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ORIGINAL ARTICLE

Conceptions and practices of an integrative treatment for substance use disorders involving Amazonian medicine: traditional healers' perspectives

Ilana Berlowitz,[1] Christian Ghasarian,[2] Heinrich Walt,[3] Fernando Mendive,[4] Vanessa Alvarado,[5] Chantal Martin-Soelch[1]

[1]*Department of Psychology, University of Fribourg, Fribourg, Switzerland.* [2]*Institute of Ethnology, University of Neuchâtel, Neuchâtel, Switzerland.* [3]*Department of Oral- and Cranio-Maxillo-Facial Surgery, University Hospital Zurich, Zurich, Switzerland.* [4]*Takiwasi Centro de Rehabilitación de Toxicómanos y de Investigación de Medicinas Tradicionales, Tarapoto, Peru.* [5]*School of Applied Psychology, University of Applied Sciences Northwestern Switzerland, Olten, Switzerland.*

Objective: The harmful use of psychoactive substances represents one of today's largest public health problems. Yet, in spite of its global relevance, current treatment for substance use disorders (SUDs) is still not entirely successful. The purpose of this study was to investigate alternative treatments and conceptions from traditional Amazonian medicine adapted to SUDs.
Methods: We conducted semi-structured interviews with 13 practicing experts at a well-established addiction treatment center in the Peruvian Amazon and performed qualitative content analysis on the collected data. Main categories were deductively defined and corresponding subcategories inductively developed.
Results: Our findings revealed characteristic features and consequences, causes and antecedents, and treatment methods of SUDs as the main categories. Overall, concepts of disease etiology bore resemblance with contemporary biopsychosocial models of SUDs. The Amazonian therapeutic means however differed markedly from current Western ones. The main methods involved dietary retreats, healing ceremonies, and purging rituals. The integral application of Amazonian methods, as well as their traditional implementation according to prescribed ritual protocols, were emphasized by the experts as crucial for efficacy and safety of treatment delivery.
Conclusion: We suggest further scientific attention to these therapies, including clinical studies, for which our results provide conceptual underpinnings. Findings from this research expand the cross-cultural understanding of SUDs and, in the long run, may enhance its treatment options.

Keywords: Substance use disorders; addiction; traditional Amazonian medicine; illness concepts; expert interviews; addiction treatment; alternative medicine; Peru; Amazon

Introduction

The harmful use of psychoactive substances is one of today's most substantial public health problems, being amongst the main contributors to the global burden of morbidity.[1] It is associated with avoidable health impairments, disabilities, and early death,[2] implying both individual suffering and high societal costs, economically amounting to over $600 billion per year in the USA alone.[3] However, in spite of the magnitude of and international concern with the problem, current treatments for substance use disorders (SUDs) are not yet entirely successful; valuable evidence-based therapies are available,[4] but relapse rates remain high.[5] This recurrent pattern of SUDs, along with neuroscientific studies showing long-term cerebral changes in this context,[6] point to the chronic nature of the condition.[7]

In an attempt to improve existing treatment options, some research has therefore explored alternative or traditional healing practices for SUDs,[8] in a parallel way as such therapies are often used for somatic chronic diseases, like cancer.[9-11] Specifically traditional Amazonian medicine, an ancient healing system involving the use of medicinal plants and ritual techniques from the Amazon rainforest,[12] ought to be investigated. SUD treatments based on Amazonian medicine are already being offered in some therapeutic contexts in South America, including the pioneering Takiwasi Center (Takiwasi Centro de Rehabilitación de Toxicómanos y de Investigación de Medicinas Tradicionales, or Takiwasi Center for Addiction Treatment and Rehabilitation) in Peru, whose addiction treatment protocol combines Western psychotherapy with Amazonian medicine. Internal statistics from the center suggest good results, but so far no scientific studies have assessed the effects of this treatment empirically. However, to evaluate how this treatment works and whether it is effective requires first gaining insight on how SUDs are understood within this medicinal system.[13] Once a fundamental conceptual understanding of Amazonian treatment processes has been established, clinical assessment of

Correspondence: Ilana Berlowitz, Department of Psychology, University of Fribourg, Rue de Faucigny 2, 1700 Fribourg, Switzerland.
E-mail: ilana.berlowitz@unifr.ch
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efficacy can follow at a next stage. The overall objective of our research was therefore to identify conceptions and practices of SUDs as understood in the Amazonian medicinal practice used in the Takiwasi treatment framework.

It is important to note that the illness concepts explored in this study reflect a contemporary adaptation of Amazonian medicine, which may differ from more ancient or traditional versions in significant ways. Amazonian medicine, as it is practiced in Peru today, reflects a blend of traditions, modified by centuries of exposure to colonial and postcolonial influences, rather than the native science it originally was.[14] As such, current Amazonian medical practice and its application in the Takiwasi treatment are understood as a kind of hybrid system[15] or Third Space,[16] i.e., a construct that evolved from the interaction of different cultural systems. Rather than giving an ethnographic account of traditional Amazonian medicine in its most original form, it is this hybrid medical practice, its methods, and its underlying concepts that the present study aimed to investigate. More specifically, our study intended to capture expert practitioners' understanding of the etiology (aim 1) and treatment (aim 2) of SUDs. We further aimed to assess which among the Amazonian techniques applied in the Takiwasi protocol is seen as the main constituent in SUD therapy (aim 3). Finally, we intended to discuss similarities and differences between the adapted Amazonian and current scientific views of SUDs (aim 4).

Methods

Participants

Our sample consisted of a group of 13 expert practitioners of traditional Amazonian medicine that presently do or in the past have worked with the Takiwasi Center. Selecting practitioners on the basis of their work association with this institution ensured that all experts were (a) knowledgeable in Amazonian medicine, (b) experienced with SUDs, and (c) well-acquainted with the standard treatment regime at the center. This also entails that their expertise relates specifically to the aforementioned Third Space,[16] within which they act as boundary objects[17,18] or hybrid actors, bridging the different medical and cultural contexts. Sample size was determined on the basis of recommendations by Morse[19,20] concerning data adequacy.

Takiwasi treatment protocol

The Takiwasi Center was originally founded in 1992 by a French medical doctor after a mission with Doctors Without Borders for an unrelated healthcare project in Peru. The Takiwasi Center was the first clinical institution in the world to apply traditional Amazonian medicine to SUDs, and is officially recognized by the Peruvian health department. Its treatment protocol combines Amazonian and Western therapeutic methods. The clinical staff working at the center thus consists of health professionals from both systems (i.e., *curanderos/as*, psychologists, nurses, etc.). Western therapeutic methods include individual psychotherapy (such as Gestalt or Analytic therapy) and group psychotherapy (e.g., relapse prevention, psychodrama, etc.), milieu therapy, and occupational therapy, as well as occasional biomedical health checks. The center generally does not administer psychopharmacological treatments for SUD (or comorbidities) except in rare cases, in which immediate stabilization is necessary (for instance, by means of tranquilizers). Traditional Amazonian methods essentially involve the use of local medicinal plants in the context of traditional rituals. The duration of the inpatient program varies, but is typically between 3 to 12 months (about 7 months on average; internal statistics), depending on individual clinical requirements. Amazonian medical treatments are administered in a weekly routine and in parallel to Western interventions to all participants throughout the entire program. The exact treatment plan, in terms of which technique is applied at which stage and with which frequency, is adapted individually and decided on in a case-by-case manner. On a typical day of treatment, a patient may do physical exercises in the morning and perform daily chores (cooking, gardening, cleaning, etc.) with the help of an occupational therapist. Individual therapy sessions may also take place during that time. Afternoons and evenings are dedicated to group interventions, Amazonian or Western, depending on the day and patient. The first weeks tend to focus on the detoxification process, while the remainder of the treatment aims at deeper therapeutic work. In accordance with Peruvian legislative requirements, a therapeutic community such as Takiwasi needs to be gender-specific. The residential treatment program therefore serves exclusively male patients, with a maximal capacity of 18 beds. The majority of treatment seekers use a combination of alcohol and illicit drugs (cocaine-related substances, cannabis, amphetamines, opiates, or tranquilizers) and are from Peru or other Latin American countries, with a minority of European or North American patients (internal statistics). Besides the male-only residential treatment for SUD patients, the center also operates outpatient services for males and females with psychosomatic problems.

Data collection

We conducted semi-structured expert interviews using guiding questions (Table 1) leaning on those developed by Berger-González, Stauffacher, Zinsstag, Edwards, and Krütli[21] and in alignment with the common-sense model of illness representation,[22] a health psychology framework for exploring dimensions of illness concepts. Our research focused on the following three dimensions: causes, consequences, and management (i.e., treatment). All interviews were conducted by a trained psychologist (IB). Data were collected in the San Martín Province of Peru between October 2013 and September 2014, until saturation occurred. Saturation was defined in terms of data adequacy, i.e., when the most salient information was identified and no fundamentally new categories were emerging, at which point data collection was discontinued.[19] Most interviews were held at the Takiwasi Center facilities (77%), and the rest at the interviewees' home/workplace. Interviews were conducted in Spanish, except for one in English. The average interview length was 70 minutes (range, 35-123 minutes), distributed across one to three sessions per participant,

Table 1 Interview guidelines (condensed form)

- How do you as a practitioner of traditional Amazonian medicine understand addiction/substance use disorders? Probe: Could you describe the main characteristics of this condition the way you see it?
- What is at the origin of addiction/substance use disorders? What are the main causes, would you say? Probe: What are the reasons for a certain person to develop an addiction, while others may sometimes use substances without becoming addicted? What is the critical difference between these two types?
- When a patient comes to see you and asks for your help to cure his addiction, what are the different components, plants, tools, or techniques of the treatment that you propose? Probe: Could you briefly describe each component and tell me in global terms what this particular tool/technique is used for?
- Which of these components is the most central or important one for the treatment process of addiction problems?

depending on time availability and circumstantial demands. Interviews were tape-recorded and subsequently transcribed verbatim. The study was approved by the relevant ethics committee and conducted in accordance with international regulatory requirements (no. 88-2013, Fribourg, Switzerland). Participants were carefully informed about the purposes of the study, and their consent was obtained.

Data analysis

We took a conventional approach to content analysis, as is recommended when existing research literature on the subject is limited.[23] We performed qualitative content analysis[24] by means of a computer-assisted (Microsoft Office) iterative process: in a first analytic step, main categories were deductively developed on the basis of our research questions and the illness representation model.[22] These categories had initially been defined as 1) characteristics of SUDs, 2) causes of SUDs, and 3) treatment of SUDs, but the preliminary labels were subsequently adjusted to more precisely match the data at hand. Subcategories or coding categories ("codes") within these main themes were then developed from the data in a stepwise inductive procedure, identifying common clusters of themes. The iterative process thus involved a repetitive analysis of the data material, in which the emerging coding system was continuously revised, until a final set of codes was established. To assess the final coding system's reliability, a random sample of 20% of the textual material was re-coded by an independent rater (VA). The independent rater was experienced in qualitative analysis and psychological research but had no prior involvement in our study, as recommended by Krippendorff.[25] In cases of discrepancies between the two ratings, consensus was reached by discussion and adjustment of codes. For each of the three main categories, Cohen's kappa was calculated as a chance-adjusted between-rater agreement measure.[26] In the scope of this study, we specifically focused on the Amazonian treatments applied in the Takiwasi framework. Western methods used at the Takiwasi Center (such as psychotherapy) were therefore not probed for in the interviews, and not considered in the analysis. Similarly, aspects mentioned by expert practitioners as part of their personal medicinal repertoire but never applied at Takiwasi Center were also not considered in this analysis. With regard to identification of the main treatment constituent, participants were asked to indicate which of the Amazonian therapeutic methods they had mentioned was most important for SUD treatment. We encouraged expert practitioners to select one method if possible, but allowed multiple choices if necessary. Preferential choices per method were subsequently summed up and the main method identified on the basis of the majority rule.

Results

Sample characteristics are shown in Table 2. The age of the expert practitioners ranged between 35 and 86 years, with 15% (n=2) being female. The majority of experts were born (77%, n=10) and lived (93%, n=12) in South America, but there was diversity with respect to the sample's cultural background. All participants had received extensive training in one or several traditional systems of Amazonian medicine (e.g., Asháninca, Quechua-Lamas, Chazuta traditions), reporting an average of 28 years of traditional medical experience. It was not generally possible for respondents to separate the learning period from practice, since, as they explained, in Amazonian medicine the learning process occurs concurrently with and through practice. An extreme case was presented by one participant who had started his career in traditional medicine at age 14, and, during the interview, at age 86, insisted he was still learning. With regard to how they had acquired their expertise in SUDs, participants mentioned as their most important source of knowledge instruction by teacher plants (n=8; see below for the concept of teacher plants), years working at Takiwasi (n=6), instruction by senior practitioners of traditional Amazonian medicine (n=2), years of clinical work in other contexts (n=1), or their personal life experience (n=1). Most participants (69%, n=9) considered themselves to be a *curandero/a* (general practitioner) with one or more areas of specialization within traditional medicine, including the self-given labels of *ayahuasquero* (specializing in the use of medicines based on the *ayahuasca* plant, *Banisteriopsis caapi*; main alkaloids harmine, harmaline, and tetrahydroharmine), *perfumero/a* (specializing in the use of water-based therapies such as plant baths), *huachumero/a* (specializing in the use of medicines based on the *huachuma* plant, *Echinopsis pachanoi*; main alkaloid mescaline), *preparador de plantas* (specializing in the preparation of plant remedies), or *curioso/a* (general practitioner considered hierarchically below *curandero/a*). Besides their training in traditional Amazonian medicine, participants reported additional training and/or work experience in fields

Table 2 Sample characteristics (n=13)

	Mean (range)	n (%)
Sex		
Female		2 (15)
Male		11 (85)
Age at time of interview	52.2 (35-86)	
Years of experience in TAM	28 (6-74)	
Years working with Takiwasi	13 (2-22)	
Place of birth		
Peru		8 (61)
Colombia		1 (8)
Argentina		1 (8)
France		1 (8)
New Caledonia		1 (8)
Australia		1 (8)
Place of residence		
Peru		10 (77)
Colombia		1 (8)
Argentina		1 (8)
Australia		1 (8)
Ethnic affiliation, self-identified		
Peruvian mestizo		6 (46)
Indigenous Amazonian		3 (23)
Western		4 (31)
Specific TAM tradition trained in		
Asháninca		1 (8)
Quechua-Lamas		1 (8)
Chazuta		1 (8)
Putumayo		1 (8)
Various		9 (68)
Areas of medical specialization*		
Curandero		9 (69)
Ayahuasquero		9 (69)
Huachumero		2 (15)
Curioso		2 (15)
Perfumero		1 (8)
Preparador de plantas		1 (8)

TAM = Traditional Amazonian medicine.
* Most participants reported various areas of specialization simultaneously.

such as farming, gardening, nursing, social work, logging/carpentry, bodywork, psychology, and biomedicine.

The presentation of findings is structured along the three main categories defined in the analytic process. We found four codes within the first main category ''characteristic features and consequences of SUDs,'' seven codes in the second main category ''causes and antecedents of SUDs,'' and five codes in the third main category ''treatment methods for SUDs.'' Inter-rater reliability was excellent, with Cohen's kappa values of $\kappa = 0.87$, $\kappa = 0.81$, and $\kappa = 0.93$ (first, second, and third main category, respectively). In the following sections, the codes within each main category are presented by means of a condensed summary of statements per code, including citations that illustrate the thematic content. We followed Meuser & Nagel's[27] recommendation to stay as close as possible to the original material and wording used by the expert practitioners. The percentage of participants that raised concepts in each coding category and the total number of mentions per code are given in Table 3, the order of presentation reflecting level of prominence in the data per main category.

Main category 1: concepts regarding characteristic features and consequences of substance use disorders

Contextualization/label

Subsumed under this code are conceptual issues in which the health condition was tagged or embedded into a wider context. Most of the expert practitioners (85%, n=11) raised such meta-level aspects, commonly labeling SUD as ''a vice,'' ''an illness,'' or as ''a habit.'' SUDs were further classified as ''an illness of the soul,'' a ''spiritual illness,'' a ''cultural illness'' rather than an individual affliction, or ''primarily a Western problem'' not observed in more traditional societies until recently. Addiction or SUD was explained as ''one of the most difficult problems.''

Spiritual-energetic concepts

A majority of expert practitioners (62%, n=8) considered that there is a pronounced spiritual dimension to addictions. Some participants referred to a search for spiritual meaning or ''filling an existential void.'' Experts that mentioned this category generally spoke of spirits or disembodied entities involved in SUDs: entities which are ''negative,'' ''malefic'' or ''unhealthy'' were explained as pushing the person toward drug use or other (self-)destructive behaviors. One expert phrased it as follows: ''The addict is a person that has lost the connection to his soul, to his spirit, and he is inhabited by a spirit, an entity that leads him to destruction, towards death. [...] Addiction does not just imply the consumption of a substance, but also entering into an entire world – a world of transgressions, a world of lies, a world of pacts and obscure relationships. All of this has an impact on that person on the spiritual level, and the person ends up becoming a kind of marionette, manipulated by spirits.''

Psychosocial concepts

An equally large portion of expert practitioners (62%, n=8) discussed aspects of SUDs that can be classified as psychosocial in nature. Affective problems were commonly mentioned, and drug use was explained to often be an attempt to alleviate emotional difficulties. A general negativistic outlook was described, in which the person ''has lost all motivation and appreciation for life.'' Practitioners reported that an affected person typically ''feels well only when using drugs.'' Moreover, relational aspects were emphasized by some respondents, explaining that addicts have dysfunctional relationships with drugs, the environment, and themselves. Some experts pointed to irresponsible, deceitful or aggressive behaviors, for instance: ''persons with addictions show a lack of ability to respect limits and boundaries.''

Physical concepts

A number of expert practitioners (38%, n=5) considered it to be a basic feature of SUDs that the person's body is affected, but there were comparatively few mentions in this coding category. Practitioners explained that ''the

Table 3 Percentage of experts (n=13) who mentioned each category and number of mentions per category

Category	Experts/category n (%)	Mentions/category n
Characteristic features and consequences of SUDs	13 (100)	101
Contextualization/label	11 (85)	25
Spiritual-energetic concepts	8 (62)	33
Psychosocial concepts	8 (62)	34
Physical concepts	5 (38)	9
Causes and antecedents of SUDs	13 (100)	156
Familial and immediate social environment	13 (100)	37
Personality and emotional tendencies	11 (85)	30
Life stressors	8 (62)	19
Biological and hereditary factors	8 (62)	15
Spiritual-energetic antecedents	7 (54)	25
Larger sociocultural context	7 (54)	22
General remarks concerning causes	6 (46)	8
Treatment methods for SUDs	13 (100)	252
General treatment process and components	13 (100)	83
Healing ceremonies with teacher plants	13 (100)	54
Dietary retreats with teacher plants	12 (92)	40
Purging rituals with emetic plants	11 (85)	49
Further Amazonian modes of treatment	11 (85)	26

SUDs = substance use disorders.

body is contaminated'' or that ''there is physical deterioration,'' and that the condition may ultimately lead to death. It was furthermore suggested that SUD patients usually demonstrate ''a lack of connection with their own body.''

Main category 2: concepts regarding causes and antecedents of substance use disorders

Familial and immediate social environment

This code appeared in the causal explanations of all expert practitioners, and accounted for the largest number of mentions in this main category. Familial problems that were named to contribute to SUDs included a lack of love, care, or guidance from one's parents. Moreover, the absence of discipline in the family was suggested to play a role in the etiology of SUDs. Typical patterns of dysfunctional familial relationships were mentioned, as well as living with a person that uses drugs or alcohol, or peer pressure, for instance: "there are many reasons [for developing an addiction]; sometimes it is about choosing a friend, the friend that you don't know but you think he is your friend; the friend that makes you do things you shouldn't do, like drinking alcohol or smoking, or takes you to the discotheques where there is much risk." Another example: "It all depends on one's home, if one's home is well [...]. If a parent also has problems, a disorganized life – that's where it originates."

Personality and emotional tendencies

Statements about such tendencies featured prominently in the data, with 85% of experts (n=11) reporting at least one concept in this context. Emotional antecedents that were mentioned as causally linked to SUDs included anger, anxiety, or grief, but also low self-esteem and feelings of loneliness, separation, or not belonging. Personality traits included tendencies to curiosity, experimentation, looking for intense experiences, a lack of willpower, or a "childish rebelliousness." A disposition labeled as "being weak" was pointed to by several respondents: "some let themselves get carried away more than others; because there are many people that are very weak and allow the vice to dominate them too much."

Life stressors

Stressful life events were mentioned by a majority of expert practitioners (62%, n=8) as contributing to the development of SUDs. Common examples included traumatic experiences such as sexual violence and childhood abuse, but also disappointing events in the course of one's life: "Addiction sometimes comes because of a disappointment, I believe. [...] Personal problems, a disappointment at work, or disappointments in love life, or possibly also disappointments by ones' relatives."

Biological and hereditary factors

A majority of respondents (62%, n=8) suggested that biological factors play a role in the development of SUDs, referred to as "physiological disturbances," a "weak bodily system," "contaminated body," or genetic predispositions. One of the experts explained that heredity played an important role in SUDs which extended beyond the somatic level: "So there is an inheritance, I believe, something cross-generational, with a somatic part and a psychological part and a spiritual part." Another expert explained that "...the body of the person demands the liquor, he feels the need, because the body is contaminated, [the body] is sick."

Spiritual-energetic antecedents

Slightly more than half of the expert practitioners (54%, n=7) pointed to energetic or spiritual antecedents of addiction. These were described as "energetic disturbances," "energetic pathogens," or "malefic or unhealthy spirits that

can cause or exacerbate addictions.'' Several ways of acquiring these were proposed, among them ''relational imbalances between the human and the spirit world,'' ''spiritual transgressions,'' ''witchcraft,'' or ''the use of sacred plants in an incorrect way.'' One healer explained this in the following way: ''Often the Amazonian healers talk about the plants – because the plants have a spirit, a mother, and if one does not treat them with respect, the plants may punish the person, possess the person, rob the person's spirit.''

Larger sociocultural context

Sociocultural conditions that contribute to SUDs were brought up by about half of participants (54%, n=7). They included factors such as economic problems, a lack of social cohesion, a lack of future perspective, as well as certain occupational environments inherently associated with consumption (e.g., agricultural labor and alcohol). The experts explained that there are structures specific to Western society that seem to foster addictive tendencies, in particular the absence of sacred spaces and initiatory or healing rituals, which, according to the experts, are vital for well-being: ''[historically,] there had been a deliberate attempt to remove people from their culture and their culture's traditional mechanisms of healing, and that's the reason why in my experience there's subsequently so much addiction, because those methods of maintenance of the soul have been removed, and therefore the impact of this Western malaise of addiction is even greater, because there's no resistive process.''

General remarks concerning causes

All participants expressed a variety of causal factors for the development of SUD, while mono-causal explanations were absent in the data set. A number of participants (46%, n=6) explicitly addressed this, through statements such as ''it is a complex problem,'' ''there's a biological, a spiritual, and an energetic component,'' or ''it's multi-causal.''

Main category 3: concepts concerning treatment methods for substance use disorders

General treatment process and components

All participants raised concepts related to the general treatment process and its components. Three components were generally pointed out as main constituents: purging rituals, dietary retreats, and healing ceremonies. The expert practitioners reported the use of a variety of plants: ''Some clean, others purify, others open our understanding and knowledge.'' They emphasized that, to ensure safety and efficaciousness, these plants have to be applied in the correct manner, for which adherence to traditional ritual is critically important. A certain class of plants the healers referred to as ''teacher plants'' was reported to play a significant role in the treatment. One expert explained that these plants ''are teaching individuals to know themselves, to know their strengths and weaknesses, and to balance those.'' The plants in general were explained to show their effects slowly: ''The processes in traditional medicine are long, the healing occurs slowly.''

Healing ceremonies with teacher plants

All the respondents mentioned healing ceremonies involving specific teacher plants. The experts explained that the plant preparations used for such ceremonies at Takiwasi are chiefly *ayahuasca* and *purgahuasca* (the central ingredient of both being the vine *Banisteriopsis caapi)*. The experts described such ceremonies as following a prescribed ritual protocol that traditional healers guide by means of ''*icaros*'' (special healing songs) and other therapeutic measures. The respondents further described several behavioral and food restrictions that need to be observed in the context of such healing ceremonies. Several functions that these ceremonies may serve were mentioned, among them cleansing, becoming aware of previously unconscious aspects of self and life, or connecting with ''non-rational layers of experience, where one's deep suffering lies.'' Statements like ''the plants make you see what you have inside'' were common. In one expert's words: ''Generally speaking, a plant ceremony is like a large operating room. A very deep kind of energetic surgery is taking place. It is like restructuring, clearing the personal and then also transpersonal weights, inherited problems that one's family lineage may carry and that may create difficulties for the person now.''

Dietary retreats with teacher plants

Nearly all participants (92%, n=12) discussed traditional dietary retreats. The expert practitioners reported that this intervention involves spending time (usually 8 days) in an isolated hut in the forest while ingesting teacher plants. The traditional healer visits the patient three times a day to administer the medicines (prepared from teacher plants), attend to his needs, and supply basic food (plain rice and cooked green plantains). Patients are required to follow strict nutritional and behavioral rules during the retreat period; the experts emphasize the omission of salt, sugar, or spices, and restrictions on social contact, sexual activity, exposure to heat or cold, and toiletries. Some of these restrictions persist for several weeks after the retreat, albeit in an attenuated fashion. One expert described this process as a ''technology of use of medicinal plants.'' They explained that the person needs to be alone in nature and follow these rules so ''the plants can work'' and will not produce adverse effects. These are also the conditions that enable the plants to teach, say the experts, namely through dreams, visions, or sudden insights. The dietary retreat is described as an intense therapeutic process during which ''the strength of the [misused] drug gets liberated from the body.'' In one case the following description was given: ''Childhood problems may come to the surface. One meditates on that and frees oneself from it. The plants activate you, they extract from you, they make you see.''

Purging rituals with emetic plants

A large majority of participants (85%, n=11) mentioned purging rituals in which emetic plants are administered in a ritual setting. The experts reported that under the guidance of a traditional healer, the prescribed plant extract

is ingested along with several liters of water, which are subsequently purged. The experts explained that this is done to detoxify the body and alleviate withdrawal and drug craving. Other effects mentioned included "eliminating memory traces of the drugs from the body," "clearing energetic charges," "establishing a strong contact with one's body," or helping with anxiety. The expert practitioners explained that different purging plants have distinct properties, may act on specific bodily and/or psychological systems, and that effects are multi-layered: "The purging rituals act not only on a physical level, but also emotionally; when they vomit, they vomit not only the toxins, the substances, but also the anger, the rage, and also the spiritual part [...]. The purge is not just a mechanism of cleaning the organism from the drug or the alcohol, but everything gets cleansed at the same time, negative thoughts, emotions, and bad memories, as they say."

Further Amazonian modes of treatment

Other Amazonian techniques used for SUD treatment were reported by 85% of experts (n=11), among them plant baths, steam baths, techniques called "*sopladas*" and "*icaradas*," and the ingestion of tonic plant preparations on a daily basis. Plant baths and saunas are explained to aid the detoxification process and "help balance the person." The *sopladas* and *icaradas* were explained to involve "an intervention in the physical and energetic-spiritual body of the person" and also described as balancing. For example: "An *icaro*, a song the healer had received, is sung, and tobacco (*mapacho*) or perfume or cinnamon (*canela del monte*) or blessed water, according to what the healer senses, is applied on the body [of the patient] and the person becomes more balanced energetically." The song component of the described intervention is referred to as *icarada*, and is often applied in conjunction with a *soplada*, i.e., blowing tobacco, cinnamon, or medicinal liquids onto the patient's body.

Identification of the most important method for SUD

When asked which of the Amazonian therapeutic methods used at Takiwasi was most efficient for SUD treatment, most expert practitioners expressed that it was not a single method, but the interplay between the different methods and plants that was efficacious. For instance: "it's an integral, it's an ecosystem [...] so I really couldn't say that one is more or less important, I think they're all part of an integral system." We encouraged experts to nonetheless select one or a set of techniques, while allowing for multiple choices per participant. Summing preferential choices per method yielded a score of 5 for purging rituals, 7 for dietary retreats, 5 for healing ceremonies with *ayahuasca*, and 1 for ceremonies with *huachuma* (Figure 1). The latter, however, is not currently practiced at the Takiwasi Center and has only rarely been used there in the past.

Discussion

This study investigated illness concepts and therapies of traditional Amazonian medicine adapted to SUDs. Interviews with 13 expert practitioners revealed a multifaceted understanding of and treatment approach for SUDs. The experts pointed out a large spectrum of relevant aspects on different levels of analysis, including biological, psychosocial, sociocultural, and spiritual-energetic factors. The categories that emerged in the analysis bear resemblance to contemporary scientific concepts of SUDs which

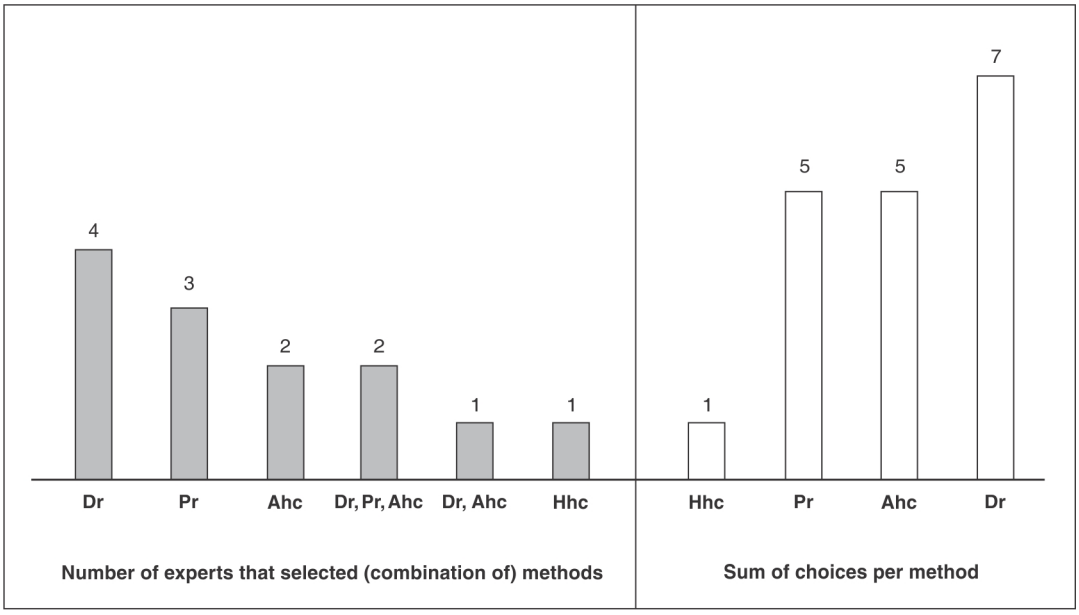

Figure 1 Identification of the main Amazonian interventions used in the context of substance use disorders according to 13 expert practitioners. Grey bars represent the number of experts that selected a given method, alone or in combination; white bars represent the sum of preferential choices per individual method. Ahc = *Ayahuasca* healing ceremonies; Dr = dietary retreats; Hhc = *Huachuma* healing ceremonies; Pr = purging rituals.

use a biopsychosocial explanatory framework. Such models outline how psychosocial factors (e.g., stressful life events), personality features (e.g., sensation-seeking), and contextual factors (e.g., the availability of drugs) interact with physiological predispositions and contribute to vulnerability to SUDs.[28,29] The expert practitioners discussed substance use as an attempt to regulate affective states, self-esteem, or interpersonal difficulties. This account matches the well-known self-medication hypothesis of SUDs, according to which drug use reflects an endeavor to assuage painful feelings.[30] Nevertheless, the Amazonian framework of understanding differs from the classical biopsychosocial approach with regard to some observations related to spiritual-energetic concepts. Certainly, the relevance of spirituality noted by the experts is in line with the worldwide spread of spiritually oriented approaches such as Alcoholics/Narcotics Anonymous and related 12-step interventions.[31] Such treatments are exceedingly common today, with evidence of beneficial effects,[32] and research investigating the significance of spirituality in these approaches relative to the perspective of traditional healing systems, such as the Amazonian one, would be of interest. Nonetheless, when spiritual-energetic factors refer to non-material forces or subtle energy processes, the Amazonian concepts diverge from the contemporary scientific understanding of SUD. Yet, since a substantial portion of expert accounts emphasized precisely these aspects, future studies should aim to further examine the nature and role of these processes in the Amazonian approach and their significance for treatment.

Regarding Amazonian therapies, the analysis revealed a wide range of methods for SUDs (see Table 4 for a general overview of treatment methods applied in the Takiwasi protocol). The main groups were purging rituals with emetic plants, dietary retreats with teacher plants, and healing ceremonies with teacher plants (for surveys on Peruvian medicinal plants, see Bussmann & Sharon[14] and Sanz-Biset et al.[33]). Clearly, the Amazonian therapeutic means differ markedly from Western ones, and call for further scientific study. Indeed, there has been an increase in scientific interest in these methods and specifically in the *ayahuasca* brew in recent decades (usually a combination of *Banisteriopsis caapi* and admixture plants, such as the dimethyltryptamine-containing *Psychotria viridis*), with a growing number of studies suggesting beneficial effects for psychosomatic problems, including substance use.[34-37] Interestingly, contrary to what this upsurge of specific interest in *ayahuasca* would imply, the view that Amazonian treatments need to be applied in conjunction with each other as an integral system prevailed in our sample. A small majority of expert practitioners considered dietary retreats with teacher plants to be especially important for SUD treatment, within the context of an overall view that all the components work together, and purging rituals were also among the top three components identified. However, systematic empirical research examining Amazonian methods other than *ayahuasca*, such as dietary retreats or purging rituals, is virtually nonexistent at present. An exception is the work of Sanz-Biset and Cañigueral[38,39] on what they termed "strict diets" and "depurative practices" for a wide range of mostly somatic ailments. These ethnopharmacological publications focus mainly on the description of plant specimens, but also include an account of dietary conditions required for some of the examined plants. Behavioral rules, such as certain food restrictions or mandatory social isolation, as mentioned in their work, broadly match the descriptions provided by our sample. Our results further indicate that these dietary conditions are considered necessary for both therapeutic efficiency and safety of the Amazonian plant medicines, as is the adherence to traditional ritual. Another ethnopharmacological study provides an account of Amazonian plant diets not as a therapeutic method, but as a tool for learning the trade of a traditional medical practitioner[40] (for the Amazonian concept of plants that teach medicine, see also[41]). Further research on therapeutic applications of those techniques in the context of psychosomatic problems and specifically SUDs is needed to elucidate the nature of these interventions, the mechanisms involved, and their short- and long-term effects. Since most expert practitioners explained that the efficacy of Amazonian treatments lies in their integral, systemic application, our findings imply that examining the treatment as a whole, rather than isolating its components, may be the most fruitful approach for study. This is in fact consistent with general methodological recommendations for clinical research on alternative medicines, as practitioners across traditions tend to maintain that the overall effect of their treatment does not necessarily equal the sum of its parts.[13,41] Similarly, since our results show that the experts consider the behavioral rules and the ritual component of Amazonian treatments as crucial for both efficiency and safety, these aspects should be included and further examined in future studies. At this stage, more in-depth qualitative research seems most suitable for this purpose.

Our strategy of encouraging participants to select a core treatment modality, despite the prevailing view that the treatment consisted of an integral system, unduly deemphasized the holistic nature of the treatment concepts and is thus a limitation of the present study. There are a number of further limitations. As mentioned earlier, our findings cannot be taken to reflect Amazonian medicine in a historically traditional sense, but represent a contemporary adaptation or hybridization thereof. Medical systems are cultural systems, which are subject to change and adjust dynamically to new contexts and influences.[42] Arguably, practitioners with less influence from Western society may

Table 4 General overview of methods applied in the Takiwasi treatment protocol

Main Amazonian methods
Purging rituals with emetic plants
Dietary retreats with teacher plants
Healing ceremonies with teacher plants
Main Western methods
Individual psychotherapy (e.g., Gestalt, Analytic)
Group psychotherapy (e.g., relapse prevention, psychodrama)
Milieu therapy
Occupational therapy
Biomedical health checks

still exist in remote rainforest areas, but for that very reason are unlikely to have had extensive experience with SUDs. Moreover, this study aimed to identify concepts within the scope of the Takiwasi treatment program. Our informants hence had to be knowledgeable in this specific implementation of traditional Amazonian medicine. However, this requirement at the same time limits the degree to which our findings can be generalized to represent Amazonian conceptions beyond that clinical context. Likewise, some of the participants had received Western health-related training in addition to the traditional Amazonian training, which may partially account for the coherence of their responses with Western concepts. The fact that our participants relied on Spanish terminology such as *curandero/a* to denote their profession also alludes to their embeddedness in a westernized cultural context, since these terms reflect a Hispanic redefinition of originally indigenous concepts and terminologies (e.g., unlike the Amazonian Trio tribe, which uses the term "*pijai*" rather than *curandero/a*[43]). Furthermore, we did not collect in-depth data on participants' characteristics, their cultural affiliation and proximity, their specific teachers, or their motives for working at Takiwasi. This would have facilitated contextualization of results and improved the understanding of these expert practitioners' roles within the cross-cultural medical context. We also did not elaborate on the background history of the Takiwasi Center and its evolution,[44] nor did we discuss the center's role as a boundary object (i.e., as an artifact acting at the boundary of different worlds and involved in the coordination between them[17,18]) in the wider sociocultural context, as this was beyond the scope of this work. Finally, we did not explore the experts' views on treatment success and retention in the interviews. Future studies should aim to do so and, if possible, compare these parameters to conventional SUD treatments, such as other therapeutic communities.

This was the first study to conduct expert interviews with this focus and thus to provide insight into a largely unexplored but promising approach. In view of the need for improved SUD treatments, alternative approaches such as the Amazonian one clearly warrant scientific attention. Our findings provide conceptual underpinnings for clinical efficacy studies of this treatment, as well as for investigating its transferability to other cultural contexts. Furthermore, understanding cultural convergences and differences with respect to underlying concepts may expand the cross-cultural understanding of SUDs and aid future cooperation between practitioners from biomedical and traditional systems. The Takiwasi approach may serve as a clinical example in this regard, as traditional healers apply their knowledge to a Western problem and join efforts with Western-trained health professionals, who in turn adopt practices from the traditional context. We are confident that this research will aid the development of enhanced SUD treatments that combine efficacious methods from both medical systems.

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Disclosure

The authors report no conflicts of interest.

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