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Comparison of Metabolic Parameters of the Patients with Schizophrenia and Bipolar Disorder Followed by a Community Mental Health Center

Hatice Kaya[1], **Batuhan Ayık**[2]

1 Department of Psychiatry, Istanbul Sultanbeyli State Hospital, Sultanbeyli Community Mental Health Center, Istanbul, Sultanbeyli, Turkey

2 Department of Psychiatry, Istanbul Erenkoy Education and Research Hospital, Istanbul, Erenkoy, Turkey

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Abstract

Introduction: Deterioration in metabolic parameters is one of the major reasons of cardiovascular system-related morbidity and mortality in psychiatric diseases and is particularly common in chronic diseases such as schizophrenia and bipolar disorder (BD). We aimed to investigate the metabolic characteristics of patients with BD, a group that has received relatively less attention, by comparing them with patients with schizophrenia.

Methods: 26 patients with BD and 27 patients with schizophrenia were involved in this study. Clinical and sociodemographic data, BMI, GAF, and CGI scores of the patients were recorded, and fasting blood glucose, HBA1C, total cholesterol, triglyceride, LDL, VLDL and HDL values performed during routine examinations in the last month were compared.

Results: There was no significant difference between the two groups in terms of age, gender, disease duration, mean number of psychotropic drugs, and mean number of antipsychotic drugs ($p>0.05$). While BMI ($p=0.02$), Triglyceride ($p=0.008$), Total cholesterol ($p=0.018$), and VLDL ($p=0.008$) values of bipolar disorder patients were significantly higher than schizophrenia patients. In the regression analysis, it was determined that the status of staying in a nursing home was a positive determinant in terms of triglyceride levels.

Conclusion: The fact that schizophrenia patients with lower functionality and needing support and care stay in a nursing home can be protective in terms of metabolic risks due to factors such as diet control and regular doctor visits. Bipolar disorder patients followed up in community mental health centers should also be carefully evaluated in terms of metabolic risks, and if necessary, support should be provided to the patients in terms of healthy nutrition and exercise.

Keywords: Bipolar Disorder; Schizophrenia; Metabolic syndrome; Cardiovascular diseases; Nursing homes; Community mental health centers

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Correspondence / Yazışma Adresi: *Batuhan Ayık, Department of Psychiatry, Istanbul Erenkoy Education and Research Hospital, Istanbul, Erenkoy, Turkey e-mail: batuayik@hotmail.com*

Toplum Ruh Sağlığı Merkezinden Takipli Şizofreni ve Bipolar Bozukluk Tanılı Hastaların Metabolik Parametrelerinin Karşılaştırılması

Öz

Giriş ve Amaç: Metabolik parametrelerdeki bozulma, psikiyatrik hastalıklarda kardiyovasküler sisteme bağlı mortalite ve morbiditenin önemli nedenlerinden biridir ve özellikle şizofreni ve bipolar bozukluk gibi kronik hastalıklarda sık görülür. Bu çalışmada, nispeten ihmal edilmiş bir grup olan bipolar bozukluk hastalarının metabolik parametrelerini şizofreni hastaları ile karşılaştırarak incelemeyi amaçladık.

Yöntemler: Bu retrospektif ve kesitsel çalışmaya 26 bipolar bozukluk ve 27 şizofreni hastası alındı. Hastaların klinik ve sosyodemografik verileri kaydedildi. Son bir ay içinde rutin muayeneleri sırasında ölçülen açlık kan şekeri, HBA1C, toplam kolesterol, trigliserit, LDL, VLDL ve HDL değerleri karşılaştırıldı.

Bulgular: İki grup arasında yaş, cinsiyet, hastalık süresi, ortalama psikotrop ilaç sayısı ve ortalama antipsikotik ilaç sayısı açısından anlamlı fark yoktu. Bipolar bozukluk hastalarının BKİ (p=0.02), Trigliserit (p=0.008), Total kolesterol (p=0.018) ve VLDL (p=0.008) düzeyleri şizofreni hastalarına göre anlamlı olarak yüksekti. Regresyon analizinde bakımevinde kalma durumunun trigliserit düzeylerini anlamlı derecede yordadığı saptandı.

Sonuç: İşlevselliği düşük, desteğe ve bakıma daha çok ihtiyacı olan şizofreni hastalarının bakımevinde kalması, diyet kontrolü ve düzenli doktor muayeneleri gibi faktörler nedeniyle metabolik riskler açısından koruyucu olabilir. Toplum ruh sağlığı merkezlerinde izlenen bipolar bozukluk hastaları da metabolik riskler açısından dikkatle değerlendirilmeli, gerekirse hastalara sağlıklı beslenme ve egzersiz açısından destek sağlanmalıdır.

Anahtar kelimeler: şizofreni, bipolar bozukluk, toplum ruh sağlığı merkezi, bakımevi, metabolik sendrom.

INTRODUCTION

In the course of chronic mental diseases such as schizophrenia and bipolar disorder (BD), cardiovascular diseases and related complications emerge as one of the main causes of morbidity and mortality[1]. Cardiovascular diseases (including coronary artery disease) are the primary cause of death in people with schizophrenia[2]. Causes of increased cardiovascular disease risk include psychopharmacological treatments, less use of general health services, lifestyles, obesity, dyslipidemia, hypertension, diabetes, and increased cigarette consumption[3–5]. Rates of 24.7%-38.3% and 13.4%-69.3% have been reported for the frequency of metabolic syndrome in patients with BD and schizophrenia, respectively[6]. The etiology of the increased risk of obesity and metabolic syndrome for these diagnostic groups is still unclear.

Studies aimed at elucidating its etiology report that increased weight gain, especially due to the use of second-generation antipsychotic drugs, results in the development of dyslipidemia and metabolic syndrome. Psychosocial factors such as insufficient physical activity, high smoking and unhealthy diet also negatively affect the metabolic parameters of the patients[7].

Olanzapine and clozapine are considered to be the riskiest antipsychotic agents for metabolic syndrome. The adverse metabolic consequences of quetiapine and risperidone are also substantial. It is accepted that amisulpiride, aripiprazole and haloperidol are safer drugs in terms of metabolic parameters. In addition, it is known that lithium and valproate, which are used in the maintenance treatment of BD are associated with weight gain, insulin resistance and impaired glucose tolerance[8–11].

Although there is not enough scientific evidence about its benefit, the use of multiple antipsychotics is quite common in the treatment of both schizophrenia and BD. Although the use of multiple antipsychotics has been shown to have positive effects on disease

symptoms in a limited group of patients, it has been found that this approach further increases the risk of metabolic syndrome.

Although the metabolic side effects of atypical antipsychotics are well known, there were studies reporting the frequency of Type-2 diabetes mellitus (DM) in schizophrenic patients much higher than the normal population before the widespread use of atypical antipsychotic drugs[12].

It is thought that additional diagnoses such as DM and dyslipidemia accompanying mental illness are not only medical conditions that threaten physical health, It has also been shown that the presence of DM accompanying bipolar disorder is associated with a more severe disease course and lower functionality in BD[13].

Although there are fewer studies conducted with patients with BD, all these data indicate that the higher frequency of DM and dyslipidemia compared to the healthy population is as important a problem as in patients with schizophrenia. Based on this, we aimed to determine the relationship between metabolic parameters and sociodemographic and clinical features in patients with schizophrenia and BD who are being treated at Sancaktepe Community Mental Health Center and to investigate the metabolic parameters of patients with BD compared to schizophrenia.

METHODS

The study included 53 patients who were followed up at Sancaktepe Community Mental Health Center for at least 6 months, were not in exacerbation period, and had complete total cholesterol, high-density lipoprotein (HDL), low-density lipoprotein (LDL), very-low-density lipoprotein (VLDL), triglyceride and HbA1c values during routine screening tests. The blood analyzes of the patients were performed simultaneously, and their sociodemographic and clinical data were recorded at the same time.

Participants

Twenty-six patients with BD and twenty-seven patients with schizophrenia matching in terms of gender and age included in this cross sectional and retrospective study. All of the participants were treated at the Sancaktepe Community Mental Health Center for at least six months and met the related criteria according to the Diagnostic and Statistical Manual for Mental Disorders-5 (DSM-5). Patients, who have complete data of sociodemographic and clinical recordings and total cholesterol, HDL, LDL, VLDL, triglyceride and HbA1c tests, were included. The Erenkoy Mental and Nervous Diseases Training and Research Hospital's ethics committee granted approval for this study (date/number 2022/20), and we got participants' written informed consent. The Declaration of Helsinki was followed by our study.

Inclusion criteria included fulfilling DSM-5 criteria for BD or schizophrenia, being between the ages of 18 and 60, being literate, and not having been hospitalized or exhibited signs of severe illness during the previous six months. The exclusion criteria were the presence of concomitant mental disease, evidence of active substance or alcohol use, and Electroconvulsive treatment (ECT) within the past year.

Data Collection Tools

Clinical and sociodemographic data form: Age, gender, education, employment status, history of ECT or attempts of suicide, family history of any psychiatric disorder, use of alcohol, drugs, or tobacco, as well as the age of disease onset, length of untreated illness, and number of medications taken, are all included on the data collection form.

Global Assessment of Functioning (GAF): GAF was used to evaluate the severity of patients' symptoms. (GAF) is a 100-point scale that assesses a patient's total occupational,

social and psychological functioning. Better scores reflect higher levels of functionality.

Clinical Global Impression-Symptom Severity (CGI-SS): The CGI-SS, a 7-point Likert-type scale, was used to evaluate the disease's severity.

Metabolic Parameters

Complete total cholesterol, HDL, LDL, VLDL, triglyceride and HbA1c values and Body Mass Index (BMI) scores which were measured within one month were recorded.

Statistics

For the statistical analyses, SPSS 22.0 was used. The minimum, maximum, mean, and standard deviation were reported using descriptive statistics, and the distribution of the variables was assessed using the Kolmogorov-Smirnov test. For data having a normal distribution, descriptive statistics are provided as mean and standard deviation; for data without a normal distribution, they are provided as median (min-max). In order to analyze the quantitative data, the Mann-Whitney U and independent sample t-tests were used. For the assessment of qualitative data the chi-square test and the Fischer's exact tests were used. In order to perform a linear regression analysis, a model containing independent variables that are predicted to have an impact on triglyceride levels was developed. A 0.05 p-value was regarded as statistically significant.

RESULTS

Sociodemographic and Clinical Profiles of the Participants

26 patients with BD and 27 patients with schizophrenia were included in the study. The mean age of the participants was 41.5±12.4 for the BD group and 39.8±10.7 for the schizophrenia group, and there was no significant difference between them (p=0.608). There were 11 females and 16 males in the schizophrenia group and 13 males and 13 females in the BD group, and there was not significant gender difference between the two groups (p=0.49). 13 participants with schizophrenia and one participant with bipolar disorder both resided in nursing homes. There was no significant difference between the two groups in terms of the mean disease duration, which was 13.2±10.0 in the BD group and 16.3±9.1 in the schizophrenia group (p=0.107). The mean total number of psychotropics used was 2.59±1.3 and 2.61±1.32 for BD and schizophrenia patients, respectively (p=0.95), the mean number of antipsychotics was 1.46±0.7 and 1.88±0 was 0.8 (p=0.051). The GAF scores of the two groups were 66.9±9.6 and 50.0±14.0 (p<0.001) for BD and schizophrenia patients, respectively, and the CGI scores were 4.15±0.67 and 4.66±0.83. (p=0.017). The sociodemographic and clinical data of the patients and the drugs they use are shown in detail in tables 1-2 and 3.

TableI: Comparison of sociodemographic and clinical variables between two groups

		Group				
		SZ	BD	Sum		
		n, %	n, %	n, %	x^2	p
Gender	Female	11, 40.7%	13, 50%	24, 45.3%		
	Male	16, 59.3%	13, 50%	29, 54.7%	0,45	0,49
Education	Primary school	14, 51.9%	19, 73.1%	33, 62.3%		
	High school	13, 48.1%	7, 26.9%	20, 37.7%	2,54	0,11
Number of hospitalizations	None	6, 22.2%	4, 15.4%	10, 18.9%		
	One	5, 18.5%	12, 46.2%	17, 32.1%		
	Multiple	16, 59.3%	10, 38.5%	26, 49.0%	4,65	0,098
Usage of mood stabilizers	yok	21, 77.8%	7, 26.9%	28,52.8%		
	var	6, 22.2%	19, 73.1%	25, 47.2%	13,7	<0,001
Number of antipsychotics	1	10, 37%	14, 56%	24, 46.2%		
	>1	17, 63%	11, 44%	28, 53.8%	1,87	0,17
Comorbid physical diseases	yok	20,74.1%	16, 61.5%	36, 67.9%		
	var	7, 25.9%	10, 38.5%	17, 32.1%	0,95	0,32

Table II: comparison of sociodemographic and clinical variables between two groups

	Group	N	Mean±SD	F	p
Age	SZ	27	39,8±10,7		
	BD	26	41,5±12,4	-,515(t)	0,608
Duration of disease	SZ	27	16,3±9,1		
	BD	26	13,2±10,0	-1,604(z)	0,107
CGI	SZ	27	4,66±0,83		
	BD	26	4,15±0,67	2,469(t)	**0,017**
GAF	SZ	27	50,0±14,0		
	BD	26	66,9±9,6	-5,13(t)	**<0,001**
Number of psychotrops	SZ	27	2,59±1,3		
	BD	26	2,61±1,32	-0,62(t)	0,95
Number of antipsychotics	SZ	27	1,88±0,8		
	BD	26	1,46±0,7	1,998(t)	0,051
BMI	SZ	27	25,5±4,5		
	BD	26	28,7±5,1	-2,41(t)	**0,02**
FBG	SZ	27	92,4±13,5		
	BD	26	103,1±40,4	-1,278(t)	0,21
Triglyceride	SZ	27	124,8±56,4		
	BD	26	174,9±73,7	-2,77(t)	**0,008**
Cholesterol	SZ	27	176,4±31,5		
	BD	26	197,3±30,7	-2,43(t)	**0,018**
HDL	SZ	27	49±13,7		
	BD	26	47±10,7	0,6(t)	0,55
LDL	SZ	27	102,5±29,3		
	BD	26	115,3±25,3	-1,69(t)	0,09
VLDL	SZ	27	25±11,3		
	BD	26	35±14,7	-2,75(t)	**0,008**
HBA1C	SZ	26	5,48±0,4		
	BD	24	5,6±1,1	-0,088(z)	0,93

t: Independent samples t-test, Z: Mann Whitney u test, BD: Bipolar disorder, SZ: Schizophrenia

Table III: Usage of antipsychotics in two groups

	SZ		BD	
	N	%	N	%
None			1	3.8
Haloperidol	3	11.1		
Risperidone	1	3.7	4	15.4
Olanzapine	6	22.2	6	23.1
Sulpiride	2	7.4		
Zuclopenthixol	1	3.7	1	3.8
Aripiprazole	4	14.8	6	23.1
Quetiapine	2	7.4	8	30.8
Clozapine	3	11.1		
Paliperidone	5	18.5		
Total	27	100,0	26	100,0

Comparison of The Metabolic Parameters Between Groups

The patients' BMI, fasting blood glucose, total cholesterol, triglyceride LDL, VLDL and HBA1C values are given in detail in Table 2. While BMI (p=0.02), triglyceride (p=0.008), total cholesterol (p=0.018), and VLDL (p=0.008) values of BD patients were significantly higher than schizophrenia patients, no difference was detected in terms of fasting blood glucose, LDL, HDL and HBA1C values.

Regression Analyses

The triglyceride levels were used as the dependent variables in the multiple linear regression analysis; gender, disease, duration of the disease, BMI, place of living and the number of psychotropic drugs were used as independent variables. Our model explains 44.5% of the total variance in triglyceride levels ($R^2=0.445$, $p<0.001$). The data didn't show multicollinearity (variance inflation factors-VIFs < 2 and tolerance values > 0.5 for all independent variables). Among the independent variables, it was determined that

BMI (p<0.001) and place of living (p=0.017) predicted triglyceride levels. The results of linear regression analysis are summarized in Table 4.

Table IV: Multiple regression analysis

						95% CI	
	UB	SE	SB	t	p	LB	UB
Constant	-56,39	48,38		-1,16	0,25	-153,77	40,99
Gender	5,26	14,63	0,038	0,36	0,72	-24,18	34,71
Psychotrops	6,95	5,70	0,13	1,22	0,23	-4,51	18,42
BMI	7,26	1,59	0,52	4,56	**<0,001**	4,057	10,46
Living place	-50,58	20,37	-0,32	-2,48	**0,017**	-91,57	-9,58
Disease	-4,36	16,90	-0,03	-0,26	0,79	-38,38	29,66
Duration of disease	0,24	0,79	0,033	0,30	0,76	-1,36	1,836

Dependent variable: triglyceride

DISCUSSION

In our study comparing the patients in terms of metabolic parameters, total cholesterol, triglyceride, and BMI levels were found to be significantly higher in the patients with BD. Although the literature mainly focuses on the deterioration in metabolic parameters of patients with schizophrenia, the results of our study revealed that the metabolic parameters of patients with BD were worse.

Cardiovascular diseases are the most important clinical manifestations that worsen life expectancy in the course of schizophrenia and BD[14]. Metabolic syndrome has a decisive role in the emergence of cardiovascular diseases6. It is known that factors such as weight gain, lack of physical activity, and especially the widespread use of second-generation antipsychotic drugs in patients with schizophrenia cause adverse metabolic consequences, especially type 2 DM[15]. It has also been shown that DM is three times more likely to occur even in drug naïve patients with schizophrenia, compared to the general population[16]. There are consistent data in the literature on metabolic dysregulation in patients with schizophrenia. Although fewer studies have been conducted on BD patients on this subject, a study found that metabolic syndrome frequency was higher in bipolar patients compared to schizophrenia patients[7]. Similarly, in our study, we found higher triglyceride and total cholesterol values in the bipolar patient group. In the light of these results, we think that the metabolic parameters of bipolar patients should be carefully examined, just like schizophrenia patients.

The results of studies comparing bipolar and schizophrenic patients in terms of metabolic parameters differ. Besides there are many studies reporting worse metabolic results in patients with schizophrenia, there are also studies comparing the two diagnostic groups in this respect and demonstrating the metabolic parameters of patients with BD more negatively[7,14,17]. There are many factors that affect metabolic parameters in psychiatric diseases. It can be suggested that in previous studies, the effects of variables such as age, number and type of psychotropic drug used, additional medical diseases, and duration of disease in both disease groups could not be fully evaluated, and therefore different results were obtained in terms of metabolic parameters[18]. In our study, both patient groups were similar in terms of age, gender, educational status, disease duration, and the number of psychotropic drugs used. As expected, the disease severity and functionality levels of bipolar patients were better. Conflicting results in the literature suggest that new studies with large samples are needed on this subject.

The prevalence of metabolic syndrome and diabetes mellitus in psychiatric patients has increased due to the extensive usage of second generation AP medications[19]. Both groups in this study had similar AP medication profiles. As expected, use of mood stabilizers was found to be higher in the bipolar patient group. The recognized metabolic side effects of lithium and valproate may have contributed to the more

unfavorable metabolic parameters found in our study within bipolar patients.

The most significant difference between the two groups was the place of living. Because patients with BD have a relatively better clinical picture, patients staying in nursing homes are predominantly schizophrenic patients. In our study, approximately half of the schizophrenia patients were staying in a nursing home, while only one bipolar patient was staying in a nursing home. We thought that the place of residence of the two diagnostic groups, who were similar in terms of basic clinical and sociodemographic variables, was effective in the variability of metabolic parameters. In the regression model, we found that staying in a nursing home significantly predicted triglyceride levels. Serving standard and dietitian-controlled meals in the nursing home, strict diet monitoring, and regular control of a professional healthcare team may have provided better metabolic control in the nursing home population[20]. Therefore, we think that diet control of outpatients of the community mental health centers is very important. As it is known, patients are given lunch in community mental health center, besides, basic cooking skills are tried to be given to patients through work-occupation activities[21]. Based on the results of our study, it seems important to offer appropriate meals under the control of a dietitian, especially considering the metabolic risks of bipolar patients, and to provide patients with healthy nutrition skills through gaining skill activities and trainings.

The study's cross-sectional design limits the establishment of a cause-and-effect relationship. The low sample size is another limitation. The absence of waist measurement and blood pressure values of the patients prevented us from evaluating the frequency of metabolic syndrome. Therefore, there is a need for more comprehensive studies with larger samples on this subject.

CONCLUSION

It should not be forgotten that patients with BD may be at as much or even more risk in terms of metabolic parameters as patients with schizophrenia. Although diet control can be done more strictly in patients staying in nursing homes, considering that patients with BD are mostly outpatients, cardiometabolic parameters should be monitored regularly, and education should be provided about healthy nutrition and exercise when necessary. In addition, healthy food delivery service for eligible patients followed in community mental health centers and multidisciplinary patient management should be put on the agenda by establishing cooperation with other medical departments.

Availability of data and material

The study's data are completely accessible to the authors. By getting in touch with the corresponding author, access to the data may be granted.

Ethics Committee Approval: The research was conducted in compliance with the ethical principles specified in the 1964 Declaration of Helsinki and its later amendments, as approved by the Erenkoy Mental and Nervous Diseases Training and Research Hospital's ethics committee (approval number: 2022/20). In addition, we certify that each subject gave informed permission prior to enrollment in the study.

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REFERENCES

1. Colton CW, Manderscheid RW. Congruencies in increased mortality rates, years of potential life lost, and causes of death among public mental health clients in eight states. Prev Chronic Dis 2006;3(2).

2. Viron MJ, Stern TA. The Impact of Serious Mental Illness on Health and Healthcare. Psychosomatics 2010;51(6):458-65.

3. Stubbs B, Williams J, Gaughran F, Craig T. How sedentary are people with psychosis? A systematic review and meta-analysis. Schizophr Res 2016(1-3):103-9.

4. De Leon J, Diaz FJ. A meta-analysis of worldwide studies demonstrates an association between schizophrenia and tobacco smoking behaviors. Schizophr Res 2005;76(2–3):135-57.

5. Meng L, Chen D, Yang Y, Zheng Y, Hui R. Depression increases the risk of hypertension incidence: A meta-analysis of prospective cohort studies. J Hypertens 2012;30(5):842-51.

6. Sarisoy G, Boke O, Ozturk A, et al. The correlation between incidence of metabolic syndrome and sociodemographic and clinical characteristics in schizophrenia patients. Dusunen Adam - J Psychiatry Neurol Sci 2013;26(3):267.

7. Karataş KS. Metabolic syndrome in patients with schizophrenia and bipolar disorders in community mental health center. South Clin Istanbul Eurasia 2019;30(3): 266-71.

8. Kang SH, Kim KH, Kang GY, et al. Cross-sectional prevalence of metabolic syndrome in Korean patients with schizophrenia. Schizophr Res 2011(1-3);179-81.

9. Kagal UA, Torgal SS, Patil NM, Malleshappa A. Prevalence of the metabolic syndrome in schizophrenic patients receiving second-generation antipsychotic agents-A cross-sectional study. J Pharm Pract 2012;25(3):368-73.

10. Correll CU, Frederickson AM, Kane JM, Manu P. Does antipsychotic polypharmacy increase the risk for metabolic syndrome? Schizophr Res 2007;89(1-3):91-100.

11. Fagiolini A, Frank E, Scott JA, Turkin S, Kupfer DJ. Metabolic syndrome in bipolar disorder: Findings from the bipolar disorder center for Pennsylvanians. Bipolar Disord 2005;7(5):424-30.

12. Dixon L, Weiden P, Delahanty J, et al. Prevalence and correlates of diabetes in national schizophrenia samples. Schizophr Bull 2000;26(4):903-12

13. McIntyre RS, Konarski JZ, Misener VL, Kennedy SH. Bipolar disorder and diabetes mellitus: Epidemiology, etiology, and treatment implications. Ann Clin Psychiatry 2005;17(2):83-93.

14. Mitchell AJ, Vancampfort D, Sweers K, et al. Prevalence of metabolic syndrome and metabolic abnormalities in schizophrenia and related disorders-a systematic review and meta-analysis. Schizophr Bull 2013;39(2):306-18.

15. Keltner NL. Metabolic syndrome: Schizophrenia and atypical antipsychotics. Perspect Psychiatr Care 2006;42(3):204-7.

16. Vancampfort D, Knapen J, Probst M, et al. Considering a frame of reference for physical activity research related to the cardiometabolic risk profile in schizophrenia. Psychiatry Res 2010;177(3):271-9.

17. Patel JK, Buckley PF, Woolson S, et al. Metabolic profiles of second-generation antipsychotics in early psychosis: Findings from the CAFE study. Schizophr Res 2009;111(1-3):9-16.

18. Kurt E, Alataş G, Yeşilbaş D. Are Bipolar I Patients Different from Schizophrenic Patients in Terms of Diabetes and Dyslipidemia Comorbidity? Turkish J Clin Psychiatry 2009;12(2):72–8.

19. Bou Khalil R. Atypical antipsychotic drugs, schizophrenia, and metabolic syndrome in non-euro-american societies. Clin Neuropharmacol 2012;35(3):141-7.

20. Leedahl SN, Chapin RK, Wendel C, et al. Successful Strategies for Discharging Medicaid Nursing Home Residents With Mental Health Diagnoses to the Community. J Soc Serv Res 2015;41(2):172-92.

21. Özdemir I, Şafak Y, Örsel S, Kahiloğullari AK, Karadağ H. Bir toplum ruh sağlığı merkezinde şizofreni hastalarına uygulanan ruhsal-toplumsal uyumlandırma etkinliğinin araştırılması: Kontrollü çalışma. Anadolu Psikiyatri Derg 2017;18(5):419.