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Ayahuasca and Public Health III: Health Status of a Sample of Ayahuasca Ceremony Attenders in Portugal

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ABSTRACT

Ayahuasca, a traditional Amazonian psychoactive brew, has gained increasing attention for its potential health benefits; however, no previous research has investigated its use in Portugal. This study aims to evaluate the health status, lifestyle behaviors, and psychosocial well-being of Portuguese ayahuasca users, comparing their self-reported health indicators with population norms. A cross-sectional online survey was conducted among 203 Portuguese adults who have participated in ayahuasca ceremonies. Participants completed validated measures assessing general health status, mental health, coping strategies, and social support. Results were compared to national health survey data. Ayahuasca users perceive their health as good or very good, with lower rates of chronic disease and obesity compared to the general population. Participants also report greater physical activity levels, lower alcohol consumption, and enhanced psychological well-being. A substantial proportion of users attributed positive lifestyle changes, reductions in substance use, and lower reliance on prescription medication to their ayahuasca experiences. Results reinforce previous research linking ayahuasca use to health and well-being, showing that ceremony attenders in Portugal display a range of beneficial lifestyle behaviors and health indicators. Future research should employ longitudinal designs to better understand the causal pathways linking ayahuasca use to health outcomes and explore potential public health implications.

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Ayahuasca; drug policy; health behaviors; public health

Introduction

Ayahuasca, a traditional psychoactive brew used for centuries by Indigenous and mestizo communities in the Amazon Basin for spiritual, healing, and social purposes (Schultes 1967), has attracted global attention in recent years for its potential therapeutic benefits, and in Western countries, its use has expanded beyond traditional contexts to include religious, therapeutic, and personal growth settings (Labate and Cavnar 2014).

Research in recent years has explored the association between ayahuasca use and various health outcomes, highlighting both the potential benefits and risks associated with its consumption. A recent review by Ruffell et al. (2023) suggests that ayahuasca use is associated with improvements in mental health outcomes, including reductions in symptoms of depression, anxiety, and posttraumatic stress disorder (PTSD). Several observational studies have reported positive effects on overall well-being, emotional regulation, and quality of life, which may stem from ayahuasca's capacity to facilitate deep psychological insights and emotional processing (Gonzalez et al. 2021; Maia et al. 2023). Moreover, other studies have noticed that the ceremonial use of ayahuasca is associated with increased mindfulness, affect, and cognitive flexibility, and fewer depression and anxiety symptoms, all of which contribute to psychological resilience and improved mental health (Radakovic et al. 2022; Uthaug et al. 2018, 2021).

These findings align with clinical studies reporting sustained reductions in depression and anxiety symptoms following ayahuasca ceremonies, which are particularly pronounced in individuals with treatment-resistant depression (Palhano-Fontes et al. 2019; Sanches et al. 2016).

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Parallel to these positive outcomes, recent studies have also evaluated the physical health implications of ayahuasca use. A cross-sectional study by Ona et al. (2019) found that ayahuasca users in Spain exhibited lower levels of cholesterol, improved immune markers, and lower incidences of lifestyle-related illnesses compared to the general population, suggesting potential health benefits beyond psychological well-being. A replication study conducted in the Netherlands had similar findings, with ayahuasca users reporting healthier dietary habits, reduced alcohol consumption, and higher levels of physical activity, compared with national averages (Kohek et al. 2022). Users also reported fewer instances of prescription medication use and overall better self-perceived health (Kohek et al. 2022), reinforcing the notion that ayahuasca ceremonies may be associated with beneficial lifestyle changes.

Despite the promising results, it remains important to explore these effects in diverse cultural and regulatory contexts. This study aims to replicate the methodologies employed in previous studies in Spain and the Netherlands to assess the health status, lifestyle behaviors, and psychosocial well-being of ayahuasca users in Portugal. The unique legal status of drug use in Portugal —where personal possession and use of all psychoactive substances, including ayahuasca, are decriminalized— highlights the relevance of this comparison. Furthermore, ayahuasca retreats appear to be increasing in this country (there are no studies with their factual prevalence), and churches using ayahuasca as a sacrament (e.g., Santo Daime) are also present in Portugal.

Materials and methods

Participants

A total of 203 Portuguese-speaking adult ayahuasca users participated in the present study and completed an online survey at a single time point, after written informed consent was obtained. Inclusion criteria comprised age (18 years or older) and the use of ayahuasca in a ceremonial context, in Portugal, more than six months before the assessment. This was done to eliminate participants with recent use, which could bias results because of the acute effects of a recent ayahuasca experience. Participants were identified through a variety of methods, including social media posts, requests via e-mail lists, and personal contacts directly with potential participants and retreat center directors, asking to forward study information to their staff. The study was approved by the Ethics Council for Research of the Faculty of Human Kinetics, University of Lisboa (CEIFMH approval number 26/2022).

Measures

Data were collected through a questionnaire developed especially for the study. The final version of the online survey included several health indicators combined in six dimensions: (a) general health; (b) lifestyle; (c) positive mental health; (d) social support; (e) coping strategies; and (f) personal values. Except for the last two dimensions, the remaining ones were constructed based on the National Health Questionnaire (INE 2020), using the same question wording and answer options. The General Health dimension included measures of self-perceived health status, body mass index (BMI), presence of chronic disease (e.g., high blood pressure, cholesterol, diabetes), and physical limitation or sleep problems, among others. The lifestyle dimension included questions about physical activity and diet (e.g., daily walking, fruit/vegetable consumption) or tobacco and alcohol use. Positive mental health included satisfaction with life and indicators of depressive symptoms. Satisfaction with life was measured using the Satisfaction With Life Scale (SWLS), a 5-item questionnaire with a 7-point Likert scale from 1 (*completely disagree*) to 7 (*completely agree*) (Diener et al. 1985). Total score can be calculated by summing the five answers, which are interpreted as follows: 5–9 = Extremely Dissatisfied; 10–14 = Dissatisfied; 15–19 = Slightly Dissatisfied; 20–24 = Slightly Satisfied; 25–30 = Satisfied; 30–35 = Extremely Satisfied. A set of eight questions assessing the frequency of common symptoms of depression was organized in an index calculated through the application of a simple arithmetic mean, with scores ranging from 1 to 4, where 1 indicates total absence of symptoms and 4 the presence of symptoms "nearly every day" or "every day." Social support was measured by asking the number of people individuals can count on in case of personal problems or that they believe have a genuine interest in them. Finally, questions in the personal values and coping strategies dimensions were based on two prior studies conducted in Spain (Ona et al. 2019) and the Netherlands (Kohek et al. 2022), in which the present study was inspired.

To evaluate coping strategies, we used a short version of the COPE inventory (Carver, Scheier, and Weintraub 1989). The Brief-COPE is a 28-item scale organized in 14 subscales, which can be combined in broader domains—problem-focused coping, emotional-focused coping, and dysfunctional coping—and has shown acceptable or satisfactory psychometric properties (Carver 1997; Coolidge et al. 2000; Cooper et al. 2006).

Problem-focused coping comprises three of the 14 subscales of the Brief-COPE (active coping, planning, and use of instrumental support), emotion-focused coping comprises five subscales (use of emotional support, positive reframing, acceptance, religion, and humor), and dysfunctional coping includes six subscales (venting, denial, substance use, behavioral disengagement, self-distraction, and self-blame) (Coolidge et al. 2000; Cooper et al. 2006). The items are scored on a 4-point Likert scale, ranging from 1 (*I haven't been doing this at all*) to 4 (*I've been doing this a lot*).

Values and life fulfillment were evaluated using The Engaged Living Scale (ELS), a 16-item measure with two subscales: (a) valued living (VL, 10 items), assessing recognition and understanding of personal values as well as the ability to take actions congruent with those values; and (b) life fulfillment (LF, 6 items), assessing the sense of fulfillment in life experienced as a result of recognizing and living in accordance with those personal values. The items are scored on a 5-point Likert scale, with responses ranging from 1 (*completely disagree*) to 5 (*completely agree*) and summed to produce total and partial scores. Higher scores indicate a greater engagement with personal values. ELS has shown good reliability, with a Cronbach's alpha ranging from .88 to .92 for both total scale and subscales (Trindade et al. 2016; Trompetter et al. 2013).

We also used questions relevant to previous ayahuasca use, such as how many ayahuasca ceremonies the respondents attended in total and subjective effects on the individual's health. The survey ended with the collection of demographic information and socioeconomic data (e.g., age, gender, country of birth/residence, marital status, educational level, employment or household).

Statistical analysis

Data were first analyzed using descriptive statistics and compared to Portuguese normative data (matched for age) retrieved from the National Health Questionnaire (INS, 2019), a cross-sectional study of probabilistic samples of the Portuguese population conducted by the Ricardo Jorge Institute and National Institute of Statistics (Portugal) (www.ine.pt). Results are expressed in percentages.

A multivariate general linear model (GLM) was developed to explore potential associations between the experience of participants in ayahuasca ceremonies and a set of 14 dependent variables—chronic disease, high blood pressure, cholesterol, depression, use of prescription medication, smoking, BMI, number of days/week in which physical activity is of at least 10 minutes, perceived health status, frequency of depression symptomatology, satisfaction with life (SWLS), global engaged living (ELS), and the valued living and life fulfillment dimensions the ELS. We used Bonferroni post-hoc analysis and adjusted for age, gender, marital status, education level, and environment.

A linear regression model was additionally run to detect potential predictor variables of subjective health status—chronic disease, prescribed medication, days/week of physical activity (10 minutes or more), smoking, BMI, age, gender, marital status, educational level, environment, number of participations in ayahuasca ceremonies, frequency of depression symptoms, and total/partial measures of engaged living.

A significance (p) value was set at .05. Analyses were performed using SPSS version 29.

Results

Participants characteristics

The sample comprised 203 individuals aged between 24 and 64 years ($M = 43$; SD = 6.9), with 64.3% identifying as female and 92% of Portuguese nationality. Most participants (68.1%) had a university degree, 14.3% completed high school, and 7.7% finished basic school (first to ninth grade). Not all participants responded to all questions, which explains the different sample sizes in different variables and analyses. Additional demographic details are available in Table 1.

History of ayahuasca use

For about 64% of participants, the first experience with ayahuasca occurred earlier than 3 years before the study (2023), whereas 85.6% had their most recent experience three years or less before 2023. About half (52.6%) of respondents reported having taken ayahuasca between one and 10 times in their lifetime, with 15.4% reporting more than 20 times. Of all participants who provided information on the context of ayahuasca use, about 85% reported having participated in indigenous or neo-shamanic ceremonies (more details available in Supplementary file 1).

When questioned about lifetime use of other psychoactive substances, a considerable number of ayahuasca users reported having previously used cannabis (81%) and psilocybin (73.9%). About half of the respondents also indicated previous contact with MDMA (56.9%), cocaine (48.1%), or LSD (45.2%). Values for lifetime use of amphetamines (16.9%) and heroin (9.5%) were lower (more details available in Supplementary file 2).

Table 1. Sample demographics.

			N	%
Gender	Female		92	64.3
(*n* = 143)	Male		50	35
	Non-Binary		1	0.7
Age	24–34		21	10
(*n* = 203)	35–44		98	48
	45–54		74	36
	55–64		10	4
Nationality	Portuguese		132	92.3
(*n* = 143)	Non-Portuguese		11	7.7
Education	Basic school (1st to 9th grade)		11	7.7
(*n* = 144)	High school		35	14.3
	University degree	Professional/technical degree	7	4.9
		Bachelor's degree	47	32.7
		Master's degree	33	22.9
		Doctoral degree	11	7.6
Employment status	Employed		110	77.5
(*n* = 142)	Unemployed		18	12.7
	Student (with/without payment)		3	2.1
	Permanent incapacity		1	0.7
	Domestic tasks		2	1.4
	Other situation of inactivity		8	5.6
Marital status	Single		75	52.1
(*n* = 144)	Married		37	25.7
	Divorced or separated		32	22.2
Type of housing	Own flat (apartment)		50	34.5
(*n* = 145)	Own house		45	31.0
	Rental		26	17.9
	Social rental		7	4.8
	Other		17	11.7
Familiar household	Living alone		30	20.7
(*n* = 145)	Living with parents		10	6.9
	Single parent with one or more children		26	17.9
	Couple without children		25	17.2
	Couple with one or more children		32	22.1
	Other		22	15.2
Area	Rural		28	19.3
(*n* = 145)	Suburban		32	22.1
	Urban		85	58.6
Number of inhabitants[a]	0 – 5,000 inhabitants		36	25.2
(*n* = 143)	5,000 – 25,000 inhabitants		21	14.7
	25,000 – 50,000 inhabitants		15	10.5
	50,000 – 100,000 inhabitants		9	6.3
	100,000 – 500,000 inhabitants		15	10.5
	More than 500,000 inhabitants		47	32.9

[a]Number of inhabitants in the city (or region) where the participant lives.

Perceived effects of ayahuasca use

Most respondents (80.1%) stated that participating in ayahuasca ceremonies had a positive or very positive influence, with only one person indicating no influence. No participant classified the influence as negative or very negative. Physical and psychological benefits were reported by 80.8% and 98.7% of respondents, respectively, with only 5.7% reporting adverse effects (e.g., panic, anxiety, fear, long altered states, integration difficulties). For example, only 2.5% reported severe or very severe pain, whereas 80.0% reported null, low, or very low pain at present. About 55% of participants indicated that ayahuasca helped them reduce substance use, with reports of an abusive pattern dropping from 24.2% prior to ayahuasca to 8.3% after ayahuasca use (Table 2).

Almost 80% of participants noted that ayahuasca helped them cope with pain, with 45% indicating that the experience helped them much or very much. More than half of the sample indicated that participation in ceremonies using ayahuasca led to the reduction of medical (55.2%) and psychological and psychiatric (66% respondents) consultations. Almost 20% of participants indicated that there was a reduction in prescribed medication following their participation in ayahuasca ceremonies.

Comparison with population data

More than 90% of participants rated their health status as "good" (52%) or "very good" (39%). A small percentage described it as "acceptable" (8.9%), and no participants

Table 2. Perceived effects of ayahuasca use.

Self-perceived general influence of ayahuasca on the individual ($n = 156$)		
Very positive	125	80.1
Positive	30	19.2
Not influenced	1	0.6
Negative	–	–
Very negative	–	–
Physical benefits ($n = 156$)		
Yes	126	80.8
No	30	19.2
Psychological benefits ($n = 156$)		
Yes	154	98.7
No	2	1.3
Adverse effects ($n = 157$)		
Yes(a)	9	5.7
No	148	94.3
Substance abuse before ayahuasca ($n = 157$)		
Yes	38	24.2
No	119	75.8
Substance abuse after ayahuasca/present day ($n = 157$)		
Yes	13	8.3
No	144	91.7
Influence of ayahuasca on substance use (n = 155)		
Increased substance use	–	–
Decreased substance use	85	54.8
No relationship	70	45.2

(a) Panic, anxiety, fear, long altered states, or difficulties related to integration are among the main adverse effects reported.

perceived their health status as poor or very poor. The mean BMI was 23.5 kg/m2, with 62.3% of participants falling within the normal range (18.5–25 kg/m2). Compared to the general population, participants in ayahuasca ceremonies were more likely to have a normal BMI and less likely to be overweight or obese. Chronic diseases were generally more prevalent in the general population, with cholesterol, high blood pressure, and osteoarthritis being particularly low among ayahuasca users. Two exceptions to this were allergies and depression, where ayahuasca users showed higher values than the population (by 5% or less). Regular alcohol consumption was higher in the general population compared to ayahuasca users, with more than 50% of our sample reporting either no alcohol consumption or only occasional use (vs. 19.4% in the population). Results for tobacco consumption showed a different pattern, with a 13.3% higher proportion of tobacco users in the sample of ayahuasca ceremony participants compared to the general population. However, as we expand on in the discussion, this comparison is not straightforward, since ayahuasca users may also be considering unique forms of tobacco use, which are not present in the normal population.

Regarding psychological and social dimensions of health, the results also suggest some differences between the groups. Compared to the general population, more ayahuasca users perceived their life as satisfying or very satisfying, and almost twice as many ayahuasca users (vs. the general population) reported having six or more people with whom they could count in case of personal problems (Table 3). Most ayahuasca users reported having 3 to 5 ($n = 69$) and 6 or more ($n = 55$) supportive individuals, whereas very few indicated having no one to count on in case of a personal problem ($n = 3$).

Ayahuasca users are generally more physically active and spend more time exercising than is reported in the national population data. For example, while 62% of ayahuasca users reported participating in physical activity 3–6 days a week, the corresponding value for the population is 19%. However, despite the higher levels of physical activity, ayahuasca users also spend more time sitting on average. Fruit and vegetable consumption was not substantially different between the groups, but, interestingly, ayahuasca users reported lower milk and dairy intake. More details on physical activity and diet are in Table 4.

Table 3. Comparison of general health in users vs. the general population.

		Ayahuasca users (AU) (%)	General population (GP) (%)	Difference (AU – GP) (%)
BMI (kg/m^2)	18.5–25	62.3	43.7	18.6[a]
($n = 154$)	≥ 25	36.4	56	−19.6[a]
High blood pressure ($n = 200$)		5.5	29.7	−24.2[a]
Osteoarthritis ($n = 200$)		6.5	25.6	−19.1[a]
Low back pain ($n = 201$)		30.3	38.3	−8[b]
Neck pain ($n = 201$)		21.9	28.5	−6.6[b]
Diabetes ($n = 201$)		0	12	−12[a]
Allergies ($n = 201$)		25.4	20.4	5
High cholesterol ($n = 201$)		9.5	27.4	−17.9[a]
Depression (201)		12.9	11.2	1.7
Tobacco smoking ($n = 164$)		36.6	23.3	13.3[a]
Alcohol	Regular use	47.8	71.4	−23.6[a]
($n = 136$)	No-Occasional use	52.2	19.4	32.8[a]
Satisfaction with life ($n = 154$)	Extremely dissatisfied/Dissatisfied/Slightly dissatisfied	9.7	20.5	−10.8[a]
	Slightly satisfied/Satisfied/Extremely satisfied	83.7	79.6	4.1
Social Support	From 0 to 5 people	64.3	76.7	−12.4[a]
(number of people available; $n = 154$)	6 people or more	35.7	19.9	15.8[a]

[a] $p \leq .001$; [b] $p \leq .05$ for differences comparing the proportion of ayahuasca users and national prevalence data (one-sample proportion z-test).

Table 4. Comparison of health-related behaviors in users vs. the general population.

	Ayahuasca users (AU; %)		General population (GP; %)	
Weekly walking (n_AU = 150)	0 to 1 or 2 days/week 23.3	3 or more days/week 76.0	0 to 1 or 2 days/week 40.6	3 or more days/week 57.5
Weekly physical activity (n_AU = 155)	0 to 1/2 days 38.1	3 to 6 days 61.9	0 to 1/2 days 77.6	3 to 6 days 18.9
Time physically active (hours/week) (n_AU = 141)	Up to 3 h/week 28.4	Over 3 h/week 71.6	Up to 3 h/week 53.5	Over 3 h/week 42.0
Time sitting (hours/day) (n_AU = 160)	Up to 6 h 50	Over 6 h 50	Up to 6 h 66	Over 6 h 32.2
Fruit intake (daily/weekly) (n_AU = 165)	0 to 3 times/week 21.8	1 or more times/day to 4–6 times/week 78.2	0 to 3 times/week 17.7	1 or more times/day to 4–6 times/week 79.7
Vegetable intake (daily/weekly) (n_AU = 164)	0 to 3 times/week 18.9	1 or more times/day to 4–6 times/week 81.1	0 to 3 times/week 28.4	1 or more times/day to 4–6 times/week 69.8
Milk and dairy products (daily/weekly) (n_AU = 164)	Never to 4–6 times/week 77.4	One or more times/day 22.6	Never to 4–6 times/week 33.4	One or more times/day 63.7

The role of experience and type of ayahuasca ceremonies

The results of the multivariate GLM analysis suggest a role of experience in well-being, with significant differences ($p < .05$) in health perception, frequency of depressive symptoms, and ELS scales. Analysis of marginal means indicated that those with a higher number of participations in ayahuasca ceremonies perceived a "better health status," had fewer depression symptoms, and were more engaged with their personal values than those with less experience. In the post-hoc analysis, both ELS and its subscale, Life Fulfillment, showed significant differences ($p < .05$). Participants who attended 100 or more ceremonies were more engaged with their personal values, and those who attended more than 50 (and more than 100 ceremonies) reported greater life fulfillment compared to individuals who participated in one to ten ceremonies.

When we compared the means obtained by ayahuasca users with different levels of experience on measures of life satisfaction, coping, and values, controlling for age, differences also emerged between more and less experienced participants (Table 5). There were significant differences between those with more vs. less experience in ayahuasca ceremonies for all coping and ELS scales, except problem-focused coping. After Holms-Bonferroni correction for multiple group comparisons, compared with individuals who attended less than 20 ceremonies, those reporting more than 100 lifetime ceremonies scored higher in satisfaction with life, ELS, and ELS subscales, and lower in the dysfunctional dimension of the Brief-COPE.

Satisfaction with life, coping strategies, and values were also compared between people participating in ayahuasca neo-shamanic and in indigenous ceremonies (note: given the low number of participants, we excluded participants who selected "other" type of ceremonies). No significant differences were observed. Finally, a linear regression model was used to identify predictor variables for perceived mental health status. Of all candidate predictors, frequency of depression symptoms, ELS, marital status, and presence of chronic disease were present in the final model [$F(4) = 14.7$, $p < .001$; $R^2 = .32$].

Table 5. Satisfaction with life, coping, and living values across levels and types of ayahuasca experience, controlling for age ($N = 156$).

	Life satisfaction ($n = 154$)	Problem-focused coping ($n = 143$)	Emotion-focused coping ($n = 140$)	Dysfunctional coping ($n = 143$)	ELS valued living ($n = 151$)	ELS life fulfillment ($n = 150$)	ELS total ($n = 150$)
1–10 ceremonies	25.8 (6.1)[a]	2.9 (0.7)	2.9 (0.7)	1.7 (0.4)[a]	40.9 (4.8)[a]	21.0 (4.8)[a]	61.9 (8.9)[a]
11–20 ceremonies	26.9 (7.0)	2.7 (0.6)	2.6 (0.7)	1.4 (0.3)[a]	40.2 (5.8)[a]	20.8 (5.8)[a]	60.9 (10.7)[a]
+20 ceremonies	27.5 (5.5)	3.1 (0.4)	3.0 (0.5)	1.8 (0.5)[a]	41.1 (6.0)	21.6 (5.3)	62.7 (10.6)[a]
+50 ceremonies	29.1 (4.9)	2.9 (1.0)	3.0 (0.9)	1.5 (0.4)	44.0 (5.3)	24.5 (4.6)	68.5 (9.2)
+100 ceremonies	31.1 (3.3)[a]	2.3 (1.1)	2.3 (1.0)	1.3 (0.3)[a]	46.1 (4.0)[a]	26.3 (3.0)[a]	72.4 (6.4)[a]
ANCOVA	$F = 3.0$ $p = .02$ $\eta 2 = .08$	—	$F = 2.9$ $p = .026$ $\eta 2 = .08$	$F = 4.95$ $p < .001$ $\eta 2 = .13$	$F = 3.80$ $p = .006$ $\eta 2 = .10$	$F = 4.82$ $p = .001$ $\eta 2 = .12$	$F = 4.92$ $p < .001$ $\eta 2 = .12$

[a]Observed tendencies in multiple comparisons ($.05 > p > .001$); η2, partial eta-square; ELS, Engaged Living Scale.

Discussion

Following up on two similar studies in Spain and the Netherlands (Kohek et al. 2022; Ona et al. 2019), the goal of the present study was to describe the lifetime experience of using ayahuasca in a sample of users in Portugal, with an emphasis on perceived health and frequency of health-related behaviors, compared with normative population data. The results suggest that ayahuasca users perceive their health as good or very good and, compared to the general population, report fewer chronic illnesses (e.g., cholesterol, high blood pressure), are less frequently obese, and consume less alcohol. These results align with those reported in Ona et al. (2019) and Kohek et al. (2022). Ona et al. (2019) concluded that ayahuasca use was associated with higher fruit consumption, yoga and meditation practices, and long-term use linked to positive perceptions of health or healthier lifestyles. Similarly, Kohek et al. (2022) reported better general well-being, fewer chronic or lifestyle-related diseases, more physical activity, and a more balanced diet among ayahuasca users compared to the general population. Moreover, our results also support studies with population studies conducted in the UK and in the United States, showing an association between lifetime use of psychedelics and lower odds of heart disease, hypertension, diabetes, as well as lower odds of being overweight or obese, and greater self-reported overall health (O. Simonsson, Osika et al. 2021, O. Simonsson, Hendricks 2021, O. Simonsson, Sexton 2021). Other observational and clinical studies also suggest a relation between psychedelic use and healthier lifestyle behaviors, such as diet and physical activity (Aday et al. 2024; Raison et al. 2022; Simonsson et al. 2022; Teixeira et al. 2022).

Regarding psychological health and social support, participants in ayahuasca ceremonies appeared to be at an advantage compared to the general population, scoring higher on measures of life satisfaction and reporting a broader support network in case of a serious problem. These mental health indicators were further complemented by other positive aspects, related to coping mechanisms, personal value engagement, and (lower) depressive symptoms, which are consistent with research on ayahuasca's potential antidepressant effects or its role in promoting quality of life, psychological well-being, or strategies to cope with difficulties, problems, or stress (e.g., Gonzalez et al. 2021; Jiménez-Garrido et al. 2020; Sanches et al. 2016).

Many respondents also indicated that participation in these ceremonies reduced their use of psychoactive substances and medication or diminished their reliance on health professionals. The positive impact of psychedelics in reducing the use or abuse of tobacco, alcohol, or drugs is well-documented (Bogenschutz et al. 2022; Garcia-Romeu et al. 2019, 2020; Glynos et al. 2024). In particular, participation in ayahuasca ceremonies has been associated with significant reductions in substance use (Perkins et al. 2022). Regarding drug use, it is interesting to note that, although a high percentage of subjects had previous experience with illicit drugs, our sample maintains high levels of physical health. This result was found in the two previous studies with similar methodology (Kohek et al. 2022; Ona et al. 2019).

Although ayahuasca users showed a higher rate of tobacco use than the general population, this does not necessarily indicate a higher prevalence of commercial tobacco smoking. The survey question "Do you use tobacco?" does not differentiate between various forms of tobacco consumption, such as cigarette smoking, ceremonial tobacco smoking (*mapacho*), drinking tobacco extract, or the use of tobacco snuff (*rapé*). Some individuals who participate in ayahuasca ceremonies also smoke *mapacho* tobacco (without inhalation) or drink tobacco extract as part of a cleansing and protective ritual. Additionally, in some ceremonies, tobacco is administered as a snuff (*rapé*). These traditional uses of tobacco differ significantly from commercial cigarette smoking in both practice and their potential health effects. However, due to limited research, the health impacts of these ceremonial uses remain poorly understood (Berlowitz et al. 2023).

Recently, a large-scale, observational study across several countries analyzed life and lifestyle changes associated with ayahuasca use as reported by nearly 9,000 adults (Perkins et al. 2023). In this study, many of the (mostly positive) changes reported in health and health behaviors in which ayahuasca was a "main contributor" (e.g., abstaining from or reducing alcohol and drug use, eating a healthy diet, increasing physical exercise) are also in line with the present results. This study also looked at insights gained from ayahuasca in relation to life and lifestyle changes, observing that insights in the categories of body function and care, life purpose or direction, and ethics, morals and your own conduct were most frequently associated with those changes. These findings start to shed some light on the mechanisms that may underlie ayahuasca-related potential benefits in health and well-being.

From a psychological perspective, the structured, ritualistic setting in which ayahuasca is typically consumed may also play a crucial role in shaping its long-term effects. Rituals associated with psychedelic use have been suggested to enhance emotional processing by providing a safe, supportive space for self-exploration and cognitive reframing (Perkins et al.

2023). Mechanisms such as somatic effects, introspection, increased self-connection, and gaining of insights and new perspectives may lead to beneficial mental health and well-being outcomes (Perkins et al. 2023). The presence of trained facilitators or experienced users further provides a form of social support that can enhance integration of the experience, reinforcing long-term behavioral and cognitive benefits.

As in the studies conducted by Kohek et al. (2022) and Ona et al. (2019), discussing potential public health implications of these findings requires caution. On the one hand, findings from the three studies are consistent with prior research suggesting that ayahuasca may contribute to reduced consumption of alcohol and other substances, as well as promote changes in psychological well-being (Dos Santos et al. 2017; Perkins et al. 2022; Rodrigues et al. 2022). Given the growing global burden of mental health disorders and substance abuse, future exploration of ayahuasca as a harm reduction tool could have significant public health benefits. On the other hand, it is impossible to determine whether participants in these studies were already healthier before they started their history of use, or whether the samples in these studies were self-selected and represent a healthier cohort within the population of ayahuasca users. The fact that frequency of use is repeatedly associated with improved health and health behaviors suggests a positive role of ayahuasca beyond self-selection effects, but causation is still difficult to infer.

Another public health implication concerns the legal and policy landscape surrounding ayahuasca use. While some jurisdictions continue to classify it as a controlled substance, increasing evidence suggests that prohibitionist policies may not align with scientific findings regarding its relatively low risk profile and potential therapeutic benefits (Maia et al. 2023). Recent efforts to incorporate psychedelic-assisted therapies into clinical and community settings highlight the need for regulatory frameworks that support safe and responsible use, including harm reduction approaches, informed consent protocols, and post-experience integration support.

Other challenges remain in translating these findings into broader public health initiatives. Standardizing ayahuasca experiences outside of traditional or ceremonial settings remains difficult, as factors such as set (mindset), setting (environment), and individual psychological history significantly influence outcomes (Hartogsohn 2016). Additionally, while most participants report positive effects, some individuals experience transient psychological distress or challenging experiences that require proper integration and support (Bouso et al. 2022). Future research should further investigate potential risks and best practices for ensuring safe use, particularly in populations with underlying psychiatric vulnerabilities.

Despite the valuable insights provided by this study, several limitations must be acknowledged. Besides self-selection and limits to infer causality, reliance on self-reported data is subject to recall bias and potential social desirability effects. While previous studies have validated self-report measures in psychedelic research (Griffiths et al. 2019), objective biomarkers or clinical assessments could provide additional validation of psychological and physiological outcomes. Finally, the cultural and contextual variability in ayahuasca use should be considered, as ceremonial practices, group settings, and individual differences may significantly shape the experience and its long-term effects (Perkins et al. 2022).

In summary, this study adds to the growing evidence linking ayahuasca use to positive health behaviors and psychological well-being, with Portuguese users reporting healthier lifestyles, lower prevalence of chronic disease, and reduced alcohol intake compared to the general population. Additionally, it reinforces the safety profile of the substance, highlighting that adverse effects may be more related to individual factors than the substance itself or may represent an integral part of a positive process for health and well-being (Bouso et al. 2022). And, despite the limits imposed by the cross-sectional nature of the study, our findings support the idea that ayahuasca ceremonies may come to be integrated into contemporary societies like other self-care practices, such as yoga, exercise, or eating a healthy diet (Kohek et al. 2022; Ona et al. 2019). The structured, ritualistic context of ayahuasca consumption may play a key role in fostering self-reflection and behavioral change, highlighting its potential relevance for public health. However, further longitudinal studies are needed to better understand the mechanisms driving these associations and to inform evidence-based policies regarding ayahuasca use and regulation.

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Data availability statement

Raw data supporting the findings of this study are available from the corresponding author on request (pteixeira@fmh.ulisboa.pt).

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