Analysis of Posts on Social Network Service Related to Panic Disorder Using Text Mining

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Panic attacks have different clinical characteristics among individuals and countries. This study aimed to identifiy clinical characteristics of panic attacks. We collected 8,728 Twitter posts related to panic disorder from January 1 to December 4, 2020 and analyzed crucial and simultaneous emergence keywords. Term frequency, term frequency inverse document frequency, degree centrality, and N-gram analyses were conducted using RStudio and TEXTOM. We also classfied results of Term frequency for panic disorder into physical symptoms, triggers, occurrence time, occurrence place, mood, mentioned pathology, mentioned person, and coping methods. Depression, drugs, respiration, and stress were keywords related to panic disorder. Hyperventilation, palpitations, and shaking were common physical symptoms. Highly ranked triggering situations were stress, sound, trauma, and coffee. Drugs and hospitals ranked high as coping methods. These results clarify various aspects of panic attacks and provide a basis for identifying the characteristic clinical aspects of panic disorders among Koreans.

Key words : panic disorder, Twitter, text mining, keyword analysis, n-gram analysis

Introduction

Panic disorder is a mental disorder that causes extreme fear and pain due to unexpected panic attacks. It also results in anticipatory anxiety and significant maladaptive changes in daily life (American Psychiatric Association [APA], 2013). Panic refers to extreme fear and is accompanied by palpitations, hyperventilation, chest pain, suffocation, and fear of dying (Park, 2016). According to the World Mental Health Survey, the lifetime prevalence of panic disorder is 1.7%, and the number of patients with panic disorder in Korea has increased annually to approximately 110,000, 140,000, and 180,000 in 2015, 2017, and 2019, respectively (de Jonge et al., 2016; Healthcare Big Data Hub, 2020).

Panic disorders degrade quality of life and can also place a heavy burden on patients and family members due to the impairment of social and occupational functioning, productivity degradation, and medical expenditures (Bandelow & Michaelis, 2015; Olaya et al., 2018; Taylor et al, 2020). It is a chronically progressive disorder, with various complications such as anxiety neurosis, depression, social phobia, agoraphobia, and hypochondriasis. Panic disorder is also associated with substance abuse, alcohol abuse, and suicidal ideation and often recurs when treatment is stopped (Craske & Stein, 2016; Kwon, 2013; Nock et al., 2018; Park, 2016; Santos et al., 2019).

Panic attacks appear suddenly —making them difficult to predict and have various causes. External stimuli that cause panic attacks include poor ventilation or dizziness, bright and wide places, extremely hot or cold places, and places wherein one experienced their first panic attack (Kim, 2016). Internal stimuli include interpersonal conflict, illness, fear, threat of loss, and economic collapse (Batinić et al., 2009; Park, 2016). Clark's cognitive model is a theory that explains the cause of panic attacks.; they assert that panic attacks occur due to catastrophic interpretations, such as impending death or loss of self-control, caused by various stimuli (Clark, 1986). However, depending on individual and cultural differences between countries, interpretations of body sensations vary, thus the frequency and clinical characteristics of panic attacks may vary. For example, among Cambodian refugees, fear of standing dizziness is said to cause panic attacks with the native belief that a substance called "khyal" is absorbed into the body and causes carotid artery rupture (Hinton et al., 2008).

Regarding symptom frequency, several studies have reported circulatory symptoms as the most common and suffocation or limb sensory abnormalities as the least. African Americans reported limb sensory abnormalities at high frequency, while depersonalization or derealization was also reported as a particularly common symptom in Puerto Ricans (Carter et al., 1999; Cox et al., 1994; Grant et al., 2006; Guarnaccia et al., 1996). Among koreans, limb

sensory abnormalities were common, and in contrast to overseas research, less fear of losing control was reported (Park, 2016). Craske et al. (2010) criticized the APA diagnostic symptoms of panic attacks for being centered around Western cultures and not including symptoms from other cultures. Lee et al. (2019) emphasized that identifying the causes and clinical characteristics of panic disorder in one country is crucial as basic data for prognostication and treatment. However, research on the clinical characteristics of panic disorder in Korea is lacking.

Existing panic disorder-related studies mostly include surveys, experiments, medical record surveys, program development and effectiveness studies, and case studies; difficulties encountered include sampling, limited ranges of responses, and subjective intervention by researchers (Levy, 2008). These methods require data from artificial interventions, such as questionnaire development, program development, and experimental design (Lee & Choi, 2020). However, with the recent generalization of the Internet, big data is increasing significantly. Social network posts are also unstructured big data wherein individuals are free to express emotions and thoughts(Chen et al., 2014; Kim, 2015; McKenna et al., 2002).

Most patients experience breathing and heart-related symptoms when they first experience panic disorder symptoms, and they do not identify these symptoms as panic disorder symptoms and undergo heart or breathing-related tests. Therefore, many patients with panic disorder miss the point of treatment. So, it will be important to identify the characteristic clinical aspects of panic disorder, which can also be helpful for early diagnosis(Lee et al., 2021). Existing studies have been conducted on people diagnosed with actual panic disorder. This will be effective in identifying the patterns and trends of patients with mental illness, but studies on potential patients who have not yet been diagnosed are insufficient. SNS can express one 's thoughts and opinions without form due to the characteristics of anonymity and non-face-to-face, which can help provide information on panic disorder patients and potential patients who have not yet been diagnosed.

Text mining is a useful statistical method for analyzing unstructured big data, such as Social Network Service (SNS) posts. Text mining automatically extracts meaningful and highly utilized knowledge or information by finding hidden relationships or patterns in unstructured text data (Feldman & Dagan, 1995). Text mining has been used in psychological studies, linguistics, computer science, and statistics (Hearst, 1999). In Korea, there is research trend analysis of autism spectrum disorder, Internet article analysis for early identification of developmental disorders. In Western countries, online community and language text analyses for eating disorder evaluation and post-traumatic

stress disorder screening, respectively, has also been done (He et al., 2012; Kim, 2021; Lee et al., 2020; McCaig et al., 2018).

Given that panic attacks have different clinical characteristics among individuals and countries, characterizing time, place, and symptoms is not clearly predictable. This is related to severe pain and maladaptation in daily life and chronic relapse, including relapse of other conditions, in patients with panic disorder. The purpose of this study is to identify various clinical characteristics of panic attack for useful therapeutic intervention in patients with panic disorder in Korea. In response, this study aims to analyze Twitter posts one of the SNS frequently used by Koreans using text mining (Korea Information Society Development Institute, 2019). Thus, unlike the limitations of the above-mentioned surveys, experimental studies, and case studies, this study will help identify clinical aspects for patients with real diagnosis or potential panic disorder. Term frequency, Term Frequency-Inverse Document Frequency (TF-IDF), degree centrality, and N-gram analyses identified the most influential and associated keywords associated with panic disorder. In particular, keyword frequencies were identified by dividing panic disorder into physical symptoms, triggers, occurrence time, occurrence place, mood, mentioned pathology, mentioned person, and coping methods aspects; highlighted factors in each area were examined.

Material and Methods

Data crawling

In this study, Twitter one of the SNS frequently used by Koreans was selected for the collection of SNS posts. Data collection leveraged the crawling capabilities of the database and the online information platform Hashscraper (https://www.hashscraper.com). Twitter posts correspond to big data, and in detail, they are unstructured and text data without structure, so they are useful for analysis. Professional program coding is required to collect SNS posts, but hashscrapers allow for the crawling of Twitter posts, making it easier to collect data. The analysis keyword was entered as " panic," and the collection period was set from January 1 to December 4, 2020, when the coronavirus outbreak occurred, collecting 117,492 words from a total of 8,728 posts (search date December 4, 2020). The data collection and research procedures of this study were reviewed by the Institutional Review Board of Dankook University (Approval No.: NON2020-009).

Preprocessing

We proceed with preprocessing to extract only the words needed for the study from the collected sentence text data. For this, the "RStudio" program was used. For Korean text mining, packages such as KoNLP, useNIADic,

and tm were installed in RStudio. For preprocessing, integration work was conducted to combine words with the same meaning, and cleaning work was done to delete unnecessary words. such as stop words, numbers, and special symbols. To integrate words of the same meaning, the "day" equivalent to the occurrence time of panic attacks was replaced with "afternoon" and the place "work" with "company." "Head," "breaths," "feelings of insecurity," and "gloomy" were replaced with

"headaches," "hyperventilation," "anxiety," and "depression," respectively. To remove unnecessary words, "it," "feel," "situation," and "after" were deleted, and some of the words preprocessed as above are shown in Table 1 and Table 2.

Data analysis and visualization

To analyze and visualize data that had been preprocessed, the TEXTOM service provided by the IMC－a big data and artificial intelligence

Table 1. Words integrated in preprocessing

No	Before integrated	After integrated	No	Before integrated	After integrated
1	Day	Afternoon	6	Breaths	Hyperventilation
2	Head	Headache	7	Heart	Hyperventilation
3	Feeling anxious	Anxiety	8	Gloomy	Depression
4	Feelings of insecurity	Anxiety	9	Work	Company
5	Alcohol	Drinking	10	House	Home

Table 2. Words removed in preprocessing

No	Word	No	Word	No	Word
1	It	11	Status	21	Reason
2	Moods	12	Situation	22	After
3	Who	13	Thought	23	Human
4	Next	14	World	24	Fault
5	Mind	15	Moment	25	Disorder
6	Matter	16	Start	26	Degree
7	Something	17	Yesterday	27	Mentality
8	Similar	18	Today	28	Symptom
9	Person	19	We	29	Progress
10	Actually	20	More	30	One day

company was utilized (http://www.textom.co.kr). TEXTOM allows various analyses—such as term frequency, TF-IDF, degree centrality, and N-gram analyses—and provides visualization services, such as word cloud, bar charts, and pie charts. Although Rstudio also has analysis and visualization capabilities, some difficulties were encountered, such as programming language coding; this work utilizes TEXTOM that are useful for easier analysis and various visualizations.

For posts about panic disorder, we conducted frequency analysis, organizing words in descending order of appearance and visualizing them as word clouds. We also conducted degree centrality analysis, which refers to the number of words associated with other words; TF-IDF analysis, which indicates how important words are in certain documents; and N-gram analysis to identify groups of words that appear simultaneously. Frequency analysis is the simplest and most powerful method of text mining, extracting words in the order of the highest frequency of appearance within a text set, and analyzing changes in major issues (Choi et al., 2015). N-gram analysis refers to a list of n consecutive syllables or words, for example, when n=2, it analyzes two consecutive syllables or words as bi-gram to extract a combination of words. N-gram analysis can infer the association of neighboring words, which helps in various analyzes (Lee, 2020). TF-IDF is frequently used to obtain word weights in information retrieval,

text mining, and user modeling retrieval (Vijayarani et al., 2015). TF-IDF refers to the weight of a word indicating how important a word is within a particular document, multiplied by TF and IDF (Pratama & Sarno, 2015; Rajaraman & Ullman, 2011). TF (Term Frequency) is 'word frequency', which means how many times a particular word appears in a certain range of documents, and DF (document frequency) is 'document frequency', which means how many documents a particular word appears in. IDF (inverse document frequency) is 'reverse document frequency', which is inversely proportional to the DF value and decreases as the DF value increases. Degree centrality refers to the degree to which a particular word is connected to another word, and the higher the degree of connection centrality, the greater the influence (Zhao et al., 2017). Connection centrality analysis is used in various fields. It was first developed in social network analysis and a person with high connection centrality can be viewed as a person with high influence. In addition, it is used to search for major infrastructure nodes of the Internet and urban networks, brain networks, and super spreaders of diseases (Saberi et al., 2021; van den Heuvel & Sporns, 2013). Furthermore, to determine the clinical characteristics of panic attacks that occur unexpectedly, the results of the overall frequency analysis related to panic attacks were divided into physical symptoms, triggers,

occurrence time, occurrence place, mood, mentioned pathology, mentioned person, and coping method, in order of frequency.

Results

Keyword analysis

To identify keywords related to panic disorder, "panic" and "disorder" were excluded from the analysis, and the frequency(Figure 1), TF-IDF, and degree centrality rankings are as shown in Table 3. Frequency and TF-IDF values were found to have the highest "anxiety." Degree centrality was highest for "depression," indicating the greatest connection between keywords. The overall ranking of keyword analysis was similar, with "attack," "hyperventilation," and "heart" related to the diagnosis criteria of panic attacks ranked high, "stress," and treatment-related terms "hospital" and "drugs".

Figure 1. Wordcloud with panic disorder keyword frequency

N-Gram analysis

An N-gram analysis was conducted to determine the frequency of simultaneous words associated with panic disorder(Table 4). To select keywords that appeared simultaneously and were closest to panic disorder, the "panic" keyword was included in the analysis list. The results showed that similar to keyword analysis, attacks, drugs, depression, anxiety, hyperventilation, and stress were frequently mentioned and were keywords mentioned along with panic disorder.

Analysis by clinical characteristics

To identify the clinical characteristics of panic attacks that occur unexpectedly, the results of the overall frequency analysis related to panic disorder are divided into physical symptoms, occurrence time, occurrence place, mood, mentioned pathology, mentioned person, and coping method, as shown in Table 5. Most of the physical symptoms were hyperventilation and palpitation; paralysis was also reported in various ways, including paralysis of the whole body, arms, legs, hands, and feet. Stress, sound, worry, and trauma were high among the triggers. For stress, specific events were mostly unmentioned but are expected to be stress caused by life events. The sounds ranged from loud sounds such as thunder, subway, and music to very soft sounds, such as the second hand of the clock. Trauma included bullying, failed to enter school,

Table 3. Panic Disorder Keyword Top20(Frequency, TF-IDF, Degree Centrality)

No	Word(frequency)	Word(TF-IDF)	Word(Degree Centrality)
1	Anxiety(275)	Anxiety(867.0289)	Depression(0.0220)
2	Depression(239)	Depression(791.4195)	Drugs(0.0201)
3	Drugs(209)	Drugs(717.502)	Anxiety(0.0190)
4	Attack(178)	Attack(635.7346)	Attack(0.0171)
5	Hyperventilation(126)	Hyperventilation(492.4099)	Hyperventilation(0.0118)
6	Stress(71)	Stress(317.6291)	Hospital(0.0083)
7	Hospital(60)	Hospital(278.5190)	Home(0.0072)
8	Home(48)	Home(233.5261)	Stress(0.0068)
9	School(47)	School(229.6505)	Trauma(0.0064)
10	Heart(42)	Heart(210.9558)	Heart(0.0057)
11	Fear(40)	Sound(202.9107)	Morning(0.0053)
12	Sound(40)	Fear(201.8980)	Subway(0.0049)
13	Worry(34)	Worry(178.1539)	Headache(0.0049)
14	Trauma(32)	Trauma(169.6749)	Sound(0.0049)
15	Subway(31)	Subway(165.3891)	School(0.0045)
16	Morning(31)	Morning(165.3891)	Freinds(0.0041)
17	Treatment(30)	Treatment(160.0539)	Coffee(0.0041)
18	Freinds(29)	Freinds(156.7196)	Night(0.0038)
19	Night(29)	Chest pain(156.7196)	Mother(0.0038)
20	Chest pain(29)	Night(155.7020)	Suicide(0.0038)

Table 4. Panic Disorder Keyword N-Gram Analysis Top 20

No	Word1	Word2	Frequency	No	Word1	Word2	Frequency
1	Panic	Disorder	307	11	Drugs	Panic	49
2	Panic	Panic	258	12	Hyperventilation	Panic	48
3	Panic	Attack	149	13	Stress	Panic	43
4	Panic	Drugs	135	14	Anxiety	Disorder	41
5	Depression	Panic	123	15	Attack	Panic	27
6	Anxiety	Panic	112	16	School	Panic	26
7	Panic	Anxiety	105	17	Hospital	Panic	26
8	Disorder	Panic	84	18	Subway	Panic	25
9	Panic	Depression	66	19	Fear	Panic	24
10	Panic	Hyperventilation	65	20	Panic	Worry	23

Table 5. Word frequency by type of panic disorder clinical characteristics

Clinical characteristics	Word(frequency, percentage)
Physical symptoms	Hyperventilation(126, 36.31%), palpitation(56, 16.14%), Tremor(48, 13.83%), Chest pain and suffocating (29, 8.36%), Headache(26, 7.49%), Faint(17, 4.90%), Sweat (10, 2.88%), Cold(10, 2.88%), Dizziness (7, 2.02%), hypertension(7, 2.02%), Paralysis (6, 1.73%), vomiting (5, 1.44%)
Triggers	Stress(71, 26.79%), Sound(40, 15.09%), Worry(34, 12.83%), Trauma(32, 12.08%), Coffee(28, 10.57%), Tension(16, 6.04%), Smoking(13, 4.91%), Exercise(11, 4.15%), Examination(10, 3.77%), Study(10, 3.77%)
Occurence time	Morning(31, 32.63%), Night(29, 30.53%), Dawn(25, 26.32%), Afternoon(5, 5.26%), Evening(5, 5.26%)
Occurence place	Home(48, 23.41%), School(47, 22.93%), Subway(31, 15.12%), Company(22, 10.73%), Bus(18, 8.78%), Academy(14, 6.83%), Airplane(9, 4.39%), Toilet(9, 4.39%), Cafe(7, 3.41%)
Mood	Fear(40, 38.46%), Tears(14, 13.46%), Embarrassment(11, 10.58%), Irritation(10, 9.62%), Anger(8, 7.69%), Regret (8, 7.69%), Lethargy(7, 6.73%), Confusion(6, 5.77%)
Mentioned pathology	Anxiety(275, 42.90%), Depression(239, 37.29%), Suicide(22, 3.43%), Bipolar disorder(20, 3.12%), Insomnia(19, 2.96%), Health(17, 2.65%), Obsessive(16, 2.50%), Self Injury(12, 1.87%), Sleep(11, 1.72%), Bad dream(10, 1.56%)
Mentioned person	Friend(29, 31.87%), Mother(16, 17.58%), Older sister(12, 13.19%), Younger brother(sister)(11, 12.09%), Older brother(8, 8.79%), Father(8, 8.79%), Psychiatrist(6, 6.59%), School counselor(1, 1.10%)
Coping methods	Drugs(209, 56.18%), Hospital(60, 16.13%), Treatment(30, 8.06%), Deep breathing(20, 5.38%), Emergency room(16, 4.30%), Call(11, 2.96%), Counseling(10, 2.69%), Meditation(8, 2.15%), Early leave(6, 1.61%), Yoga(2, 0.54%)

stalking, sex crimes, and abuse of parents. Other related factors included drinking coffee, smoking, exercise, and study were also reported.

Morning, night, and dawn were common times of attack; several cases reported not sleeping because they were afraid of panic attacks or waking up due to nocturnal panic attacks. Most of the places panic attacks occurred in were homes and schools; forms of public transportation such as subways were also reported. Regarding mood, people complained the most about the physical symptoms of panic attacks and reported difficulties controlling anger. In terms of pathology, anxiety, depression, and suicide were common. Most individuals mentioned their friends, mothers, and sisters, implying they shared their panic disorder with their family or friends. Many temporary and

medical treatments, such as drugs and hospitals, were reported.

Discussion

This study analyzed keywords from SNS posts related to panic disorder and the results of frequency analysis related to panic disorder in various aspects. The main results of this study are as follows. First, depression, drugs, hyperventilation, and stress accounted for the upper frequency of panic disorder-related and simultaneous keywords analyses. The high ranking of the depression keyword is in line with previous overseas studies that panic disorder is accompanied by a variety of mental disorders, and that the most common comorbidities are depressive disorders (Karelia et al., 2014). Panic disorders with depressive disorders have higher severity, persistence, and recurrence rates than panic disorder alone. Studies have also shown that patients with depression have highly neurotic temperaments, high harm avoidance, and low quality of life. Understanding and clinical approaches to patients with depression are required (Carr et al., 2013; Lee et al., 2018; Norberg et al., 2008). In addition, it will be necessary to screen for depressive disorders and provide therapeutic interventions for patients with panic disorder. Drugs were also shown as common keywords, indicating that drug treatment is used as a primary means of managing panic disorder symptoms (Batelaan et al., 2012). In addition, hyperventilation has been reported as a common physical symptom in previous domestic and oversea studies, and it was particularly ranked highest in this study (Barlow & Craske, 1988; Lee et al., 2019; Ley, 1992; Park, 2016). Life stress includes interpersonal conflict, problems at work and unemployment, and extreme stress can stimulate the autonomous nervous system, hyperventilation, and panic attacks (Klauke et al., 2010; Moitra et al., 2011).

Meanwhile, the keywords related to panic disorder in various clinical aspects are as follows. In terms of physical symptoms, hyperventilation was the most frequent term. This suggests that hyperventilation can be a characteristic physical symptom of panic disorder among Koreans and that consideration of these symptoms should be prioritized during treatment. According to a Korean study, those who complained of hyperventilation had higher levels of tension, anger, fatigue, and depression than those who did not and had a lower proportion of abdominal breathing (Yun et al., 2016). Meanwhile, tremors were relatively uncommon in prior domestic s tudies and ranged from somewhat to very common. in overseas studies; it was quite common in the present study. The rest of the rankings of symptoms also showed deviation, supporting prior studies that illustrated varying physical symptoms among individuals and countries (Barlow & Craske, 1988; Lee et

al., 2019; Ley, 1992; Park, 2016).

Life stress accounts for the largest portion of panic attacks. Korea has the highest level of stress among OECD countries, and according to a domestic survey, stress in daily life, work, home, and academic life were reported (Statistics Korea, 2020). Various daily noises in this study were also reported as a main cause of panic attacks. Noise can cause an imbalance in the autonomic nervous system, activating sympathetic nervous system processes and increasing heart rate (El Aarbaoui et al., 2017). Experience of traumatic events is associated with a variety of physiological reactions, including increased heart rate, increased respiratory rate, and sweating. Caffeine intake and smoking similarly stimulate sympathetic nerves, causing panic attacks (Fargamfar et al., 2020; Magalhães et al., 2014; Masdrakis et al., 2009). Panic attacks can also occur if natural physical sensations that appear during exercise are catastrophically interpreted. Some participants reported experiencing panic attacks while taking tests or studying. These results appear to have been attributed to the fact that Twitter's main users are students who experience academic stress due to excessive entrance examination education in Korea (NAS Media, 2019; Won & Lee, 2019).

Individuals also often experienced panic attacks immediately after they woke up or while sleeping. More than half of panic disorder patients experience nighttime panic attacks during sleep and are reported to have more difficulty initiating and maintaining sleep than those with only daytime seizures (Singareddy & Uhde, 2009). Patients with panic disorder may also experience sleep problems due to high levels of anxiety sensitivity and cortisol hormones (Bandelow et al., 2000; Hoge et al., 2011; Singareddy & Uhde, 2009). Therefore, separate treatment interventions are required from patients who experience only daytime seizures, and appropriate interventions such as sleep education are needed to deal with emotions and fear of falling asleep experienced in nocturnal panic attacks.

In terms of places where panic attacks occurred, the home was reported most frequently because of family conflicts and living noise. Public transportation and other crowded places were also commonly reported, in line with agoraphobia's frequent accompaniment of panic disorder (APA, 2013). Individuals in this study complained the most about fear of the crowd and reported various negative emotions, including anger. These results support prior research that individuals with panic disorder experience anger management difficulty, low energy levels, ruminative thought, and negative self-awareness (Lee & Lee, 2009; Moscovitch et al., 2008). In terms of pathology, anxiety and depression was most often reported, and other reports of suicidal ideation, bipolar disorder, sleep disability, and hypochondriasis were in line with research that panic disorder is accompanied by various diseases (Hoge et al., 2011; KARAPIÇAK &

ASLAN, 2012; Preti et al., 2018; Scheer et al., 2020). Therefore, it will be necessary to check the severity of anxiety and depression symptoms in patients with panic disorder and to properly coping them.

Participants of the study often shared their panic disorder with friends and family members and gained support, but the proportion of available mental health services, such as those provided by psychiatrists and counselors, was small. It was almost using medication, even if it used mental health services. However, cognitive behavioral therapy combined with medication for panic disorder is more effective than single, and the effectiveness of mindfulness has also been reported (Cho et al., 2004; Katzman et al., 2014). In particular, breathing training is effective for hyperventilation symptoms, which were the most common physical symptoms in the present study, and promotes relaxation (Yamada et al., 2017). Although there are various ways to treat and manage panic disorder, poor use of mental health services and medication-oriented coping can be related to the cost burden of psychotherapy and social prejudice against mental disorders. In fact, the domestic mental health budget is less than 3% of the total health sector, which is, in turn, focused on hospitals. Areas for improving mental disorder awareness and building community infrastructure are less valued (The National Mental Health and Welfare Commission, 2020).

Regarding panic disorder, the results of this study and previous overseas studies are compared as follows. In this study, depressive disorder appears to be the most frequent keyword, and it is in line with previous overseas studies that the most common comorbidities in panic disorder are depressive disorder (Karelia et al., 2014). In addition, when comparing the physical symptoms of panic attack, the high ranking of hyperventilation and palpitations is consistent with previous domestic and overseas studies that have investigated the frequency of physical symptoms of panic attack. The tremor was relatively lower in previous studies in Korea and upper middle in overseas studies, but it was found to be one of the very common physical symptoms in this study. Chills and dizziness were ranked lower than previous overseas studies, and the ranking of the remaining symptoms also showed slight deviation, supporting previous studies that showed that the physical symptom patte rns of panic attack may vary from individual to country and from individual (Barlow & Craske, 1988; Ley, 1992). Therefore, depressive disorders in patients with panic disorder should be considered first, and therapeutic interventions for hyperventilation and palpitations are required, and studies on various physical symptoms will be continuously needed.

Conclusions

The contributions and significance of this

study are as follows. To the knowledge of the authors this is the first study to analyze SNS posts related to panic disorder in the absence of research on the clinical characteristics of patients with panic disorder in Korea. Most previous studies were conducted on patients, including those diagnosed with psychiatric disorders and other mental disorders (Kim et al., 2015; Lee et al., 2019). Meanwhile, this study analyzed the characteristics of panic disorder among various citizens by utilizing unstructured big data and contributed to expanding the understanding of the main characteristics of panic disorder.

Furthermore, the use of a novel method of analysis of various aspects of unexpected panic attacks including physical symptoms, triggers, occurrence time, occurrence place, mood, mentioned pathology, mentioned person, and coping method is meaningful since this data may serve as a basis for identifying the clinical characteristics of panic disorder among Koreans and may expand data collection methods for future studies. Suggesting implications for identifying and improving the deficiencies of domestic panic disorder treatment is also of value. In this study, patients shared about their disorder with friends and family gaining emotional support rather than mental health professionals (e.g., clinical psychologists, psychiatrists) and focused on medication. Patients must be aided in fully using mental health services and accessing various treatment techniques by improving awareness of mental

disorders at the national level.

The limitations of this study and suggestions for future research are as follows. First, this study only analyzed Twitter, thus there is a limit to generalizing the results of this study to all SNS users. Second, This study targeted posts on Twitter that included the word 'panic'. Therefore, the person who posted the post may not have experienced an actual panic attack. Third, a study that analyzes only text posted on Twitter may have reported only some of personal information on various aspects, including physical symptoms, mood, pathology, and treatment. Fourth, Twitter is most commonly used by younger individuals (teenager), and there is a limit to generalizing this study to all ages (NAS Media, 2019). In future studies, unstructured data on panic disorder should be analyzed among various age groups. Finally, demographic information, such as age and sex, was not available. Given that symptoms of panic disorder may vary depending on the age and gender of the outbreak, future research must be analyzed according to demographics.

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텍스트마이닝을 활용한 공황장애 관련 SNS 게시글 분석

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공황발작은 개인과 국가에 따라 다른 임상적 특징을 가지고 있다. 본 연구는 공황발작의 임상적 특징을 파악하는 것을 목표로 하였다. 본 연구는 2020년 1월 1일부터 12월 4일까지 공황장애와 관련된 트위터 게시물 8,728개를 수집하여 핵심 및 동시 출현 키워드를 분석하였다. RStudio와 TEXTOM을 활용하여 빈도 분석, TF-IDF 분석, 연결 중심성 분석, N-그램 분석을 실시하였다. 또한, 빈도 분석의 결과를 신체 증상, 유발 상황, 발생 시간, 발생 장소, 기분, 언급된 병리, 언급된 인물, 대처 방법으로 분류하였다. 우울, 약물, 호흡, 스트레스는 공황장애와 관련된 핵심 키워드였다. 신체 증상에서는 과호흡, 심계항진, 온몸 떨림이 높은 순위를 차지하였다. 유발 상황에서는 스트레스, 소리, 외상, 커피가 높은 순위를 차지하였다. 대처 방법에서는 약물과 병원이 높은 순위를 차지하였다. 이러한 결과는 공황발작의 다양한 측면을 명확히 하고 한국인의 공황장애의 임상적 특성을 파악하는 데 근거 자료가 될 것이다.

주요어 : 공황장애, 트위터, 텍스트 마이닝, 키워드 분석, N-그램 분석