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The Impact of Lifestyle Habits on the Risk of Developing Psychological Disorders

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Abstract: Since COVID-19, the incidence rate of psychological disorders has shown an increasing trend, and its treatment is facing greater challenges, which has become a difficult problem in today's society. Previous psychological disease screening scales were mainly self-reported and were greatly influenced by subjective factors. This article is based on psychological disease data from Kaggle, and attempts to establish a Logistic regression prediction model using lifestyle habits such as smoking, alcohol intake, diet, and sleep habits as predictive indicators. The research results indicate that at a significance level of 0.001, alcohol intake, diet, and sleep habits have a positive predictive effect on psychological disorders. In contrast, smoking has a negative predictive effect on psychological disorders. In summary, this study suggests using alcohol intake, diet, and sleep habits as indicators for predicting psychological disorders. It explains the negative predictive effect of smoking related to short-term stress events but does not recommend improving mental health through smoking. In the future, it can refine the statistical methods of independent variables and establish more specific predictive models.

Keywords: lifestyle habits, psychological disorders, logistic regression

1. Introduction

Psychological disorders refer to a type of disease that affects an individual's thinking, emotions, behavior, and mental health. These diseases can seriously affect an individual's daily life, work, and interpersonal relationships. In recent years, according to reports from the World Health Organization (WHO), global mental health issues have been rapidly increasing, with the prevalence of depression and anxiety diseases increasing by approximately 18% over the past decade [1]. The report issued by the Institute of Psychology of the Chinese Academy of Sciences also proves that the development trend of psychological problems in China is similar to that in the world [2].

There are various treatment methods for psychological disorders. There are two mainstream methods: drug therapy and psychological therapy. Drug therapy is effective quickly, but its drawbacks are also very obvious, such as the easy occurrence of side effects and drug resistance. Although psychotherapy has fewer side effects, its effectiveness is slow and limited by the level of psychological counselors, making it a treatment method with high variance. There are two existing methods for preventing psychological disorders. The first and more common method is self-testing scales, where participants rate themselves based on the relevant symptoms on the scale and then calculate the total score to assess their risk of psychological disorders. Research has shown that self-

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reported scales may be influenced by patients' subjective emotions, social expectations, and other factors, leading to inaccurate results. Some patients may underestimate or overestimate their symptoms [3]. At the same time, as a high-risk group for mental illness, teenagers often do not truthfully report their psychological situation due to social pressure, shame, and other influences [4].

Lifestyle habits often refer to people's performance in various aspects such as exercise, sleep, diet, and social behavior. Bad lifestyle habits may increase the risk of psychological disorders. Similarly, people with psychological disorders often exhibit differences in lifestyle habits compared to others. For example, regular exercise can help reduce the occurrence of depressive symptoms. Sleep disorders (such as insomnia or excessive sleep) are closely related to depressive symptoms [5, 6]. In terms of diet, Janus found that a diet pattern rich in fruits, vegetables, and Omega-3 is associated with a lower risk of v [7]. Finally, social isolation and lack of social support are important risk factors for psychological disorders in numerous studies [8, 9].

Compared to self-assessment scales, lifestyle habits are less influenced by the subjective factors of patients. Therefore, this study takes this as the independent variable and uses a logistic regression model to investigate its impact on the risk of psychological disorders. It is expected to construct the first line of defense in the current increasingly serious problem of psychological disorders.

2. Method

Whether or not one has a mental illness is a binary discrete variable. The value of ‘Y' only includes suffered and not suffered, so using a binary logistic regression model is the most suitable. Compared to traditional linear regression models, binary logistic regression models map the model output to a probability value representing the probability of an event occurring, ranging from 0 to 1. Therefore, it has the advantage of not requiring the dependent variable to follow a normal distribution. In addition, its computational efficiency is high, and the computational complexity is only related to the number of features, making it suitable for handling social survey problems containing a large amount of data in this study. The specific principle is as follows;

$$Ln\left(\frac{p_i}{1-p_i}\right) = \beta_0+\beta_1 x_1+\beta_2 x_2 + \cdots +\beta_p x_p \quad (1)$$

In this model, $Ln\left(\frac{p_i}{1-p_i}\right)$ is a linear function of x, p_i is the probability of the event being studied occurring, $\frac{p_i}{1-p_i}$ is the chance ratio, which is the probability ratio between the event being studied "occurring" and "not occurring". The regression coefficient β_i refers to the change in the logarithm of the ratio caused by a one-unit change in the explanatory variable while keeping other variables constant. β_0 is a constant term and x_i is the independent variable.

3. Results

3.1. Descriptive statistics

This study selected a dataset from Kaggle that covered 413768 individuals, including information such as gender, age, lifestyle habits, and whether they had previously suffered from psychological disorders. The preliminary descriptive statistics are shown in Figure 1, with the horizontal axis representing the age groups of the subjects, the vertical axis representing the corresponding number of people, and the histogram colors corresponding to whether they have suffered from psychological disorders.

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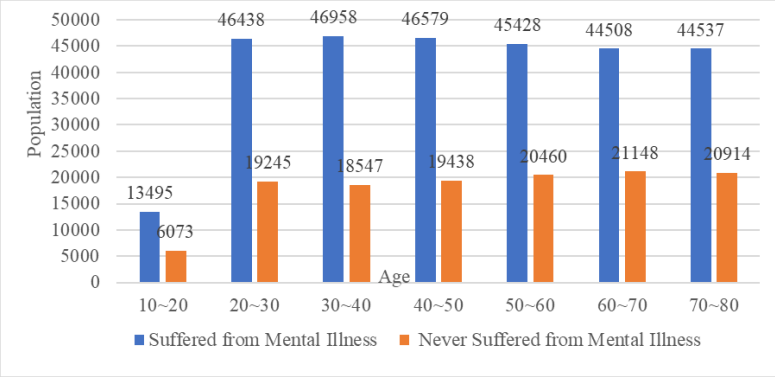

Figure 1: Descriptive statistics of psychological disorders (Photo/Picture credit: Original).

It can be seen that except for the small total amount caused by age-specific factors such as 10-20 years old, the distribution of the rest of the data and whether they have psychological disorders are relatively uniform. Specifically, regardless of the age group, 30% of people have had psychological disorders.

This study selected smoking status, alcohol consumption, dietary habits, and sleep patterns as independent variables. The proportion of independent variables at each level is shown in Figure 2.

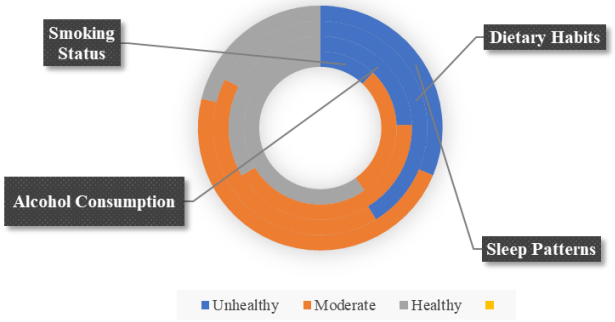

Figure 2: Descriptive statistics of independent variables (Photo/Picture credit: Original).

In terms of lifestyle habits, more people prefer healthier ways when it comes to smoking status and alcohol consumption. When it comes to lifestyle habits with less obvious side effects such as diet and sleep, most people tend to lean towards unhealthy lifestyles. In addition, in previous studies, family history of psychological disorders has been considered an important influencing factor for an individual's risk of psychological disorders [10]. Therefore, this study introduced a family history of psychological disorders as a background variable. The descriptive statistics are shown in Figure 3.

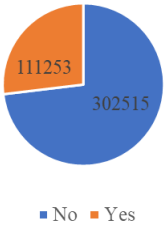

Figure 3: Family history of psychological disorders (Photo/Picture credit: Original).

For the convenience of data processing, the variables of the data were reassigned from small to large according to the principle of health. For example, for the Smoking Status variable, assign non-smoker to 0, former to 1, and current to 2.

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3.2. Logistic regression analysis

This study used logistic regression analysis, and the results are shown in Table 1.

Table 1: Results of regression analysis

Variable	Coefficient	Std. Error	Z-Statistic	Prob.
Smoking Status	-0.024	0.0049	-5.108	0.000
Alcohol Consumption	0.024	0.0045	5.573	0.000
Dietary Habits	0.082	0.0047	17.624	0.000
Sleep Patterns	0.114	0.0047	24.115	0.000
Family History of Depression	0.022	0.0076	2.920	0.001
Intercept	-1.074	0.0098	-109.137	0.000

According to the regression results, the logistic regression model is as follows:

$$Ln\left(\frac{p_i}{1-p_i}\right) = -0.024X1 + 0.024X2 + 0.082X3 + 0.0114X4 + 0.022X5 - 1.074 \quad (2)$$

When it comes to the Z-test, the Z-statistic test value for smoking status is -5.108, the Z-statistic test value for alcohol consumption is 5.573, the Z-statistic test value for dietary habits is 17.624, the Z-statistic test value for sleep patterns is 24.115, and the Z-statistic test value for family history of psychological disorders is 2.920. According to the Z-distribution table, t the P-values are all less than the confidence level coefficient α=0.05 of Z, indicating that the coefficients of the regression equation are not all 0 and the regression equation is very significant.

3.3. Advise

Based on the regression results, the following conclusion can be drawn: alcohol consumption, dietary habits, sleep patterns, and family history of psychological disorders are positively correlated with whether people have psychological disorders. This has been proven in previous studies, for example, an Australian study showed a high comorbidity rate between alcohol abuse and psychological disorders [11]. This further proves the credibility of this study. Among them, the Z-values of diet and sleep habits are relatively large, reflecting their strong influence on the dependent variable. One possible explanation for this is that eating and sleep disorders are symptoms of psychological disorders, while smoking and alcohol intake are not. That is, if the patient is at risk of developing psychological disorders, this risk will in turn affect the patient's eating and sleeping behavior. Therefore, the effects of these two independent variables observed in logistic regression analysis are more powerful.

In summary, this study suggests that maintaining healthy lifestyle habits can significantly reduce the probability of developing psychological disorders in individuals. For the prevention and treatment of psychological disorders, alcohol consumption, diet habits, and sleep patterns can serve as new risk predictors.

In addition, there is a negative correlation between smoking status and psychological disorders, indicating that smokers have a lower risk of developing psychological disorders. This study attempts to explain. The current mainstream view in academia regarding the origin of psychological disorders is that if short-term stress events exceed a person's psychological threshold, they will trigger the mind's defense mechanism, namely psychological disorders. Although smoking is harmful to the human in the long term, it does have a role in relieving stress in the short term. Therefore, when humans are exposed to overly strong short-term stress events, if smoking behavior can help reduce their psychological stress to below the threshold, it can significantly reduce the risk of psychological

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disorders. This study only explains but does not recommend keeping mental health through smoking. Previous studies have also found that smoking is harmful to mental health in the long term, and the effect of quitting smoking on mood and anxiety disorders is comparable to or greater than that of antidepressant medication treatment [12].

4. Conclusion

This article analyzed the psychological disorders data of 413768 people and selected smoking status, alcohol consumption, dietary habits, and sleep patterns as independent variables. Among them, alcohol consumption, dietary habits, and sleep patterns have a positive predictive effect. Therefore, this study suggests that they be included in the predictive indicators of psychological disorders. For the negative predictive effect of smoking status, this study attempts to explain it through the relationship between smoking and short-term stress events but does not recommend maintaining mental health through smoking.

This study is constrained by the qualitative statistical approach of the independent variables and therefore only discusses the impact relationship, failing to obtain a more accurate predictive model. In the future, the statistical methods of independent variables can be optimized. For example, for alcohol consumption, weekly intake amounts can be used as the statistical method instead of high, medium, and low values. For sleep patterns, daily average sleep time can be used as the statistical method instead of health. Correspondingly, using new statistical models to obtain more specific prediction models.

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