

IX. SUMMARY

Suicide is defined as deliberate ending of life. Among suicidal behaviours, we can also distinguish between suicidal thoughts that are based on a plan to fulfil the suicidal intention, and those that do not present a tendency of implementation.

The aim of this study was to analyse the level of cognitive functioning of patients with history of suicidal behaviour suffering from depression and schizophrenia, and to evaluate their oxidative stress parameters and selected biochemical parameters on the basis of bloodwork.

The study was conducted among 120 patients hospitalized with depression or schizophrenia in the Department of Psychiatry of the UMB (Medical University of Białystok). The Bioethics Committee of the Medical University of Białystok approved the research (R-I-002/33/2016). Every participant gave their own voluntary and informed written consent. Blood parameters tests were performed in the Diagnostic Laboratory of the University's Clinical Hospital and in the Department of Hygiene, Epidemiology and Ergonomics of the Medical University of Białystok. In the first stage of the study, an M.I.N.I. interview was conducted with each patient to verify the intensification of suicidal behaviour. Based on the scores, the patients were classified into one of four groups: control group displaying no suicidal behaviour (G0); group experiencing suicidal thoughts without a tendency of implementation (G1); group experiencing suicidal thoughts with a tendency of implementation (G2); group after a suicide attempt (G3). The second stage of the study consisted of biochemical blood tests, where concentrations of vitamin D3, B12, folic acid, sodium, potassium, calcium, magnesium, chlorine, total cholesterol, LDL and HDL fractions, TG and metabolites of the oxidative stress pathway were determined. The following concentrations were determined: dityrosine (AUF/mg protein), TOS (nmol H₂O₂ Equiv/mg protein), TAC (umol/mg protein), OSI (TOS/TAC ratio), FRAP (μmol/mg protein), GPx (mU/mg protein), SOD (mU/mg protein) CAT (nmol H₂O₂/min/mg protein), AOPP (nmol/mg protein), NO (nmol/mg protein), GSH (μg/mg protein). The third stage of the study consisted of the participants completing a CogState computerized test to verify their cognitive functioning. The following cognitive functions were assessed: psychomotor drive (DET), metastability of attention (IDN), verbal memory, retrieval of learned material (ISLR) and verbal learning and memory (ISL), visual learning and memory (OCL), processing speed (GMCT), visual memory including deferred retrieval (GMR), executive functions (SETS and GML), working memory (ONB, TWOB).

The obtained results were statistically analysed using the following tests: Shapiro-Wilk and Kruskal-Wallis, where statistically significant results were taken as those where $p < 0.05$. ROC curve analysis was also performed to determine the discriminatory power of the cognitive tests. The cognitive function tests with an ROC value above 60% were selected based on the results.

The obtained results indicate that there was a lower efficiency of metastability of attention (IDN) in the G2K group (women group experiencing suicidal thoughts with a tendency of implementation) as compared to the control group. Also tests evaluating the verbal memory in the deferred playback category (ISLR) indicate that G2K patients made more errors compared to those displaying no suicidal behaviour (G0K). In the same group of patients (G2K) there was also a trend of lower scores on visual memory tests (deferred retrieval - GMR) in relation to the group of patients experiencing suicidal thoughts without a tendency of implementation (G1K). In contrast, in the male research participants, it was observed that psychomotor performance (DET) was lower in the G1M group (experiencing suicidal thoughts without a tendency of implementation) in comparison to the control group (G0M). Meanwhile the tests assessing verbal memory (ISL) indicate more errors in the group with suicidal behavior ($p = 0,055$; G1M, G2M, G3M) as compared to the control group. On the other hand, tests checking deferred verbal memory levels (ISLR) indicate more frequent errors in men in G2M and G3M groups in comparison to the control group. However, there were no statistically significant differences between the study groups in tests testing executive functions or working memory among either women or men.

At the same time, the parameters of oxidative stress were assessed and it was found that the GSH, GPx were reduced in the groups with suicidal behavior (G1K, G2K, G3K), while the concentration of OSI and TOS in these groups was higher compared to the control group (G0K). On the other hand, the concentration of FRAP was lower only in the G2K group compared to the G0K group. It was also observed that oxidative parameters: DT, TOS, OSI were significantly higher in the group of women with "s" thoughts with a tendency to complete (G2K) compared to the group with suicidal thoughts without a tendency to complete (G1K). On the other hand, in the groups with the "s" behavior (G1M, G2M, G3M) in men, it was observed that the parameters of the oxidative stress: GPx and SOD were reduced compared to the control group (G0M). On the other hand, the FRAP concentration indicated a lower concentration in the group with "s" thoughts without a tendency to realize (G1M) compared to the control group - G0M. The analysis of the conducted studies also indicates the

presence of correlations of the oxidative stress parameters with some factors of the cognitive functioning in patients with depression and schizophrenia. In women, it was also observed that with the increase in plasma TOS concentration, the number of the correct responses in the tests assessing visual memory (deferred reproduction - GMR) decreased and the number of errors made in the tests checking verbal memory in the deferred reproduction - ISLR category increased. It was also observed that when the OSI concentration increased, there was a decrease in providing correct answers in the GMR test (visual memory - delayed reproduction) in the group of women. On the other hand, in men, it was shown that with the decrease in the GPx concentration, the number of errors made in tests checking verbal memory - delayed reproduction (ISLR) increased. As well as the fact that psychomotor performance (DET) decreased with the decreasing plasma levels of SOD.

The results of selected blood biochemical tests (vitamins, minerals, lipid metabolism) showed no differences between the men and the women. Only a trend of lower TG concentrations was observed in the group of women with suicidal thoughts (G2K), which could indicate increased fat metabolism, likely related to the perceived psychological stress.

Six conclusions were drawn from the study, indicating differences between men and women suffering from depression and schizophrenia and exhibiting suicidal behaviour in terms of cognitive function and oxidative stress parameters. Possible future studies should be performed on a larger group of subjects consisting of mentally ill patients in order to more accurately verify the development of suicidal behaviour. Moreover, it seems worthwhile to carry out more detailed analyses on two separate groups - patients with depression, and patients with schizophrenia.