KLİNİK ÇALIŞMA / ORIGINAL ARTICLE

EUROASPIRE-IV: Avrupa Kardiyoloji Derneğinin koroner arter hastalarında yaşam tarzı, risk faktörleri ve tedavi yaklaşımı üzerine çalışması: Türkiye verileri

EUROASPIRE-IV: European Society of Cardiology study of lifestyle, risk factors, and treatment approaches in patients with coronary artery disease: Data from Turkey

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ÖZET

Amaç: Koroner arter hastalığı (KAH) tanısı ile hastaneye yatırılan hastalarda risk faktörleri ve kılavuzlara uyumun araştırıldığı EUROASPIRE-IV Türkiye kolu verileri ve bulguları EUROASPIRE-III Türkiye ve EUROASPIRE-IV Avrupa bulguları ile karşılaştırıldı. ***Yöntemler:*** Çalışma Türkiye'nin 17 merkez ile dahil olduğu, 24 Avrupa ülkesinde yapıldı. Son 6 ay içinde ve 3 yıl öncesi dönemde koroner (indeks) olay nedeniyle hastaneye yatmış 18–80 yaş arası hastalar, hastane kayıtlarından belirlenerek görüşmeye çağrıldı. Hastaların indeks olay sırasındaki bilgileri arşiv kayıtlardan elde edildi. Görüşmede detaylı öykü alınarak fiziksel muayeneleri ve laboratuvar ölçümleri yapıldı.

Bulgular: Koroner olay sırasındaki yaş ortancası 58.8 yıl olup, 6 yıl önce aynı merkezlerde yapılan EUROASPIRE-III çalışmasına göre (60.5 yıl) anlamlı olarak düştüğü gözlendi (p=0.017). Hastaların %19.3'ü 50 yaş altında olup ortalama yaş EUROASPIRE-IV Avrupa'ya (62.5 yıl) göre belirgin olarak düşük bulundu. EUROASPIRE-III ile karşılaştırıldığında EUROASPIRE-IV Türkiye kolunda sigara içme oranı %23.1'den %25.5'e (p=0.499), obezite %35.5'ten %40.7'ye (p=0.211), total kolesterol yüksekliği %48.3'ten %49.6'ya (p=0.767) ve diyabet %33.6'dan %39.7'ye (p=0.139) yükselmiş olmakla beraber farklar istatistiksel açıdan anlamlı değildi. Koroner olay sonrasında sigara içicilerinin %11.7'si sigarayı bıraktı. EUROASPIRE-IV Avrupa'da bu risk faktörleri daha az oranda saptanmış olup sigara içme %16, obezite %37.6, diyabet %26.8 oranlarına idi. ***Sonuç:*** EUROASPIRE IV çalışması Türkiye kolunda koroner arter hastalarında ikincil korunmanın istenilen düzeyde olmadığı, altı yıl öncesine göre olumsuz yönde ilerlediği, genel Avrupa ortalamasına göre bazı risk faktörlerinin daha kontrolsüz olduğu ve genç yaşta koroner olayların hâlâ önemli bir sorun olduğu saptanmıştır.

ABSTRACT

Objective: Data from EUROASPIRE-IV Turkey report investigating risk factors and adherence to guidelines in patients hospitalized for coronary artery disease are presented and results are compared with those of EUROASPIRE-III Turkey and EUROASPIRE-IV Europe. ***Methods:*** Study was performed in 24 European countries, including Turkey (17 centers). Patients (18–80 years old) hospitalized for coronary (index) event during preceding 3 years were identified from hospital records and interviewed ≥6 months later. Patient information regarding index event was acquired from hospital records. Anamnesis was obtained during the interview, and physical examination and laboratory analyses were performed. ***Results:*** Median age at the index coronary event was 58.8 years, and it was signifcantly decreased compared with last EU-ROASPIRE-III study (60.5 years), which was conducted at the same centers 6 years earlier (p=0.017). Of all patients, 19.3% were under 50 years of age and mean age was lower than that of EUROASPIRE-IV Europe (62.5 years). Comparing EUROASPIRE-IV Turkey with EUROASPIRE-III Turkey, rate of smokers increased to 25.5% from 23.1% (p=0.499), obesity increased to 40.7% from 35.5% (p=0.211), total cholesterol level increased to 49.6% from 48.3% (p=0.767), and diabetes rate increased to 39.7% from 33.6% (p=0.139), however none of the differences reached a level of statistical signifcance. Only 11.7% of the smokers quit after coronary event. Rates for these factors were lower in EUROASPIRE-IV Europe (16% for smoking, 37.6% for obesity, and 26.8% for diabetes). ***Conclusion:*** EUROASPIRE-IV Turkey data revealed that secondary prevention was unsatisfactory and had progressed unfavorably compared with last EUROASPIRE study, some risk factors were more uncontrolled than overall European average, and coronary artery events at young age remain an important problem.

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Cardiovascular diseases (CVD) are stil among one of the foremost causes of morbidity, and mortality in the whole world. According to data of World Health Organization every year 17.5 million people are dying because of CVD which constitutes 31 % of all deaths worldwide..[1] Cardiovascular diseases cause disease burden, and important amount of workforce loss, in addition to socioeconomic burden.[2] Most of the cardiovascular diseases can be prevented by implementation of strategies against behavioural risk factors as smoking, unhealthy dietary habits, obesity, sedentary life, and alcohol abuse.[1] These strategies are important both in primary prophylaxis, and protection against a newly developed event in patients who previously experienced a cardiovascular episodes.[3]

The EUROASPIRE (European Action on Secondary and Primary Prevention by Intervention to Reduce Events) study conducted by The European Society of Cardiology on life style, risk factors, and their treatment of inpatients have demonstrated greater differences between guidelines, and daily practices..[2] EUROASPIRE I , and II studies have demonstrated the presence of higher rates of modifiable risk factors in CAD.[4] During the years 2006-2007 EUROASPIRE-III, and later on EUROASPIRE-IV were realized in 22, and 24 European countries respectively, and Turkey participated in EUROASPIRE-IV .[5,6]

In this article, we aimed to present data collected from Turkey within the frame of EUROASPIRE-IV study in detail with particular attention to important issues for our country. At the same time, we targeted to investigate if any difference exists between our findings and EUROASPIRE-III Turkey data , and to compare our findings with those of European countries still within the context of EUROASPIRE-IV study.

METHODS

Selection of Geographic Region and Hospital

EUROASPIRE-IV study is a cross-sectional study performed on patients with CAD, and carried out in 17 centers, and 24 European countries (78 centers) including Turkey between 2012, and 2013 The same centers from Turkey were included both in EUROASPIRE-III , and EUROASPIRE-IV studies.[5]

Patients

Within the frame of the study consecutive patients aged ≥ 18, and <80 years hospitalized because of coronary events (index) detected in hospital files within the period between the last 3 years, and 6 months were retrospectively determined, and invited for interviews.

Abbreviations:

ACEI Angiotensin cocnverting enztme inhibitur
FH Familial hypercholesterolemia
ARB Angiotensin II receptor blocker
CO Carbon monoxide
EUROASPIRE European Action on Secondary and Primary Prevention by Intervention to Reduce Events
HDL High-density lipoprotein
CAD Coronary artery disease
CVD Cardiovascular disease
LDL Low-density lipoprotein
PTCA Percutaneous transluminal coronary angioplasty

Index coronary event was defined as acute myocardial infarction (MI) or percutaneous coronary intervention (PCI) ischemia, coronary bypass surgery, The patients who met one or more than one of the following diagnostic criteria were selected:

i) Elective or emergency coronary artery bypaass grafting (CABG) (incl. emergency CABG performed for the treatment of acute MI). *ii)* Elective or emergency percutaneous transluminal coronary angioplasty (PTCA) (incl. emergency PTCA performed for the treatment of acute MI), *iii)* Acute MI (with or without ST-elevation MI (acute MI: ICD-10 code # 121). *iv)* Acute myocardial ischemia without any evidence of infarction (troponin negative) (ischemia: ICD-10 code # 120).

Collection of Data

A standardized interview was realized with the trained health personel, and patients who attended the invitation for the control visit. Demographic information, and medical histories of the patients were recorded, Physical examinations, and antropometric measurements of the patients were performed. Venous blood samples were drawn for the measurements of fasting blood glucose, HbA1c (in diabetics), and lipid profile. Besides, during occurrence of index event, patients'data related to their hospital stay (demographic characteristics, medical history, physical examination, and laboratory findings, and drugs prescribed at discharge) were retrospectively retrieved from hospital archives, and recorded.

Measurements

During interview, the patients with their shoes off and wearing light clothes were weighed using a calibrated scales (SECA brand scales, model no: 271, stick model 220, USA) Blood pressures weremeasured with the patient at rest, and while sitting erect from right upper arm using automatic digital sphygmomanometer (Omron M5-I, Omron Healthcare, Japan). Average of two measurements performed at intervals of few minutes was recorded. Systolic blood pressure ≥140 mmHg (in diabetics ≥130) and/ or diastolic blood pressure ≥90 mmHg (in

diabetics ≥80) considered as high blood pressure .
Smoking status was determined based on patient's self-reports, and/or >10 ppm of carbon monoxide (CO) detected in patient's breath. Measurement of CO in breath was performed using portable measurement device (Smokerlyser, Model Micro 4; Bedfont Scientifc Ltd., Rochester, Kent, UK) .
Definitions of hyperlipidemia (increased lipid levels) or dyslipidemia (abnormal lipid levels) were made as follows: increased total cholesterol level: serum total cholesterol level ≥174 mg/dL; increased LDL-cholesterol level: low-density lipoprotein (LDL) cholesterol: ≥100 mg/dL; decreased HDL – cholesterol level: high-density lipoprotein (HDL) level: men, <40 mg/dL, and women, <45 mg/dL increased triglyceride level: triglyceride level: ≥150 mg/dL With treatment LDL-cholesterol level of <70 mg/dL was targeted Diagnosis of diabetes was made based on the patient's own words and /or plasma fasting glucose level of ≥126 mg/dL A detailed and a standardized questionnaire survey was applied for all interviewed study participants related to their physical activity, and dietary habits.[6]

Familial hypercholesterolemiaa (FH) scores were calculated based on the definitions suggested by De Backer et al.[7] Based on the familial hypercholesterolemia scores, FH was categorized as follows: 0–2:un-likely, 3–5: possible, 6–8: probable , and >8: definite FH. Probable, and definite categories were combined in potential AH category. In the scoring of familial hypercholesterolemia the age limits for early onset CVD were accepted as <55 years for men, and <65 years for women.

Besides the findings of EUROASPIRE-IV Turkey were compared with those of EUROASPIRE-III Turkey study performed in the same centers 6 years previously.

Quality Assurance

To achieve standardization of measurements in compliance with the maanufacturers' recommendations, all devices were calibrated, and their maintenance was performed. Venous blood samples were drawn , and stored in compliance with the formulated guideline. All national coordinators, and main research personnel who were responsible for the training of local data collectors were trained in Coordination Center in Imperial College, Department of Cardiovascular Medicine, National Heart and Lung Institute (London, UK) . During the study period raandomly chosen 10 medical reports were audited similarly, all disputed matters were discussed, and resolved

Ethical Issues

National Coordinators were responsible for obtaining Local Research Ethics Committees approvals. Written, informed consent was obtained from each participant by the investigator by a signed declaration. The research assistants signed the Case Record Form to confirm that informed consent was obtained and stored the original signed declaration consent in the patient's file.

Statistical Analysis

For statistical analysis Predictive Analytics Software (PASW) Statistics version 18.0 for Windows (SPSS Inc., Chicago, IL, ABD) program was used. Descriptive statistics for numerical variables were presented as median (interquartile range) , and for categorical variables as the number of cases, and percentages. Fitness of variables to normal distribution were analyzed using visual (histogram, and probability graphics), and analytical (Kolmogrov-Simirnov test) methods In pairwise comparisons of numerical variables which did not demonstrate normal distribution Mann-Whitney U-test was used. Categorical variables were evaluated using *chi*-square test. In cases where anticipated frequency was below 5, Fisher's exact probaability test was employed. Level of statistical significance was set at $p<0.05$.

RESULTS

Patients' characteristics during index event

Within the frame of EUROASPIRE-IV Turkey records of a total of 446 patients from Turkey were evaluated. Study population consisted of 88 (19.7%) female, and 358 (80.3%) male patients. Patients' characteristics during index event are shown in Table 1. During index event mean age of the female patients was higher than that of the male patients (62.4 , and 58.2 years, p=0.003, respectively). Among study population aged < 50 years, higher number of men experienced coronary events when compared with women (21.2 % *vs* 11.4 %, p=0.012). Also number of nonsmoker women were higher than that of men (68.2 % *vs* 19.6,% p<0.001), while higher number of men were smoking (35.8 % *vs* 16.7%, p<0.001).

Table 1. Characteristic features of the coronary artery patients from Turkey who participated in EUROASPIRE-IV study

	n	Total	n	Female	n	Male	*p*
Age, years, median (intyerquartile range) (minimum, maximum)	446	58.8 (52.3–66.3) (25–80)	88	62.4 (53.6–70.0) (33–80)	358	58.2 (51.5–65.1) (25–79)	0.003*
Age group year, n (%)	446		88		358		
<50		86 (19.3)		10 (11.4)		76 (21.2)	0.012**
50–59		155 (34.8)		27 (30.7)		128 (35.8)	
60–69		133 (29.8)		28 (31.8)		105 (29.3)	
≥70		72 (16.1)		23 (26.1)		49 (13.7)	
Index event, n (%)	446		88		358		
Acute myocardial infarction		155 (34.8)		28 (31.8) 9		127 (35.5)	0.681**
Acute myocardial ischemia		33 (7.4)		(10.2)		24 (6.7)	
Coronary bypass surgery		38 (8.5)		8 (9.1)		30 (8.4)	
Percutaneous coronary intervention		220 (49.3)		43 (48.9)		177 (49.4)	
Smoking ¥, n (%)	326	104 (31.9)	66	11 (16.7)	260	93 (35.8)	<0.001**
Active smoker							
Recently quitted		73 (22.4)		6 (9.1) 4		67 (25.8)	
Former smoker		53 (16.3)		(6.1)		49 (18.8)	
Nonsmoker		96 (29.4)		45 (68.2)		51 (19.6)	
Obesity, n (%)							
Based on patient's self-report	276	78 (28.3)	57	24 (42.1)	219	54 (24.7)	0.009**
Body mass index ≥30 kg/m^2	230	73 (31.7)	46	20 (43.5)	184	53 (28.8)	0.056**
Hypertension n (%)	404	272 (67.3)	79	62 (78.5)	325	210 (64.6)	0.018**
Based on patient's self-report							
Blood pressure (≥140/≥90 mmHg)	379	169 (45.4)	70	34 (46.6)	309	135 (45.2)	0.826**
(in diabetics ≥130/≥80 mmHg)							
Dyslipidemia, n (%)							
Based on patient's self report	379	251 (66.2)	70	47 (67.1)	309	204 (66.0)	0.858**
Elevated total cholesterol (≥174 mg/dL)	387	206 (53.2)	74	48 (64.9)	313	158 (50.5)	0.026**
Elevated LDL-cholesterol (≥100 mg/dL)	391	249 (63.7)	75	47 (62.7)	316	202 (63.9)	0.839**
LDL-cholesterol (≥70 mg/dL)	391	349 (89.3)	75	67 (89.3)	316	282 (89.2)	0.981**
(inability to attain treatment target)							
Decreased HDL-cholesterol	386	219 (56.7)	75	48 (64)	311	171 (55)	0.157**
(Male: <40, Female: <45 mg/dL)	387	154 (39.8)	75	29 (38.7)	312	125 (40.1)	0.824**
Elevated triglyceride (≥150 mg/dL)							
Diabetes, n (%)	333	87 (26.1)	63	27 (42.9)	270	60 (22.2)	0.001**
Based of patient's self report							
Fasting plasma glucose (≥126 mg/dL)	356	125 (35.1)	74	29 (39.2)	282	96 (34.0)	0.409**

*Mann Whitney U test; **_chi_-square test; ¥ based on self-report. LDL: low-density lipoprotein lipoprotein; HDL: High-density lipoprotein

When female, and male patients were compared as for parametres based on patients'self-reports obesity (42.1 % *vs* 24.7%, p=0.009), hypertension (78.5 % *vs* 64.6%, p=0.018) and diabetes mellitu (42.9 % *vs* 22.2%, p=0.001) were detected to be significantly higher in female patients. Besides hypercholesterolemia was significantly more frequently detected in women (%64.9 *vs* 50.5 %, p=0.026).

Characteristics of the patients who attended or didn't attend interview sessions

Two hundred and thirty-nine (53.6%) out of 446 invited patients attended interview sessions. The reasons for not attending these sessions were stated as follows. The patients indicated time constraints (n=31), 31 patients did not want to attend, while 27 patients put forward personal reasons. Twenty-three patients complained of the distance barrier, and 10 cases did not respond to invitation letters.

Four patients did not attend interview sessions because of changes in their health status. While 16 patients set forth other reasons, and 64 patients did not report any reason for not attending interview sessions. Two patients exited during study period. Cause of death of one patient was reported as CAD, while that of the other patient was not learnt. A 15.5 % of female patients attended the interview sessions, while 25.3 % of them did not.. A 11.7 % of old (≥70 yaş) patients attended the interview sessions while 21.4% of them did not. In other words higher number of female patients, and old participants responded negatively to the calls.

The characteristic features of the patients who attended interviews

Median time interval passed between coronary index event, and time of interview was 1.0 (interquartile range, 0.8-1.5 year) year. Risk factors detected based on data obtained during interviews are shown in Table 2.

Only 11.7 % of the patients who attended interview sessions quitted smoking. Even though higher percentage of male patients quitted smoking relative to female patients (13.9 % *vs* 0 %, p=0.011), rate of smoking was still higher among men (28.7% *vs* 8.1%, p=0.008). Following interviews, intensity of physical activity increased in 39% of the patients, and 87.7% of the attenders switched to healthy diet. While 43.2% of the participants lost weight. However 40.7% of them were obese, and in 48.3 of them central obesity was detected. Obesity was detected in significantly higher percentage of women /(62.9%) than men (36.8 %) (p=0.004). Similarly, central obesity was more frequently encountered in women (85.3% *va* 41.8%, p<0.001). High blood pressure levels were detected in 45% of the patients. Significantly higher percentage of women was hypertensive (69.4 % *vs* 40.6%) (p=0.001). In 39.7% of the patients diabetes was detected. (women, 67.6 %, and men, 34.7%) (p<0.001). -

Table 2. Characteristic features of risk factors based on data obtained from interviewed coronary artery patients who were enrolled in EUROASPIRE-IV Turkey

	n	Total	n	Female	n	Male	*p*
		n (%)		n (%)		n (%)	
Cessation of smoking (after the index event)	239	28 (11.7)	37	0 (0.0)	202	28 (13.9)	0.011*
Smoking (Self-report and/or CO in breathCO >10 ppm in breath)	239	61 (25.5)	37	3 (8.1)	202	58 (28.7)	0.008**
Overweight (BMI≥25 kg/m^2)	236	191 (80.9)	35	31 (88.6)	201	160 (79.6)	0.213**
Obesity (VKİ ≥30 kg/m^2)							
Central obesity	236	96 (40.7)	35	22 (62.9)	201	74 (36.8)	0.004**
(Waist circumference Erkek: ≥102 cm, Kadın:							
Hypertension	238	107 (45.0)	36	25 (69.4)	202	82 (40.6)	0.001**
Blood pressure (≥140/≥90 mmHg)							
(in diabetics ≥130/≥80 mmHg)							
Increased total cholesterol level (≥174 mg/dL)	228	113 (49.6)	35	22 (62.9)	193	91 (47.2)	0.087**
Increased LDL-cholesterol level (≥100 mg/dL)	217	115 (53.0)	35	20 (57.1)	182	95 (52.2)	0.591**
LDL-cholesterol (≥70 mg/dL inability to	217	199 (91.7)	35	35 (100.0)	182	164 (90.1)	0.086*
attain treatment target)							
Decreased HDL-cholesterol level	228	131 (57.5)	35	21 (60.0)	193	110 (57.0)	0.741**
(Male: <40 mg/dL, Female: <45 mg/dL)	228	97 (42.5)	35	16 (45.7)	193	81 (42.0)	0.680**
Elevated triglyceride (≥150 mg/dL)							
Diabetes (Patient's self-report and/or	239	95 (39.7)	37	25 (67.6)	202	70 (34.7)	<0.001**
fasting plasma glucose ≥126 mg/dL)							
Healthy diet	236	207 (87.7)	36	32 (88.9)	200	175 (87.5)	1.000*
Weight loss	139	60 (43.2)	21	11 (52.4)	118	49 (41.5)	0.355**
Increase in the intensity of physical activity	236	92 (39.0)	36	15 (41.7)	200	77 (38.5)	0.720**

*Fisher's exact test; **chi-square test. VKİ: Body mass index CO: Carbon monoxide; LDL: Low-density lipoprotein ; HDL: High-density lipoprotein.

Table 3. Comparison between EUROASPIRE-IV Turkey, and EUROASPIRE-III Turkey data

	n	EUROASPIRE-III Turkey¥	n	EUROASPIRE-IV Turkey	Difference	*p*
Based on index event data						
Female patient , n (%)						
Age, year,median (interquartile range)	669	159 (23.8) 60.5	446	358 (19.7) 58.8	-4.1 -	0.112**
<50 age , n (%)	669	134 (20.0)	446	86 (19.3)	-0.7	0.759**
Diagnosis , n (%)	669		446			
Percutaneous coronary intervention		230 (34.4)		220 (49.3)		<0.001**
Acute myocardial infarction		235 (35.1)		155 (34.8)		
Acute myocardial ischemia		105 (15.7)		33 (7.4)		
Coronary bypass surgery		99 (14.8)		38 (8.5)		
Smoking , n (%)	472	145 (30.7)	326	104 (31.9)	1.2	0.723**
The ttime elapsed between the index eventi and the interview , year,median (interquartile range)	338	0.8 (0.7–1.0)	238	1.0 (0.8–1.5)	-0.2	<0.001*
Number of interviewed patients, n (%)	669	338 (50.5)	446	239 (53.6)	3.1	0.316**
Based on the data obtained from interviews, n (%)						
Smoking	338	78 (23.1)	239	61 (25.5)	2.4	0.499**
Change in dietary habits	338	317 (93.7)	237	219 (92.4)	-1.3	0.517**
Increase in physical activity	334	162 (48.6)	236	117 (49.6)	1.0	0.801**
Regular exercise to become slim	338	142 (42.0)	236	92 (39.0)	-3.0	0.467**
Obesity	335	119 (35.5)	236	96 (40.7)	5.2	0.211**
Central obesity	330	136 (41.2)	230	111 (48.3)	7.1	0.098**
Diabetes mellitus	275	92 (33.6)	239	95 (39.7)	6.1 -	0.139**
Hypertension	337	186 (55.2)	238	107 (45.0)	10.2	0.019**
Elevated total cholesterol concentration	319	154 (48.3)	228	113 (49.6)	1.3	0.767**
ElevatedLDL-cholesterol concentration	282	159 (56.4)	217	115 (53.0)	-3.4	0.451**
Inability to attain treatment targets for LDL-cholesterol levels	282	244 (86.5)	217	199 (91.7)	5.2	0.069**
Decreased HDL-cholesterol levels	319	160 (50.2)	228	131 (57.5)	7.3	0.092**
Hypertriglyceridemia	290	106 (36.6)	228	97 (42.5)	5.9	0.166**

*Mann Whitney U test; ***chi*-square test; ¥EUROASPIRE-III Turkey data were retrieved fron reference < 5. (Tokgözoğlu et al.) , and re-calculated using the databeseLDL: Low-density lipoprotein; HDL: High-density lipoprotein.

Increased total cholesterol (49.6%), LDL-cholesterol (53%), triglyceride (42.5%), while decreased HDL-cholesterol (57.5 %) levels were detected in respective percentage of patients. In 91.7% of the patients targeted LDL-cholesterol levels could not be attained. Incidence of hyperlipidemia, and attainment of treatment targets did not differ between female, and male patients (Table 2).

Based on EUROASPIRE-IV data, FH scores of 207 patients were calculated among participants. Accordingly, age-adjusted standardized potential FH prevalence was 8.9 %(95% CI: 5.0–12.7)

Comparison of data obtained from EUROASPIRE-III Turkey, and IV Turkey

Data from EUROASPIRE-IV Turkey, and EUROASPIRE-III Turkey performed in the same centers 6 years previously are summarized in Table 3.

Compared with the previous study, median age of the patients participated in EUROASPIRE-IV study during index event was significantly lower (p=0.017). According to the index event definition, distribution of the diagnoses differed between two studies. In EUROASPIRE-IV, higher number of patients experienced myocardial ischemia, infarction, and coronary bypass surgery.

Comparison between EUROASPIRE-IV Türkey, and EUROASPIRE-IV Europe data

Data of EUROASPIRE-IV Turkey, and EUROASPIRE-IV Europe were compared (Table 4). When compared with European arm of the study during index event percentage (26.5% *vs* 19.7 %), and median age (62.5 *vs* 58.6 years) of the female patients were lower , while rate of smoking was higher (29.6% *vs* 31.9 %*)* in Turkey. Based on interview data the incidence rates of smoking (25.5 % *vs* 16%), obesity (40.7% *vs* 37.6%), diabetes (39.7% *vs* 26.8%), hypertension (45% *vs* 42.7%), raised LDL-cholesterol levels in women (57.1 % *vs* 48.9%), and raised LDL-cholesterol levels in men (52.2% *vs* 39%) were estimated both in Turkey, and in Europe and as indicated higher rates were found in Turkey.

Drug information in EUROASPIRE-III ve IV Turkey

Drug used by the patients during discharge related to index event, and at a later date during interview are summarized in Table IV. When EUROASPIRE-III and IV Turkey data were compared, antiplatelet drugs, beta-blockers, angiotensin-converting enzyme inhibitors (ACEI), angiotensin II receptor blocker (ARB), and statins were more frequently used in EUROASPIRE-IV However rates of beta-blocker (95.8% *vs* 86.6%), and statin (88.1% *vs* 81%) use decreased at an average of one year after discharge.

DISCUSSION

In order to decrease rates of morbidity, and mortality related to coronary artery disease, implementation of primary, and secondary preventive measures against modifiable risk factors conveys utmost importance. Within the last 30 years efforts directed at controlling risk factors have reportedly decreased mortality rates nearly 50 %, but secondary prophylaxis is not still at a desired level.[8]

Table 4. Comparison between EUROASPIRE-IV Turkey, and EUROASPIRE-IV Europe data

	EUROASPIRE-IV Turkey (n=446)	EUROASPIRE-IV Europe¥ (n=16426)
Based on information related to index event		
Female patient (%)	19.7	26.5
Age,year (Mean±Standard deviation)	58.6±10.3	62.5±9.6
Smoking (%)	31.9	29.6
Time interval between the index event and the interview , year,median (interquartile range)	1.0 (0.8–1.5)	1.4 (0.9–1.9)
Interviewed patients (%)	53.6	48.7
Based on interview data (%)		
Smoking	25.5	16.0
Regular exercise to get slim	39.0	40.1
Central obesity	40.7	37.6
Obesity	48.3	58.2
Diabetes	39.7	26.8
Hypertension	45.0	42.7
Increased LDL-cholesterol level	Women: 57.1	Women: 48.9
Inability to attain treatment target for LDL-cholesterol	Men: 52.2	Men : 39.8
	Women: 100.0	Women: 84.4
	Men: 164 (90.1)	Men: 79.2

¥EUROASPIRE-IV Europe data were retrieved from ref. 6 (Kotseva et al..) alınmıştır. LDL: Low-density lipoprotein .

Table 5. Drugs used during discharge related to index coronary event, and interview in EUROASPIRE III Turkey and EUROASPIRE IV Turkey studies

	EUROASPIRE-III Turkey		EUROASPIRE-IV Türkiye				
	Discharge %	Interview %	Discharge n	%	Interview n	%	Adherence ¥%
Drug Group							
Antiplatelets	99.4	91.4	424	99.8	228	98.7	98.7
Beta- blocker	83.1	73.8	407	95.8	200	86.6	89.0
ACEİ/ARB	73.6	69.0	328	77.5	180	78.3	84.4
Calcium antagonist	11.4	14.2	41	9.7	29	12.6	84.2
Diüretics	17.7	27.6	66	15.5	45	19.5	65.8
Statins	82.3	65.0	371	88.1	187	81.0	83.8
Anticoagulants	2.7	2.1	18	4.3	12	5.2	62.5

¥ The percentage of patients who stated that they were still using the drug prescribed at discharge during interview . ACEİ: Angiotensin converting enzyme inhibitor; ARB: Angiotensin II receptor blocker.

One of the most important findings in EUROASPIRE-IV Turkey was relatively younger age of the patients at the onset of a coronary event. In EUROASPIRE-IV Turkey study median age was 58.8 years during index event. In EURO-ASPIRE III Turkey study 20%, and in EUROASPIRE IV Turkey study 19.3% of the patients experiencing a coronary event were younger than 50 years of age Mean age of these patients was markedly lower than that estimated in EUROASPIRE-IV Europe study (62.5 years). Reasons of this finding include still higher rates of smoking, obesity, diabetes, and hyperlipidemia.

Despite implementation of smoking cessation, and smoke-free airzone programs in our country, smoking still continues to be a problem, and in general, 27.1 % of adult population are still using tobacco products (men, 41.5%, and women 13.1%) .[9] Based on EUROASPIRE-IV data the rate of smoking during index event was 29.6 % in Europe (men, 35.8%, and women, 16.7%) , while it was higher in Turkey 31.9 % (men 35.8%, and women 16.7%) . In our country smoking cessation rates were significantly higher in men relative to women following index event (13.9 % *vs* %0), however smoking rate detected during interview was still higher in men (28.7% *vs* 8.1%). The smoking rates are still higher than average values detected in Europe.

Based on EUROASPIRE-IV Turkey data the percentage of women hospitalized with the indication of CAD was lower (19.7%) when compared with that (26.5%) detected in EUROASPIRE-III Turkey study. Since coronary event occurs at advanced ages in women number of female patients with CAD is significantly lower relative to the number of male patients. Women display less favourable clinical manifestations as for obesity, hypertension, and diabetesç Besides the fact that lesser number of female patients responded to invitation for interview will probably worsen this condition. In addition new strategies with the intention to raise awareness among women may be developed. Obesity has been detected to be an increasingly significant issue among women both during index event, and interview (based on body mass index, 62.9 % *vs* 36.8%) relative to male patients. Central obesity was more frequently seen among women rather than men (85.3 % *vs* 41.8%). In patients with coronary artery disease within the last 6 years the incidence of obesity increased from 35.5 % to 40.7%, and central obesity from 41.2 % to 48.3 percent. In our country incidence of obesity was higher in our country relative to Europe (40.7% *vs* 37.6%), while incidence of central obesity was lower (48.3 % *vs* 58.2%).

Incidence of elevated levels of low-density lipoprotein cholesterol was higher both among men, and women in our country when compared with European data

Besides, in our country, in higher percentage of patients treatment targets could not be achieved when compared with European countries. Despite treatment, LDL-cholesterol levels are far from the targets predicted by the guidelines. In this study age-adjusted standardized potential FH prevalence for Turkey was found to be 8.9 % which is comparable to that estimated for Europe (8.3%).[7]

Hypertension is one of the important risk factors, and based on data retrieved from interviews the incidence of hypertension in CAD patients in Turkey demonstrated a significant drop within 6 years from 55.2% to 45 % which still does not signify an ideal BP control. In Europe this rate was detected to be 42.7 percent.

A population based TURDEP study performed in our country, emphasized increasing rate of diabetes in adults which has rapidly become a public health problem .[10] Incidence rates of diabetes in patients with coronary artery disease in the previous, and recent studies were 33.6 %, and 39.7%, respectively being significantly higher in women relative to men (67.6% *vs* 34.7%). In EUROASPIRE IV lower incidence of diabetes (26.8%) has been reported for CAD patients in Europe.

Based on EUROASPIRE IV Turkey data, antiplatelet drugs, beta-blockers, ACEI/ARB, and statins have been more frequently used when compared with EUROASPIRE III Turkey data. This condition might suggest that patients' awareness raised, and they began to use their drugs more regularly. However use of beta-blockers, and statins during the interview was at a lower rate when compared with the data related to discharge. Unfavourable impact of media may be the reason for decrease in the use of statins.[11] Besides, use of statins during discharge still remained at nearly 80% which might be associated with inadequate awareness of the physicians. Indeed, in EUROASPIRE-IV Europe study, a drop in statin use was reported one year later.[12] A meta-analysis where patients' adherence to statin treatment was systematically reviewed, and evaluated, revealed that elder patients, female patients, and those with low income levels complied to treatment at a lesser extent.[13] These observations are also in compliance with our findings

Formulation of guidelines is not sufficient in order to prevent the patients from deleterious effects of coronary artery disease. The physicians should be also motivated, and supported in order to Increase their application in daily practice.[14] Generally speaking, when compared with European countries the patients hospitalized in our country with the diagnosis of CAD are relatively younger, and heavy smokers,. They are also comparatively more obese, and diabetic. All of these emphasize the importance of primary preventive measures. As an alarming fact, within the last 6 years, the distribution of these risk factors has not improved. The fact that most of the patients did not quit smoking after they were discharged from the hospital, and they complied to treatment at a lesser extent also underlines better implementation of secondary preventive measures. Herein, the physician should provide more detailed training to their patients, in addition, evaluation of health politics, and allied health personnel who will provide rehabilitation services, and rehabilitation programs should be integrated into the procedure

This study has many limitations. Firstly, it was performed in consecutive patients participated from only 3 metropolitan cities, and 17 selected centers. In addition, small number of study interviewees may not reflect the general condition in Turkey. However we think that participation of the same centers in both studies performed at 6 year intervals has been helpful in displaying general tendency. Since the patients selected retrospectively from hospital archives were called for the interview, and participation in the study, this study reflects hospital care, and secondary prophylaxis as clinical application in real life. However, failed secondary preventive measures in reference centers selected for the study have demonstrated the necessity of taking more comprehensive measures, and working on more innovative strategies. Another limitation of the study is that even though a standardized, and detailed questionnaire survey was conducted, data related to physical activity, and dietary habits of the patients were based on patients'own statements. However outcomes of the relevant studies as TURDEP,[10] TEKHARF,[15] PURE[16] etc. also demonstrate clear-cut increase in the incidence of metabolic diseases as obesity, and diabetes in our country.

In conclusion, in the light of all these findings, we can say that secondary prophylaxis for CAD is not at desired levels. Despite recommendations, and drug therapy after index event, they were still had risk factors when they were evaluated nearly one year later

The number of strategic studies aiming to raise awareness, among patients, and health professionals should be increased.

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