Depression

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Among the various mental illnesses, depression is probably among the most well-known ones. Depression, with its full name major depressive disorder, is a mental disorder that can seriously interfere with one's cognition and daily activities[1]. In 2017, an estimated 17.3 million adults and 2.3 million adolescents, which presented 7.1% of adults and 9.4% of adolescents in the United States, had experienced depression at least once[2]. Furthermore, 64% of these adults and 71% of these adolescents suffered from severe impairment during the depressive episodes[2]. Due to this high prevalence and impairment rate, people have started to pay attention to this health condition, subsequently turning depression into a public health issue. Over the years, researchers have gradually determined the risk factors of depression and found out ways to prevent depression to some extent, and the findings would be the focus of this report.

There are many types of risk factors, but in this report, only biological, psychological, and behavioral risk factors would be discussed. To ensure there are indeed biological, or genetic, risk factors that cause depression, researchers first investigated if those share some same genes would be more likely to get depression together. One of the most profound studies is called twin studies, which analyzes the gene pattern of twins, either identical twins, meaning sharing 100% of their genes, or non-identical twins, meaning sharing 50% of their genes. These studies show that identical twins have a much higher risk of depression, which means the cause of depression is highly related to genetic factors, and in fact, further studies show that one with a depressive parent or sibling has 2 to 3 times greater risk of developing depression[3]. Having learned there are genetic risk factors, researchers started investigating which particular gene or genes would contribute to depression, and they conducted studies analyzing the difference in genetic patterns of depressive patients and those free of depression. According to the different theories about depression, they analyzed genes responsible for serotonin production, mitochondrial dysfunction, and many others, but so far there is still no evidence showing which genes have a decisive impact on the onset of depression[4]. However, this is still a promising field due to the results of twin studies, and if some genes were eventually proved to cause depression, gene editing could become another powerful treatment for this condition.

Psychological risk factors are more common sense. The almost stereotypical causes of depression, such as physical or emotional abuse, miserable childhood, and loss of beloved ones, are all considered psychological risk factors[5]. Despite unavoidable events, sometimes one's behavior can cause depression. Studies show that smoking, obesity, limited physical activity, and a less healthy diet are all behavioral risk factors, and younger ones are even more vulnerable to these behaviors than adults[6]. Moreover, the more risk factors one has, the higher odds one would develop depression[6]. The importance of understanding these risk factors is that, rather than looking back at these causes after the onset of depression, it would be more useful to apply preventive measures as soon as these events or behaviors took place, and this understanding brings up the next topic, which is how to prevent depression.

Prevention is divided into primary, secondary, and tertiary. By learning the behavioral risk factors, it is easy to infer the methods of primary prevention: quit smoking, exercise more, and have a healthier diet. Also, by common sense, learning to cope with stress and occasional socialization can

prevent depression on the primary level. As for secondary prevention, there are many versions of depression screenings, such as PHQ-9 and CES-D, which can be filled out online. Results and suggestions would come out immediately, which could urge those with early signs of depression to seek treatment. Despite medication, cognitive therapy is also a good way for tertiary prevention. This therapy is designed to correct false and negative self-beliefs that can worsen one's mental status, and studies show it is even better than medication in reducing relapses[7].

From these foundational public health topics, especially the different types of prevention, the key takeaway for biostatistician is that, though the future career may be entirely focused on clinical trials and medical research, it is important to understand that health is not only about medication and therapies in the tertiary prevention. Primary and secondary preventions also matter, and, if fully investigated, can be more effective than tertiary prevention alone. Another takeaway is that sometimes health disparities may respond differently to existing treatment. For example, one with a lower socioeconomic status developed depression and may not have access to existing expensive medication and therapies. Thus, it is important to consider these groups before making any public health decisions.

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