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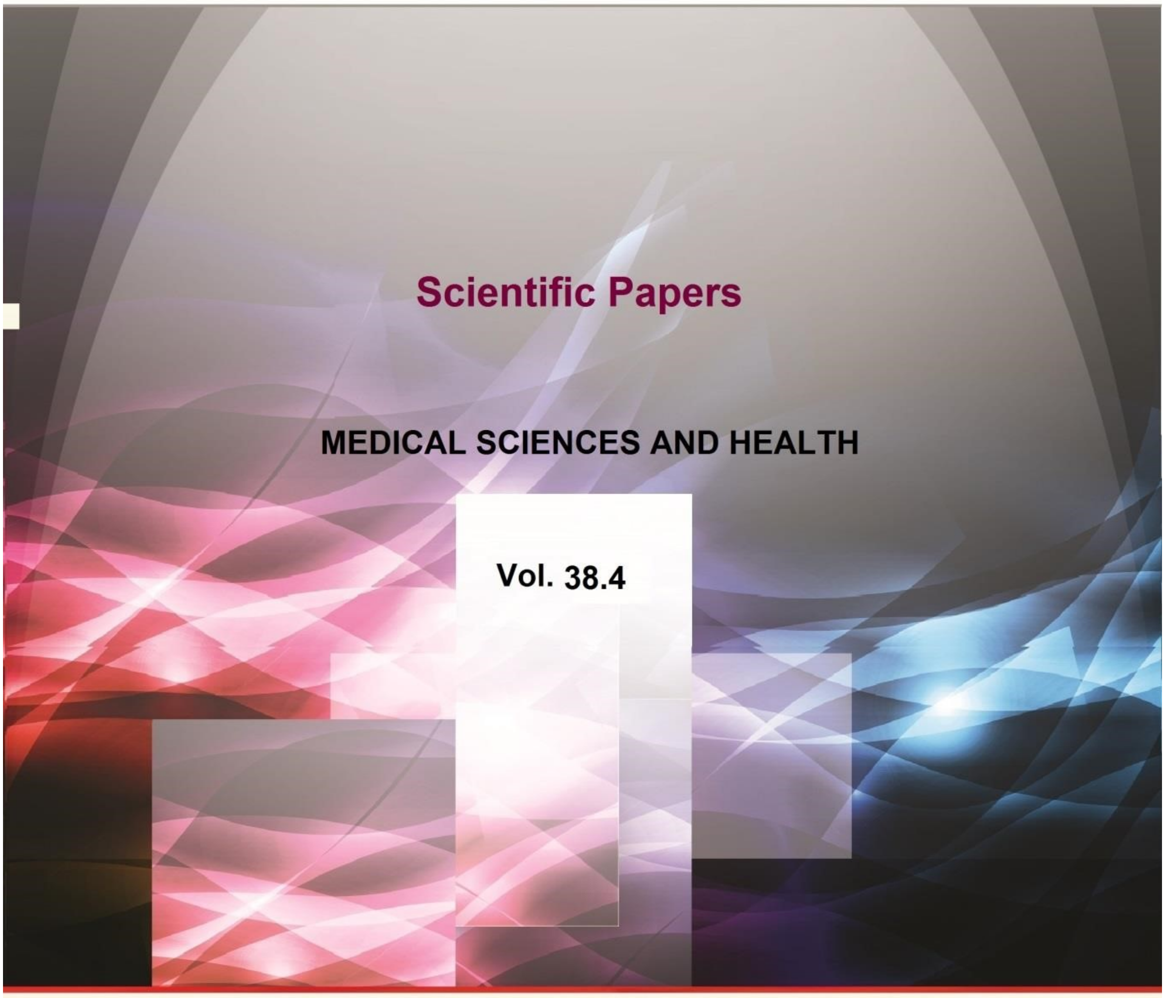

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DEPRESSION AND DIABETES

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Abstract: Introduction: Some researchers suggest that people with depression are more likely to develop diabetes. The **AIM** of this study is determinate the effects of SSRIs antidepressant in depressive patients with diabetes mellitus . **Methods**: The study was designed as observation cross-section including 80 depressive patients with diabetes, observed as two groups. The first group was presented patients without antidepressant medication in them (the patients who starting in the treatment), and the second group were patients with antidepressant therapy (sertraline). Depression status was assessed using BDI. Quantitative determination of glucose level in serum was performed with enzymatic reference method with hexokinase. **Results** : There was significant differences in distribution on according the level of blood glucose in observed groups. . In the first group 58% of patients have high level of blood glucose but in second group only 20% of them.. Data obtained in the first groups show significant positive correlation between score of BDI and blood glucose level. P=0,003. The results in examination groups show positive correlation between blood glucose level and socio-demographic and clinical parameters. **Conclusion** : The results obtained in our study showed high blood glucose levels in depressant patients but treatment with sertraline was diminished this level. So screening this condition is important, because that patients shoved be treated differently.

Keywords: patients, depression, diabetes mellitus, therapy

1. INTRODUCTION

According to the International Diabetes Federation diabetes is one of the largest global health emergencies of the 21 st century (1). Also depression is a common and very serious disease with lifetime prevalence ranging from approximately 11% and low-income countries to 15% in high-income counties (2). There is evidence that prevalence of depression is moderately increased in pre diabetic patients and in undiagnosed diabetic patients, and markedly in creased in the previously diagnosed diabetic patients compared to normal glucose metabolism individuals (3). So some studies show that depression occurrence is two to three times higher in people with diabetes mellitus, the majority of the case remaining under-diagnosed. Some researchers suggest that this could be due to diabetes metabolic effects on brain as well as the toll day to day management can take. It is also possible that people with depression are more likely to develop diabetes (4). Although the psychological burden of diabetes may contribute to depression, this explanation does not fully explain the relationship between these 2 condition. Both condition may be driven by shared underlying biological and behavioral mechanisms, such as hypothalamic-pituitary-adrenal axis activation, inflammation, sleep disturbance, inactive lifestyle, poor dietary habits and environmental and cultural risk factors. (5). Also chronic stress activates the hypothalamus-pituitary-adrenal axis and the sympathetic nervous system , increasing the production of cortisol in the adrenal cortex and the production of adrenalin and noraderenalin in the adrenal medulla (6). Chronic hypercortisolemia and prolonged SNS activation promote insulin résistance, visceral obesity and lead to metabolic syndrome and diabetes mellitus (7). On other hand it is though that alteration in brain chemistry tied to diabetes may be related to the development of depression. For example, damage resulting from diabetic neuropathy or blocked blood vessels in the brain may contribute the development of depression in people with diabetes (4). Conversely, changes in the brain due to depression may cause an increased risk for diabetes complication. Some study found that people with diabetes and depression often have higher blood sugar levels (2). Additionally the results of another study suggested that people who have both conditions are 82 percentage more likely to experience a heart attack (5) .On another hand poor diabetes management can also prompt symptoms similar to those of depression If the blood sugar is too high or too low, people may experience increased feeling of anxiety, restlessness, or low energy. Low blood sugar levels can also cause people to feel shaky and sweaty, which are symptoms similar to anxiety (3). It is also possible that people with depression are more likely to develop diabetes. Because of this , it is recommended that people who have a history of depression be screened for diabetes(7).

2. AIM

The AIM of this study is determinate the effects of SSRIs- antidepressant in depressive patients with diabetes mellitus

3. MATERIALS AND METHODS

The patients of this cross-section study were examination in the Private Psychiatric Ambulance "Zora Mitic" and Psychiatric Hospital Skopje during 2019 years. The study was approved by the regional ethics committee for research. All participants gave written consent. We evaluated prevalence of diabetes mellitus in 80 patients with depression. The patients were observed in two groups. The first groups was presented with patients without antidepressant medication in them only detection the depression and diabetes mellitus (the patients who starting in the treatment). The second group consisted patients with antidepressant therapy (SSRIs__sertraline) and diabetes mellitus. For the collection of data we use medical documentation (history of illness and outpatient diary) The socio-demographic data were collected by structural questionnaire . All the patients followed criteria for depression. Criteria for elimination was: chronic liver or renal diseases, HIV diseases or active infection .All the patients there followed by routine medical examination, with included blood chemistry , urinoanalisis to determinate the serology for hepatitis and HIV infection. . Blood samples of patients were obtained the morning between 9,00-11,00 H in the University Institute of Clinical biochemistry Skopje. The glucose plasma levels were assayed using the Enzymatic reference method with hexokinase. Hexokinase catalyzes the phosphorylation of glucose to glucose-6-phosphate by ATP. Glucose-6-phosphate dehydrogenase oxidizes glucose-6- phosphate in the presence of NADP to gluconate-6-phosphate. No other carbohydrate is oxidized. The rate of NADPH formation during the reaction is directly proportional to the glucose concentration and is measured photometrically. The normal range of glucose level was 3,5-6,1 mmol/l. To determinate exactly results of plasma glucose l levels we use QS of the BIORAD . Depression was assays with Beck Depression Inventory (BDI) considerate with 21 items. The score BDI ≥10 determinate depressive symptoms. The results were an analyzed statistically using; descriptive methods, t-test for independent simplex and the Pearson coefficient of linear correlation The statistical test were considered significant at the level $p \leq 0,05$.

4. RESULTS

Our study included two groups of patients with depression (BDI ≥ 10). There was significant differences in distribution on according the level of blood glucose in observed groups. (Table 1). In the first group 58% of patients have high level of blood glucose but in second group only 20% of them.

Table 1. Distribution of depressive patients in examination groups according their blood glucose levels

Level of blood glucose	Group 1 (N=41)		Group 2 (N=39)		P level
	N	%	N	%	sig
normal	18	42	30	80	
high	23	58	9	20	
low	0	0	0	0	

Data obtained in the first groups show significant positive correlation between score of BDI and blood glucose level. (Table 2)

Table 2. Correlation between score of BDI and blood glucose level in examination groups.

Parameters Score BDI/ Blood glucose level	p-spearmen koeficient	P valvule
Group A	P=0,365	0,003
Group B	P= 0,290	0,098

The results in examination groups show positive correlation between blood glucose level and socio-demographic and clinical parameters. (Table3,4).

Table 3. Correlation of the socio-demographic and clinical parameters with blood glucose level in the first examination group.

Parameters	p-Spearmen coefficient	p valvule
Gender (female)	0,350	0,002
Age	0,070	0,082
Smoking	0,274	0,062
Physical activity	0,211	0,003
Stress	0,075	0,081
BMI	0,325	0,009
Marital status (single)	0,071	0,089
Education	0,285	0,095

Table 4. Correlation of the socio-demographic and clinical parameters with blood glucose level in depressant patients after three mount of SSRIs (sertraline) therapy (second group) .

Parameters	p-Spearmen coefficient	p valvule
Gender(female)	0,356	0,032
Age	0,295	0,096
Smoking	0,552	0,004
Physical activity	0,301	0,061
Stress	0,215	0,095
BMI	0,604	0,002
Marital status (single)	0,065	0,074
Education	0,360	0,002

5. DISCUSION

The association between mental illness and diabetes has recognized for many years (8). In the 17th century, Thomas Willis, the famous anatomic and founding member of the Royal Society, described how " diabetes is a consequence of prolonged sorrow" (9) . In our study we got that 58% of depressant patients in the first group and only 20 % in second group have high level of blood glucose . This results correlate with another study who reported that twenty-nine percent of male and 30,5% of female participants with depression had diabetes mellitus (10) . This results also correlate with another studies who suggested that rates of depression are also elevated in either type 1 or type 2 diabetes with prevalence rates ranging from 9%-26% (11). Significant depressive symptoms affect approximately 1 in 4 adults with type 1 and type 2 diabetes, where a formal diagnosis of depressive disorders is made in approximately 10%-15% of people with diabetes (12). As observed by Thomas Willis, epidemiologic studies have demonstrated that the association between depression and diabetes is be-directional (13,14). A meta-analysis of 9 cohort studies found that adults with depression had 37% increased risk of developing type 2 diabetes (15) after according for factors common to both disorders including sex, body mass index, and poverty. Also both disorders some researches reported that common especially in women (10). This findings correlate with results in our study we got that 65 % in the first groups and 55% in the second groups of patients were women.

In both examination groups we got positive correlation between blood glucose level and socio-demographic and clinical parameters (smoking, physical activity, stress, BMI, marital satus and education (table3,4). This results correlate with another studies who reported that in additional , there a number of diabetes specific risk factors associated with depression.General population risk factor for depression, including female sex, marital status, childhood, adversity and social deprivation also apply to people with diabetes. (16,17). Lifestyle factor are hypothesized to play a role in priming or reinforcing the co morbidity of depression and diabetes. For example, people with depression are more likely to be sedentary and eat diets that are rich in saturated fats and refined sugar while avoiding fruit and vegetables , which may contribute to the risk of developing diabetes (18,19).Both conditions (depression and diabetes) is also associated with premature mortalility through a range of physical conditions (20) blood pressure lipids, body mass index, tobacco, living alone and education level (21).This finding correlate with our results. In our study we also got positive correlation between diabetess mellitus(blood glucose levels) and marital status, smoking status, fizical activity, body mass index,.stressful lifestyle. Lifestyle change such as increased physical activity or exercise , dietary modification, adequate relaxation, sleep and social interaction, use of mindfulness-based meditation techniques, and the reduction of recreational substances such as nicotine, drugs and alcohol already proved their benefits in the improvement of depression as well as diabetes

Both psychological therapies and antidepressant medication should be determined on an individual basis. As poor metabolic control, low rates of blood glucose self-monitoring, and diabetes complications all predict inadequate response to depression treatment, an equal emphasis on both diabetes and depression is needed (18). Until recently, people with diabetes were specifically excluded from tries of the depression treatment and so consequently, there are relatively few studies examining antidepressant and psychotherapy treatment of depression in this population. Nevrtheless studies published over the last decade have Cleary indicated that treating both condition is effective (22). There is preliminary evidence to suggest the web-based psychological therapies may also be effective in treating depression in people with diabetes but may have limited effects on glycemic outcomes (15,16). The best response to psychological interventions occurs when these are combined with diabetes education, to provide diabetes self-management skills as well as the psychological support to use these affectively (22). Some antidepressants, including mirtazapinje, paroxetine and some tricyclic antidepressants, are associated with significant weight gain and are less suitable because of worsening insulin resistance and potentially glycemic control (21). Furthermore, unlike SSRIs, it does not appear to worsen sexual function and therefore may have advantages for people with diabetes (22). Sertraline may have specific advantages for glycemic control (20). So in our study also we got results who show that treatment diabetes in depressant patients with antidepressant sertraline diminished the percentage the depressant patients with high blood glucose level . Only 20 % of patients in second group (treated with sertraline) have high blood glucose level. Psychiatric intervention may be necessary in addition to lifestyle change to prevent the exponential increase in the occurrence of diabetes. In addition a common approach including psychiatric treatment in diabetes care may be necessary to achieve improved glycemic control in this population. (2).

6. CONCLUSION

The results obtained in our study showed high blood glucose levels in depressant patients but treatment with sertraline was diminished this level. So screening this condition is important, because that patients shoved be treated differently than these who have normal blood glucose level. Psychiatric interventions (psychotherapy, social support) and treatment with SSRIs- sertraline may be prevent the exponential increase in the occurrence diabetes mellitus in those patients .

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