

The Therapeutic Effect and Potential Application of Psilocybin

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Abstract. Mental illness is a hot topic of concern worldwide. The psilocybin has great potential in the treatment of mental disorders, but there is still a research gap on whether it can truly be applied in the treatment of mental disorders. Therefore, this research explores the feasibility of psilocybin's true application in the treatment of mental disorders by collecting relevant literature on its experiments in recent years, analyzing the data and experimental results in detail. Research has found that in the treatment of mental disorders, psilocybin does have significant effects compared to traditional drugs. Psilocybin's role is more pronounced in cancer patients with more severe and complex mental disorders, greatly reducing their depression index and effectively controlling the condition of substance abuse patients. And through popular science, some healthcare professionals who care for patients with eating disorders hope to apply psilocybin for treatment. Psilocybin also does have certain unresolved side effects. Overall, from a scientific perspective, psilocybin can indeed effectively treat mental illnesses, and morally speaking, healthcare professionals are willing to introduce psilocybin into the treatment of patients with mental illnesses. One day, when psilocybin is widely used to treat mental illnesses, it will be a significant progress in medical history.

Keywords: Psilocybin; Mental illness; Treatment.

1. Introduction

Mushrooms are very popular food, and their presence can be seen in many dishes. At the same time, there is always a sense of fear towards mushrooms, as every year there are incidents of toxic mushroom poisoning, resulting in many deaths. In order to explore the mystery of poisonous mushrooms, scientists made unexpected discoveries through further research. One of the toxic mushrooms is the psilocybe, which contains psilocybin, which can cause hallucinations. However, research has also found that psilocybin has a positive impact on healthcare, especially when it comes to mental illness, for example obsessive-compulsive disorder (OCD), depression, and substance use disorders (namely alcohol and cigarette use). Modern medicine increasingly values psychiatry, but due to a certain lack of understanding among a substantial amount of people about mental illness and the fact that mental illness is generally caused by brain disorders, few mental illnesses can be completely eradicated through medication. Moreover, severe mental illness can cause dual psychological and physiological torment to patients, causing them to be unable to work and live normally. Some patients may also engage in life-threatening behaviors such as self-harm and suicide, and even endanger the lives of others in society. According to the report of Buenos Aires Economic News Network on September 27, 2019, depression will become the first major cause of disability by 2030 without considering socio-economic level, country, belief, culture and other factors. The discovery and further experiments of psilocybin extract have brought hope for better treatment of severe mental illness and it also plays an extremely important role in the field of mental illness medicine. Psilocybin is one of the least dangerous central nervous system medications known, with a very minimal addiction potential.

There has been significant progress in treating mental illness. By 2005, about 2,000 subjects had been treated for psychotherapy in clinical studies of psilocybin. In recent years, the number of participants has increased sharply compared to before 2005 [1]. Psychedelic treatment has garnered increased attention as a mental intervention measure in recent years furthermore, with 10 published clinical trials demonstrating its high efficacy in treating depression symptoms (such as Carhart Harris, 2016; Ross, 2016; Goldberg, Pace, Nicholas, Raison, and Hutson, 2020; Davis, 2021; Goodwin, 2022; Sloshower, 2023). Psilocybin adjuvant therapy (PAP) may have gotten the most interest, with some

modest trials looking into its usefulness in the treatment of mild to severe depression. There are other approaches, such as the research in which moderate dosages of psilocybin were administered to participants who had severe depression with an acceptable degree of risk. To investigate the impact of psilocybin to mental illness by following up with beck depression inventory (BDI) [2] and state-trait anxiety inventory (STAI) [3] and other efficacy measures.

This research will summarize the mechanism of psilocybin and how it is metabolized by the human body to better understand how psilocybin can play a significant role in medical treatment, as well as compare different methods, experimental data, and conclusions of psilocybin experiments in the literature to analyze the application of psilocybin in medical treatment, particularly in mental diseases. Whether the advantages outweigh the disadvantages or the disadvantages outweigh the advantages. The method is to find papers on the google scholar, compare and analyze the conclusions obtained from the valid data, and exclude the conclusions obtained from some experimental data such as too few experiments, no t-test and other statistic test, no control variables and so on.

2. Therapeutic Effect of Psilocybin

2.1. Treatment of cancer, depression, and anxiety disorders

In the research, the first article briefly discusses the mechanism of the successful anti-depression effect of psilocybin and its mechanism in the human body. It focuses on analyzing five experiments on the anti-depression effect of psilocybin and points out which areas in the current research on psilocybin are worth improving.

Regarding the mechanism of psilocybin, the research has been investigated, which is based on 16 patients with refractory depression before and after using psilocybin and concludes that psilocybin can reduce cerebral blood flow [4]. And another research has been also investigated, which is based on 19 patients with refractory depression who used a small amount of psilocybin in psychotherapy and concluded that psilocybin had different effects on the human body compared to traditional antidepressants [5]. Five experiments on the positive effects of psilocybin on depression, with a focus on analyzing two of them.

Davis et al. roughly divided 24 patients with severe depression into two groups: the groups receiving prompt treatment and those receiving delayed treatment [6]. Patients in the group receiving rapid therapy received 20 mg/70 kg of psilocybin one week earlier than those in the delayed treatment group (receiving 10mg less than those in the delayed treatment group). By evaluating the GRID-Hamilton compression rating scale and GRID-HAMD, it was found that the group receiving immediate treatment with psilocybin had lower GRID-HAMD scores, indicating that the earlier the use of psilocybin, the better the treatment effect.

The research is based on 29 mental illness patients with different stages of cancer was analyzed [7]. The patients were randomly divided into two groups: one group received an appropriate amount of psilocybin treatment, and the other group received an appropriate amount of niacin as treatment. Seven weeks later, the experimental results showed that the group receiving psilocybin treatment had significantly lower scores on five scales measuring depression and anxiety index than the group receiving niacin treatment. Niacin can help alleviate mild depression in treatment, but this experiment shows that the effect of psilocybin is more pronounced in cancer patients with more severe and complex mental illness.

2.2. Treatment for patients with depression, obsessive-compulsive disorder, and substance use disorders

In the research, the second article mainly discusses nine previous literature and experiments in the literature. The experiment mainly focuses on the effects of psilocybin on depression, OCD, and substance use disorders. Nine experiments on the positive effects of psilocybin on depression, with a focus on analyzing three of them.

The first experiment was to treat depression patients with psilocybin. Scientists recruited 12 volunteers that had moderate to severe major depression. The scientists measured the results of the experiment in this way. During the sessions, assess subjective experience and follow up with BDI and STAI efficacy measures [2, 3]. The experimental data was accompanied by a longer follow-up period, with all 12 participants completing a follow-up period of 3 months or more, and 8 participants completing a follow-up period of 6 months. The results of the 6-month follow-up were analyzed, the average BDI [2] score decreased by 7.4 compared to baseline (16.1). This proves that it greatly reduces the depression index of depressed patients [3]. After 1 month (average STAI: 34.0) and 3 months, the average trait anxiety score (average state~32.6) was lower than the baseline (average STAI: 43.0), showing a slight decrease. But psilocybin does not all give advantage, as the experiment also measured HR and blood pressure, the patient's HR and blood pressure have increased. In addition, no negative psychological effects were found, and all patients persisted in the treatment and achieved a better mental state than before.

The second experiment was to treat OCD through psilocybin. The study uses the YaleBrown Obsessive-Compulsive Disorder Scale (YBOCS) and the Visual Analogue Scale (VAS) to investigate the outcome. A total of nine patients voluntarily participated in the experiment. Because of the pain of the treatment, only seven patients survived. Mean YBOCS score reduced dramatically after 24 hours of treatment, from 18.3-24.1 to 10.7-11.3.

Substance use disorders can be divided into two broad categories: tobacco and alcohol. The third experiment was to treat excessive alcohol use in substance use disorders through psilocybin. As the results of experiments, the percent heavy drinking days decreased from 35% to 8%. The percent drinking days decreased from 42% to 14.8%. The final experiment was to treat excessive smoking in substance use disorders. There is a total of 15 volunteers, all of whom have severe smoking habits and smoke at least 10 cigarettes per day. During normal treatment, naked mushroom extract was added at weeks 5, 7, and 13. Eleven participants self-reported quitting smoking with the exception of one participant who relapsed, the remaining ten individuals had higher confidence in smoking cessation. At all-time points during the 6-month follow-up, there was a noticeably lower level of need and temptation to smoke. The drawback of these experiments is that the number of participants is too small and lacks a certain degree of representativeness.

2.3. The acceptable of psilocybin among healthcare workers who care for Anorexia nervosa

In addition to depression, psilocybin has also played a significant role in the treatment of mental illnesses such as anorexia nervosa. Anorexia nervosa refers to an eating disorder in which sufferers use techniques like dieting to purposefully cause and maintain a body weight that is far below what is considered normal. It falls under the heading of "physiological disorders related to psychological factors" in the psychiatric discipline. Symptoms mainly include psychological and behavioral disorders, physiological disorders, and a lack of self-awareness. Neurogenic anorexia mainly adopts treatment methods such as psychological therapy, drug therapy, supportive therapy, and nutritional therapy to alleviate and alleviate symptoms, and even achieve cure. In addition to the above treatment methods, scientists have proposed using psilocybin to treat anorexia nervosa. However, due to the lack of relevant knowledge and fear among anorexia patients because it is an extract from poisonous mushrooms, the most important thing is to let them understand the relevant knowledge about psilocybin and choose whether to accept this special drug treatment independently.

The final article is a qualitative study of eating disorder providers about psilocybin-assisted psychotherapy mainly about invites 32 healthcare workers provide care for clients with eating problems. Through Zoom meetings, these 32 individuals will get pertinent information about eating disorders from medical and behavioral health professionals who treat eating disorders, with their permission, answer their concerns, and cultivate interest in treat Anorexia nervosa with psilocybin. These 32 participants need to have basic abilities, they need to be able to speak English for listening and communication, can log in to zoom using the internet, and agree to sign corresponding agreements. With all the prerequisites ready, divide 32 people into five groups [8].

Most participants want to know detailed information about it, its mechanism of action, how the human body metabolizes it, and whether there will be any side effects. The focus group is also often worried about the monetary motive that encourages private companies to promote psychedelic therapy, as well as how the combination of this financial incentive and unreasonable patient expectations could lead to careless implementation. providers of medical and mental health services for eating disorders. They patiently answered the questions about psilocybin mechanism and its metabolic mechanism in the human body and made a commitment as this article mentioned at the beginning. Using it to treat anorexia nervosa is not a benefit, but a new method. This new treatment method has great opportunities to shine brightly in the treatment process.

With the majority of participants changing their attitudes, gradually accepting and becoming interested in psilocybin, it provides a certain foundation for using new drugs to better treat anorexia. Undoubtedly, this action is a good start and a good beginning for future treatment actions. Further efforts are needed in the future, including obtaining the consent of patients and their families, conducting multiple experiments with it, and truly incorporating it into treatment. But as long as psilocybin can be further used in the effective treatment of anorexia, even the greatest difficulties can be overcome.

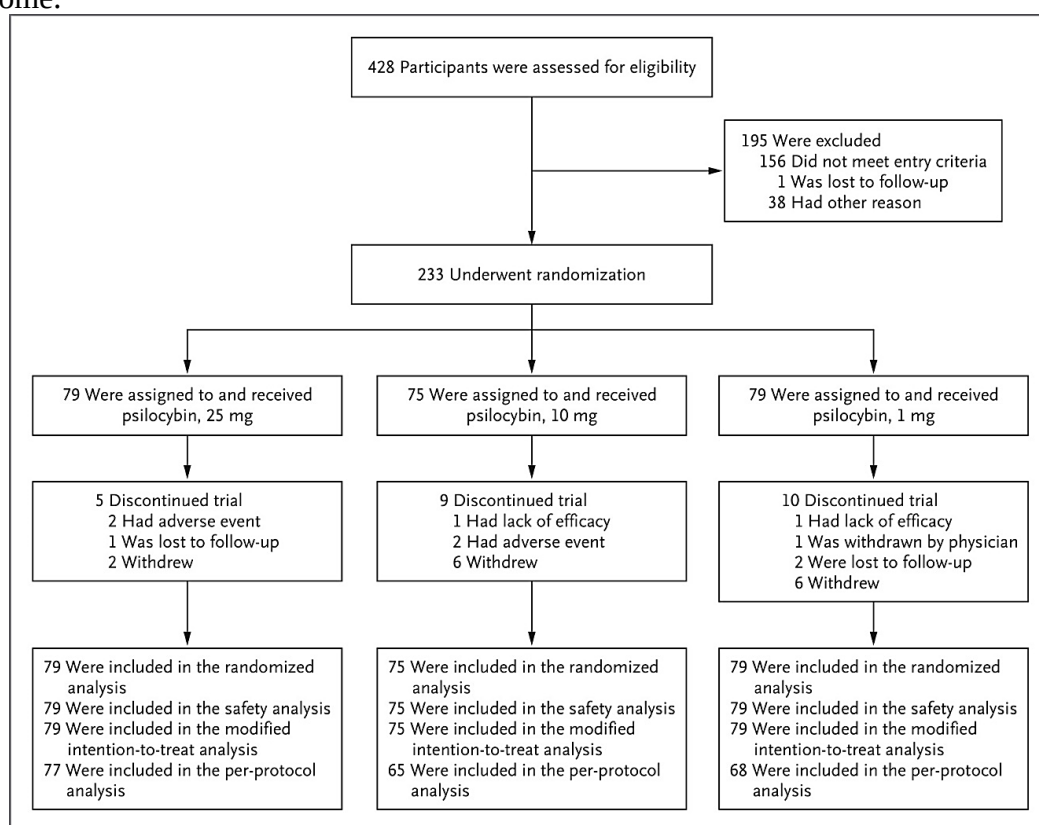


Fig. 1 Experimental allocation and operation of participants [9].

2.4. The negative affect of using psilocybin and its prospect

In addition to psilocybin's positive effects in medical treatment mentioned above, negative effects also exist. As shown in Fig. 1, the main basis for the treatment of intractable depression with psilocybin was a study in 2022 involving 233 participants, which found that taking 25 milligrams of synthetic psilocybin reduced depression scores within three weeks [9]. However, researchers found that the effect gradually disappeared after about three months. At the same time, the action taken by the Australian government surprises a lot of scientists. According to James Rucker [10], Australia was moving too quickly. More research is required in order for us to fully grasp how long psilocybin-induced changes in brain activity will persist. It is aware that some individuals may experience a relapse, and that their brains may eventually revert to the inflexible patterns of brain activity

associated with depression. More research is required to evaluate the effectiveness of these medications and the hazards they carry.

Psilocybin also provides business opportunities for many people. A research report released in January 2023 shows that the valuation of the legitimate pharmaceutical market for psilocybin's large category of psychedelic drugs is expected to increase from \$4.87 billion in 2022 to \$11.82 billion in 2029. The report points out that the increasing prevalence of mental disorders, increasing global awareness of mental health, and the booming pharmaceutical industry are the main factors enhancing the prospects of this vertical industry. The emergence of well-known companies in this field, the increase in the number of clinical trials related to these drugs, and the increasing demand for early diagnosis and treatment of mental disorders all contribute to the expansion of the global market for legalized use of hallucinogenic drugs.

3. Conclusion

Psilocybin use has been found to benefit the treatment of mental diseases, according to research. It is advised that, especially for patients with OCD, substance use disorders, and depression, psilocybin's effect is more pronounced in cancer patients with more severe and complex mental disorders compared to normal drugs, greatly reducing the patient's depression index and effectively controlling the condition of substance abuse patients. The adverse effects of psilocybin are only temporary, and some may occur if it is administered improperly. Psilocybin is cost-effective when weighed against a number of advantages when used to treat mental disorder. After its effects were made more widely known by research, psilocybin also garnered positive reviews from medical professionals. This article's contribution is helpful in that it lays the groundwork for future massive investments in medical care. Future study should evaluate more papers and compare data from more publications because the number of articles now analyzed in research is still far from sufficient.

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