Treatment Research on Mental Diseases of Brain Organic Mental Disorders Based on Big Data

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Abstract. In the field of medical research, even for the same disease, different scientific methods are usually used for research and experiments, but the final results are not the same. This article aims to analyze the treatment plan of organic mental disorder in mental illness based on the big data field of view and synthesize different existing research results. Based on the application of big data in medical experiments, this article uses big data technology to quantitatively analyze and process the related research results of brain organic mental disorders and the treatment data of similar cases, and use appropriate statistical methods to analyze multiple research results. Perform quantitative, qualitative, systematic and standardized comprehensive analysis to study different treatment methods and treatment effects of organic mental disorders. The experimental results show that the treatment of organic mental disorders based on big data can observe and understand the patient's condition in real time, and adjust the treatment plan in time. Compared with traditional treatment methods, the probability of detecting the condition in time has increased by about 13%, and the treatment effect on brain organic mental disorders has increased by about 15%.

Keywords: Big Data; Mental Illness; Brain Organic Mental Disorder; Multiple Regression Analysis

1. Introduction

1.1. Background and Significance
At present, the number of patients with mental disorders worldwide is increasing, and their prevalence of physical diseases is high [1]. With the rapid development of China's economy and the improvement of people's living standards, people's attention to mental illness represented by mental illness is also increasing [2]. In this context, as a mental illness that seriously affects people's spiritual life and even causes physical diseases and threatens people's life and health, its medical research has received more and more attention [3]. However, there are many kinds of research on mental diseases, especially brain organic mental disorders, and the treatment methods are not the same. There is no more systematic treatment plan [4].

Angermeyer evaluated the latest developments in population-based mental health attitude research based on representative population research surveys on beliefs and attitudes about mental illness...
published from January 2005 to December 2014 [5-6]. It turns out that in the ten years covered by the survey, there were more papers on psychiatric attitude research than in the entire previous period. However, the methodological quality of these studies differs greatly, and there is a lack of rigorous evaluation of the progress and shortcomings of the research on mental illness attitudes [7]. Chritinin extracted data on mental health status and management from the mental health information system of a mental health center in Beijing in June 2016, and used a logistic regression model to explore the results of management differences between Beijing and non-Beijing people. Mental illness [8-9]. The study covers the types of serious mental illnesses, the time of illness, current treatment status, state management methods and treatment methods, and the prevalence of developmental disorders in patients with mental illness in Beijing City [10]. However, due to the large differences between patients with severe mental disorders living in cities and local residents, the study did not propose constructive treatments for mental illness.

1.2. Innovations in This Article
In order to analyze and compare the effects of different research and treatment plans for mental illnesses such as organic mental disorders, this article explores the use of big data and other technologies to analyze and study mental illnesses of mental disorders caused by brain organic mental disorders by using medical database resources. Features and more successful treatments. The innovation of this research lies in making full use of valuable medical research information resources through big data and other technologies, discussing various treatment options for brain organic mental disorders, and on this basis, combining the actual conditions of the patients and various therapies to propose new combination treatments Program to improve the therapeutic effect and cure rate of brain organic mental disorders.

2. Big Data Analysis Method for Mental Illness Medical Research

2.1. Application of Neural Network Model in Medical Research of Mental Illness
At present, with the rapid development of science and technology such as computers, the level of medical technology has also made huge breakthroughs. In the medical field, data resources for research results of various diseases are already very abundant. Big data and other technologies can make the most of these valuable medical data resources and give full play to their value. As an important research result in the development of big data and artificial intelligence, the neural network model can take advantage of machine learning big data, analyze and predict the condition of patients with various diseases through a large amount of medical data, and select the best treatment plan in related research. Has an important role in the medical research of mental illness. In the neural network model, assuming that the random training set used for machine learning is \( \{a_i | i = 1, ..., m\} \), where \( a_i \) represents the child node in the neural network structure, and \( P_x(a_i) \) represents all parent nodes of the child node, the joint probability distribution of the neural network model is as follows.

\[
P(a_1, a_2, ..., a_n) = \prod_{i=1}^{n} P(a_i | P_x(a_i))
\]

(1)

Each state in the joint probability distribution can be represented by the product of conditional probabilities, that is, the probability of each state of each variable can be calculated. After knowing the structure of the neural network, the learning of the neural network is only parameter learning. Maximum likelihood method and Bayesian estimation method are two commonly used parameter learning methods in data set integrity model learning. After the network model is determined, the maximum likelihood function of parameter \( \alpha \) and data set \( S \) can be obtained according to the data samples as shown below.

\[
\log L(\alpha | S) = \log \prod_{i=1}^{n} P(a_i | \alpha) = \sum_{i=1}^{s} \sum_{j=1}^{m} \sum_{k=1}^{n} n_{ij} \log(a_{ik})
\]

(2)
2.2. Multiple Regression Analysis Model of Medical Experiment Data

(1) Regression Analysis

Regression analysis is a statistical method that can analyze and aggregate multiple research data collected, and provide a quantitative average effect for answering research questions. The advantage of this is that the reliability of the conclusion can be improved by increasing the sample content and the contradictions in the research results can be resolved. A quantitative review of the literature to collect the results of multiple independent studies on the same topic. Based on strict design, we use appropriate statistical methods to systematically, objectively and quantitatively analyze the results of multiple studies. To perform regression analysis, you first need to determine the effect value of the research results, that is, statistical data that can be used to measure the quality of the research results. Generally, correlation coefficient, relative ratio, standard relative deviation, etc. can be used as the effect value.

(2) Multiple Regression Analysis Model

Multiple regression analysis models can be divided into fixed effects models and random effects models. The difference between the fixed-effects model and the random-effects model is that the fixed-effects model assumes that there is only infra-study variation between studies and no inter-study variation, and they are random effects. The model considers both infra-study variation and inter-study variation between studies, so inter-study variation must be considered when modeling. In order to facilitate understanding, we first take the binary model as an example to introduce the two models of the multiple regression analysis model. In regression analysis, a result obtained through certain experimental data is called a research. Suppose there are \( N \) related medical studies, and each study has two effect values, that is, the study results, and each study obeys the bi-variate normal distribution under the fixed effect model setting.

\[
Y \sim MVN(\mu, S), \quad Y = \begin{pmatrix} y_{1i} \\ y_{2i} \end{pmatrix}, \quad \mu = \begin{pmatrix} \mu_1 \\ \mu_2 \end{pmatrix}, \quad S_i = \begin{pmatrix} \sigma^2_{1i} & \rho \sigma_{1i} \sigma_{12} \\ \rho \sigma_{1i} \sigma_{12} & \sigma^2_{12} \end{pmatrix} (3)
\]

Where \( \rho \) represents the correlation coefficient between the two effect sizes in the study numbered \( i \), \( \mu \) refers to the expectation of the two effect sizes in all study sets, and \( \sigma^2_i \) refers to the variance of the first effect size in the study. \( S_i \) refers to the co-variance matrix within the study. Under the setting of the random effects model, the total variance includes not only the infra-study variance, but also the inter-study variance. Similarly, the total correlation coefficient can also be decomposed into the infra-study correlation coefficient and the inter-study correlation coefficient. Since the model has assumed that the studies are independent of each other, the maximum likelihood estimation method can be used to estimate the model parameters. Assuming that the effect values of all studies are the same and there are no missing values, according to the principle of maximum likelihood estimation, the expected estimated value can be obtained by solving the maximum value of the likelihood function, but the expected estimated value is required, and it needs to rely on The co-variance matrix \( \hat{C} \) is iterated repeatedly through the Newton iteration method until it converges to obtain the estimated value \( \hat{\mu} \) of the overall expectation.

\[
\hat{C} = \left( \sum_{i=1}^{n} (\Delta + S_i) \right)^{-1}, \quad \hat{\mu} = \left[ \sum_{i=1}^{n} (C + S_i) \right]^{-1} \left[ \sum_{i=1}^{n} (\hat{C} + S_i) \right]^{-1} y_i \quad (4)
\]

(3) Application of Regression Analysis in Emotional Management of Mental Illness

A large number of studies have shown that the occurrence of many physical diseases is closely related to the impact of mental illness, and emotional management is one of the important treatments for mental illness. Currently, emotional regulation has not yet formed a standardized definition. Many researchers try to define emotions based on the content, function and process of emotion management. Although it is not possible to evaluate the content and functions of emotional management through an absolutely unified standard, multiple regression analysis can highly fit the research results of many
scholars and a large number of practical case studies, thereby obtaining a highly credible emotional management Functional data to help improve the effectiveness of mental illness treatment.

3. Medical Experiment of Brain Organic Mental Disorders under the Big Data Perspective

3.1. Data Collection and Prepossessing

In order to ensure the reliability and comprehensiveness of the data collected for the treatment of organic mental disorders, this paper uses big data mining technology to collect relevant data from medical databases for classification and processing, so as to obtain important reference data for this research. Based on these medical research data, scientific, effective, and standardized evaluations of the therapies for various brain organic mental disorders are conducted, and finally the evaluation conclusions and deficiencies of these therapies are drawn, and improvements are made in the course of the experiment. This article uses SPSS22.0 software to process and analyze the experimental data by performing descriptive statistics, t-test and multiple logistic regression analysis methods. Statistics with P values less than 0.05 are considered statistically significant. On the basis of controlling the effective variables and the treatment plan of brain organic mental disorder, the research results show that there are significant differences between the two groups of experiments in whether innovative therapies under the vision of big data are used.

3.2. Design of Medical Experiment for Mental Disorder of Brain

The purpose of this experiment is to study innovative treatment methods and curative effects of brain organic mental disorders under the big data perspective. The experimental objects of this study are the treatment status and treatment effects of patients with three different degrees of organic brain mental disorders: mild, moderate and severe. Taking into account the different circumstances of the patient's living area, age, gender, and symptoms, this paper initially designed a random sampling experiment to select patients with different degrees of cerebral organic mental disorders in different regions and different ages for medical experimental research. On the premise of following the voluntary principle, this article designs the procedures for the treatment of brain organic mental disorders based on the guidance and help of psychologists, and records the patient’s illness time, current treatment status, state management methods, treatment results and Situation data such as the probability of cure and the probability of recurrence.

4. Discussion on Medical Experiment of Brain Organic Mental Disorder

4.1. Data Mining in Medical Research on Brain Organic Mental Disorders

Organic mental disorder is different from ordinary mental diseases. It is usually a mental disorder caused by physiological vascular diseases such as brain trauma and brain infection. However, because it is also affected by the patient's mental condition, it will also be classified as a physical and mental illness. This article uses big data mining to obtain the neurotic-ism, extroversion, openness, homogeneity, rigor and other clinical characteristics of patients with organic mental disorders of different degrees from medical databases. As shown in Table 1, there are statistically significant differences in these clinical characteristics between patients with mild, moderate and severe brain organic mental disorders and those without mental disorders.

| Prevalence | Neurotic | Extroversion | Openness | Homosexuality | Rigorousness |
|------------|----------|--------------|----------|---------------|--------------|
| None       | 23.57±8.43 | 32.43±6.57   | 24.62±8.34 | 30.93±5.82    | 27.38±9.32   |
| Mild       | 30.54±9.24 | 28.37±6.23   | 22.64±9.87 | 28.54±5.36    | 21.87±8.73   |
| Moderate   | 31.12±7.68 | 26.87±6.93   | 23.76±9.85 | 22.53±5.47    | 26.51±7.64   |
| Severe     | 31.98±9.83 | 24.13±7.42   | 22.39±9.97 | 25.33±5.21    | 21.32±6.74   |

In order to have a clearer and more intuitive understanding of the clinical characteristics and current research status of organic mental disorders, this paper draws the data collected from the above
survey into a clustered column statistics chart as shown in Figure 1.

![Clustered Column Statistics Chart](image1)

**Figure 1.** Comparison of clinical features of different degrees of organic mental disorders

4.2. *Therapeutic Effect of Organic Mental Disorders*

According to related research, this article mainly analyzes and analyzes the neurotic response NR, neurotic depression ND, the probability of timely detection of the disease, the current treatment effect TE, the cure rate CR, and the recurrence rate RR of patients with brain organic mental disorders. Evaluate the therapeutic effects of the innovative therapies for mental disorders with organic mental disorders based on the big data perspective proposed in this research and other traditional therapies such as etiological treatment, symptomatic treatment and drug treatment. As shown in Figure 2, the innovative therapies for mental illnesses of organic mental disorders based on big data have significantly improved the diagnosis of such mental illnesses. The probability of detecting the condition in time has increased by about 13%. The therapeutic effect of qualitative mental disorder has increased by about 15%, its cure rate has increased by about 13%, and the recurrence rate has decreased by about 9%. This fully demonstrates that the innovative therapies for mental disorders of brain organic mental disorders based on big data in this study have a good application effect and play an important role in the treatment of mental disorders of mental disorders.

![Comparison of Therapeutic Effects](image2)

**Figure 2.** Comparison of the effects of different therapies on brain organic mental disorders
5. Conclusions

The analysis and research of mental disorders and organic mental disorders based on the big data perspective is to explore how to use big data and other technologies to make full use of the valuable medical research data resources accumulated over a long period of time for brain organic mental disorders, etc. The treatment of mental illness and other types of diseases provides more choices and references for high-quality therapies. And on this basis, improvements and innovations can also be made based on the advantages and disadvantages of previous studies to improve the therapeutic effect of diseases such as organic brain disorders. In the innovative treatment of brain organic mental disorders based on big data vision, medical staff can not only understand the patient’s condition at any time and adjust the treatment plan in time, but can also select the best based on the successful cure of similar cases in related research. Therapies increase the patient's chance of cure. With the continuous development of medical technology, it is believed that in the near future, the treatment and research of these diseases will be able to make even major breakthroughs, and big data technology is an important medium for the valuable value of these research results.

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