

Executive summary

In modern society, the mental health comprises an important aspect of the overall healthy life of an individual. Despite the fact that the prevalence of mental illness in Korea show an increasing trend over time, the rate of individuals seeking psychiatric services is very low compared to other industrial nations. In addition, major depression have come to the center of focus, as the primary cause of teen suicide, and suggestions are being made in regards to the treatment of depressive patients with comorbidities. Thus, it is necessary to determine the treatment demands for depression in the perspectives of the general public, adolescents, and adult patients with comorbidities, and seek methods to enhance the treatment for depression. The study on psychiatric disorder research, depression and suicide generally cover the following three parts.

[Part 1: A study on current status and unmet need for the treatment of psychiatric disorders in Korea]

This study is a part of the establishment research to increase the utilization rate of the psychiatric services by patients with mental illnesses. The study was performed to investigate the state of psychiatric disorder treatments in Korea and to determine its unmet needs.

A survey was performed on psychiatric patients in 9 university hospitals in Korea from October 2011 through February 2012 and the results on the total 737 patients are as follows. Male and female made up 38.9% and 61.1% of the survey participants each. In psychiatric diseases, depression made up 67.4% the mostly, and anxiety disorder and insomnia did individually in the next order. Those who are admitted to a psychiatric unit immediately when the symptoms appeared were only 26.6%, and majority of patients presented to the psychiatric unit after some elapsed time post manifestations, or after treatment from

another medical department. This analysis revealed the necessity for publicity and education for the general public and physicians in other medical departments. Numerous patients presented high needs for psychiatric therapy including both pharmacological and psychological treatments. The results showed that the delivery of information by a psychiatrist was the most significant when providing information regarding mental illnesses. The necessity for services supporting hobbies, resources for leisure activities, and education regarding the etiology and treatment options for mental illnesses were found to be also very high, however, the patients answered that there lacks information regarding such resources and the places to obtain such services is very limited.

Concurrently with the patient surveys, a web-based survey was performed on the psychiatrists in Korea. Of the total 3,122 psychiatrists (based on March 2011 data), electronic mail requesting participation in the survey were sent to 2,715 members of the Korean Neuropsychiatric Association, whose email addresses were verifiable. Analysis of the survey was based on the total 386 responses received (15.7% response rate). Greater than 90% of the respondents acknowledged that despite the seriousness of social depression, there lacked effective measures to resolve or prevent the illness. Contrary to the results of the patient surveys, the psychiatrists answered that about 25% of patients will be dissatisfied with the psychiatric treatment, however, the results were similar in showing a high demand for nonpharmacological treatments in addition to drug therapy. Analysis of results revealed that the key important factors in improving psychiatric care to be the early diagnosis of depression, alleviation of social biases regarding psychiatric treatment, and education regarding the disease and pharmacologic therapy.

Finally, a systematic literature search was performed to investigate the current state of clinical research on antidepressants and cognitive function enhancers for Korean patients and to assess quality of the studies. Randomized controlled trials (RCTs) were then assessed according to risk of bias, and non-RCTs were appraised based on quality assessments to develop the concept map of the studies. 80 studies were

selected for antidepressants, which comprised of RCTS (10%), pretest-posttest studies and time series analysis (28%), and case reports (53%). Among them, 32% was on SSRIs, 17% on SNRIs, 6% on TCA, and 28% on others. For cognitive function enhancers, 28 studies consisted with RCTs (7%), pretest-posttest studies and time series analysis (50%), and case reports (18%). Cholinesterase inhibitors were 89% and NMDAR antagonists were 11%. Bias and quality analysis of the literature revealed that overall the risk of bias was high, or the quality was low in existing literatures. Clinical research in antidepressants and cognitive function enhancers for Korean patients was insufficient, and it was unclear in terms of "allocation concealment" and "blinding". Further research with high-quality is needed on randomization and blinding in the RCTs.

[Part 2: Study on adolescent depression and suicide]

Purpose: The purpose of this study is to formulate a nationwide distribution chart on adolescent depression and suicide, as well as to understand the associated risk factors. In addition, the characteristics of adolescents who have had suicide ideations or attempts were identified, in collaboration with professionals (adolescent counselors/psychiatrists), to identify the current state of treatment modalities for depression and suicide.

Methods: The 2007-2009 claim data from the Health Insurance Review & Assessment Service were used to identify the current state of treatment options for adolescent depression. In addition, the 2007-2009 mortality rate data from the National Statistical Office were used to identify the distribution of adolescent suicide among cities and states, as well as the associated risk factors. The data from the Youth Health Online Survey and the National Health and Nutrition Survey were used to identify the risk factors and formulate a Bayesian Disease Mapping distribution chart for adolescent depression, suicide ideation, and suicide

attempt by city and state. For the period of four months, from Aug. 17, 2011 through Dec. 30, 2011, adolescents from 12 to 18 years old (middle and high school) who visited a medical facility were selected based on their selection of answer on Item 9 of the Children's Depression Inventory (CDI). Those who answered "(1) I have thoughts about killing myself but I will not commit suicide" or "(2) I want to commit suicide" were selected. The Reynold's Suicidal Ideation Questionnaire (RSIQ), Korean State-Trait Anger Expression Inventory (STAXI-K), Childhood Trauma Questionnaire (CTQ), and the Coping Inventory for Stressful Situations (CISS) were given to the selected adolescents to self-record the answers. In addition, the depression scales of parents of the selected adolescents were also measured with Beck Depression Inventory (BDI), State-Trait Anxiety Inventory-X1 (STAI-X1), and State-Trait Anxiety Inventory-X2 (STAI-X2). The web surveys conducted for six weeks from Nov. 11, 2011 to Dec. 23, 2011 were evaluated by counselors and psychiatrists for the general population of adolescents who experienced suicide attempts and ideation, the characteristics of the adolescents who attempted suicide or had suicide ideations, and characteristics of the survey respondents.

Results: First, the current state of adolescent depression revealed that 1.6% of adolescents from 12-18 years of age were seeking pharmacologic or psychiatric treatment for depression.

Second, the mortality rate data from the National Statistical Office was examined for suicide rates for 100,000 adolescents (based on the data from the 2007-2009 National Statistical Office Registered Residents Mid-Year Population). The average suicide rate was 5.7 people per 100,000, with an average of 5.8 males per 100,000 and 5.6 females per 100,000. The older age group (15-18 years old) had an average suicide rate of 8.2 persons per 100,000, which is more than three times higher than the younger age group (12-14 years old). This rate was higher than the average suicide rate of 6.8 per 100,000 people in Organization for Economic Cooperation and Development (OECD) nations for the age

group of 15-18 years. Comparing the annual suicide rates for cities and states, the adults reflected a significant difference in suicide rates by city and state, whereas adolescents did not show a significant difference by region. The top five regions that showed a risk higher than 1.75 times the national average for adolescent suicide were Gangwon Pyeongchang-gun, Gyeongsangbuk-do Euseong-gun, Busan Gangseo-gu, Gyeongbuk Gunwi-gun, and Gangwon Jeongseon-gun. When compared with the depression treatment rates, the treatment rates turned out to be lower than the suicide rates in the seven states, excluding the metropolitan cities and Gyeonggi-do.

Third, the current state of depression, suicide ideation, and suicide attempt was examined through the Youth Health Online Survey data. There was a significant difference by region regarding depressive feelings and suicide ideation. However, there was no significant difference regarding suicide attempts by city or state (p-value: Depressive feelings [$<.0001$], Suicide ideation [$<.0001$], Suicide attempt [0.1005]). Examining by regions, depressive feelings were highest in Daejeon with 40.43% and lowest in Daegu with 32.01%. On the other hand, suicide ideation was highest in Jeonbuk with 20.84% and lowest in Daegu with 15.82%.

The risk factors that were found to be significant for depression, suicide ideation, and suicide attempt were female gender, subjective feelings of unhappiness, high rate of subjective stress, high depressive feelings, economic status below the mid-range, not living with a paternal figure, lack of exercise (less than once a week) and sleep (less than five hours per day), smoking or alcohol experience, sexual experience or sexual assault, attending a same-sex school (all girls, all boys), and weight controlling efforts. Considering the odds ratio, stress and subjective happiness were found to be the most influential risk factors for depression, whereas depressive feelings were found to be the most significant determining factor for suicide ideation and attempt.

Fourth, according to the surveys conducted for adolescents, the time period of suicidal ideation was mostly less than three years (78.6%) and

suicidal planning was mostly less than one year (41.4%). The time of suicidal planning was inversely proportional to the rates of attempted suicide. Methods for suicide attempts described by the adolescents included self-injury (61.2%), drug overdose (42.9%), and jumping or suffocation (26.5%). In addition, the number of attempts was higher in adolescents who used less lethal methods (self-injury, drug overdose, etc.).

For adolescents who were hospitalized, 36.6% reported conflicts with a family member as their motivation for suicide attempt, 25.6% reported conflicts with a friend, and 12.2% reported academic struggle. In addition, 22.4% of adolescents notified a friend of their suicide plan, while only 6.1% reported their thoughts to their parents prior to suicide attempts.

The adolescents who have prior suicide attempts revealed a higher anxiety level than those who have not, showed impulsive reactions that were emotionally driven, and had higher rate of experience of prior sexual or emotional assault. These adolescents had a tendency to think that "my death will benefit others," "my life is not worth living," "it would be better if I had not lived," "the problem will be solved if I die," or "no one will care whether I live or die."

Fifth, the counseling specialists stated that 59.33% of adolescents who seek counseling have temporary or mild depression, while psychiatrists stated that 73.89% of the adolescents were moderately or severely depressed. This was an expected finding as the treating facility chosen depends on the severity of depressive symptoms. When recommended to visit a facility for the treatment of depressive feelings, even the moderate or severely depressed showed only 16.2% compliance with their follow-up visit in counseling facilities, and 19.1% compliance with psychiatrists. The reported reasons for non-compliance with follow-up visits included determining counselors and psychiatrists as unnecessary by the adolescent (50.49%), or biases and stigmas regarding psychiatric evaluation or counseling (25.89%).

When an adolescent visits a counseling or medical facility with a

suicide ideation, 25.7% of adolescents who visited counselors and 22.93% who visited psychiatrists had specific plans for suicide. In such cases, however, only 13.2% and 3.8% of adolescents were compliant in follow-up evaluations in counselors and psychiatrists, respectively. Counselors reported family discord (23.2%), difficulties in friendships (20.0%), and school violence/bullying/ostracizing (18.1%) in decreasing order, while psychiatrists reported school violence/bullying/ostracizing (18.9%), difficulties in friendships (18.64%), and family discord (17.2%) as the primary reasons in decreasing order. The history of psychological disorders for adolescents with suicide ideation was found to be differently diagnosed among counselors and psychiatrists. This difference could be explained by the reflection of the adolescents' overall condition when visiting different types of facilities.

For adolescents who visited a facility for attempted suicide, 6.7% stated a clear intent of suicide using a lethal method. When recommended, about 20% of adolescents who visited a counselor were compliant with a follow-up visit. On the other hand, only 13.6% of those who visited a psychiatrist were compliant with a follow-up visit.

The counselors recommended counseling with a professional (99.27%) as the main approach to treatment for adolescents who think about committing suicide. Psychiatrists selected psychiatric pharmacologic treatment (99.36%) as the appropriate treatment approach, as well as psychiatric hospitalization (86.0%) and outpatient treatment (95.5%).

Counselors recommended counseling with a professional (99.17%) as the appropriate treatment approach for adolescents with suicide attempts, while psychiatrists recommended pharmacologic therapy (99.3%) as the preferred mode of treatment. Psychiatric hospitalization was recommended by 96.0% of psychiatrists and 78.8% of counselors.

Conclusion: This study suggested a multilateral and systematic approach to adolescent depression and suicide, as well as its associated risk factors and treatment options, as a distribution map for adolescents who committed suicide by region. Comparing the rate of depression

treatment (number of adolescents seeking treatment for depression/total number of adolescent population, %) to the rate of adolescent suicide, the treatment rates were found to be lower than the suicide rates in the seven states, excluding the metropolitan cities and Gyeonggi-do. In addition, macroscopic data, such as the Youth Health Online Survey and the National Health and Nutrition Survey, were analyzed and the highest risk factors for suicide attempt, suicide ideation, and depression were determined.

The appropriate treatment approach showed a significant discrepancy between the recommendations given by psychiatrists and counselors, which revealed that the development of evidence-based treatment approach, as well as information and policy changes, would be necessary for adolescents who experience suicide ideation or attempt.

[Part 3: A study on current status and treatment promotion of comorbid depression among the patients with cancer or the patients with diabetes mellitus]

According to the depression guidelines (American Psychological Association, 2010), it was stated that the prevalence of depressive disorders was high in patients with comorbidities, and that the prognosis was poor in depression patients that experienced comorbidities. Specifically, the prevalence of depression in cancer patients was estimated to be about 10.8% (Bottomley et al., 1998), and the prevalence of Type 2 diabetes would increase by 37% in depression patients (Holt et al., 2009). Additionally, according to the National Evidence-based Healthcare Collaborating Agency in 2009, depressive patients who had comorbidities such as cancer or diabetes were likely to experience reduction in the compliance of antidepressant medications.

The purpose of this study is to determine the state of depressive patients with cancer or diabetes, which is known to influence the treatment and recurrence of depression in adults, as well as to produce the evidences to deduce the measures to enhance the treatment of

depression.

Through literature review, the depression and treatments in patients with chronic illnesses were examined. Key questions of depressive patients who have cancer or diabetes as comorbidities were identified through the analysis of the national claims data (2006-2008) and the Fourth Korea National Health and Nutrition Examination Survey (KNHANES IV, 2007-2009).

The analysis of the national claims data regarding depression in cancer patients showed that an estimated 13.2% of cancer patients were being treated at medical institution for depression. Furthermore, about 100 days elapsed from the date of cancer diagnosis before they were diagnosed or treated for depression. Based on the patient characteristics recorded on the first consultation for depression treatment, analysis showed that the severity of depression manifested by suicide attempt, admission, or visit to the emergency room were higher in males, metastatic cancer, lung cancer, or liver cancer patients, patients treated at multiple medical institutions, and those who frequently visit medical facilities for treatment. Furthermore, the factors related to the aggravation of depressive symptoms were increasing age, metastatic cancer, and frequent visits to medical institutions for cancer treatment. According to the analysis of KNHANES IV (2007-2009), 25% of cancer patients experienced depression. However, only 4.3% was diagnosed with depression by a physician, showing a high discrepancy. Of these, only 32% received treatment for depressive symptoms. Furthermore, 53.2% of cancer patients have had suicidal ideation in the past year. The suicidal ideation level or depression increased in the group of aging, female, and poorly subjective health state.

The analysis of the national claims data showed that 16.2% of diabetic patients visited medical institutions for depression. After the diagnosis for depression, the cities with higher rates of compliance with antidepressant medications had increased compliance with oral hypoglycemic agents. Those who also experienced cardio-cerebrovascular complications were 63.1% of diabetic patients with co-occurring depression, 43.8%

experienced ophthalmic complications, and 24.2% experienced co-occurring neuropathies. Compared to patients without co-occurring diabetes, those with co-occurring diabetes or diabetic complications experienced higher rate of depression aggravation (the rate was especially high in the co-occurrence of microvascular and macrovascular complications, odds ratio = 2.20). The Fourth Korea National Health and Nutrition Examination Survey showed that 18.6% of diabetics experienced depressive symptoms, which were lower in prevalence than cancer patients. Those who had suicidal ideation thoughts in the past year was 59.3%. Furthermore, the quality of life was lower "depression - suicidal ideation - attempted suicide."

The results of this study showed the following: 1) The results of surveys on patients and psychiatrists suggest that publicity and education for the general public and physicians in other medical departments, and extension of supplies for the information and resources on psychiatric services are needed, 2) we confirmed the geographical distribution and risk factors for adolescent depression and suicide, and identified the characteristics of adolescents who have had suicide ideations or attempts, in collaboration with professionals (adolescent counselors/psychiatrists), to understand the current state of treatment modalities for depression and suicide, and 3) we determined the needs of treatments for many depressive patients with cancer or diabetes, and suggested evidences to deduce ways to enhance the treatments. Based on this study, It is necessary that we expand the range of the psychiatric disorder-related research in future and develop measures to increase the utilization of psychiatric services. Furthermore, if systematic treatment measures are developed in preventing adolescent depression and suicide, as well as patients with co-morbidities, subsequent effective treatment of depression will reduce the distress caused by mental illness in the general society.