Suicide and Mental Disorder: Evidence of An Increased Risk of Suicide in Mental Disorder and the Risk Factors Associated with Suicide

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Abstract

Suicide is a significant public health problem in Korea. Previous studies have suggested that mental disorders constitute an important risk factor for suicidal behavior. Moreover, many socio-demographic and clinical features are reported to be associated with an increased risk for suicide in subjects with mental disorder. Yet, the mechanism behind the relationship and the direct effect of mental disorder on suicidal behavior remain unclear. This article reviews the evidence for there being an increased risk of suicide among people with mental disorder and the characteristics which are related to suicide from a bio-psycho-social perspective. Furthermore, this review presents a conceptual framework relating mental disorder to suicide.

Key words: Suicide, Major depressive disorder, Schizophrenia, Alcohol use disorder, Anxiety disorder.

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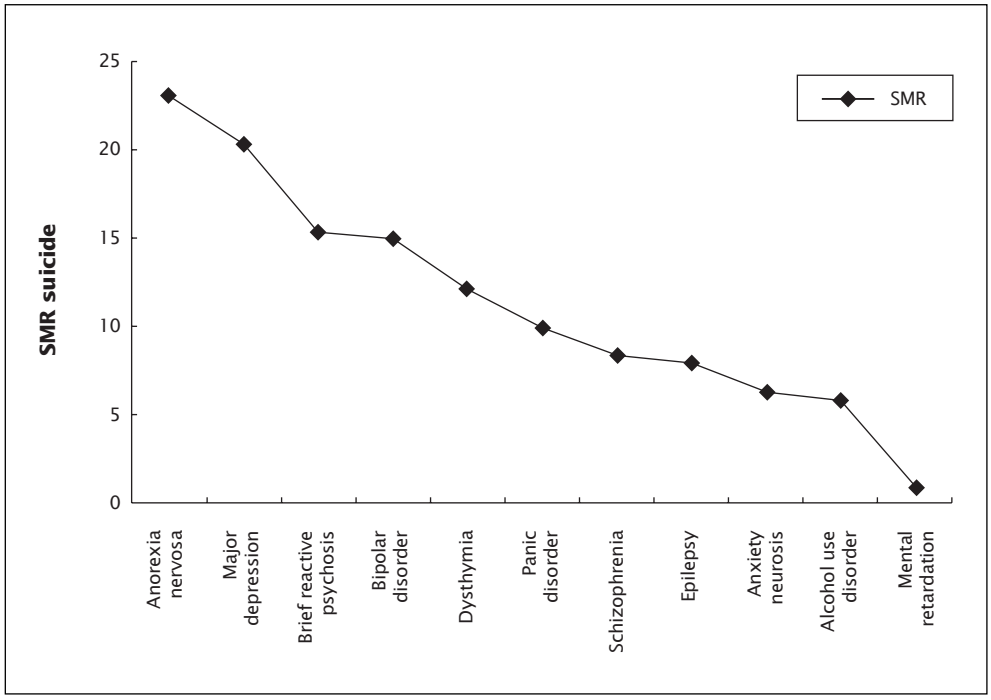
Introduction

Suicide is an important public health problem and is the leading cause of death in many countries.[1] Over the past few decades, the relationship between suicide and mental disorders has been the focus of several studies, many of which have indicated that subjects with mental disorders have an increased risk of suicide (Fig. 1).[2] The data sources of these studies are epidemiological studies, studies using psychological autopsy, vital statistics, medical records, and suicide notes, psychopharmacological studies, etc. However, suicide is a rare phenomenon, and it is the final action of the victims in their lives. Thus, researchers can investigate it only by using a retrospective and indirect method, and not using a prospective and direct method. Because the act of suicide and the victims carry social stigmas, information on suicide can be disturbed by family members or people who are respondents to data collection. Another obstacle to suicide research is that many studies conduct investigations by using their own definition of suicide which differs from other definitions.[3]

Korea is confronted with the problem of suicide on a national level, and there is much debates regarding the cause of suicide, especially the role of mental illness. Although some studies reported on the clinical characteristics of suicide attempters with mental illnesses,[4-6]



SMR: standardized mortality ratio

FIGURE 1. SMR for suicide and psychiatric diagnoses.[2]

no papers have been published concerning the suicide victim's characteristics, such as the victim's personality and psychology, and his/her social environment. Since there are many differences between completed suicides and non-fatal suicide attempts, it is impossible to fully understand the characteristics of suicide victims and their role in the suicidal process just by relying on studies of suicide attempters.[7] The purpose of this paper is to review the evidence for there being an increased risk of suicide in subjects with mental disorders and the proposed risk factors of suicide among mentally ill individuals. We reviewed previously published papers which were concerned with the "completed suicide" of subjects with some of the most common mental illnesses in Korea.[8]

Mood disorders

Major depressive disorder (MDD) and other depressive disorders are the most highly prevalent and consistently identified axis I diagnoses in individuals who die by committing suicide.[9-11] In the meta-analysis from seven studies on suicide among patients with affective disorders, Guze and Robins[12] concluded that 15% of depressed patients would die by committing suicide, and that the lifetime risk for suicide in depression was approximately 30 times higher than expected. Harris and Barraclough,[2] in their meta-analysis of suicides from twenty-three studies of 351 suicides, found that patients with mood disorder were at a high risk for suicide during their lifetime. They identified this risk by calculating the standardized mortality ratios (SMR) as follows: SMR 20.4 (95% confidence interval (CI) =18.2-22.6) for major depression (MD), SMR 12.1 (95% CI=12.3-18.4) for dysthymia, SMR 6.1 (95% CI=14.5-17.8) for depressive disorders NOS, and SMR 15.0 (95% CI=3.5-17.3) for bipolar disorder.

There is some controversy surrounding the report done on a hospitalized population by Guze and Robins[12] which states that the lifetime risk for suicide

of patients with mood disorder is lower than 15%. Inskip et al.,[13] using twenty-seven mortality studies for affective disorder, estimated the lifetime suicide risk in affective disorders to be 6%. In a community population with MD, the lifetime suicide risk in MD was 3.4% (6.9% for males and 1.1% for females).[14] Bostwick and Pankratz[15] also reported that the lifetime prevalence of suicide among patients with affective disorder who had had at least one experience of being hospitalized for suicidal behavior was estimated to be 8.6%-4.0% for inpatients without suicidal behavior and 2.2% for outpatients. Although they reported much lower suicidal rates than the frequently quoted rate of 15%, these studies suggest that suicide accounts for a small but important fraction of the total mortality associated with MD. In general, the decision of psychiatric admission often relies on the severity of depression, the degree of suicidality or the communication of suicide intent,[16] a history of attempted suicide,[17] or the existence of more severe symptoms directly related to high suicidality.[18] The findings that those subjects who commit suicide after psychiatric hospitalization had experienced more and longer hospitalization, more suicide attempts, and more overt depression and neuroleptic use,[19] explain the higher suicide risk among psychiatric inpatients with MD than among outpatients in the community.

Various clinical features were reported as risk factors associated with suicide in mood disorder. In a Swedish inpatient registry study on unipolar (N=39,182) and bipolar disorder inpatients (N =15,386) with a 22-year follow-up,[20] suicide was identified to be the most common cause of unnatural deaths in mood disorders. The SMRs for suicide were 20.9 for men and 27.0 for women with unipolar disorder, and 15.0 and 22.4 for men and women with bipolar disorder, respectively. The suicide risk was the highest among younger patients during the first year, after the first diagnosis and the first admission. The suicide mortality among women with unipolar depression with first admission between 1991 and 1995 had increased significantly by 42% compared to those admitted before 1980. A similarly increasing trend was found in men with unipolar depression, but not for bipolar men or women. Interestingly, the suicide risk among female inpatients was higher than that among men in the case of both unipolar and bipolar disorders, and this pattern was also reported by another study.[21] In general, younger men with MD have been identified to have the greatest lifetime risk for suicide.[9,22] Furthermore, the existence of the highest risk in younger men could be explained by prior papers which noted that male youths had a lesser amount of contact with psychiatric help and that more women than men with MD received psychiatric pharmacotherapy which lowered suicide risk.[21,22] Until now, the effect of gender on the risk of suicide in subjects with mood disorders has not been confirmed and it seems to interact with other clinical factors such as the treatment setting, daily function, and supportive system, which are known to have protective effects on female patients with mood disorder.

The increased suicide risk was not constant across the natural course of mood disorder. The suicide risk was the highest in the first few weeks after discharge and declined thereafter.[23] In the nationwide Danish study on over 20,000 suicidal deaths between 1981 and 1997,[24] the risk for suicide among affective disorder patients was extremely high in the first week after admission (208 times higher for men than that of the control group and 168 times higher for women) and discharge (219 times higher for men and 1977 times higher for women), and it declined quickly during the first year after discharge (12 times higher for men and 15 times higher for women). Even though the suicide risk varied during the course of the illness, the risk was constantly greater over the patient's lifetime than that of the general population.[2,21] Aged patients with MD suffered more from the risk for suicide. Conwell et al.[25] found that suicide victims who were older than 75 years of age (57%) were more likely to suffer from a single episode of MD than victims younger less than

34 years of age (4%). In a psychological autopsy study done in Northern Ireland,[9] older suicides over 65 years of age (77%) were more likely to suffer from current MD than those under 65 years of age (26%). Although long-term drug treatments markedly reduced the suicide rates in mood disorder,[21] most of the depressive victims were left underdiagnosed and untreated, or they were inadequately treated prior to their suicide.[11,22,26-29]

Prior investigations suggested that comorbid psychiatric conditions and anxiety symptoms might be contributing factors to the eventual suicide of patients with mood disorder. Fawcett and his colleagues[30] found that panic attacks, severe psychic anxiety, diminished concentration, global insomnia, moderate alcohol abuse, and severe anhedonia were associated with suicide among patients with MDD within one year after their clinical assessment. Furthermore, severe hopelessness, suicidal ideation, and a history of suicide attempts were associated with suicide occurring after 1 year. Because the short-term risk factors may be modifiable through therapeutic interventions, this study implicated the need for a clinically thorough evaluation for suicide risk. In the Finnish National Suicide Prevention Project, Isometsä et al.[31] examined 71 suicides with current MD from a random sample of 229 subjects of all suicides in Finland over a 12-month period by using the psychological autopsy method. They found that the majority of the suicides (85%) were complicated cases with comorbid diagnoses in which substance use disorder was the most common condition. Substance use disorders were more common in males, and older victims tended to have more physical disorders and comorbid diagnoses, while personality disorders were more common among the younger victims. Moreover, patients with psychotic MD were more likely to use violent methods to commit suicide.[32] A case-control study conducted on 113 consecutive suicide cases in east Taiwan also revealed that the majority of the suicide victims had the following psychiatric comorbidities: MD with alcoholism (43%) and double depression with alcoholism (26%).[33] The odds ratio (OR) for suicide among the patients with MD and comorbid alcoholism was 470, which was nearly three times that for uncomplicated MD (OR=168).

Dumais et al.,[34] using proxy interview, examined 104 males who died by committing suicide during an MD episode and 74 living depressed male controls. They found that in the last 6 months prior to death, comorbid alcohol use disorder and cluster B personality disorder were two independent predictors of suicide among patients with MDD, and these factors were more specific to younger males under 40 years of age. The adjusted OR for cluster B personality disorders was estimated to be 16.6 (95% CI=2.0−136.2) and 4.1 (95% CI=1.4−12.1) for alcohol use disorder during the final 6 months. They indicated that impulsive and aggressive personality traits might underlie the effects of two independent risk factors on suicide.

Isometsä et al.[35] also conducted a psychological autopsy study on suicides with bipolar I disorder (N=31) among the sample of the Finnish National Suicide Prevention Project. They found that 79% of the bipolar suicides had occurred during a major depressive episode and 11% of them occurred during a mixed episode. Bipolar victims had significantly more marital problems, longer treatment histories, and more frequent hospitalizations. Moreover, they were more likely to experience recent psychosocial stress caused by their own behavior, as compared to victims with unipolar disorder. Among the bipolar victims, more males than females had experienced recent life events.[36] In a recent review of 13 studies on bipolar suicides by Hawton et al.,[37] the risk factors for suicide among bipolar patients were male gender, a history of suicide attempt, and hopelessness at the index admission. However, they did not find any association between clinical features such as a diagnosis of bipolar I or II disorder, rapid cycling, substance abuse, insomnia, psychotic symptoms, suicide ideation, and suicide. Nevertheless, because the diagnostic category

of bipolar disorder was only recently developed and most previous studies did not separate bipolar disorder from depressive disorder, only a few studies on suicide in bipolar disorder have been conducted. Therefore, further studies are needed to identify the risk factors for suicide and its clinical meaning.

In summary, the main cause of the increased mortality in mood disorder is suicide, and depression is most commonly present in more than two-thirds of all suicides. Prior studies indicated that the severity and course of illness, type of symptoms, comorbid diagnoses, personality traits, and recent life stress are associated with the increased suicide risk among patients with mood disorder. Despite the fact that the suicide risk has increased among patients with mood disorder, adequate drug treatment can play an important role in lowering the suicide risk. Clinicians should conduct thorough clinical assessments and active treatment for the modifiable factors associated with suicide risk to prevent suicide among patients with mood disorder.

Schizophrenia

Suicide is the single largest cause of premature death among individuals with schizophrenia. One hundred years ago, Kraepelin[38] and Bleuler[39] already noticed the high risk for suicide among patients with schizophrenia. However, the suicide risk among schizophrenic patients has received relatively less attention than that for MDD. The suicide rates and SMR for suicide vary among mortality studies. About 4%-10% of schizophrenic patients are expected to commit suicide during their lifetime.[40-42] The suicide rate among individuals with schizophrenia is estimated to be 350-700/100,000 per year,[43,44] and the lifetime risk for suicide is considered to be 10-40 times higher than that in the general population.[45]

Schizophrenic patients share some general risk factors for suicide with other suicidal populations. The general risk factors associated with suicide are as follows: being white, a family history of suicide, male gender, being single (unmarried, divorced, or widowed), social isolation, major life events, previous suicidal behavior, unemployment, and chronic physical illness.[45,46]

On the other hand, a number of studies also noted that other risk factors for suicide appeared specifically in schizophrenic patients. The suicide risk varied according to the patients' age and course of illness. The suicide risk was the highest in the age group of under 40 years of age and declined with age.[47,48] The risk was especially high among patients with a more chronic course with frequent relapses.[49,50] The suicide risk usually peaked soon after the onset of schizophrenia,[13,40] at the beginning of the acute phase[51] and shortly after admission and discharge.[24]

Affective symptoms such as depression, a sense of hopelessness and worthlessness, and agitation are factors which increase the risk of suicide among schizophrenic patients.[52] Especially, depression and hopelessness seemed to be related to high premorbid functioning. Drake et al.[53] indicated that suicides had a higher level of education (OR=6.7, 95% CI=1.9-22.8), premorbid achievement, and self-expectation (OR=6.2, 95% CI=1.6-16.5). They reported that the majority of schizophrenic suicides suffered from persistently depressed mood, not major depressive episodes. Furthermore, they hypothesized that hopelessness and worthlessness might play a more important role in suicide among schizophrenics than depressed mood itself.[53] In another study,[54] the same authors suggested that schizophrenics' emotional reaction to the awareness of their unrealistic expectations and the fear of further deterioration would have predisposed the patients to commit suicide and that their suicide was drived from good premorbid function.

Previous studies which reported a greater suicide risk among schizophrenics with high ability of abstract thinking[55] and IQ[56] supported the hypothesized relationship between suicide risk and premorbid

fuction suggested by Drake et al..[54] Therefore, clinicians should accord particular attention to the signs for suicide in schizophrenic patients, because schizophrenic suicides tended to experience some loss of familial support and to express explicit suicidal intent prior to death. Nevertheless, as suicides were more likely to be in an improved state at discharge than para-suicidal patients,[54] monitoring for suicide risk among schizophrenic patients would be needed continuously and regularly during their follow-up.

In the Denmark Nested Case-Control Study, Rossau and Mortensen[57] examined the suicide risk factors and their incidence risk ratio (IRR) on 508 schizophrenic suicides whose first admission was between 1970 and 1987. The increased risk for suicide was associated with previous suicide attempts (IRR=2.1), a previous diagnosis of depression (IRR=1.5), and male gender (IRR=1.7). They discovered that the suicide risk varied during the course of hospitalization: the risk significantly declined during the hospitalization period, while, shortly after discharge, it rose to two times that in the first few days of hospitalization. If schizophrenics have multiple psychiatric admissions and/or admission to a general hospital for physical illness during the last one year before suicide, they are likely to have a greater risk for suicide. In fact, the risk for suicide among patients with more than 8 admissions was three times that for patients with 1-2 admissions, and the IRR for patients with admission for physical illness was 1.6 (95% CI=1.2-2.1). Surprisingly, nearly a quarter of schizophrenic victims committed suicide during periods of temporary release from hospital. These data indicate that the so-called "revolving pattern" of psychiatric admission might have a significant negative effect on suicide prevention among schizophrenic patients.

In the Belgian Suicide in Schizophrenia Project, De Hert and colleagues[56] conducted a case-control study of 63 younger schizophrenic suicides and controls who were less than 30 years old. They identified the following suicide risk factors: male gender, a family history of suicide (OR=8.0), high premorbid IQ (OR=4.3), chronic illness with frequent relapses (OR=6.0), impulsiveness such as acting out (OR=6.4) and involuntary commitment (OR=17), previous suicide attempt (OR=4.8) and highly lethal suicide attempt (OR=11), recent major loss (OR=7.3), psychotic episode (OR=7.0) and depression (OR=36). With regard to psychiatric treatment, suicide victims with schizophrenia were likely to have a history of psychiatric hospitalizations (OR=2.6) which were more frequent and shorter, to be treated with antidepressants (OR=2.9), to be non-compliant to medications (OR=7.0), and to have an involuntary admission (OR=17.0). They also identified that absence of symptoms (OR=20.0), ambulatory treatment (OR=2.4), participation in a useful daily activity (OR=4.2), and the early onset of a defect state (OR=6.3) as protective factors against suicide.

Using proxy interview, Hunt et al.[58] conducted a nationwide clinical survey on 960 suicides during 1996-2000 who had been in contact with the mental health services in the last one year in England and Wales. The majority of schizophrenic victims had a history of previous violence and drug abuse, but not of alcoholism. In addition to this, over half of the schizophrenic victims had comorbid psychiatric conditions (40% depressive disorder and 34% alcohol use disorder). Compared to victims with other diagnoses, more schizophrenic victims had contacted the mental health service in the last week prior to death (64% vs. 45%) and had been inpatients at the time of death (27% vs. 13%). However, the abnormalities of mental states (53% vs. 67%) and the suicide risk (12% vs. 16%) of the schizophrenic victims were less detected by the professionals during their contact with the mental health services compared to victims with other diagnoses. In addition, non-compliance was more common among schizophrenic suicides, and was mainly due to a lack of insight and

the side effects of psychotropic medications. McGirr et al.[59] compared 45 schizophrenic suicides and controls and identified current comorbid depressive disorder (OR=395.0, 95% CI=1.5-1061.4), cluster C personality traits (OR=0.3, 95% CI=0.1-0.9), and severe psychotic symptoms (OR=87.4, 95% CI=3.3-2309.7) as independent suicide predictors in schizophrenics. Schizophrenic suicides were more likely to have a family history of suicidal behavior, and to have two or more comorbid Axis I disorders, but they were likely to exhibit lower levels of negative symptoms and cluster A symptoms as well. Hawton and his colleagues[53] supported the negative effect of positive symptoms (OR=1.2, 95% CI=0.3-4.1) on the risk of suicide in schizophrenia. Nonetheless, hallucinations (OR=0.5, 95% CI=0.3-1.0) and delusions (OR=0.5, 95% CI=0.4-0.7) appeared to be associated with a lower risk of suicide.

Some of the previous studies point to the existence of a trend towards increased lifetime suicide risk in patients with schizophrenia in recent times. The suicide rate among first admitted schizophrenics in the 1990s was 1.6 times higher than that of those in the 1980s.[60] More surprisingly, the suicide rate for schizophrenia between 1994 and 1998 was 30 times higher than that observed during the 50 years before the year 1924.[61] The previous literatures suggested that modern psychiatric treatment was the main contributor to the increasing trend of suicide risk in recent times. Caldwell and Gottesman[45] proposed that the trend of increasing suicide rates in recent times was possibly mediated by deinstitutionalization, return to insight, and inadequate treatment of antipsychotic agents and its adverse effects, but not by antipsychotic agents themselves. Antipsychotic agents can also induce akathisia and dysphoria which are related to the increased suicide risk among schizophrenic patients.[62] If pharmacologically induced side effects develop in relatively unsupervised settings, the suicide risk will increase as a result of the interaction between deinstitutionalization and drug induced adverse effects.[45]

In summary, previous studies indicate that schizophrenic patients are at high risk of committing suicide. Comorbid depression, hopelessness, early phase after illness onset, frequent exacerbations, the period shortly after being discharged from hospital and good premorbid function combine together to increase the suicide risk among patients. On the other hand, in the majority of schizophrenic suicides, the significant signs indicating the impending risk of suicide are undetected at the last contacts with the mental health services. Clinical assessments of individual risk factors with regular monitoring, psychoeducation for patients and their support systems facilitate the effective prevention of suicide in patients with schizophrenia.

Alcohol use disorder

It was previously noted in various countries with different cultures that alcohol abuse and/or dependence is prevalent among suicide victims and that alcohol use disorders contributed to over 40% of suicides.[10,33,63] The SMR for suicide in alcoholism was 979 (95% CI=898-1065),[64] and about 4.8%-10% of individuals with alcoholism were likely to commit suicide during their lifetime.[13,42,65] Although the proportion of suicides among deaths is the highest in the younger aged group and declines with age in the population without mental illness,[66] the suicide risk among the middle-aged group of adults with alcohol abuse is nearly three times higher than that in the corresponding younger group.[13] In addition, cultural differences in the societal response to alcoholism and drinking culture could affect the impact of alcohol use disorders on suicide risk.[67,68]

Even though no pathognomonic feature has been identified which can predict those who will commit suicide, a number of factors have been reported to be interrelated with suicide in individuals with alcohol use disorders. Murphy and his colleagues,[69] based on

a consecutive series of 32 alcoholic suicides, reported that one third of alcoholic suicides had experienced the significant loss of a close interpersonal relationship within the last six weeks prior to death. In their subsequent study based on 50 alcoholic suicides, they noticed that events of significant losses occurred more frequently near the final weeks of their life compared to living alcoholics.[70] Rich et al.[63] examined the relationships between psychiatric illnesses and psychosocial stressors in 283 suicides from San Diego County and reported that suicides with other substance use disorders such as alcoholic suicides were likely to have an acute interpersonal disruption before the act of suicide. Furthermore, the interpersonal disruption occurred more frequently near the time of death for substance abusers with/without depression than for individuals with pure affective disorder.

In addition to the effect of acute stress in interpersonal relationships on the suicide risk among alcoholic individuals, Murphy et al.[70] identified that the following non-acute clinical features were more frequently present in a consecutive series of 82 alcoholic suicides than in living alcoholics: a recent act of heavy drinking (97% vs. 42%), expression of the victim's suicidal intent or threat of suicide (79% vs. 23%), poor social support (75% vs. 26%), a major depressive episode (58% vs. 5%), unemployment (54% vs. 18%), living alone (45% vs. 17%), and serious medical problems (16% vs. 7%). Moreover, the effects of these non-acute clinical features, individually and cumulatively, were greater in the alcoholic suicides than in the non-alcoholic suicides with depressive disorder. Over eighty percent of the alcoholic suicides had multiple risk factors (four or more). Conner et al.,[71] using proxy interview, examined the age-related pattern of seven non-acute risk factors on 56 male suicide victims with a diagnosis of alcohol dependence from 141 suicide cases between 1989 and 1992 in New York. They found that younger suicide victims (under 34 years of age) were more likely to experience relationship conflicts and separation (50% vs. 13%) and unemployment (40% vs. 7%) compared to older victims (over 50 years of age). Mood disorder (60% vs. 27%) and severe medical illness (73% vs. 0%) were more commonly present among older victims than younger victims. Younger victims were also likely to experience alcohol abuse from an early age (100% vs. 27%) and other drug abuse (50% vs. 13%). Nevertheless, middle-aged suicides shared risk factors with younger and older victims. Alcoholic suicides more frequently expressed their intent or threat of suicide for longer durations compared to non-alcoholic victims.[70]

The risk of suicide among alcoholics appears to be promoted by the severity of the illness, which is indicated by a heavier drinking pattern,[70] alcohol-related medical problems,[70,73] and an earlier onset and longer duration of alcoholism than in comparison groups.[33] Alcohol intoxication effects increase the risk both in alcoholic and non-alcoholic individuals.[64,72] Previous studies indicated that antisocial traits such as impulsivity/aggression seemed to mediate the effect of alcohol intoxication on the increase in the suicide risk.[72,73] Prior investigations support the role of alcohol intoxication in the suicidal process, by reporting that people who die by suicide with firearms were almost five times more likely to have been drinking at the end of their life than people who used other methods.[73] These antisocial traits are strongly associated with a more severe form of alcoholism,[76] early onset of illness,[77] and aggression after alcohol drinking.[78] Impulsivity/aggression can also predict poorer social and interpersonal function and treatment outcome.[77] These results strongly suggest that impulsivity/aggression is a common substrate in alcohol intoxication and increased suicide risk.

However, alcohol intoxication is not a necessary condition for committing suicide, because the risk still increased among individuals with remitted alcoholism. Conner et al.,[79] using the data from a community sample of suicide victims with alcohol misuse (N=55), reported that remitted alcoholics at the time of death were by substantial portion (31%) alcoholic

victims and were likely to be younger. Among the alcoholic remitted victims, those over 50 years of age were more likely to have MD (78% vs. 0%), but psychotic disorder was more prevalent in younger victims (63% vs. 0%). Younger active alcoholics were more likely to have other depressive disorders (24%) compared to both the younger and older remitted groups (0%). These data suggest that comorbid disorders also increased the risk for suicide among alcoholic individuals.[70,71,79] Previous studies reported that 45-70% of alcoholic suicides were acknowledged to have MD at the end of their life.[10,33,70,71] Although MD and alcoholism are frequently comorbid, the temporal relationship and the nature of the interaction between alcoholism and depression are unclear. In addition to this, physical disorders seemed to be a late complication of alcoholism.[71] Poser et al.,[80] in a follow-up study on 269 deceased cases from 2,082 patients with substance use disorders, reported that alcoholics with co-occurring other drug abuses were more likely to commit suicide than pure alcoholics (25% vs. 14%).

Conner and Duberstein[72] proposed a model of the suicidal process among alcoholics with integrating risk factors and their interactions. This model indicates that aggression/impulsivity and alcoholism severity act as externalizing components of the predisposing factors, while negative affect and hopelessness act as internalizing components. Major depressive episodes act as frequent precursors of suicidal behavior, independent of alcoholism, and as precipitating factors to mediate the relationship between negative influence and suicidal behavior. Stressful life events promote depression, which in turn increases the likelihood of suicidal behavior.

In summary, alcohol use disorder is the second most frequent psychiatric condition inciting people to commit suicide. Moreover, the act of drinking alcohol itself is the major factor associated with an increased risk for suicide in non-alcoholic individuals. It is very difficult to clearly understand the role of alcohol in the process of suicide, because alcohol drinking interacts with the personality traits, environment, and comorbid psychiatric and medical illnesses of the subject during his or her lifetime. The accumulated effect of alcohol consumption also increases the complexity of the suicidal process. Hence, clinicians must bear in mind that alcohol can cause both the imminent crisis and chronically accumulating problems, and they should therefore formulate the treatment plans according to the individual risk factors - especially psychosocial stress - and their interaction.

Anxiety disorder

Anxiety is a common symptom of depression, substance abuse or psychosis and is pathognomonic of anxiety disorder. However, the suicide risk for anxiety disorder remains unclear. Noyes,[82] after reviewing the earlier follow-up studies, reported that between 6% and 60% of the total mortality among patients with anxiety disorder consisted of deaths by suicide, and estimated that the mean suicide rate was 268/100,000 per year. In the Swedish National Psychiatric Case Register study on anxiety neurosis and depressive neurosis with a 17-year follow-up,[83] the SMR for suicide in anxiety neurosis was 6.7 for younger aged men (95% CI, 4.9-8.4) and 4.9 (95% CI, 3.2-6.6) for younger aged women respectively, which were lower compared to those of depressive neurosis patients. Using the U.S. Food and Drug Administration (FDA) database of over 20,000 anxiety disorder patients, Khan and his colleagues[84] estimated the suicide rate to be 193/100,000 per year, and it was 10 times higher than that in the general population.[66] Several investigations reported a high risk of suicide in panic disorder patients. Coryell et al.[85] were the first to give clinicians an insight into the high risk of suicide in panic disorder, by reporting that suicide accounted for 20% of mortality among psychiatric inpatients with panic disorder, a rate which is comparable to that of primary depression. Harris and Barraclough,[2] in their meta-analysis on

276 panic patients, found that the risk of suicide in patients with panic disorder was ten times higher than that which would be expected (SMR=10.0, 95% CI, 4.6-19.0) during their lifetime. Kahn et al.[84] also calculated that the suicide rate in panic disorder was 136/100,000 per year. In other anxiety disorders, there is some debate as to whether the suicide risk has increased, as in the case of panic disorders, because these disorders have been studied relatively less keenly. In obsessive compulsive disorder (OCD), one small sized sample study reported a very low risk for suicide.[86] Khan et al.[84] reported that the suicide rate for OCD was over ten times (105/100,000/year) the expected rate. Lehmann et al.[87] reported that about 13 % of suicide victims were individuals with post traumatic stress disorder (PTSD) which was the most common diagnosis among suicides with anxiety disorder. Khan et al.[84] reported that the suicide rate for OCD (105/100,000/year) was more than ten times higher than the expected rate, but that no suicides occurred among patients with PTSD or with generalized anxiety disorder during the 14 years of the study period. Furthermore, the suicide rate in social phobia was 425/100,000 per year. The data on the suicide risk in anxiety disorder in the community sample were inconsistent.[88,89]

Several studies indicated the significant role of comorbid disorders in the suicidal behavior of anxiety disorder patients. Patients with anxiety disorders are prone to major depression and substance use disorder, and such developments likewise promote suicide.[90-92] Anxiety disorders co-occur frequently with other anxiety disorders,[93] and this can increase the risk of major depression.[94] Since both major depression and substance use disorder increase the suicide risk,[2] comorbid psychiatric conditions may be a prelude to suicide in anxiety disorder. In the Finnish psychological autopsy study of random sampled suicides (N=229) from all suicides that occurred during a period of 1 year, Henriksson et al.[10] reported that anxiety disorder accounted for only 1% of all suicides as a principal diagnosis, even though 11% of suicide victims had anxiety disorder. In their subsequent study of all suicides (N=1397) in Finland that occurred during a 1 year period,[95] 1.2% of all suicides were identified to have panic disorder. On the other hand, all panic suicides suffered concurrent Axis I disorders in which major depression (59%) and substance use disorder (47%) were the most common comorbid disorders. Noyes et al.[96] reported that serious suicide attempters with panic disorder were more likely to be younger in age, be in an earlier stage and experience the gradual onset of illness, and to have coexisting personality disorders and major depression, than non-attempters. In addition to this, the suicide attempters had more severe symptoms and social impairment at the initial assessment.

Clinicians must also consider the contribution of comorbid personality disorder to the risk for suicide among patients with anxiety disorder, because comorbid personality disorder is common in patients with anxiety disorders.[97] Patients with panic disorder combined with comorbid personality disorders were found to have more severe anxiety and depressive symptoms and lower social functioning compared to those who did not have any comorbid personality disorder.[96] This in turn increases the likelihood of suicidal behavior. Moreover, nearly one half of suicides with panic disorder had a comorbid axis II disorder. Comorbid borderline and paranoid personality disorder may predict suicidal behavior among panic patients.[98]

These data suggest that the severity of symptoms and functioning levels in patients with anxiety disorders may be important factors in the individual suicidal process. However, only a few standard demographics and assessment data are available to describe the characteristics of suicide completers and the role of anxiety disorders as an independent risk factor. Along with this, the available data are insufficient to fully explain whether comorbid psychiatric conditions play a key role in suicidal behavior or are mere markers of the greater severity of the underly-

ing illness. Neither do they explain whether anxiety disorder carries the same suicide risk as frequent comorbid disorders do or not. Nonetheless, psychiatrists should be alert for comorbid diagnoses and for suicide risk among patients with anxiety disorders and conduct an explicit evaluation and follow-up for these conditions.

Conclusion

A number of studies indicate that the presence of a mental disorder is probably the most important risk factor for suicide and that the risk of suicide increases among people with mental illnesses. Many studies have tried to explain the mechanism and process involved in the increased risk for suicide among mentally ill people. However, it has not yet been identified which pathognomonic feature identifies those who will commit suicide and what the primary cause of committing suicide in individuals with mental disorders is.

Previous studies indicate that multiple predisposing and precipitating factors of a bio-psycho-social nature play unique roles and that they have complex interactions with each other in the suicidal process. Furthermore, there are also variations in the risk at differing points in the course of illness in the same high-risk patients. As the majority of suicide victims with mental illness are in contact with professional mental health services prior to death, clinicians and mental health professionals should try to evaluate and monitor the risk of suicide in every contact. The characteristics of suicidal behavior may vary according to ethnic and cultural-environmental differences. Yet, previous investigations have mainly been conducted on suicide victims in western countries and especially in places where suicide rates are high. To understand and prevent suicide in Korean individuals with mental illnesses, epidemiological and clinical investigations are urgently needed at both the national and community level.

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