

Gender Differences in Major Depressive Disorder and Relevant Interventions

Jiajing Xiao^{1,a,*}

¹*School of Central China Normal University, Wuhan, Hubei, China;*

a. jiajing.xiao@mails.ccnu.edu.cn

**corresponding author*

Abstract: Depression can manifest in various ways. There are differences in age of onset, mood regulation, and personality traits between males and females with depression. Due to the interplay of genetic predisposition and environmental circumstances, gender variations in major depression disorder manifest in a variety of ways. Focusing on general gender differences in major depression and related interventions, this article discussed the differences and similarities between women and men with major depression disorder, the reasons for the differences, gender differences in major depression during adolescence, and interventions that take gender into account. As a result of the above research discussions, gender differences in major depressive disorder were concluded and interventions for adolescents were proposed. One of the limitations of previous studies is that they mainly focused on the gender differences during a certain developmental period. Future study should conduct longitudinal studies to investigate the dynamic changes of gender differences across different developmental stages. This review can provide some guidance for prevention and intervention programs at schools for major depressive disorder. These educational programs should incorporate gender differences into the curriculum.

Keywords: gender differences, Major Depressive Disorder, adolescence, interventions.

1. Introduction

Depression is currently a major cause of disability worldwide, impacting approximately 250 million people of all ages [1]. Depression often manifests in different ways, and it can lead to a diagnosis of Major Depressive Disorder (MDD). The unipolar–bipolar dichotomy is used to define mood disorders in DSM-III and DSM-IV, with the major depressive disorder being the key construct. According to previous studies, melancholia ought to be regarded as the most prevalent type of mood disorder. Researchers claimed that bipolar disease, catatonic depression, postpartum depression, depression with psychotic symptoms, and pathological grief are all manifestations of melancholia [2]. A change in prior functioning, such as a gloomy mood or a loss of pleasure or interest, which must also last for at least two weeks, is defined as a major depressive disorder.

Gender differences are typically connected with emotional competence, according to a growing number of research [3]. Boys and girls have different capacities of regulating emotions. Girls are more sensitive to emotions, especially negative feelings. Moreover, the adjustment of emotions differs by gender. Based on previous research, gender differences can be seen in many different areas. Girls suffer more anxiety and have a more difficult time managing their negative emotions than boys.

Limited access to efficient emotion regulation tools, as well as a lack of emotional clarity, were shown to predict anxiety in girls, whereas non-acceptance of negative emotional reactions were found to predict anxiety in boys [3]. Greater attention to and awareness of emotions in everyday life may highlight girls' difficulties in regulating negative emotions. On the other hand, boys have difficulties in being aware of their emotional states and express their emotions less. Emotional dysregulation may have less of an impact on boys.

Substantial elements, such as gender-bound social norms, a history of mental illness, a premorbid personality, as well as biochemical and genetic characteristics, can each play a part in predisposing an individual to depression [4]. Social norms require different responsibilities depending on the gender role. Most individuals shape their perceptions and behaviors according to the requirements of society. Males are usually considered to be rational and decisive. Society requires men to play roles that exhibit more control over their emotions. Men are raised to maintain traditional social norms of masculinity, which tend to be insensitive to depressive moods. Women, meanwhile, are expected to have friendly, approachable traits. Maintaining good relationships with others helps women survive and thrive. Women are more sensitive to emotions under social norms. It is possible for gender roles to have an effect on a person's self-efficacy, as well as their self-esteem, and the development of either an externalized or an internalized manner of coping strategy, which can affect vulnerability. A precipitant's normative gender-role, such as a traumatic life event, may influence the depressogenic reaction [2].

In some previous studies on this topic, research also examined the factors influencing depression differently in men and women. Studies have found that personality traits like conscientiousness and neuroticism are clearly connected to depressive disorder in women and play an important role in men's prevalence and course of subthreshold depressive symptomatology (SDS) [5, 6]. Furthermore, there may be a neural mechanism between personality traits and depression. This neural mechanism involves the area of the brain responsible for emotion processing, and different personality traits influence or predicts depressive symptoms through this neural mechanism. To most people, their depression is resulted from interactions between the environmental elements and genetic predisposition. The varied symptoms of depression may be mediated by numerous brain regions, which is inferred by the understanding of their function under normal situations. The cognitive aspects of depression may be mediated by hippocampus and neocortex, which are related to memory defects and feelings of desperation, doom, worthlessness, sense of guilty and tendency to commit suicide. There is superimposed genetic susceptibilities in major depressive disorder and the neuroticism personality. The serotonin transporter promoter region's polymorphism (5-HTTLPR) has tiny positive connections with bipolar disorder, suicide, and personality features related to depression [7]. Gene-environment interactions mediate the various symptoms of depression by interacting with personality traits.

In brief, existing research regarding the factors that influence the development of depression has been conducted in terms of both genetic and environmental factors. As for the research in MDD, the current studies mainly investigated the development of depression in the entire population. This review aims to examine gender differences in groups of adult patients, children, and adolescents, in terms of prevalence, comorbidity, anxiety, emotion dysregulation, personality traits, and seasonality. The purpose of this paper is to dissect gender differences in MDD by focusing on the differences and similarities between patients with MDD by gender, the different treatment modalities by gender, and to look at gender differences in MDD and relevant interventions from a developmental perspective. This review can provide guidance to prevention and intervention programs for MDD at schools. Gender differences should be incorporated into such educational programs.

2. General Gender Differences in MDD

2.1. The Difference and Similarity between Female and Male MDD Patients

Indeed, there are some differences between male and female patients in terms of disease manifestations and comorbidities. Studies have shown that the women's average age of onset in both single and recurrent MDD was lower than men, regarding the clinical features of depressive disorder. There exists significant difference in the occurrence probability of depressive symptoms between men and women when testing dichotomized IDS-SR30 items. Men more often report sad feelings, reducing emotional responsiveness, reducing pleasure or enjoyment, psychomotor agitation and psychomotor slowing. Women more tend to experience nocturnal insomnia, weight gain, somatic (pain) complaints, panic/fear symptoms, raising interpersonal sensitivity, and gastrointestinal complaints (diarrhea, constipation) [8]. Women are expected to be in a good shape and have good interpersonal relationships with other people, therefore, they may show more depression when it comes to weight concern and sensitivity to relationships. Women are more likely to feel insecure and more fearful of threats. Weight gain or changes in interpersonal circumstances can bring about changes in depressed mood, and the presence of depression further exacerbates their complaints and fears. Women showed more tendency to experience a comorbid alarm disorder with agoraphobia than men regard to axis I comorbidity. From another point of view, comparing with women, men are more probability to be diagnosed with co-occurring alcoholism or abuse [8]. Men and women regulate their emotions in different ways. Women relieve depression more often through words and expression. For men, they tend to drink to relieve stress, and when patients with MDD are likely to drink excessively, resulting in alcohol dependence or abuse. There may be gender-specific disparities in the clinical manifestations of MDD in men and women due to variances in how depressed individuals of different sexes see the world. Similarly, gender disparities in the comorbidity of MDD are the result of differences in how men and women cope with depressed moods.

In particular settings, men and women differ in their risk of illness and in the way they seek help. It is revealed that Syrian migrants face an unusually high MDD burden when seeking asylum in the survey of a Syrian refugee camp. Time spent in camps is an important MDD risk element which can be mitigated by accelerated relocation. The sudden outbreak of war destroyed people's homes and left many people without close family and friends. In the background of displacement, people's fears and sadness are intermingled. Persistent harsh conditions greatly elevate people's risk of major depression. Comparing to men, women have a more increased risk of MDD. Since a proportion of women are mothers with children, the instinct to worry about their children increases the severity of maternal depression. Women's care for their children may trigger more anxiety and worry, thus increasing their own risk of depression. In terms of the way people with MDD seek help, men who diagnose with current MDD showed more tendency to receive treatment in mental health organizations, while women tend to ask for a helping hand from alternative caretakers [8]. Men may have higher self-esteem and be reluctant to disclose their psychological problems like others. Also, under traditional social norms, men are considered to have the ability to solve psychological problems, so men with MDD do not receive good feedback when they seek help from others. And women's social skills allow them to get more help when they confide in other caregivers. A symbolic population research in Australia found that women showed more probability to exploit alternative and complementary medicine than men [9]. As can be seen, there is a clear difference in the way women and men seek help out of consideration of more factors.

There is no significant difference in severity and age-specific prevalence between male and female patients with MDD. It has not been established the gender diversity regarding the risk of becoming a feasible indicator or an intention to commit suicide [8]. For females in all age bands, the medium or severe morbidity impairment of MDD, Lundby depression, the regulation disorder of depressive

mood, DSM-IV mood disorder, and non-melancholic depression are significantly higher. But there was no such discrepancy, mean age, and age-specific rates of different types of depression onset in the aspect of gender [2]. Patients of both sexes have similar beginning ages, as well as the prevalence of certain forms of depression, age-specific prevalence, and severity.

2.2. Factors Underlying Gender Differences in MDD

Smoking, risk of alcohol consumption, lack of exercise and overall nutritional deficiencies are included in lifestyle risk elements. A health study on depression showed a clear association of gender in the accumulation of these elements. What's more, smoking and overall undernutrition are main determinants of depression risk in women [10]. Smoking is often done to alleviate the distress caused by real-life problems. On the one hand, people with MDD suffer from distress producing more depressed moods. On the other hand, the health problems associated with smoking have a negative impact on mood. Overall nutritional deficiencies are mostly due to the pathological control of weight in women. Overall nutritional deficiencies are mostly due to women's pathological control of their figures. Poor nutrition can exacerbate body image anxiety in women, and this anxiety increases the risk of depression in women. The certain reproductive events and the reduction or loss of antidepressant influence of estrogen of women because of menopause may cause their fragility to such factors. In addition to this, women are more conscious about their bodies. When women try to lose weight, they may engage in poor eating behaviors more often, such as dieting. This pattern of behavior may contribute to general nutritional inadequacies. The likelihood of suffering from depression is thought to rise in tandem with the severity of general dietary deficits. For patients with mild symptoms, lifestyle risk factors may exacerbate depressed mood and ultimately lead to MDD.

Seasonal disparities in depression between men and women are similarly influenced by the seasons. According to Fellingner et al., seasonal differences existed in hospitalization rates. Hospitalization rates for patients with episodes of moderate and major depression differed significantly between summer and winter, with the lowest hospitalization rates in summer and the highest rates in winter [6]. The fall and winter seasons are rainy and snowy, and the rain and snow lead to inconvenient outdoor transportation limiting people's travel. As outdoor activities are reduced, people's social activities are correspondingly reduced. People are more likely to experience an increase in negative emotions when they are affected by a decrease in human interaction. At this time, women are more severely affected because social activities are more important to the generation of women's emotions. Both men and women could be affected by a seasonal variation of their MDD symptoms and the dimensional seasonality trait which specified seasonal-affective disorder (SAD) might have more impact on women [6]. Seasonal changes bring changes in weather, and rainy days without sunshine may make people more depressed. Women, on the other hand, are more sensitive to changes in mood and thus are affected by greater seasonal changes. Men and women perceive seasons differently, and through the effect of seasonality on depression, it can be concluded that seasonality may lead to gender differences in MDD.

3. A Developmental Perspective of Gender Differences in MDD and Relevant Interventions

3.1. Gender Differences in MDD during Adolescence

Adolescents are in a critical period of growth and development, and depressive symptoms may prevent adolescents from learning and living normally, and may even lead to suicidal behavior in adolescents. Therefore, it is feasible and necessary to identify adolescents at risk for depression and to focus on gender differences in MDD during adolescence. In a study done by Connelly and colleagues, maternal depression was shown to be a major predictor of depression in girls [11]. In

addition to genetic inheritance, the mother's parenting style also affects her children. Girls grow up subconsciously imitating their mothers' behaviors. During the child's personality formation period, the mother's depressed mood or out-of-control behavior may be imitated by the child. Maternal depression affects girls more than boys, and in addition to genetic and physiological factors, the formation of personality traits in girls may unconsciously mimic the mental representations of their mothers. When children are 9 years old, maternal grief is predictive of depressive symptoms in females by age 13 but not in boys. Furthermore, discord with caretakers, family economics, and bullying is a significant factor for all genders. If they have experienced trauma early on, individuals may be more vulnerable and more likely to be depressed when faced with stressful events. When boys and girls face the same traumatic events such as caregiver conflict and bullying situations, girls may be more sensitive and more severely affected by the trauma. Not only does the family's financial situation affect the child's depression by influencing family relationships, but it may also lead to the child's depression not being diagnosed and treated in a timely manner. Neglect and delay of depressive symptoms leads to more severe major depression. Therefore, research on gender differences in MDD during adolescence can consider the effects caused by the broader family context.

Gender differences are also reflected in the interaction with the environment. Meiser et al.'s study examines depressive symptoms, dependent interpersonal, dysfunctional attitudes, non-interpersonal stress, and gender variations in the structure of adolescents' interactions in children and early adolescents [12]. To summarize, the findings of this research may aid in the treatment or prevention of depression in teenagers (especially girls).

3.2. Incorporating Gender Factors in Interventions

Social support from parents, instructors, and close friends may have mitigated the link between depression and suicidal thinking [13]. Individuals who have more social support can buffer the negative effects of depression. When someone has MDD, having social support from their parents, peers, instructors, and close friends helps lessen the intensity of depression and the likelihood that they would have suicide thoughts. Considering the impact of mental health and suicide risk on youth, and for the implementation of early interventions in the prepubertal stage, schools should establish and maintain positive social connections between staff and students. Schools should assist adolescents, particularly females, in developing close and supportive connections with their peers, given the value of peers and close friends. A specific course for adolescent females, which integrates physical activity, well-being, positive thinking, mental health, and screen time habits is conducted. It can be implemented in secondary schools as an elective within the teaching and learning context and is based on gender differences in major depressive disorder [13]. The results of this study could help treat or prevent depression in adolescents. Gender factors are incorporated into the intervention and adolescents reduce the risk of depression through social cooperation, curriculum learning, etc.

4. Conclusions

In sum, depression differs by gender, and as a specific condition of depression, MDD has similarities and differences in disease characteristics in men and women. There are no gender differences in the severity of morbidity and age-specific incidence of MDD patients, while there are differences in clinical features and comorbidities of depression between men and women with MDD. Seasonal fluctuations and lifestyle risk factors are the primary contributors to gender disparities in MDD. Smoking and a lack of adequate nutrition are particularly strong risk factors for depression in women, but not in men. The seasonal variations of MDD episodes impacted both sexes similarly. Men with psychotic depression are the only exception, who did not demonstrate any seasonal change in their symptoms. Gender differences in MDD during adolescence were related to the effects of maternal

depression, caregiver conflict, family income, and bullying at school. Incorporating gender into interventions can better prevent and reduce the impact of MDD on adolescents. Although existing research has revealed important insights about gender differences in MDD, there are still many overlooked aspects that need improvement. One of the limitations is that most studies have not explained the reasons for the differences from a neurobiological perspective. The conclusions drawn in these studies lack neurobiological support. Future research should be conducted in conjunction with neurobiological measures. Another limitation is that previous studies mainly focused on one developmental period. Future research should examine the long-term changes of gender differences in MDD. This paper can provide some guidance to the design of prevention and intervention programs for depression at schools.

References

- [1] James, S.L., Abate, D., Abate, K.H., Abay, S.M., Abbafati, C., Abbasi, N., Abastabar, H., Abd-Allah, F., Abdela, J., Abdelalim, A., Abdollahpour, I., Abdulkader, R.S., Abebe, Z., Abera, S.F., Abil, O.Z., Abraha, H.N., Abu-Raddad, L.J., Abu-Rmeileh, N.M.E., Accrombessi, M.M.K., ... Murray, C.J.L. (2018). Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990–2017: A systematic analysis for the Global Burden of Disease Study 2017. *The Lancet*, 392(10159), 1789–1858.
- [2] Bogren, M., Brådvik, L., Holmstrand, C., Nöbbelein, L., and Mattisson, C. (2018). Gender differences in subtypes of depression by first incidence and age of onset: A follow-up of the Lundby population. *European Archives of Psychiatry and Clinical Neuroscience*, 268(2), 179–189.
- [3] Bender, P.K., Reinholdt-Dunne, M.L., Esbjørn, B.H., and Pons, F. (2012). Emotion dysregulation and anxiety in children and adolescents: Gender differences. *Personality and Individual Differences*, 53(3), 284–288.
- [4] Kuehner, C. (2003). Gender differences in unipolar depression: An update of epidemiological findings and possible explanations: Gender differences in depression. *Acta Psychiatrica Scandinavica*, 108(3), 163–174.
- [5] Serrano, D., Mart íLluch, R., Cárdenas, M., Solanas, P., Marrugat, J., Vilalta-Franch, J., and Garre-Olmo, J. (2022). Gender analysis of the frequency and course of depressive disorders and relationship with personality traits in general population: A prospective cohort study. *Journal of Affective Disorders*, 302, 241–248.
- [6] Fellingner, M., Waldhör, T., Serretti, A., Hinterbuchinger, B., Pruckner, N., König, D., Gmeiner, A., Vyssoki, S., Vyssoki, B., and Fugger, G. (2022). Seasonality in major depressive disorder: Effect of sex and age. *Journal of Affective Disorders*, 296, 111–116.
- [7] Levinson, D.F. (2006). The genetics of depression: A review. *Biological Psychiatry*, 60(2), 84–92.
- [8] Schuch, J.J.J., Roest, A.M., Nolen, W.A., Penninx, B.W.J.H., and de Jonge, P. (2014). Gender differences in major depressive disorder: Results from the Netherlands study of depression and anxiety. *Journal of Affective Disorders*, 156, 156–163.
- [9] MacLennan, A. (2002). The escalating cost and prevalence of alternative medicine. *Preventive Medicine*, 35(2), 166–173.
- [10] Kim, S. (2022). The relationship between lifestyle risk factors and depression in Korean older adults: A moderating effect of gender. *BMC Geriatrics*, 22(1), 24.
- [11] Connelly, J.P., and O’Connell, M. (2022). Gender differences in vulnerability to maternal depression during early adolescence: Girls appear more susceptible than boys. *Psychology in the Schools*, 59(2), 297–315.
- [12] Meiser, S., and Esser, G. (2019). Interpersonal stress generation—a girl problem? The role of depressive symptoms, dysfunctional attitudes, and gender in early adolescent stress generation. *The Journal of Early Adolescence*, 39(1), 41–66.
- [13] White, K., Lubans, D.R., and Eather, N. (2022). Feasibility and preliminary efficacy of a school-based health and well-being program for adolescent girls. *Pilot and Feasibility Studies*, 8(1), 15.