Management of coronary artery disease in Kyrgyzstan: a comparison with Turkey and europe according to European Action on Primary and Secondary Prevention by Intervention to Reduce Events III results

Kırgızistan'da koroner arter hastalığı yönetimi: EUROASPIRE III verilerine göre Avrupa ve Türkiye ile karşılaştırma

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ABSTRACT

Objectives: The European Action on Primary and Secondary Prevention by Intervention to Reduce Events (EUROASPIRE III) Study in coronary artery disease had been undertaken between the years of 2006 and 2007, with the participation of 22 countries in Europe including Turkey (76 centers). In this study, the situation in the management of coronary artery disease in Kyrgyzstan was compared with EUROASPIRE III findings of Turkey and Europe.

Study design: The results of 1067 patients with stable coronary artery disease admitted to 22 centers in Kyrgyzstan were studied retrospectively and compared with the European and Turkish findings in EUROASPIRE III. During the study, the patients were interviewed and examined in the first year after the initial coronary event and/or intervention.

Results: The gender distribution of the 1067 patients in the study was 658 female (61.7%) and 409 male (38.3%), and the average age was 68±14 years. The ratio of young patients (<50 years) in Kyrgyzstan and Turkey were higher compared with the other European countries (Kyrgyzstan 28.2%, Turkey 20% and Europe 12.7%). The number of patients followed after the coronary event in Kyrgyzstan was 524 (49.1%). Although there was not a big difference of the classical risk factors between Turkey and Europe, in Kyrgyzstan, smoking (75%), hypertension (84%), dyslipidemia (86.5%), and diabetes (74.4%) were much higher when compared to the other countries. The biggest difference between Kyrgyzstan and the other countries in EUROASPIRE III study including Turkey, was the infrequency of medical (78% vs. 95%) and interventional treatment (1.9% vs. 57%). Also, smoking cessation (27.4% vs.70.8% in Europe), physical activity (17.5% vs. 59.1% in Europe), and weight loss (37.2% vs. 58.2% in Europe) ratios after the coronary event were found to be much lower in Kyrgyzstan than in EUROASPIRE III study.

Conclusion: When compared to the results of EUROASPIRE III study of Turkey and Europe; the Kyrgyzstan results were found to be behind for the prevention, follow-up and treatment goals set by the guidelines.

ÖZET

Amaç: Koroner arter hastalığında EUROASPIRE III (The European Action on Primary and Secondary Prevention by Intervention to Reduce Events) çalışması, 2006-2007 yılları arasında Türkiye'nin de dahil olduğu 22 Avrupa ülkesinde (76 merkez) yapılmıştır. Bu çalışmada, bir Asya ülkesi olan Kırgızistan'da koroner arter hastalığının yönetimi ile ilgili durum EUROASPIRE III Türkiye ve Avrupa verileri ile karşılaştırıldı.

Çalışma planı: Kırgızistan'da 22 merkeze ait 1.067 kararlı koroner arter hastasının verileri geriye dönük olarak incelendi ve Türkiye'nin ve diğer Avrupa ülkelerinin EUROASPIRE III sonuçları ile karşılaştırıldı. Hastalarla çalışma sırasında ve koroner olay ve/veya girişimden en az bir yıl sonra görüşüldü, muayeneleri yapıldı.

Bulgular: Hastaların 658'i kadın (%61.7) ve 409'u erkek (%38.3) olup ortalama yaşları 68±14 yıldı. Çalışmaya alınan hastaların 524'ü (%49.1) koroner olay sonrası tekrar izlenebildi. Kırgızistan ve Türkiye'de genç hasta (<50 yaş) oranlarının Avrupa ülkelerine kıyasla yüksek olduğu görüldü (Kırgızistan %28.2, Türkiye %20 ve Avrupa %12.7). Klasik risk faktörleri bakımından Türkiye ve Avrupa sonuçları arasında büyük fark olmamasına rağmen; Kırgızistan'da sigara (%75), hipertansiyon (%84), dislipidemi (%86.5) ve diyabet (%74.4) sıklığının diğer ülkelere göre belirgin yüksek olduğu görüldü. Kırgızistan'daki tedavi yaklaşımı ile Türkiye dahil diğer EUROASPIRE III ülkeleri arasındaki en büyük fark, tıbbi (%78'e karşı %95) ve girişimsel tedavinin (%1.9'a karşı %57) azlığıydı. Ayrıca, Avrupa sonuçları ile karşılaştırıldığı zaman, koroner olay sonrası sigara bırakma (Kırgızistan %27.4, Avrupa %70.8), fiziksel aktivite (Kırgızistan %17.5, Avrupa %59.1), kilo kaybı (Kırgızistan %37.2, Avrupa %58.2) oranlarının, Kırgızistan'da belirgin olarak az olduğu görüldü.

Sonuç: Kırgızistan ile Türkiye ve Avrupa'nın EUROASPIRE III sonuçları karşılaştırıldığı zaman, Kırgızistan'da koroner arter hastalığı ve risk faktörleri yönteminin kılavuzların önlem, takip ve tedavi amaçlarının gerisinde kaldığı görüldü.

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Coronary heart disease (CHD) is the most significant cause of mortality and morbidity all over the world. Although there is a decline in the rate of mortality from the CHD in the USA and Europe, there is actually no decline in the absolute number of people dying from this disease.[1] The number of people over 60 years of age is expected to double by the year 2025 and triple by the year 2050. The majority of these people will be in Asia and therefore more than half of all CHD patients are expected to be in this region.[2] Kyrgyzstan has the sixth highest cardiovascular disease (CVD) mortality in Eurasia following Russia, Byelorussia, Ukraine, Kazakhstan and Moldova.[3] More than 19,000 people die from CVD annually in Kyrgyzstan, with the death rate being >50/day. The death rate from CVD is caused basically (80%) by CHD (including acute myocardial infarction) and cerebrovascular diseases.

The European Action on Primary and Secondary Prevention by Intervention to Reduce Events (EUROASPIRE) studies have analyzed the effects of medical treatments and the modifications of life style and risk factors on the patients with CHD. Nine countries (Czech Republic, Finland, France, Germany, Hungary, Italy, Holland, Slovenia, and Spain) participated in the EUROASPIRE I[4] between 1995 and 1996; in the EUROASPIRE II,[5] Belgium, Greece, Ireland, Poland, Sweden and England joined to these countries between years 1999 and 2000; and in the EUROASPIRE III[6] a total of 22 countries including Turkey, Bulgaria, Croatia, Cyprus, Lithuania, Latonia, Romania, and Russia (Switzerland was excluded) participated to the study between 2006 and 2007. The EUROASPIRE III study was performed to examine whether the patients with CHD were followed according to the current European CHD guidelines; and whether there was an improvement in the preventive cardiology practice compared with the EUROASPIRE I and II studies. A total of 13,935 medical records (27% women) from 76 centers among 22 European countries were screened in this study and 8966 patients were interviewed. Findings of the survey revealed that expected goals in risk modification, and proper use of medications were not reached in many patients with CHD.[6] Furthermore, the frequency of risk factors and the usage of cardio-protective drugs were quite different among the participating countries.

The purpose of this study is to evaluate the differences in cardiovascular risk factors, life style modifications and drug usage between a Central Asian country-Kyrgyzstan- and European countries, specifically Turkey, using the findings of the EUROASPIRE III study.

Abbreviations:

ACE	*Angiotensin converting enzyme*
ARBs	*Angiotensin II receptor blockers*
CHD	*Coronary heart disease*
CVD	*Cardiovascular disease*
EUROASPIRE	*The European Action on Primary and Secondary Prevention by Intervention to Reduce Events*
HDL	*High-density lipoprotein*
LDL	*Low-density lipoprotein*
SBP	*Systolic blood pressures*
TC	*Total cholesterol*
TG	*Triglycerides*
WHO	*World Health Organization*

PATIENTS AND METHODS

The study was carried out retrospectively covering the years 2006 and 2007, and was accomplished according to the national programs of Kyrgyzstan Health Ministry, namely Manas Directory. Records of the patients with the diagnoses of CHD from the 18 Family Medicine Centers and 4 Hospitals belonging to the Osh (Bishkek) Province in Kyrgyzstan were reviewed retrospectively and patients who suffer from stable angina pectoris were registered. Patients (aged between 40 and 80 years) with the diagnoses of CHD (previous myocardial infarction, revascularization or proven ischemia) and who suffer from angina pectoris were included in the study. Patients with an acute coronary syndrome after the index event, cardiomyopathies, and patients having missing data were excluded from the study.

Each patient was interviewed and data were recorded in personal medical records. The topics included in the patient interview were personal and demographic data, past illnesses and current diagnoses, risk factor distribution, physical examination findings, laboratory results, and medical treatment data. The patients were called for the control examinations one year later. Their body mass indexes (kg/m^2) were measured, and classified according to reference values as lean (<18.5 kg/m^2), normal (18.5 to 24.9 kg/m^2), overweight (25 to 29.9 kg/m^2), and obese (≥30 kg/m^2). Their waist circumferences were measured and a circumference >102 cm for men and >88 cm for women was considered as the abdominal obesity cut-off points. Systolic and diastolic blood pressures (SBP and DBP) were measured in a sitting position and hypertension was diagnosed according

to the classification used by the World Health Organization (WHO)-International Society of Hypertension. Total cholesterol (TC), high-density lipoprotein (HDL), low-density lipoprotein (LDL), and triglycerides (TG) levels, and in diabetic patients glycosylated haemoglobin (HgbA1c) levels were measured from venous blood samples. Dyslipidemia was defined as a total serum cholesterol ≥4.5 mmol/L (174 mg/dL); HDL <1 mmol/L (40 mg/dL) (male) and <1.2 mmol/L (45 mg/dL) (female); TG ≥1.7 mmol/L (150 mg/dL); LDL >2.5 mmol/L (110 mg/dL). Diabetes was defined as a fasting plasma glucose level ≥7 mmol/L (126 mg/dL). The drugs used for the medical treatment of CHD were recorded as antiplatelets, beta-blockers, angiotensin converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs), calcium channel blockers, diuretics, statins, other dyslipidemic agents, and anticoagulants.

Ethical procedures

The permission was obtained from The Kyrgyzstan Ministry of Health, Central Ethics Committee. A signed informed consent was obtained for all participants.

Statistical analysis

All the obtained data was analyzed using "Microsoft Office Excel 2003" and "Statisca 7" programs. For the numerical variations defining statistics (average, median, standard deviation, minimum and maximum values), and for the categorical variations the frequency tables were used.

RESULTS

Totally 2004 patients were randomly selected, but only 1067 of them were included in the study due to the exclusion criteria. The gender distribution was 658 (61.7%) females and 409 (38.3%) males, and the average age was 68.3±13.7 years. Female gender ratio of CHD patients in Kyrgyzstan was markedly higher than Turkey and Europe (Table 1).

The number of patients that came for the control visit following the index event was 524 (49.1%) in Kyrgyzstan. The most common reasons for the patients not to being followed were as follows: personal reasons 41.6%, death of the patient 28.9%, moving to a different location 8.6%, not having enough time 2.7%, having a change in the health status 13.4%, and unknown causes and other reasons 4.8%. The data pertaining the gender of the patients, the age during the index event, and the distribution of patients' diagnosis and interventions (diagnostic categories)

Table 1. Comparison of the gender, age distribution and type of index event in Europe, Turkey and Kyrgyzstan based on medical records

	Kyrgyzstan (%) (n=1067)	Turkey (%) (n=669)	Europe (%) (n=13935)
Gender			
Women	61.7	27.5	23.8
Men	38.3	72.5	76.2
Age at index event			
<50	28.2	20.0	12.7
50-59	30.6	27.5	28.7
60-69	39.1	32.3	35.5
≥70	5.1	20.2	23.1
Diagnostic category			
Coronary artery bypass grafting	1.2	14.8	17.7
PTCA	0.7	34.4	39.4
Acute myocardial infarction	49.7	35.1	22.6
Ischemia[1]	31.3 (48.4%)	15.7	20.3

PTCA: Percutaneous transluminal coronary angioplasty. [1]Myocardial ischemia with out semptoms or signs of myocardial infarction.

according to medical records are given on Table 1. When the data from Kyrgyzstan, Turkey, and Europe were compared, the ratio of patients who are younger than 50 years was found to be higher in Kyrgyzstan and Turkey compared to Europe (28.2%, 20% and 12.7 % respectively). Furthermore, smoking (75%), hypertension (84%), dyslipidemia (86.5%), and diabetes (74.4%) were more common in Kyrgyzstan compared to the Europe and Turkey (Table 2).

Although there was not a big difference between Turkey and other European countries for documenting the classical risk factors there were deficiencies in recording the weight, height, waist circumference, TC, HDL, LDL, triglycerid, glucose, and HgbA1c measurements in Kyrgyzstan, and this ratio was much lower when compared with these countries. On the other hand, in Kyrgyzstan the SBP measurements were recorded in a higher ratio (85.7%, 75.5%, and 63.4%, respectively) (Table 3).

In the follow-up data of the patients, the ratio of smoking cessation has been found to be less in Kyrgyzstan (27.4%) compared to Europe (70.8%). Also, weight loss in Kyrgyzstan (37.2%) was less than Europe (58.2%), and Turkey (69.4%). Physical activity in Kyrgyzstan (17.5%) has been also found to be less compared to Europe (59.1%) (Table 4).

While getting medical treatment following a coronary event in Turkey and Europe had been close to each other (99.4% vs. 95.1% respectively), this ratio was quite low in Kyrgyzstan (78%). The most marked difference was observed in usage of statins and other lipid lowering agents in Kyrgyzstan compared with Turkey and Europe (Table 5).

DISCUSSION

Coronary artery disease risk factors, treatment and post treatment data all are mainly derived from American and European sources. However, the risk factors and the treatment modalities could be different for Asian and western populations for a given disease. CVD could affect different races in different ways. The genetic structural changes caused by different eating habits and environmental factors could explain this difference.[7]

In our study, we compared EUROASPIRE III data

Table 2. Available information on coronary risk factors and measurements of weight, height, waist, blood pressure, lipids, glucose and HgbA1c in hospital discharge documents

	Kyrgyzstan (%)	Turkey (%)	Europe (%)
Available information on risk factors			
Smoking	65.2	73.1	69.7
Hypertension	84.1	75.2	81.4
Dyslipidemia	56.5	67.0	76.5
Diabetes	64.4	72.3	75.4
Available information on risk factor measurements on discharge			
Weight	8.1	16.3	40.2
Height	8.1	16.1	40.9
Waist	3.2	5.7	12.8
Systolic blood pressure	85.7	75.5	63.4
Total cholesterol	13.1	32.0	53.6
High-density lipoprotein cholesterol	13.1	31.3	41.2
Low-density lipoprotein cholesterol	13.1	30.7	41.3
Triglycerides	13.1	31.0	48.1
Glucose	46.2	49.8	58.4
HgbA1c	3.7	6.9	11.2

HgbA1c: Glycated haemoglobin A1c.

Table 3. Quantitative coronary heart disease risk factors at interview

Risk factors	Kyrgyzstan	Turkey	Europe
Body mass index (kg/m^2, mean-SD)	29.3±3.9	28.6±4.0	28.9±4.5
Waist circumference (cm, mean-SD)	102.7±11.2	96.7±11.5	99.6±12.4
Systolic blood pressure (mmHg, mean-SD)	142.8±23.9	141.1±22.7	140.3±20.7
Diastolic blood pressure (mmHg, mean-SD)	91.2±10.1	83.1±12.3	82.7±11.8
Serum total cholesterol (mmol/L, mean-SD)	4.68±1.33	4.66±1.18	4.69±1.20
Serum LDL cholesterol (mmol/L, mean-SD)	3.1±1.11	2.81±0.99	2.77±0.99
Serum HDL cholesterol (mmol/L, mean-SD)	1.06±0.34	1.05±0.22	1.16±1.29
Serum triglycerides (mmol/L, median-IR)	1.49±1.18-2.24	1.46±(1.09-2.04)	1.39±(1.02-1.96)
Plasma glucose (mmol/L, median-IR)	6.56±(6.01-7.62)	6.10±(5.67-6.94)	6.36±(5.87-7.21)

HDL: High-density lipoprotein; SD: Standard deviation.

with one of the Asian countries, namely Kyrgyzstan's. The ease of access to accurate medical data has been the reason for choosing this country. The most important difference in baseline (discharge) characteristics between the countries was the higher frequency of female patients in Kyrgyzstan. When we reviewed our data more detailly, we observed that the frequency of men was higher in 45-55 years age group and the frequency of women was higher in 55-65 years age group (Figure 1). Life expectancy at birth is 65 years for men and 72 years for women in Kyrgyzstan which is 10 years less than Europe (75.3 years for men and 81.7 years for women) (Ref: http://www.who.int/countries/kgz/en/). The probability of dying between 15 and 60 years (per 1 000 population) is 279 for men and 135 for women.

Therefore, the higher frequency of women in Kyrgyzstan data could be due longer life spans of women compared with the men. Nevertheless, we think that this fact can only partially explain the marked difference in gender distribution and coincidence may also play a role.

Mean age of the patients at index event was also

Table 4. Comparison of the rate of patients with risk factors regarding lifestyle changes and guideline targets after the index events reported by patients during the interview

Risk factors	Kyrgyzstan (%)	Turkey (%)	Europe (%)
Current smoking[A]	25.7	23.1	17.2
Overweight[B]	85.3	83.6	81.8
Obesity[C]	39.1	35.5	35.3
Increased waist circumference[D]	58.9	41.2	52.7
Raised BP[E]	56.4	55.2	56.0
Elevated TC[F]	54.1	48.3	51.1
Decreased HDL[G]	52.3	50.2	36.7
Elevated TG[H]	38.7	36.6	34.7
Diabetes[I]	38.5	33.6	34.8
Healthy	88.7	93.7	92.3
Physical activity	17.5	48.6	59.1

A: Patients were evaluated according to verbal data. B: Body mass index ≥25 kg/m^2. C: Body mass index ≥30 kg/m^2, D: Waist circumference ≥102 cm (male) and ≥88 cm (female), E: SBP ≥140 mmHg and (or) DBP ≥90 mmHg (diabetes SBP ≥130 mmHg and (or) DBP ≥80 mmHg). F: Serum TC ≥4.5 mmol/L, G: Serum HDL cholesterol <1 mmol/L (male) and <1.2 mmol/L (female), H: Serum TG ≥1.7 mmol/L, I: Plasma glucose ≥7 mmol/L and (or) diabetes history. BP: Blood pressure; TC: Total cholesterol; TG: Triglycerides, HDL: High-density lipoprotein; SBP: Systolic blood pressure; DBP: Diastolic blood pressure.

Table 5. Reported medications at discharge (D) and at the time of interview (I)

Drugs	Kyrgyzstan		Turkey		Europe	
	D (%)	I (%)	D (%)	I (%)	D (%)	I (%)
Antiplatelets[1]	78.0	70.3	99.4	91.4	95.1	90.5
B-blockers	69.1	62.7	83.1	73.8	82.5	79.8
ACE, ARB-II inhibitors	76.6	49.6	73.6	69.0	69.0	70.9
Calcium antagonists	49.5	37.4	11.4	14.2	22.5	24.5
Diuretics	11.3	12.6	17.7	27.6	29.5	30.2
Lipid-lowering drugs*	1.4*	1.1	82.0	65.9	79.7	79.8
Statins	27.4	14.8	82.3	65.0	80.7	78.1
Anticoagulants	0.7	0.4	2.7	2.1	7.8	5.6

ACE: Angiotensin converting enzyme inhibitors; ARB: Angiotensin II receptor blockers; *: Non statins. 1: Acetylsalicylic acid (94.1%) and clopidogrel or ticlopidine (5.9%).

lower in Kyrgyzstan compared to both Turkey and Europe. Accordingly, frequency of the patients over 70 years is less than Turkey and Europe. The size of the younger generation in the whole Kyrgyzstan population may play a role in this difference. Hypertension, obesity, diabetes and smoking are more common in Kyrgyzstan than in Europe including Turkey. The percentage of the interventions at the index event (coronary artery bypass grefting, percutaneous coronary intervention) has been found to be less common in Kyrgyzstan than in Turkey and the other European countries in the EUROASPIRE III study. Besides this, post coronary event smoking cessation, weight reduction and increase in physical activity have been found to be much less in Kyrgyzstan. Life style changes, such as smoking cessation, healthy diet, sufficient and regular physical activity have been shown to lower recurrent coronary vascular events significantly in previous several studies.[8,9] Lower treatment of risk factors, less access to interventional treatment and less implementation of evidence based medicine may be important in younger age of the patients in Kyrgyzstan compared to Europe.

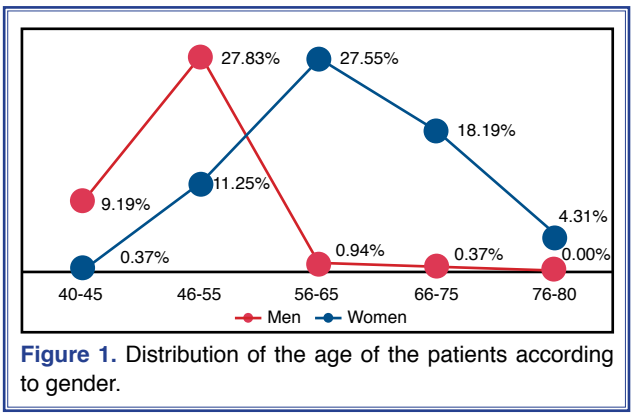

Figure 1. Distribution of the age of the patients according to gender.

When discharge summaries were reviewed, the insufficiency of the information on the risk factor history and measurements was more common in Kyrgyzstan except for hypertension and blood pressure measurement. Especially weight, height, waist circumference and lipid profile was infrequently recorded in Kyrgyzstan, whereas weight, height and waist circumference was uncommonly recorded in Turkey.

While drug usage ratio at discharge and at the follow-up were similar in Turkey and the other European countries, usage of statins was infrequent at discharge in Kyrgyzstan and usage of the other drugs declined more markedly at follow-up than in Europe.

Tokgözoğlu and et al.[10] reported that the striking difference between Turkey and other European countries is the medication use after discharge. In the present study, we observed lesser medication use after discharge in Kyrgyzstan than Turkey and the European countries, and a striking decrease in the use of statins during follow-up.

A reverse ratio between the socio-economic development of the countries and the CVD has been reported.[11] As a result of economic development obesity and diabetes have reportedly increased in the Asian countries.[12] Yusuf et al.[13] reported that use of secondary prevention medications is low worldwide,

especially in low-income countries and rural areas. He and his co-authors therefore stated that systematic approaches are needed to improve the long-term use of basic, inexpensive, and effective drugs in their prospective study, which enrolled 153,996 adults from 628 urban and rural communities in countries.

Kyrgyzstan is a low income country according to WHO classification. The compulsory health insurance system of Kyrgyz Republic came into force in 1999. The compulsory health insurance has been covering approximately two million people, and 50% of the insured patient's treatment costs in Kyrgyz Republic (Kyrgyzstan health sector report, 2007).

According to the Republican Medical Information Center in the Kyrgyz Republic, CVDs took first place in the structure of annual death rate representing almost half (48.3%) of all deaths in the year 2007 (Health of Population and the Activity of the Medical Organizations of the Kyrgyz Republic in 2007. Bishkek 2008). The struggle against CVDs in the Kyrgyz Republic has become one of the priority directions of the National Program of Reforming the Public Health "Manas Taalimi (Exercise)" for 2006-2010.[14]

Current regulations on the usage of evidence based drugs are somehow different than European countries. The ACE-Is and ARBs are reimbursed by the Kyrgyzstan National Health System, but statins, clopidogrel and ticlopidine are not reimbursed. These factors might be contributing to inadequate medical treatment in Kyrgyzstan. We were unable to evaluate whether Kyrgyz doctors' education level was effective in inadequate medical treatment. Inadequate doctor and also patient education may explain the lack of success in areas of drug use and lifestyle changes.

The most prominent differences of Kyrgyzstan compared to European countries are the higher frequency of younger people with the myocardial infarction, higher ratio of the discontinuation of smoking and sedentary lifestyles, lower usage of antilipidemics, and not being followed up with by the physician and not being educated well enough after the index event. The EUROASPIRE III study has shown that, European countries, including Turkey, are behind in the cardiovascular prevention goals. Review of the Kyrgyzstan data shows that both risk factor management and access to medical and interventional treatment were insufficient compared to Europe.

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Key words: Cardiovascular disease; coronary artery disease; Kyrgyzstan; life style; risk factor.

Anahtar sözcükler: Kardiyovasküler hastalık; koroner arter hastalığı; Kırgızistan; yaşam tarzı; risk faktörü.