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The Application of Mindfulness in The Treatment of Borderline Personality Disorder

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Abstract. Borderline personality disorder is characterized by generally unstable patterns in emotional regulation, impulse control, interpersonal relationships, and self-image. It is always accompanied by some associated disorders, such as problematic alcohol use and self-harm. The cause of borderline personality disorder is well understood, with genetic factors and childhood abuse both contributing, and it is more common in women than in men. In this study, we also investigated the neuroscientific aspect of changes in the brains of people with borderline personality disorder. We wanted to find out about the effectiveness of mindfulness in the treatment of borderline personality disorder. Studies show that mindfulness practice affects psychological and neural processes and systems, leading to improved attentional capacity, body awareness and engagement in cognitive control processes, and recognising the therapy as a behavioural component to improve emotion regulation and reduce symptoms in people with borderline personality disorder. We proposed 3 hypotheses regarding the mechanism of mindfulness treatment in patients with borderline personality disorder. That is, mindfulness may affect borderline personality disorder by improving individuals' emotional regulation, reducing impulsivity, and inducing changes at the neurophysiological level.

Keywords: Borderline personality disorder; mindfulness; mechanisms.

1. Introduction

Borderline Personality Disorder (BPD) is characterized by pervasive patterns of emotional dysregulation, suicidality, impulsivity, identity disturbance, and significant challenges in interpersonal relationships [1]. People with this disorder cannot clarify other people's identities, and they have difficulty regulating their own emotions because the disorder causes them to feel anger and impulsivity. Typically, they may experience sudden anger with no apparent trigger, which can quickly escalate into a state of dysphoria. This intense emotional distress can lead them to act out in potentially harmful ways.

In epidemiological studies, the community prevalence of BPD ranges from 1% to 6% [2], and the general population prevalence of BPD is 2-5% and 40-44% in the hospitalised mentally ill population. There are also gender differences in borderline personality disorder, with a higher prevalence in females compared to males (approximately 70% versus 30%) [3]. In a study involving children and adolescents, BPD was found to affect 11% of those aged 9-19 years and 7.8% of those aged 11-21 years. Additionally, the disorder was observed to be more prevalent in girls than in boys across these age groups [4]. It is difficult to diagnose BPD because it may have several factors, such as the genetic factor and a poor childhood experience, which would contribute to emotional dysregulation and impulsivity and lead to dysfunctional behaviours, psychological conflicts and deficits, all of which may exacerbate emotional dysregulation and impulsivity [5]. In a twin study based on DSM-IV criteria, the coincidence rate for borderline personality disorder in identical and fraternal twins was 35% and 7%, respectively, suggesting that there may be a strong genetic influence on the development of the disorder [5,6].

Individuals with borderline personality disorder often exhibit alcohol abuse. According to the National Epidemiologic Survey on Alcohol and Related Disorders (NESARC), a significant 42% of

those who meet the diagnostic criteria for any personality disorder also fulfill the DSM-IV criteria for alcohol dependence [7]. A recent review indicated that 46-49% of individuals diagnosed with BPD also meet the current diagnostic criteria for alcohol use disorder (AUD), while 59% meet the criteria for a lifetime AUD diagnosis. Among individuals in the general population or clinical settings who have a current diagnosis of AUD or alcohol dependence, the prevalence of BPD is roughly 12% to 17% [8].

Non-suicidal self-injury (NSSI) and suicidal behavior (SB), both of which fall under self-harming behaviors, are frequently observed in individuals with borderline personality disorder. The most common form of NSSI is deliberate cutting, such as cutting with a knife or breaking glass, in women, and punching the body in men. In contrast, SB means acting with the intention of dying. Methods include overdosing, hanging, refusing to eat or drink, or shooting oneself [9]. It is estimated that the prevalence of NSSI in adolescents is approximately 17% [10], the prevalence of NSSI in the adult sample of the general population is approximately 6%, and the prevalence of NSSI in the adolescent and adult BPD samples is 95% and 90%, respectively [11].

To reduce the adverse effects of borderline personality disorder on personal development, this study investigates how mindfulness can be applied in interventions for borderline personality disorder and examines the mechanisms involved.

2. The introduction of Mindfulness

Mindfulness was first translated from Buddhism by T.W. Rhys Davids in 1811. The academic world has increasingly focused on mindfulness as an intervention over the last three decades. Mindfulness is a process of openly attending to one's experience of the present moment with awareness [12]. Although the term originated in Buddhism, all individuals have the capacity for mindfulness, regardless of Buddhism or Buddhist contemplative practices [12]. Certain research indicates that individuals diagnosed with mental health conditions such major depressive disorder (MDD), bipolar disorder (BPD), and obsessive-compulsive disorder (OCD) have deficiencies in several aspects of mindfulness, including the overall score [13]. It is interesting to note that the level of mindfulness skills is negatively related to the broadline personality disorder (BPD) trait.

The self-regulation of consciousness and attention, along with being open and receptive to the experience of the present moment, constitute the fundamental logic of mindfulness [13]. It enables people to identify the triggers behind their feelings, behaviors, and thoughts and to stop viewing their thoughts as reflections of reality and start viewing them as separate entities [13]. Different therapies may include different ways of applying mindfulness, but the baseline of this exercise remains the same. After reviewing the articles of many scholars, we conclude that there are four core skills of mindfulness: (1) Observe. (2) describing. (3) acting with awareness, and (4) non-judgmental acceptance [14,15]. Observing is the skill that requires the individual to recognise the stimuli, both internal and external. When an emotion or physical sensation occurs, trainees are asked to find out what is causing the feeling [14]. The urge for the next behaviour is also observed [14]. Then comes the describing stage, where people are asked to describe or label their feeling with words, but without judgement, such as painful, excited, etc. [14]. Mindfulness encourages participants to be curious, positive and kind about the observed phenomenon [14]. Mindfulness rejects mindless or automatic responses to stimuli. Acting with awareness, also referred to as attention and awareness in some papers, encourages participants to focus all their attention on one thing and avoid mind wandering [14]. With sustained attention, people can better observe their emotions and sensations changing [15]. Based on this skill, people can practice mindfulness anywhere, anytime. With the aim of focusing on the present experience rather than its origins, implications and associations, mindfulness requires participants to apply one-pointed attention to the present rather than its past and future, allowing a free shift from one thing to another at any time. In mindfulness, practitioners maintain an attitude of curiosity about anything related to the stream of consciousness, such as sensations, thoughts and feelings [16]. Participants notice the flow of attention and various stimuli, but inhibit secondary

elaborative processing [17], which suggests that people should not criticise their feelings or thoughts. Another mindfulness skill, accepting with non-judgment, plays an important role in this process. Non-judgment emphasises acknowledging what is happening in the moment and accepting it with a non-evaluative attitude [16]. Scientists believe that people should not tend to escape or change something but accept it and allow it to evolve [16].

The utilization of mindfulness skills training in treating borderline personality disorder (BPD) is commonly integrated into Dialectical Behavioural Therapy (DBT), which has demonstrated efficacy as a standalone treatment for the prevalent symptoms observed in BPD patients. Following the adjustment for potential confounding factors, non-judgmental acceptance emerged as the sole mindfulness skill dimension from the Kentucky Inventory of Mindfulness Skills (KIMS) that displayed significant development over time. Emotional dysregulation (ED) and mindfulness meditation were found to be correlated, with those practicing more frequently (both in terms of frequency and length) showing larger decreases in ED. A minimum frequency of 3-4 days per week with sessions lasting over 30 minutes was found to be imperative for realizing meaningful ED improvements. Nevertheless, the dropout rates were greater in the mindfulness group (40% vs. 19% in the control group) [17], and some participants initially reported negative sensations as boredom or anxiety during mindfulness practice [18,19,20]. As a result, mindfulness educators ought to advise beginners to anticipate these possible difficulties and stress that it can take some time for the advantages of practicing mindfulness to become evident.

3. The Mechanism of Mindfulness Treatment on BPD Patients

The mechanism of mindfulness treatment for borderline personality disorder remains unclear, but researchers suggest that mindfulness may improve people's emotional regulation, reduce impulsivity, and induce neurophysiological changes, thereby reducing their symptoms of borderline personality disorder.

3.1. Emotional Regulation

A key feature of BPD is impaired emotional regulation [1]. One assumption of the mindfulness treatment mechanism is emotional regulation as a mediator. Emotional dysregulation (ED) is defined as the inability to engage in appropriate and goal-directed behaviour under distressing emotions [21,22]. Some other behavioural features of BPD may be due to ED, such as self-harm, substance abuse, and interpersonal problems [22,23]. Patients with BPD do not understand and accept their emotions because they cannot respond appropriately, but engage in other maladaptive behaviours such as self-injury or binge eating. With mindfulness treatment, participants are exposed to difficult feelings and emotions and view them with a detached perspective [24,25]. Mindfulness encourages people to look objectively at their experience in the moment, rather than dwelling on the past. In randomised trials, researchers have found that patients with mindfulness interventions have significant improvements in a wide range of symptoms and emotional regulation [22]. Furthermore, emotional regulation plays a mediating role between mindfulness treatment and the reduction of substance abuse and other BPD symptoms, as well as the improvement of interpersonal functioning [26,27]. Carmona I Farrés et al. [22] found that patients with BPD showed progress in emotional clarity and emotional acceptance following mindfulness treatment. This suggests that individuals can better label and then accept their feelings and emotions [22]. Therefore, mindfulness intervention treats BPD patients by enabling them to accurately observe and describe their emotions and actively accept them from a non-judgmental perspective. As emotional dysregulation improves, participants tend to better control their behavioural responses to stimuli in a calm manner, instead of resorting to self-harm, indulgence or substance abuse, thereby reducing the symptoms of borderline personality disorder.

3.2. Impulsivity

Impulsivity is one of the hallmarks of BPD [1]. This notion suggests that individuals act impulsively, making quick decisions without considering long-term consequences [22,28]. People with BPD have higher levels of impulsivity than people in healthy control groups [22,29,30,31]. Impulsivity can be measured from different aspects, such as personality traits and neuropsychological functioning. It can also be measured by reward-discounting models, as patients with higher impulsivity prefer immediate rewards to delayed gratification [32,33,34,35]. Mindfulness encourages participants to achieve a state of responding with awareness and without judgement, which is contrary to impulsivity [24,30]. Researchers have found a negative correlation between impulsivity in BPD patients and mindfulness traits [30,34,35]. Experience suggests that patients' impulsivity scores decreased after receiving mindfulness treatment [22,30] and showed an improvement in tolerance for delayed gratification [30]. Mindfulness encourages individuals to think dispassionately and objectively, and asks participants to respond with awareness rather than in impulsive ways such as self-harm or suicide. Hayes et al. [36] suggested that impulsivity is a way of escaping from negative emotions and cognitions that lack consideration of long-term goals. To combat this, mindfulness trains participants to accept their internal feelings and emotions in a non-judgmental and non-reactive way, thereby reducing the tendency to act impulsively [37]. Mindfulness skills are inversely correlated with impulsivity, with mindfulness having the strongest relationship [37]. Scholars suggest that individuals who are made aware of their impulsive tendencies and negative urges may benefit from being able to control these emotions and feelings [38]. In line with this study, the descriptive facets showed a significant negative correlation with impulsivity score, suggesting that better labelling of feelings and emotions in patients with BPD may benefit their ability to control impulsivity in a dispassionate manner [37]. The study also found that a mindfulness intervention affects the ability to decenter on internal and external experiences, reducing the possibility of participants responding on automatic pilot [22]. Mindfulness suggests that BPD patients respond in a non-judgmental way, with full perception of the situation and emotions, as opposed to impulsivity, which is mainly driven by urges.

3.3. Neuroscience

The practice of mindfulness may have an impact on borderline personality disorder (BPD) by bringing about neurological changes. Mindfulness meditation activates both the dorsal medial prefrontal cortex (dmPFC) and the anterior cingulate cortex (ACC) across brain hemispheres. The ACC is responsible for integrating attention, motivation, as well as motor control, with its rostral part engaged during emotional overload and its dorsal part during cognitive control tasks. In situations where attentional focus is disrupted by thoughts or memories, the ACC likely aids in maintaining attention by alerting the brain's neural networks to address conflicts using a top-down regulatory mechanism that emphasizes cognitive regulation. Grecucci's model [39] emphasizes a neural circuit that involves the prefrontal cortex (PFC), ACC, amygdala (A), and insula (I), which is vital for emotional regulation induced by mindfulness. The circuit encompasses "top-down" regulating regions like the prefrontal cortex (PFC) and anterior cingulate cortex (ACC), as well as "bottom-up" emotional areas such as the amygdala and insula, which interact through structures like the corona radiata. Focused, sustained, and detached attention to emotional states triggers PFC and ACC activation, leading to increased emotional awareness (I and A activation) and reduced BPD symptoms. Studies also indicate differences in white matter fibre tracts between novice and experienced meditators, with experienced meditators exhibiting more tracts in five specific pathways. Two pathways connect the left and right amygdalae and anterior insula, while three connect the left anterior cingulate with the right anterior insula, right amygdala, and left amygdala [40]. These findings suggest stronger interhemispheric and cingulo-amygdalar/cingulo-insular connections, potentially linked to the mental stillness achieved through meditation. Individuals with higher dispositional mindfulness demonstrate greater prefrontal cortex, anterior cingulate cortex, and insular cortex activity, alongside reduced amygdala activity during emotionally salient tasks, compared to those with lower dispositional mindfulness [40].

In summary, these studies show that practicing mindfulness impacts mental and neural processes and systems, resulting in better attention, body awareness, and activation of cognitive control processes

4. Conclusion

Borderline personality disorder is characterized by a pervasive pattern of instability in affect regulation, impulse control, interpersonal relationships, and self-image. It always accompanies some corresponding disorders, like problematic alcohol use, and self-harm. The cause of BPD is some part known, genetic factors and childhood abuse both contribute to BPD, and it is more common in women than men. We supposed three means of mechanism of mindfulness in BPD treatment. The mechanisms through emotional regulation and impulsivity emphasize the importance of objective and decenter perspective when BPD patients encounter things. In addition, increased connections between brain regions and decreased activity of amygdala of the experienced meditators compared to the amateurs indicate that mindfulness significantly strengthens participants' ability of attentional capacity, body awareness, as well as engagement of cognitive control processes. Therefore, mindfulness could play a significant role in assisting treatment of borderline personality disorder, and this is proved to be effective in multiple researches. However, with existing papers, mindfulness can only have influence on some hallmarks of BPD rather than treat it and in some cases this method may not work. This may attribute to the instinct level of the ability of mindfulness. For some patients, they are hard to go into the mindfulness situation and cannot stay calm to perceive their feeling dispassionately. Mindfulness usually takes a long time to take effects and for emergency situations, thus it may not a good way to treat patients with BPD. Consequently, mindfulness should be accompanied with other sessions such as oral medicines or be included in DBT sessions and may not be appropriate as the main course in the treatment.

5. Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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