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Research Article

Examining The Potential For Varying Metabolic Reactions To Dietary Modifications And Eating Behavior Shifts In Female Schizophrenia Patients.

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Abstract

Schizophrenia patients are especially vulnerable to metabolic diseases, obesity, and overweight. The purpose of this study was to evaluate how eating habits, permitted dietary modifications, and altered nutrition regimens affected the metabolism of carbohydrates and fats. Methods: 52 inhabitants of a 24-hour social welfare home for people with severe mental illnesses participated in this three-year study. Dietary adjustments included altering the sources of essential nutrients and harmonizing the diet's energy and nutritional value. In addition to body composition, anthropometric (body weight, waist circumference, hip circumference) and metabolic (concentrations of glucose, triglycerides, total cholesterol, and its HDL and LDL fractions) parameters were tracked. Results: Nutrition supervision and diet modification led to positive changes in the parameters tracked in nearly all of the individuals, including 12 female patients with schizophrenia.

Keywords: *blood markers, anthropometric parameters, schizophrenia, diet, and individual responses.*

INTRODUCTION

Numerous studies have demonstrated that people with schizophrenia are particularly prone to being overweight or obese, which leads to a variety of problems, including dysregulation of the neuroendocrine system, which is further exacerbated by antipsychotic drugs used to treat schizophrenia [1,2]. Numerous metabolic conditions, including as insulin resistance, type 2 diabetes, dyslipidemia, and associated cardiovascular illnesses and early mortality, are linked to this [3]. Therefore, it is crucial that fundamental metabolic and anthropometric parameters be tracked when treating schizophrenia and that patients get education on healthy eating, controlling body weight, and engaging in physical activity.Therefore, it was determined to look into whether nutritional supervision and a dietary adjustment that is approved by the residents of social welfare homes would improve certain anthropometric and metabolic markers of the health status of the mentally ill residents under study, including those who have schizophrenia. Despite the medications taken and various metabolic conditions related to the primary disease that the resident experienced, it was assumed that the improvement in their diet composition would be reflected in the improvement of their anthropometric and metabolic parameters, as evidenced by literature data [1–3]. Friedrich et al.'s articles [4–7] contained the findings of the investigations that were carried out.

RESOURCES AND PROCEDURES

All 52 residents of a 24-hour social welfare home (SWH) for people with chronic mental illnesses participated in this three-year study. Thirteen males aged 59.2 ± 12.5 (27–80) and eighteen women aged 64.0 ± 12.5 (27–80) who had been residents of SWH for at least four years made up the study group. Living in a social welfare home where the study was carried out, giving the resident's or their legal guardian's voluntary agreement, and having a diagnosed mental disorder were all requirements for inclusion. Exclusion criteria include: inability to participate in the study due to

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mental (no contact with the resident), physical (disability to participate in anthropometric and biochemical tests), or lack of consent from the resident or legal guardian. The diet's energy and nutritional value were balanced suitably for gender and age, taking into account the primary illness and comorbid conditions, and the sources of basic nutrients (proteins, carbohydrates, and lipids) were changed to more highly recommended or health-promoting ones. Red meat and pork sausages were drastically cut out of the diet in favor of fish and poultry, while cottage cheese and natural probiotic yoghurts were used in place of full-fat dairy products. Whole-grain items with a low glycemic index were used in favor of products with high glycemic index that contained purified and processed complex carbs.Monounsaturated and n-3 polyunsaturated fatty acids were substituted for lipids that contain trans fatty acids, saturated fatty acids, and high levels of n-6 polyunsaturated fatty acids.

The diet was expanded to include more seasonal fruits and herbs, vegetables (particularly naturally fermented vegetables), and choline sources. The diet was reduced to include less highly processed foods and less kitchen salt and sucrose added to food. The methods of cooking were modified to be more health-promoting (baking or stewing were used in place of frying). The works by Friedrich et al. [4,5] provide a thorough explanation of the modifications. In the morning, anthropometric measures were taken using the traditional Martin approach. Body weight was calculated using a RADWAG WPT 200.0 medical scale (accurate to 0.1 kg), waist and hip circumferences were measured with a Gulick anthropometric tape (accurate to 1 mm), and body height was measured with an SECA 215 stadiometer (precise to 0.1 cm). WHR (waist to hip ratio) was computed using the formula WHR = waist circumference (cm)/hip circumference (cm); WHtR (waist to height ratio) was computed using the formula WHtR = waist circumference (cm)/height (cm); and BMI (body mass index) was computed using the formula BMI=bodyweight (kg)/height (m)2. Additionally, a body composition test was conducted that same day. The non-invasive bioimpedance method was used to make the measurement. The majority of the people under observation exhibited greater or lesser positive changes; however, three female patients with schizophrenia, sisters ages 59, 62, and 64, reacted differently to the altered nutrition regimen and diet than the other twelve women with schizophrenia, who were all 61.7 ± 10.9. The present authors were alerted to a varied response by the carbohydrate–lipid metabolism data of the three female patients, even though the nutrition regimens and food purchases were the same for all of the patients [6].The Shapiro-Wilk test verified the normal distribution of the findings from 12 women, Levene's test verified the homogeneity of variance, and Student's t-test for paired samples ($p < 0.05$) was used to determine significance. The nonparametric Wilcoxon signed-rank test at $p \leq 0.05$ was used for statistical analysis of the findings obtained in the group of three women because the small size of the group made it impossible to validate the homogeneity of variance and normality of distribution. The software utilized was Statistica® 12.0 (TIBCO, Palo Alto, CA USA).Risperidone was the only drug administered to the three girls during the study period. Olanzapine (3 patients), clozapine (5), olanzapine + clozapine (1), haloperidol (1), quetiapine (1), and perazine (1) were used to treat the remaining 12 female patients with schizophrenia. The most commonly prescribed additional medications were anti-hypertensive (Tisercin, Conor 5, Avedol) and anti-anxiety and stress-relieving (Lorafen, Relanium, Hydroxyzine).

TALK

Schizophrenia and the medications used to treat it have an impact on the body's metabolism and may be considered a risk factor for heart disease. This accounted for the significance of the diet-adjusted lowered glucose concentration in this investigation; in 12 female residents with schizophrenia, it was accompanied by decreased TG, TC, and LDL-C concentrations as well as an enhanced HDL-C concentration [4]. However, in the three female patients covered in this research, the lowered glucose concentration was followed by increasing TG (originally extremely low), TC, and LDL-C concentrations, as well as a decreased HDL-C concentration. As a result, it was discovered that the risk indicators for cardiovascular disorders rose in three of the sisters under study, but fell in the remaining twelve. The three women's recorded values before their diet change were within the acceptable ranges for females, but after the change, their values climbed and were either near or over the acceptable ranges. This suggests that the three women are at risk for sclerosis and metabolic syndrome, especially given their high BMI, WC values that are below 80 cm, and body fat tissue content.

Carbohydrate-lipid metabolism problems are more than twice as common, according to numerous research. in individuals with schizophrenia compared to the general population [10]. Additionally, it has been hypothesized that there may be a hereditary component to both schizophrenia and cardiovascular disorders [11]. Furthermore, several antipsychotic medications, especially olanzapine and clozapine, support type 2 diabetes and abnormalities of the metabolism of carbohydrates and fats [1,12]. It has been proposed that the medications work by, among other things, preventing the metabolism and transport of glucose into cells.By altering the structure of the cell wall and the activity of the insulin receptor, saturated fatty acids (FAs) promote the development of problems related to glucose metabolism and may be the cause of insulin resistance. Among other things, the diet change included cutting off saturated fats

and substituting polyunsaturated fats (found in fatty fish, olive and rapeseed oils). Therefore, the observed drop in blood glucose levels in the women under investigation may have been caused by enhanced cell insulin sensitivity as a result of their decreased consumption of saturated fats following dietary modification [16]. Reduced consumption of simple carbohydrates, decreased dietary glycaemic load, increased consumption of components involved in proper carbohydrate–lipid metabolism, and a regular meal schedule (2.5 hours between meals) must have also played a significant role in the decline in glucose concentration [4]. Medium-and long-chain FAs typically function as ligands of the GPR120 receptor [16,17], but new study indicates that patients with schizophrenia metabolize FAs in a different way [18]. It has been discovered that the blood serum FA concentration in these patients is disassociated from the GPR120 receptor, which may be the consequence of GPR120 insensitivity. According to the research, the synthesis of the GPR120 protein is influenced by both genetic and environmental factors; polymorphisms in the GPR120 gene may prevent the protein from being synthesized. Vestmar et al. [19] noticed this impact in the Danish population they looked at. They came to the conclusion that, in comparison to people without the mutation, those with the R27OH variation of the GPR120 gene had 70% less GPR120 receptor expression.

Is it plausible that the three women's altered GPR120 receptor polymorphism led to a much greater impairment of its function than in the other schizophrenia-afflicted women? The fact that GPR120 suppresses lipolysis [20], which was shown to be very intense in the sisters under examination, as seen by the alterations in their WC, HC, and body composition, may suggest that such a mechanism may be involved. Nevertheless, why are endogenous FAs utilized to alter lipoprotein biosynthesis? As of right now, there is no proof that GRP120 has a direct impact on the blood lipid profile. Nevertheless, since the receptor protein's anti-inflammatory qualities have been demonstrated in multiple investigations [17].

However, it appears likely that the three women's glucose concentration decline was due to dietary changes rather than the GPR120 receptor protein's involvement, given the potential that changes in their GPR120 receptor polymorphism led to a stronger weakening of the receptor's function than that of the other schizophrenia patients. Research on the protein's function in carbohydrate metabolism has produced conflicting results. While one study found that tissue insulin sensitivity, insulin resistance, and glucose tolerance are unaffected by the receptor's genotype [21], other studies found a linear inverse relationship between the protein's blood content and HOMA-IR [22]. Only once in their extensive experience with dietary changes and their positive impacts on the metabolism of carbohydrates and fats did the current authors experience a response that was not what they had anticipated. Some women with mammary cancer experienced this, as they showed higher concentrations of TG, TC, and LDL-C, lower concentrations of HDL-C, and higher concentrations of estradiol when compared to other similarly affected patients receiving identical dietary adjustments and a statistically significant decline in glucose concentration [24].

Given that breast cancer is categorized as a genetic illness along with tumors that are dependent on hormones and food, this result was deemed highly unfavorable. Even though research on GPR120's involvement in cancer is still in its early stages, there is a positive link between fat intake.Schizophrenia is a severe, long-lasting illness that is challenging to cure. Additionally, it is commonly linked to obesity and a variety of metabolic abnormalities that are exacerbated by the antipsychotic medications used to treat it. Therefore, a nutritional component should be included in an effective therapeutic strategy for schizophrenia in addition to pharmacological treatment. In addition to its fundamental role, a healthy diet can lessen or even eliminate symptoms of anxiety, depression, agitation, or violence, among other things [7].

Equally essential, especially for women, is the possibility that excessive fat formation might be avoided with the right food composition.Dietary changes had the exact opposite effect on the three sisters with schizophrenia who were the subject of this discussion.

This demonstrates that the lack of intended benefits is not necessarily the result of the patient's lack of dietary control. The absence of positive metabolic changes during walk-in therapy, when there is no way to track the patient's eating patterns, may cause the doctor to question the patient's credibility. At the same time, the patient may feel a range of negative emotions and be deterred from following a sensible diet.

FINAL THOUGHTS

After analyzing the data, we were able to draw the conclusion that while dietary changes in people with schizophrenia can have a good metabolic impact, individual responses may differ because of underlying physiological and genetic factors.

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