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Master's Thesis of Public Health

**An Exploratory Study on
Intermittent Explosive Disorder
Patients: Trends and Use of
Outpatient Service in Diagnosis
- Data from National Health Insurance Data
from 2002 to 2018 -**

분노조절장애 환자에 대한 탐색적 연구:
진단 건수의 추이 및 외래 서비스 이용
특징
- 2002년 - 2018년 국민건강보험공단
자료를 중심으로 -

August 2020

**Graduate School of Public Health
Seoul National University
Health Policy & Management Major**

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**An Exploratory Study on
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Advisory Professor. Myoungsoon You

**Submitting a master's thesis of
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Abstract

Much attention on Intermittent Explosive Disorder(IED) have been paid since many of infamous criminals were found to be suffering from the disease. Although various social debate exists with assumptions that IED patients are potential criminals, it is of surprise that no data-driven evidence about characteristics of IED patients exists or supports the fact. Therefore, this thesis aims to address the gap between looming social assumptions and actual evidence-based research and provide implications on treating IED patients.

To understand the trends of IED in Korea, the paper explores IED diagnosis between 2002 to 2018, with National Health Insurance Service claim data, a national representative data. Next, the paper explores the vulnerable populations of IED. Finally, the paper deals with outpatient service use of IED patients, especially on outpatient visits to verify whether those who need treatments are actually taken care of.

The result reports that while IED diagnosis has seen a steady increase for the last 17 years, patients with the disorder are usually men, young adults in their 20s, and likely to be either very rich or otherwise at the very bottom of economic class. However, those who actually sought treatment at the hospital, were not consistent with the actual vulnerable population of IED.

The overall findings suggest that while IED patients are socially inferred as potential criminals, born with biological defects, there is a socio-demographic factors that contributes to IED diagnosis, implying that more empirical research should be conducted, with ideas on dealing with IED vulnerable population in the perspective of public health interventions.

Keyword: Intermittent Explosive Disorder, mental health, outpatient, medical service, national health service data, public health

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Table of Contents

CHAPTER 1. INTRODUCTION.....	1
1.1 Background.....	1
1.2 Purpose of the research.....	5
1.3 Research questions.....	7
CHAPTER 2. LITERATURE REVIEW.....	8
2.1 Intermittent explosive disorder.....	8
2.2 Empirical evidence on people with IED.....	10
2.3 Intermittent explosive disorder research in Korea	13
2.4 Use of medical service in mental patients.....	17
CHAPTER 3. STUDY DESIGN AND METHODS.....	20
3.1 Data.....	20
3.2 Operational definition of variables.....	22
CHAPTER 4. RESULTS.....	24
4.1 Changes in IED diagnosis, 2002 – 2018.....	24
4.2 Characteristics of IED patients.....	28
4.3 Factors affecting use of outpatient service in IED patients.....	34
CHAPTER 5. DISCUSSION.....	48
5.1 Summary of findings.....	48
5.2 Limitations and strength of the study.....	51
5.3 Implications and further suggestions.....	53
CHAPTER 6. CONCLUSION.....	62
REFERENCES	

List of Tables

Table 4.1: Comorbid diseases of Intermittent Explosive Disorders in 2008.....	29
Table 4.2: Comorbid diseases of Intermittent Explosive Disorders in 2017	30
Table 4.3: Patients with IED as main disease in 2008 and 2017.....	31
Table 4.4: Outpatients with IED as main disease in 2008 and 2017 ...	35
Table 4.5: Factors related with medical cost of outpatient with IED as a main disease, 2008.....	38
Table 4.6: Factors related with number of hospital visits of outpatient with IED as a main disease, 2008.....	40
Table 4.7: Factors related with duration of care of outpatient with IED as a main disease, 2008.....	42
Table 4.8: Factors related with medical cost of outpatient with IED as a main disease, 2017.....	44
Table 4.9: Factors related with number of hospital visits of outpatient with IED as a main disease, 2017.....	45
Table 4.10: Factors related with duration of care of outpatient with IED as a main disease, 2017	47

List of Figures

Figure 1.1: Number of “anger management” media coverages, 2010-2018.....	2
Figure 1.2: BIGKINDS word cloud analysis of “anger management”	3
Figure 2.1: Number of research in Korea with search term “분노조절”, 1990-2019.....	14
Figure 2.2: Number of research in Korea with search term “분노조절장애”, 1990-2019	14
Figure 2.3: Research subject of the published articles with search term “분노조절장애”, 1990-2019	16
Figure 4.1: Total number of people diagnosed with IED from 2002-2018	24
Figure 4.2: Number of people diagnosed with IED by gender from 2002-2018.....	25
Figure 4.3: Number of people diagnosed with IED by age from 2002-2018.....	26
Figure 4.4: Number of people diagnosed with IED by economic status from 2002-2018	27
Figure 5.1: Age differences in lifetime prevalence of mental disorders.....	55
Figure 5.2: Classification variables in Korea Health Panel Study.....	61

Chapter 1. Introduction

1.1. Background

In recent years, socially expressed negative emotions of an individual is widely debated such as ‘angered society’ or ‘embitterment’. Especially, anger is frequently discussed in relation to crimes, since much of the criminals are known to have anger management issues, in other words, Intermittent Explosive Disorder (IED).

Debate regarding Intermittent Explosive Disorder (IED) has been increasing in the Korean society. The majority may be familiar with the disease by the Korean Air “Nut Rage” incident in 2014. The Nut Rage is an event which Cho Hyun-Min, the heiress to Korean Air ordered the aircraft to return to the gate before takeoff. Dissatisfied with the flight attendant’s service, she made the Chief to kneel down and beg for forgiveness with physical assaults, and finally ordered him to get off the plane.

Increasing number of media coverage about Intermittent Explosive Disorder (IED) is another evidence that the IED is a public issue. To explore how IED is discussed in media, I briefly performed a word cloud analysis of media coverage in five major media in Korea using BIGKINDS database, with the search term ‘anger management (분노 조절)’.

The analysis revealed that the number of media coverage from 2010 to 2019 has been gradually increasing (see Figure 1.1). After frequency analysis of word

appearances in the coverage, it was found that the most frequent word was ‘victim’, followed by ‘mental disease’, ‘the department of justice’, and ‘perpetrator’ (see Figure 1.2). This confirms the prior statement that IED is discussed mainly in relation to crimes, or mental disorders in Korean context.

Figure 1.1. Number of “anger management” media coverages, 2010-2018

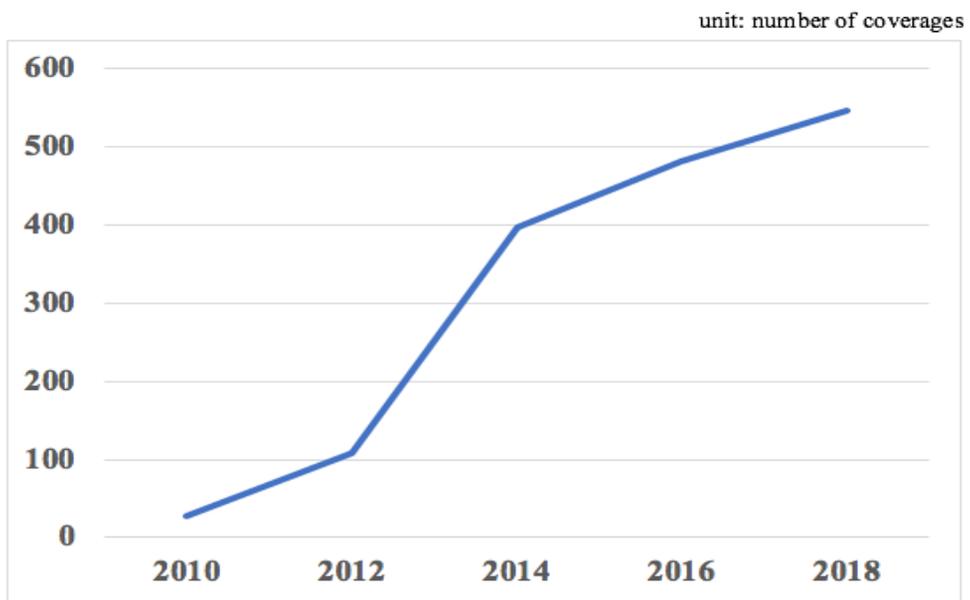
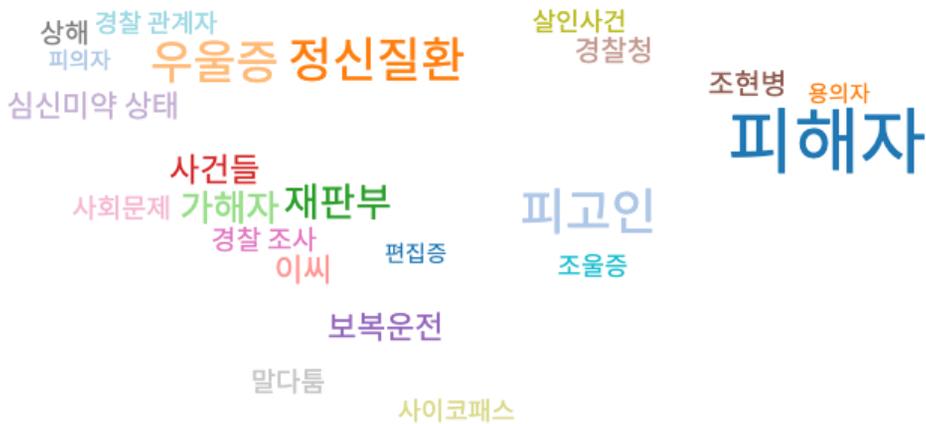


Figure 1.2. BIGKINDS word cloud analysis of “anger management”



Reports suggest that some of the criminals were found to have Intermittent Explosive Disorder (IED). For example, the assailant of PC Room Murder incidence in Gangseo-Gu(강서구 PC방 살인사건) in 2018 was found to have been suffering from IED, which also relates to his crime intent that he was upset that the waiter did not clean his table fast enough. Also, it has been found that the criminal of the Han-River Torso Murder in 2019 was also suffering from the IED.

These groundless assumptions regarding IED patients putting them under stigmatization that IED patients are potential criminals, and therefore needs to be segregated from the society. However, these assumptions are not based on any scientific evidence, and even if biological factors that they are born with lead them to suffer from IED, public health intervention enabling them to manage angers properly should be sought rather than social isolation approach.

Since the Intermittent Explosive Disease (IED) is thought of as a potential factor of a lot of social issues, it is an undeniable fact that we should focus more on

the cause and management of the IED. However, in Korea, most of mental disorder research have been focused towards depression or schizophrenia and almost none of the research deals with IED independently.

1.2. Purpose of the Research

This paper aims to explore the trends in the prevalence of Intermittent Explosive Disorder (IED), the vulnerable population and outpatient service use in Korea over the 17 years, from 2002 to 2018 using the Korean National Health Insurance Service data. The paper addresses the amount of outpatient service use of IED patients in three perspectives, by individual medical cost, number of hospital visits, and duration of care. By focusing on outpatient service use, this thesis enables to better measure the patient's willingness to seek treatment. The analysis of IED patient's willingness to seek treatment enables us to better understand how IED is discussed in the Korean context, together with the analysis of trend and patient characteristics of IED.

This paper is organized as follows. Chapter 2 provides literature review regarding Intermittent Explosive Disorder. Firstly, it provides the definition of IED, and briefly provides inclusion of IED in the DSM criteria, followed by characteristics of IED patients from findings from previous studies. Since currently, there is no previous work of IED patient characteristics in Korea and the disorder is rather dealt in few frequencies, the summary is mainly discussed with the findings from other countries, mainly studies from the United States, where IED is researched the most. Finally, we discuss factors that are known to affect the hospital visits of those with mental disease. Data description, research questions, and methods are presented in chapter 3. Results of statistical analysis are presented in Chapter 4. Chapter 5 sets out a discussion of the analysis and the concluding chapter 5 provides a summary of the results.

Although there is a limitation in verifying the motivation to seek treatments due to the fact that the data is based on medical records, it is of high reliability in that the data covers 97% of total Korean population. Also, by focusing mainly on the sociodemographic factors, the study can be used as a preliminary data for public health policy towards Intermittent Explosive Disorder patients.

1.3 Research Questions

The main purpose of this research is to provide a baseline data of research regarding Intermittent Explosive Disorder in Korea. Although with several limitations, the research is valuable in that it uses a national data covering almost the entire population in Korea. Also, since most of previous research regarding anger or related disease focused on treatment methods, it is worthwhile in that it is the very first research which explores the characteristics of IED patients in the perspective of public health policy.

The present thesis therefore aims to contribute empirical insights into the following research questions:

1. What are the changes in the diagnosis of IED in Korea from 2002 to 2018?
2. Who are IED patients and how and where do they seek treatment?
3. Who actually uses IED outpatient service?

Chapter 2. Literature Review

2.1. Intermittent Explosive Disorder

Intermittent Explosive Disorder (IED), as defined in DSM-5, is characterized by recurrent, problematic, impulsive aggressive behavior (Coccaro, 2012). Aggression in IED may be presented as injurious or non-destructive behaviors, with a form of high frequency or low intensity aggression, or as low frequency/high intensity aggression that is destructive and/or injurious (Coccaro, Solis, Fanning & Lee, 2015).

However expressed, the aggression is impulsive, and/or anger-based, in nature. Based on previous research, about 70% of individuals with IED display both forms of impulsive aggression while 20% display only the high frequency/low intensity aggression, and 10% display only the low frequency/high intensity aggression (Coccaro et al., 2014). Aggressive behavior in IED is reported to be most often displayed in social interactions.

Inclusion of IED in the DSM criteria

Although not widely known, Intermittent Explosive Disorder (IED) has been codified in the Diagnostic and Statistical Manual of Mental Disorders (DSM) since its outset. In the original version of DSM, IED was classified as “Passive-Aggressive Personality”, with its main symptom being disproportionate reactions to surrounding pressures (Pereira et al, 2020). In the next version (DSM-II) revised in 1968, IED was classified as “Explosive Personality”. It was in 1980 that the IED was

finally set out as current name “Intermittent Explosive Disorder”, proposed by DSM-III Working Group (Pereira et al, 2020). In this version, it was under the section of “Impulse Control Disorders”. Although more specified than the previous versions, the DSM-III criteria of IED had several limitations. Firstly, IED was still considered to be of less frequent disease, and was conceptualized as a disorder of exclusion. In other words, if any other disease better explained the symptom or behavior, it was prioritized than IED. In addition, the criteria were limited and poorly operationalized. The definition and type of aggressive behavior was vague, and to what extent the duration and length should be to conclude as aggressive behavior was also not clear (Coccaro, E.F., & Grant, 2018). In 1994, an updated version (DSM-IV) was published, with diagnostic criteria of IED as episodes of aggressive acts and destruction of property (Pereira et al, 2020).

At the time, new research suggesting the relationship between aggressive behavior and malfunctioning of 5-HT, a central serotonic system was conducted. This model, which suggested that 5-HT is the reason behind the behavioral “brake” was accepted by many scholars in explaining human aggression (Coccaro, Fanning, Phan & Lee, 2015). This popular model shed light on research criteria focusing on frequent outbursts of impulsive aggressive behaviors, which in turn led to create a new diagnostic criterion of IED in DSM-V (Coccaro et al., 2015). The current DSM-V version encompasses additional features in its diagnostic criteria, such as episodes of impulsive verbal hostility and significant psychological distress and/or social impairment associated with the aggressive behavior (Coccaro, E.F., & Grant, 2018).

2.2. Empirical Evidence on People with Intermittent Explosive Disorder

Research on the demographics of Intermittent Explosive Disorder is very limited in Korea. The following section provides an overview of existing research regarding characteristics of IED population, mostly from other countries.

Using a National Comorbidity Survey Replication in the United States with a sample of 9,282 nationwide, Kessler and his colleagues found that IED is more prevalent in men than women. In terms of age, those of 60 years and older had a very low prevalence of 2.1%. Also, married, working, and people with low family income were found to be more vulnerable to IED. Although IED was more prevalent in people living in the metropolitan cities, it was not statistically different. In addition, although a majority (60.3%) with IED received treatment for emotional issues, only a minority (28.8%) were treated mainly for IED (Kessler, Coccaro, Fava, Jaeger, Jin et al, 2006).

However, another research with a data from 2005 to 2007 in Metropolitan São Paulo, Brazil reported that IED was more prevalent in women with 57.5% than men, which suggests findings different from research by Kessler et al. Also, the research found that IED is more prevalent in the married (55.7%), currently working (60.5%) and those in their 30s (Pereira, Coutinho, Corassa, Andrade & Viana, 2020). About half of the IED population completed secondary school and tendency towards a low family income was reported, which was consistent with previous findings by Kessler et al.

In 2012, Coccaro suggested in his publication that there is relatively few

number of people reporting IED in specific regions (Asia, the Middle East) and countries (Ronmani, Nigeria) compared to the United States. He reported in the publication that these can be traced back to the cultural factors, since such aggressive behaviors tend to be less present in the presented areas. The reported lifetime weighted prevalence of IED is about 6.9% (21 million) in United States. He also suggested that IED is more frequent in other races, specifically those who are not white, black, or Hispanic. According to his report, it is said that only two community research in the United States report a relationship between education and IED, in which people with less than 13 years of education reported a greater odds ratio for IED than other groups (Coccaro, 2012).

Another IED research was held in Timor-Leste, with a sample of women affected by conflicts in regard to associations with human rights trauma. Rees and his colleagues examined IED with a culturally adapted scale measure. In their research, women were found to have higher prevalence of IED, which was 41%, compared to men, 38%. In sociodemographic factors and education perspective, urban residence was associated with IED, with an OR of 2.03, however education showed no statistical significance with prevalence of IED. Also, IED population were more likely to report feeling of unhealthiness with an odds of 1.73. Another thing to note from this study is that it tried to encompass the sociological view, which was to measure the feeling of injustice in IED patients. It was reported that the feelingness of injustice was associated with IED with an odds of 2.1 (Rees, Silove, Verdial, et al; 2013).

IED research regarding Japan population also exists. In a Japanese research using World Mental Health Japan Survey 2002-2006, it was found that lifetime and

12-month prevalence of IED were 2.1% and 0.7% respectively. Yoshimasu et al. revealed in their study this low prevalence of IED compared to U.S study can be attributed to cross-cultural factors. In general, Japanese tend to suppress their feelings, especially anger than Westerners or other Asian population due to social norms (Yoshimasu, Kawakami et al, 2011).

Gender difference is also reported in other studies. IED was found to be about two times more frequent in men than women (Coccaro, Kavoussi, Berman & Lish, 1998; McElroy, Soutullo, Beckman, Taylor & Keck 1998; Mattes, 1990). In terms of age, IED was most prevalent among younger individuals who are less than 35 years old (Bromet, Gluzman, Paniotto, Webb, Tintle et al., 2005; Kessler, Coccaro, Fava, Jaeger, Jin et al., 2006; Yoshimasu & Kawakami, 2011).

2.3. Intermittent Explosive Disorder Research in Korea

In this section, lack of research in Intermittent Explosive Disorder is highlighted by reviewing a widely used Korean database(RISS) in three perspectives. Firstly, the actual number of research regarding IED is very limited in Korea. Also, even if the research exists, the realm of research was very limited; small number of samples, research confined to intervention treatment or certain groups. Finally, some of the research used the diagnosis inconsistently (ex. Using PTSD as IED).

Limited research in anger management issues

Korean database RISS (<http://www.riss.kr>) was analyzed to understand the status and trends of Intermittent Explosive Disorder research in Korea. “분노조절장애” was entered as a search term, and the analyzed research was confined to peer-reviewed journals and thesis. The reviewed articles were those including the term “분노조절장애” in the title, abstract or as a keyword. Final literature were selected after excluding the duplicated ones, and excluding irrelevant literature.

Figure 2.1 shows number of literature computed with the search term “분노조절” by 2 year gap. Over 30 years, it is shown that the number of published articles is only 309, implying that articles published were limited

to ten or less. The number of published article drop even further with the search term “분노조절장애”. In all years, the number was less than eight, implying lack of research in “분노조절장애” criteria (Figure 2.2).

Figure 2.1. Number of research in Korea with search term “분노조절”, 1990-2019

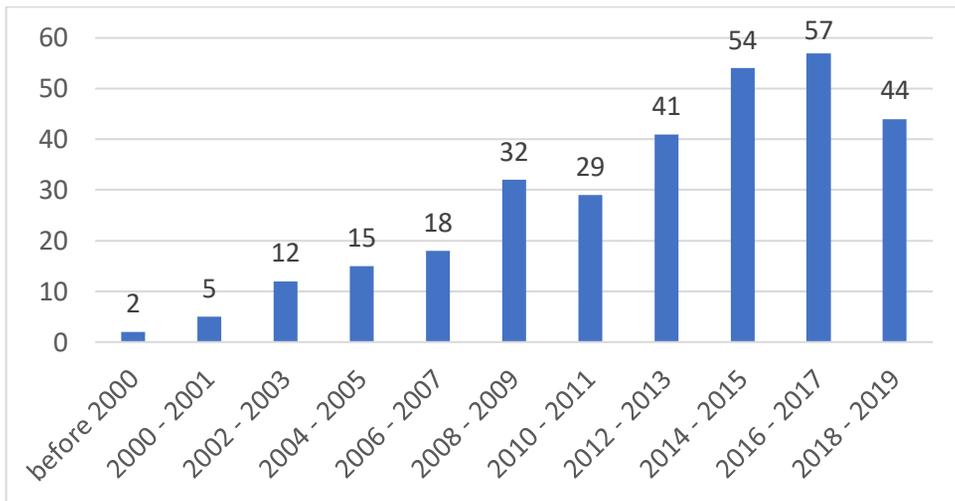
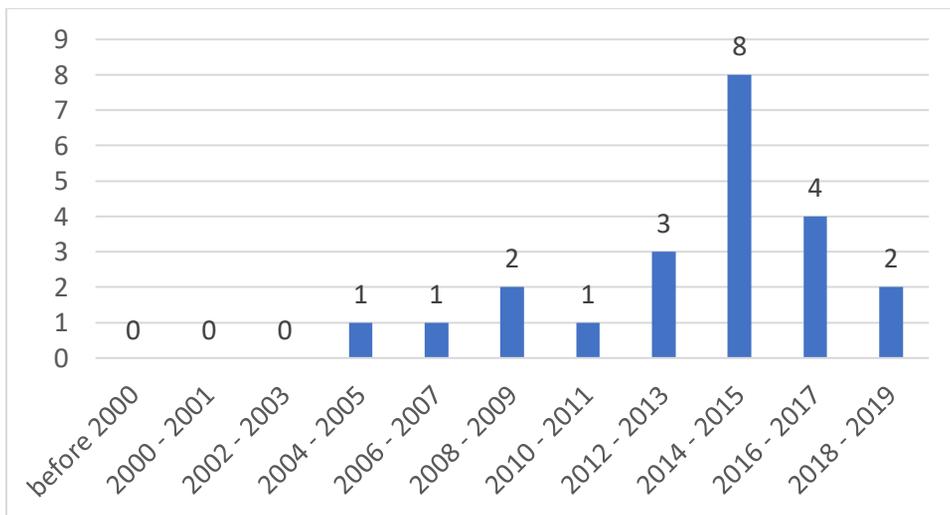


Figure 2.2. Number of research in Korea with search term “분노조절장애”, 1990-2019



Research limited to certain groups and interventions

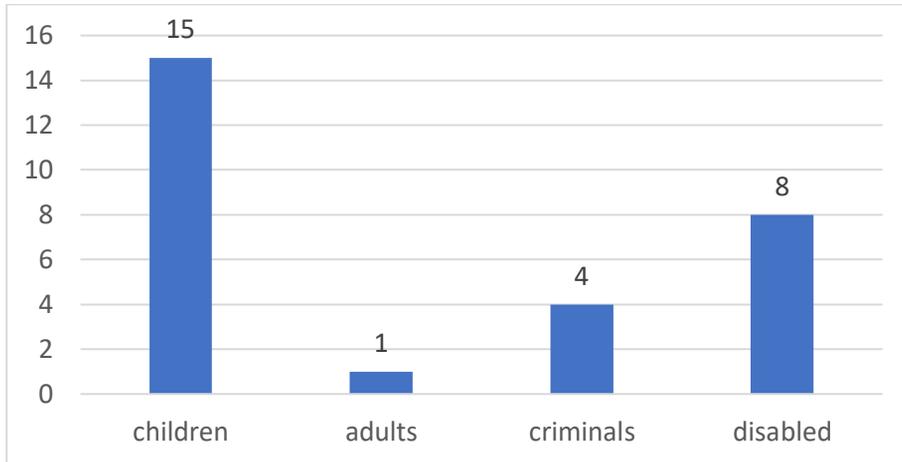
Also, the abstract of searched literature with the term “분노조절장애” were classified according to target population and research type; quantitative and qualitative.

It is indicated from Figure 2.3 that no research has yet dealt with gross population. The population that was researched the most was children. Usually, they were elementary school children, describing about the effectiveness of intervention/treatment programs on them. Two of the children-targeted research was a case-study based on consultation records of a single young patient.

Another group that was researched a lot was the disabled. Two of the research were found, subject of each being people diagnosed with depressive disorder and behavioral disorder.

Criminals were also one of the subject researched, and all of them had to do with murder or arson. However, since these literature was based on a case report from the police department, it was hard to derive implications on public health.

Figure 2.3. Research subject of the published articles with search term “분노조절장애”, 1990-2019



Inconsistent use of diagnosis

Another finding to note from previous literature is that the cited diagnostic term for “분노조절장애” is not consistent. Psychiatrists, including The National Center for Mental Health have clarified that the diagnostic term for “분노조절장애” is “Intermittent Explosive Disorder”. However, it was indicated that many of the research have used different terms to describe “분노조절장애”. Of total 18 literature, two used the term “분노조절장애” without diagnosis to describe people committing arson crimes. Sixteen literature used the “분노조절장애” to describe aggressive or anger related behaviors, without diagnosis. Since these are based on questionnaires which depend on the recall of patients, and rather a ‘symptom’ than based on a ‘diagnosis’ issues such as memory bias can be problematic.

2.4. Use of Medical Service in Mental Patients

An increasing number of literature suggests that sociodemographic background of an individual may affect his or her use of health care services (Mojitabai, Olfson & Mechanic, 2002; Gallo, Marino, Ford & Antony, 1995; Horwitz, 1977; Greenley & Mullen, 1990). Also, other studies have reported that sociodemographic variables influence where or from whom help is sought rather than whether help is sought or not (Greenley & Mullen, 1990; Greenley, Mechanic & Cleary, 1987).

Gender

Many studies report gender differences in seeking professional mental help. Women recognize psychological distress easier than men, and more likely to seek treatment for psychological problems or psychiatric disorders (Horwitz, 1977; Greenley & Mullen, 1990; Greenley, Mechanic & Cleary, 1987; Kessler, Reuter & Greenley, 1979). In addition, women have a tendency to visit psychiatric department more frequently than men (Greenley & Mullen, 1990; Bijl & Ravelli, 2002; Leaf & Bruce, 1987; Pescosolido & Boyer, 1999).

Age

Many researchers also report age differences in seeking medical care (Mojitabai, Olfson & Mechanic, 2002; Gallo, Marino, Ford & Antony, 1995; Greenley, Mechanic & Cleary, 1987; Shapiro, Skinner, Kessler, Von Korff & German, 1984; Vilhjalmsón, Olafsson, Sigurdsson & Herbertsson, 2001; Vilhjalmsón, Jo

rundsdottir, Sigurdardottir & Johannsdottir, 2001). It is suggested that age distribution of seeking medical is rather polarized. People under 25 and individuals over 65 seem to have the lowest rates of medical use for mental health issues, while the middle aged are most likely to visit mental health professionals (Mojitabai, Olfson & Mechanic, 2002; Gallo, Marino, Ford & Antony, 1995; Greenley, Mechanic & Cleary, 1987; Shapiro, Skinner, Kessler, Von Korff & German, 1984). Also, elderly population tend to utilize mental treatment less, since they may attribute the emotional symptoms to natural process or aging. Instead, they visit emergency rooms, nursing homes, and the general medical sector (Shapiro, Skinner, Kessler, Von Korff & German, 1984; Wang, Lane, Olfson, Pincus & Wells et al., 2005), which do not provide intensive care devoted to mental health (Wang, Lane, Olfson, Pincus & Wells et al., 2005).

Residence

Residential differences are also known to predict utilization in psychiatric services. It has been reported that those living in rural areas visit hospitals less often (Biji & Ravelli; 2000, Wang, Lane, Olfson, Pincus & Wells et al., 2005). The reason behind this low utilization rate can be attributed to less available specialty care in these areas (Greenley & Mullen, 1990; Vilhjalmsson, Jo" rundsdottir, Sigurdardottir & Johannsdottir, 2001; Wang, Lane, Olfson, Pincus & Wells et al., 2005).

Marital Status

Marital status is also suggested to affect help-seeking for mental health.

Mental health service users tended to be unmarried, divorced, separated, or widowed (Mojtabai, Olfson & Mechanic, 2002; Greenley, Mechanic & Cleary, 1987).

Chapter 3. Study Design and Methods

3.1. Data

Data source

The Korean Health Security System consists of National Health Insurance and Medical Aid. National Health Insurance includes the majority of Korean population, while Medical Aid covers people at the lowest income level. NHI is the only medical insurance provided by the Korean government and compulsory social security system covering over 97% of total Korean population.

The Korean National Health data largely is composed of separate DBs, which are beneficiary DB, medical record DB, health checkup DB, and finally institution DB. The beneficiary DB contents information such sex, age, residence, beneficiary type, premium quantile of each individual.

The data were collected from customized DB offered by National Health Insurance Service (NHIS). Because of privacy protection issues, the medical records of mental disease patients can only be obtained by customized claims data. I collected diagnostic data of IED patients from 2002 to 2018. The study was approved by the National Health Insurance System (No. REQ0000035411) and the Institutional Review boards of the Seoul National University (IRB No. E2004/001-001).

Beneficiary database

Beneficiary database is a person-based health care utilization data. It includes variables such as ID, sex, age, beneficiary type, disability, national health insurance fee, address.

Medical record database

Medical record database includes variables such as medical institution code, visit type(inpatient/outpatient), department code, main symptom and sub symptoms, date of visit, days of hospitalization/visits, days of prescription, actual medical cost payed by an individual (pocket money), total medical costs.

Institution database

The main purpose of institution database is to provide information about a hospital of an institution that an individual visited. The variables included in the database are medical institution code, hospital level (clinic, general or tertiary hospital), hospital address.

3.2. Operational Definition of Variables

Population of Interest

In the present research, Intermittent Explosive Disorder patients are defined as those diagnosed with IED as a main disease. The data were examined with by each claim rather than individual. Only patients diagnosed with IED as a main disease were included because it was considered to better explain the need of an individual to be treated with IED, not by other comorbid diseases.

Sociodemographic variables

In the present research, gender, age, economic status, disability, medical aid, and residence were used as a sociodemographic variable. These variables were extracted from the beneficiary DB. Age was recoded into several groups. People under the age of 19, was excluded and the rest was divided into seven groups; 20-29, 30-39 and so forth. Economic status was measured using insurance fee variable, by dividing the variable into 5 groups. Also, residence variable was recoded and recoded into binary variable, as “capital residence”, those people living in Seoul, Geong-gi, and Incheon province and “non-capital residence”, those living other than the above-mentioned capital area.

Medical service use variables

Variables used to measure the amount of hospital utilization were days of hospital visit, individual medical cost (pocket money), and duration under the

treatment. Individual medical cost variable was logarithmized. Also, by analyzing the medical service use targeting on outpatient visitors, I mainly focused on those who actually had a desire to be treated voluntarily. In other words, medical service use variables were used to measure an individual's desire to be treated with IED.

Chapter 4. Results

4.1. Changes in Intermittent Explosive Disorder Diagnosis, 2002-2018

Figure 4.1 to Figure 4.4 show the trend curves for population diagnosed with Intermittent Explosive Disorder in the order of total population, by gender, by age, and by economic status, respectively for the last 17 years.

Curve in Figure 4.1 shows a steady increasing pattern, implying that number of people diagnosed with IED is gradually increasing. Also, it can be inferred that the slope is slightly steeper from 2014 than the previous years.

Figure 4.1. Total number of people diagnosed with IED from 2002-2018

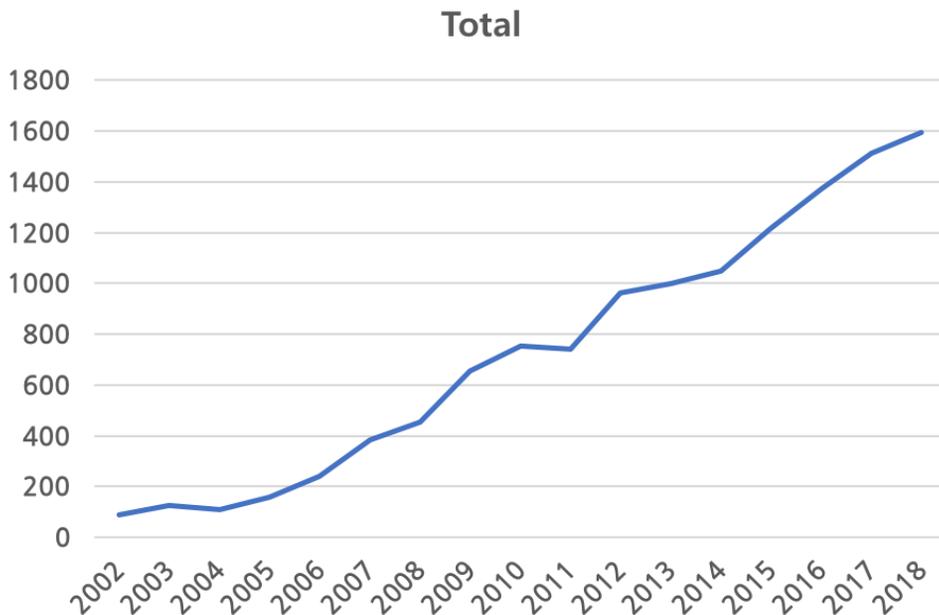


Figure 4.2. Number of people diagnosed with IED by gender from 2002-2018

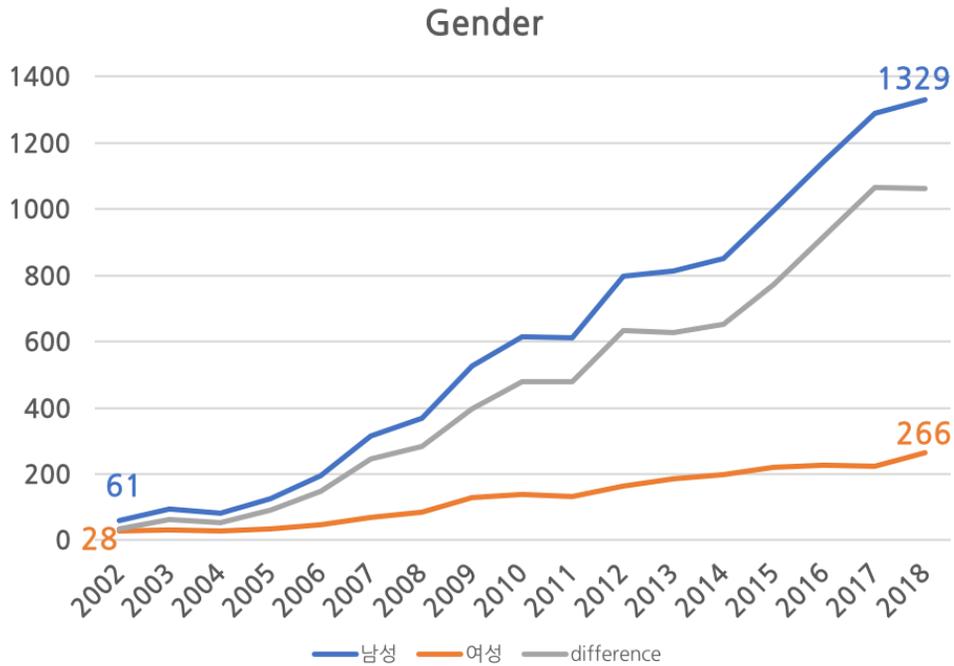


Figure 4.2 shows number of people diagnosed by gender and the difference between men and women by each year. It can be implied that the number of diagnosis in both men and women is steadily increasing. Moreover, the difference between men and women is increasing, which in 2018, men diagnosed with IED is about 5 times more than women.

In terms of age, it can be seen from Figure 4.3 that IED is rather a disease of young adults, since those in 20s and 30s are the most vulnerable age group. Especially it should be noted that those in 20s have a tendency to show a steep increase than other age groups, which indicate a rather gradual, or minimal increase.

It can also be implied from Figure 4.4 which shows number of diagnosis by economic status that IED is rather prevalent among people at a better economic status.

However, since the National Health Insurance Service Data is based on a medical record, it only captures population who actually went to the hospital for the disease. So, while the number of diagnosed people is the greatest among the wealthiest population, we should also consider the possibility that this is because those at a better economic status visit hospital more frequently for their mental health. In addition, the graph shows that the second population with the most diagnosis is those at the lowest economic status, implying that we may consider IED as a ‘polarized’ disease, since the most diagnosis are displayed among the wealthiest and the poorest.

Figure 4.3. Number of people diagnosed with IED by age from 2002-2018

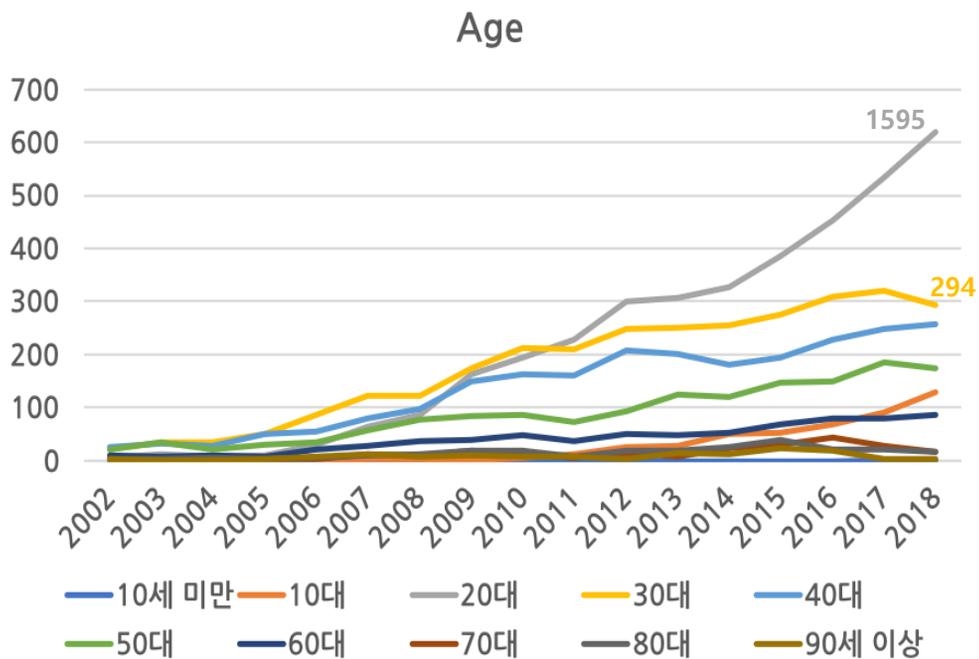
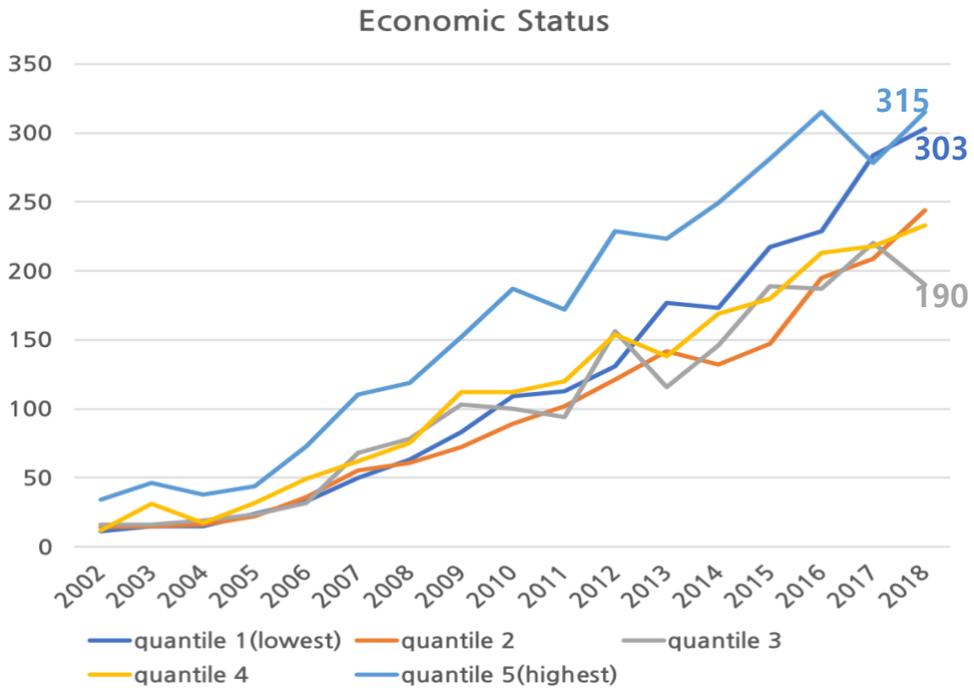


Figure 4.4. Number of people diagnosed with IED by economic status from 2002-2018



4.2. Characteristics of Intermittent Explosive Disorder Patients

Table 4.1 shows the most common comorbid disease of IED. It is reported that in 2008, Attention deficit disorder with hyperactivity, in other words known as ADHD is of the most frequency, accounting 6.78%, followed by serious of depression related disorders. In 2017, three most frequent comorbid disorders seem to be consistent with the year 2008, which are ADHD, and depression related disorders. Another thing to note is that 49.18% of IED patients had visited hospital with the purpose to be treated with the disease.

Table 4.1. Comorbid diseases of Intermittent Explosive Disorders in 2008

Disease code and names	<i>n</i>	%
None	1,495	49.18
F900 (Attention deficit disorder with hyperactivity, 주의력 결핍장애)	206	6.78
F329 (Depressive episode, unspecified, 상세불명의 우울에피소드)	115	3.78
F320 (Mild depressive episode, 경도 우울에피소드)	84	2.76
F332 (Recurrent depressive disorder, 재발성 우울장애)	66	2.17
F321 (Moderate depressive episode, 중등도 우울에피소드)	62	2.04
F328 (Other depressive episodes, 기타 우울에피소드)	43	1.41
F908 (Other hyperkinetic disorders, 기타 운동과다장애)	42	1.38
F901 (Hyperkinetic conduct disorder, 운동과다성 행동장애)	39	1.28
F432 (Adjustment disorders, 적응장애)	37	1.22
F710 (Moderate mental retardation, 중등도 정신지체)	36	1.18

- Cumulative: 74.34%

- *Table 4.2. Comorbid diseases of Intermittent Explosive Disorders in 2017*

Disease code and names	<i>n</i>	%
None	1,321	12.30
F329 (Depressive episode, unspecified, 상세불명의 우울에피소드)	871	8.11
F320 (Mild depressive episode, 경도 우울에피소드)	634	5.90
F900 (Attention deficit disorder with hyperactivity, 주의력 결핍장애)	577	5.37
F319 (Bipolar affective disorder unspecified, 상세불명의 양극성정동장애)	552	5.14
F321 (Moderate depressive episode, 중등도 우울에피소드)	497	4.63
F328 (Other depressive episodes, 기타 우울에피소드)	411	3.83
F510 (Nonorganic insomnia, 비기질성 불면증)	346	3.22
F318 (Other bipolar affective disorders, 기타 양극성 정동장애)	335	3.12
F412 (Mixed anxiety and depressive disorder, 혼합형 불안 및 우울장애)	322	3.00
F102 (Mental and behavioural disorders due to use of alcohol, 알콜사용에 의한 정신및 행동장애)	209	1.95

- Cumulative: 56.5%

Table 4.3a. Patients with IED as main disease in 2008 and 2017

	2008		2017	
	<i>n</i>	%	<i>n</i>	%
Sex				
Male	2,468	81.18	9,166	85.34
Female	572	18.82	1,575	14.66
Chi-square	<i>p</i> < 0.001		<i>p</i> < 0.001	
Age				
20-29	836	27.82	4,265	42.10
30-39	840	27.95	2,227	21.98
40-49	643	21.40	1,657	16.36
50-59	405	13.48	1,147	11.32
60-69	185	6.16	564	5.57
70-79	63	2.10	178	1.76
80 years old or older	33	1.10	92	0.91
Chi-square	<i>p</i> < 0.001		<i>p</i> < 0.001	
Economic Status				
1 st quantile (Lowest)	406	14.66	1,923	21.95
2 nd quantile	377	13.61	1,715	19.58
3 rd quantile	483	17.44	1,588	18.13
4 th quantile	752	27.15	1,285	14.67
5 th quantile (Highest)	752	27.15	2,250	25.68
Chi-square	<i>p</i> = 0.189		<i>p</i> < 0.001	
Disability				
Disabled	325	10.69	1,448	13.48
Not disabled	2,715	89.31	9,293	86.52
Chi-square	<i>p</i> < 0.05		<i>p</i> < 0.001	

Characteristics of people diagnosed with Intermittent Explosive Disease as a main disease in 2008 and 2017 are presented in Table 4.3a and Table 4.3b. Differences in distribution between each subgroup were statistically significant in both years, except the economic status in 2008.

In terms of sex, in both years, men accounted for more than 80% of total IED diagnosis, and even took up greater proportion in the latter year (85.34%). Whereas in 2008 those in 30s was the most by 27.95%, in 2017, the 20s were the

most frequent, by 42.1%. People with the highest economic status and those at the 4th quantile reported the highest proportion of 27.15% in 2008. However, in 2017, it is indicated that whereas the highest economic status was still most frequent, the next frequent population was those with the lowest economic status (21.95%). Also, it should be noted that the rate of increase was the greatest in the lowest economic class, which increased by 7.29% (Table 4.3a). Also, it can be seen from Table 4.3b that the proportion of IED patients with medical aid takes up about 16.5% in 2017, which has increased from 6.3% in 2008. It can be inferred that proportion of medical aid beneficiary IED patients have increased, whereas it has decreased in the general population, patients under National Health Insurance system. In terms of hospital level, it is indicated that more than half of IED patients seek medical care from primary hospitals in both years. Also, it is shown that people rather visit other departments rather than psychiatric department to be treated with IED.

Table 4.3b. Patients with IED as main disease in 2008 and 2017 (cont.)

	2008		2017	
	<i>n</i>	%	<i>n</i>	%
Medical Aid				
Yes	192	6.32	1,769	16.47
No (national health insurance)	2,848	93.68	8,972	83.53
Chi-square	<i>p</i> < 0.001		<i>p</i> < 0.001	
Residence				
Capital Area (Seoul, Incheon, Gyeonggi)	1,513	49.77	5,390	50.18
Other regions	1,527	50.23	5,351	49.82
Chi-square	<i>p</i> < 0.001		<i>p</i> = 0.177	
Hospital Level				
Primary care (clinic, public health center)	2,324	76.45	5,712	53.09
Secondary care (hospital, general hospital)	544	17.9	3,966	36.93
Tertiary care (tertiary hospital)	172	5.66	823	7.66
Nursing hospital	0	0	250	2.33
Chi-square	<i>p</i> < 0.001		<i>p</i> < 0.001	
Visit Type				
Inpatient	167	5.49	464	4.32
Outpatient	2,530	83.22	9,684	90.16
Psychiatric inpatient	128	4.21	194	1.81
Psychiatric outpatient	215	7.07	399	3.71
Chi-square	<i>p</i> < 0.001		<i>p</i> < 0.001	
Total	3,040		10,741	

4.3. Factors Affecting Use of Outpatient Service in IED Patients

Characteristics of IED patients using outpatient service

In this section(4.3), the operational definition of ‘outpatient visitors’ are patients with IED as a main disease, solely seeking outpatient care without hospitalization. By confining the target population to IED patients only seeking outpatient care, it is assumed to better reflect the patient’s ‘willingness’ to seek professional treatment.

Table 4.4 reports outpatients with Intermittent Explosive Disorder as a main symptom. It is indicated that the men accounted more proportion in 2017 than in 2008. While in 2008, the difference between distribution of gender was significant, in 2008, no significant difference was reported in 2017. Age group of 20s accounted for the largest proportion by 41.77%, followed by those in their 30s. In terms of economic status, while the proportion of the highest economic status decreased from 27.78% to 25.02%, that of the lowest economic status increased from 13.83% to 21.97%. Also, the proportion of the disabled showed similar tendency, which increased from 8.78% to 12.01% in 2017. Beneficiaries of medical aid also accounted for 15.56% of outpatient visits in 2017, which increased from 4.44% in 2008. Another thing to note is that whereas in 2008 more than three fourths of people visited primary care institutions to be treated with IED (82.26%), in 2017, only about half of the people visited primary care institution (56.62%), mostly transferred to secondary care institutions, which accounted for 35.49% in 2017 compared to 11.88% in 2008.

Table 4.4a. Outpatients with IED as main disease in 2008 and 2017

	2008		2017	
	<i>n</i>	%	<i>n</i>	%
Sex				
Male	2,255	82.15	8,594	85.5
Female	490	17.85	1,458	14.5
Chi-square	<i>p</i> < 0.001		<i>p</i> = 0.075	
Age				
20-29	815	30.07	3,954	41.77
30-39	721	26.61	2,077	21.94
40-49	538	19.85	1,587	16.76
50-59	393	14.5	1,105	11.67
60-69	174	6.42	518	5.47
70-79	50	1.85	146	1.54
80 years old or older	19	0.7	80	0.85
Chi-square	<i>p</i> < 0.001		<i>p</i> < 0.001	
Economic Status				
1 st quantile (Lowest)	352	13.83	1,820	21.97
2 nd quantile	360	14.15	1,657	20.0
3 rd quantile	430	16.9	1,495	18.04
4 th quantile	696	27.35	1,240	14.97
5 th quantile (Highest)	707	27.78	2,073	25.02
Chi-square	<i>p</i> < 0.001		<i>p</i> < 0.001	
Disability				
Disabled	241	8.78	1,207	12.01
Not disabled	2,504	91.22	8,845	87.99
Chi-square	<i>p</i> < 0.001		<i>p</i> < 0.001	

Table 4.4b. Outpatients with IED as main disease in 2008 and 2017 (cont.)

	2008		2017	
	<i>n</i>	%	<i>n</i>	%
Medical Aid				
Yes	122	4.44	1,564	15.56
No (national health insurance)	2,623	95.56	8,488	84.44
Chi-square	<i>p</i> < 0.001		<i>p</i> < 0.001	
Residence				
Capital Area (Seoul, Incheon, Gyeonggi)	1,431	52.13	4,991	49.65
Other regions	1,314	47.87	5,061	50.35
Chi-square	<i>p</i> < 0.001		<i>p</i> = 0.187	
Hospital Level				
Primary care (clinic, public health center)	2,258	82.26	5,681	56.52
Secondary care (hospital, general hospital)	326	11.88	3,567	35.49
Tertiary care (tertiary hospital)	161	5.87	804	8.0
Nursing hospital	-	-	-	-
Chi-square	<i>p</i> < 0.001		<i>p</i> < 0.001	
Total	2745		10,052	

Factors Affecting Medical Service Use in IED Outpatients, 2008

Our first model with the individual medical cost as dependent variable, two sets of multivariate models were fitted. The first set examined sociodemographic factors (model 1), and the second added other factors related to medical costs other than sociodemographic factors (model 2). Table 4.5 presents the results of these analyses. Since adding additional factors better explained the dependent variable (Adjusted - $R^2 = 38.4$, $p < 0.001$), model 2 was selected as the most fit model. Medical aid was excluded from the model because of multicollinearity. All of the independent variables except gender were statistically significant. Lower age was associated with higher medical cost (coefficient = -0.006 , $p < 0.001$), and higher economic status was associated with higher medical cost (coefficient = 0.043 , $p < 0.01$). The disabled had lower medical cost than those without disability (coefficient = -0.220 , $p < 0.001$). Also, people living around the capital were more likely to pay more than those who do not (coefficient = -0.072 , $p < 0.01$). Number of hospital visits, length of medication, and hospital level were all statistically significant with p-value less than 0.001. To sum, the younger, richer, non-disabled people, living around capital city had a tendency of higher medical cost, in other words, seek more professional help in 2008.

Table 4.5. Factors related with medical cost of outpatient with IED as a main disease, 2008

Variables	Model 1		Model 2	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Sex (ref. women)	-0.006	0.040	-0.045	0.031
Age	-0.004 **	0.001	-0.006 ***	0.001
Economic Status	0.039 ***	0.011	0.043 **	0.009
Disability (ref. no disability)	-0.045	0.060	-0.220 ***	0.049
Medical Aid (ref. medical aid)	-		-	
Capital Area (ref. non-capital)	0.082 **	0.030	0.072 **	0.024
Number of Hospital Visits			0.321 ***	0.041
Length of Medication			0.015 ***	0.001
Length of Prescription			-0.005 **	0.002
Hospital Level			0.666 ***	0.025
Constant	9.242 ***	0.072	8.089 ***	0.070
R ²	1.300		38.620	
Adjusted - R ²	1.100 ***		38.400 ***	

* $p < .05$ (two-tailed). ** $p < .01$ (two-tailed). *** $p < .001$ (two-tailed)

Another dependent variable to measure service use of Intermittent Explosive Disorder patients was number of visits, fitted with two sets of multivariate models. The first set examined sociodemographic factors (Model 1), and the second model added other factors related to number of hospital visits. The final model that best explained the dependent variable (Adjusted - $R^2 = 21.2$, $p < 0.001$) was selected as the most fit model (Model 2). Medical aid was excluded from the model because of multicollinearity. Table 4.6 presents the results of these analysis. Independent variables that were statistically significant were age, disability, length of medication, length of prescription, and hospital level. The non-disabled visited hospitals more frequently than the disabled (coefficient=-0.103, $p < 0.001$). Length of medication, length of prescription, and hospital level were all found to be statistically significant in 2008.

Table 4.6. Factors related with number of hospital visits of outpatient with IED as a main disease, 2008

Variables	Model 1		Model 2	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Sex (ref. women)	0.017	0.017	0.000	0.016
Age	0.000	0.000	-0.001 *	0.000
Economic Status	-0.006	0.005	-0.005	0.004
Disability (ref. no disability)	-0.009	0.026	-0.103 ***	0.024
Medical Aid (ref. medical aid)	-		-	
Capital Area (ref. non-capital)	-0.012	0.013	-0.010	0.012
Length of Medication			0.009 ***	0.001
Length of Prescription			0.002 *	0.001
Hospital Level			0.208 ***	0.011
Constant	1.067 ***	0.032	***	0.031
R ₂	0.15		21.44	
Adjusted - R ₂	0.05		21.19	

* $p < .05$ (two-tailed). ** $p < .01$ (two-tailed). *** $p < .001$ (two-tailed).

Another dependent variable to measure service use of Intermittent Explosive Disorder patients was duration of care, fitted with three sets of multivariate models (Table 4.7). Variables included in each of the three models were same as the number of hospital visits. The first set examined sociodemographic factors (model 1), and the second model added other factors related to number of hospital visits. The final model that best explained the dependent variable (Adjusted - $R_2 = 21.84$, $p < 0.001$) was selected as the most fit model (Model 2). The multivariate regression results of age showed a positive relationship with the duration of care in outpatients. People with disability were treated longer than those without disability, and the coefficient was noticeably large compared to other independent variables, implying stronger relationship between disability and length of care (coefficient=7.112, $p < 0.001$). Length of medication, length of prescription, and hospital level were all statistically significant ($p < 0.001$). This implies that disabled people are likely to be treated longer mainly for IED.

Table 4.7. Factors related with duration of care of outpatient with IED as a main disease, 2008

Variables	Model 1		Model 2	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Sex (ref. women)	0.469	0.486	0.680	0.444
Age	0.092 ***	0.014	0.090 ***	0.012
Economic Status	-0.122	0.133	0.012	0.122
Disability (ref. no disability)	7.286 ***	0.726	6.898 ***	0.663
Medical Aid (ref. medical aid)	-		-	
Capital Area (ref. non-capital)	0.252	0.369	-0.226	0.338
Length of Medication			7.379 ***	0.548
Length of Prescription			-0.332 ***	0.022
Hospital Level			2.454 ***	0.345
Constant	4.662 ***	0.882	-5.675 ***	0.979
R2	5.92		22.08	
Adjusted - R2	5.73		21.84	

* $p < .05$ (two-tailed). ** $p < .01$ (two-tailed). *** $p < .001$ (two-tailed)

Factors Affecting Medical Service Use in IED Outpatients, 2017

Table 4.9 shows the multivariate regression analysis of Intermittent Explosive Disorder outpatient medical cost. The final model was selected as the best fit model, with the Adjusted – R square of 29.38%. Medical aid was excluded from the model because of collinearity. All of the independent variables were found to be statistically significant in the final model. Women rather men, younger people, with higher economic status, the non-disabled people, people living around capital area were more likely to use outpatient services.

Provided in table 4.10 are results of multivariate regression analysis of number of outpatient visits of IED patients. The results illustrate that in the final model with R-square of 0.24%, lower hospital level was associated with more frequent hospital visits. This implies that people visiting primary medical institutions such as clinics, or public healthcare centers are more likely to visit hospitals often than big hospitals.²

Table 4.8. Factors related with medical cost of outpatient with IED as a main disease, 2017

Variables	Model 1		Model 2		SE
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	
Sex (ref. women)	-0.757 **	0.231	-0.132 ***	0.02	
Age	-0.005 ***	0.001	-0.005 ***	0.001	
Economic Status	0.064	0.005	0.062 ***	0.062	
Disability (ref. no disability)	-0.425 ***	0.034	-0.388 ***	0.029	
Medical Aid (ref. medical aid)	-		-		
Capital Area (ref. non-capital)	-0.115	0.016	0.071 ***	0.014	
Number of Hospital Visits			0.926 **	0.358	
Length of Medication			0.008 ***	0.001	
Length of Prescription			-0.008 ***	0.001	
Hospital Level			0.535 ***	0.011	
Constant	9.662 ***		7.896 ***	0.36	
R ₂	5.5		29.46		
Adjusted - R ₂	5.44 ***		29.38 ***		

* $p < .05$ (two-tailed). ** $p < .01$ (two-tailed). *** $p < .001$ (two-tailed).

Table 4.9. Factors related with number of hospital visits of outpatient with IED as a main disease, 2017

Variables	Model 1		Model 2	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Sex (ref. women)	0.000	0.001	0.000	0.001
Age	0.000	0.000	0.000	0.000
Economic Status	0.000	0.000	0.000	0.000
Disability (ref. no disability)	0.000	0.001	0.000	0.001
Medical Aid (ref. medical aid)	-		-	
Capital Area (ref. non-capital)	0.001	0.000	0.001	0.000
Length of Medication			0.000	0.000
Length of Prescription			0.000	0.000
Hospital Level			-0.001	0.000
Constant	0.998 ***	0.001	0.999 ***	0.001
R2	0.08		0.16	
Adjusted - R2	0.02		0.06	

* $p < .05$ (two-tailed). ** $p < .01$ (two-tailed). *** $p < .001$ (two-tailed).

Table 4.11 suggests result of multivariate regression analysis of duration of care of IED outpatients. The final model had an adjusted R-square of 20.53%, all independent variables being statistically significant except for sex, area of residence. Medical aid and number of hospital visits were excluded from the analysis because of collinearity. This suggests that older people, at low economic status, and people with disability were more likely to be under treatment for a long time than the others.

Table 4.10. Factors related with duration of care of outpatient with IED as a main disease, 2017

Variables	Model 1		Model 2	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Sex (ref. women)	-0.126	0.352	0.180	0.32
Age	0.123 ***	0.009	0.139 ***	0.00
Economic Status	-0.346 ***	0.082	-0.366 ***	0.074
Disability (ref. no disability)	2.951 ***	0.495	3.250 ***	0.450
Medical Aid (ref. medical aid)	-			
Capital Area (ref. non-capital)	0.302	0.242	0.354	0.223
Length of Medication			12.226 *	5.778
Length of Prescription			-0.417 ***	0.011
Hospital Level			3.808 ***	0.176
Constant	6.459 ***	0.541	-10.361	5.800
R2	3.27		20.03	
Adjusted - R2	3.21		19.95	

* $p < .05$ (two-tailed). ** $p < .01$ (two-tailed). *** $p < .001$ (two-tailed).

Chapter 5. Discussion

5.1. Summary of Findings

Reflecting on the National Health Insurance Data, from 2002 to 2018, Korea has witnessed a steady increase in the diagnosis of Intermittent Explosive Disorder. Despite emerging research regarding the disease in other countries, such as United States and Japan, no study has yet investigated the issue in Korea. The present study therefore further examined the characteristics of people with IED, and their use of hospital, in particular outpatient services using data from a nationally collected medical record (the National Health Insurance data) in Korea. This investigation is particularly timely given the reported increasing rate of crimes related with anger management.

Findings from trends and characteristics of intermittent explosive disorder patients

The result showed that the number of diagnosis regarding Intermittent Explosive Disorder (IED) had gradually increased for last 17 years. In light of gender perspective, it was reported that the men were diagnosed more than women and the gap between the two is steadily increasing, which in the year 2017, men accounted for about five times more proportion than women. According to Koreans Statistical Information Service(KOSIS) data, total population of men was 25,768,000 and women 25,654,000. This suggests that IED actually might be more prevalent in men

than women, which is consistent from the previous research that IED is more prevalent in men than women (Coccaro, 2006). However, whereas the research done by Coccaro revealed that IED is three times more prevalent in men, in Korean context, it seems that the gender gap is even greater considering that men were five times more diagnosed than the women. This implies that IED might be a gender specific disease, in other words, men are more prone to be diagnosed or IED is more prevalent in men.

Also, it was observed that IED have a possibility of having a relationship with economic status. While those at the highest economic status accounted for the largest proportions, the following population that took up the second most proportion was those in the lowest economic status, in other words, implying that IED might be a disease that is “polarized” in economic status perspective. We should also note that the percent of IED patient receiving medical aid have increased from 2008 to 2017.

Also, it is interesting to note that although like other previous research depression was common comorbid disease of IED, in Korea, ADHD was of high comorbidity, which is different from previous findings in other countries.

Finally, while Intermittent Explosive Disorder is a mental disorder, only about 12% of the diagnosed visited psychiatric department in 2008, and the proportion of psychiatric visits of IED patients even decreased to 5% in 2017. This implies that even when people seek treatment for IED in hospital, they rather go to general department, mostly clinics than to visit psychiatric departments, which can give more professional advice regarding the mental disorder.

Findings from factors related with outpatient service use of intermittent explosive disorder

In 2008, it was suggested that more than 50% of IED outpatients sought primary care. However, number of outpatient visits were positively related with hospital level. In other words, while IED outpatients might visit primary care medical institution, the frequency of being treated is higher in hospitals at the higher level. The finding was of a little difference in 2017. In the year 2017, while still more than 50% of IED outpatients sought primary care services, the number of visits were negatively related with the hospital level. This implies opposite finding from the year 2008, since in 2017, the lower hospital level meant more frequent visits.

Moreover, in 2008, the younger an IED outpatient, the higher the individual medical cost. However, the duration of treatment was positively related with age, in other words, the older the IED outpatient, the longer he or she was under the treatment. Since the duration of treatment includes days of prescription in addition to frequency of hospital visits.

Finally, in terms of residence, while outpatients living in non-capital area utilized medical services more often than the capital residents, the pocket money (individual medical cost) was higher in case of capital residents. In the year 2017 data, economic status was positively related with duration of care, which was not statistically significant in 2008. In 2017, higher economic status was related with longer treatment.

5.2. Limitations and Strength of the Study

A number of limitations should be taken into account when interpreting the findings of the research set out in this thesis. Firstly, the limitation comes from the data characteristic that National Health Insurance Data(NHIS) is a medical record, rather than a survey. Based on the limited variables available, only nominal reports such as changes in IED diagnosis and their medical service use were possible. Variables that provides evidence regarding why people do not seek long-term care or why men, who are the actual vulnerable population of IED do not seek treatment as much as women were not included, therefore making it hard to make further inferences.

Secondly, since the data was obtained with a population limited to IED patients, it is unable to yield the actual prevalence of IED in Korea. While previous research discussing prevalence of a disease based on the NHIS claim data by applying standardization can be found, there have been much criticism since NHIS still captures those who are enrolled in the national health insurance system. Therefore, this paper did not discuss the prevalence rate and only was able to discuss the diagnosis patter or variations.

Lastly, tracking down the IED cohort was not conducted in the study. Therefore, mortality of IED patients was not considered in the study and follow-up based on each individual could not be inferred.

However, despite the above-mentioned limitations, the research is in value that it shed light on Intermittent Explosive Disorder, an often-neglected disease in Korea. Mental health field is an important research topic nowadays, since poor

mental status can lead to negative outcomes physically, even socially. However, much of research in Korea have been focused only on depression, schizophrenia, or bipolar disorders. As mentioned in the literature review, Coccaro (2017) have discussed that IED often times precedes these above-mentioned diseases, therefore should be dealt independently rather than as a comorbid disease.

The second value of the research comes from the data characteristics. Despite limited variables, NHIS data is valuable in that it encompasses over 97% of the Korean population. Since currently only sample-based studies are available, despite limitations, the study has its value in that it can be a preliminary data for further IED research with a nationally representative data. Also, because IED is classified as a 'sensitive disease' it is not open to the public and can only be obtained by in the form of claims data.

5.3. Implications and Further Suggestions

Implications from section 4.1

Main findings from section 4.1 were that people with IED are steadily increasing. While it is suggested that IED is continuously increasing both in men and women, especially, it is severe in men, since the gender gap keep increasing in 2017, men reaching up to five times more than women. In terms of age, it seems that those in 20s are especially suffering from IED. By economic status, it is rather polarized, since the diagnosis is the most in highest, and the lowest income status. Another notable fact is that the speed of increase is especially rapid in the lowest income class.

What do the result show us? Firstly, it is true that the absolute number of IED patients are low compared to depression patients, which was 643,102 in 2017, or schizophrenia patients, 108,000 in 2017, according to National Center for Mental Health. But it should be noted that the number is overrated since it encompasses all people with depression or schizophrenia even if it was not the main disease. However, considering the number of IED as a main disease is keep increasing, it should not be neglected and preventative measures to decrease the number of IED patients should be taken before it is too late.

The overall low prevalence of IED in Korea compared to U.S or other countries might be expressed by the previous research in Japan. It is reported by Yoshimasu et al (2011), that Japanese tend to suppress their feelings, especially anger than Westerners due to social norms. This might also be true in Koreans, since collective actions are valued than individual or personal opinions. In these social

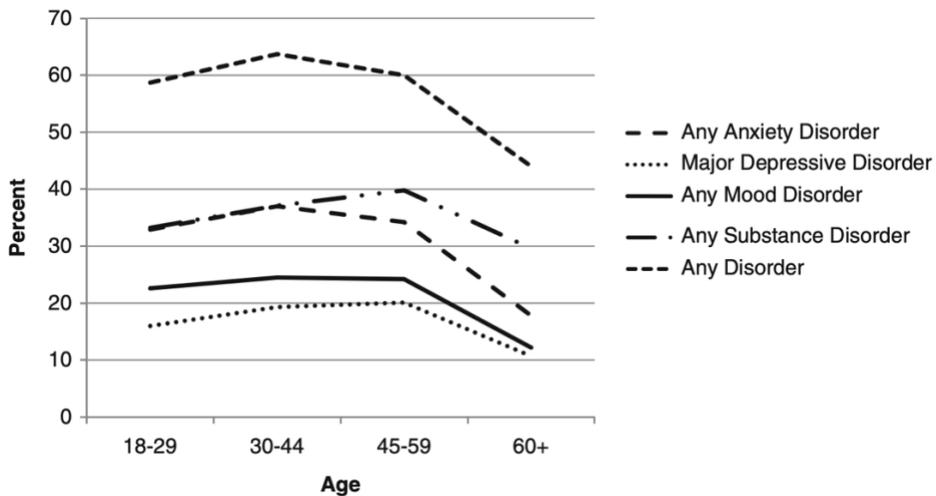
context, showing one's feelings, especially anger will isolate himself or herself from other members of the society.

Next, it is reported that the gender gap is increasing. Although more in-depth research is needed, this implies that the IED might be a gender-specific disease. Gender differences are among the strongest patterns of mental health problems (Rosenfield & Mouzon, 2012). Men and women are said to experience substantially different types of problems (Avison & McAlpine, 1992 ; Gore, Aseltine, & Colten, 1993 ; Kessler, 2003 ; Turner & Lloyd, 1995 ; Rosen field, Lennon, & White, 2005). Women, since adolescence, suffer more than men from internalizing disorders, turning problematic feelings against the self in depression and anxiety. This difference means that women endure attributions of self-blame and self-reproach more often than men. In contrast, prevalence of externalizing disorders is more frequent in men, including antisocial personality disorders and substance abuse or dependence. In internalizing problems, 46 million women (29%) suffer from depression over their lifetimes, compared to 28 million men (18%). In addition, 54 million women (34%) as opposed to 36 million men (23%) endure some form of anxiety during their lives (Kessler, 2003). In externalizing problems, 8 million men (5%) experience antisocial personality disorder versus 1.5 million women (1%) (Rosenfield & Mouzon, 2012).

In terms of age, it shows that IED is high in 20s. Although we cannot reveal the actual reason to this due to limitations of data, we can get some ideas from other mental disease that shows similar patterns in age perspective. It is shown in various

research that in terms of depressive symptoms¹, the graph shows a pattern of ‘J’ or ‘U’ in relationship with age (Kessler, Foster, & House, 1992 ; Mirowsky & Ross, 1992 ; Ross & Mirowsky, 2008 ; Schieman, Van Gundy, & Taylor, 2001) (see Figure 5.1). In discussing the transition from early adulthood to middle age, researchers speculate that high proportion of depression in early adulthood can be attributed to a relative lack of experience in coping with numerous life transitions that occur at that time, whereas middle age is associated with greater maturity (Rosenfield & Mouzon, 2012). Since IED is often related with anger, one possible of high prevalence if IED in 20s is that it is because they are yet immature in controlling their feelings.

Figure 5.1. Age differences in lifetime prevalence of mental disorders (compiled by the authors from the National Comorbidity Survey Replication)



¹ Since ‘symptom’ and actual ‘diagnosis’ is different, there is a difference between ‘depressive symptom’ and ‘depression’, and cautious interpretation is needed.

Implications from section 4.2

Main findings from section 4.2 are as follows. The disease with highest comorbidity in IED patients were ADHD and depression. In terms of use of medical services, most IED patients sought primary care, while the proportion of visits to secondary care hospitals have slightly increased in 2017. Also, they mostly used outpatient service, which increased from 83.22% in 2008 to 90.16% in 2017. In terms of mental department, both inpatient and outpatient have decreased, 4.21% in 2008 to 1.81% in 2017 and 7.97% to 3.71%, respectively.

One of main findings from section 4.2 is, whereas Intermittent Explosive Disorder is known to coexist with depression, in the Korean context, it is shown that people with IED are most likely to have Attention deficit hyperactivity disorder(ADHD). According to NHS(National Health Service), UK website, the symptoms of ADHD are as follows:

- carelessness and lack of attention to detail
- continually starting new tasks before finishing old ones
- poor organizational skills
- inability to focus or prioritize
- continually losing or misplacing things
- forgetfulness
- restlessness and edginess
- difficulty keeping quiet, and speaking out of turn

Since careful attention should be paid in interpreting the diagnosis or discussing the specific difference between the disorders, this thesis does not further discuss about the difference in ADHD or depression. However, as shown from above, the symptoms of ADHD are quite different from depression, by which we can infer that the people vulnerable to IED in Korea might be different from other countries because of the differences in the comorbid disease.

Another finding is that IED patients mostly seek primary care, which largely means that people usually go to neighborhood hospitals. This can be because people have better accessibility to primary medical institutions which are in large numbers. But in other words, it can be interpreted as that IED patients are not getting adequate care. Since IED is a mental disorder, it is an undeniable fact that to be treated professionally with IED, one should visit psychiatric department. However, though further analysis is needed, there is less possibility of getting professional mental care if people just visit general doctor. If the diagnosis is not from a psychiatrist but from other department professionals or general doctor, there is a possibility of wrongly giving or abuse of IED diagnosis.

Finally, another thing to note is that the number of IED patients seeking care from psychiatric department have decreased in the past 9 years. This means that whereas the diagnosis is steadily increasing, people get IED

diagnosis from other department than psychiatric department. One scenario can be related with stigma. Since seeking professional mental help often times is interpreted as that the person has mental issues, embarrassment or worries of what others might think about getting mental treatment acts as a barrier for patients visiting psychiatric department (Amelia Gulliver, Kathleen M Griffiths, & Helen Christensen, 2010).

Implications from section 4.3

Since the proportion of outpatient is more than 80%, amount or degree of medical service use, in other words, seeking more professional treatment was analyzed with IED outpatient visits. Analysis of psychiatric department visits were excluded because the number was too small. Main findings from section 4.3 are as follows. Whereas men accounted for more than 80% of outpatient visits, the amount of outpatient medical service use was significantly high in women. Especially, the gender difference in use of outpatient service showed no statistical difference in 2008, whereas difference was shown in 2017.

First thing to note from the finding is that there is a gap between the actual diagnosed population and those who actually seek use medical, especially outpatient services. It is shown that whereas men are more diagnosed than women, those who actually seek professional care are women.

Although not IED specific, previous research have reported that women recognize psychological problems better than men, and therefore more likely to seek treatment for psychological problems or psychiatric disorders (Horwitz, 1977; Greenley & Mullen, 1990; Greenley, Mechanic & Cleary, 1987; Kessler, Reuter & Greenley, 1979). In addition, it is also reported that women have a tendency to visit psychiatric department more frequently than men (Greenley & Mullen, 1990; Bijl & Ravelli, 2002; Leaf & Bruce, 1987; Pescosolido & Boyer, 1999).

Further Suggestions

Though the paper provides a baseline data regarding Intermittent Explosive Disorder, it is undeniable that further research based on the data should be conducted. Especially, more studies should be done to narrow the gap between the social implications made about IED patients and actual IED patients based on data. As mentioned, it was indicated that media coverages deal IED mainly with the frame of ‘potential criminals. Further research should focus on whether this crime-based narrative is actually valid or not.

In this regard, two further research are possible. Firstly, qualitative research such as interview is suggested. By actually facing the IED patients face-to-face, and analyzing their narrative, additional factors that contribute to IED can be found and provide further insights regarding IED research. The other is panel study. Establishing a panel of IED patients and tracking down their trajectories will provide

a much more information in understanding the dynamics of IED and even more, in terms of social pathology.

Especially, ways to improve accessibility to sensitive mental disease related national data should be schemed. In Korea, no national or annual panel data is available regarding mental disease, not to mention 'sensitive disease', such as Intermittent Explosive Disorder. Although NHIS data has advantage that with customized claims data, information about sensitive disease caring patients can be obtained, it is still a medical record, thus limiting the IED research to only analyzing medical service use. In order understand the blinded cause behind the use of medical services, further national survey, or merging the dataset with other national medical data should be considered. A highly probable data is Korea Health Panel Study, since it provides variables such as unmet medical needs, occupation, marital status, overall mental health. However, because Korea Health Panel Study provides limited classification of mental disease (Figure 5.2), in the current status, we cannot identify or sort out the diagnosis code of IED, F.638. In other words, the only way to get nationally representative information of IED is customized DB from NHIS.

Figure 5.2. Classification variables in Korea Health Panel Study

변수	정의
진료유형	의료기관 방문 시 진료 구분 형태로 응급, 입원, 외래 3개로 분류함
의료기관 종별	의료기관 종별 분류인 상급종합병원, 종합병원, 병원, 의원, 치과병원, 치과의원, 한방병원, 한의원, 보건소 또는 보건의료원, 그 외(노인요양 병원, 조산소, 외국병원)는 기타로 총 10개로 분류
진단코드분류	ICD10 대분류 기준에 따라 22개로 분류함 - 특정 감염성 및 기생충성 질환(A00-B99), 신생물(C00-D48), 혈액 및 조혈기관의 질환과 면역기전(D50-D89), 내분비, 영양 및 대사질환(E00-E90), 정신 및 행동장애(R00-R99), 신경계통의 질환(G00-G99), 눈 및 눈 부속기의 질환(H00-H59), 귀 및 꼭지돌기의 질환(H60-H95), 순환기계통의 질환(I00-I99), 호흡기계통의 질환(J00-J99), 소화기계통의 질환(K00-K93), 피부 및 피부밑조직의 질환(L00-L99), 근육골격계통 및 결합조직의 질환(M00-M99), 비뇨생식기계통의 질환(N00-N99), 임신, 출산 및 산후기(O00-O99), 출생전후기에 기원한 특정병태(P00-P96), 선천기형, 변형 및 염색체 이상(Q00-Q99), 달리 분류되지 않은 증상 등(R00-R99), 손상, 중독 및 외인에 의한 특정 기타 결과(S00-T98), 건강상태 및 보건 서비스 접촉(Z00-Z99), not allocated

Lastly, research that includes psychiatric advisory is necessary. Previous studies have attributed IED to biological factors. In other words, some people are born with defects in anger management. However, this study gives a glimpse to the possibility that IED should be dealt in terms of social pathology, or in socially generated disease. With psychiatric advice, more findings can be made regarding IED patients, and whether the disease should be dealt in biological perspective or socially ill perspective, that needs public health intervention.

Chapter 6. Conclusion

Much attention on Intermittent Explosive Disorder(IED) have been paid with many of criminals were found to be suffering from the disease. Although various assumptions about the disease have been socially debated, it is of surprise that no scientific basic information about the disease is established in Korea. In this regard, this study aimed to fill the gap between social implications and analysis based on national data.

Therefore, the paper firstly, explored variations in IED between 2002 to 2018. Next, the paper suggests sociodemographic characteristics of IED patients, mainly focused on sex, age, economic status, and area of residence.

The result suggested that while IED diagnosis has seen a steady increase for the last 17 years, patients with the disorder are usually men, young adults in their 20s, and likely to be either very rich or otherwise at the very bottom of economic status. However, those who actually sought treatment at the hospital, were not consistent with the actual vulnerable population of IED.

The overall findings suggest that while IED patients are socially inferred as potential criminals, with biological defects, there is a socio-demographic factors that contributes to IED diagnosis, implying that more empirical research should be conducted, with ideas on dealing with IED vulnerable population in the perspective of public health interventions.

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