

Research on the Influencing Factors of Depression Based on Regression Analysis

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Abstract. With the rapid development of living standards, mental health has gradually become a topic of concern in people's daily lives. Among the many psychological problems of the 21st century, depression has become a widespread concern. The symptoms of depression include low mood, unhappiness, inability to find things that interest oneself, and a decline in willpower. According to the latest statistics from the World Health Organization, about 5% of adults worldwide suffer from mild or severe depression, and some of them choose to have a light life. This shows that the negative impact of depression is very significant. Therefore, scientists from around the world are also further studying the causes of depression and the related factors that affect the probability of depression occurrence. This article conducted regression analysis and correlation coefficient analysis on the influencing factors of depression. Firstly, by comparing the impact of the probabilities of bidirectional emotional disorders, dietary disorders, and alcohol use disorders in different countries on the incidence of depression. Furthermore, the per capita Gross Domestic Product (GDP) of different countries and the changes in the incidence of depression over time and after the promulgation of relevant policies were analyzed.

Keywords: Depression, influencing factors, regression analysis.

1. Introduction

In recent years, with the accelerating pace of life, mental health has become a new topic, and depression is one of the most concerning topics. Depression has become a mental symptom of today's era. It should be noted that patients with depression not only need to endure psychological pain but also physical discomfort, as well as facing societal biases against the disease [1]. So, understanding this disease is also a further understanding of the depression population, and understanding the factors that lead to depression can help effectively avoid the induction of depression.

In the magazine *The Lancet*, depression is listed as the third largest cause of disease in the world. The symptoms of depression include low mood, unhappiness, inability to find things that interest oneself, and a decline in willpower. Among them, the core symptom of depression is low self-evaluation, which leads to some suicidal thoughts or behaviors. According to the latest statistics from the World Health Organization, about 5% of adults worldwide suffer from mild to severe depression. Although there are currently many readily available treatments for mental illness, over 75% of patients in low-income and middle-income countries are unable to receive effective treatment. This includes investment in mental health care, lack of qualified healthcare providers, and social discrimination against patients with mental illness [2]. The above literature indicates that depression is becoming a very important topic in today's society and has also attracted widespread attention in the international community.

The influencing factors of depression are complex and diverse and have attracted considerable attention from scholars both domestically and internationally. 1) Firstly, certain types of depression in families with a high incidence of genetic depression may recur and have genetic characteristics. For example, in identical twins, if one pair suffers from depression or mania, the other pair also has a 70% to 80% chance of suffering from this disease. The probability of nonidentical twins developing this disease will decrease to 25% [3-5]. Researchers in New York and Brussels have divided adopted

children surveyed into two groups, one with depression and the other without depression. They found that among relatives who are related by blood to the affected group, the probability of developing depression and alcoholism is much higher than others. 2) Biochemical factors may also lead to the onset of depression. About 30 years ago, doctors discovered that some drugs can significantly change patients' emotions. There are various opinions on why drugs can change emotions, and most hypotheses believe that this is the result of neurotransmission [6]. 3) Sleep is also an important project in emotional research, and people with or without emotional disorders have different sleep patterns. For example, rapid eye movements related to dreams occur earlier in patients with emotional disorders. 4) Disability, severe physical illness, postpartum, marital discord, lack of social interaction (loneliness), and academic or work pressure are most factors that promote the development of depression. Experts from the American Institute of Mental Health analyzed data from a large-scale psychological disease survey conducted in the United States regarding the relationship between environmental, social, and psychological factors and depression [7]. 18000 adults aged 18 and above living in five communities were surveyed at home, and about 10% of the respondents were diagnosed with depression. The survey found that women of all age groups have a higher risk of developing severe depression compared to men. The incidence rate of major depression was the highest in families aged between 18 and 44, separated, divorced, or unhappy in marriage. In addition, depression is also a serious problem among the elderly and is easily misdiagnosed. They always complain about physical symptoms rather than psychological symptoms, so the probability of suicide is also high.

The above research results have conducted extensive research on different factors, but there is still insufficient research on the relationship between various mental illnesses and depression. There are many types of mental illnesses. Among them, bipolar disorder includes two situations: manic and depressive. When manic, emotions rise, speech increases, and when depressed, emotions decrease without pleasure, which may turn into depression [8]. Eating disorders refer to a disease caused by abnormal eating habits and excessive attention to food size and weight, mainly known as anorexia psychological, where patients do not eat to maintain their weight. Eating disorders are usually also a symptom of depression [9]. Alcohol use disorders, including alcohol abuse, alcohol dependence, etc. Patients often have vague language and weak control and judgment. Many patients often experience depression by numbing themselves with alcohol [10]. There may also be a certain connection between different mental illnesses. This article mainly studies the effects of bipolar disorder, dietary disorders, alcohol use disorders, per capita GDP, and social attention to mental illness on the incidence of depression.

2. Method

2.1. Data Sources

This dataset is from the Kaggle website and includes data on mental health diseases and prevalence rates from countries around the world. The raw data includes numerical values for the probability of bipolar disorder, dietary disorders, alcohol use disorders, and depression in 231 countries and regions from 1990 to 2017.

2.2. Indicator Selection and Description

This article will select some representative countries, such as the Asian region, Latin American region, European region, North American region, Australian continent, and African region, as the research objects. To obtain the correlation between the incidence of depression among countries with different levels of development, and whether bipolar disorder, dietary disorders, and alcohol use disorders have an impact on the probability of depression.

This article also selects the relevant data on the per capita GDP of various countries in 2017 released by the National Bureau of Statistics of China, as the value of per capita GDP can basically represent the level of wealth of a country's citizens and the amount of disposable wealth each citizen has. Therefore, the main purpose of selecting per capita GDP as a reference data is to represent the

economic situation of each individual. This includes countries with representative continents such as Australia, China, the United States, Canada, Japan, and Germany.

In addition, this article also selected the incidence rates of bipolar disorder, dietary disorders, alcohol use disorders, and depression in China from 1990 to 2017 in the original data table. The purpose is to compare the probability trends of various diseases to determine whether they are related to the incidence of depression, as well as the trend characteristics of depression incidence over time and social development in China over the past 18 years.

2.3. Research Method

This article adopts the analysis method of univariate linear regression. Linear regression analysis refers to the statistical method of using regression analysis in mathematical statistics to determine the quantitative relationship between two or more variables that are interdependent. Univariate linear regression is a method of comparing the correlation between two types of data to obtain a scatter plot and then using the method of fitting a straight line to estimate the relationship between two variables. In addition, we also analyzed the correlation coefficients of the two columns of data to determine the degree of correlation between the data and the data.

3. Result Analysis

As shown in Table 1, the incidence rates of bidirectional affective disorders, dietary disorders, alcohol use disorders, and depression in various countries in 2017 are presented. The data in the table shows that the incidence of depression in developed countries is higher than that in developing and underdeveloped countries.

As shown in Fig. 1, the per capita GDP data of developed countries such as the United States, Germany, and Japan are relatively high, while the per capita GDP data of developing and underdeveloped countries are relatively low.

Table 1. Probability of mental disorders and depression in different countries

Development Level	Country	Year	Bipolar disorder (%)	Eating disorders (%)	Alcohol use disorders (%)	Depression (%)
developing	Japan	2017	0.688	0.454	0.583	3.342
	Australia	2017	1.142	0.943	1.512	4.624
	Austria	2017	0.940	0.675	1.824	3.261
	Belgium	2017	0.947	0.604	1.466	4.109
	Germany	2017	0.777	0.522	1.806	3.960
	Canada	2017	0.716	0.477	1.618	3.989
	United States	2017	0.651	0.513	2.040	4.836
	China	2017	0.322	0.160	1.221	3.311
	Brazil	2017	1.107	0.277	2.684	3.297
	Colombia	2017	0.769	0.260	1.759	2.196
underdeveloped	Ghana	2017	0.643	0.147	1.008	3.397
	Algeria	2017	0.819	0.214	0.665	3.661

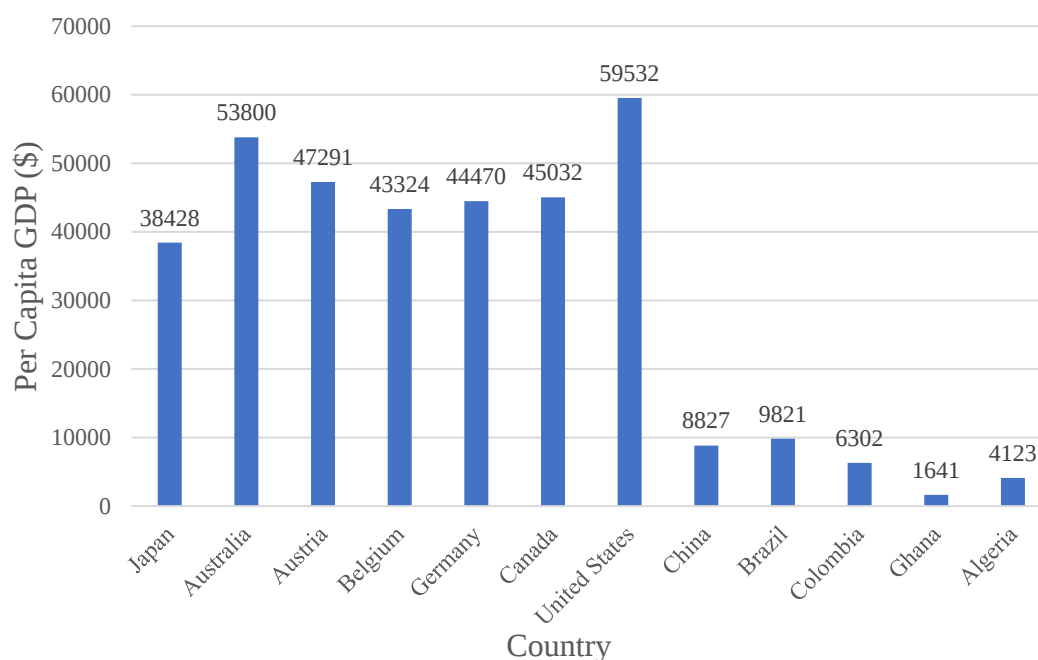


Figure 1. Per capita GDP of each country in 2017 (Photo credit: Original)

Fig. 2 shows the changes in the incidence of depression in China from 1990 to 2017, as well as the changes in the incidence of bipolar disorder, dietary disorders, and alcohol use disorders. Fig. 2 shows a significant downward trend in the incidence of depression in China from 1990 to 2017.

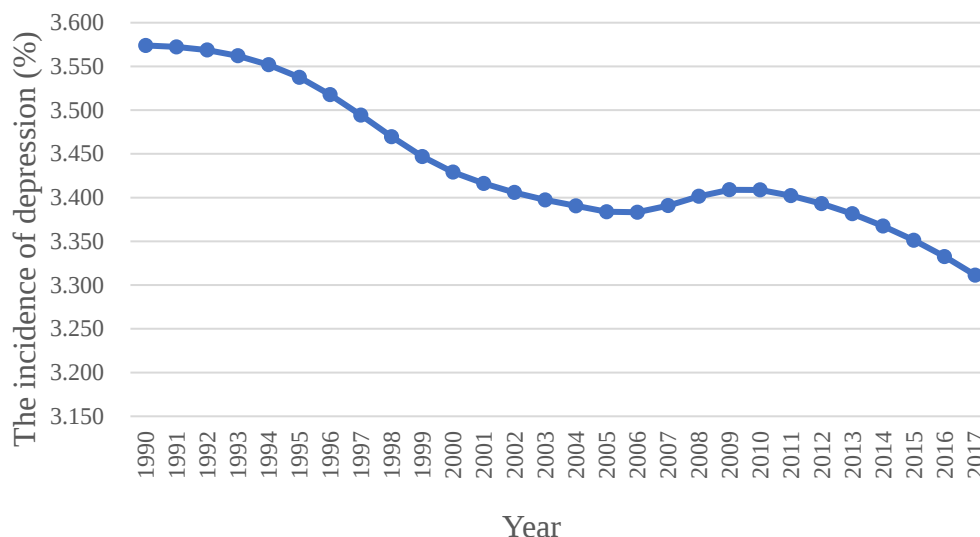


Figure 2. Incidence rate of depression in China in 2017 (Photo credit: Original)

Fig.3 shows the relevant trends of changes in bipolar disorder, dietary disorders, and alcohol use disorders in China from 1990 to 2017. By observing the icons, it was found that they all showed a slow upward trend, which is completely different from the downward trend in the incidence of depression.

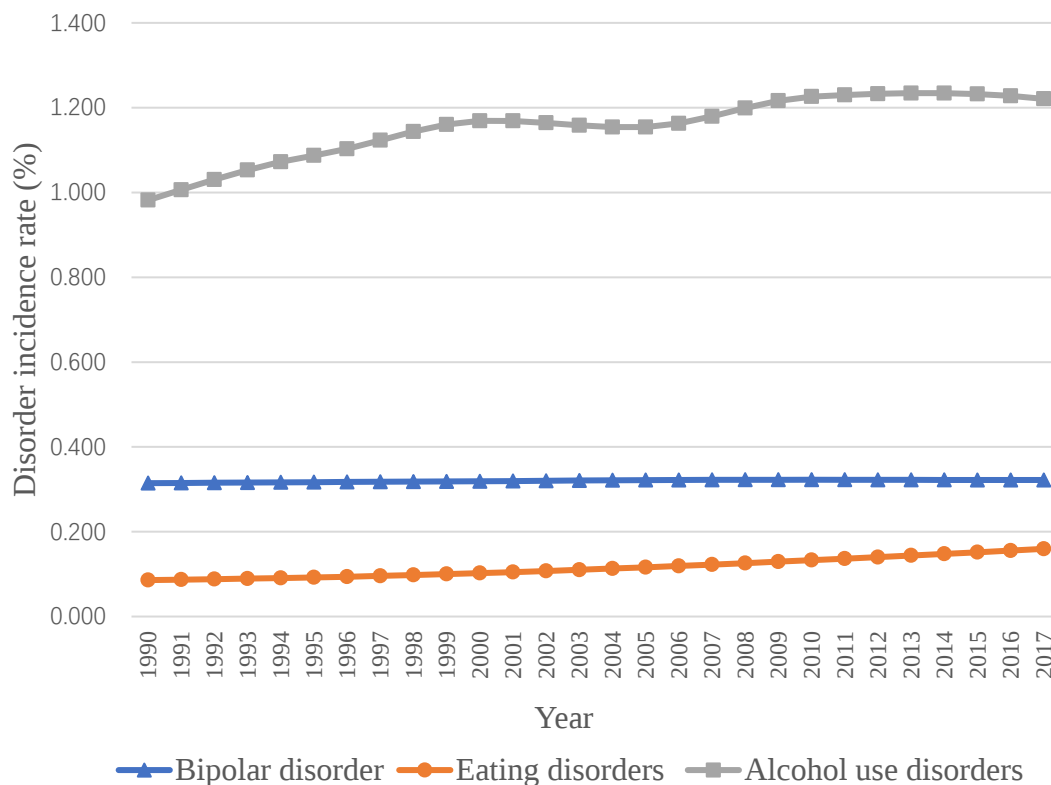


Figure 3. Incidence rate of various disorders in China from 1990 to 2017 (Photo credit: Original)

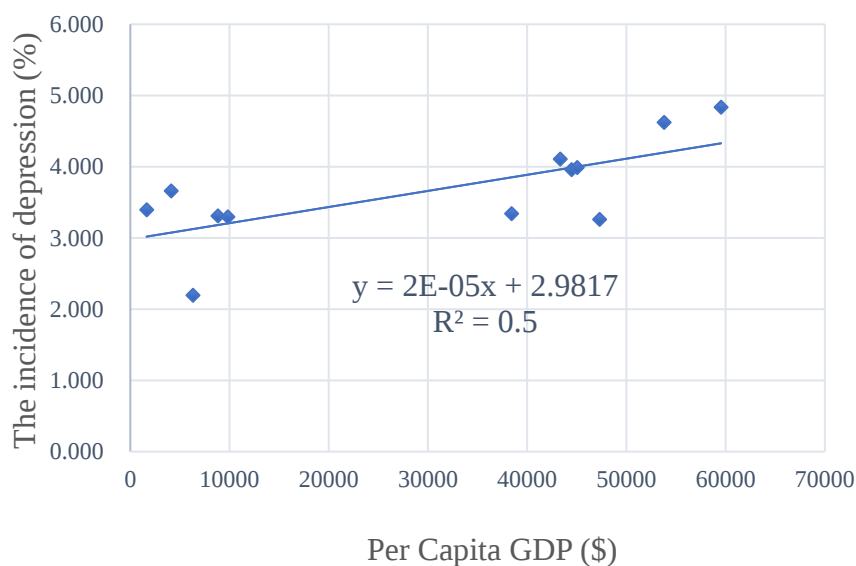


Figure 4. Per capita GDP and incidence of depression in various countries (Photo credit: Original)

These twelve countries are representative countries from Asia, Europe, Africa, Australia, North America, and South America, respectively. The 12 scatter points in Fig. 3 correspond to the per capita GDP values of Algeria, Australia, Austria, Belgium, China, Colombia, Brazil, Germany, Ghana, Japan, the United States, and Canada in 2017, as well as the corresponding positions of depression incidence in the chart. Univariate linear regression analysis was performed on them, and the univariate linear equation was obtained as $y = 2 \times 10^{-5}x + 2.9817$ (see Fig.4).

This article uses the method of linear regression to select the values of per capita GDP and the incidence of depression in the above 12 countries in 2017. The results are shown in Figure 3, and there is a significant positive correlation between the incidence of depression and per capita GDP, and The determination coefficient value, R , is obtained $R^2 = 0.5$, a significant positive correlation between the incidence of depression and per capita GDP. Reported by Russian satellite news agency.

The incidence of depression in Iceland reached 10% in 2021, but Iceland's GDP is leading in the world, and there is currently no scientific explanation for this phenomenon.

In addition, this article also analyzed the correlation coefficients between the incidence trends of bipolar disorder, dietary disorders, and alcohol use disorders and the incidence trends of depression. The correlation coefficients between the incidence rates of these three disorders and the incidence of depression are $r_1=-0.934$, $r_2=-0.878$, and $r_3=-0.915$.

They are all very close to -1, indicating a significant negative correlation.

4. Conclusion

Based on the relevant data provided by the dataset and the mapping analysis, this paper draws the following conclusions: in Asia, Africa, North America, Latin America, Australia, Europe, and other regions, there are different degrees of depression incidence rates. According to the comparison of per capita GDP, there is a significant positive correlation between the incidence of depression and the value of per capita GDP, meaning that countries with higher per capita GDP have a higher probability of depression. In addition, for the incidence of related diseases in China from 1990 to 2017, such as bipolar disorder, eating disorder, and alcohol use disorder, the incidence of depression showed a significant negative correlation with these mental disorders and alcohol use disorders. The correlation coefficients between the three disorders and depression were: $r_1=-0.934$, $r_2=-0.878$, and $r_3=-0.915$, all very close to -1, indicating a significant negative correlation.

Based on the incidence of depression in China from 1990 to 2017, there is a significant downward trend. The "Special Action Plan for Comprehensive Strengthening and Improving the Mental Health Work of Students in the New Era" jointly issued by the Ministry of Education and 17 other departments pointed out that comprehensive strengthening and improving the mental health work of students in the new era, enhancing their mental health literacy, etc, It has been planned in the long-term plan from 2023 to 2035, so with the development of time, social progress, and the gradual attention of the country to mental health issues, it has also become one of the factors that have led to a decrease in the incidence of depression in China in the past 20 years.

Although this article cannot comprehensively analyze the influencing factors of depression, it also makes relevant conclusions to reduce the incidence of depression. It is hoped that more scholars can join the industry of analyzing the influencing factors of depression and even mental health, and contribute to eliminating possible factors of depression and reducing the incidence of depression.

Authors Contribution

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

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