# ANALYSIS OF FATALITIES OF HOSPITALIZED PATIENTS OF THE CLINIC FOR MENTAL DISORDERS DR LAZA LAZAREVIC IN 2011 AND 2012

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# **SUMMARY**

Increased mortality rate for patients with mental disorders and their shorter lifespan compared to the general public is stated by numerous authors. Services on the Clinic for mental disorders "Dr Laza Lazarević" were reorganized, by introducing intensive care units - level two, i.e. contemporary intensive care of patients was introduced, only without life support. Primary objective of the research was to determine if the introduction of intensive care to the Clinic led to a statistically significant change in the number of fatal outcomes of hospitalized patients. The research was designed as a cross-sectional study and it included 62 patients that have died while being hospitalized at the Clinic for mental disorders "Dr Laza Lazarević" in Belgrade, in 2011 and 2012. Data were collected by retrospective insight in the histories of illnesses and treatment protocols of the Clinic and institutes for pathology and forensic medicine of the Faculty of Medicine in Belgrade. Obtained data were statistically analysed with Student's T-test and ANOVA test, with a significance level of 0.05. Statistically significant difference was determined in fatalities in 2011 compared to 2012 with p = 0.007, and there were significantly less fatalities in 2012. Statistically significant difference in frequency of fatal outcomes when comparing 2011 to 2012 was determined only when comparing the ward of previous intensive care on one side with the newly established psychiatric intensive care units - level two on the other. High level of significance was determined with p = 0.005. New organizational concept introduced in 2012 has led to more efficient twenty-four-hour care and monitoring of hospitalized patients, suppression of accompanying somatic illnesses which altogether led to a significant reduction of fatal outcomes.

Keywords: Fatalities of psychiatric patients, comorbidity in psychiatry, intensive psychiatric care.

## **INTRODUCTION**

Increased mortality rate in patients with mental disorders and shorter life span compared to general population were mentioned by numerous authors in their studies. The first known epidemiological study of mortality in psychiatric patients was conducted 173 years ago [1, 2]. Many years later, Babigian and Odoroff [3] have analysed the mortality rate of different categories of psychiatric patients in Monroe county in New York and they have determined that it was three times larger than in general population of the same age groups. Similarly, Innes and Millar [4] conducted comparative studies between patients from psychiatric institutions in Scotland and general population and they have determined that psychiatric patients were at two times higher risk of death. Higher mortality rate of psychiatric patients was pointed out in the works of Dembling, Chen and Vachon [5], as well as Hwang [6].

Works of Shepherd [7] and Norris [8], based on comorbidity and causes of death from the middle of last century, show that in that period the most common nonviolent causes of death of psychiatric patients were tuberculosis, malnutrition and communicable diseases. However, increased hygienic and dietary life conditions in stationary psychiatric institutions have shifted the most common nonviolent causes of death towards cardiovascular and respiratory diseases in the last 20 years, and the use of efficient medical screening and prevention of serious somatic disorders reduces the mortality rate and prolongs the lifespan of mentally ill [9,10].

Starting from these facts, in the end of 2011 services at the Clinic for mental disorders "Dr Laza Lazarević" were reorganized, converting the classical intensive care unit with 40 beds into two contemporary intensive care units - level two, with 12 beds each. Wanting to make a realistic assessment of validity of such a move, we have conducted a comparative analysis of fatality at the Clinic in 2011 and 2012.

### THE AIM

- Determining whether there is a statistically significant difference in the number of deceased hospitalized patients in 2011 and 2012.
- Determining the effect of analysed parameters on the level of statistical significance of the difference in the number of hospitalized patients in 2011 and 2012.
- Determine whether the new organization of intensive care level two brought to a statistically significant change in the number of fatal outcomes in patients hospitalized at the Clinic.

#### MATERIAL AND METHODS

Research was designed as a cross sectional study and it included 62 patients hospitalized in the Clinic for mental disorders "Dr Laza Lazarević" in Belgrade, during 2011 and 2012 who have died during their treatment.

In all deceased patients we the following parameters were monitored: year of death, gender and age, number of hospitalizations, ward in which they have died, month of death, primary psychiatric diagnosis, and follow up diagnosis for their release or sending to autopsy and autopsy report.

Data were collected retrospectively by reviewing patients' medical histories and treatment protocols of the Clinic and reviewing autopsy reports of the institutes for pathology and forensic medicine of the Faculty for Medicine in Belgrade.

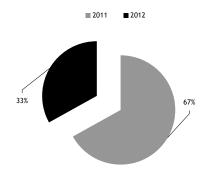
Obtained data were statistically processed with a Student's T-test and ANOVA test, with a significance level of 0.05. Obtained data are presented graphically and in tables.

## **RESULTS**

The research gave us the following results.

Number of fatal outcomes in 2011 was 42 or 67%, while in 2012 there were 20 fatal outcomes or 33% of the total number of deceased in the observed two year period. We have confirmed the difference in fatal outcomes frequency between 2011 and 2012 was statistically significant with p = 0.007, with significantly less fatal outcomes in 2012 (Chart 1).

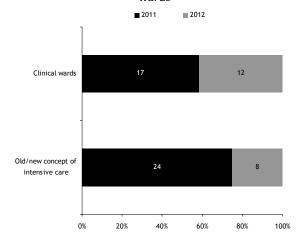
Chart 1. Distribution of patients with lethal outcome by year



Statistically significant difference was confirmed 2011 / 2012 (p=0.007)

Statistically significant difference of fatal outcomes frequency in 2011 compared to 2012 was confirmed only between the previous intensive care unit and new contemporary intensive psychiatric care unit - level two (p = 0.005). There were less fatal outcomes in the new contemporary intensive psychiatric care units - level two (Chart 2).

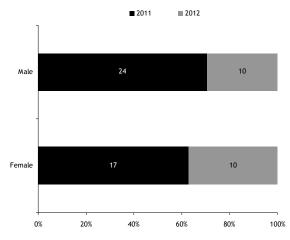
Chart 2. Distribution of patients with lethal outcome by wards



Statistically significant difference in mortalities in previous intensive care of the clinic was confirmed when compared to current intensive care units - level two (p=0.005)

Fatal outcomes were nearly equally distributed in relation to gender for both observed years, so the low level of statistical significance (p = 0.529) clearly indicated that gender did not determine whether the outcome would be fatal (Chart 3).

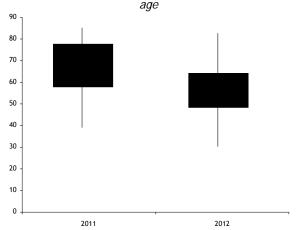
Chart 3. Distribution of patients with lethal outcome by gender



Statistically significant difference was not confirmed (p=0.529)

Average age of all patients in the research was 61.1  $\pm$  12.3 years. The youngest patient was 28, and the oldest 85 years old. Level of statistical significance (p = 0.072) shows that between 2011 and 2012 there is no statistically significant difference in the average age of the deceased patients (Chart 4).

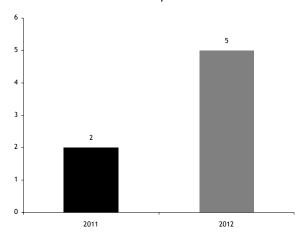
Chart 4. Distribution of patients with lethal outcome by



Statistically significant difference was not confirmed (p=0.529)

Median of the number of hospitalizations with a lethal outcome in 2011 was 2 with the range from one to 69 hospitalizations, and in 2012 median were 5 with the range from one to 14 hospitalizations. Statistical analysis has determined that there is a statistically significant difference in the median of the number of the hospitalizations for the observed years (p = 0.011). Deceased patients in 2012 had significantly higher frequency of hospitalizations (Chart 5).

Chart 5. Distribution of patients with lethal outcome by median number of hospitalizations



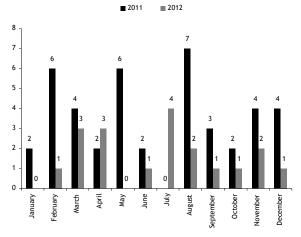
Statistically significant difference between medians was confirmed (p=0.011)

Highest number of fatal outcomes in 2011 was in August, 7 of them or 17.1%, and in 2012 the highest number of fatal outcomes was in July, 4 of them or 20%. Statistical analysis of these results has shown that considerable frequency of fatal outcomes was not a distinct characteristic of any month in the studied years (Chart 6).

In relation to the base diagnosis of those that have died in 2011 and 2012, the highest frequency was registered for diagnosis F20.5, in 6 patients or 14.6% in 2011 and in 7 patients or 35% in 2012. Statistically significant difference was not confirmed for this parameter (Table 1).

Cardiovascular and respiratory diseases were dominant in the follow up clinical diagnoses for patients that have died during the treatment. However, we have not determined statistically significant frequency of any clinical entity during the analysed period, related to these organ systems, that could be singled out as a major risk factor for the lethal outcome (Table 2).

Chart 6. Distribution of patients with lethal outcome in relation to the month of the year



Statistically significant difference was not confirmed

The most common immediate cause of death of our patients was cardiorespiratory insufficiency, shock and pulmonary thromboembolism, which was confirmed by clinical and forensic autopsies. However, as with follow up diagnoses, we have not confirmed a statistically significant frequency of these conditions in either of the analysed years (Table 3).

## **DISCUSION**

Unlike our patients, in whom the distribution of lethal outcomes has not shown a difference in relation to gender that was statistically significant, Politi et al. have shown a higher risk in men (Standardized Mortality Rate SMR = 4.55; 95% Cumulative Incidence CI 4.17-4.97) than in women (SMR = 3.43; 95% CI 3,07-3.83) [11]. Argyropoulos et al. have also shown the statistical dominance in male patients of 67% [12, 13].

The average age of patients in our research was  $61.1 \pm 12.3$  years. Approximately equal average age of the hospitalized patients with fatal outcomes was shown in their work by Argyropoulos et al. (64 years) [12].

The absence of statistically significant difference in average age of the deceased patients in 2011 compared to 2012 rules out the possibility of this factor having an effect on the reduced mortality rate, after the reorganization of the intensive care unit.

Hamer, Stamatakis and Steptoe in their analysis of risk factors for the mortality of hospitalized patients show the medians for the number of hospitalizations to be 2 [13], which is equal to the median of the number of hospitalizations of our patients in 2011. Statistically significant decrease in mortality rate of patients hospitalized in 2012 was a result of intense twenty-four-hour medical care for the patients; not only in psychomotor restlessness but in those with somatic disorders as well, i.e. those with damaged somatic health.

Table 1. Distribution of patients with lethal outcome by psychiatric diagnoses

PSYCHIATRIC DIAGNOSES —	2011		2	012	TOTAL		
	N	%	N	%	N	%	
Delirium	1	2,4	0	0,0	1	1,6	
F 00.9	1	2,4	0	0,0	1	1,6	
F 00.0	1	2,4	1	5,0	2	3,3	
F 01	1	2,4	0	0,0	1	1,6	
F 03	2	4,9	0	0,0	2	3,3	
F 04	1	2,4	0	0,0	1	1,6	
F 06	1	2,4	0	0,0	1	1,6	
F 06.2	2	4,9	1	5,0	3	4,9	
F 06.3	2	4,9	1	5,0	3	4,9	
F 07.9	2	4,9	2	10,0	4	6,6	
F 09	1	2,4	0	0,0	1	1,6	
F 10.3	1	2,4	0	0,0	1	1,6	
F 10.4	5	12,2	1	5,0	6	9,8	
F 10.5	1	2,4	2	10,0	3	4,9	
F 20	2	4,9	0	0,0	2	3,3	
F 20.5	6	14,6	7	35,0	13	21,3	
F 22	2	4,9	2	10,0	4	6,6	
F 25	2	4,9	0	0,0	2	3,3	
F 25.2	0	0,0	1	5,0	1	1,6	
F 29	4	9,8	0	0,0	4	6,6	
F 31	1	2,4	0	0,0	1	1,3	
F 33.2	0	0,0	1	5,0	1	1,3	
F 33.3	1	2,4	0	0,0	1	1,3	
F 70	1	2,4	0	0,0	1	1,3	
F 72	0	0,0	1	5,0	1	1,3	
TOTAL	41	100,0	20	100,0	61	100,0	

Statistically significant difference was not confirmed

Table 2. Distribution of patients with lethal outcome by accompanying clinical diagnoses

CLINICAL DIAGNOSES	2011		2012		TOTAL	
CLINICAL DIAGNOSES	N	%	N	%	%	N
Aethylismus	0	0,0	1	7,7	1	3,1
Alzzheimer	1	5,3	1	7,7	2	6,2
Atherosclerosis generalis	1	5,3	0	0,0	1	3,1
Bezdijagnoze	3	15,8	1	7,7	4	12,5
Bronchopneumonia	2	10,5	1	7,7	3	9,4
Bronhopneumoniafibrinosa	1	10,5	0	0,0	1	3,1
Caplanocellularemetstaticum	1	5,3	0	0,0	1	3,1
Cardiomyopathia	0	0,0	2	15,4	2	6,2
Cardiomyopathia. Morbushepatis	0	0,0	1	7,7	1	3,1
Contentumalienumin I. hypoph., trach. et bronch.	0	0,0	1	7,7	1	3,1
Corpulmonaleacutum	1	5,3	0	0,0	1	3,1
Disordopersonae et disordomorumorgnicum	1	5,3	0	0,0	1	3,1
Emphysema	0	0,0	1	7,7	1	3,1
Emphysema pulmonum	1	5,3	0	0,0	1	3,1
Fracturacostarummultiplices	1	5,3	0	0,0	1	3,1
Fracturatranstrochantericafemorissin.	1	5,3	0	0,0	1	3,1
Haemorrhagia	0	0,0	1	7,7	1	3,1
Hypertensioartherialis	0	0,0	1	7,7	1	3,1
Insufitientiorespiratoria	1	5,3	0	0,0	1	3,1
Morbuscordis	1	5,3	0	0,0	1	3,1
Morbuscordisischemicus	1	5,3	0	0,0	1	3,1
Morbus obstructive pulmonum	0	0,0	1	7,7	1	3,1
Mors naturalis	1	5,3	1	7,7	2	6,2
Oedemapulmonum	1	5,3	0	0,0	1	3,1
TOTAL	19	100,0	13	100,0	32	100,0

Statistically significant difference was not confirmed

In 2011 the highest number of fatal outcomes was in August - 7 or 17.1%, while in 2012 the highest number of fatal outcomes was in July - 4 or 20%. Statistical analysis of these results has not shown a considerable frequency of fatal outcomes to be a distinct characteristic of any month during the studied years.

Increased mortality in patients with severe mental disorders (F20.5 and F29) in both studied years, even

though not statistically significant, speaks of the fact that hospitalised patients should be given attention in monitoring the comorbidities those patients [14]. This was also shown by Valenti et al., stating psychoses as the most common cause of death in their studied populations (SMR = 4.55) [15, 16, 17].

Table 3. Distribution of patients with lethal outcome by autopsy findings

AUTOPSY DIAGNOSES	20	2011		2012		TOTAL	
AUTOPST DIAGNOSES	N	%	N	%	N	%	
Bronchopneumonia	1	5,0	1	7,1	2	5,9	
Bronhopneumoniabill.	1	5,0	0	0,0	1	2,9	
Infarctusmyocardi	2	10,0	0	0,0	2	5,9	
Insufitientiocardiorespiratoria	5	25,0	1	7,1	6	17,6	
Insufitientiocordis	1	5,0	3	21,4	4	11,8	
Insufitientiomyocardi	0	0,0	1	7,1	1	2,9	
Insufitientiorespiratoria	2	10,0	5	35,7	7	20,6	
Ischaemiaac. myocardi	1	5,0	0	0,0	1	2,9	
Masnaembilija	1	5,0	0	0,0	1	2,9	
Mors cardiac subita	0	0,0	1	7,1	1	2,9	
Schock	3	15,0	1	7,1	4	11,8	
Thromboemboliamassivapulmonum	1	5,0	0	0,0	1	2,9	
Thromboemboliapulmonum	0	0,0	1	7,1	1	2,9	
Thromboemboliaramoruma.pulmonalis	1	5,0	0	0,0	1	2,9	
Thrombosis venarumprofundarum cruris	1	5,0	0	0,0	1	2,9	
TOTAL	20	100,0	14	100,0	34	100,0	

Statistically significant difference was not confirmed

Cardiovascular and respiratory system diseases were dominant in follow up diagnoses of our patients, as well as in the works by other authors [15, 18, 19].

Statistically dominant decrease in the number of deaths in 2012 compared to 2011, as well as the lower mortality rate in the newly formed intensive psychiatric care units - level two in comparison to previous treatment concept in intensive care indicates that this reorganization enabled a significantly better twenty-fourhour care for the patients, discovery and treatment of accompanying somatic illnesses, all of which resulted in significant decrease in mortality. Number of fatal outcomes in 2011 was 42 or 67%, while in 2012 there were 20 fatal outcomes or 33% out of the total number of deceased during the studied two year period. We have confirmed statistically significant difference in the frequency of lethal outcomes between 2011 and 2012 with p = 0.007 and with significantly less fatal outcomes in 2012.

## CONCLUSION

This research has proven the following:

In 2012, the number of lethal outcomes in patients treated in the Clinic for mental disorders "Dr Laza Lazarević" lower than in 2011, which was shown to be statistically significant.

High statistical significance was confirmed in reduction of the number of deceased patients in the newly formed intensive psychiatric care units - level two in 2012 compared to the previous concept of intensive care in 2011.

Statistically significant decrease in mortality of patients hospitalized in 2012 was the result of intensive twenty-four-hour medical care provided for patients.

From previous conclusions we can infer that the reorganized intensive psychiatric care in the Clinic in 2012 has led to more efficient treatment of hospitalized patients, as well as to prevention and treatment of accompanying somatic diseases, and the result of that was a significant decrease in the number of fatal outcomes.

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# **SRPSKI**

### ANALIZA SMRTNOSTI HOSPITALIZOVANIH BOLESNIKA U PSIHIJATRIJSKOJ KLINICI DR LAZA LAZAREVIĆ TOKOM 2011. **I 2012. GODINE**

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#### SΔŽFTΔK

Povišenu stopu mortaliteta među pacijentima sa mentalnim poremećajima i kraći životni vek u odnosu na opštu populaciju navode brojni autori. Na Klinici za psihijatrijske bolesti "Dr Laza Lazarević" urađena je reorganizacija službi uvođenjem odeljenja intenzivne nege - nivo dva, tj.uvedena je savremena intenzivna nega bolesnika samo bez podrške aparata. Osnovi cili istraživanja je utvrditi da li je uvođenje intenzivne nege na Klinici doprinelo statistički značajnoj promeni broja smrtnih ishoda hospitalizovanih bolesnika. Istraživanje je dizajnirano po principu studije preseka i njime je obuhvaćeno 62 bolesnika hospitalizovanih na Klinici za psihijatrijske bolesti "Dr Laza Lazarević" u Beogradu od 2011. do 2012. godine, čije je lečenje završeno smrtnim ishodom. Podaci su prikupljani retrospektivnim uvidom u istorije bolesti i protokole na Klinici i institutima za patologiju i sudsku medicinu Medicinskog fakulteta u Beogradu. Dobijeni rezultati statistički su obrađeni Studentovim T-testom i ANOVA testom, na nivou značajnosti od 0,05. Dokazana je statistički značajna razlika učestalosti smrtnih ishoda između 2011. i 2012. godine u zp = 0,007, pri čemu je značajno manje smrtnih ishoda bilo 2012. godine. Statistički značajnu razliku u učestalosti smrtnih ishoda 2011. godine, poređeno sa 2012. godinom, utvrdili smo jedino između odeljenja ranije intenzivne nege, s jedne, i novokoncipiranih odeljenja psihijatrijske nege - nivo dva, s druge strane. Potvrđen je visok stepen značajnost ip = 0,005. Nova organizaciona koncepcija sprovedena 2012. godine doprinela je efikasnijem zbrinjavanju i dvadesetčetvoročasovnom praćenju pacijenata i suzbijanju propratnih oboljenja, što je sve skupa dovelo do znatnog smanjenja broja smrtnih ishoda.

Ključne reči: smrtnost lečenih na psihijatriji, komorbiditet u psihijatriji, intenzivna psihijatrijska nega

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