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A Study on Big Data-Based Analysis of Risk Factors for Depression in Adolescents

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Abstract

The purpose of this study is to explore adolescent depression, increase understanding of social problems, and develop prevention and intervention strategies. As a research method, social big data was used to collect information related to 'youth depression', and related factors were identified through data mining and analysis of related rules. We used 'Somtrend Biz Tool' to collect and clean data from the web and then analyzed data in various languages. The study found that online articles about depression decreased during the school holidays (January to March), then increased from March to the end of June, and then decreased again from July. Therefore, it is important to establish a government-wide depression management monitoring system that can detect risk signs of adolescent depression in real time. In addition, regular stress relief and mental health education are needed during the semester, and measures must be prepared to deal with at-risk youth who share their depressed feelings in cyberspace. Results from these studies can be expected to provide important information in investigating and preventing youth depression and to contribute to policy development and intervention.

Keywords: Big Data, Adolescent Depression, Risk Factors, Positive Factors, Negative Factors

1. INTRODUCTION

Depression affects all ages and genders, and depression in adolescence is chronic, recurrent, and negatively impacts interpersonal relationships and academics, making it an important social problem that increases adolescents' growth and the likelihood of developing other mental disorders [1]. Adolescence is prolonged due to the complexity of social structures and needs, and adolescents' influence on family, school, and society is increasing. As a result of these changes, runaways, domestic violence, school violence, and mental health problems are on the rise, and are recognized as serious social problems, especially adolescent depression, which can lead to problems adjusting to home and school, suicide, and mental health problems in adulthood [2]. This depression is a social problem because it is associated with suicide, and most people who commit suicide suffer from depression [3-4], and the WHO has also published a study on the Global Burden of Disease (GBD) on depressive disorder as one of the most important goals to intervene in the 21st century [5, 7, 8].

Recently, with the spread of smart media and SNS, the use of the internet and SNS has skyrocketed, and

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media. Social media creates a network of individuals, groups, and social relationships, and contributes to the rapid spread of news and issues. Therefore, social issues as well as everyday news spread quickly through social media [6].

Governments and companies around the world can effectively solve social problems and develop policies through the use and analysis of social big data through social media. With the rapid increase in the influence of social media, social media is playing an essential role in responding to emergencies and crises, and messages left on online media have become an important source of understanding the sensibilities and sentiments of the times, and policy demands can be predicted through social big data analysis [7-8]. Social big data analysis includes thematic analysis and opinion mining, and utilizes a variety of data through network analysis and statistical analysis [9]. This analysis is useful for identifying and causating the correlation of the information discussed and can improve predictive power, but the factors related to depression in social big data are defined as frequencies within online documents, so they may differ from existing theories and are likely to need to be tested in future studies [10-11].

The main purpose of this study is to promote a comprehensive understanding of adolescent depression and to develop depression prevention and intervention strategies, and to conduct research to investigate the causes and effects of adolescent depression that is influenced by many factors in the home, school, and social environment. The study collected information related to adolescent depression using social big data, identified various factors affecting depression through data mining and analysis of association rules, collected and refined data from the web using the 'Somtrend Biz Tool', analyzed data in various languages to extract depression-related keywords, and predicted policy demand through social big data analysis. The details of the study are as follows.

1) Collect search terms related to the current status of the impact of adolescent depression on social media with big data.

2) Check the correlation between search terms and adolescent depression with big data.

2. RESEARCH METHODS

2.1 Research Subject

The factor analysis of youth depression in Korea was conducted using search statistics collected from online news sites, social media such as blogs, cafes, and social media bulletin boards. As shown in Figure 1, a total of 56,987 topics related to search terms searched on the channel from January 1, 2022 to October 31, 2023 were collected and analyzed.

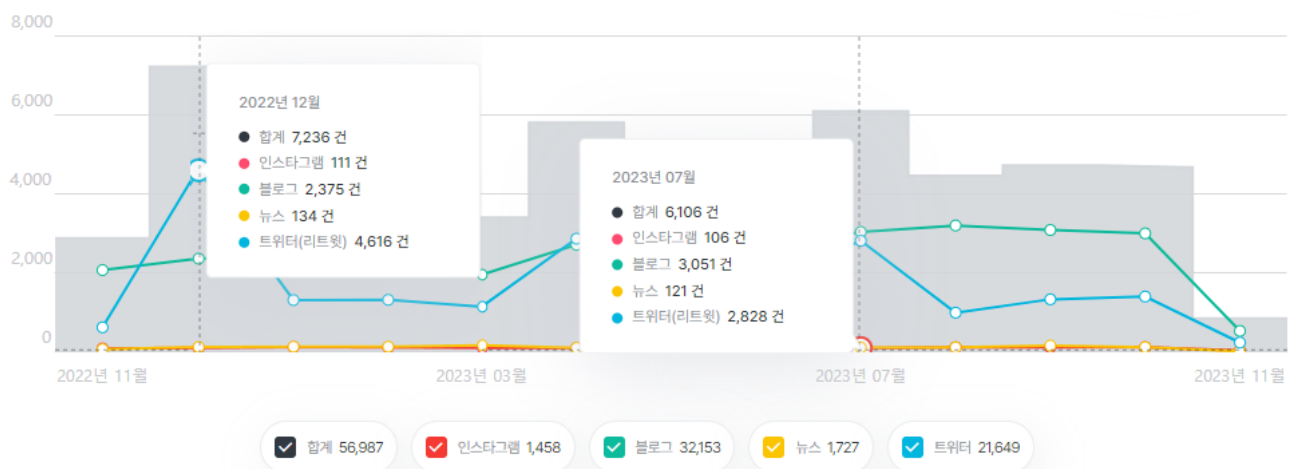


Figure 1. Trends in the amount of mentions according to the source of adolescent depression

Pre-treatment was performed according to the data collection of the mentioned words, sentences, and contents of adolescent depression. Text mining is a method used to refine unstructured data using stemming techniques to find frequencies, similarities, and regularities. In this study, the keyword adolescent depression was centered on and the extracted text was refined using the sometrend biz tool. In this study, online documents from web pages, blogs, news, Facebook, and Twitter containing the keyword adolescent depression were extracted and analyzed. In the pre-processing, except for nouns such as common words, adjectives, and adverbs, and foreign words, all non-words were treated as non-words, and only the main words related to the commercial sphere were used. The analysis process of text mining first went through the pre-processing process for the extraction of key keywords, and then data mining was carried out.

3. ANALYTICS OF BIG DATA

Figure 4 analyzes the results of a search for words associated with adolescent depression. If you look at the words mentioned, you can see that they are made up of school, anxiety, therapy, mental health, puberty, anxiety, health, etc.



Figure 4. Search for associations in adolescent depression

Figure 5 shows the change in related words for the monthly search results of adolescent depression and shows the top five related words searched from 2022 to October 2023.

🏆 전체순위 ⓘ 2022.11.08~2023.11.07

순위	연관어	건수
1	스트레스	22,555
2	불안	12,418
3	증상	9,556
4	자살	7,709
5	마음	6,487

Figure 5. Year search rankings related to teen depression

4. RESULTS

In Figure 6, the monthly change in associations shows that common words are stress: 22,555, anxiety: 12,418, symptom: 9,556, suicide: 7,709, and mind (including emotions, thoughts, and spirit): 22,544. The top 5 cases were checked in the overall ranking, and it can be confirmed that they are under a lot of stress due to adolescent depression. As you can see in Figure 6, related words such as stress, anxiety, and suicide are at the top of the list.



Figure 6. Monthly change in ranking of related words of adolescent depression

Figure 7 shows the analysis of positive or negative words in depression-related emotional words, with positive words in blue, negative in red, and neutral in yellow.



Figure7. Positive or negative words in adolescent depression

Positive words include happiness, help, effectiveness, hope, love, and positive words, while negative words include stress, anxiety, not good, fatigue, sadness, depression, tension, aftereffects, and anger., despair, danger, etc . In addition, neutral words appeared as regular, shocking, etc. When divided into positive and negative words, negative answers account for a large proportion of 77%.

5. CONCLUSION

The purpose of this study was to analyze the depressive trends and risk factors of adolescents in Korea through the analysis of associative rules and decision trees in data mining using social big data. According to the study, the number of online articles related to depression tends to decline from January to March, when school is on the first day, rises in March, peaks at the end of June, and then declines again in July. Specifically, 24.5% of documents reported negative feelings related to depression in 2014 conducted by the ministry of education in 2014, similar to the rate of experiencing depression in the adolescent health behavior online survey (26.7%). In the prediction of associations to the causes of depression, adolescents exchange depressive discourse, such as suicidal ideation, online, and these references can be exposed as psychological and behavioral traits associated with actual suicide. Therefore, if risk signs of depression in adolescents are predicted online, a real-time depression management monitoring system should be established at the government level. In addition, adolescents are often exposed to depressive feelings during the school year, so they need education related to stress relief and mental health on a regular basis during the school year. In addition, it is essential to respond to at-risk youth who exchange depressive feelings in cyberspace, and it is necessary to provide crisis management information to at-risk youth, as well as crisis management information and educational programs for parents and teachers.

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