Major Depressive Disorder and Gender Differences

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Abstract. Major depressive disorder (MDD) has been a persistent mental health issue around the world. The fact that MDD has a higher prevalence in women has been a robust finding in the research literature and an unresolved problem. Therefore, this paper reviews the related literature and summarizes the main findings of gender differences in a variety of aspects, such as symptoms, diagnosis, and treatment. For instance, women usually have an earlier onset of MDD and report more symptoms and comorbidities, while men tend to have alcohol issues and negative attitudes toward MDD. Then, the paper explores the possible explanations that contribute to the gender gap through the lens of biology and socio-cultural elements. The biological aspect is examined through the elements of genes, brain functioning, and hormone. The socio-cultural explanation discusses the connection of MDD with socially constructed concepts of masculinity and femininity and women's social role conflicts. For example, while masculinity ideologies may restrict men's emotional expression of sadness and vulnerability, femininity sends the message that women should be caring and empathetic and should not express "masculine emotions" such as anger. This emotion suppression may influence them to mask their true emotions, which is associated with mental negativity. Lastly, implications and further research directions are suggested, given the current uncertainty in the literature.

Keywords: Major depressive disorder · depression · gender differences

1 Introduction

Rapid growth in the number of people suffering from major depressive disorder (MDD) is a disturbing trend in the mental health field. Commonly known as depression, MDD is a medical condition characterized by a persistent depressed feeling or lack of interest in activities, severely impairing normal daily functioning. The primary symptom of major depressive disorder is experiencing a lack of interest in daily activities and low mood for two consecutive weeks at the least [1]. Additionally, the patient should show at least four additional symptoms such as insomnia, loss of appetite or weight, fatigue, psychomotor agitation, feelings of worthlessness and guilty, decreased capacity for cognition and concentration, recurrent death-related thoughts, suicidal ideation, and more [1]. Moreover, in addition to the serious mental consequences MDD brings, MDD is also the leading cause of disabilities [2].

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An estimated 280 million individuals worldwide suffer from MDD — approximately 3.8 percent of the population [3]. MDD is a highly prevalent yet devastating mental illness in many nations. In the U.S., 8.4% of adults, or almost 21 million people, have suffered at least one depressive episode [4]. MDD affects 10.5% of American females and 6.2% of American males [4]. Similarly, data from the European Health Interview Survey indicates the depression prevalence was 6.4 percent, with a rate of 7.7 percent among women and 4.9 percent among men [5]. It is suggested that the prevalence estimate of MDD among Chinese adults was around 1.1 percent, with a higher female rate, which is significantly lower than the data from other countries [6]. However, this relatively low prevalence may not reflect the true rate but rather the low rate at which MDD is reported, diagnosed, and treated due to stigma, fear of discrimination, and a lack of adequate mental health resources [6]. In a similar way, Chinese people tend to somatize their symptoms of mental illness, such as headaches and stomachaches, which contributes to the relatively low depression rate [2]. Therefore, given its high prevalence and seriousness, MDD should be one of the important focuses of research.

Considering the statistics above, it is conspicuous that the female population demonstrates significantly higher rates of depression than males, regardless of country. Women have consistently and persistently been found to have a much greater prevalence of MDD in the literature. The global prevalence of MDD is 1.8 percent in males but 3 percent in females [7]. The DSM-5 also indicates that beginning in early adolescence, the prevalence of MDD in girls is 1.5 to 3 times that in boys [1]. The data on antidepressant use demonstrate that women have significantly higher use (17 percent) compared to men (8.4%) in the U.S. between 2015 to 2018 [8]. At the same time, female adolescents are found to be nearly four times more likely to self-harm than male adolescents [9]. From 2010 to 2020, there was a notable increase of 86 percent in the suicide death rate among female adolescents, compared to the 58 percent increase among male adolescents [9]. All the statistical evidence reflects that women are more prone to MDD. Therefore, there may be a differential risk of MDD based on biological sex differences. It is of paramount importance to investigate this gender imbalance because MDD has been a major health hazard. Understanding the gender gap is able to promote the understanding of the etiology of MDD through more detailed, specific lenses, which could be utilized in various respects, such as diagnosis and informing intervention and treatment. The gender gap is a reflection of health disparities. Therefore, it is important for this research to analyze this imbalance to encourage mental illness resources related to MDD and alleviate the burden of global depression. Furthermore, gender differences in MDD are an imperative indicator of gender equality. Since women are one of the marginalized groups, studying MDD concerning women, such as the family, social, and cultural impacts on them, provides insights into gender phenomenon and equality.

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2 Gender Imbalance in MDD

2.1 Gender Distinctions in MDD Symptoms

In general, there is sufficient evidence suggesting that there are various gender differences regarding the symptoms of MDD. The early research examines the clinical features of MDD with the control of biological sex and found that the only significant difference in MDD symptoms is women's increase in appetite and weight [10]. There is no significant gender difference in other aspects, such as severity, function impairment, or endogenous symptoms [10]. In other words, the symptomatology of MDD is relatively homogeneous in regard to gender [10]. However, the recent literature suggests greater gender differences in MDD symptoms. It is supported by evidence that the gender disparity in MDD symptoms can manifest as early as the age of 12 [11]. Then the gap begins to narrow during early adulthood, but it remains steady and significant [11]. Several symptoms have a higher tendency to occur among females, including fearfulness, crying, and increased appetite. [12]. Female patients typically report more symptoms compared to male patients, but the severity of MDD is generally the same for both sexes [13]. One Netherland clinical epidemiological study reports that women tend to have a younger onset age of single or recurrent MDD and higher comorbidity of panic disorder and panic disorder [14]. At the same time, the odds of having atypical depression among women were 1.3% higher than among men [14]. When considering sexual function, symptoms, and overall life quality, women report more sleep disruptions and sexual dysfunction, pain, depression, and sorrow [15].

On the other hand, the prevalence of co-occurring alcohol abuse or dependence is nearly two times higher in men [14]. Men are also susceptible to externalizing problems, including antisocial conduct and substance use [16].

2.2 Gender Disparities in Diagnosis, Help-Seeking, and Coping Strategies

The relationship between the higher prevalence of MDD and a higher diagnosis rate among women has been validated [17]. Clinic visits, marital status, and BDI scores can be predictive of the diagnosis of MDD, and all point to a higher likelihood of MDD among women than males [17]. When it comes to reporting and seeking care for MDD symptoms, females have a higher tendency than men to do this [18]. Males are more inclined to hold a negative outlook and are less likely to seek depression therapy. Instead, they are more prone to cope with the disorder through avoidance, alcohol, and placing the blame on others. [13]. In addition, it is observed that stress is the most significant attribution for the onset of MDD, and men are more likely to attribute their onsets to problems at work and physical illness, while women typically relate the beginning of their symptoms to issues in their relationships or a family member's illness or death [19]. In regard to coping mechanisms, emotional outlets, such as laughing, crying, and shouting, are more characteristic among females, while males tend to engage in sports activities and consume alcohol [19], which is consistent with the aforementioned findings.

2.3 Gender Differences in Treatment of MDD

The relationship between the treatment of MDD and gender has been a hotly debated topic among scholars. Some researchers emphasize the role of gender differences in various depression treatments, including medications, psychotherapy, and electroconvulsive therapy. It is stated that the efficacy and tolerability of antidepressants are different regarding genders: women demonstrate a better response to SSRIs and monoamine oxidase inhibitors, while men respond better to tricyclics and respond more rapidly to medications in general than women [20]. For psychotherapy, women with more severe MDD show worse responses, but in general, the outcome of cognitive behavioral therapy (CBT) is found to be similar between men and women, and gender is not considered a predictive factor of CBT results [20]. According to the more recent review by Gorman, several studies claim no gender difference in various treatments of MDD, while others report the correlation between gender and patients' responses to the treatments [21]. Some studies find no gender difference in antidepressant treatment, whereas there are studies suggesting differences: men respond better to imipramine, a tricyclic antidepressant, while women show a greater response to sertraline, an SSRI inhibitor [21], which is consistent with the aforementioned findings.

3 Discussion

The gender variations in the numerous facets of MDD highlight the necessity to identify potential explanations from a variety of angles. The discussion part will dive into the biological and socio-cultural explanations.

3.1 Biological Factors

Numerous studies imply that the MDD gender disparity may be attributable to biological sex variations.

In terms of genes, several loci are identified as conferring vulnerability to depression, such as serotonin receptor genes HTR1A and HTR2A, tryptophan hydroxylase gene TPH2, and 5-HTTLPR polymorphism [22]. However, some studies present that there is no evidence for the correlation between women's higher rate of MDD and dominant genes in the X chromosome [23]. There is no significant finding on the genetic impact on the gender difference in depression [23]. Nonetheless, the interaction between genotypes and environmental factors such as stress can produce depression [22]. It is hypothesized that adolescent girls may expose to more stress, such as body image issues and sexual maturation concerns, so that the genotype-stress interaction may be responsible for the appearance of the MDD gender gap around the age of adolescence.

The gender difference in MDD is thought to arise around the adolescent age due to the interplay between genotype and stress [22].

In addition, brain function is another important view concerning gender differences in depression. Some mechanisms, like serotonin neurotransmitters, undergo sexual differentiation, which may potentially provide insights into the gender imbalance in MDD [22]. However, additional study is needed to give more convincing findings in this area.

Many researchers argue that a difference in hormones between the sexes is a major factor in the observed gender gap in depressive symptoms. Women may be more vulnerable to mood disorders throughout unstable hormonal phases, such as puberty, prenatal or postnatal periods, and menopause [23]. It is proposed that hormones, including estrogen, testosterone, and DHEA, may be involved in the increasing depression among teenage girls [22]. Similarly, the cyclicity of estrogen and changing levels of hormones may render women vulnerable to mood and anxiety [24]. However, the relationship between hormones and depression is non-linear and interactive, and hormones are not the single cause of MDD [22]. The hormonal perspective needs to include the consideration of other facets, such as social impact.

3.2 Sociocultural Factors

On the social level, some researchers argued that masculinity and femininity act as predictive roles in life stress and depression [25]. The connection between socially constructed masculinity and men's depression is one crucial part of the discussion. Vulnerability is usually associated with femininity, whereas masculinity emphasizes restrictive or hard emotions such as anger and denial of vulnerable emotions in many cultures [13]. That is, masculinity and femininity are culturally seen as antagonistic [26]. Men are reinforced from an early age to avoid feminine behaviors, such as the "act in" behaviors when facing psychological conflicts like crying and talking to others, which are portrayed as weak [26].

As a result, this social construction of gender has a huge impact on men's acknowledgment and labels of depression. Research shows that adherence to masculinity is correlated with negative attitudes towards help-seeking in professional or non-professional sources like family and close friends [13]. The conformity might lead to externalization of symptoms as well, such as bad temper, hypersexuality, substance use, and aggression [13]. It is found that those men who endorse the masculine culture more are associated with higher depression scores [13]. There is a conceptual framework of masked depression that focuses on the "invisible" or "hidden" depression among men due to the restrictive masculinity norm [16]. Despite the fact that clinical evidence for masked depression is scant, it is found that gender role conflicts lend males to emotional suppression and communication difficulties, which makes the depression hard to be identified and seems hidden [16]. That is, the social expectations make them mask their emotions to be socially acceptable. However, suppression of negative feelings does not help to relieve the associated negative experiences and impacts [23]. Therefore, the suppressed but unrelieved negativity may burden their psychological distress. In a nutshell, the masculine norms and related stigma create barriers for men to recognize their depression, report it, and seek help for it.

On the other hand, there is less recent literature on femininity and depression. Generally speaking, femininity predicts depression to a lesser extent [25]. Nevertheless, the issue of emotional suppression also happens to women. Women are socially considered to show care and empathy to others, which is a form of self-sacrifice, and avoid unfeminine emotions like anger [23]. Thus, to fit into the social norms, women tend to mask their emotions like silence, which may result in a lack of real self-expression and feeling a loss of self in the long term [23]. This disconnection between the authentic self and

masked self might contribute to women's anguish and depression. Additionally, looking at the femininity ideologies of body objectification and inauthenticity in relationships and adolescent girls' mental health, it is found that girls who internalize femininity beliefs demonstrate more depressed moods and lower self-esteem, especially in regard to body objectification [27]. The femininity concept of body image and physical attractiveness is closely correlated to life quality and depression [28]. The lower self-perceived body image and attractiveness are connected to increased levels of depression and poorer overall life quality [28].

In addition to concepts of femininity, the impact of social roles on females' higher MDD rates is highlighted. Social roles such as wife and mother may burden women with additional responsibilities and stress as they are considered to be the one that takes care of house chores and children care [18]. The division of labor in families has not been changing much under the influence of power imbalance between males and females [23]. Typical married working women have less time for leisure and self-care due to the overload of home and office responsibilities, while husbands usually focus on work responsibilities and act as a helping role in the family, such as the times when their wives are not available [23]. At the same time, workplace discrimination and inequality toward women, such as wages and promotions, worsen the situation [18]. On the other hand, the role of homemakers has been devalued in society [18]. Thus, there is a dilemma for women regardless of whether they work or not.

Further, motherhood is closely associated with female identity. When women become mothers, the work-life balance is more challenging to achieve, and the adjustment in career and life often overburden them [23]. The socially constructed "good mother" concept emphasizes women's selfless sacrifice for their children [23]. While mothers who quit may be vulnerable to MDD because of a reduction in socialization and diminished self-value, mothers who work feel guilty and self-blame about not always being available for their children [23]. Thus, the overload and conflict of roles may have detrimental effects on women's mental health, which may contribute to the preponderance of females in MDD rates [18].

4 Implications

The findings on the topic of gender differences in MDD provide ample implications for the future. At the clinical level, gender differences can provide insights for the assessment, diagnosis, and treatment process of MDD, as well as training for physicians and therapists. There should be adequate knowledge that various aspects of MDD might be gender specific. As men tend to report fewer symptoms, they might tend to be misdiagnosed as not reaching the threshold. Consequently, it is essential to prevent under-reporting and clarify depressive symptoms, especially for some external symptoms that are easy to misdiagnose, such as somatic and emotional symptoms. When assessing female patients, it should be fully aware that women may have more symptoms, comorbidity of anxiety disorder and panic disorder, and other impairments, and attention should be paid to their menstrual cycle as well. Moreover, given the gender differences in treatment, the physician may adjust treatment plans for the patients. For instance, tricyclics can be prescribed to male patients and strengthen the examination of

alcohol consumption and alcohol abuse history. For women, SSRIs can be prescribed given the better response, and the prescribed dosage should consider comorbidity and menstrual cycle.

Regarding the possible explanations of the gender gap in MDD, further research, such as biological factors, is needed to establish conceptual models and direct evidence. In the socio-cultural lens concerning the socialization of masculinity and femininity, it is important to educate the concept of masculinity in a more positive light, such as courage and independence, and address the denial of "feminine behaviors" [13]. Investigating effective ways of eliminating men's depression stigma and raising awareness of the seriousness of MDD could be further studied in the future. At the same time, encouragement of help-seeking from professionals and non-professionals should also be emphasized. For females, as teenage girls may encounter more stressors during puberty, schools should provide mental health resources and enhance education on fostering healthy attitudes to body images. The reflection on women's role conflicts can be helpful for the social policy or regulation-making, such as advanced maternity leave and equal wages, which aim to alleviate the overburden of women and promote gender equality in the family and workplace, especially for pregnant women and mothers. It is also momentous to strengthen men's awareness of taking care of home responsibilities and appreciate women's input to the family.

5 Conclusion

In conclusion, the gender difference in MDD is well established that the number of females affected by MDD is nearly double that of males. This significant gender gap is reflected in symptoms, diagnosis, help-seeking, and treatments, and it can emerge as early as early adolescence, around 12 years old. Women demonstrate a younger onset of MDD, and more symptoms such as fearfulness, crying, sexual impairment, and atypical depression, while men tend to have the issue of alcohol abuse. As more women are diagnosed with MDD, men are found to be less willing to seek help and tend to use external attribution, alcohol, and avoidance as coping mechanisms. In terms of medication, women generally respond more slowly and respond better to SSRIs and monoamine oxidase inhibitors. Conversely, tricyclics tend to work better for men. Therefore, the wide range of gender differences is crucial to a comprehensive understanding of MDD and contributes to the improvement of treatment and intervention. The gender imbalance may be explained by biological factors, including genetic interaction, hormones, brain structures, and socio-cultural factors, which involve social constructs of masculinity and femininity and women's family-work role conflicts. However, there is still ambiguity with the gender gap, such as the mechanisms of gender affecting the risk factors, triggering events, and responses to treatment, and further research is needed to fill in the knowledge gap.

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