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Impact of psychoactive substances on risk of suicide in schizophrenia. Review

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Summary

The main reason of death among people suffering from schizophrenia is suicide. Suicidal risk in this group of patients still remains at high level and is rated at 10%. Literature of subject points to some essential factors of suicide in schizophrenia, among them are mentioned abusing or addiction to psychoactive substances. The aim of present study is making a survey of current studies, concerning the influence of ingesting psychoactive substances on process of schizophrenia and suicidal behaviors in this group of patients. From analysis of literature results, that using psychoactive substances increases the risk of suicidal attempt in schizophrenia and interaction of this phenomenon is complex as it comes to accumulation variables resulting from coexistence of schizophrenia and disorders connected with using psychoactive substances. The most frequently quoted in literature of subject factors of suicidal risk in schizophrenia are partly located also among these, which are important in abusing and addiction to psychoactive substances. Contemporary news, point to necessity of earliest identification patients with schizophrenia and disorders connected with using psychoactive substances, to introduce effective, two-way and simultaneous therapy of both diseases.

Keywords: suicide, schizophrenia, psychoactive substances

Introduction

A suicide is aware and intended acting, which aims at making away with oneself [1]. It happens 12 times more frequently among psychiatric patients than in general population [2]. Among patients stricken with schizophrenia presently suicide is thought to be the main cause of death [3]. In this group it's estimated at 10%, but the recent studies indicate to 4,9% [3,4]. It results from analysis, that from 20% to 50% patients suffering from schizophrenia undertakes suicidal attempts in their life [5]. They are mainly white unmarried males with good preliminary functioning. They are also characterized by the sense of hopelessness and fear of intellectual deterioration. In anamnesis, depression, abusing/addiction to psychoactive substances and undertaking suicidal attempts in the past is often identified among them. Patients from the group of high suicidal risk, are characterized by social isolation, lack of external support or home environment full of conflicts and instability. Moreover, these people don't accept treatment and don't believe in its effectiveness [6].

Among risk factors of suicidal attempt in schizophrenia mentioned above, some are identified as increasing a risk of suicidal death also among general population. One of these factors is abusing or addiction to psychoactive substances. In a light of literature 15% of people addicted to alcohol or other psychoactive substances lose their life in suicidal assassination [2]. Presence of both such strong factors of suicidal attempt risk as schizophrenia and disorders caused by using psychoactive substances, will undoubtedly intensify a danger of suicidal assassination, but is it only by simple total effect of these two factors or maybe also by modulating, not necessarily intensifying influence on other variables? The authors of this study made a survey of 29 recent articles concerning the subject from a base of Pubmed from 1997 to 2008 and other available Polish publications to analyse complicated interaction of schizophrenia and using, abusing or addicting to psychoactive substances and their impact on decision on committing a suicide.

Phenomenon of comorbid of schizophrenia and disorders caused by using psychoactive substances is broadly discussed in literature. The most frequently quoted data say about 40-50% spread of „double diagnosis" which makes higher level than in general population [7-9]. There are some theories explaining such high frequency of comorbid these two disorders. Some researchers perceive common genetic base of schizophrenia and abusing/addiction to psychoactive substances, what can be connected with disturbances in producing dopamine in OUN [7]. Some scientists acknowledge, that such wide comorbid of both disorders is caused by phenomenon of „self-medication" the symptoms of schizophrenia such as negative symptoms accompanying psychosis of mood disorder or side effects of against psychotic medicines with the help of psychoactive substances [7]. It's also known the effect of psychostimulants such as amphetamine on short improvement in the range of negative symptoms of schizophrenia. Also nicotine by stimulating cholinergic system stimulates cognitive-

processes, including memory. There are also conceptions saying about its antidepressive influence [10]. However, there are examinations, which didn't find the proofs supporting the hypothesis of „self-medication" schizophrenia [11,12]. Some researchers inform, that just using psychoactive substances can lead to development of disease [7,13]. Gut-Fayand and others proved, that first usage of psychoactive substances preceded in statistically constitutive way prodromal symptoms of psychosis, and among 72% overusing the first episode began, when they had already been abusing or addicted to psychoactive substances [14]. Also study by Cantor-Graae et al. [8] proved that abusing the substance preceded appearance of disorder.

In a light of literature the most popular in group of patients with identified schizophrenia is addiction to nicotine which comes up to 88% [15]. Majority of authors state, that the second the most frequently used substance is alcohol. It's confirmed by Cantor-Graae et al. [8] examinations, which prove, that patients stricken with schizophrenia the most frequently abused alcohol itself or combined with other substances. Also Miles et al. [16] proved, that in group of patients with identified psychotic disorders the most frequently used was alcohol (34%), stimulants (24%), alcohol together with cannabinols (22%), and cannabinols (12%). Observations made by Dervaux and others as well as Liraund and Verdoux revealed the largest prevalence alcohol and cannabinols usage [11,17]. In study of Gut-Fayand et al. [14] 36% people with identified schizophrenia were abusing or were addicted to psychoactive substances. The most frequently used was alcohol, then cannabinols and at a lower grade sedative. Australian studies made by Fowler et al. [12] indicated to nearly 60% prevalence of abusing and addiction to psychoactive substances in group of people suffering from schizophrenia. The most commonly used were alcohol (48,4%), cannabinols (36%), and amphetamine. Opiates, hallucinogens and inhaled substances were used less commonly and mainly in the past. Very high level of using nicotine (74,2%) and caffeine was also revealed among examined population.

Some examinations prove major prevalence of using cannabinols in group of patients with identified schizophrenia. It seems, that this substance is especially popular among younger age groups. Israeli studies by Shoval et al. [18] prove that the most frequently used by this population are cannabinols - 23,4%, then: alcohol - 12,7%, ecstasy - 1.7%, lysergic acid diethylamide - 8,5%, inhaled substances -7,4%, cocaine - 5,8%, amphetamine - 4,8%, opiates - 3,2%, but more than one substance was used by 18,6% of the group. Prevalence of abusing in this group of patients made only 28,2% which is a very low result in comparison with other examinations, which showed even 80% overusage of psychoactive substances among young people with identified schizophrenia [19].

There can be a few reasons of such great popularity of alcohol and cannabinols. Alcohol is a substance the most familiar to whole general population, it is cheap, legal and easily accessible. In society, it is considered to be relaxing and integrating bonds substance. Therefore, it can facilitate making and supporting social relations lost during the process of illness, can be used to improve interpersonal relations and reduce social isolation. Cannabinols are used „recreationally", to intensify the pleasure, often with alcohol to intensify euphoric effect, they intensify sexual feeling, raise self esteem and sense of good understanding the reality [15]. Studies of Fowler et al. [12] confirm, that reasons for using psychoactive substances by people suffering from schizophrenia are similar to these among general population. Alcohol is used to reduce dysphoria, to relax, feel happy and calm or for better social integration, to be the part of group. For the same reasons nicotine, cannabinols, caffeine and amphetamine are used: for nothing but effects induced by intoxication of these substances or to reduce dysphoria, feel happier and relaxed. Only 9% of examines stated that they used psychoactive substances to forget about illness, to „come off" hallucination or reduce side effects of used psychotic medicines. This way of „self-medication" was declared by people presently abusing psychoactive substances, mainly alcohol and cannabinols.

Using discussed group of substances influences the process of schizophrenia in multidirectional way. The most serious disadvantageous effect of „double diagnosis", is increasing a suicidal risk in this group of patients risk, which is admitted by most researchers dealing with this problem [7,20].

Observations of large group of patients with identified disorders from the field of schizophrenia, among them 609 persons with schizophrenia, estimating multicultural dissimilarities in the range of factors influencing a decision about commiting a suicide, proved that coexistence of overusing psychoactive substances (presently or in the past), among it present smoking tobacco was common variable for patients from all examined world regions: North and South America, Europe, Eastern Europe, except for South Africa [21]. Connection between addiction to nicotine and increasing a suicidal risk was also proved in studies of Malone at al. [22] in a light of this study, people with identified serious psychotic disorder therein schizophrenia – smoking, face higher likelihood of appearing suicidal thoughts effectuating suicidal attempt or higher levels of aggressive beha-

viors, than people not addicted to nicotine. Also Almatura et al. [23] proved that people suffering from schizophrenia undertaking suicidal attempts, more frequently smoke cigarettes in comparison with patients without suicidal attempts in the anamnesis. Limosin et al. [24] to independent factors of suicidal risk in schizophrenia included: male gender, previous suicidal attempts, short period of disease and abusing drugs. Researches also proved that these people were smokers more frequently and had at least one positive response in alcoholic problems questionnaire CAGE. Patients using psychoactive substances alternative to alcohol, were younger than examined population with shorter period of disease and higher sense of suffering.

In parallel to the growth of suicidal risk taking psychoactive substances carries the risk of psychosis set back or exacerbating its symptoms [9,20]. Fowler et al. [12] proved that patients with positive anamnesis towards misusing psychoactive substances were younger, male gender and had conflicts with law more frequently. At younger age substances were misused presently more frequently, which was connected with higher intensification of psychopathological symptoms and the beginning of treatment. However the connection between overusage/addiction to substances and undertaking suicidal attempts hasn't been found, though these people were more frequently hospitalized, needed higher doses of medicines and had lower social support. Such relationship was evidenced by Shoval et al. [25] in a group of young patients with „double diagnosis". The authors proved, that people with suicidal attempts in the anamnesis, were hospitalized more frequently, more often made self injuries, but had indolent psychotic symptoms. The most popular in the group undertaking suicidal attempts were inhaled substances, LSD, alcohol and MDMA (methylenedioxy-methylamphethamine). No differences in using cannabinols, amphetamine, cocaine and opiates between the group making suicidal assassinations and without suicidal attempts in anamnesis have been found. Convergent to results of this study are observations of Kamala et al. [26] who didn't prove the statistically constitutive connection between overusing psychoactive substances with the change in the range of positive, negative or depressive symptoms in schizophrenia. Still, people with abusing psychoactive substances in anamnesis declared occurring suicidal thoughts more frequently. Also Cantwell et al. [27] proved, that people with schizophrenia using psychoactive substances only to little extent differed in the range of intensification of preliminary symptoms and social functioning in comparison with not using the group. Examinations of Dervaux et al. [11] didn't prove any influence of taking psychoactive substances on intensity of positive, negative, depressive and anxiety symptoms. Impact of these substances on symptoms of schizophrenia is therefore not determined in full, as well as the meaning of positive and negative symptoms in increasing suicidal risk. In a light of available examinations they are difficult to be classified as decidedly increasing suicidal risk, decreasing it or remaining neutral. According to some authors psychopathology in the range of positive and negative doesn't seem to have the most important influence on suicidal behaviors of patients with diagnosed schizophrenia [28].

Analyzing mutual relations using psychoactive substances, schizophrenia and their influence on process of disease and suicidal risk, we must beside psychopathological symptoms estimate changes taking place in the process of hospitalizations and pharmacotherapy. Study of Gut-Fayand et al. [14] didn't prove the influence of psychoactive substances on relapse of schizophrenic episodes. Authors didn't find differences in number of disease recurrences, length of hospitalization, response to treatment and level of general functioning. Similarly, examinations of Shovel et al. [18] didn't prove the relation between using psychoactive substances and frequency and length of hospitalization. Even so, authors proved, that using psychoactive substance correlates with higher level of aggressive and self aggressive behaviors: self injuries and suicidal attempts. Some researchers acknowledge, that psychoactive substances increase the risk of recurrence of psychosis, exacerbate its symptoms, increase the frequency and length of hospitalization, worsen the cooperation in treating, influence a decision about waiving of medicines and also worsen the effectiveness of medicines [8,9,20]. We can think that psychoactive substances through this influence, will increase the risk of suicidal attempt, as in a light of available examinations higher number of disease relapse, longer and more frequent hospitalizations, rejecting the need of treatment and lack of cooperation in therapy increase the risk of suicide in group of patients suffering from schizophrenia [6]. Verdoux et al. [29] emphasize, that early psychosis and the period of first hospitalization connected with it causes special risk of using psychoactive substances and consequences connected with it, for example undertaking suicidal attempt especially among people using a few substances at the same time.

There is direct connection between cooperation in treating insight into the disease. Influence of both factors on suicidal risk can be changed by coexistence of schizophrenia and using, abusing or addiction to psychoactive substances. Especially, that their impact is different: good insight into the disease increases a risk of suicide in schizophrenia,

whereas the lack of morbid criticism decreases it. However the lack of sense of disease often goes hand in hand with a lack of cooperation in treatment, which in turn decides about increasing a suicidal risk. Additionally, coexistence of disorders connected with using described substances defaces interactions between these variables. It is known the disadvantageous effect of psychoactive substances on deterioration of cognitive functions, which in turn can project on deterioration of morbid criticism. The role of morbid insight in increasing suicidal risk was confirmed by examinations of Kim et.al. [30], where group of patients with diagnosed schizophrenia with positive anamnesis towards suicidal behaviors, had statistically higher level of insight into the disease and sense of hopelessness in comparison with group suffering from schizophrenia with negative anamnesis towards suicidal behaviors. Researchers acknowledged, that sense of hopelessness, awareness of psychical disease and high neurocognitive functioning can increase the risk of suicidal attempt in schizophrenia. Among risk factors authors also quote overdosing psychoactive substances.

Taking psychoactive medicines increases appearance mood disorder. In the context of suicidal risk it can cause its intensification by deepening depression and giving up thoughts. However both depressive episodes, sense of hopelessness and using psychoactive substances are mentioned among independent factors of suicidal risk [6]. Altamura et al. [23] proved, that addiction or abusing psychoactive substances and depressive episode were more frequently diagnosed in the group of patients suffering from schizophrenia after suicidal attempt. These people had longer period of not treated psychosis and they were more frequently prescribed typical antipsychotic medicines. In studies of Harkavy-Friedman [31] the extent of depressive episode, head trauma, overdosing or addition to psychoactive substances and presence of auditory commending hallucinations occurring in anamnesis, forecasted attempt of suicidal attack in the future, among patients with diagnosed schizophrenia.

In a light of previous examinations using psychoactive substances increases a risk of school and family problems, homelessness, aggression and conflicts with law also in a group of patients with diagnosed schizophrenia [7,8,19]. Some researchers incline to accepting the role of high level of impulsiveness and aggression in development of problems mentioned above. Also in a group of patients suffering from schizophrenia using psychoactive substances, levels of impulsiveness, searching for news and experiments were proved [11,17]. Impulsiveness can – as the feature of temperament, but not a result of using substances – show the way to the start of using them in preliminary period of psychosis, making the process of adaptation to new situation easier. High connection between abusing psychoactive substances, impulsiveness and number of suicidal attempts was also proved [14]. It's confirmed by results of McGirr's and Turecki's studies [32]. The authors proved high levels of impulsiveness and aggression among people suffering from schizophrenia or schizoaffective disorder, trying to commit a suicide. These patients in comparison with other people, who tried to commit a suicide, are characterized by lower level of depressiveness and lower level of overdosing alcohol presently as in the past, whereas both groups of patients suicide characterized the same level of using drugs. Researchers presented hypothesis, that alcohol in the group of people suffering from schizophrenia can be not fundamental factor of making a decision to commit a suicide. High level of impulsiveness and aggression in connection with period of active psychosis can be enough to hand. There are also examinations, which don't prove that impulsively-aggressive behaviors were significant for undertaking suicidal attempt [33].

The role of alcohol in creating suicidal behaviors seems to hang in a balance. It's certainly more popular among elderly people with diagnosed schizophrenia, who because of their age are located in the group of lower suicidal risk [16]. However, in studies of Heil et al. [34] 1/5 of group of patients suffering from schizophrenia after suicidal attempt, had alcoholic problems (9% of people overused, 12% were addicted), other psychoactive substances were used only by 3 persons from 92-people examined group. Alcoholic problems more frequently concerned men in the middle age, with average period of disease, but young and old men in comparison with them more often experienced depressive symptoms. It's surprising, that level of abusing/addiction to substances in age average group of suicide victims in schizophrenia corresponded with the level in whole population undertaking suicidal attempts in examined region, which can indicate that people with diagnose schizophrenia weren't specially predisposed to overdosing or addiction to alcohol. Some examinations say about the lack of any influence on using alcohol on suicidal risk in schizophrenia [35]. Harkavy-Friedman et al. [36] didn't show any statistically essential differences between patients suffering from schizophrenia undertaking suicidal attempts and without suicidal attempts in anamnesis in the history of overdosing/addiction to alcohol or other psychoactive substances. Metaanalysis of Hawton at al. [37] estimate a risk caused by overusing/addiction to alcohol, other psychoactive substances and all psychoactive substances together on commitment of suicide in schizophrenia.

Researchers proved such connection only for using psychoactive substances alternative to alcohol.

Conclusions

From analysis of literature results, that using psychoactive substances increases the risk of suicidal attempt in schizophrenia. Interaction of this phenomenon is complex as it comes to accumulation variables resulting from coexistence of schizophrenia and disorders connected with using psychoactive substances such as: worsening a cooperation in treating and higher frequency of relapse of disease, intensification of depressive symptoms, more serious process of illness, worsening social relations and marginalization of patients [38]. The most frequently quoted in literature of subject factors of suicidal risk in schizophrenia are partly located also among these, which are important in abusing and addiction to psychoactive substances. Patient with ,,double diagnosis" is young, homeless man experiencing higher levels of positive symptoms, accompanied by affective symptoms and repeated aggressive behaviours, hospitalized more frequently, not cooperating in therapy and requiring higher doses of medicines at the same time [39]. Concluding, it must be stated that diagnosis of coexisting relationships in this group of patients requires further observations and studies. Contemporary news, point to necessity of earliest identification patients with schizophrenia and disorders connected with using psychoactive substances, to introduce effective, two-way and simultaneous therapy of both diseases.

References

1. Petit J.R. Psychiatria ratunkowa. Wrocław: Urban & Partner; 2007; 248-267.
2. Golec S., Kokoszka A. Postępowanie w nagłych zaburzeniach psychicznych. Kraków: Medycyna Praktyczna, 2002; 100-105.
3. Wciórka J. Schizofrenia, zaburzenia schizotypowe i schizoafektywne. In: Bilikiewicz A. Eds. Psychiatria. Wrocław: Urban & Partner 2002; Vol. 2, 213-323.
4. Palmer B.A., Pankratz V.S., Bostwick J.M. The lifetime risk of suicide in schizophrenia: a reexamination. Arch. Gen. Psychiatry, 2005; 62: 247-253.
5. Siris S. Suicide and schizophrenia. J. Psychopharmacol., 2001; 15: 127-35.
6. Pompili M. Suicide risk in schizophrenia: an overview. In: Tatarelli R, Pompili M, Girardi P. eds. Suicide in schizophrenia. New York: Nova Science Publishers 2007; 1-18.
7. Blanchard J.J., Brown S.A., Horan W.P., Sherwood A.R. Substance use disorders in schizophrenia: review, integration and a proposed model. Clin. Psychol. Rev., 2000; 20: 207-234.
8. Cantor-Graae E., Nordstrom L.G., McNeil T.F. Substance abuse in schizophrenia: a review of the literature and a study of correlates in Sweden. Schizophr. Res., 2001; 1: 48(1), 69-82.
9. Soyka M., Albus M., Immler B., Kathmann N., Hippius H. Psychopathology in dual diagnosis and non-addicted schizophrenics - are there differences? Eur. Arch. Psychiatry Clin. Neurosci., 2001; 251: 232-238.
10. Pużyński S., Rybakowski J. Neurobiologia zaburzeń psychicznych.. In: Bilikiewicz, A. Eds. Psychiatria. Wrocław: Urban & Partner 2002; Vol. 1, 151-178.
11. Dervaux A., Baylé F.J., Laqueille X., Bourdel M., Le Borgne M., Olié J., Krebs M. Is Substance Abuse in Schizophrenia Related to Impulsivity, Sensation Seeking, or Anhedonia? Am. J. Psychiatry, 2001; 158: 492-494.
12. Fowler I.L., Carr V.J., Carter N.T., Lewin T.J. Patterns of Current and Lifetime Substance Use in Schizophrenia. Schizophr. Bull., 1998; 24(3): 443-455.
13. Bodkin L.L., Singh A., Corcoran C. Kanabinole jako czynnik ryzyka psychozy u podatnych nastolatków: implikacje terapeutyczne. Psychiatria po Dyplomie 2008; 5, 6: 66-72.
14. Gut-Fayand A., Dervaux A., Olie J.P., Loo H., Poirier M.F., Krebs M.O. Substance abuse and suicidality in schizophrenia: a common risk factor linked to impulsivity. Psychiatry Research, 2001; 102: 65-72.
15. Baran-Furga H., Steinbarth-Chmielewska K. Uzależnienia. Obraz kliniczny i leczenie. Warszawa: Wydawnictwo Lekarskie PZWL 1999; 213-323.
16. Miles H., Johnson S., Amponsah-Afuwape S., Finch E., Leese M., Thornicroft G. Characteristics of subgroups of individuals with psychotic illness and a comorbid substance use disorder. javascript:AL_get(this, 'jour', 'Psychiatr Serv.'); Psychiatr. Serv., 2003; 54(4): 554-61.
17. Liraud F., Verdoux H. Which temperamental characteristics are associated with substance use in subjects with psychotic and mood disorders. Psychiatry Research, 2000; 93: 63-72.
18. Shoval G., Zalsman G., Apter A., Diller R., Sher L., Weizman A. A 10-year retrospective study of inpatient adolescents with schizophrenia/schizoaffective disorder and substance use. Comprehensive Psychiatry, 2007; 48: 1-7.
19. Swadi H., Bobier C. Substance use disorder comorbidity among inpatient youths with psychiatric disorder. Aust. N. Z. J. Psychiatry, 2003; 37: 294-298.
20. Green A.I., Burgess E.S., Dawson R., Zimmet S.V., Strous R.D. Alcohol and cannabis use in schizophrenia: effects of clozapine vs. risperidone. Schizophr. Res., 2003; 1: 60(1), 81-5.
21. Altamura A.C., Mundo E., Bassetti R., Green A., Lindenmayer J.P., Alphs L., Meltzer H.Y. Transcultural differences in suicide attempters: Analysis on a high-risk population of patients with schizophrenia or schizoaffective disorder. Schizophr. Res. 2007; 89: 140-146.
22. Malone K.M., Waternaux C., Haas G., Cooper T.B., Li S., Mann J.J. Cigarette Smoking, Suicidal Behavior, and Serotonin Function in Major Psychiatric Disorders. Am. J. Psychiatry, 2003; 160: 773-779.
23. Altamura A.C., Bassetti R., Bigotti S., Pioli R., Mundo E. Clinical variables related to suicide attempts in schizophrenic patients: a retrospective study. Schizoph. Res., 2003; 60: 47-55.
24. Limosin F., Loze J.Y., Philippe A., Casadebaig F., Rouillon F. Ten-year prospective follow-up study of the mortality by suicide in schizophrenic patients. Schizophr. Res., 2007; 94: 23-28.
25. Shoval G., Sever J., Sher L., Diller R., Apter A., Weizman A., Zalsman G. Substance Use, Suicidality, and Adolescent-Onset Schizophrenia: An Israeli 10-Year Retrospective Study. J. Child. Adolesc. Psychopharmacol., 2006; 16, 6, 767-775.
26. Kamali M., Kelly L., Gervin M., Browne S., Larkin C., O'Callaghan E. The prevalence of comorbid substance misuse and its influence on suicidal ideation among in-patients with schizophrenia. Acta Psychiatr. Scand., 2000; 101: 452-456.
27. Cantwell R. on behalf of the Scottish Comorbidity Study Gropup Substance use and schizophrenia: effects on symptoms, social functioning and service use. Br. J. Psychiatry, 2003; 182: 324-329.
28. Modestin J. Symptoms, subtype, and suicidality in patients with schizophrenia. In: Tatarelli R., Pompili M., Girardi P. eds. Suicide in schizophrenia. New York: Nova Science Publishers 2007; 31-47.

29. Verdoux H., Liraud F., Gonzales B., Assens F., Abalan F., van Os J. Suicidality and substance misuse in first-admitted subjects with psychotic disorder. Acta Psychiatr. Scand., 1999; 100(5): 389-95.
30. Kim C.H., Jayathilake K., Meltzer H.Y. Hopelessness, neurocognitive function and insight in schizophrenia. Schizophr. Res., 2003; 60: 71-80.
31. Harkavy-Friedman J.M. Depression and Suicidal Behavior in Schizophrenia. In: Tatarelli R., Pompili M., Girardi P. eds. Suicide in schizophrenia. New York: Nova Science Publishers 2007; 99-112.
32. McGirr A., Turecki G. What is specific to suicide in schizophrenia disorder? Demographic, clinical and behavioural dimensions. Schizophr. Res., 2008; 98: 217-224.
33. McGirr A., Tousignant M., Routhier D., Pouliot L., Chawky N., Margolese H.C., Turecki G. Risk factors for completed suicide in schizophrenia and other chronic psychotic disorders: a case-control study. Schizophr. Res. 2006; 84(1): 132-43.
34. Heilä H., Isometsä E.T., Henriksson M.M., Heikkinen M.E., Marttunen M.J., Lönnqvist J.K. Suicide and Schizophrenia: A Nationwide Psychological Autopsy Study on Age- and Sex-Specific Clinical Characteristics of 92 Suicide Victims With Schizophrenia. Am. J. Psychiatry, 1997; 154: 1235-1242.
35. Steinert T., Wiebe C., Gebhardt R.P. Aggressive Behavior Against Self and Others Among First-Admission Patients With Schizophrenia. Psychiatric Services, 1999; 50: 85-90.
36. Harkavy-Friedman J.M., Restifo K., Malaspina D., Kaufmann C.A., Amador X.F., Yale S.A., Gorman J.M. Suicidal Behavior in Schizophrenia: Characteristics of Individuals Who Had and Had Not Attempted Suicide. Am. J. Psychiatry, 1999; 156: 1276-1278.
37. Hawton K., Sutton L., Haw C., Sinclair J., Deeks J.J. Schizophrenia and suicide: systematic review of risk factors. Br. J. Psychiatry, 2005; 187: 9-20.
38. Pompili M., Amador X.R., Girardi P., Harkavy-Friedman J., Harrow M., Kaplan K., Krausz M., Lester D., Meltzer H.Y., Modestin J., Montross L.P., Mortensen P.B., Munk-Jorgensen P., Nielsen J., Nordentoft M., Saarinen P.I., Zisook S., Wilson S.T., Tatarelli R. Suicide risk in schizophrenia: learning from the past to change the future. Ann. Gen. Psychiatry, 2007; 16: 10, 1-22.
39. Scheller-Gilkey G., Lewine R.R., Caudle J., Brown F.W. Schizophrenia, substance use, and brain morphology. Schizophr. Res., 1999; 11: 35(2), 113-20.

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