


## EFFECTIVENESS OF AN ALTERNATIVE PROTOCOL TO FACE SUBSTANCE USE DISORDER AND SYMPTOMS OF COMORBID DEPRESSION

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### ABSTRACT

Introduction: There is scarcity of studies in the national and international literature on alternative protocols to pharmacological and psychotherapeutic intervention for the treatment of Substance Use Disorder (SUD) and symptoms of comorbid depression. This study aimed to develop a protocol based on alternative therapies through mindfulness meditation, reiki, acupuncture and auriculotherapy to improve substance use problems and symptoms of comorbid depression. Method: This is a randomized single-blind controlled study. The final sample consisted of 18 participants randomized divided into two groups of nine participants: experimental and control. Participants were evaluated by four validated instruments during the screening process and after the intervention. The instruments were: Beck Depression Scale (BDI), Depression, Anxiety and Stress Scale (DASS-21), Alcohol Use Disorders Identification Test (AUDIT), Drug Abuse Screening Test (DAST-10) and Brazilian Economic Classification Criteria (CCEB). Results: the results of the analysis indicate a significant reduction in the pattern of alcohol consumption ( $p < 0.001$ ); other drugs related problems ( $p < 0.001$ ); symptoms of depression ( $p < 0.001$ ); anxiety ( $p < 0.001$ ) and stress ( $p < 0.001$ ) between the two distinct groups (experimental and control) after the intervention. Conclusion: The protocol proposed in this study was effective in reducing the pattern of problems related to alcohol and other drugs, in addition to being effective in reducing symptoms of depression, stress and anxiety.

**Keywords:** Substance Use Disorder. Depressive Symptoms. Alternative Treatment. Alternative Therapy.

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## INTRODUCTION

Substance Use Disorder (SUD) triggers physical and mental problems as a result of substance abuse and its abstinence (Volkow & Blanco, 2023). Depressive symptom is one of the most frequent symptoms among those with SUD, with high rate of comorbidity between them (Saffari et al., 2022).

Data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) highlight the significant overlap between depressive disorders and alcohol use disorder (AUD). Major depressive disorder frequently co-occurs with AUD, with affected individuals being 2.3 times more likely to experience depression within the past year. Approximately 33% of patients seeking treatment for AUD also meet the criteria for major depressive disorder. Those diagnosed with alcohol dependence have an even higher likelihood of experiencing major depression. While substance-induced depression is less common in the general population, it appears more frequently among individuals in treatment. The diagnosis and management of these co-occurring disorders pose challenges due to symptom overlap (Alcohol Use Disorder and Depressive Disorders - Alcohol Research: Current Reviews, 2019).

SUD and depression have many similarities in their neurobiological circuits and reward pathways as well many vulnerabilities and risk factors in common. In this sense, depression may be a risk for SUD and SUD may be a risk for depression. Moreover, recurrent substance use problems and the long-term use of it can increase the risk of depressive symptoms (McHugh, 2019). Additionally, the presence of depressive symptoms among those with SUD may not favor the adherence to SUD treatment conducting them to a poorer outcome (Calarco & Lobo, 2021).

The main treatment of SUD and symptoms of comorbid depression occurs through medication prescribed according to the biomedical model of pharmacological treatment, which mainly treats the symptoms and clinical manifestations of these disorders (Grau-López et al., 2018; McIntyre et al., 2017). On SUD treatment, the main aim is relieving the user's drug problems or self-controlled its use (Walker et al., 2018).

However, these medications have adverse effects that could not favor the adherence to the treatment of SUD (Kranzler & Soyka, 2018) and comorbid depression (Strawn, Mills, Poweleit, Ramsey, & Croarkin, 2023). In addition, the use of antidepressants in this population can trigger a dangerous interaction with the abuse of alcohol or other drugs besides a risk of antidepressants misuse and abuse (Carey, 2018).

On the other hand, there are no reports of adverse effects by using alternative therapeutic techniques as those tested in this study (Cherkin et al., 2016). Another advantage of using these techniques is that they treat physical symptoms and also emotional ones (Sun et al., 2022). These techniques can be considered as an important alternative treatment for SUD and symptoms of comorbid depression among those who have low adherence to the traditional treatment or even as a complementary treatment.

Therefore, the choice of these techniques was based on the fact that they have already been studied individually and have been shown to be effective in reducing drug and alcohol use (Lee, Lee B, Kim, Yang, 2021), in reducing the withdrawal symptoms, craving or fissure among heroin dependents (Ge et al, 2020; Kwon et at., 2022; Wen et al., 2021), reducing alcohol or other drugs related problems among dependent ones (Zhao, Tong, & Wang, 2021) and improve symptoms of comorbid depression (Fujisaki, 2020). However, these therapies were not tested as a concomitant intervention yet.

The practice of Mindfulness meditation has been used to treat symptoms of depression and anxiety (Fujisaki, 2020); to reduce drug use (Krishnan, 2022); and to modify the dysregulation of behavior among those with alcohol and drug use problem (Demina et al., 2023). The action of Mindfulness meditation occurs through the practice of psychoeducational exercises used to achieve the proposed goals, directing the focus of attention to breathing (Swargiary & Roy, 2024).

Acupuncture is another technique that has shown efficacy to treat the symptoms of depression (Bailey, 2022), in reducing clinical symptoms of alcohol craving ( Wen et al., 2021; Kwon et at., 2022). Acupuncture treatment uses needle insertion into specific body "acupoints," which are determined through the practitioner's diagnosis to achieve therapeutic or analgesic effects on the unit channels to treat physical and emotional disease (Wang, Wu, Abel, Hsieh, & Kung, 2022).

Auriculotherapy is a therapy that has been used for some symptoms of mental disorders (Munhoz et al., 2022). Studies have shown that the use of Auriculotherapy may help in the treatment of stress and general promotion of well-being (Moura et al., 2023); relaxation of body and mind related to sleep disorders (Hu et al., 2023); and anxiety (Carina et al., 2023). In this technique, needles or seeds are applied in the auricle to stimulate the points to be used for treatment (Morais et al., 2023).

Reiki was the fourth therapy used in the alternative protocol in this study. The main purpose of using universal energy Reiki is to promote healing in the physical, mental and

emotional body in humans (Winters, 2023). There is some literature that has verified the effectiveness of Reiki in the treatment of symptoms of depression and stress (Morero et al., 2021); of anxiety (Guo et al., 2024). However, there is a scarce literature that has evaluated the effectiveness of the Reiki in the treatment of SUD and symptoms of comorbid depression, and this paper would be important to support another research on the same subject.

This study reinforces the importance of evaluating alternative protocols for the treatment of SUD with symptoms of comorbid depression. Previous study evaluated the effect of this same protocol on individuals with depressive symptoms with no SUD. Results showed a significant reduction of depressive symptoms after the intervention (Cardozo-Batista & Tucci, 2020). There was no publication that addressed multiple alternative techniques to coping with the problems arising from SUD and symptoms of comorbid depression. In addition, it is expected that the results of the present study can be replicated at other treatment sites for this population for harm reduction or even as a complementary or to substitute traditional treatment based on medication for those who do not adhere to it.

In this sense, the main objective of this study was to elaborate and evaluate the effectiveness of a protocol based on alternative therapies to pharmacological and psychotherapeutic treatments through Mindfulness, Reiki, Acupuncture and Auriculotherapy in the treatment of SUD and symptoms of comorbid depression. Specific aims were also to evaluate the symptoms of anxiety and stress among those individuals before and after the application of the intervention protocol.

The hypothesis of this research was that the approach through these techniques should be effective in reducing the abuse of alcohol or other substances and their related problems, as well to face the symptoms of depression among those with SUD.

## **METHODS**

This is a randomized single-blind controlled study.

## **PARTICIPANTS**

Participants were captured as follows: the researcher recorded a video on social networks offering a free intervention for the treatment of alcohol or drug abuse and depression symptoms comorbid; production of flyer-invitation, disseminated by e-mail and by social networks; lectures on drug and alcohol problems and depression for employees of

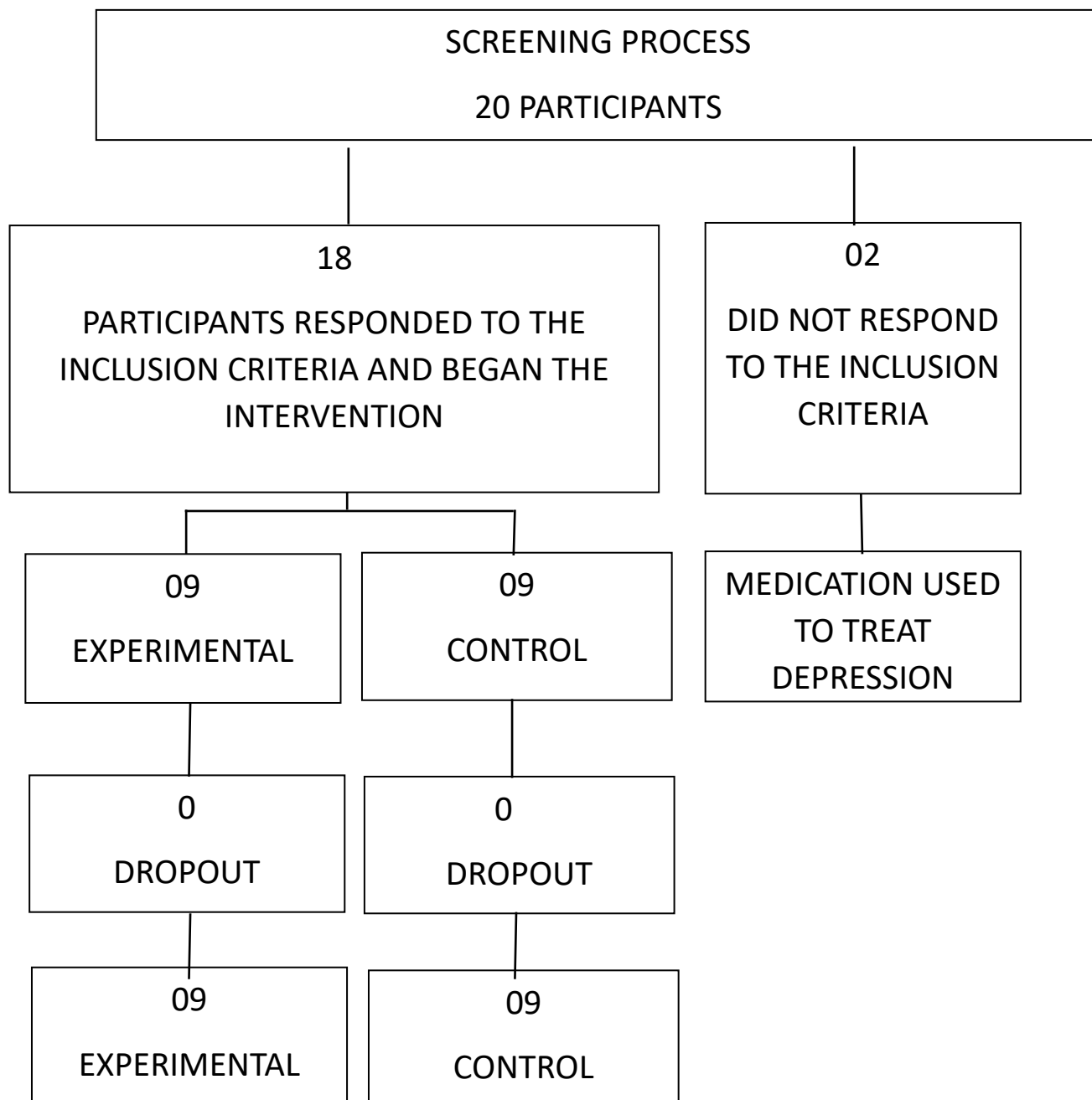
a hypermarket in a city of south coast of São Paulo state, Brazil, and disclosure to academics of a private college in the same city. Additionally, the data were collected and the intervention was performed in a non-profit studio, provided by an institution in this city.

The inclusion criteria in the study were: both gender, over 18 years of age, responding to the minimum criteria for mild to moderate depression (scoring 10 or higher) by the Brazilian version of Beck Depression Inventory (BDI) (Gorenstein & Andrade, 1996) and minimum of risky alcohol use (scoring 8 or higher), by the Alcohol Use Disorders Identification Test (AUDIT) (Babor et al., 2001) or minimum of moderate problems related to others drug use (scoring 3 or higher), evaluated by the Drug Abuse Screening Test (DAST-10) (Skinner, 1982); to accept the treatment through the four alternative therapy, being: Mindfulness meditation, Reiki, Acupuncture and Auriculotherapy; not being on medication for the treatment of symptoms of depression or anxiety or any other mental health problem and not performing psychological treatment or other treatment alternatives to the pharmacotherapeutic or psychotherapeutic.

## COLLECT DATA PROCESS

Figure 1 represents the flowchart of collect data process. The screening process started with 20 participants who watched the video broadcast on social networks and referred themselves as responding to depression criteria and under alcohol or other drugs abusive use. The instruments were applied to the 20 participants and 18 fulfilled the criteria for inclusion in the study. Two participants were excluded because they were under the use of antidepressant.

Figure 1 – Flowchart of collect data process



The selection for participation in the study in the experimental or control groups was randomized and a dice was used as criterion to determine which group the participant would be inserted: if the result was an even number, the participant would be inserted in the experimental group and, if it resulted in an odd number, the participant would be inserted into the control group. The final sample was 18 participants: nine were included in the experimental group, and nine, in the control group.

## INSTRUMENTS

Two instruments, in addition to those mentioned in the study inclusion criteria, were used before the intervention: the Brazilian Economic Classification Criteria (CCEB) (IBGE, 2011) and a socio-demographic instrument, developed by the researcher to characterize sociodemographic variables.

During the pre-intervention period, five instruments were used:

- Alcohol Use Disorders Identification Test (AUDIT): this instrument was developed by the World Health Organization (Babor et al., 2001) and validated in Brazil in 1999 (Lima et al., 2005). AUDIT is an instrument that aims to identify the pattern of alcohol consumption in the past twelve months. The pattern of alcohol consumption is classified into four “Zones”. Zone I: low risk consumption (0 to 7 points); Zone II: risky consumption (8 to 15 points); Zone III: harmful consumption (16 to 19 points) and Zone IV: probable dependence (above 20 points) (Lima et al., 2005).
- Drug Abuse Screening Test (DAST-10): this instrument assesses the level of problems related to illicit drug abuse in the past twelve months. This instrument has not yet been validated for Brazil; however, it was opted for its use due to its similarity in the form of evaluation with AUDIT. The total score of the instrument can vary between 0 and 10, with 0 = no reported problems, 1-2 = low problem level, 3-5 = moderate problem level, 6-8 = substantial problem level and 9-10 = serious problem level. The DAST-10 was used to verify the problems associated with illicit drug abuse before and after the intervention to verify its effectiveness in improving these problems (Skinner, 1982).
- Beck Depression Inventory (BDI) was developed to assess “negative cognition”, persistent negative thoughts and the intensity of negative feelings during the past 12 months. The questions assess, among others, mood, negative feelings such as: failure, guilt, self-punishment, irritability; sleep pattern disturbances and insomnia, loss of libido and weight gain or loss. Each question is evaluated using a “likert” scale ranging from zero to three, with zero being the absence of the symptom or behaviour evaluated and three, the greater severity of the symptom or behaviour (Beck, 1961) The classification is given by the sum of the scores obtained in each question; less than nine are characterized by absence of depression; between 10 and 18, mild to moderate depression; between 19 and

- 29, moderate to severe depression; and between 30 and 63, severe depression (Beck et al., 1988).
- Depression, Anxiety and Stress Scale-21 (DASS-21), validated in Brazil by Vignola and Tucci (2014). The DASS assesses symptoms of depression, anxiety and stress using a scale of 21 questions, which are divided into three subscales of seven questions each, with a total of 21 points for each subscale. The sum of score of each sub-scale must be multiplied by two to get the final score and the classification proposed by the authors of the dass-21 (Lovibond & Lovibond, 1995). The higher score on the subscales, the worse the symptoms evaluated (Vignola & Tucci, 2014).
  - Brazilian Economic Classification Criteria (CCEB): it was used to assess economic class, according to the Brazilian Institute of Geography and Statistics (IBGE, 2011). The instrument assesses the availability of some household items, such as: number of bathrooms, domestic appliance, electronics, automobile; maid, home provider education level, etc. The final classification of the CCBE is carried out by class. The highest class is titled "A" and the lowest is "E". In addition, another instrument was developed by the researcher to evaluate some sociodemographic variables, such as: fictional name, age, gender, marital status, race, education and profession.

## THERAPIES PROTOCOL

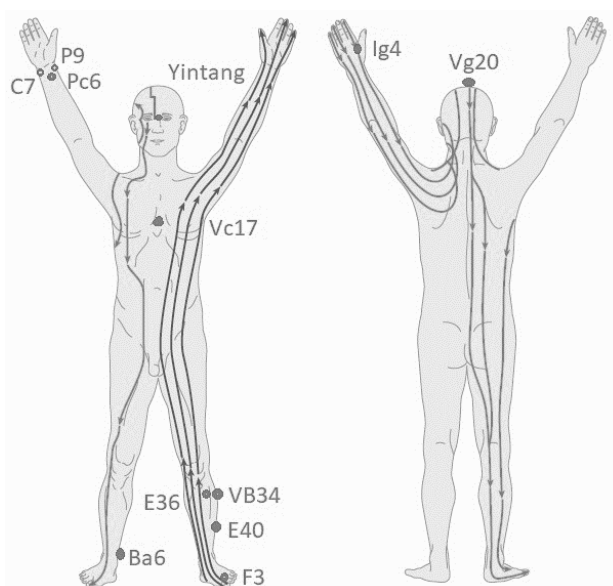
In order to carry out the therapies, the researcher previously had professional training in Mindfulness meditation, Reiki level I, II, III (last level) and master's degree in Reiki; postgraduate in Chinese medicine: Acupuncture and Auriculotherapy. All participants in the experimental group received all the techniques performed by the researcher during the eight intervention sessions, once a week. The total duration of each session was one hour and five minutes.

The proposed intervention protocol was as follows: the first intervention technique of the proposed protocol was Mindfulness meditation developed by the researcher from his experience working with meditative processes in healing. An audio was recorded with the process of meditation focused on breathing and perception of the sensations present during this process. The duration was twenty minutes and it was applied in all sessions.



The second intervention technique of the proposed protocol was Acupuncture. The Acupuncture protocol was developed through some points based on scientific studies (Ling et al., 2016). The needle used was 0.25x40 in length for all Acupuncture points and the insertion varied according to what is recommended at each point. Thus, the participants of the present study received Acupuncture intervention in the following points, illustrated below in Figure 2.

Figure 2. Points used in Acupuncture intervention



A total of 12 needles were used in the treatment of each participant, and they remained with the needles for thirty minutes. In all sessions, the same protocol was used.

The third intervention technique of the proposed protocol was Reiki. The participants received the Universal Energy Reiki in the seven main chakras, being: Crown chakra, frontal, laryngeal, cardiac, solar plexus, umbilical and basic. Each chakra application of Reiki had the duration of at least one minute and ten minutes for the total of the application in all the chakras.

The fourth intervention technique of the proposed protocol was Auriculotherapy. After the thirty minutes of application of the techniques described in items two and three, the participant received Auriculotherapy, as described by Sasaki (2014). The points used were adapted for Auriculotherapy seeds and they were: shenmen (mirrored), heart, spleen, liver, lung, kidney, adrenal, mouth, anxiety (mirrored). It was used mustard seeds with the micropore skin color for fixation.

The Auriculotherapy application lasted between three and five minutes. The seeds remained in the ear as a continuation treatment until the next session. If during this period any seed had been lost, it was not a problem for the intervention because during the intervention the main stimulus had been made in the ear.

All procedures were followed according to this protocol during all eight sessions in which the proposed intervention techniques occurred.

## STATISTICAL ANALYSIS

The response variable considered for the sample design was BDI total score. It was considered as initial information that the expected difference under the intervention effect hypothesis was 10 points, while the change in the control group was zero point. To have a power greater than 0.80 and considering a significance level of 0.05, the minimum sample size should be six individuals per group.

In order to verify whether the groups were homogeneous, Fischer's exact test was used to verify association between socioeconomic and demographic variables and group (Neter & Wasserman, 1996). The results obtained found that there were no differences between group and gender ( $p = 0.33$ ), group and race ( $p = 0.99$ ), group and marital status ( $p = 0.15$ ), group and level of education ( $p = 0.77$ ), and group and CCEB economic classification ( $p = 0.50$ ). To compare age between experimental and control groups, Student's t test for unrelated samples was used. The result showed that there was no difference between groups ( $p = 0.21$ ).

To test the response-variables behavior in relation to the evaluation of alcohol use pattern (AUDIT), problems related to drug use (DAST-10), depressive symptoms (BDI), anxiety (DASS anxiety subscale), stress (DASS stress subscale), and depression (DASS depression subscale) in relation to the group, treatment and evaluation, the model of analysis of variance with repeated measures was used and after that, multiple comparisons of Bonferroni (Neter & Wasserman, 1996). Exact values of  $p$  were obtained from the tests whenever possible and necessary. All the alternative hypotheses formulated were two-tailed. Statistical analysis was performed using the R statistical program (R Core Team, 2017) and the minimum level of significance of 5% was adopted.

## ETHICAL ISSUES

In order to uphold resolution 466/2012 of the National Research Ethics Committee for Research with Human Beings, all participants signed the Free and Informed Consent Form and the research was approved by the Research Ethics Committee of the Federal University of São Paulo (CAAE: 57751816.0.0000.5505).

## RESULTS

Table 1 shows the socioeconomic and demographic data of the participants of the groups. The sample in the experimental group had a higher frequency of female participants (N = 5; 55,6%), single (N = 7; 77,8%); White Caucasian (N = 6; 66,7%); with high school completed (N=6; 66,7) and from economy class B2 (N = 4; 44,4%). The sample in the control group had a higher frequency of male participants (N = 7; 77,8%), married (N = 6; 66,7%); White Caucasian (N = 6; 66,7%); with high school completed (N=5; 55,6%) and economy class B2 (N = 7; 77,8%).

Table 1 – Sociodemographic characteristics of participants with SUD and comorbid depression according to experimental or control groups

	Experimental N = 9 N (%)	Control N = 9 N (%)
Gender <sup>a</sup>		
Female	5 (55.6)	2 (22.2)
Male	4 (44.4)	7 (77.8)
Marital Status <sup>a</sup>		
Single	7 (77.8)	3 (33.3)
Married	2 (22.2)	6 (66.7)
Widower	0	0
Divorced	0	0
Race <sup>a</sup>		
White Caucasian	6 (66.7)	6 (66.7)
African Descendent	0	2 (22.2)
Mulatto	3 (33.3)	1 (11.3)
Schooling <sup>a</sup>		
Elementary school	2 (22.2)	1 (9,1)
High school complete	6 (66.7)	5 (55.6)
Higher education incomplete	1 (11.1)	2 (22.2)
Higher education complete	0	1 (9.1)
The Brazilian Economic Classification Criterion <sup>a</sup>		
A1	1 (11,1)	0
B1	(11.1)	1 (11.1)
B2	4 (44.4)	7 (77.8)
C1	3 (33.4)	1 (11.1)
C2	0	0
Age in years (media; sd) <sup>b</sup>	36,00 ±8,11	31,00±8,19

sd= Standard Deviation.

<sup>a</sup> Fischer's Exact Test.

<sup>b</sup> Student's t Test for Unrelated Samples

Table 2 presents the results of the AUDIT, DAST-10, BDI and DASS-21 subscales at the pre-intervention and post-intervention moments.

Table 2 - Result of the model of analysis of variance with repeated measures and multiple comparisons of Bonferroni of AUDIT, DASS-10, BDI, and DASS-21 subscales of participants with SUD and comorbid depression according to experimental or control groups

	SUD and comorbid depression (mean; sd <sup>**</sup> )	
	Experimental	Control
Audit pre	10.33; 1.15	11.00; 0.71
Audit post <sup>b</sup>	2.33; 0.58 <sup>a</sup>	11.00; 1.73
Dast 10 pre	6.29; 0.76	6.00; 0.76
Dast 10 post <sup>b</sup>	2.29; 0.49 <sup>a</sup>	6.13; 0.99
BDI pre	29.92; 5.85	32.78; 12.39
BDI post	14.25; 4.96 <sup>a</sup>	32.67; 10.87
Anxiety pre	8.78; 5.07	11.44; 5.57
Anxiety post <sup>b</sup>	4.67; 2.50 <sup>a</sup>	11.56; 5.70
Stress pre	11.56; 3.97	16.44; 9.61
Stress post <sup>b</sup>	7.11; 3.66 <sup>a</sup>	16.33; 9.10
Depression pre	12.44; 3.61	10.44; 4.28
Depression post <sup>b</sup>	4.78; 2.54 <sup>a</sup>	10.78; 4.09

<sup>a</sup>Significant association when comparing the pre and post intervention moments (intra group) ( $p < 0.001$ );

<sup>b</sup> Significant association when comparing experimental and control group ( $p < 0.001$ );

\*\* sd = Standard Deviation.

Between the groups, it was not detected differences related to the pre-intervention moment in relation to AUDIT and DAST scores. The same result was found regarding alcohol consumption pattern and level of problems related to illicit drug abuse. According to the classification of AUDIT, the pattern of alcohol consumption, in both groups, was characterized by risk consumption (zone II) before the intervention. In relation to DAST classification, both groups were characterized by moderate level of problem before the intervention.

Significant difference was found in the intragroup analysis, performed to compare the pattern of alcohol consumption (AUDIT) between the two groups after the intervention ( $p < 0.001$ ). Experimental group showed a pattern of alcohol consumption characterized by low risk (zone I), while, in the control group, it was not detected change after the intervention

In relation to DAST-10, it was also found a significant difference between the pre- and post-intervention moments among the experimental group ( $p < 0.001$ ). The participants of this group showed a low level of illicit drug problems after the intervention. However, there was no difference among the control group when the two moments were compared.

Between the groups, it was not detected differences related to the pre-intervention moment in relation to BDI and DASS subscales mean scores.

The intragroup analyses, performed to compare the two distinctive groups (experimental and control) before and after the intervention indicate reduction in the symptoms of depression, evaluated by BDI ( $p < 0.001$ ) and symptoms evaluated by DASS subscales: depression ( $p < 0.001$ ); anxiety ( $p < 0.01$ ) and stress ( $p < 0.01$ ). On the other hand, no significant difference was detected in the control group when these two moments of evaluation were compared.

According to the classification adopted in the BDI instrument, the experimental group presented a moderate to severe level of depression before the intervention and; after the intervention, it presented a mild to moderate level. The control group was characterized by the level of severe depression, both before and after the intervention in the experimental group.

## **DISCUSSION**

Due to the lack of studies that evaluated alternative techniques in the treatment of SUD and symptoms of comorbid depression, the main objective of this study was to elaborate and evaluate the efficacy of a protocol based on alternative therapies to pharmacological and psychotherapeutic techniques: Mindfulness, Reiki, Acupuncture and Auriculotherapy to cope with SUD and comorbid depression.

The results found in the present study indicate that the protocol used was effective to reduce alcohol use pattern and other drugs-related problems. The results also showed that the protocol was effective to reduce the symptoms of depression, stress and anxiety among individuals with SUD. Thus, the hypothesis of the present study was confirmed.

The techniques used in the present study have also been shown to be effective in the treatment of those with SUD. The literature has pointed to the effectiveness of applying some of the alternative techniques used to deal with problems related to alcohol, other drugs use, problems related to drug abstinence, craving, prevention of relapse and among the techniques used in the present study, Acupuncture is the most used to deal with SUD and also depressive symptoms (Ge et al, 2020; Lee, Lee B, Kim, Yang, 2021; Wen et al., 2021; Zhao, Tong, & Wang, 2021; Kwon et al., 2022).

Auriculotherapy has also shown important results in sleep quality, promoting of well-being, anxiety (Moura et al., 2023; Hu et al., 2023; Carina et al., 2023) coping with

withdrawal and fissure symptoms among users of alcohol or other drugs, reducing the desire for consumption and helping to maintain abstinence (Lee, 2022).

Regarding Mindfulness meditation, it was significant to reduce alcohol and drug use (Krishnan, 2022; Demina et al., 2023) and depression and anxiety (Fujisaki, 2020).

Many people seek the use of the substance to resolve emotional problems and internal conflicts before establishing physical or psychological dependence on the substance (Mahadevan). In this sense, substance use can be understood as self-medication, as a strategy for coping with emotional and internal conflicts. However, long-term use of drugs can alter the relationship between the individual and the drug used. Thus, the search for feelings of pleasure and momentary relief from suffering could lead the individual to increasingly consume the drug or, later, to relieve withdrawal symptoms establishing a dependence (Semaan & Khan, 2023). In this sense, it is important to test other forms of SUD treatment using alternative techniques instead of using medications, as these individuals can also abuse them (Carey, 2018).

In addition to the effects on alcohol pattern and drug-related problems, techniques used in the present study have shown significant effect in treating symptoms of depression, stress and anxiety, negative effects that are important triggers to substance abuse Novaes et al., 2018; Obeid et al., 2020; Hu et al., 2023; Moura et al., 2023). In this direction, these symptoms can be considered as high-risk triggers for relapse in drug abuse (Obeid et al., 2020; Peirce et al., 2020).

Abstinence period also triggers symptoms of depression, stress and anxiety during drug craving (Asensio et al., 2020). In this context, in order to reduce the harms and risk factors associated with SUD, the reduction of depression, stress and anxiety through the alternative techniques proposed in this treatment protocol seems to favor a healthy and effective coping with SUD (Wen et al., 2021; Zhao, Tong, & Wang, 2021; Kwon et al., 2022; Guo et al., 2024).

Although the results of the present study showed a significant effect of the alternative protocol used to treat SUD and comorbid depression, there are some limitations that should be pointed. Human being is subject to suggestibility in any clinical intervention. The suggestibility would be the patient's belief that something positive will happen (Raver et al., 2023). In the present study, it was not possible to rule out the hypothesis that the results of the participants of the experimental group were influenced by suggestibility, even though the application of the techniques according to scientific orientation. However, there are

clinical studies that also showed significant results with the use of the same techniques that were used in this study (Munhoz et al., 2022; Kwon et al., 2022).

The study did not assess the qualitative data or had feedback about the clinical improvement of participants during the interventions. Thus, it is suggested that other studies can evaluate the perception of the participants regarding the feelings and improvement in the clinical picture of both drug abuse and depression comorbid. Additionally, it is not possible to know which technique produced more significant results due to the fact of using multiple approaches. Therefore, it is suggested that other studies may evaluate separately the effects of each of the techniques used in this protocol.

Finally, it was not possible to carry out a double-blind study because the first author performed all the intervention techniques alone and there were no partners trained in the four techniques for helping in the proceeding. Thus, it is recommended that future studies develop a double-blind study to test the applied protocol.

Although there are the limitations mentioned above, the results found in this study may contribute to other research that seeks the treatment of SUD and symptoms of depression comorbid without the use of medications that have adverse effects or even as an additional tool in a more traditional treatment, contributing to this area of knowledge.

## **CONCLUSION**

It is concluded, from the results of this study, that the alternative protocol intervention proposed was effective in reducing alcohol use pattern and other drugs-related problems. Moreover, this alternative protocol intervention reduced the symptoms of depression comorbid among them and improved stress and anxiety symptoms, important risk factors for SUD and for the treatment outcome.

## **FUNDING**

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