Psychological Factors of Addition and Interventions for Substance Use Disorder

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Abstract: Substance use disorders appeared earlier in the history of human development with the discovery of alcohol and drugs. As society develops, more and more people exhibit substance abuse and substance addiction. Therefore, substance use disorders are gradually appearing in the limelight. This review begins with an analysis of the pathology and prevalence of substance use disorders, dividing those psychological factors that can lead to substance use disorders into internalizing and social factors. Five specific therapies, including cognitive behavioral therapy, mindfulness-based cognitive therapy, prize-based contingency management approach, cue-exposure therapy, and acceptance and commitment therapy, are analyzed and discussed, also categorized as internal promotion and external influence, based on how these therapies affect clients. Finally, for future research and treatment of substance use disorders, this review combines the previous literature and suggests ways to combine two or more therapies in order to achieve the best treatment results.

1. Introduction

Ever since the ancient people of Mesopotamian civilization invented liquor, some people have already been addicted to it because of the existence of alcohol. People found that alcohol can bring a stimulating feeling to the human body and make people feel pleasure. Similarly, since well-known drugs, such as Marijuana, opium, and cocaine, have been discovered or extracted from chemical or natural substances, drug addiction has already been a problem in human society. Both substance abuse and addiction have a negative impact on normal social development. Substance abuse and addiction are manifestation states of substance use disorder, of which addiction is the most serious manifestation. However, as the causes of substance use disorder remain unclear, generations of scholars have devoted themselves to finding the causes in order to propose more effective treatments.

The topic of the current review on causes of substance abuse mainly focuses on two points: nature and nurture. Natural causes refer to the physiological reaction to the substance. It mainly comes from the harm of substances to the human body, such as increased tolerance to substances or withdrawal reactions [1]. A good example is that opioid drugs such as heroin act directly on the body's central nervous system, binding to opioid neuronal receptors to produce pleasant feelings and suppress negative emotions. The body then develops drug dependence, addiction, and eventually substance use disorder. The factor of nurture may be the environment of developing or family attachment patterns. Especially for teenagers, substance use disorder is associated with adolescent family attachment patterns. There is a special link between certain forms of SUD and specific patterns of attachment [2]. As for the treatment, existing research has suggested several areas of treatment, such as drug therapy and cognitive behavioral therapy. One of the most famous drug therapies is methadone therapy. Step out of addiction by using other, less harmful substances instead. One well-known treatment used for substance use disorder is the prize-based contingency management approach. It mainly reduces the frequency of substance abuse by moderating the effects of related behaviors [3].

This article summarizes and analyzes the psychological factors that cause substance addiction, such as other mental disorders: depression, anxiety, and bipolar disorder. More targeted treatment measures are proposed. By the combination of psychological factors and related therapy, there will be a clearer understanding of substance use disorder and treatment.

The purpose of this review is to do a review of previous literature and develop effective interventions for substance use disorder. During the time period between 1990 and 2010, the burden of substance use disorder has grown by about 41%. It has brought severe social and economic damage to the clients, carers, and society [4]. A useful treatment can increase the probability of cure by studying the psychological factors that lead to substance addiction, analyzing the influence on substance abuse, and putting forward feasible solutions in the field of psychotherapy.

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2. Method

A very professional and thorough literature review was done by searching online literature databases such as Google Scholar, Springer, Wiley Interscience, and Science Direct. When searching the literature for references, the focus was on "substance use disorders," "treatment," and "therapy," and looking for experiments that have been conducted by scholars. At the outset, the first question is what is the relationship between "substance abuse," "substance addiction," and "substance use disorder." The focus of the search was then on clarifying the relationship between the three to facilitate the subsequent systematic summary and elaboration of ideas. According to the previous literature, the more serious form of substance abuse is substance addiction or addiction, which in psychopathology is referred to as substance use disorder. Prevalence and pathology analyses of substance use disorders were then retrieved, and data were collected and analyzed. Finally, each of the five treatments was analyzed. The meaning of the therapies was discussed, and then their application to the treatment of substance use disorders was investigated in order to understand their advantages and limitations.

3. Literature Review

3.1 Definition of Addiction and Substance Use Disorder

Addiction refers to the long-term intake of a substance, as well as dependence. Some of the most typical examples are drug addiction, long-term drug intake, and quitting difficulty. The four main characteristics of addiction are the development of dependence on the drug, the development of tolerance, the development of withdrawal reactions, and changes to the physiological system. Some researchers mentioned the relative importance of two forms of reinforcement: positive reinforcement from addiction and negative reinforcement from the drug [5]. This means that addiction will bring physical and psychological pleasure to the human body, and the withdrawal reaction brought by drugs will force the continued intake of drugs.

Substance use disorder is the pathological manifestation of substance abuse and addiction. Clients who suffer from substance abuse develop substance dependence, addiction, and substance use disorder. Its basic characteristics are a set of cognitive, behavioral, and physiological symptoms. The use of substances continues despite significant substance-related problems. The symptoms listed for the relevant disorder and for substance intoxication or withdrawal were counted toward the substance-induced mental disorder only when they exceeded the expected severity of intoxication or withdrawal [6]. According to DSM-5, substance use disorder has two main characteristics: disorder use and intoxication. Disorder use means continued use out of rational control, and intoxication refers to damage to human body in psychological and physical field.

3.2 Etiology and Prevalence Analysis of Substance Use Disorder

The etiology of substance use disorder has three main factors: genetic, social, and psychological factors. The genetic factor refers to the biological changes done by substances such as drugs and medicine towards the human body. In contrast, the social factor refers to substance abuse led by social problems such as social class and social status. Besides the genetic and social part, psychological factors are not as clearly analyzed as the former.

The psychological factor of substance use disorder is thought to be related to some mental health problems. Just as Roberts et al. mentioned, PTSD and substance use disorder are common comorbidities among individuals with SUD, and the prevalence of lifetime PTSD ranges from 26% to 52% [7]. Alcohol use disorder has been found to be the most commonly co-occurring comorbidity of substance use disorder, with a prevalence rate of 36% to 52% [7]. Through data collection and meta-analysis, the researchers included 1,506 participants from 897 sources in 14 randomized controlled trials. The time range is from 2004 to 2013. Finally, the data analysis showed that PTSD and substance use disorder have comorbidities, and the probability of developing substance use disorder in clients with PTSD is about 20% to 50%.

Apart from the prevalence of comorbidities of substance use disorders, there are also differences among different genders. Because men and women have biological differences have different endocrine levels and hormone levels, ingesting the same substance will lead to different metabolic rates and different dependence probabilities. Illicit drug abuse is more prevalent among males than females, with 7.9 percent of female adolescents aged 12 and older using illicit drugs in the past month compared to 12.5 percent of male adolescents, according to the report. Between 2002 and 2013, heroin use among male adults increased by 50 percent, compared to 100 percent among female adults [8].

3.3 Psychological Factor of Substance Use Disorder

In the pathological analysis of substance use disorder, two transdiagnostic factors are focused on, usually internalizing and social factors. Compared with traditional diagnostic methods, transdiagnostic factor research has experienced tremendous growth, with new, competing models being proposed, expanded, and directly tested in a variety of innovative ways [9].

3.3.1 Internalized cause

Internalized factors refer to those internal factors that lead to the development of substance use disorders and are more biased toward the patient's inner changes. For example, mood disorders, trauma- and stressor-related disorders, and eating disorders are almost invariably included as indicators of internalizing.

Because of the comorbidities between PTSD and substance use disorder, the researchers analyzed possible causes of substance disorders triggered by PTSD. Individuals with PTSD may seek symptom relief through drug or alcohol use, potentially leading to the development of substance use disorder [7]. For example, clients with PTSD suffer from painful memories, while alcohol and drugs can bring pleasure to human body and let them forget the problem for a moment. Therefore, they would tend to substances for pleasure, numb themselves, and escape pain.

Eating disorders and substance use disorders have a lot in common, and there is some overlap. Specifically for bulimia, researchers have proposed the concept of food addiction. It means clients are addicted to food, just like addiction to medicine and alcohol. Although there are no bad or forbidden foods in the traditional concept of eating disorders, the two share many mechanisms. Just like Schulte et al. mentioned in their research, these mechanisms contain reward dysfunction, craving, emotion dysregulation, and impulsivity [10]. Food addiction is thought to occur because food, like drugs, activates the brain's dopamine system by being high in fat and sugar, which induces pleasurable feelings in individuals [10]. Therefore, it is been suggested that eating disorders, especially bulimia, can lead to a much higher risk of substance abuse, which can lead to substance use disorders.

3.3.2 Social Cause

Social factors refer to the factors in social relations, as opposed to the patient's own factors. Social factors that lead to substance use disorders include substance abuse, intimate relationship problems, and antisocial personality disorder. These factors can externally lead to dependence on substances such as alcohol and drugs, which can lead to substance use disorders.

Besides the association with PTSD, substance use disorder is also thought to be related to attachment relationships, especially in the adolescent group. Insecure attachment in the growth of adolescents is considered a risk factor, while secure attachment is considered a protective factor [2]. Therefore, adolescents who are in insecure attachment relationships tend to use other means to relieve their uneasy emotions. Some people would fall into substance abuse and addiction, eventually leading to substance use disorder.

According to research, antisocial personality disorder often has higher patterns of aggressive and impulsive behavior and is like those of clients with substance use disorder. Complications between the two are common. Antisocial personality traits in adolescence have been linked to a significantly increased risk of developing substance use disorders in adulthood [11]. Antisocial personality would cause clients to be impulsive and do many things that violate social rules, such as drinking and taking drugs.

3.4 Treatment of Substance Use Disorder

Treatment for substance abuse, especially clinical treatment for opioid addiction, mainly includes medication and psychotherapy. Methadone therapy is a well-known drug therapy. Methadone is a proven and effective opioid medicine and not as harmful as traditional opioid medicine. Clients suffering from substance use disorder, especially opioid use disorder, would take methadone instead of injecting drugs [12]. Then, clients decrease the intake of drugs and get the goal of treatment. The psychological treatment for substance use disorders is mainly carried out in the following directions: the patient's cognition and behavior, and the external inhibition and guidance. In terms of how the treatment works, it can be divided into internal promotion and external influence.

Cognitive behavioral therapy, mindfulness-based cognitive therapy, and acceptance and commitment therapy all work to reduce substance abuse by influencing clients' inner thoughts and guiding cognition. Cue-exposure therapy and prize-based contingency management approach, on the other hand, use the external environment to induce psychological or physiological responses in clients. Based on classical conditioning and operant conditioning, we know that external stimulus can effectively affect individual behavior, to achieve the purpose of a certain behavior. Cue-exposure therapy works through controlled exposure to the substance to achieve the purpose of extinction and weakening the response of clients to stimuli. The prize-based contingency management approach is based on external rewards to guide clients' behavior to achieve the purpose of reducing substance use.

3.4.1 Cognitive Behavioral Therapy

Cognitive behavioral therapy is a kind of therapy that focuses on the association between thoughts, emotions, and Behaviour. Cognitive behavioral therapy would slowly guide clients back to the normal way. According to the cognitive model, emotions and Behaviour are affected by the thought towards one specific thing under the situation. Giving new modes of sensing and new behavior to assist clients in cognitively adjusting negative thoughts. The behavioral method mainly operates through activity scheduling and graded task assignments to get pleasurable or productive experiences [13].

In the treatment of substance use disorders, cognitive behavioral therapy provides clients with the correct understanding of substance abuse. For example, strengthening clients about the harm of drugs and the impact of alcohol on normal life. However, cognitive behavioral therapy requires a high quality of cognition. According to the study mentioned by Kiluk and Carroll, in addition to cognitive behavioral therapy, another therapy that can improve cognitive function well is drug therapy. The combination of the two gives better results. For example, for clients with opioid use disorder, an acetylcholinesterase inhibitor is added to CBT [14]. At the same time, the purpose of reducing substance use is achieved through cognitive guidance.

The application of cognitive behavioral therapy has several advantages. As Moore et al. mentioned, in randomized clinical trials, adding cognitive behavioral therapy to physician management for clients with opioid prescription drug addiction led to better withdrawal outcomes [15]. This means that cognitive behavioral therapy can be more useful as a supplement to general therapy, such as medication, in conjunction with other therapies.

However, just as mentioned above, the effect of cognitive behavioral therapy mainly comes from the quality of cognition. Therefore, for the best result, clients should have enough ability to handle social reality and learn through guidance. For example, clients should be able to understand the harm of substances such as drugs and alcohol. Besides, cognitive behavioral therapy requires a large amount of time and focuses too much on the effect of the relationship. If clients can not get enough time to finish every step and quit, the effect will be very weak or no effect. As reflected in cognitive behavioral therapy for substance use disorders, clients start using substances again.

3.4.2 Mindfulness-Based Cognitive Therapy

Mindfulness-based cognitive therapy is a kind of therapy that has comes to people's attention in recent years. It belongs to cognitive therapy and uses mindfulness as its main concept. Mindfulness is about focusing on yourself, with all your attention focused on actual experiences and learning from them. The therapeutic stance of mindfulness-based cognitive therapy focuses on encouraging clients to adopt a new way of being and relating to original thoughts and feelings while placing little emphasis on altering or challenging specific cognitions [16].

In the treatment of substance use disorder, it mainly refers to promoting long-term health behavior change. Studies have found that trait mindfulness shows a lower level in populations of substance users. The target of mindfulness-based cognitive therapy is to use mindfulness to have a better schedule of behavior. The first way is mindfulness can inhibit the thoughts of using drugs. The main idea is to let clients find the existence of thoughts related to substance use and guide them to understand the bad effects of impulsion. By helping them with mindfulness meditation, clients would find the impulsion of substance use is temporary [17]. After letting this kind of idea pass away, the impulse to take substances would be inhibited. The second mechanism is mindfulness, which would adjust the relationship between stress and negative affect, which are thought to be a possible risky factor causing substance use [17]. With better handling of the negative emotion, clients would have less demands of substance.

In contrast to cognitive-behavioral therapy, mindfulness-based cognitive therapy has mindfulness as a primary goal, and positive mindfulness meditation limits experiential avoidance by facilitating non-judgmental acceptance of present-moment thoughts and the tendency to respond to maladaptive behaviors such as substance use by interrupting their use [18]. Moreover, the results of the study showed that clients who received mindfulness-based relapse prevention demonstrated better outcomes.

This therapy has shortcomings in that there is not enough data to support it. Preliminary evidence suggests that mindfulness-based interventions are effective, but the data are still inconclusive [18]. More research is needed to analyze for more accurate results.

3.4.3 Acceptance and Commitment Therapy

As a particular form of Cognitive Behavioral Therapy, the core functional concept of Acceptance and Commitment Therapy is psychological flexibility, which refers to the ability to fully contact the present moment and the inner experiences that are occurring [19]. Psychological flexibility has three main components, namely, be present, open up, and do what matters. In this therapy, a very well-known model is used to enhance psychological flexibility, containing six processes of psychological change: acceptance, cognitive defusion, present, value, committed action, and self as context [19]. Acceptance and Commitment Therapy plays a role in therapy by guiding clients to focus on these six components: moderating the inner experience, reducing the context in which the inner experience occurs, focusing on the events that are happening in the present moment, reducing the impact of cognitive constructs on the world, and incorporating the behavioral change processes of traditional therapy into the mix.

In the process of treating substance use disorders, acceptance, and commitment therapy uses a combination of acceptance, mindfulness, and values-based therapeutic processes to foster psychological flexibility [20]. Gaining a higher level of psychological flexibility means that clients can better participate and experience life. By learning more accepting and positive thinking approaches, clients with substance use disorders process their internal experiences in a normal way of activities and behaviors rather than continuing to engage in substance abuse. Finally, those meaningful behaviors further guide clients to reduce the substance intake behaviors that exist.

As one of the more novel therapies in cognitive behavioral therapy, there have been many studies and experiments implemented to embrace and commit to the therapy. Studies have reported that this therapy, although it incorporates mindfulness as part of the therapy, unlike other therapies, places less emphasis on the role of meditative practices [20]. Therefore, it is easier to implement compared to mindfulness-based cognitive therapy. The probability of failure due to individual factors of clients is less.

The major drawbacks of this therapy are also not negligible. Just as Lee et al. mentioned, current research on acceptance and commitment therapy for substance use disorder is lacking of process of change data [20]. Without enough data being collected in experiments, it is difficult to explore how this therapy can be used without sufficient data collected in experiments. It is difficult to explore how this therapy works over time to improve the effects of substance abuse. Lee et al. also mentioned that the goal of

acceptance and commitment therapy is not simply to reduce substance intake but to assist clients in improving their overall functioning level and that patients treated with this therapy are able to perform better in many aspects of their lives in the future [20].

3.4.4 Cue-Exposure Therapy

The main content of cue-exposure therapy is to immerse clients in exposure by showing them relevant scenes to achieve the purpose of treatment. This therapy is based on Pavlov's theory of learning, where, as mentioned in the study, scenes or objects are thought to be associated with addictive substances. Scenarios that should not lead to a response and should be unconditional stimuli are transformed into conditioned stimuli that trigger cravings for addictive substances [21]. Create scenes around clients that will make them feel bad emotions many times, disconnect the scenes from the consequences of adverse responses, and achieve the purpose of desensitization through extinction.

As for how to implement this therapy in the treatment of substance use disorder, it is mentioned in research by Clus et al. that the purpose of treatment can be achieved through virtual reality technology [22]. VR can be defined as an emerging computer technology that can reproduce a real or imagined environment and simulate the user's real presence in that environment. Users can interact with the environment through their senses (sight, touch, hearing, and smell) [22]. Clients with substance use disorder in virtual reality can be guided to feel the bad feelings after taking the substance. With the blessing of VR technology, clients' feelings can be artificially manipulated to better achieve the goal of getting rid of substance. Besides the application of virtual reality, cue-exposure therapy can also be implemented by artificially created scenarios. For example, in the treatment of alcohol use disorder, clients were exposed to their favorite alcoholic beverage by touching the alcohol bottle, pouring the drink, and smelling the drink without drinking it [23].

In contrast to therapies that rely on clients' internal cognition, cue-exposure therapy is guided primarily by external stimuli. Thanks to the development of technology, virtual reality technology can help researchers create more realistic scenarios for clients to obtain more effective treatment. This type of therapy does not require a high level of personal cognition and does not require a long course of treatment.

However, there are some researches that conduct several disadvantages and limitations of cue-exposure therapy. Since this therapy is very dependent on the created scene, if it can have a high degree of similarity to the real scene, then it will have a better effect. Extinction training during treatment can only simulate a limited number of scenarios, while for clients, there are almost unlimited ingestion scenarios, which seriously weakens the universality of extinction. Using a fading situation also increases the likelihood that clients will associate the unique properties of the treatment situation with fading. When this distinctiveness is not present in the post-treatment environment, clients are less likely to activate the learning abilities gained during regression [24]. This results in a decrease in the effectiveness of cue-exposure therapy.

3.4.5 Prize-Based Contingency Management Approach

In clinical treatment, contingency management usually contains three main parts. First, clinical doctors should arrange the environment to have a better observation of the target behavior. Second, when the target behaviors are shown up, tangible reinforcers should be provided. Third, when the target behaviors do not happen, the reinforcement should be stopped [25]. The target behavior then gradually becomes the dominant behavior and replaces the old undesirable behavior through operant conditioning under the influence of the reinforcing operation. As a sub-category of contingency management, the prize-based contingency management approach proceeds through the same principle. However, its special feature is the adoption of rewards as reinforcing behaviors. Just as Gagnon et al. mentioned in their research, prize-based contingency management approach differs from other types of contingency management approaches in at least two ways [26]. Firstly, the incentive is based on successful behavioral change rather than simply trying. While the actual monetary value of the reward may not always be attractive, it does make the target process, behavior, and outcome more attractive. Second, prize-based contingency management operates similarly to gambling, exploiting the desire of clients to obtain rewards [26].

The treatment of prize-based contingency management has demonstrated high feasibility and excellent flexibility in the treatment of substance use disorders. For example, the reinforcing behavior used for motivation could be cash, vouchers, or retail goods, while the behavior required of clients would be to reduce their intake of the substance. In a randomized controlled trial of a cohort of adolescents with cannabis use disorders, participants in a contingency management group were entered into a lottery when they submitted a negative urine drug screen and breathalyzers negative for alcohol. Consecutive negative reports increase the chances of the draw, while the number of draws will be zeroed out once the test shows a positive result or absence from treatment [27]. We can then conclude that priority-based contingency management for substance use disorders treats the reduction of substance intake as a target behavior, which is prompted by various incentives.

The main advantage of prize-based contingency management is that it has been proven effective by many studies and is considered a very effective treatment. In experimental studies of treating methamphetamine use disorders, researchers indicate better results of prize-based contingency management during treatment than other psychosocial models used. It is also suggested that adding contingency management to existing psychotherapies can provide better treatment outcomes [28].

Also, the limitations of this approach cannot be ignored. Firstly, there are some pragmatic concerns about how to raise the necessary funds, as prize-based contingency management requires a large amount of money to be invested in reinforcing behavior. Secondly, there is the use of prizes for clients, who may use the prizes to continue to purchase substances such as drugs and alcohol [25]. How to manage and monitor the use of prizes, especially cash prizes, is a very important issue in this treatment. Finally, since the ingestion of substances can have extremely strong positive effects on clients, such as drug-induced euphoria and dopamine secretion, artificially controlled reward-reinforcing behaviors used for counteracting it should have a higher intensity. Only in this way can the clients' behavior of ingesting substances be changed by the stimulus-reinforcing behavior.

4. Implications

After doing this systematic review paper, a deeper understanding of substance use disorders was gained, along with an analysis of the strengths and weaknesses of the five main therapies. From alcohol, a substance that appeared earlier in human history, we can rely on prior research to learn about the basic development of substance use disorders. From alcohol to tobacco, to opium, and finally to some of the newer drugs, substance use disorders have evolved, and so should the therapies for substance use disorders. In addition to using only one type of therapy to orientate clients, it is possible to combine two or even more therapies. As Monti and Rohsenow mentioned in research on alcohol use disorders, combining more novel therapies of coping-skills training and cue-exposure therapy [29]. Coping-skills training teaches clients to better cope with the urge to drink, and cue-exposure therapy provides clients with an opportunity to implement the learned skills to cope with the urge to drink in real-life situations [29]. Applied to the five therapies focused on in this review, most therapies for substance use disorders can be categorized based on whether their mode of influence is internal promotion or external influence. For better treatment outcomes, internal promotion and external influence can be combined, such as cognitive behavioral therapy and priority-based contingency management.

For future research on substance use disorder, the possible field is to focus on the etiology and prevalence, for example, the gender difference and country difference. From these factors, a deeper understanding of this disorder will be conducted.

5. Conclusion

This systematic review essay first explores the origins of substance abuse in humans by gathering data from prior literature, beginning with the discovery of alcohol by ancient humans and then the discovery of drugs.

This review then explores both natural and environmental factors that contribute to substance use disorders, which are the focus of existing research. Natural factors are mentioned as substances such as drugs that act directly on the central nervous system of humans. For example, an autopsy of 20 heroin-addicted clients who died suddenly revealed that heroin addiction causes neuronal degeneration in the central nervous system, altering hormone levels and blood pressure [30]. This causes clients to develop a substance use disorder physiologically. Environmental factors, on the other hand, point more toward the negative influences the clients had during their development or in their family environment, such as family parenting styles, post-traumatic, and childhood abuse. It also concludes with a summary of therapies for substance use disorders, using methadone therapy as an exemplary therapy.

In analyzing the psychological factors of substance use disorders, the discussion and analysis were divided into internalizing and social factors. Correspondingly, when analyzing therapies, internal promotion and external influence were also proposed through internalized causes and social causes, with three cognitively related therapies being categorized as relying on internal promotion, including cognitive behavioral therapy, mindfulness-based cognitive therapy, and acceptance and commitment therapy. These therapies guide the reduction of substance intake by influencing clients' perceptions and attitudes about their intake of substances. The other two are about external influence, which is not about creating the right cognition for clients but rather about the influence of external stimuli, such as cue-exposure therapy, which is used to reduce substance intake by showing clients relevant scenarios that make them feel negative about substance abuse. In analyzing each of these therapies, this review also cites the previous literature to discuss what the advantages of these therapies are, as well as the existing shortcomings and limitations that need to be resolved.

In the implication part, this review focuses on how these more detailed analyses of therapies affect existing treatments. And what future improvements in treatment for substance use disorders might be made in response to these strengths and weaknesses. Similarly, these analyses of each therapy can also have an impact on future research on substance use disorder treatment.

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