

Schizophrenia and its health consequences as a public health problem

Schizofrenia i jej konsekwencje zdrowotne jako problem zdrowia publicznego

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Abstract

Schizophrenia is a disease affecting not only mental but also physical health. In this paper, risk factors and somatic disorders comorbid to schizophrenia have been described. Among them, obesity, hyperlipidemia, metabolic disorder, and increased risk of acute cardiac events associated to preterm death were outlined. Factors connected to improper lifestyle have also been mentioned, i.e., inappropriate diet and insufficient physical activity. Prevalence of metabolic syndrome in patients with schizophrenia is 2–3 times higher when compared with general population. Metabolic syndrome combines clinical and metabolic signs predictive for the increased cardiovascular risk, including visceral obesity, insulin resistance, hypertension, hypertriglyceridemia, and hypercholesterolemia (both high-density-lipoprotein (HDL) and low-density-lipoprotein (LDL) cholesterol). Low intake of vegetables and fiber, and high intake of saturated fats is associated with increased concentration of inflammatory markers such as tumor necrosis factor α (TNF- α), interleukin 6 (IL-6) and C-reactive protein (CRP), which may act as propagators and enhancers of development of metabolic syndrome and atherosclerosis.

Key words: schizophrenia, diet, obesity, metabolic syndrome, lifestyle

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Streszczenie

Schizofrenia jest chorobą, która ma wpływ nie tylko na zdrowie psychiczne, ale także na ogólny stan zdrowia osób, które się z nią zmagają. W pracy omówiono czynniki ryzyka oraz stany chorobowe współtowarzyszące schizofrenii. Należy do nich zwiększona częstość występowania otyłości, zaburzeń gospodarki tłuszczowej, zespołu metabolicznego, jak również ogólnego ryzyka krążeniowego. Zwrócono uwagę także na czynniki ryzyka związane z nieprawidłowym stylem życia, takie jak złe nawyki żywieniowe oraz niewystarczająca aktywność fizyczna. Rozpowszechnienie zespołu metabolicznego wśród pacjentów, u których rozpoznano schizofrenię, jest znaczne. Jest on 2–3 razy częściej rozpoznawany u osób chorych w porównaniu z populacją ogólną. Zespół metaboliczny łączy zbiór nieprawidłowych wyników klinicznych i metabolicznych, które są predykcyjne dla chorób sercowo-naczyniowych. Te nieprawidłowe wyniki obejmują otyłość trzewną, insulinooporność, podwyższone ciśnienie tętnicze krwi, zwiększone stężenie trójglicerydów oraz lipoprotein o małej gęstości (LDL), a zmniejszone stężenie lipoprotein o dużej gęstości (HDL). Niedostateczne spożycie warzyw, owoców oraz błonnika przy jednoczesnym dużym spożyciu tłuszczów nasyconych wiąże się z wysokim stężeniem markerów stanu zapalnego, takich jak czynnik martwicy nowotworów TNF- α , interleukina 6 i białko C-reaktywne (CRP), które mogą przyczynić się do rozwoju albo nasilenia zespołu metabolicznego.

Słowa kluczowe: schizofrenia, dieta, otyłość, zespół metaboliczny, styl życia

The World Health Organization (WHO) reports that over 21 million people worldwide are struggling with schizophrenia. The disease leads, on the one hand, to different degrees of psychosocial disorders and, on the other, to increased health risks and premature death. These issues are important problem areas requiring the development and implementation of public health interventions in this population of patients.

Diagnosis of schizophrenia includes the revised diagnostic criteria of the classification system contained in the *Diagnostic and Statistical Manual of Mental Disorders DSM-V* and the *International Statistical Classification of Diseases and Health Problems ICD-11*. They include the symptoms in 8 dimensions of schizophrenia, i.e.: hallucinations, delusions, speech disorganization, abnormal psychomotor behaviors, negative symptoms, cognitive impairment, depression, and mania.¹ The ICD-11 criteria are helpful in making a diagnosis. According to ICD-11, in order to diagnose schizophrenia, the patient must have one of the following symptoms:

- persecutory or reference delusions;
- auditory hallucinations that either talk to each other about the patient in the third person or regularly comment on his behavior;
- auditory pseudo-hallucinations coming from any part of the body;
- absurd and unusual delusions;
- visualization of thoughts, thought echoes, transmission of thoughts.¹

If none of these symptoms occur, schizophrenia can be recognized by the presence of 2 of such symptoms as:

- coexistence of delusions and hallucinations different from those mentioned above typical for schizophrenia, and the occurrence of overvalued thoughts in exchange for delusions;
- catatonic symptoms;
- negative symptoms (apathy, abulia, alogia, emotional indifference, social withdrawal);

- disturbances in thinking and speech in the form of distractions, breaks, neologisms, and inclusions in the course of thinking.¹

The etiology of schizophrenia is associated with genetic and environmental factors. Genetic predisposition is inherited and the disease is revealed by adverse environmental factors.² It has been found that the risk of developing schizophrenia occurs in people with a specific genetic constitution, which is called schizotaxis. It is believed that there is an endophenotype that causes a defect in neuronal integration in the brains of people with schizotaxis. Endophenotype is a measurable parameter that is not visible to the naked eye and is a link between genotype and disease. A marker that meets the following conditions is considered to be an endophenotype of a mental disorder:

- is associated with a mental disorder in the population;
- is inherited;
- independent of the duration of the disease and the severity of the symptoms;
- that occurs more often in patients and their relatives than in the general population;
- is present more often among sick relatives of patients than in their healthy relatives, and more intensively than in the general population.

There are many endophenotypes in schizophrenia, although one classic endophenotype could not be found. Candidates for endophenotypes in schizophrenia include the following parameters: neurophysiological, neurocognitive, neuroanatomical, and biochemical.²

Biochemical studies show that patients suffer from disorders of 3 very important neurotransmission systems: dopaminergic, serotonergic and glutamatergic. The use of older generation neuroleptics is mainly associated with blocking dopaminergic receptors, which caused many side effects – up to secondary impairment of functioning. On the other hand, new atypical neuroleptics have a stronger affinity for serotonergic receptors. They are

more effective in fighting negative symptoms and reduce the occurrence of side effects.²

Environmental risk factors for schizophrenia include the use of psychoactive substances such as cannabinoids or stimulants (amphetamine and its derivatives). The use of cannabinoids is a risk factor for schizophrenia and is not only related to the treatment of the prodromal symptoms of this disease. When used during adolescence, they double the risk of developing this disease.^{3,4} In another aspect, the appearance of prodromal, i.e., early symptoms of schizophrenia, can cause a desire to use cannabis and hashish as a form of self-medication for subtle psychopathological disorders.² This applies in particular to the patient's fight against feelings of indifference and schizophrenic anhedonia, as well as with negative symptoms of schizophrenia affecting the psychosocial functioning of patients, which include apathy, abulia, mating disorders and withdrawal, and various degrees of cognitive and executive functions impairment.²

Social and environmental factors also have an impact on schizophrenia. It was found that living in a large urban agglomeration affects the incidence of schizophrenia. The risk of disease is 1.5 times higher for people living in urbanized environments, and for people who belong to less urbanized environments, the risk of disease is significantly lower.⁵

According to the neurodevelopmental concept of schizophrenia, the process disrupting normal brain development in the fetal, perinatal and postnatal period is important in the pathogenesis of the disease. The cause is viral and bacterial infections during pregnancy, especially during the period of development of central nervous system structures (2nd and partly 3rd trimester of pregnancy). Other factors of lesser risk include pregnancy complications: diabetes mellitus, bleeding during pregnancy, serological conflict, premature birth, and low birth weight of newborns.⁶

Psychosocial stress acts as a trigger and modifier of the disease. It has also been shown that relapses of schizophrenic psychoses are much more common in patients exposed to family stress.²

People with schizophrenia are at greater risk of obesity, hyperlipidemia, diabetes, ischemic heart disease, and stroke. The standard mortality rate from natural causes such as cardiovascular disease and diabetes mellitus is also significantly higher in patients diagnosed with schizophrenia. This is related to diet, lifestyle, medication intake, and physical activity.³

Excessive body weight is a very common problem faced by people with schizophrenia.⁷ Excessive visceral fat is much more common. Recent studies indicate a link with environmental factors and gender (male).⁸ Pharmaceuticals used and disease experience are of paramount importance. They can contribute to the development of excessive appetite. Hyperphagia, on the other hand,

can lead to the development of obesity with its serious consequences. The factors exacerbating the problem of overweight of patients are sensations that accompany schizophrenia. These include: depression, fear of severity or recurrence of disease symptoms, mental suffering, and reduced physical activity. As a result, people who are ill are willing to reward themselves by smoking, eating food of different quality, as well as by using other stimulants.⁹

The metabolic syndrome combines a set of abnormal clinical and metabolic results that are predictive for cardiovascular diseases. These abnormal results include visceral obesity, insulin resistance, increased blood pressure, increased levels of triglycerides and LDL lipoproteins, and reduced concentration of HDL lipoproteins. The prevalence of metabolic syndrome among patients diagnosed with schizophrenia is significant. It is diagnosed 2–3 times more often in them than in the general population.^{9,10}

The disease itself does not contribute to the development of metabolic syndrome – it is the result of a combination of congenital biological risks with lifestyle factors and metabolic antipsychotic treatment.⁸ Neuroleptic appetite enhancers such as clozapine, olanzapine, and less frequently quetiapine, aripiprazole or risperidone, poor diet, sedentary lifestyle, smoking, alcohol abuse, and other stimulants are considered.⁹

As a result, patients are observed to have lipid and carbohydrate disorders. The patients have high blood glucose and LDL level. Low physical activity, lack of motivation and social withdrawal due to negative symptoms of schizophrenia promote bad health habits.¹⁰ The diet of people with schizophrenia is rich in saturated fats with significantly low intake of dietary fiber, vegetables and fruit. The use of such a diet contributes to the development of a metabolic syndrome or the deterioration of existing metabolic disorders.^{11,12}

Insufficient consumption of vegetables, fruit and fiber with high saturated fat intake is associated with high concentration of inflammatory markers such as tumor necrosis factor α (TNF- α), interleukin 6 (IL-6) and C-reactive protein (CRP), which may contribute to the development or exacerbation of metabolic syndrome. This is harmful to schizophrenic patients who are more likely to experience oxidative stress, high levels of pro-inflammatory cytokines and metabolic abnormalities at the onset of the disease.^{9,10}

In patients suffering from schizophrenia, low concentration of polyunsaturated fatty acids is observed in the diet and their metabolism is abnormal. As a result of oxidative stress, polyunsaturated fatty acids are lost and their content in neuronal membranes is reduced. Insufficient coverage of fatty acids leads to a higher risk of suicide and cardiovascular disease. This is due to, among other things, insufficient fish intake by schizophrenic patients.^{13,14}

Abnormalities in the supply of micro- and macroelements also appear in patients. The study showed an increased copper content in plasma at reduced concentrations of iron and manganese.^{15,16}

Physical activity of people suffering from schizophrenia is limited compared to the general population. Patients show little physical activity and lack of involvement in sport. Only less than half of the patients participating in the study declared physical activity. The most common forms were: walking, cycling and running.¹⁷

Special attention should be paid to patients' eating habits and the nutrients provided. Proper selection of nutrients can reduce the symptoms of comorbidities and support the treatment of schizophrenia, reducing somatic burden and the risk of premature death. Creating an environment conducive to and stimulating pro-health attitudes of people with schizophrenia, but also their psychophysical activation and psychoeducation, should be one of the important public health priorities for macro-regional and local health policy.^{17,18}

In conclusion, public health actions should cover a fairly broad area of psychosocial interventions.

Mental health promotion activities should cover also pregnant women in order to minimize the risk of infections, pregnancy-related diseases and perinatal complications.

Rehabilitation and activation activities include encouraging and motivating patients to various forms of physical activity, but also their intellectual and emotional stimulation. Properly conducted forms of training in schizophrenia contribute to reducing negative symptoms and improving cognitive functions.¹⁹

There is also a strong need for psychoprophylaxis and psychoeducation of adolescents to prevent the use of psychoactive substances, for health-oriented activities concerning various correct mental and physical hygiene habits, as well as for minimizing stress and dealing with it.

Another area is counteracting the environmental stress of densely populated and urbanized areas by creating friendly places for rest, relaxation and active leisure in the urban area.

For the implementation of activities related to the organization of time of people suffering from schizophrenia, health promoters and educators working with specialists in the field of physical and mental health, as well as dietetics and physiotherapy seem to be increasingly needed. It is also necessary for professionals working in areas connected to health to acquire practical skills enabling creation of pro-health activities at the local and regional level.

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References

- Bucci P. Rozwój rozdziału ICD-11 dotyczącego zaburzeń psychicznych – aktualizacja dla członków WPA. *Psychiatr Pol.* 2014;48(2):401–402. http://www.psychiatriapolska.pl/uploads/images/PP_2_2014/401Bucci_PsychiatrPol2_2014.pdf. Accessed on October 25, 2019.
- Rybakowski J, Pużyński S, Wciórka J. *Psychiatria: Tom 2 – psychiatria kliniczna*. Wrocław, Poland: Elsevier Urban & Partner; 2011.
- Murray RM, Englund A, Abi-Dargham A, et al. Cannabis-associated psychosis: Neural substrate and clinical impact. *Neuropharmacology.* 2017;124:89–104. doi:10.1016/j.neuropharm.2017.06.018
- Renard J, Krebs MO, Le Pen G, Jay TM. Long-term consequences of adolescent cannabinoid exposure in adult psychopathology. *Front Neurosci.* 2014;10(8):361. doi:10.3389/fnins.2014.00361
- Colodro-Conde L, Couvy-Duchesne B, Whitfield JB, et al. Association between population density and genetic risk for schizophrenia. *JAMA Psychiatry.* 2018;75(9):901–910. doi:10.1001/jamapsychiatry.2018.1581
- Liu CH, Keshavan MS, Tronick E, Seidman LJ. Perinatal risks and childhood premorbid indicators of later psychosis: Next steps for early psychosocial interventions. *Schizophr Bull.* 2015;41(4):801–816. doi:10.1093/schbul/sbv047
- Lech M, Ostrowska L. Otyłość u pacjentów ze schizofrenią. *Forum Zab Metabol.* 2015;6(3):103–111. https://journals.viamedica.pl/forum_zaburzen_metabolicznych/article/view/44022/33732. Accessed on October 25, 2019.
- Abou Kassam S, Hoertel N, Naja W, et al; CSA Study Group. Metabolic syndrome among older adults with schizophrenia spectrum disorder: Prevalence and associated factors in a multicenter study. *Psychiatry Res.* 2019;275:238–246. doi:10.1016/j.psychres.2019.03.036
- Mitchell A, Vancampfort D, Sweers Kim, van Winkel R, Yu W, De Hert M. Prevalence of metabolic syndrome and metabolic abnormalities in schizophrenia and related disorders: A systematic review and meta-analysis. *Schizophr Bull.* 2013;39(2):306–318. doi:10.1093/schbul/sbr148
- Bly M, Taylor S, Dalack G, et al. Metabolic syndrome in bipolar disorder and schizophrenia: Dietary and lifestyle factors compared to the general population. *Bipolar Dis.* 2014;16(3):277–288. doi:10.1111/bdi.12160
- Scheewe TW, Jörg F, Takken T, et al. Low physical activity and cardiorespiratory fitness in people with schizophrenia: A comparison with matched healthy controls and associations with mental and physical health. *Front Psychiatry.* 2019;10:87. doi:10.3389/fpsy.2019.00087
- Simonelli-Munoz A, Fortea M, Salorio P, Gallego-Gomez JI, Sánchez-Bautista S, Balanza S. Dietary habits of patients with schizophrenia: A self-reported questionnaire survey. *Int J Ment Health Nurs.* 2012;21(3):220–228. doi:10.1111/j.1447-0349.2012.00821.x
- Groszewska K, Suchecka D, Preś J, et al. Postępowanie żywieniowe w schizofrenii. *Post Psych Neurol.* 2015;24(3):128–136.
- Perica MM, Delas I. Essential fatty acids and psychiatric disorders. *Nutr Clin Pract.* 2011;26(4):409–425. doi:10.1177/0884533611411306
- Dipasquale S, Pariente CM, Dazzan P, Aguglia E, McGuire P, Mondelli V. The dietary pattern of patients with schizophrenia: A systematic review. *J Psychiatr Res.* 2013;47(2):197–207. doi:10.1016/j.jpsychires.2012.10.005
- Tsuruga K, Sugawara N, Sato Y, et al. Dietary patterns and schizophrenia: A comparison with healthy controls. *Neuropsychiatr Dis Treat.* 2015;11:1115–1120. doi:10.2147/NDT.S74760
- Ratliff JC, Palmese LB, Reutenauer EL, Liskov E, Grilo CM, Tek C. The effect of dietary and physical activity pattern on metabolic profile in individuals with schizophrenia: A cross-sectional study. *Compr Psychiatry.* 2012;53(7):1028–1033. doi:10.1016/j.comppsy.2012.02.003
- Vancampfort D, Probst M, Scheewe T, Sweers K, Knapen J, De Hert M. Lack of physical activity during leisure time contributes to an impaired health related quality of life in patients with schizophrenia. *Schizophr Res.* 2011;129(2–3):122–127. doi:10.1016/j.schres.2011.03.018
- Falkai P, Malchow B, Schmitt A. Aerobic exercise and its effects on cognition in schizophrenia. *Curr Opin Psychiatry.* 2017;30(3):171–175. doi:10.1097/YCO.0000000000000326