RESEARCH ARTICLE / *Araştırma Makalesi*

Investigation of the Relationship of Sociodemographic and Clinical Characteristics with Cardiovascular Risk Scores in Patients with Schizophrenia Living in Nursing Homes

Bakımevinde yaşayan Şizofreni Hastalarında Sosyodemografik ve Klinik Özelliklerin Kardiyovasküler Risk Skorları ile İlişkisinin İncelenmesi

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Abstract

Introduction	Cardiovascular risk increases in patients with schizophrenia. In our study, it was aimed to predict the 10-year risk of developing cardiovascular disease using the Framingham risk score in schizophrenia patients living in nursing homes
Materials and Methods	In our study, the sociodemographic and clinical characteristics of schizophrenia patients living in nursing homes, such as age, gender, educational status, duration of disease, and treatments used, and Framingham risk scoring which included age, gender total cholesterol, HDL, smoking status, systolic blood pressure, and presence of diabetes mellitus. were used in the calculation of cardiovascular risk. Also, the results of the General Assessment of Functioning and Clinical Global Impression disease severity scale were recorded in order to determine the functionality and severity of the disease.
Results	51 patients with schizophrenia were included, and the Framingham risk score of the patients was calculated as 4.65±4.63. While Framingham risk scores were significantly correlated with disease duration (r=0.284, p=0.044), age (r=0363, p=0.01) and length of stay in nursing home (r=0.538, p<0.001)), No relationship was found between risk scores and the number of psychotropic drugs. disease severity or functionality.
Conclusion	Our results showed that factors such as advanced age, male gender and length of nursing home stay were associated with an increased cardiovascular disease risk. Further studies including schizophrenia patients who do not stay in nursing homes are essential to determine the effects of nursing home conditions on cardiovascular disease risk
Keywords	Schizophrenia, Nursing home, Cardiovascular risk, Framingham risk score

Öz

Amaç	*Şizofreni hastalarında kardiyovasküler riskin arttığı bilinmektedir. Çalışmamızda bakımevinde yaşayan şizofreni tanılı hastalarda Framingham risk skorlaması kullanılarak 10 yıllık kardiyovasküler hastalık gelişme riskini yordamak amaçlanmıştır.*
Yöntem ve Gereçler	*Çalışmamızda bakımevinde yaşayan şizofreni hastalarının yaş, cinsiyet, eğitim durumu, hastalık süresi, kullanılan tedaviler gibi sosyodemografik ve klinik özellikleri yanında işlevsellikleri ve hastalık şiddetini saptamak üzere İşlevsellik Genel Değerlendirmesi ve Klinik Global İzlenim hastalık şiddeti ölçeği sonuçları kaydedilmiş, kardiyovasküler riskin hesaplanmasında yaş, cinsiyet, toplam kolesterol, HDL, sigara içme durumu, sistolik kan basıncı ve diabetes mellitus varlığını içeren Framingham risk skorlaması kullanılmıştır.*
Bulgular	*51 şizofreni hastası dahil edilmiş, hastaların Framingham risk skoru 4.65±4.63 olarak hesaplanmıştır. Framingham risk skorlarının hastalığın süresi (r=0.284, p=0.044), yaş (r=0363, p=0.01) ve bakımevinde kalış süresi (r=0. 538, p<0.001)) ile anlamlı ilişki bulunurken hastalık şiddeti, işlevsellik ve psikotropik ilaç sayıları arasında ilişki bulunamamıştır*
Sonuç	*Sonuçlarımız ileri yaş, erkek cinsiyet ve bakımevinde kalış süresi gibi faktörlerin artmış kardiyovasküler hastalık riski ile ilişkili olduğunu göstermiştir. Bakımevi koşullarının kardiyovasküler hastalık riski üzerindeki etkilerini saptamak için bakımevinde kalmayan şizofreni hastalarını da içeren yeni çalışmalara ihtiyaç vardır.*
Anahtar Kelimeler	*Şizofreni, Bakımevi, Kardiyovasküler risk, Framingham risk skoru*

INTRODUCTION

Schizophrenia is a chronic mental illness that affects more than 21 million people in the world, usually beginning in adolescence or young adulthood, leading to deterioration in perception, thoughts and behaviors, leading to significant long-term loss of functionality.[1] It is known that individuals with chronic mental illness have higher mortality rates compared to the healthy population schizophrenia[2], those with mortality are higher than other mental illnesses and life expectancy is 15-20 years shorter than in the general population[3]. Although the first cause of death comes to mind is unnatural deaths, such as suicide, cardiovascular diseases (CVD) are the most common cause of death in patients with schizophrenia[4]. Studies have shown that the risk of CVD in schizophrenia increases by 53% and the risk of death from CVD is 2.9 times higher than in the general population[5]. Reasons of increased risk of cardiovascular disease include less use of general health services, unhealthy lifestyle such as increased smoking, poor diet, lack of physical activity, and concomitant physical diseases such as obesity, dyslipidemia, hypertension, diabetes. In addition, pharmacological agents used in the treatment increase the risk[6]. Today, the use of antipsychotic drugs has become widespread in many psychiatric diseases, especially schizophrenia and bipolar disorder, and the choice of drugs has gradually changed. Second generation antipsychotics have generally been preferred to reduce the occurrence of extrapyramidal side effects. This has led to new cardiovascular side effects such as weight gain, lipid and glucose metabolism disorders, metabolic syndrome, orthostatic hypotension, cardiomyopathy, myocarditis, tachycardia, arrhythmia and sudden death[5].

Recent studies showed that some of the people with chronic mental illnesses do not improve functionality despite treatment, and 10-15% of them requires lifelong care[7]. In the last century, policies aimed at treating mental patients in the community have produced supportive services such as Community Mental Health Centers for patients who live with their families, and residential care services such as nursing homes for people with poor social support or alone[7]. In the nursing homes that have been serving since 2007 in our country, the basic requirements such as shelter, nutrition, as well as the mental and social needs of people who can not take care of themselves due to chronic mental illness, who are forced to care for by their families or who do not have a family, are met by trained and competent personnel. In the literature, studies with schizophrenia patients staying in nursing homes are very limited, In these studies, besides some of the advantages of nursing homes, some difficulties have also reported. In the study conducted in 2015, Ersan and Yıldız stated that the recommendations of current treatment guidelines were not followed in psychotic disorder patients staying in nursing homes, the use of multiple antipsychotic drugs was high, and the use of clozapine was quite low[8]. In the study in which Aydın and his colleagues compared schizophrenia patients living in nursing homes and in their homes with families in 2020, it was reported that the male sex ratio, average age, duration of illness and smoking status of those staying in nursing homes were high, and no difference was found between drug side effects and multiple antipsychotic use in both groups[9]. Although nursing homes appear to be sheltered living spaces for people with schizophrenia, there have been no studies on people's medical conditions and cardiovascular risks.

The Framingham Risk Score is an analysis calculated using variables such as age, gender, systolic blood pressure, diabetes mellitus (DM) history, antihypertensive treatment, smoking, and body mass index to predict a 10-year risk of cardiovascular disease[10]. Past studies have shown that the calculated score in schizophrenia patients (5.16%) is significantly higher than the general population (3.02%), and cardiovascular risk is reported to rise as severity and duration of the disease increase[11]. Additionally, comprehensive program of exercise, dietary changes, and behavioral intervention strategies can reduce the risk in people with schizophrenia by changing their lifestyle have been shown in literature[12] In this context, interventions such as the

arrangement of psychiatric treatment of patients staying in nursing homes by stable team working in Community Mental Health Centers, consultating them to medical examinations if necessary, standard meals served under the control of a dietician, and restricting smoking consumption may contribute to reducing the cardiovascular risk increase of patients. Based on this, we aimed to predict the 10-year risk of developing coronary heart disease by using Framingham risk scoring in patients with schizophrenia living in nursing homes

MATERIALS and METHODS

Our study was designed retrospectively, descriptively and cross-sectionally. The study sample consists of patients who are followed up with the diagnosis of schizophrenia according to DSM-5 criteria at Sultanbeyli Community Mental Health Center, who have been regularly brought to their follow-up for the last 6 months, who have complete treatment records, and who are staying in the nursing home. In the collection of the data, the form including the socio-demographic information and clinical characteristics of the patients, the General Assessment of Functionality (IGD) scale, the Clinical Global Impression Disease Severity Scale (CGI-SS) and the Framingham risk scoring. Ethics committee approval from Erenkoy Mental and Nervous Diseases Training and Research Hospital was received for our study (date/number 07.03.2022/13). Our study complies with the Declaration of Helsinki.

Data Collection Tools

The sociodemographic and clinical data form prepared and applied by the researchers includes the age, gender, marital status, education status, duration of the disease, duration of treatment, smoking-alcohol-drug use, additional psychiatric and physical disease history, family history of psychiatric diseases, drugs used and side effects.

The Global Assessment of Functionality Scale (GAF) is a 100-point scale that measures the general psychological, social and occupational functioning level of the patient, with higher scores indicating higher levels of functionality[13].

Clinical Global Impression Disease Severity Scale (CGI-SS) is a 7-point Likert-type scale used to score the severity and degree of recovery of psychiatric illnesses (1: normal; 2: borderline patient; 3: mild patient; 4: moderately ill; 5: markedly ill, 6: severely ill; 7: extremely ill)[14].

Framingham risk score was calculated according to the 10-year cardiovascular risk calculation system determined by the Turkish Society of Cardiology with the data of age, gender, cholesterol and high-density lipoprotein (HDL) levels, systolic blood pressure, presence of DM, smoking of the patients[15].

Statistical evaluation

Windows SPSS [Statistical Package for Social Sciences version 20.0 software for Windows program were used for statistical analysis. The Kolmogorov-Smirnov and Shapiro-Wilk tests were used to determine whether or not the variables were normally distributed. Numerical variables were presented as mean and standard deviation for those with normal distribution and as median (min-max) for those without normal distribution. Categorical variables were presented with n (%) values. Mann-Whitney U test was used in the analysis of quantitative data and Spearman correlation analysis was used to determine the relationship between numerical variables. P values less than 0.05 ($p<0.05$) were considered significant.

RESULTS

51 patients with schizophrenia were included in the study. The mean age of the participants was 49.74±9.32. There were 14(%27.50) females and 37(%72.50) males among the patients. The median disease duration was 20(3-50) years. The total number of psychotropics and antipsychotics used were 3(1-5), 2(1-4) respectively. Framingham risk score of the participants was calculated as 4.65±4.63. The sociodemographic and clinical data of the patients are shown in

detail in Table-1.

Table 1: Sociodemographic and clinical characteristics of patients	
	N (%)
Gender	
Female	14 (27,50)
Male	37 (72,50)
Comorbid medical disease	
No	37 (72,50)
Yes	14 (27,50)
Smoking status	
No	25 (49)
Yes	26 (51)
	Median (min-max)
Age at the onset of disease	25 (15-58)
Duration of illness	20 (3-50)
Number of psychotropic drugs	3 (1-5)
Number of antipsychotic drugs	2 (1-4)
CGI score	5 (4-6)
GAF score	45 (15-65)
Duration of stay in nursing home (months)	50 (6-144)
	Mean ± SD
Age	49,74 ± 9,32
High-density lipoprotein (HDL)	45,47 ± 13,08
Cholesterol	167.17 ± 36.74
Systolic blood pressure	118.25 ± 13.55
Framingham risk score	4.65 ± 4.63

In the correlation analysis that were performed, revealed that Framingham risk scores were positively correlated with duration of the disease (r=0.284, p=0.044), age (r=0.363, p=0.01), and duration of staying at nursing home (r=0.538, p<0.001) There was no correlation between FRS and the scores of GAF and CGI, numbers of psychotropic drugs. Correlations between FRS and other variables are summarized in Table-2.

In the analysis where clinical variables were compared according to Framingham risk score, the FRS of men (5,88±0.8) was significantly higher than that of women (1,39±0,3) (p<0.001). Risk scores of patients who were divided into groups in terms of presence of co-morbidity, smoking status, number of antipsychotics and olanzapine-clozapine use did not differ statistically. Comparison of categorical variables in terms of FRS was shown in Table-3.

Table-3: Comparison of Framingham risk scores and categorical values				
	n	M(min-max)	z	p
Gender				
Female	14	1,15(0,2-3,5)	-3,737	<0.001
Male	37	4,7(0-22)		
Smoking status				
No	25	2,1(0-13,3)	-1,885	0.59
Yes	26	3,35(0,9-22)		
Comorbid medical disease				
No	37	3,1(0-16,3)	-,760	0.447
Yes	14	5,1(0,2-22)		
Number of antipsychotics				
1	16	2,95(0,2-22)	-,122	0.903
>1	35	3,3(0,2-16,3)		
Use of olanzapine or clozapine				
No	24	3,3(0,4-13,3)	-,293	0.77
Yes	27	2,88(0-22)		

Table-2: Relationship between numerical variables and Framingham risk scores										
		CGI	GAF	Duration of disease	Age	Duration of stay in nursing home	HDL	Systolic blood pressure	Number of anti-psychotics	Number of psychotropics
FHR	r	,142	-,016	,284*	,538**	,363**	-,172	,013	-,022	-,080
	p	,321	,909	,044	<0,001	,010	,227	,929	,877	,578
	n	51	51	51	51	50	51	51	51	51

DISCUSSION

The 10-year cardiovascular risk of schizophrenia patients living in nursing homes and followed by the community mental health center, was calculated as 4.65 with the Framingham risk score and it was found that the increase in risk was related to being male, duration of illness, age and length of stay in nursing home in our study.

In the literature, there are many studies that show that cardiovascular risk increases in chronic mental diseases, especially in pattients with schizophrenia, and leads to premature death.In the meta-analysis from 92 studies, conducted by Correll et al it was shown that the frequency of CVD in serious mental illnesses was 9.9%, the risk of developing CVD in patients increased by 78%, and the risk of death due to CVD increased by 85% 5. A 24-year follow-up study in Sweden found that deaths due to CVD were 6 times higher and 10 years earlier in people with schizophrenia than in the general population 16. A meta-analysis of 13 cohort studies showed a 53% increase in CVD risk in this patient group compared to the healthy population 4. In the studies conducted with FRS analysis, which is stated as the most common calculation method recommended for this purpose, it was confirmed that the cardiovascular risk was high in schizophrenia patients. The 10-year cardiovascular risk we identified with FRS is 4.65%. This score was found to be lower than the results (5,16% and 5,90%) of studies conducted with schizophrenia patients in our country despite the mean ages and ratios of male gender of them were higher than our study sample [11,17]. These results may suggest that nursing home conditions may be effective. The most important factors increasing cardiovascular risk in the schizophrenia patient group are unhealthy lifestyle behaviors characterized by decreased physical activity, unhealthy diet rich in carbohydrates and fats, excessive amounts of smoking, alcohol or substance use[12]. For patient families and physicians, the prominence of patients' management and treatment of chronic psychiatric symptoms and stigma can lead to not pay adequate attention to patients' physical illnesses. A meta-analysis published in 2011 showed that patients with schizophrenia had a 47% lower rate of invasive coronary interventions compared with people without mental illness[18]. The living conditions and medical care of the patients living in the nursing home, which constitutes our study sample, are under control differently from the patients living with their families. In nursing homes, the staff in charge restricts the amount of cigarettes smoked daily in smoking patients, does not allow the use of alcohol and drugs, the meals of the patients consist of menus created by the dietitian and the patients are motivated to activities during the day. The personnel responsible for psychiatric and medical care ensure that the patients are brought to the community mental health center regularly, regardless of their will[19]. Some researchers have found that a lifestyle change program that includes diet and exercise is effective in reducing the risk of cardiovascular disease, that key variables affecting risk continue to decrease with three-month follow-up after the program, and that some effects persist even at six and twelve months of follow-up[12,20]. This regulated living conditions of the patients in nursing homes may have contributed to lower FRS scores.

Another of the most likely causes that may cause increased cardiovascular risk in people with schizophrenia is the presence of comorbid diseases such as DM, hypertension and hyperlipidemia, although the underlying pathophysiology cannot be elucidated yet. In recent studies showed that 66.1% of schizophrenia patients have comorbid cardiovascular diseases, DM is accompanied by 28%, hypertension is 57%, and hyperlipidemia is 30% 4. In our patient group, 27.5% of patients had comorbid diseases and hypertension was detected in 3 patients and DM in 6 patients. The fact that the comorbid diseases seen in our patient group are lower than the rates detected in previous studies may also explain to low cardiovascular risk rates.

One of the factors responsible for the increase in cardiovascular risk is the use of antipsychotics. Among the second generation antipsychotic drugs (especially olanzapine

and clozapine) whose use has risen in recent years, have been shown to cause weight gain, deterioration in glucose tolerance and DM that increase cardiovascular risk[4,16]. However, there are also studies in the literature showing that there is no significant relationship between first or second generation antipsychotic use and increased cardiovascular risk[21]. It has even been suggested that patients who adhere to antipsychotic treatment reduce the risk of CVD due to the ability to provide their own care and that antipsychotics reduce deaths due to CVD due to the anti-inflammatory effects at the molecular level[22]. In a recent cohort study comparing mortality rates of patients with first-episode or chronic schizophrenia, using first-generation, second-generation antipsychotic drugs or none, under oral and long acting injection treatment showed that the highest mortality rate was in those who did not use antipsychotics and that second-generation antipsychotics used orally reduced mortality rates[23,24]. However, in another study mortality rates due to CVD increased in those who did not take any antipsychotics or high-dose antipsychotics. Although our study sample consisted mostly of chronic patients who had to receive more than one antipsychotic treatment, the cardiovascular risk score was not high and the number of antipsychotics used or the use of olanzapine/clozapine was not found significantly related with the risk score in line with the literature showing that the risk was reduced in the patients under treatment. This suggests that the disease, which cannot be treated rather than the metabolic side effects of drugs, increases the cardiovascular risk.

In studies evaluating the risk of CVD with FRS in schizophrenia patients, gender has been shown to interfere with the risk[25,26]. In the study conducted by Goff et al., the 10-year risk of coronary disease was found to be 9.4% in men and 6.3% in women[25]. In the Cardiovascular Lipid and Metabolic Outcomes Study in Schizophrenia (CLAMORS study) of Bobes et al., the total risk of CVD in 10 years was determined to be 6.8% in schizophrenia patients, and it was shown that the risk was significantly higher in men (8.3%-4.5%) than in women[26]. In our study, similarly, FRS was found to be significantly higher in men.

As the age progresses, the risk of cardiovascular disease increases in the general population. In a cohort study that screened 3.6 million people aged 40 years and older, it was shown that the frequency of all vascular diseases increased markedly every decade[27]. The risk is similarly increased in people with schizophrenia. In a study on the factors affecting the mortality rate in schizophrenia patients, it was stated that the average age of the patients who died at the end of 11-year follow-up was 48.9 and the survivors were 41.9 and that there was a statistically significant difference between the two groups in terms of age, and that advanced age was a risk factor for death. is an expected result28. In our patient group, advanced age is one of the factors that increase the risk of CVD.

In a study investigating the mortality of schizophrenia patients due to CVD, the mean age of onset of schizophrenia in deceased patients was 25.6 years, and 28.3 in the survivors, and the difference was found to be statistically significant[29]. The advanced age of onset of the disease indicates good prognosis of schizophrenia and reduces the cardiovascular risk as it shortens the time spent with the disease. The number of studies measuring cardiovascular risk and disease severity is limited. In deficit schizophrenia, in which negative symptoms predominate, patients have been shown to be at greater risk[30]. In a recent study conducted in our country, no significant relationship was found between disease symptom severity and FRS, and cardiovascular risk was mostly related to disease duration and number of hospitalizations[11]. In our sample, in accordance with the literature, FRS was found to be reduced in patients with low disease duration. Similarly, although we did not measure disease severity in detail in our sample, it was determined that functionality and recovery levels were not related to cardiovascular risk and that the risk increased as the duration of the disease was prolonged. In addition, the risk was affected by the duration of nursing

home of patients. Although this result seems contrary to our suggestion that nursing home conditions reduce the cardiovascular risk, as the age and duration of illness of people living in nursing homes increases, the length of stay in nursing homes also increases. Since there is no control group in our study, these confounding effects could not be analyzed.

The limitations of our research are that it does not include a control group consisting of schizophrenia patients living with their own families, the cause and effect relationship cannot be fully established and generalized due to its cross-sectional nature, and the data are collected by retrospective file scanning and the number of samples was low. In addition, since a scale that measures positive, negative and cognitive symptoms could not be used, the severity of the disease could not be evaluated comprehensively. Further larger scale studies are needed to clarify the issue.

As a result, our data show that schizophrenia patients living in nursing homes lead to mandatory changes in living conditions due to the rules of the nursing home, slightly reducing the cardiovascular risk known to increase in the disease. In addition to the psychiatric treatment, medical care should be taken in this neglected group and attention should be paid to the treatment and life condition changes for cardiovascular diseases.

Declarations

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Declaration of Competing Interest

The authors declare that they have no conflicts of interest.

Ethical Approval

The study has been approved by the Ethics Committee of SBU Erenköy Mental and Nervous Diseases Training and Research Hospital (date/number: 07.03.2022/13).

Authorship Contributions

Concept: RT, BA; Design: BA, HK, RT; Data Collection: RT, BA; Analysis and/or Interpretation: RT, BA; Literature Review: RT, BA; Writing Manuscript: BA, RT; Critical Review: HK.

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