelic-assisted therapy compared to those who responded ‘no’ are displayed in Table 1. Overall, 43% ($n = 211$) of women in the study said they would be interested in receiving psychedelic-assisted therapy if they ever experience a mental health or substance use issue. 41% ($n = 197$) were living with HIV, and 49% ($n = 237$) had engaged in sex work in the last six months. Overall, 52% ($n = 255$) identified as Indigenous, 37% ($n = 182$) identified as sexual minorities, and 8% ($n = 41$) identified as gender minorities/trans; these characteristics were all significantly more prevalent among women interested in receiving psychedelic-assisted therapy than among those who were not (all $p < 0.02$).

With respect to mental health and trauma-related variables, 77% ($n = 376$) had experienced physical and/or sexual childhood abuse, 68% ($n = 330$) reported ever being diagnosed with or treated for depression, anxiety or PTSD, and 63% ($n = 307$) reported lifetime suicidality; women who were interested in psychedelic-assisted therapy were significantly more likely to report all of these characteristics relative to those who were not (all $p < 0.001$).

3.2. Descriptive findings among women who ever used psychedelics

Lifetime use of psychedelics was reported by 72% ($n = 376$) of women. The vast majority had ever used LSD (83%; $n = 312$) or psilocybin/magic mushrooms (82%; $n = 310$). A breakdown by type of psychedelics used is displayed in Fig. 2.

Regarding impacts on personal meaningfulness, sense of wellbeing and spiritual significance, 15% ($n = 55$) of women with a history

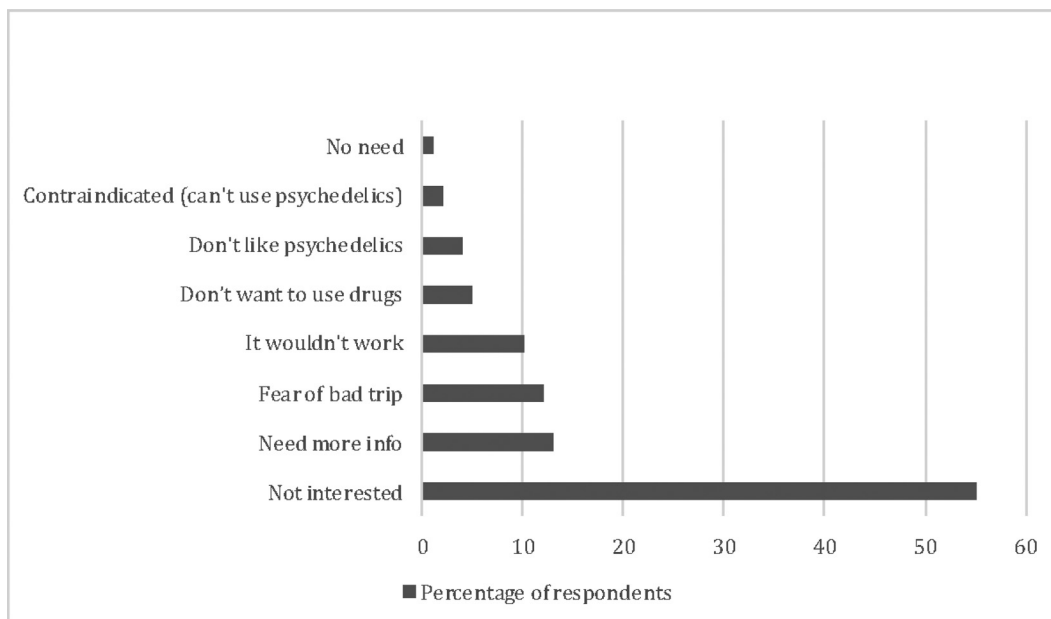


Fig. 1. Reasons provided by participants who responded 'No' or 'Don't know' to interest in psychedelic-assisted therapy.

Table 1

Socio-structural characteristics associated with interest in receiving psychedelic-assisted therapy among marginalized women in Vancouver, Canada (N = 486).

Characteristic	Interested in receiving psychedelic-assisted therapy		p-value
	Yes n = 211 (43.4%)	No n = 275 (56.6%)	
Age (median, IQR)	41 (33 to 48)	45 (37 to 52)	<0.001
Gender minority/trans	25 (11.9)	16 (5.8)	0.018
Sexual minority	96 (45.5)	86 (31.3)	0.001
Indigenous ancestry	126 (59.7)	129 (46.9)	0.005
Education, high school or greater	91 (43.1)	144 (52.4)	0.043
HIV seropositivity	86 (40.8)	111 (40.4)	0.940
Homelessness [†]	40 (19.0)	33 (12.0)	0.033
Sex work [†]	101 (47.9)	136 (49.5)	0.699
Overdose, ever	121 (57.4)	115 (41.8)	<0.001
Current medication for opioid use disorder	94 (44.6)	95 (34.6)	<0.001
Unable to access drug treatment [†]	13 (6.2)	10 (3.6)	0.199
Depression, anxiety, or PTSD, ever	171 (81.0)	159 (57.8)	<0.001
Experienced barriers to counseling for trauma [†]	31 (14.7)	20 (7.3)	0.007
Suicidality, ever	159 (75.4)	148 (53.8)	<0.001
Physical/sexual childhood abuse	181 (85.8)	195 (70.9)	<0.001
Any physical/sexual violence [†]	51 (24.2)	39 (14.2)	0.003
Psychedelic use, ever	177 (83.9)	173 (62.9)	<0.001
<i>Heroin use[†]</i>			
None	115 (54.5)	183 (66.6)	
Less than daily	37 (17.5)	38 (13.8)	
Daily	59 (28.0)	53 (19.3)	0.020
<i>Prescription opioid use[†]</i>			
None	116 (55.0)	178 (64.7)	
Less than daily	26 (12.3)	16 (5.8)	
Daily	4 (1.9)	4 (1.5)	0.021
<i>Cocaine use[†]</i>			
None	168 (79.6)	232 (84.4)	
Less than daily	36 (17.1)	36 (13.1)	
Daily	7 (3.3)	6 (2.2)	0.338
<i>Crystal meth use[†]</i>			
None	131 (62.1)	215 (78.2)	
Less than daily	44 (20.9)	45 (16.4)	
Daily	34 (16.1)	15 (5.5)	<0.001
<i>Crack use[†]</i>			
None	135 (64.0)	183 (66.6)	
Less than daily	50 (23.7)	59 (21.5)	
Daily	26 (12.3)	32 (11.6)	0.805
Binged on alcohol [†]	24 (11.4)	25 (9.1)	0.423
Benzodiazepine use [†]	12 (5.7)	12 (4.4)	0.510

[†] In the last 6 months.

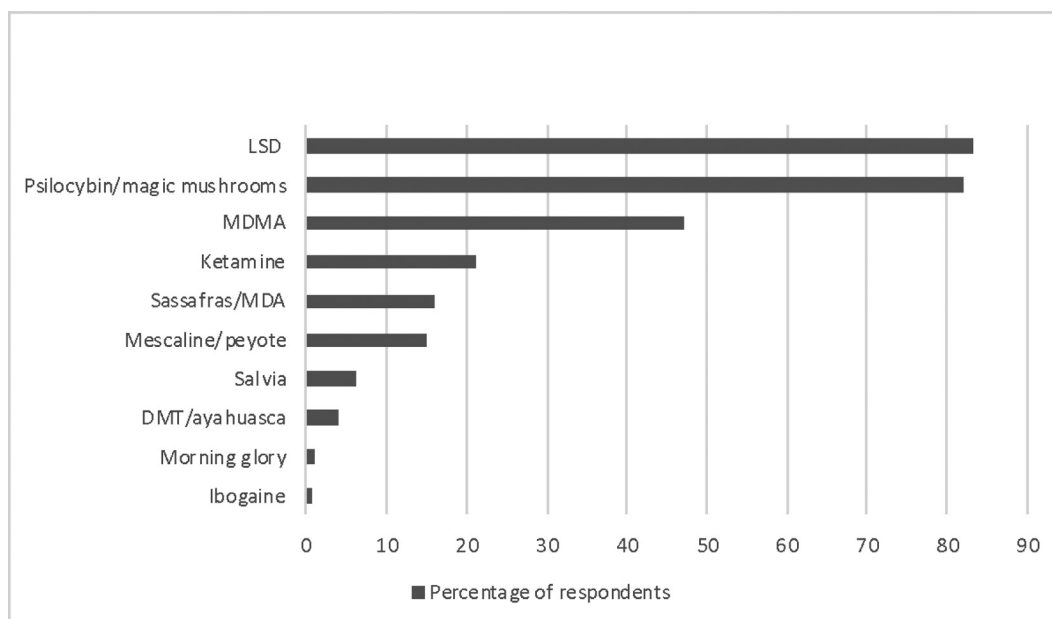


Fig. 2. Type of psychedelics used among participants who had ever used psychedelics ($n = 376$).

psychedelic experience reported that it was either among the five most personally meaningful or the single most personally meaningful experience in their life. Fourteen percent ($n = 53$) reported that their experience with psychedelics increased their current sense of wellbeing somewhat or very much; and 10% ($n = 36$) reported that their psychedelic experience was either among the top five most spiritual experiences or the single most spiritual experience in their life.

3.3. Bivariate and multivariable analyses

Unadjusted and adjusted odds ratios for factors independently associated with interest in psychedelic-assisted therapy are displayed in Table 2. In the final multivariable model, daily use of crystal methamphetamine in the last six months (AOR 3.02; 95%CI 1.37–6.65), lifetime mental health issues (depression, anxiety, or PTSD) (AOR 2.13; 95%CI 1.27–3.59), physical and/or sexual childhood abuse (AOR 1.99; 95%CI 1.02–3.88), lifetime psychedelic use (AOR 1.97; 95%CI 1.14–3.38), and younger age (AOR 0.97 per year older; 95%CI 0.95–0.99) were significantly associated with being interested in receiving psychedelic-assisted therapy.

4. Discussion

In the present study, approximately half of women surveyed reported interest in receiving psychedelic-assisted therapy for a current or future mental health or substance use issue. Factors independently associated with interest in psychedelic-assisted therapy included: recent daily crystal methamphetamine use, lifetime mental health disorders (depression, anxiety or PTSD), physical and/or sexual childhood abuse, lifetime psychedelic use, and younger age. To our knowledge, this is the first study globally to examine interest in psychedelic-assisted therapy among marginalized women or any other marginalized group. In the context of accumulating evidence demonstrating safety and positive outcomes with psychedelic-assisted therapies (Carhart-Harris et al., 2016; dos Santos et al., 2016; Morgan et al., 2010; Tupper et al., 2015), this study suggests that should psychedelic medicine become more widely available for treating mental health and substance use issues, there is an interest among marginalized women who may have unique and diverse needs as a result of experiencing multiple forms of trauma and interpersonal and structural violence.

Structurally marginalized women experience elevated risks and harms related to mental health and substance use, and there remains a critical need to improve access to novel, evidence-based interventions that are tailored to underserved groups (Jeal et al., 2015; Puri et al., 2017; Shannon et al., 2015). While further research among marginalized women is needed, a few studies have focused on marginalized and racialized populations, such as Indigenous people and sexual minorities. A small observational study conducted with 12 members of a rural First Nations community in British Columbia, Canada, found statistically significant improvements in measures of emotional wellbeing and quality of life, as well as reductions in self-reported use of cocaine, alcohol, and tobacco following an ayahuasca-assisted intervention delivered in a retreat setting (Thomas et al., 2013). A recent qualitative follow-up to this study provided key contextual insights into the pivotal role of enhanced connectedness (i.e., with self, others, nature/spirit) in reducing problematic substance use and cravings following ayahuasca-based therapy (Argento et al., 2019), echoing extant psychedelic literature describing the importance of enhanced social connections and connectedness to the world in general (Carhart-Harris et al., 2017; Watts et al., 2017).

Prior research has demonstrated benefit of psychedelic-assisted therapy among women and people who identify as sexual minorities who have experienced sexual trauma (Cavnar, 2014; Espinoza, 2014). Randomized clinical trials of MDMA-assisted psychotherapy for treating PTSD, including among women with histories of sexual abuse, have demonstrated safety and efficacy (Bouso et al., 2008; Mithoefer et al., 2019, 2010; Oehen and Schnyder, 2013). For example, in a small study of predominantly women participants (85%), many of whom experienced childhood sexual abuse, the vast majority (83%; 10/12) in the MDMA treatment group experienced significant reductions in PTSD symptom severity compared to 25% in the placebo group, with no serious adverse effects reported (Mithoefer et al., 2010). Notably, the average duration of PTSD symptoms in this study was estimated to be 19+ years.

Previous research has examined the impacts of psychedelic experiences on personal meaningfulness, wellbeing, and spiritual significance (Griffiths et al., 2006; Rubin, 2019), yet the present study is the first to investigate these outcomes among marginalized women. The current literature on psychedelics suggests that the emotion awe and related mystical-type experiences are primary catalysts for change among individuals struggling with addictions and psychological distress (Garcia-

Table 2
Bivariate and multivariable associations with interest in receiving psychedelic-assisted therapy among marginalized women in Vancouver, Canada (N = 486).

Characteristics	Unadjusted Odds Ratio (95%CI)	p-value	Adjusted Odds Ratio (95%CI)	p-value
Age (per year older)	0.96 (0.95–0.98)	<0.001	0.97 (0.95–0.99)	0.011
Gender minority/trans	2.18 (1.13–4.19)	0.020		
Sexual minority	1.84 (1.27–2.66)	0.001		
Indigenous ancestry	1.68 (1.17–2.41)	0.005		
Education, high school or greater	0.69 (0.48–0.99)	0.044		
HIV seropositivity	1.01 (0.70–1.46)	0.940		
Homelessness [†]	1.72 (1.04–2.83)	0.035		
Sex work [†]	0.93 (0.65–1.33)	0.700		
Overdose, ever	1.87 (1.30–2.69)	<0.001		
<i>Current medication for opioid use disorder</i>				
Yes (vs. no)	1.13 (0.75–1.71)	0.552		
No opioid use (vs. no)	0.42 (0.26–0.70)	<0.001		
Unable-access drug treatment [†]	1.73 (0.74–4.02)	0.204		
Depression, anxiety, or PTSD	3.12 (2.05–4.74)	<0.001	2.13 (1.27–3.59)	0.004
Barriers-counseling for trauma [†]	2.24 (1.24–4.06)	0.008		
Suicidality, ever	2.60 (1.76–3.86)	<0.001		
Physical/sexual childhood abuse	3.04 (1.73–5.35)	<0.001	1.99 (1.02–3.88)	0.042
Any physical/sexual violence [†]	2.03 (1.28–3.24)	0.003		
Psychedelic use, ever	3.04 (1.95–4.73)	<0.001	1.97 (1.14–3.38)	0.015
<i>Heroin use[†]</i>				
Less than daily (vs. none)	1.55 (0.93–2.58)	0.092		
Daily (vs. none)	1.77 (1.14–2.75)	0.011		
<i>Prescription opioid use[†]</i>				
Less than daily (vs. none)	2.49 (1.28–4.85)	0.007		
Daily (vs. none)	1.53 (0.38–6.26)	0.550		
<i>Crystal meth use[†]</i>				
Less than daily (vs. none)	1.61 (1.00–2.57)	0.048	1.24 (0.70–2.22)	0.460
Daily (vs. none)	3.72 (1.95–7.09)	<0.001	3.02 (1.37–6.65)	0.006
<i>Cocaine use[†]</i>				
Less than daily (vs. none)	1.38 (0.84–2.28)	0.208		
Daily (vs. none)	1.61 (0.53–4.88)	0.399		
<i>Crack use[†]</i>				
Less than daily (vs. none)	1.15 (0.74–1.78)	0.534		
Daily (vs. none)	1.10 (0.63–1.93)	0.737		
Binged on alcohol [†]	1.27 (0.71–2.30)	0.424		
Benzodiazepine use [†]	1.32 (0.58–2.99)	0.512		

[†] In the last 6 months.

Romeu and Richards, 2018; Griffiths et al., 2006; Hendricks, 2018; MacLean et al., 2011). For example, studies of psilocybin-assisted therapy for tobacco cessation found that mystical experiences were significantly correlated with quitting smoking (Garcia-Romeu et al., 2014), and 87% of participants rated their psilocybin experience among the five most personally meaningful and spiritually significant experiences of their lives (Johnson et al., 2017). Similar findings were demonstrated among patients with life-threatening cancer who received psilocybin-assisted therapy, whereby mystical experiences were significantly associated with reduced depression and anxiety (Griffiths et al., 2016; Ross et al., 2016). A recent randomized, double-blind crossover study that administered a single high dose of LSD to 16 volunteers found that 71% rated their experiences among the top 10 most meaningful experiences of their lives one year later (Schmid and Liechti, 2018).

Although the present observational study examined women's histories of psychedelic experiences outside of clinical settings with uncertainties around dose, therapeutic intent, and whether psychedelics were used with other substances, 10–15% of women in the study still reported their psychedelic experiences to be among the top five or the single most personally meaningful or spiritually significant experiences in their lives. Such impacts have high potential to be maximized in safe and supportive therapeutic settings as evidenced in prior research. Evidence from preliminary clinical trials has demonstrated lasting benefits after only one to three moderate-to-high doses of psychedelics administered in the context of psychotherapy, alongside careful preparation and integration of the psychedelic experience guided by qualified care providers (Agin-Liebess et al., 2020; Bogenschutz et al., 2015; Jerome et al., 2020; Johnson et al., 2017; Mitchell et al., 2021).

The associations with interest in psychedelic-assisted therapy uncovered in the present analysis may be attributable to underlying trauma and interrelated socio-structural factors. Women who seek treatment for substance use disorders suffer high rates of comorbid mental health conditions stemming from past experiences of violence. For instance, crystal methamphetamine use is particularly high among those suffering from PTSD (Cohen et al., 2007; Smith et al., 2010). In this study setting, historical physical and sexual abuse, living with HIV, and younger age have been previously found to be significantly associated with initiating crystal methamphetamine injection (Argento et al., 2017a). While there may be unmeasured confounding variables at play, it could be that women who have tried other therapies or have experienced barriers to accessing therapy are more open to exploring new therapeutic modalities for mental health disorders that are known to be difficult to treat. Barriers to accessing counselling for trauma was significantly associated with interest in psychedelic-assisted therapy in bivariate analysis. Women who had prior experiences with psychedelics had higher odds of reporting interest in receiving psychedelic-assisted therapy, possibly reflecting insights into the therapeutic potential of these substances based on direct personal experience and knowledge of the growing evidence base demonstrating the possible utility of psychedelics in treating mental health and substance use disorders.

In the present study, over half of the women identified as Indigenous and Indigeneity was significantly associated with interest in psychedelic-assisted therapy in bivariate analysis. In Canada, "Indigenous" is used as an umbrella term to refer to First Nations, Métis, and Inuit peoples, which represent distinct and separate groups (Smylie et al., 2020). There remains an opportunity for future

psychedelic research to engage in further dialog with Indigenous women and communities to potentially develop innovative Indigenous-led programs that could integrate psychedelic and Indigenous approaches to healing and culturally safe care. Some Indigenous groups have contributed substantially to the progress of psychedelics as medicines in working with psychedelic plants and fungi for thousands of years, yet it has been argued that Indigenous peoples and traditions have gone unacknowledged in mainstream psychedelic research and medicine, and that this deep well of experience and knowledge is being missed (George et al., 2020). While the scientific community is beginning to reflect on the need to foster diversity, equity and inclusion, there is much work to be done to reduce health disparities and ensure equitable access for marginalized and racialized groups in psychedelic science, which has been largely informed by traditional Indigenous knowledge and approaches to healing (Fotiou, 2020; Michaels et al., 2018).

Should psychedelic-assisted therapy become more widely available, it will be important to consider multicultural competence when working with marginalized and racialized women. Prior research has demonstrated that psychedelics are associated with significant reductions in symptoms related to race-based trauma (Williams et al., 2021). Given that psychedelics can induce highly vulnerable psychological and emotional states, it is possible they may carry risk of re-traumatization or ongoing psychological distress if administered without adequate support. As such, careful consideration of approaches that integrate trauma-informed care and cultural competency and safety is needed with psychedelic medicine among marginalized groups. Prioritizing gender and ethnic diversity in psychedelic research will also serve to broaden the generalizability of findings to wider populations and facilitate more equitable access to those with the greatest need (Noorani, 2020; Thurl and Garcia-Romeu, 2021; Williams and Labate, 2020).

4.1. Strengths and limitations

Strengths of this study include drawing from two large community-based cohorts of marginalized women built upon longstanding partnerships within the community, and this study is comprised of a team with diverse lived experience represented across interviewer, outreach, nursing, and coordinator staff. As such, and given the excellent rapport established with marginalized women in Vancouver, the community-based nature of the study is believed to have reduced the likelihood of social desirability and reporting biases common to this type of research. Limitations include the cross-sectional design and limited generalizability to other populations of marginalized and Indigenous women (e.g., those living in more rural settings) as this was not a random sample. This study looked at psychedelics broadly, including MDMA, ketamine and ibogaine in the definition, and more nuanced reasons for being interested in psychedelic-assisted therapy could not be determined. Findings suggest further research is needed to address barriers to psychedelic-assisted therapy, and acknowledge the unique, intersecting and heterogeneous identities and experiences of marginalized women and people who identify as ethnic, gender or sexual minorities. Data were based on self-report and may be subject to reporting and recall biases. Finally, interest in psychedelic-assisted therapy may be influenced by several variables not all of which could be included in multivariable analysis.

5. Conclusion

This study found that approximately half of marginalized women in this setting reported interest in receiving psychedelic-assisted therapy for a current or future mental health or substance use issue. Several mental health and substance use-related variables that have been demonstrated to be amenable to psychedelic-assisted therapy were associated with interest in receiving psychedelic-assisted therapy. As access to psychedelic-assisted therapies continues to expand, any future approaches to extend psychedelic medicine to marginalized women should be integrated within the context of trauma-informed care and

broader socio-structural strategies and supports (e.g., decriminalization, violence prevention and harm reduction efforts) to safely and effectively address mental health and addiction issues among marginalized women.

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Declaration of Competing Interest

EA works as a part-time consultant with Numinus Wellness, a Canadian mental health company interested in the use of psychedelics for medical purposes. Numinus Wellness was not involved in the writing of this manuscript or the decision to submit for publication. No other conflict declared.

CRedit authorship contribution statement

Elena Argento: Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Shira Goldenberg:** Conceptualization, Data curation, Formal analysis, Methodology, Writing – review & editing. **Kathleen Deering:** Writing – review & editing. **Jennifer Lavalley:** Writing – review & editing. **Melissa Braschel:** Formal analysis, Methodology, Writing – review & editing. **Brittany Bingham:** Writing – review & editing. **Kate Shannon:** Conceptualization, Data curation, Formal analysis, Methodology, Writing – review & editing.

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