Original Article

wiener klinische wochenschrift
the middle european journal of medicine
Printed in Austria

Wien Klin Wochenschr (2001) 113/15–16: 573–579

Recent trends and sociodemographic distribution of cardiovascular risk factors: Results from two population surveys in the Austrian WHO CINDI demonstration area

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Aktuelle Trends und soziodemographische Verteilungsmuster bei kardiovaskulären Risikofaktoren: Ergebnisse aus der Österreichischen WHO CINDI-Region

Zusammenfassung. *Hintergrund und Zielsetzung:* Im Rahmen des CINDI (Countrywide Integrated Noncommunicable Diseases Intervention)-Programms der Weltgesundheitsorganisation wurden in Vorarlberg in den Jahren 1991 und 1999 zwei Querschnittstudien zur Erhebung des Gesundheitszustandes und des Gesundheitsverhaltens der Bevölkerung durchgeführt. Ziel dieser Arbeit ist es, die Prävalenzveränderungen in den etablierten kardiovaskulären Risikofaktoren während dieses Zeitraumes aufzuzeigen sowie soziodemographische Verteilungsmuster zu untersuchen.

Methoden: Die Surveys beinhalteten jeweils ein standardisiertes Interview und eine medizinische Untersuchung. 1863 zufällig ausgewählte Personen im Alter von 25 bis 64 Jahren nahmen 1991 am Interview teil, 1999 waren es 1550 Personen. An der medizinischen Untersuchung nahmen 1991 1446 Personen teil, 1999 841 Personen.

Ergebnisse: Die Prävalenz des Übergewichts und der Adipositas zeigte bei Frauen einen deutlichen Anstieg. Sie stieg von 34% im Jahre 1991 auf 41% im Jahre 1999. Rund 50% der Männer waren 1999 übergewichtig oder adipös. Die Prävalenz der Hypertonie war sowohl bei Frauen als auch bei Männern 1999 deutlich erniedrigt. Beim Gesamtcholesterin und bei den Triglyzeriden waren die Prävalenzen bei Männer rückläufig. Während bei den männlichen Studienteilnehmern insgesamt der Anteil der Personen mit einem Gesamtcholesterin von mehr als 250 mg/dl auf 21% zurück ging, wies 1999 die Hälfte der 55 bis 64-jährigen Frauen derart erhöhte Werte auf. Der Anteil der regelmäßigen Raucher/-innen blieb mit circa 27% in beiden Jahren ungefähr gleich. 1999 rauchten 34% der Männer und 24% der Frauen mehr als eine Zigarette täglich. Bei Frauen unter 45 Jahren zeigte sich ein leichter Anstieg von 1991 auf 1999. Über 30% der Frauen in dieser Altersgruppe bezeichneten sich als regelmäßige Raucherinnen. In Bezug auf soziodemographischen Einflüsse zeigten sich erhöhte Risikofaktorenwerte bei Personen mit niederer Bildung sowie bei Personen mit Herkunft Türkei oder Ex-Jugoslawien. Insgesamt hat sich das kardiovaskuläre Risiko der Bevölkerung – ausgedrückt durch Framingham Risikoprofile – von 1991 auf 1999 nicht signifikant verändert.

Schlussfolgerung: Es zeigten sich Umschichtungen in den einzelnen Risikofaktoren – erfreulich ist der sinkende Anteil der Hypertonie und der Rückgang im Gesamtcholesterin bei Männern, weniger erfreulich der Anstieg von übergewichtigen Personen und von jungen Raucherinnen - als auch soziodemographische Einflüsse, die eine Anpassung von gesundheitsfördernden und präventiven Maßnahmen notwendig erscheinen lassen.

Schlüsselwörter: Kardiovaskuläre Krankheiten, Risikofaktoren, Querschnittstudien, soziodemographische Einflüsse, Epidemiologie.

Summary. *Objective:* The major risk factors for cardiovascular diseases are well established; however, only a few studies report on recent trends in risk factor profiles. This study analyses the sociodemographic distribution of risk factors and gives an account of their changes from 1991 to 1999.

Methods: Two cross-sectional population surveys as part of the CINDI (Countrywide Integrated Noncommunicable Diseases Intervention) program of the World Health Organization were performed in 1991 and 1999 in the province of Vorarlberg (Austria). The surveys included a standardized interview and a medical examination. 1863 persons aged 25 to 64 years in 1991 and 1550 persons in 1999 participated in the interview section of the surveys. From these, 1446 in 1991 and 841 persons in 1999 underwent medical examination. Prevalence of overweight and obesity, mild and severe hypertension, hypercholesterolemia, hypertriglyceridemia, hyperglycemia, regular smoking and lack of physical activity were estimated. Framingham risk functions were calculated to compare overall risk for coronary heart disease.

Results: In women, prevalence of overweight including obesity increased from 34% in 1991 to 41% in 1999. Almost 50% of the male population were estimated to be overweight or obese in 1991 and 1999. Hypertension showed a favorable trend and decreased substantially in both genders. Hypercholesterolemia decreased only in men, from 27% to 21%. In 1999, women aged 55 - 64 showed a prevalence of over 50% in highly elevated cholesterol. Hypertriglyceridemia decreased in men from 21% to 18%, in women it remained almost unchanged. Total prevalence of smoking did not change from 1991 to 1999. 34% of the men and 24% of the women reported to smoke more than one cigarette daily. In women under 45 years of age, regular smoking increased slightly and reached a prevalence of over 30%. Less educated people and people of non-national origin had significantly higher risk factor levels. The risk functions did not reveal a significant difference in 10 year risk for coronary heart disease between the two surveys.

Conclusions: Decreasing levels in hypertension and in male hypercholesterolemia showed favorable developments in risk factor prevalence. Preventive measures should concentrate on reducing overweight in older people and smoking in young women as well as on intensifying the care for less educated people and people of non-national origin.

Key words: Cardiovascular disease, risk factors, population survey, sociodemographic factors, epidemiology.

Introduction

Cardiovascular diseases, of which coronary heart disease is the most common, are still the leading cause of death in western industrialized countries, accounting for up to 50% of all deaths depending on the region [1–3]. Cardiovascular diseases result in substantial disability and loss of productivity and contribute in large part to the escalating costs of healthcare, especially in the presence of an aging population [2].

The development of cardiovascular disease is strongly related to lifestyle characteristics and associated risk factors. These characteristics are largely determined by social and cultural factors and are therefore modifiable [4]. Overweight, elevated blood pressure, blood lipids and blood sugar as well as smoking, poor nutrition and lack of physical activity are well established risk factors. A recent study showed that the major risk factors (high blood pressure, high blood cholesterol level and smoking) are important, both in men and in women [5]. There is scientific evidence that lifestyle modification and risk factor reduction can retard the development of cardiovascular disease both before and after the occurrence of a clinical event [6–7].

The risk factor situation of a population is the major modifiable determinant of cardiovascular disease levels, and is particularly worthwhile to be monitored on a regular basis. Observing trends in risk factors provides an important instrument to evaluate and to control measures of primary and secondary prevention. In Vorarlberg, the most western province of Austria, population-based documentation of established risk factors has been performed routinely since 1970 by the Agency for Preventive and Social Medicine [8]. Risk factor levels have been recorded centrally, pooling data from all preventive checkups performed by general practitioners and internists. Additionally, three population surveys were conducted in the years 1986, 1991 and 1999. These surveys were performed within the framework of the CINDI (Countrywide Integrated Noncommunicable Diseases Intervention) program of the World Health Organization (WHO) [9].

The CINDI program was established in 1984 by the WHO through its Regional Office for Europe, in order to fight growing levels of noncommunicable diseases such as cancer and heart disease [10]. Currently CINDI involves 24 countries (CINDI Austria is represented by the province of Vorarlberg and is coordinated by the Agency for Preventive and Social Medicine, Bregenz) committed to work together to promote health and reduce disease. CINDI's main objectives relate to common risk factors and related lifestyle changes, thus raising the awareness of health risks in the population and reducing modifiable risk factors through measures of disease prevention and health promotion.

The CINDI program is based on scientific methods for process and outcome evaluation, and uses appropriate existing data sources and special data collections to assess the extent to which the program has attained its objectives. Thus, preventive measures and health promotion activities in the member countries are regularly monitored and evaluated using standardized methods and indicators such as mortality, morbidity and risk factor data, regularly collected through population based surveys [11].

The purpose of this paper is to analyze sociodemographic distribution and changes in prevalence of single risk factors and of combinations of risk factors, using a modified Framingham risk function using data from the CINDI population surveys, performed in 1991 and 1999.

Methods

Study population

Two cross-sectional population surveys were performed in Vorarlberg in 1991 and 1999. The samples were drawn independently in both years following a two stage selection process. In the first stage a number of communities were randomly chosen; in the second stage individuals were randomly selected from these communities, and stratified according to gender and age. A total of 2400 individuals (300 individuals per gender and age group: 25-34, 35-44, 45-54 and 55-64 years of age) were asked to participate in each of the surveys. The surveys included a standardized interview by trained personnel at the persons' homes and a medical examination in the general practitioners' or internists' offices. 1863 individuals (920 men and 943 women) aged 25 to 64 years in 1991 and 1550 individuals (786 men and 764 women) in 1999 participated in the interview section of the surveys. From these, 1446 individuals (702 men and 744 women) in 1991 and 841 individuals (418 men and 423 women) in 1999 underwent an additional medical examination.

Measurements

The interview was based on a questionnaire, including detailed questions regarding the sociodemographic situation, present and past diseases, food consumption, alcohol intake, physical activity and smoking. Sociodemographic variables (pro-

Table 1. Definitions of risk factor categories

overweight	body mass index 25–30 kg/qm
obesity	body mass index > 30 kg/qm
mild hypertension	systolic blood pressure > 140mmHg or diastolic blood pressure > 90mmHg
severe hypertension	systolic blood pressure ≥ 160mmHg or diastolic blood pressure ≥ 95mmHg
hypercholesterolemia	total cholesterol > 250 mg/dl
hypertriglyceridemia	triglyceride > 200 mg/dl
hyperglycemia	fasting glucose > 115 mg/dl
regular smoking	more than one cigarette per day
lack of physical activity	hardly any or no physical activity during leisure time

fession, education, household and nationality) were only assessed in 1999. The physical examination included sampling of fasting blood and measurements of height, weight and blood pressure. Systolic and diastolic blood pressure were measured with a mercury manometer in the sitting position. Total cholesterol, HDL cholesterol, triglycerides, and blood glucose were determined enzymatically by two central laboratories. The two laboratories underwent standardized internal and external quality control procedures.

For the purpose of this paper the main measurements were grouped into categories according to usual criteria as shown in Table 1 [10].

Statistical analysis

Accounting for the multistage, stratified design of the surveys, special survey methodology [12] for estimation of risk factor levels had to be employed. Point estimates and standard errors of the prevalence estimates are affected by participation in the surveys, the stagewise selection and the stratification criteria. Participation in the survey varied substantially, not only between 1991 and 1999 and between interview and medical examination, but also across the different age and gender groups. For example, participation was considerably lower in younger men (25–44 years of age) and women (25–34) in comparison to the older participants. Therefore, sampling weights had to be calculated using population data from the 1991 Census and from updates, provided by Statistik Austria and by the Office for Statistics of the Government of Vorarlberg. All analyses were carried out separately for men and women.

Prevalence of overweight, obesity, hypertension, hypercholesterolemia, hypertriglyceridemia, hyperglycemia, smoking and lack of physical activity were given as point estimates together with their 95% confidence intervals. P-values were calculated for differences between 1991 and 1999. Multiple linear and logistic regression analyses were performed to study the effect of social indicators on risk factors adjusting for age. These analyses were carried out on the data set of the second survey. Framingham risk profiles were calculated using the modified formula, published in 1991 [13] and reported as median 10 year risk. These profiles were only calculated for individuals who were free from coronary heart disease. The Mann-Whitney-U test was used to compare the risk scores between 1991 and 1999. P-values smaller 0.05 were considered to indicate statistical significance. Statistical analysis was performed using Stata Statistical Software [14].

Results

Prevalence of overweight

In women 25–64 years of age, prevalence of overweight including obesity increased from 34% (95% Confidence Interval 30.5–37.7%) in 1991 to 40.8% (35.2–46.3%) in 1999 (p = 0.076, indicates a trend). Only women under 35 years of age did not contribute to this increase, either in overweight or obesity. Almost 50% of the male population were estimated to be overweight or obese in both surveys. In 1999, the prevalence was 49.3% (43.9–54.8%). The prevalence of women measuring a body mass index higher than 30 kg/qm increased nonsignificantly from 11.7% (9.2–14.1%) in 1991 to 13.7% (9.7–17.7%) in 1999 (p = 0.479). In men, obesity increased nonsignificantly (p = 0.562) from 8.5% (6.2–10.8%) to 9.7% (6.5–12.9%).

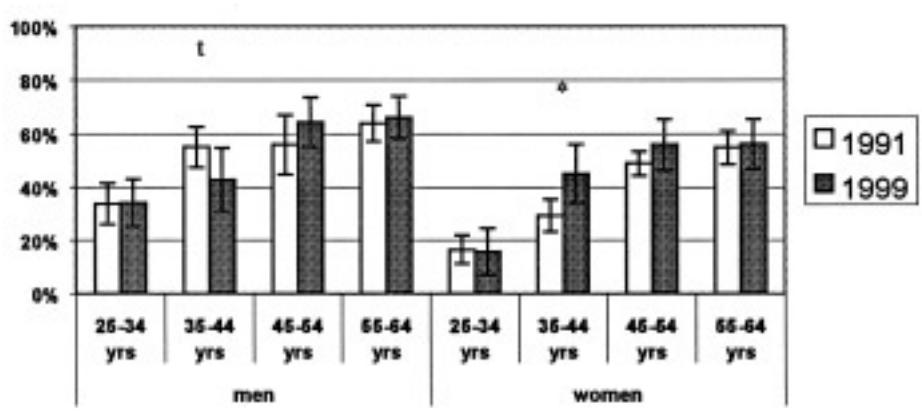

Fig. 1. Prevalence and 95% CI of overweight including obesity 1991 and 1999, * indicates a significant change (p<0,05) in mean prevalence from 1991 to 1999, t indicates a trend (p < 0.1). There was a trend (p = 0.076) towards increased overweight/obesity in women aged 25–64 from 1991 to 1999

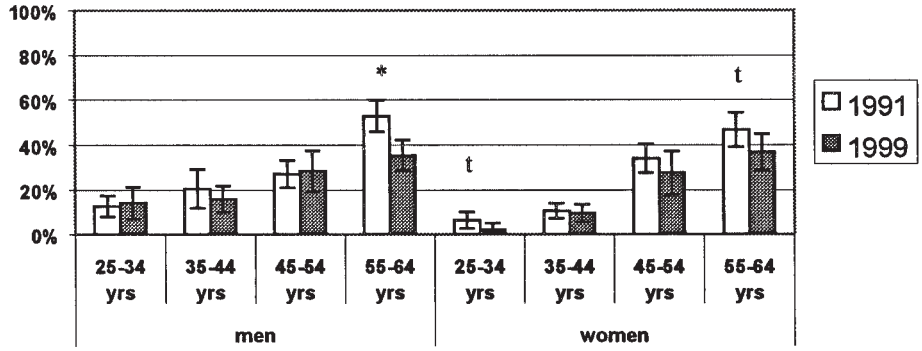

Fig. 2. Prevalence and 95% CI of total hypertension 1991 and 1999, * indicates a significant change ($p < 0.05$) in mean prevalence from 1991 to 1999, t indicates a trend ($p < 0.1$)

Prevalence of hypertension

Hypertension showed a favorable trend and decreased substantially from 1991 to 1999. Severe hypertension decreased from 13.1% (95% CI 10.7–15.4%) to 9.1% (95% CI 6.5–11.7%) in women ($p = 0.055$) and from 15.5% (95% CI 12.5–18.4%) to 12.9% (10-15.7%) in men ($p = 0.245$); total hypertension from 20.9% (95% CI 17.4-24.4%) to 16.6% (95% CI 13.1–20.2%) in women ($p = 0.149$) and from 24.7% (95% CI 21.1–28.3%) to 21.8% (95% CI 18.2–25.4%) in men ($p = 0.305$). In men aged 55 to 64 years, there was a significant decrease in total ($p = 0.002$) and severe hypertension ($p = 0.016$).

Prevalence of elevated blood lipids and glucose

Hypercholesterolemia decreased only in men, from 26.7% (23.1–30.4%) in 1991 to 21.1% (16.4–25.7%) in 1999 ($p = 0.077$). This trend was significant in men 45 to 54 years of age ($p = 0.033$). In women there was a slight, nonsignificant increase from 20.9 (17.5–24.3%) in 1991 to 22.3% (18.1–26.4%) in 1999 ($p = 0.658$). In 1999, women aged 55 to 64 showed a striking prevalence of over 50% in highly elevated cholesterol. Hypertriglyceridemia decreased nonsignificantly ($p = 0.257$) in men from 20.7% (17.5–23.8%) to 17.8% (13.7–21.8%); in women it remained almost unchanged ($p = 0.631$).

For hyperglycemia, no significant trend ($p = 0.53$ for men and $p = 0.42$ for women) could be established. Overall, the 1999 prevalence was 5.8% (3.4–8.2%) in men, and 4% (2.2–5.8%) in women.

Prevalence of smoking and lack of physical activity

Total prevalence of smoking did not change from 1991 to 1999 ($p = 0.981$ for men, $p = 0.755$ for women). In 1999, 33.9% (29.9–37.9%) of men and 24.2% (20.6–27.8%) of women reported to smoke more than one cigarette daily. The number of cigarettes smoked per day, however, dropped from 19 to 17 ($p = 0.017$), mainly due to a strong decline in cigarettes smoked among the 55–64 year old men. A remarkably high smoking prevalence was found among women in the age-groups below 45; in these groups more than 30% of all women smoke regularly. In women aged 45 and older, smoking rates were decreasing. More than a fifth of the people performed hardly any sports or were physically inactive. In women, this prevalence was favorably but not significantly reduced from 23.3% (20.4–26.2%) in 1991 to 20.6% (17.4–23.9%) in 1999 ($p = 0.239$).

Risk profiles

As cardiovascular diseases are multifactorial in origin, it is important to consider the risk factors simultaneously. For calculation of the coronary heart disease risk of healthy individuals, risk functions and simplified risk charts [7] were developed. A modified version of the well known risk function from the Framingham study [15] was proposed in 1991 [13]. This risk function is based on age, gender, systolic blood pressure, total cholesterol/Hdl cholesterol ratio, diabetes, smoking and, if available, left ventricular hypertrophy measured by electrocardiography.

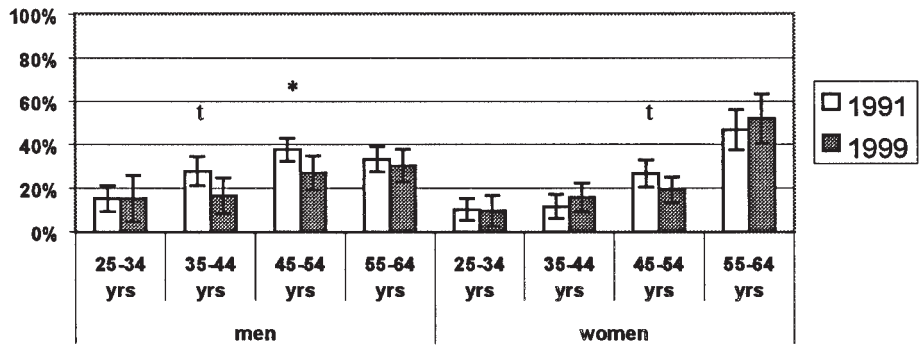

Fig. 3. Prevalence and 95% CI of total cholesterolemia 1991 and 1999, * indicates a significant change ($p<0.05$) in mean prevalence from 1991 to 1999, t indicates a trend ($p < 0.1$). There was a trend ($p = 0.077$) towards decreased cholesterolemia in men aged 25–64 from 1991 to 1999

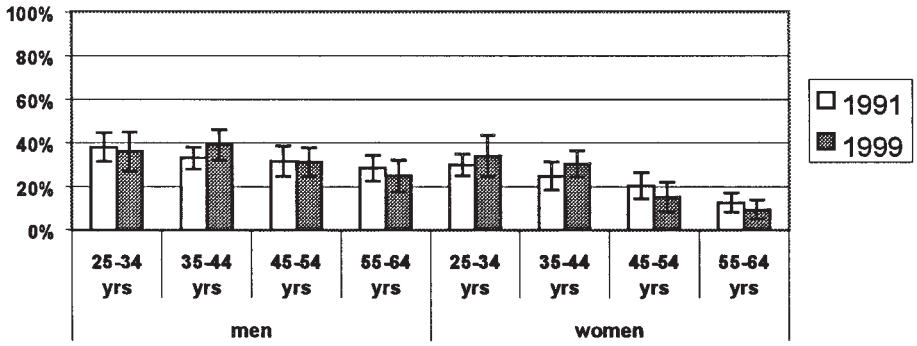

Fig. 4. Prevalence and 95% CI of regular smoking 1991 and 1999

Regarding the entire age-range, there was no significant change in risk for coronary heart disease from 1991 to 1999. The median risk for a coronary heart disease event within 10 years was 2.2% in women in 1991, and 2.5% in women in 1999. The median risk for men was 6.7% in 1991, and 7.1% in 1999. There was a statistically non-significant improvement from 1991 to 1999 in the 55-64 year age-group, in both women and men. In women, risk was reduced from 7.2% to 6.9% ($p = 0.162$); in men from 15.8% to 14.2% ($p = 0.06$). Additionally, men aged 45–54 had a slightly lower risk in 1999. Comparison of the median risk in all other age/gender-groups revealed smaller risks in 1991.

Sociodemographic distribution

In general, the sociodemographic situation in western Austria is rather balanced, although there are differences, mainly due to levels of education and nationality. The latter refers to migrant workers of non-national origin. In 1999, 23% of the male and 18% of the female study participants had completed secondary school (high school) or had acquired an university degree. 9% of the studied individuals were immigrants from Turkey or the former Yugoslavia.

Being overweight was associated with the individual's level of education and nationality. On average, more highly educated individuals (having completed high school or with a university degree) had a significantly lower body mass index ($p = 0.031$ in men and $p < 0.001$ in women), although they mostly had office jobs. The mean body mass index in less educated women was 25.3 kq/qm (95% CI 24.7–25.8 kq/qm) versus 22.3 kg/qm (95% 21.4–23.2 kg/qm) in higher educated women. Although age had a confounding effect, the difference still remained highly significant in the adjusted multivariate analysis. Non-national women showed a mean body mass index of 27.5 kg/qm (95% CI 25.3-29.6). This was significantly increased in comparison to Austrian women who showed a mean body mass index of 24.5 kg/qm ($p < 0.001$). Foreigners were also significantly less physically active than people with Austrian nationality ($p < 0.001$ in both genders).

Higher educated people smoked significantly less than those who had not completed high school ($p < 0.001$ in both genders, 21% (95% CI 15.9%–26%) versus 31.6% (95% CI 28.4–34.9%) in men and women together). In male foreigners, regular smoking prevalence was 51.1% (95% CI 36.3–65.9%), which was significantly higher than in Austrians (32.3%, $p = 0.013$).

As far as medical checkups are concerned, it became evident that HDL cholesterol ($p = 0.014$) was significantly higher in women with a high school education. Education had no significant relationship to lipid concentrations in men. Austrian men and women manifested higher HDL cholesterol values ($p < 0.001$ in both genders). HDL was especially low in men and women of Turkish origin. Turkish men showed a mean HDL of 38.9 mg/dl (95% CI 35.2-42.6mg/dl versus 54.1mg/dl in Austrian men), Turkish women a mean HDL of 45.9 mg/dl (95% CI 42.2-49.8 mg/dl versus 64.5mg/dl in Austrian women). Triglyceride values were higher among male foreigners ($p = 0.004$). Blood pressure was significantly higher ($p = 0.005$) in women of foreign nationality mostly due to elevated values in women from Bosnia and Croatia. In the Framingham risk profiles, there was a significantly higher risk in non-national men ($p = 0.04$) and a marginally significant, higher risk in foreign women ($p = 0.062$) compared to people with Austrian nationality. For the age-group 55-64, the median 10-year risk for coronary heart disease was 16.1% among male non-national residents versus 14.1% among native Austrian men ($p = 0.243$), while among women the median risk was 10.5% versus 6.9% for non-national versus native residents ($p = 0,2$).

Discussion

The average risk for cardiovascular disease, as measured by the Framingham risk functions, did not decrease significantly during the nineties. Although there were marked improvements in reducing blood pressure levels in both genders and cholesterol levels in men, new problems for primary prevention arose. Increasing levels of overweight and obesity and increasing numbers of young women smokers show undesirable developments.

Although not significant, a trend reducing the risk of the people aged 55 to 64 is apparent, perhaps reflecting the efforts of primary prevention in Vorarlberg. These people, who are (in terms of the age-range in our study) most susceptible to heart diseases, make great use of regular preventive checkups. More than half of the people in this age-group in Vorarlberg visit their doctors at least once in three years for preventive medical examinations.

A recent analysis of these documented preventive examinations showed similar trends in risk factors [16]. In this study a total of 300,026 measurements from 114,279

participants, representing 73.5% of the female and 61% of the male Vorarlberg population were analyzed regarding the risk factor developments from 1985 to 1996. The same age-range was applied, but it included more women as well as more persons of higher ages. Also, the sample was self-selected in contrast to the random samples of the CINDI population surveys. From 1985 to 1996, a significant increase in obesity and hyperglycemia and significant decreases in cholesterolemia and triglyceridemia, primarily among men, were observed. Cigarette smoking was decreasing as well. Blood pressure levels did not vary substantially.

To date, only the results from a small number of international studies presenting cardiovascular risk factor data from the nineties have been published. Studies from Finland, a country with very high mortality rates from cardiovascular diseases in the past, reported decreasing levels of cholesterol, blood pressure and smoking from 1972 to 1997 [17] and increasing levels in body-mass-index and obesity from 1972 to 1992 [18]. Another recently published study demonstrated trends in risk factors in the population of former East Germany as part of the WHO MONICA project. Between 1982 and 1994, hypertension, hypercholesterolemia and smoking in men showed a downward trend; smoking among young women in particular, an upward trend [19]. From 1985 to 1995, a MONICA population in Canada (Halifax) showed increasing levels of body-mass-index and blood pressure, higher smoking rates in men and young women and lower cholesterol levels in men [20].

In comparison to other CINDI member countries, the Austrian demonstration area showed the lowest prevalence in all major risk factors with the exception of cholesterol and smoking in women [21]. These comparisons are limited, because the most recent available data dates back to 1995 (Hungary, Canada), 1994 (Russia) and 1992 (Germany, Estonia and Spain). In addition, there are large differences between the countries pertaining to the sociodemographic situation, the health system and the epidemiology of cardiovascular diseases. In terms of standardized death rates, Vorarlberg belongs to the CINDI-countries with the lowest mortalities.

Education and nationality constituted significant factors for risk profile levels. Many previous studies have already focused on the association of social indicators with risk factor levels [22–24]. However, in this population, pronounced effects of education and particularly ethnic affiliation could additionally be shown. People from Turkey and the former Yugoslavia (mostly guest-workers and their families) showed an increased risk for cardiovascular diseases. These results are in agreement with the Giessen study [25] where high prevalence of coronary heart disease and high risk factor levels could be shown for Turkish migrants to Germany. As in our study, the authors of the Giessen study found low HDL cholesterol levels for migrants. In addition, our data revealed that non-national women and men are less likely to participate in prophylactic medical checkups than Austrians. The special health situation of these people should be recognized by health authorities.

We mainly presented the risk factor data in a dichotomized form, i.e. we grouped the data in classes of normal and elevated values. This way of presenting the results facilitates the interpretation of data but should not hide the fact that many cardiac events happen within normal risk factor ranges. Managing individual risk factors, particularly elevated blood pressure or cholesterol, can fail. Measures to lower single risk factor levels, even within a normal range, can be greatly beneficial to people at increased risk. Priority for treatment should be given to patients at a high absolute risk for coronary heart disease (defined as the probability of developing heart disease over a specific period of time) rather than putting emphasis on an individual risk factor [26, 27].

Although recent studies showed that the used Framingham risk equation can predict coronary risk with reasonable accuracy in white men and women in the United Kingdom [28, 29], the results derived from this function should be interpreted with caution. The Framingham risk function does not consider important risk factors such as heredity and obesity. It is not certain whether their effects were mediated by the used risk factors. Also, the equations can only be calculated with a complete set of risk factor measurements, a problem which also occurred in our calculations when single values of risk factors were missing.

Incomplete response is a problem which applies to almost every survey. Participation varied considerably between the two studies, and parts of the study (namely the interview section and the medical examination). There was a high response to the interview section in 1991 (amounting 77.6%), fair responses to the interview section in 1999 and to the medical examination in 1991 (amounting 64.6% and 60.2% respectively) and a marginal response rate of 35% for the medical examination in 1999. The threshold medical examination and organizational problems lead to these large differences in response, even within the same surveys [30]. Through the application of advanced survey methodology we tried to solve this problem.

In conclusion, the results of this study suggest that the efforts in prevention of cardiovascular diseases have been successful in very important areas such as lowering the levels of hypertension and cholesterol (primarily in susceptible age-groups), and should continue on this way. Further reduction in risk factors such as obesity and smoking, and intensified care for less educated people and people of non-national origin still holds great potential for improved public health.

Acknowledgments

The CINDI population surveys 1991 and 1999 were funded by the government of Vorarlberg, department of health (director Dr. Elmar Bechter). We thank Karl Huber and Mag. Dietmar Mostegl and their teams for performing the surveys. We also thank Dr. Larry Brant, Johns Hopkins University Baltimore, for helpful suggestions.

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(Received April 23, 2001, accepted after revision June 27, 2001)