



Discrepancies between clinical and autopsy diagnosis of cause of death among psychiatric patients who died due to natural causes. A retrospective autopsy study

Neslaganje između kliničkih i autopsijskih dijagnoza uzroka smrti među psihijatrijskim bolesnicima umrlim zbog prirodnih uzroka

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Abstract

Background/Aim. Autopsy studies rarely investigate the causes of natural death in psychiatric population. The aim of this study was to examine the causes of death among the subjects with various psychiatric disorders in whom a clinical (pathoanatomical) autopsy was requested. **Methods.** The study group included 118 patients (65% men, 35% women, mean age 58.2 ± 13.6 years) with a psychiatric diagnosis, in whom a clinical autopsy was performed. We compared the distribution of causes of natural death among psychiatric patients and other patients, representatives of the general population who died of natural causes. We also analyzed the difference between clinical diagnoses of cause of death and the autopsy findings in psychiatric patients. **Results.** Psychiatric patients died earlier than the control group (58 vs. 69 years), usually due to the respiratory (46%) and cardiovascular diseases (37%). The most common diagnoses in psychiatric patients were organic psychoses and dementias (F00-F09) and schizophrenia and schizoaffective disorders (F20-F29). Majority of the patients (55%) died in general hospitals vs. specialized psychiatric hospitals (45%) due to somatic diseases. There was a significant difference in the distribution of causes of death compared to the control group in which the cardiovascular diseases dominated. Even in 64% of psychiatric patients there was a discrepancy between the clinical diagnosis of the cause of death and definite autopsy findings. **Conclusion.** The assessment of somatic diseases in psychiatric patients is insufficient, especially in specialized psychiatric hospitals. That leads to a significant discrepancy between clinical diagnosis of the cause of death and autopsy findings. Therefore, it is necessary to pay additional attention in diagnostics and treatment of somatic diseases in these patients to improve their health care.

Key words:

autopsy; cause of death; death, sudden; diagnosis; hospitals, general; hospitals, psychiatric; mental disorders; patients.

Apstrakt

Uvod/Cilj. Obdukcijske studije se retko bave ispitivanjem prirodnih uzroka smrti kod psihijatrijskih bolesnika. Cilj istraživanja bio je ispitivanje uzroka smrti bolesnika sa različitim psihijatrijskim oboljenjima, u slučajevima gde je tražena i urađena patoanatomska (klinička) obdukcija. **Metode.** U istraživanje je bilo uključeno 118 bolesnika (65% muškaraca, 35% žena, prosečne starosti $58,2 \pm 13,6$ godina) sa dijagnozom psihijatrijske bolesti kojima je rađena patoanatomska (klinička) obdukcija. Poređena je distribucija uzroka prirodne smrti psihijatrijskih bolesnika sa drugim bolesnicima (koji reprezentuju opštu populaciju) umrlim zbog prirodnih uzroka smrti, a ispitivane su i razlike između kliničkih i autopsijskih dijagnoza uzroka smrti kod psihijatrijskih bolesnika. **Rezultati.** Psihijatrijski bolesnici umirali su ranije u odnosu na opštu populaciju (58 vs. 69 godina), najčešće zbog respiratornih (46%) i kardiovaskularnih bolesti (37%). Najčešće dijagnoze kod psihijatrijskih bolesnika bile su organske psihoze i demencije (F00-F09) i shizofrenija i shizoafektivni poremećaji (F20-F29). Većina njih (55%) umirala je u opštim bolnicama, a 45% u psihijatrijskim bolnicama zbog somatskih oboljenja. Ustanovljena je značajna razlika u distribuciji uzroka smrti u odnosu na kontrolnu grupu u kojoj su dominirale kardiovaskularne bolesti. Kod 64% psihijatrijskih bolesnika postojale su značajne razlike u kliničkoj dijagnozi uzroka smrti u odnosu na konačan obdukcioni nalaz. **Zaključak.** Dijagnostika somatskih bolesti kod psihijatrijskih bolesnika je nedovoljna, pogotovo u psihijatrijskim bolnicama. Ovo dovodi do značajnog neslaganja između kliničkih i autopsijskih dijagnoza uzroka smrti u ovoj populaciji. Potrebno je posvetiti dodatnu pažnju ispitivanju i lečenju somatskih bolesti kod ovih bolesnika da bi se poboljšala njihova zdravstvena zaštita.

Ključne reči:

autopsija; smrt, uzrok; smrt, iznenadna; dijagnoza; bolnice, opšte; bolnice, psihijatrijske; psihički poremećaji; bolesnici.

Introduction

Many studies suggested that psychiatric patients have an increased risk of premature death, including both natural and unnatural causes¹⁻⁸. The hypotheses about why people with psychiatric disorders are more likely to die than the rest of the population are many, different and often supported by contradictory data. It is known that psychiatric patients are more prone to death from violent causes, especially suicide or accident death^{3,5}. On the other hand, although a correlation between organic diseases and mental disorders is evident, there is no adequate explanation of the excess morbidity and mortality of the people with severe mental illnesses (including schizophrenia, schizoaffective disorder, bipolar disorder, and depressive psychosis)^{5,6}. There seems to be several groups of reasons for this phenomenon. The first one includes socioeconomic reasons – people with serious mental illnesses live with health disparities, which, among other things, result from social dysfunction, stigma, and direct consequences of psychopathology^{5,6}. The second possible explanation could be the unhealthy lifestyle of people with psychiatric disorders (smoking, alcohol abuse, dietary habits, illicit drug use, physical inactivity, etc.), especially those with severe mental illnesses⁵⁻⁸. Beside these, there is another potential health disparity which comes from the deleterious physical consequences of a long-term antipsychotic use and their relation to cardiovascular deaths^{1,3,6}. In the diseases such as schizophrenia, the autonomic irregularities could also provide a mechanism that could produce sudden death⁵. Additional reasons could be less adequate medical assistance for psychiatric patients than for people without psychiatric disorders^{9,10}, and, furthermore, the limited ability of people with mental disorders to recognize and communicate their symptoms of organic diseases could be another possible explanation⁵.

Most of these conclusions came out of the large cohort studies based on registers of psychiatric patients. However, there is a small number of the autopsy studies that research natural causes of death in psychiatric patients, and most of these studies consider sudden death^{3,11,12}. Most of these studies indicate the cardiac death (and most commonly coronary heart disease) as the most common natural cause of death in psychiatric patients.

Autopsy, as a gold standard in diagnostics, is an important tool for testing and consequently improving clinical practice¹³. For a long time, there has been a great interest in comparing clinical diagnoses and autopsy findings^{14,15}. Many diagnoses that are not detected before can be revealed by autopsy¹⁶. Moreover, some studies found the significant discrepancies between the clinical diagnosis and autopsy findings¹⁴. Still, it is not easy to find studies on concordance between the clinical diagnosis of cause of death and autopsy findings in psychiatric patients.

The aim of this study was to examine the causes of death among the subjects with various psychiatric disorders for whom a clinical (pathoanatomical) autopsy was requested.

Methods

This 7-year (2007–2013) retrospective autopsy study was performed at the Institute of Pathology, Faculty of Medicine, University of Belgrade, Serbia. The subjects of our study were selected from all decedents who underwent the complete clinical (pathoanatomical) autopsies at the Institute. The study participants were all the deceased with psychiatric diagnosis in their medical history, submitted with the autopsy request. The psychiatric diseases were classified according to ICD-10 into the following groups: schizophrenia and schizoaffective disorders, affective disorders (depression and bipolar disorder), neurotic and somatiform disorders, alcohol addiction, psychoorganic syndrome and dementia.

The patients with psychiatric diseases accounted for about 2.5% of the performed pathoanatomical autopsies at the Institute during a 7-year period (118 out of 5,620 autopsies). The study group consisted of 118 subjects, with significantly more males, than females, 77 (65%) vs. 41 (35%), respectively ($\chi^2 = 10.983$, $p = 0.001$), with the average age of 58.2 ± 13.6 years (median 57 years, ranging from 25 to 88 years), and no age difference between the males and female (58.1 vs. 58.5 , respectively $p < 0.05$).

The control group ($n = 236$) was randomly selected as every next two autopsies following the autopsy of a subject with a psychiatric diagnosis. This group was selected to represent the “general population”, or at least, the population of the deceased whose pathoanatomical autopsies were performed at the Institute of Pathology, which covers about 80% of clinical autopsies performed in the city of Belgrade (population about 1.7 million people). The control group showed rather balanced distribution of genders (129 males and 107 females; $\chi^2 = 1.373$, $p = 0.2431$), with the average age of 69.9 ± 11.1 years (median 70 years, ranging from 36 to 97 years).

In both the study and control groups, the causes of death were classified as: malignant neoplasms, cardiovascular diseases, respiratory diseases, diseases of the gastrointestinal system, infectious diseases, or other causes.

We noted the distribution of different psychiatric diagnosis in the subjects for whom a clinical (pathoanatomical) autopsy was requested as well as the distribution of natural causes of death among these subjects compared to the control group. In addition, in the group of psychiatric patients, we also analyzed the concordance between the clinical diagnosis of their cause of death and the cause of death determined through the autopsy.

Statistical analysis was performed using the Student *t*-test for variables with the parametric distribution, and the Pearson's χ^2 test, Fisher's exact probability test and the Spearman's correlation coefficient, for variables with the nonparametric distribution. All numerical variables were tested with the Kolmogorov – Smirnov test for a normal distribution. *P* value of 0.05 was considered to be significant and *p* value of 0.01 to be highly significant. The SPSS version 17.0 (license number 106454) was used to assist the statistical analysis.

Results

Comparing the study group with the control group showed that the psychiatric patients died significantly younger than those from the control group ($t = -8.680$, $df = 352$, $p < 0.001$; Figure 1). There was also a borderline significance in the gender distribution with a predominance of males over females in the group of psychiatric patients compared to the control group ($\chi^2 = 3.628$, $p = 0.057$).

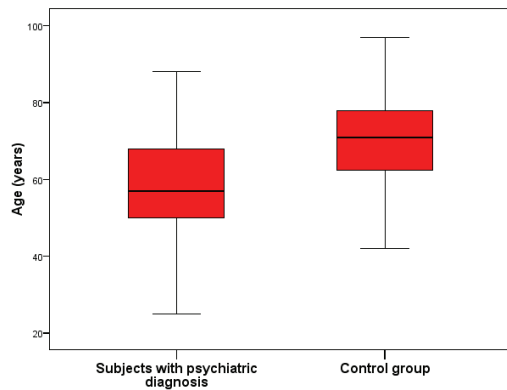


Fig. 1 – The box and whisker plots represent the age of the group of psychiatric patients and the control group. The lower boundary of the box indicates the 25th percentile, the line within the box marks the median, and the upper boundary of the box indicates the 75th percentile. The error bars above and below the box indicate the 90th and the 10th percentiles, respectively.

The distribution of psychiatric diseases in the study group is shown in Table 1. Organic psychoses and dementia, and schizophrenia and schizoaffective disorders were the most frequent psychiatric diagnoses ($\chi^2 = 28.675$, $df = 3$, $p < 0.001$).

Table 1
The distribution of psychiatric diseases in the study group

Psychiatric disease (code according to ICD-10)	Patients n (%)
Schizophrenia and schizoaffective disorders (F20-F29)	34 (29)
Affective disorders (F30-F39)	11 (9)
Neurotic and somatiform disorders (F40-F48)	1 (1)
Alcohol addiction (F10)	22 (19)
Organic psychoses and dementia (F00-F09)	50 (42)
Total	118 (100)

ICD – International classification of diseases.

Table 2
Different psychiatric diseases in the patients who died in psychiatric hospitals and those who died in general hospitals

Psychiatric disease code according to ICD-10)	Patients (n)	
	psychiatric hospitals	general hospitals
Schizophrenia and schizoaffective disorders (F20-F29)	26	8
Affective disorders (F30-F39)	2	9
Neurotic and somatiform disorders (F40-F48)	0	1
Alcohol addiction (F10)	7	15
Organic psychoses and dementia (F00-F09)	18	32
Total	53	65

ICD – International classification of diseases.

Among the subjects with psychiatric disease, 53 (45%) individuals died in specialized psychiatric hospitals, while 65 (55%) died in general hospitals and were primarily treated for organic diseases. There was a significant difference in the distribution of different psychiatric diseases among the patients who died in psychiatric hospitals compared to those psychiatric patients who died in general hospitals ($\chi^2 = 20.808$, $df = 4$, $p < 0.001$) (Table 2). The Table 2 shows that patients with schizophrenia died more frequently in psychiatric hospitals, while those with organic psychoses and alcohol addiction died more frequently in general hospitals.

The statistical analysis also showed that the younger subjects died more frequently in specialized psychiatric hospitals, while the older ones died more frequently in general hospitals (Spearman's $\rho = 0.241$, $p = 0.008$). Younger subjects more often had schizophrenia than other psychiatric diseases (Spearman's $\rho = 0.439$, $p < 0.001$). The subjects with schizophrenia died more often in psychiatric hospitals, while other psychiatric patients usually died in general hospitals (Spearman's $\rho = 0.282$, $p = 0.002$).

There was also a significant difference in the distribution of causes of death between the study group and the control group ($\chi^2 = 18.848$, $df = 5$, $p = 0.003$). The most frequent causes of death in the study group were respiratory diseases, whereas cardiovascular diseases dominated in the control group (more than 50% of the patients) (Table 3).

Table 3
Distribution of causes of death in the study group and control group

Cause of death	Study group	Control group
	n (%)	n (%)
Malignant neoplasms	5 (4.2)	7 (3)
Cardiovascular diseases	44 (37)	123 (52)
Respiratory diseases	54 (46)	86 (36)
Digestive diseases	3 (3)	7 (3)
Infectious diseases	6 (5)	13 (6)
Miscellaneous	6 (5)	0
Total	118 (100)	236 (100)

The analysis showed that there were significantly frequent discrepancies between the clinical diagnosis and autopsy findings of the cause of death ($\chi^2 = 9.797$, $p = 0.002$), and these findings were different in 76 out of 118 cases (64%). There was a tendency to higher concordance between the clinical diagnosis and autopsy findings in general hospitals than in psychiatric hospitals (28 vs 14, respectively), however the significance in this case was a borderline ($\chi^2 = 3.536$, $p = 0.060$).

The cause of death in the psychiatric patients was not related to the specific psychiatric diagnosis (Fisher's Exact Test = 0.962).

Discussion

In this study, the psychiatric patients who died from natural causes were more than 10 years younger comparing to the control group, 58 vs. 69 years, respectively (Figure 1). There are several studies that showed that mortality among psychiatric patients is higher than the general population¹⁻⁸. Some of them measured that patients with severe mental illness had lower life expectancy for 13 to more than 30 years compared to the general population¹⁷, while another showed a loss of 8.8 life-years in comparison with psychiatric patients and the general population¹⁸. These studies suggest that the main reasons for somatic diseases in these patients can be caused by direct complications of psychiatric disorders, their unfavorable behavioral styles and side effects of pharmacological treatment^{2,3,5-8,19}. Some of the studies found no other explainable cause of death, but the mental illness itself³. Of note, patients with psychiatric diseases often do not receive sufficient check-ups regarding their somatic conditions^{20,21}. Although these conclusions came out mostly from the large cohort studies based on registers of psychiatric patients, they all could be generally applied to our retrospective autopsy study.

Although there were significantly more males than females in our study group, there was only a borderline significance in the male predominance comparing the study group to the control group. This means that autopsies are more commonly performed on male than female subjects in general. However, we can assume that increasing sample size would have led to statistical significance and that the male predominance among subjects with psychiatric diagnosis really exists. The explanation for the male predominance could lie in the fact that our study group also included chronic alcohol abuse which is a type of hazardous behaviour, generally more common in males than females.

Organic psychoses, followed by schizophrenia and chronic alcohol abuse were the most frequent among psychiatric diagnoses in the entire study group. On the other hand, schizophrenia was the most common mental disease in the subjects from specialized psychiatric hospitals, whereas organic psychoses, alcohol addiction and depression occurred more often in subjects from general hospitals. This implies that patients with more severe psychiatric diagnosis, such as schizophrenia, probably spent more time in specialized institutions. It could also imply that medical service is less available and probably less accessible, especially for the patients with dementia^{9,10} and that people with mental disorders have the limited ability of to recognize the symptoms of organic diseases or react to them⁵, which could refer to the patients with dementia and depression, as well as chronic alcoholics.

According to our data, the younger patients were more likely to suffer from schizophrenia and die in specialized psychiatric hospitals. This could mean that these patients had

more severe psychiatric condition which manifested earlier in life. In contrast, the older psychiatric patients suffered more often from organic psychoses, alcohol addiction and depression, and they deceased in general hospitals, thus, having been treated for nonpsychiatric diseases. Similarly, other studies show that there is a lower prevalence of severe mental disorders, such as schizophrenia, mood and alcohol-induced disorders, in the late than in the early adult life²² as the number of new generation of older people affected is lower than the number of prevalent cases who die early, and this is explained by the premature mortality in the affected younger individuals. Consequently, older people with severe mental disorders consist of a group of survivors and a relatively small number of new cases. Old survivors could, conceivably, have had a more benign course of illness or healthier lifestyle than those who died early, whereas new cases would have had only limited exposure to the potentially detrimental effects associated with their illness²².

One of the major results of our study was a significant and quite big discrepancy between clinical diagnosis and autopsy findings of the cause of death, practically in two thirds of the cases. This discrepancy seemed to be higher in the subjects who died in psychiatric hospitals. This could suggest that quality of general medical care in general hospitals is higher than in psychiatric hospitals, with more accurate clinical judgment of the cause of death. One of the problems lies in the fact that mental and physical health care are separated, and communication between general and psychiatric institutions is insufficient, including partial and uncoordinated approaches to somatic or mental conditions as well as weak communication between general and psychiatric institutions²³. Even in rich and developed countries, psychiatric patients often have lower somatic "health care utilization" and are less likely to be thoroughly examined for somatic diseases^{20,24}. Also, there is a constant decline in the autopsy rates and it appears to be a global phenomenon, despite the significant discrepancies between the clinical and autopsy determined cause of death^{25,26}. The reason for this could lie in more and more common judicial proceeding due to potential medical errors and an autopsy is often the proceeding that exposes some omissions in the medical procedures, diagnosis and treatment²⁶. Our study, again, stresses the importance of the autopsy diagnosis of cause of death especially in psychiatric patients.

Another important result of our study was the difference in causes of death in the psychiatric patients compared to the control group. Most of the studies considered cardiovascular death to be the most common natural cause of death in psychiatric patients^{2,3,5-8,11,12,27,28}, explaining the increased risk for cardiovascular diseases by higher vulnerability, reduced access to health care services, lower adherence, biological alterations, use of psychiatric medication, and higher frequency of classic cardiovascular risk factors (smoking, obesity, diabetes mellitus, metabolic syndrome)^{8,19}. A recent autopsy study on 51 patients with schizophrenia indicated that sudden death in those patients was in most cases due to the acute myocardial infarction²⁹. A recent large-scale meta-analysis confirmed that the pa-

tients with severe mental illness are at a significantly higher risk of cardiovascular diseases and related mortality, which is particularly aggravated in the cases with elevated body mass index and use of antipsychotic medication³⁰. Likewise, our study showed a high proportion of cardiovascular diseases as a cause of death; however, there was even a higher prevalence of respiratory diseases compared to cardiovascular ones. This could be, in fact, explained by the same reasons mentioned above, including smoking as a common factor for both respiratory and cardiovascular diseases.

There are several limitations of the study. One of them was that no toxicological analyses were performed since these were the pathoanatomical autopsies. Therefore, in clinical terms, there were no indications of poisoning. On the other hand, since these analyses were not performed, we cannot exclude the possibility that in some of these cases, the blood level of psychiatric or other drugs could have been above the therapeutic level and could have influenced the occurrence of death. The other limitation includes the possible underestimation of the presence of psychiatric diseases in the cases where the autopsy was performed, especially in the patients treated outside the psychiatric hospitals for organic diseases. In such cases, a psychiatric diagnosis might not be included in the history. This way, the psychiatric diagnosis

might have been overlooked, or considered insignificant by the clinicians, especially in cases with mild disorders, neurotic and somatiform disorders (only one such diagnosis was noted in our sample). Therefore, this study practically considered causes of death among the subjects with severe psychiatric illness.

Conclusion

The presented retrospective autopsy study showed that psychiatric patients die prematurely compared to the general population, most commonly due to respiratory and cardiovascular diseases. Our study also indicated that there was probably less accurate and/or less thorough diagnostic processing of somatic diseases in psychiatric patients, especially in specialized psychiatric hospitals. That led to a significant discrepancy between the clinical diagnosis of cause of death and autopsy findings. These findings are in line with a general notion that psychiatric patients have a poor access to quality health care and emphasize that the health care system has to be modified so that it can overcome current insufficiencies in treating these patients. Finally, the autopsy is, and must remain, an important tool in assessing and consequently improving clinical practice in psychiatric patients.

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