bit
Drug and Therapeutics Bulletin of Navarre. Spain
VOLUMEN 17, No 3 **MAY-JULY 2009**

Servicio Navarro de Salud / Osasunbidea
Plaza de la Paz, s/n - 31002 Pamplona
T 848429047 - **F** 848429010
farmacia.atprimaria@cfnavarra.es

The Vascular Risk Study in Navarra (RIVANA)
Applications in clinical practice

summary

Objective: to estimate the vascular risk factors and metabolic syndrome in the population between 35-94 years in Navarre and to establish a cohort for the followup of cardiovascular events within the next 10 years. **Material and methods:** a questionnaire was filled out during a personal interview and physical examniation was carried out on 6,553 individuals. Information regarding weight, height, waist circumference and blood pressure was recollected. Blood determinations of total cholesterol values, HDL-c, triglycerides, LDL-c and glycaemia was carried out within 7 days of the interviews. **Results and conclusions:** the main cardiovascular risk factors identified were smoking, overweight/obesity, hypertension and hyperglycaemia. Measures with regard to their management are proposed. Cardiovascular risk in the Navarre population is sensitively lower than the Framingham cohort. The calibrated tables for Framingham-Navarre are described. They will be validated in the future.

J. CARLOS AMÉZQUETA GOÑI
Section for Evaluation and Quality in Primary Care.
Iturrama Health Care Centre. SNS-O

Mª JESÚS GUEMBE SUESCUN
Department of Teaching and Health Development.
Government of Navarre

PAULINO GONZÁLEZ DIEGO
Department of Teaching and Health Development.
Government of Navarre

ANA GRIJALBA UCHE
Biochemistry Department. Hospital of Navarre. SNS-O

CONCHI MORENO IRIBAS
Section for Epidemiology, Prevention and Health Promotion.
Public Health Institute. SNS-O

ISABEL SOBEJANO TORNOS
Department of Teaching and Health Development.
Government of Navarre

JOSÉ JAVIER VIÑES RUEDA
Department of Teaching and Health Development (former director).
Government of Navarre

Introduction

During our daily clinical practice we often encounter frequent questions and uncertain situations regarding diagnosis, management and health care which require answers whose precision depend on the knowledge of the given population rather than data from other epidemiological settings. What risk factors are decisive in vascular disease in our population? What interventions are we carrying out and which ones should be implemented to improve vascular disease prevention? What percentage of unidentified diabetes patients do I have in "my practice"? Do we measure the weight circumferences of our patients in our practices? Do we identify and pay attention to patients with metabolic syndrome (MS)? What are the values of cholesterol we should employ to identify patients with hypercholesterolemia? And how should these patients be managed?

The Vascular Risk Study in Navarre (RIVANA)[1] aims to offer us adequate and useful answers to these and other similar questions. These responses are recollected in this paper.

After a description of the methodological characteristics of the study, we will present some of the conclusions and recommendations we consider interesting with the results that support these affirmations.

Methodology of the RIVANA study[2]

The aim of our investigation was to estimate the prevalence of vascular risk and metabolic syndrome (MS) in the population between 35 and 84 years in Navarre and, at the same time, to establish a cohort that could be followed up for cardiovascular events within the next 10 years. We calculated the sample size, based on the prevalence of MS using the data from a questionnaire carried out in 1993 (7%), with a precision of 10% and a confidence interval of 95%. The calculated sample size consisted of 5,021 individuals. The sample was then increased by 30%, foreseeing non-responses from part of the population, and the final overall sample size was 6,553 individuals.

Individuals who had died, those residing in caring homes, and displaced individuals from other provinces other than Navarra were excluded. In 1,328 cases, the individuals declined to participate, 377 of which presented a justified cause while 951 did not wish to participate. A total of 4,354 questionnaires and physical examinations were performed (76% participation), while blood determinations were carried out in 4,168 participants with a global participation of 73% (72% men; 75% women).

The questionnaire was carried out during a personal interview conducted by registered nurses who attended a preparatory course to apply the predetermined questionnaires and carry out the physical examinations. The latter included the determination of the weight, height, waist circumference and blood pressure (BP) of each participant. Blood values of total cholesterol, high-density lipoprotein cholesterol (HDL-c), low-density lipoprotein cholesterol (LDL-c), triglycerides, and glycaemia were determined within 7 days after the interview at a reference laboratory (Hospital of Navarre) with both internal and external quality controls.

Risk factors' definitions can be seen in table 1.

Summary of results

In table 2 the mean values of the results of each factor are shown for men and women between 35 and 84 years in Navarre, with the exception of smoking, alcohol consumption and physical activity which is reflected in their corresponding section. Prevalence of risk factors is shown in table 3.

Recommendations of interest for clinical practice

The RIVANA study offers relevant information on the vascular risk profile of our population and promotes rational, and why not, innovative strategies to improve management and health care.

In the following sections we present in summarised form results, comments and recommendations we believe useful for health professionals in their daily clinical practice.

Table 1. Definitions for different risk factors in the RIVANA study.

HYPERTENSION
Blood pressure ≥ 140/90 mmHg and/or
diagnosis of hypertension and current treatment with antihypertensive drugs or lifestyle intervention
OBESITY: BMI ≥ 30 Kg/m²
OVERWEIGHT: BMI = 25.0-29.9 Kg/m², subgroups considered: 25-27 Kg/m² and > 27-29.9 Kg/m²
WAIST CIRCUMFERENCE: >102 cm (males) and >88 cm (females) (ATP III[3])
HYPERCHOLESTEROLEMIA
Total cholesterol ≥ 240 mg/dL or 6.2 mmol/L
Diagnosis of hypercholesterolemia and current treatment with antihypertensive drugs or lifestyle intervention
DIABETES
Fasting glucose ≥ 126 mg/dL or 7.0 mmol/L
Diagnosis of diabetes current treatment with antidiabetic drugs or insulin
METABOLIC SYNDROME: IF THREE OR MORE OF THE FOLLOWING CRITERIA (ATP III)
Waist circumference >102 cm (males) and >88 cm (females)
Hypertriglyceridemia: 150 mg/dL or 1.70 mmol/L
HDL-c < 40 mg/dL or 1.03 mmol/L (males) or < 50 mg/dL or 1.29 mmol/L (females)
Blood pressure: ≥ 130/85 mmHg or current treatment with antihypertensive drugs
Fasting glucose ≥ 110 mg/dL or 6.0 mmol/L or current treatment with antidiabetic drugs or insulin
ALCOHOL INTAKE[4]
Habitual drinker: four or more times within the last month
High-risk drinker: ≥ 500 mL daily [40 g daily to 280 g weekly (males) and ≥ 300 mL (24 g daily to 170 g weekly (females)]
TOBACCO
Habitual smoker: at least one cigarette daily
Former smoker: used to smoke everyday but does not smoke at present
Occasional smoker: less than one cigarette daily
Former occasional smoker: used to smoke occasionally but does not smoke at present
PHYSICAL ACTIVITY
Active individuals during their leisure time: total energy expenditure during leisure time > 300 MET minute/day
(1 MET accounts for 1 Kcal/min)

Table 2. Mean values of different cardiovascular risk factors in the 35-84 age group in Navarre.

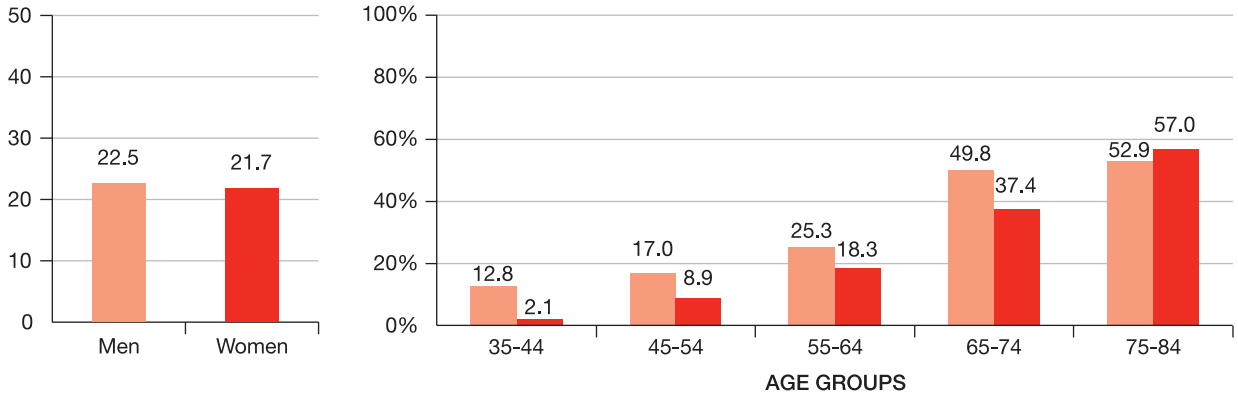
	MEN	WOMEN
Systolic blood pressure	138.4 mmHg (SD 17.6)	129.5 mmHg (SD 20.8)
Diastolic blood pressure	81.6 mmHg (SD 10.2)	78.2 mmHg (SD 10.1)
Pulse pressure	56.9 mmHg (SD 13.3)	51.2 mmHg (SD 15.4)
Glycaemia	106.1 mg/dL (SD 24.8)	98.1 mg/dL (SD 20.9)
BMI	27.6 Kg/m² (SD 3.9)	26.5 Kg/m² (SD 5.2)
Waist circumference	97.9 cm (SD 10.6)	88.5 cm (SD 13.4)
Total cholesterol	211.4 mg/dL (SD 39.2)	212.7 (SD 37.3)
LDL-c	129.7 mg/dL (SD 34.9)	123.8 mg/dL (SD 32.9)
Triglycerides*	106 mg/dL (II 74)	83 mg/dL (II 53)
HDL-c	56.8 mg/dL (SD 13.8)	70 mg/dL (SD 16.2)

*Median and interquartil interval (II)

Table 3. Prevalence (%) of cardiovascular risk factors in the polulation aged between 35 to 84 years according to gender.

	MEN	WOMEN
Blood pressure	50.9 (48.9-52.8)	39.4 (37.7-41.1)
Obesity	22.5 (20.9-24.1)	21.7 (20.3-23.2)
Waist circumference	30.9	46.2
Hypercholesterolemia	38.4 (36.5-40.2)	38.4 (36.7-40.2)
LDL-c (>160 mg/dL or 4.1 mmol/L)	18.9 (17.4-20.5)	12.8 (11.6-14.0)
Triglycerides (>200 mg/dL or 2.3 mmol/L)	12.7 (11.4-13.9)	5 (4.2-5.8)
HDL-c (<40 mg/dL or 1.03 mmol/L in men and <50 mg/dL or 1.29 mmol/L in women)	8.5 (7.4-9.6)	8.5 (7.5-9.5)
Diabetes	11 (9.9-12.3)	6.4 (5.5-7.2)
Habitual smoker	26.9	18.3
Metabolic syndrome	22.1 (20.5-23.7)	17.2 (15.8-18.5)
High-risk drinker	10.8	2.2
Active persons during leisure time	52 (50-54)	45 (43-47)

Figure 1. Prevalence of obesity according to age and gender.



The prevalence of overweight and obesity is high in our population. Detection and intervention of central obesity is primordial.

Possibly the most important health problem now and in the future is illustrated by the fact that two out of three individuals over 35 years in Navarre (3 out of every 4 men) is overweight or obese. This epidemiological information is of great relevance as it directly conditions the presentations of risk factors such as hypertension, hyperglycaemia and dyslipidemia. In any case, it should make us reflect profoundly on the impact of vascular disease in our population and on ways of preventing it. Without doubt, overeating and sedentarism play a decisive role in this situation.

Mean values of BMI are 27.6 kg/m^2 (SD 3.9) and 26.5 kg/m^2 (SD 5.2) in men and women respectively.

Waist circumference represents a median value of 98 cm (interval range IR 13) and 87 cm (IR 18) in men and women respectively. Thirty-one percent of men and 46% of women present a waist circumference above that recommended by the AT-PIII cut off level (102 cm and 88 cm for men and women respectively). This information shows the high incidence in our population of abdominal fat and consequently visceral fat. When applying more strict criteria (94 cm and 80 cm) this frequency reaches 67% in men and 73% in women in our population[5-6].

According to the data from the study, 40% of the overweight or obese individuals were adverted of their situation by a health care professional. Of these patients, 70% underwent dietary measures. Only 5% of those treated attained a normal BMI. Seventy-six percent were weighed in the last year (table 4).

It is absolutely necessary to design a strategic population-based intervention that is decisive and continued to detain and revert this situation. At the same time, individual interventions, often unsuc-

Figure 2. Prevalence of overweight according to gender and overweight severity (25-27 kg/m² or 27-29.9 Kg/m²).

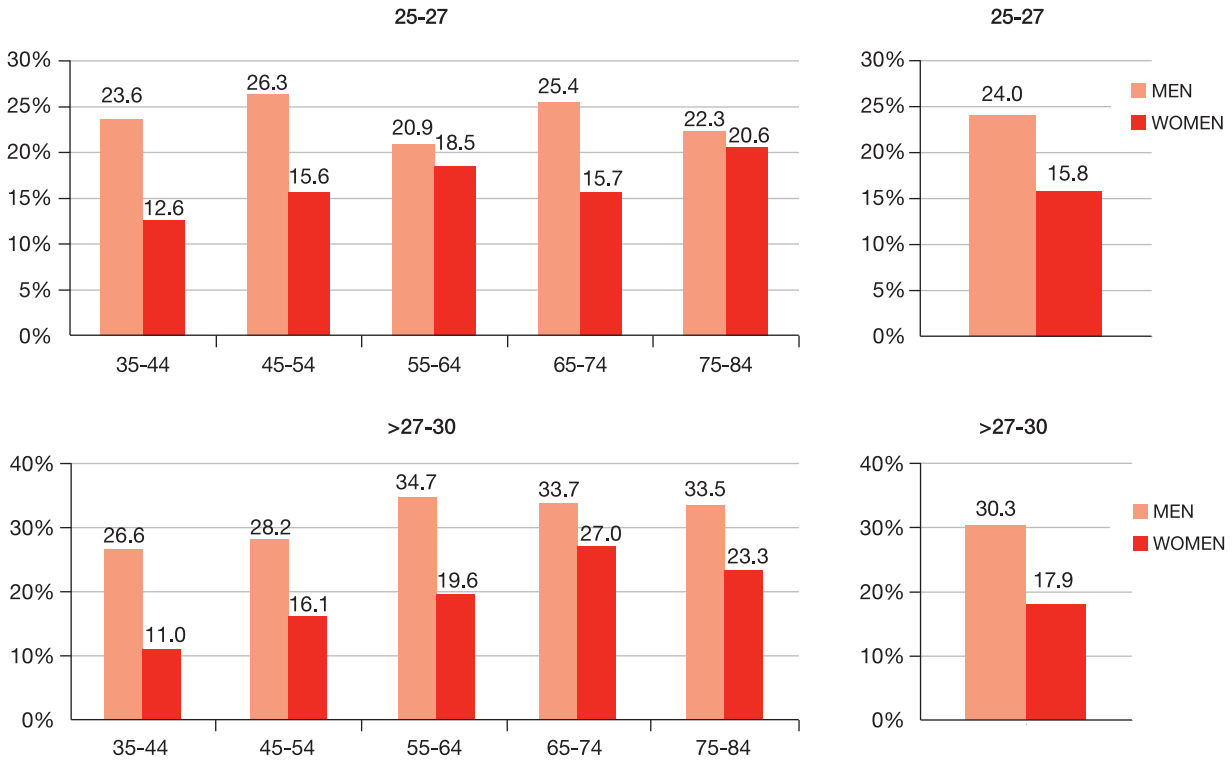


Figure 3. Prevalence of central obesity according to age and gender.

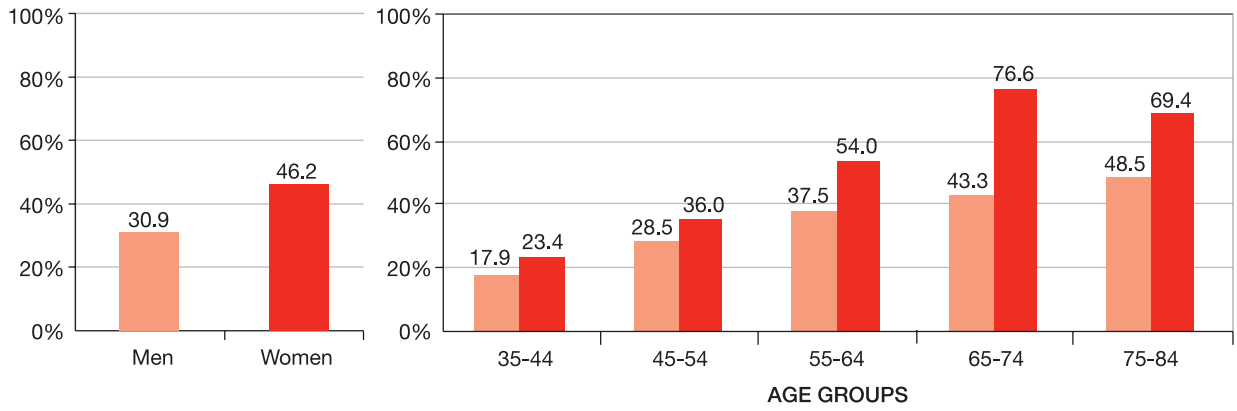


Table 4. Profile of overweight or obese individuals.

RISK FACTOR	AFECTED (2/n%)	DIAGNOSED (3/2%)	TREATED (4/3%)	EFFECTIV CONTROL (5/4%)	FOLLOW UP (6/3%)
Overweight - Obesity (n = 4,348)	2,851 (65.5%)	1,130 (39.6%)	791 (70%)	42 (5.3%)	862 (76.3%)

cessful, is obligatory. This should be directed preferably, though not exclusively to those individuals who would obtain the most benefit. For example, although a debate could be started on the strictness of criteria to define abdominal obesity, in our context, those patients who are beyond the 75 percentile are candidates for a more selective intervention. In clinical practice this would include men with over 104 cm and women with over 97 cm in waist circumference.

The association of central obesity with insulin resistance and vascular risk make waist circumference a necessary and complementary indicator of

Main risk factors include: smoking, overweight/obesity, hypertension and hyperglycemia

the BMI. The combination of calory reduction, increase in physical activity and behavioural interventions is the most recommended approach to management and with the most evidence available[7]. This approach proposes realistic targets such as a reasonable loss of 5% of current weight. Its realization results in a relevant improvement in the cardiovascular risk of the patient.

There is a high prevalence of hypertension among the population which increases significantly with age. Special attention and control should be given to systolic hypertension.

Fifty-percent of the men (95%CI, 48.9-52.8) and 39.4% of women (95%CI 37.1-41.1) between 35 and 84 years in Navarre were diagnosed with hypertension or presented blood pressure values >140/90 during the study. The clinical diagnosis of hypertension requires a series of determinations obtained at different moments and over a certain period.[8] This could justify the fact that patients with values >140/90 in our study were not diagnosed previously as hypertensive and a measurement was performed in the last year (70% of them). The increase in systolic blood pressure (SBP) with age is not accompanied by an equivalent increase in diastolic blood pressure (DBP), thus the pulse pressure progressively increases in both sexes. In men, the prevalence of isolated systolic hypertension is 25.2% (95%CI 23.5-26.9) and in women 18.6% (95%CI 17.2-20.0). In individuals over 75 years of age, half of the men and women present systolic hypertension.

Of all the patients with hypertension, 60% knew their diagnosis, 88% of which were under treatment and 37% of these treated patients had controlled blood pressure. This percentage of control is lower than those found in other revisions of the computer based clinical records in primary care which reached approximately 50%. Aging of the population with the progressive increase in blood pressure at the expense of the systolic value can increase the difficulty in systematically maintaining a SBP <140 mmHg.

Nearly 95% of the "known" hypertension patients referred having measured their blood pressure at least once in the last year. Sixty-seven percent of the undiagnosed patients with hypertension and the population with normal blood pressure had measured their blood pressure at least once in the last year (table 5).

The existence of up to 18% of undiagnosed hypertension in the population and the fact that only one out of three patients with hypertension is correctly managed indicates that there is a need to intensify the interventions with regard to this important risk factor of cardiovascular disease.

Self measurement of blood pressure at home with a validated apparatus, could prove to be an adequate alternative to obtain greater autonomy on the part of the patient in the follow up and management of the disease. In addition, this would reduce the burden on health care services where professionals, both doctors and nurses, could devote more time to health education, information and correct management of their patients.

The prevalence of elevated basal glycaemia in our population, with or without criteria for diabetes is more than 20%.

Eleven percent (95%CI 9.9–12.3) of the men and 6.4% (95%CI 5.5–7.2) of the women between 35 and 84 years in Navarre are diabetes patients[9]. The prevalence of diabetes increases with age in both sexes, while men present a higher prevalence than women at all ages. Sixteen percent of the men and 8% of women present glycaemias between 110 and 125 mg/dL (6.0 and 6.9 mmol/L).

There is often speculation concerning the number of diabetes patients that still remain unidentified as such in our population. In the RIVANA study the

Measurement of the waist circumference should habitual in daily clinical practice

Figure 4. Prevalence of hypertension according to age and gender.

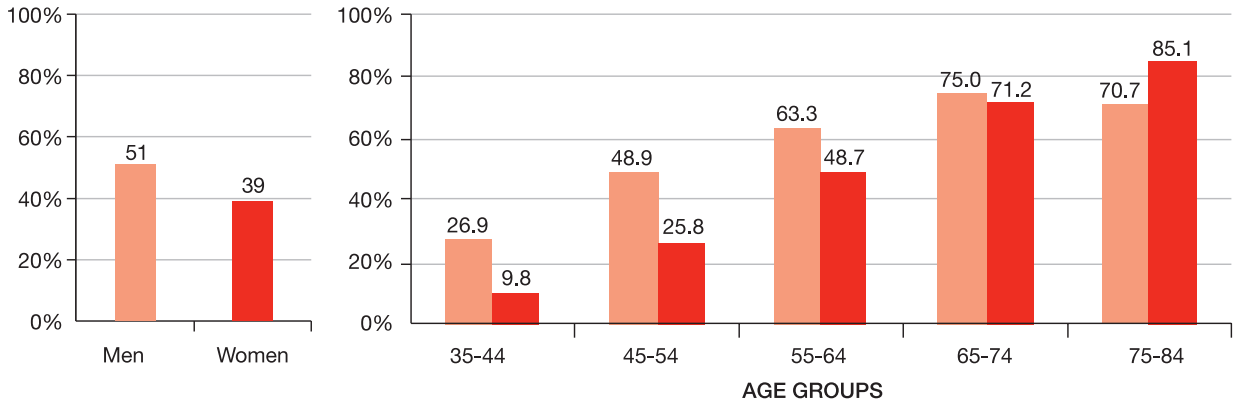


Figure 5. Prevalence of systolic hypertension according to age and gender.

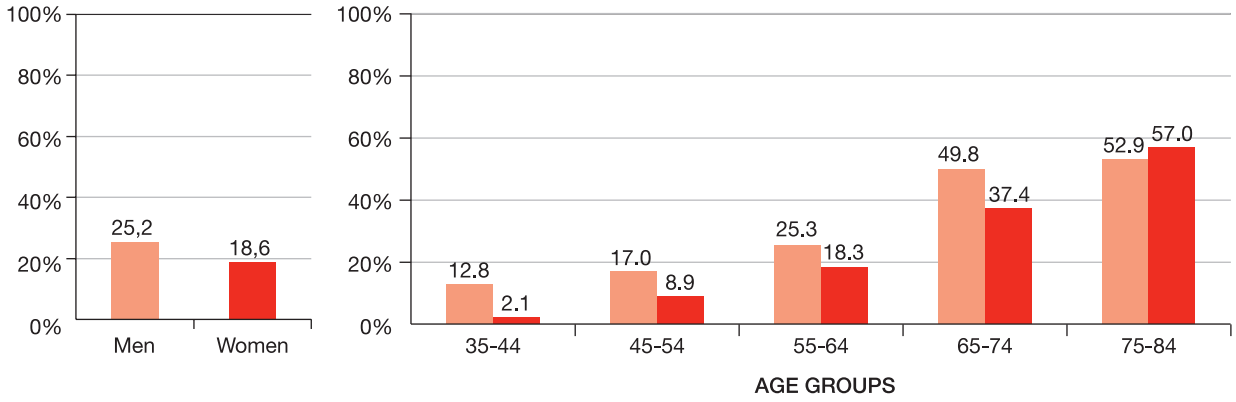


Table 5. Profile of hypertensive individuals.

RISK FACTOR	AFECTED (2/n%)	DIAGNOSED (3/2%)	TREATED (4/3%)	EFFECTIVE CONTROL (5/4%)	FOLLOW UP (6/3%)
Blood pressure (n = 4,353)	1,972 (45.3%)	1,175 (59.6%)	1,034 (88.1%)	387 (37.4%)	1,111 (94.6%)

number did not exceed 2% of the individuals with either glycaemias ≥ 126 mg/dL (7.0 mmol/L) or with no previous diagnosis. However 9.5% of the population presented values between 110 and 125 mg/dL (6.0 and 6.9 mmol/L) and declared that they were unaware of having "high sugar levels". Detection of these patients and intervention are absolutely necessary. An early, multidisciplinary and multifaceted approach to the diabetes patients vascular risk profile, and early pharmacological management (metformin) in accordance with the current guidelines can improve micro and macrovascular protection[9-10]. In individuals with impaired basal glycaemia, decisive intervention in lifestyle could at least delay the development of diabetes. Detection and intervention of diabetes is one of the main epidemiological challenges today which presents the enormous potential for impact on the vascular health of our population in the future.

Forty-six percent of the individuals with elevated glycaemia knew of their condition, 86% of which were treated, while 49% presented glycaemias below 130 mg/dL (7.1 mmol/L) and 84% had carried out at least one blood determination in the last year (table 6).

Figure 6. Prevalence of diabetes according to age and gender.

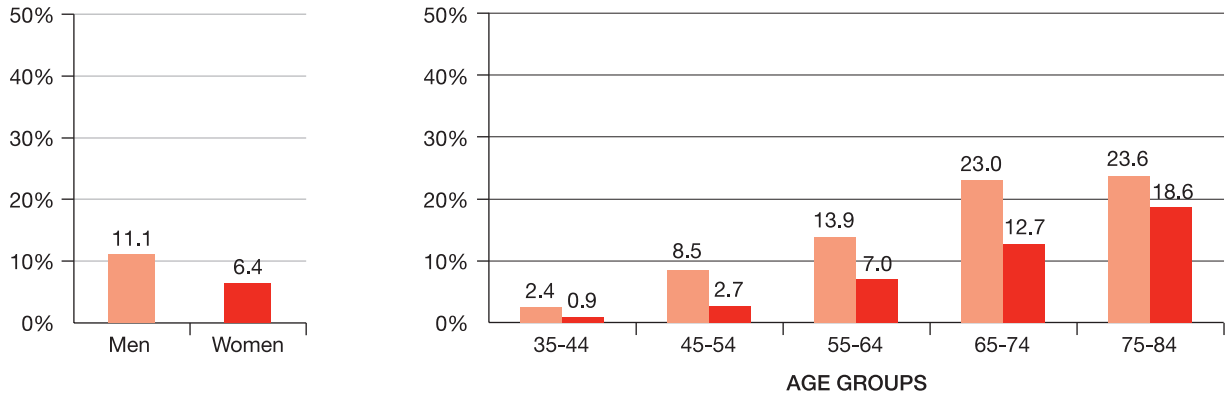


Figure 7. Prevalence of impaired fasting glucose according to age and gender.

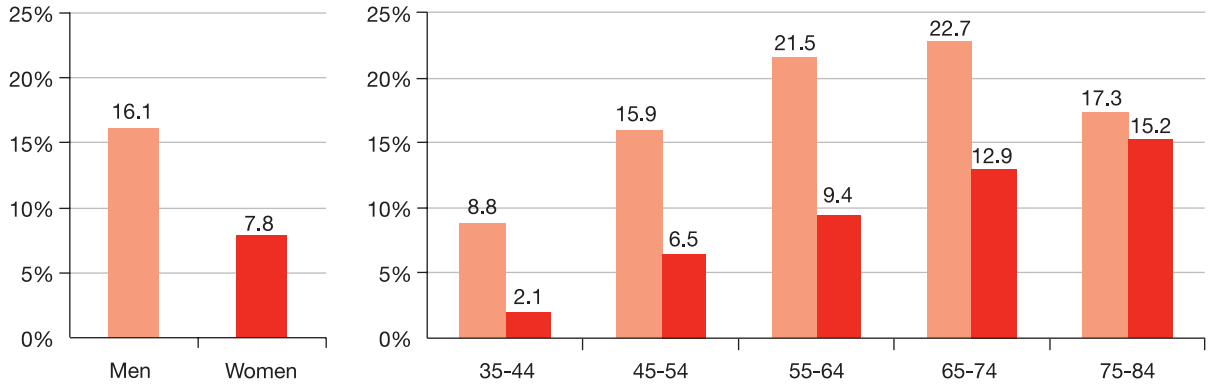


Table 6. Profile of individuals with hyperglycaemia.

RISK FACTOR	AFECTED (2/n%)	DIAGNOSED (3/2%)	TREATED (4/3%)	EFFECTIVE CONTROL (5/4%)	FOLLOW UP (6/3%)
Glycaemia (n = 4,168)	891 (21.4%)	409 (45.9%)	353 (86.3%)	202 (57.2%)	345 (84.4%)

The metabolic syndrome (MS) in our population have identification criteria which differ in proportion to those found in other population studies.

One of the motives for designing the RIVANA study was to discover information regarding the metabolic syndrome in our population. There is an interesting debate, still open, on the existence of the metabolic syndrome as a unique and differentiated entity, and on the clinical use of its identification and intervention.

In Navarre, 22.1% (95%CI 20.5–23.7) of men and 17.2% (95%CI 15.8–18.5) of women present metabolic syndrome. In men the prevalence increases with age up to the 65-74 years age-group; in women however the increase with age is maintained. The increase in blood pressure, waist circumference and glycaemia are the most frequent criteria monitored by individuals from Navarra with metabolic syndrome (figure 3). While low HDL-c values, represent the second most frequent criterion in the USA[11-12] and in the Canary islands[13], in our population this was found in fifth place.

The triad consisting of central obesity, elevated blood pressure and basal glycaemia represents the most frequent profile present in patients with potential vascular risk in our population and their identification is important. It is crucial therefore that abdominal obesity is kept in mind, and that the measurement of weight circumferences should be introduced systematically during the physical examination in our clinical practice. In our study waist circumference measurements were carried out in 9.5% of the individuals and in 17% of all overweight and obese patients. In contrast to this, determination of basal glycaemia was carried out in 50% of the individuals in the study. Measurement of waist circumference is advised when the patient is relaxed, with the measuring tape above the iliac crests and parallel to the floor.

It is a priority to promote healthy life style habits (physical activity and diet)

Despite the series of questions that remain open in relation to the metabolic syndrome its pronostic value is generally accepted for the diagnosis of diabetes. In this sense, identification of the metabolic syndrome and a decisive intervention in improving eating habits and physical activity with the aim of controlling or reducing accordingly, weight and the waist circumference becomes with no doubt an important health care objective today.

The prevalence of hypercholesterolemia in the population is approximately 40%. Mean HDL-c values are elevated.

The mean values of total cholesterol (TC) are 211.4 mg/dL (SD 39.2) or 5.47 mmol/L (SD 1.01) and 212.7 mg/dL (SD 37.3) or 5.50 mmol/L (SD 0.96) in men and women respectively. LDL-c levels are 129.7 mg/dL (3.35 mmol/L) in men and 123.8 mg/dL (3.20 mmol/L) in women and median values of triglycerides are 106 mg/dL (1.20 mmol/L) and 83 mg/dL (0.94 mmol/L) in men and women respectively.

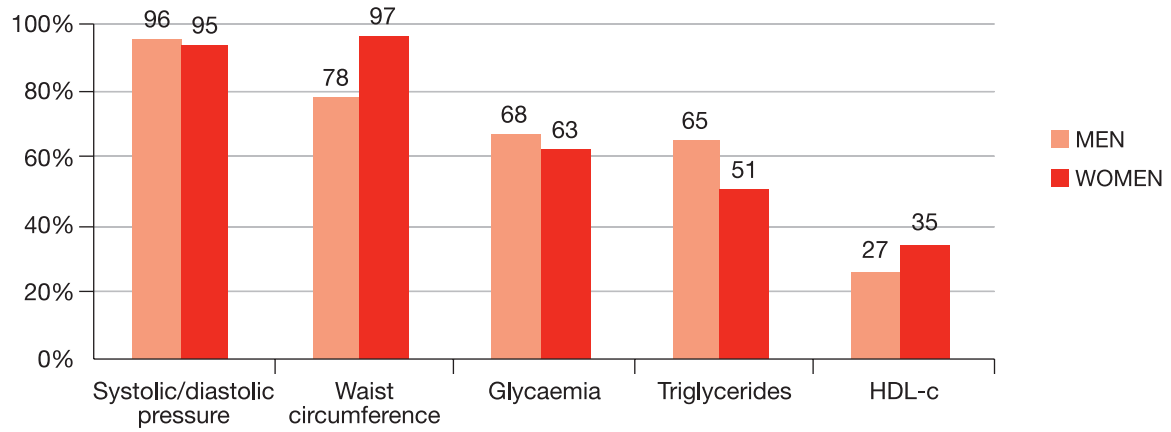
The mean value of HDL-c was 56.8 mg/dl (SD 13.8) or 1.47 mmol/L (SD 0.36) for men and 70 mg/dl (SD 16.2) or 1.81 (SD 0,42) for women. Only approximately 8.5% of the men and women presented HDL-c levels below 40 mg/dL (1.03 mmol/L) and 50 mg/dL (1.29 mmol/L) respectively.

This lipid profile could contribute to the low coronary morbidity and mortality in Navarre and the use of total cholesterol exclusively to identify and treat hypercholesterolemia in patients is unadvisable in clinical practice.

Given a cut-off point of 240 mg/dL (6.2 mmol/L) in total cholesterol or a previous diagnosis of hypercholesterolemia, 38% of the men and women between 34 and 84 years are considered hypercholesterolemic.

This prevalence is maintained among the different age-groups in men, with reductions observed in advanced ages, whereas in the case of women prevalence increases with age.

Figure 8. Prevalence of each of the five factors defining the metabolic syndrome in individuals diagnosed with metabolic syndrome.



The prevalence of high LDL-c levels (>160 mg/dl or 4.14 mmol/L) in men and women is 18.9% and 12.8% respectively while that of triglycerides (>200 mg/dL or 2.26 mmol/L) is 12.7% and 5% respectively.

The total cholesterol/HDL-c index showed a mean value of 3.91 (SD 1.12) in men and 3.19 (SD 0.94) in women. It is difficult to propose a single value to identify hypercholesterolemia. Thus, for example, in the "Practical Guidelines on the management of lipids as a cardiovascular risk factor" included in the Guide for Health[14] there is no reference to any determined values that define hypercholesterolemia. This is justified because the relevance of the values will depend on the particular patient, for example, presence of cardiovascular disease, familial hypercholesterolemia, family history of disease or premature cardiovascular death, or in the absence of these factors, the presence of other risk factors. On the whole management of hypercholesterolemia depends on the overall vascular risk profile of the patient.

The authors agree with this reflection and believe that it should be taken into account when making a recommendation on diagnosing patients with hypercholesterolemia. The above mentioned "preventive etiquette" is not innocuous and can generate a series of expectations, controls, consultancies and frequently pharmacological treatments with little or no solid scientific evidence, which given their interactions, and adverse effects can jeopardize the health of the patient. The concept of quaternary prevention, understood as a series of health practices that reduce or avoid unnecessary or excessive health interventions should be take into account in our daily clinical practice[15].

To identify correctly those patients who would benefit from active intervention it is necessary that health care professionals register the information in the clinical records belonging to patients with total cholesterol values of >250 mg/dL or >6.46 mmol/L (defined hypercholesterolemia). This information can be complemented with the identification of persons with HDL-c levels below 40/50 mg/dl or 1.03/1.29 mmol/L (men/women) or LDL-c values above 160 mg/dL or 4.14 mmol/L, triglycerides >200 mg/dL or >2.26 mmol/L or a TC/HDL index >5.

In any case pharmacological intervention should be evaluated on an individual basis taking into account the cardiovascular risk profile, age, modifiers, etc. Special prudence should be taken when prescribing to women, where the effect on global mortality is not clearly demonstrated[16]. Additionally, in those patients over 75 years of age, the benefits and risks of treatment should be evaluated because there are no trials available involving patients of that age range[17].

Figure 9. Prevalence of hypercholesterolemia according to age and gender.

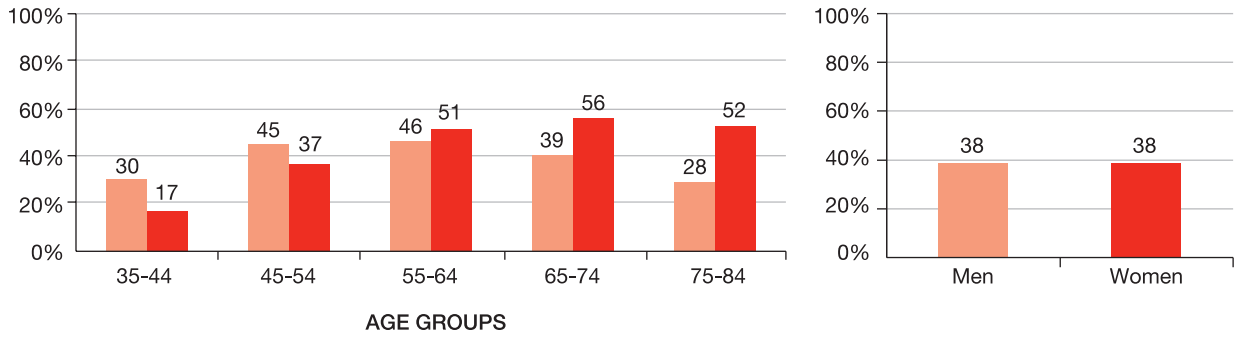


Table 7. Profile of individuals with hypercholesterolemia.

RISK FACTOR	AFECTED (2/n%)	DIAGNOSED (3/2%)	TREATED (4/3%)	EFFECTIVE CONTROL (5/4%)	FOLLOW UP (6/3%)
Cholesterol (n = 4,168)	1,626 (39.0%)	1,391 (85.5%)	1,130 (81.2%)	987 (87.3%)	1,093 (78.6%)

In the RIVANA study it was observed that 86% of the hypercholesterolemia patients were aware of the disease, 81% of them were under treatment with diet and/or drugs) while 87% of those treated presented cholesterol values <250 mg/dL (<6.46 mmol/L) and 79% had carried out a blood determination in the previous year. As known, the values of individual control of cholesterol can vary according to the history of vascular disease or in its absence. Rigorousness in a trial of such characteristics would make us focus on the epidemiological control of the factor rather than individual clinical control (table 7).

It is necessary to intensify individual and population based interventions to avoid smoking and excess alcohol consumption

In summary, we would insist on the importance of evaluating the global cardiovascular risk profile before making a decision on management, rather than basing our decision only on the cholesterol values of the patient.

The proportion of smokers decreases with age. It is relevant that there is an increase in women smokers in the age groups below 55 years.

Habitual smoking was admitted by 27% and 18% of the men and women respectively, while 35 and 19% of men and women respectively were former smokers (after previous habitual smoking). Twenty-four percent of the men and 52% of the women denied having ever smoked. In men, the percentage of habitual smokers decreases with age while the prevalence of former smokers increases in parallel, thus the sum of both remains stable. In the case of women the prevalence of habitual smokers and former smokers is higher among the younger age groups (35-44 years) (figure 10).

Between 35-44 years, the incidence of smoking among both sexes is practically equal with men representing 58% (32% smokers; 26% former smokers) and women representing 56% (30% smokers and 26% former smokers). With age the number of former smokers increases with respect to the number of smokers in both sexes.

Despite the progressive abandonment of smoking over the years, at a given time nearly 60% of the population are smoking habitually which suggests that it is necessary to intensify the measures directed at avoiding the initiation of the smoking habit. Currently the majority of the women who have smoked or are smoking are under 55 years of age. It is therefore foreseeable that in the near

Figure 10. Prevalence of habitual smokers and former smokers according to age and gender.

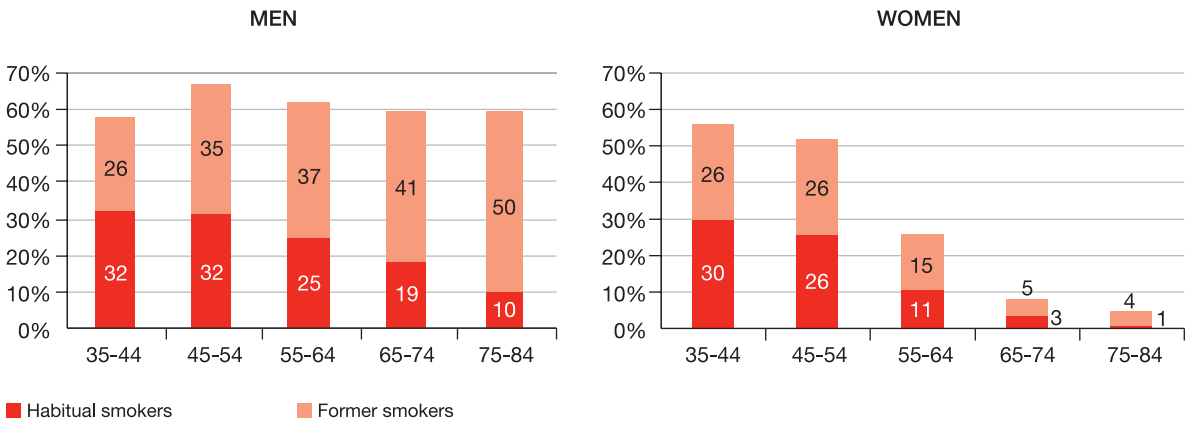
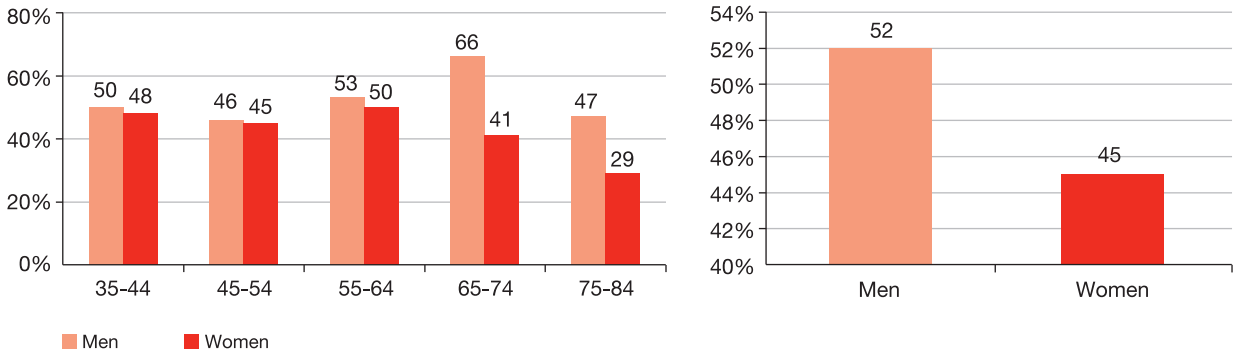


Figure 11. Prevalence of active individuals during their leisure time (> 300 METs/min/day) according to age and gender.



future there will be an increase in the incidence of tobacco related diseases.

Of the smokers who consult a medical practice, 75% of men and 71% of women had already received smoking-cessation advice. Women were given advice to a lesser extent than men, especially between 35 and 44 years of age (17 *vs* 28%).

It is necessary to continue promoting both individual and group programmes on smoking cessation, especially in the 35 to 54 age group. Advice on giving up the habit should be intensified especially in women and young people.

The decrease in the habit of smoking produces the greatest impact on cardiovascular morbidity and mortality in the population[18].

Approximately half of the population in Navarre is not physically active during their leisure time.

The median total energy expenditure during leisure time is 387.6 (IR 359.9) and 330.7 (IR 286.8) METs/minute in men and women respectively. Men between 65 and 74 years have greater values of total energy expenditure during their free time. Women reduce their expenditure from 65 years of age.

Approximately half of the population between 35 and 84 years of age in Navarre is physically active during their leisure time (>300 METs/min daily). In men, physical activity is associated with having between 65 and 74 years and belonging to the middle or high social class. The prevalence of active persons is greater in men. With regard to women, the prevalence of physical activity decreases from 65 years of age, with no differences found in body mass index (BMI), level of studies, or social class based on profession once adjusted for these variables.

In Navarre women above 65 years of age and men in upper social classes are sub-groups of the population susceptible to interventions regarding physical activity during their leisure time.

The indication for physical exercise should be individualised, that is "prescribed" on a personal basis, adapted to the routine of the individual, coherent with the individuals previous situation, progressive and continuous[19]. It is recommended to develop computer based "aids" for the correct prescription of physical activity from health services.

Physical exercise during leisure time should be promoted from social, cultural, sport and health institutions to increase the proportion of active individuals during leisure hours.

Habitual consumption of alcohol reaches 66% in men and 31% in women and of these 17% and 7%, respectively, present criteria for the risk of alcoholism.

In our population 66% of the men and 31% of the women are habitual drinkers. Of these, 80% and 66% of the men and women respectively drink on a daily basis. In 17% of men and 7% of the women who drink habitually there is a risk for alcoholism. Men between 45 and 64 years are at a greater exposure to risk (21%). This value taken at population level means that 10.8% of men and 2.2% of women between 35 and 84 years present a consumption rate at risk for alcoholism.

Alcohol risk consumption is independent of one´s profession in both sexes. The elementary level of education is associated with greater risk consumption in men.

Moderate consumption of alcohol is related to a reduction in global and cardiovascular mortality, especially in elderly individuals and type 2 diabetes patients. On the other hand, when excess alcohol consumption exists, these cardiovascular benefits disappear and important health problems settle in. In individuals below 40 years, given their lower vascular risk any consumption of alcohol is associated with greater mortality due to all causes[7-20-21-22-23].

Health systems and especially primary care professionals should intensify the detection of drinkers of alcohol in excess which is an important risk factor affecting the overall health of the individuals. Active recommendations to correct consumption habits should be carried out without jeopardizing the detection and intervention of those patients who are alcohol dependent.

Population strategies should consider measures directed towards habitual drinkers to avoid, and in appropriate cases, correct the risk of alcohol consumption.

Coronary risk calculated with a calibrated score for Navarra could be up to three times lower than that estimated by the original function from the Framingham assessment tool.

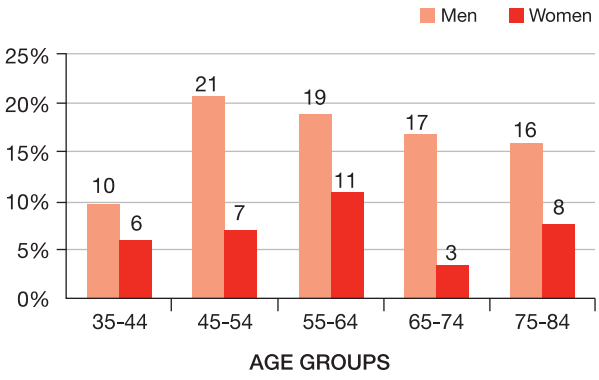
In the calibrated Framingham–Navarre (RICORNA) score, the probability of a coronary event in 10 years of more than 9% was lower by approximately a half, whereas in cases of high or very high risk (20%) coronary risk was three times lower than when applying the original Framingham risk tables. The values of HDL-c <35 mg/dL (0.90 mmol/L) increased the risk by 50% and values ≥ 60 mg/dL (1.55 mmol/L) reduced the risk by 50% approximately.

To perform the calibration of the Framingham-Navarre equation the prevalence of risk factors was substituted with the data obtained from the RIVANA study. The rate of myocardial infarction, mortal or no, in our population and the estimated cases of silent myocardial infarction and angina from the Framingham database were employed[24]. The original coefficients of the 1998 Framingham-Wilson coronary risk score were introduced in the calculation, just like J. Marrugat et al employed in the REGICOR calibration[25].

Advances should be made in promoting self control and care on the part of the patient

We believe that the Framingham–Navarre (RICORNA) score is a useful tool that can be employed to estimate the global coronary risk with greater precision in primary prevention in Navarre to adjust the intensity of a preventive and therapeutic intervention according to the risk profile of the patient, thus improving its efficiency. One of the objectives of the follow up of this cohort is to evaluate its adequacy to the reality of morbidity and mortality in Navarre. The results of its application should provide more or less validity for its use in clinical practice.

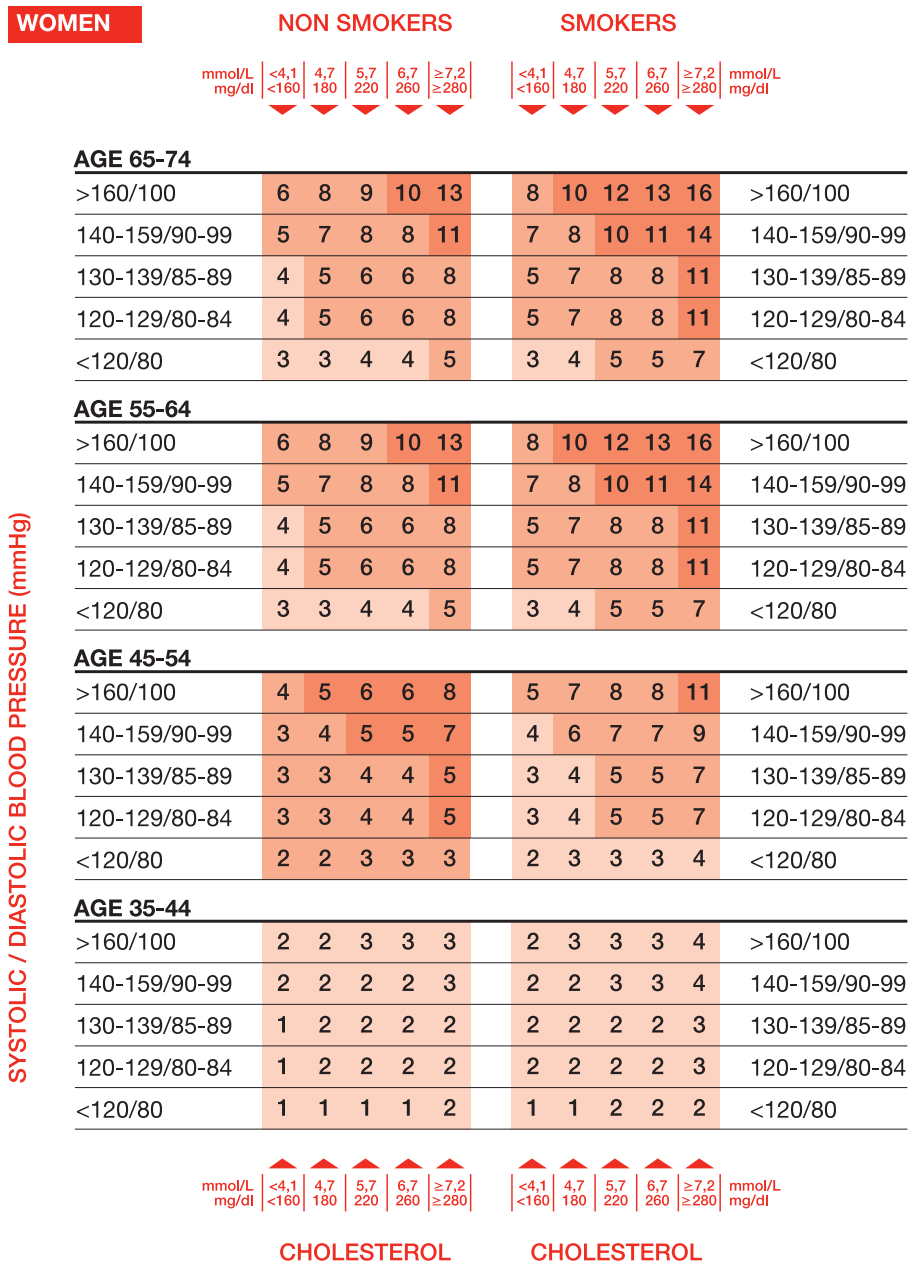
Figure 12. Prevalence of high-risk drinkers according to age and gender.



Acknowledgements

We thank Dr Clint Jean Louis, of the Emergency Department of the Navarre Regional Health Service in Spain, for translating the original manuscript into English.

Figure 13. Risk of myocardial infarction (fatal or not, with or without symptoms) or angina in non-diabetic women with HDL-c levels between 35 and 59 mg/dL (0.9 and 1.5 mmol/L).



If HDL-c < 35 mg/dL or 0.9 mmol/L, real risk = risk - 1,5
If HDL-c ≥ 60 mg/dL or 1.5 mmol/L, real risk = risk - 0,5

10-YEAR RISK:

■ Very high (> 39%) ■ High (20-39%) ■ Moderate (10-19%) ■ Mild (5-9%) ■ Low (<5%)

Figure 14. Risk of myocardial infarction (fatal or not, with or without symptoms) or angina in non-diabetic men with HDL-c levels between 35 and 59 mg/dL (0.9 and 1.5 mmol/L)

MEN

SYSTOLIC SYSTOLIC / DIASTOLIC BLOOD PRESSURE (mmHg)

	NON SMOKERS						SMOKERS					
mmol/L	<4,1	4,7	5,7	6,7	≥7,2		<4,1	4,7	5,7	6,7	≥7,2	mmol/L
mg/dl	<160	180	220	260	≥280		<160	180	220	260	≥280	mg/dl
AGE 65-74												
>160/100	7	13	15	20	23		11	20	24	31	35	>160/100
140-159/90-99	6	12	14	18	21		10	19	22	29	33	140-159/90-99
130-139/85-89	5	9	11	15	17		8	15	18	24	27	130-139/85-89
120-129/80-84	4	7	9	12	13		6	12	14	18	21	120-129/80-84
<120/80	4	7	9	12	13		6	12	14	18	21	<120/80
AGE 55-64												
>160/100	5	8	10	13	15		7	13	16	21	2	>160/100
140-159/90-99	4	8	9	12	14		7	12	14	19	22	140-159/90-99
130-139/85-89	3	6	7	10	11		5	10	12	15	18	130-139/85-89
120-129/80-84	3	5	6	7	9		4	8	9	12	14	120-129/80-84
<120/80	3	5	6	7	9		4	8	9	12	14	<120/80
AGE 45-54												
>160/100	3	5	6	8	10		5	9	10	14	16	>160/100
140-159/90-99	3	5	6	8	9		4	8	9	12	14	140-159/90-99
130-139/85-89	2	4	5	6	7		4	6	7	10	12	130-139/85-89
120-129/80-84	2	3	4	5	6		3	5	6	8	9	120-129/80-84
<120/80	2	3	4	5	6		3	5	6	8	9	<120/80
AGE 35-44												
>160/100	2	4	4	5	6		3	6	7	9	10	>160/100
140-159/90-99	2	3	4	5	6		3	5	6	8	9	140-159/90-99
130-139/85-89	2	3	3	4	5		2	4	5	6	7	130-139/85-89
120-129/80-84	1	2	2	3	4		2	3	4	5	6	120-129/80-84
<120/80	1	2	2	3	4		2	3	4	5	6	<120/80
mmol/L	<4,1	4,7	5,7	6,7	≥7,2		<4,1	4,7	5,7	6,7	≥7,2	mmol/L
mg/dl	<160	180	220	260	≥280		<160	180	220	260	≥280	mg/dl
	CHOLESTEROL						CHOLESTEROL					

If HDL-c < 35 mg/dL or 0.9 mmol/L, real risk = risk - 1,5
If HDL-c ≥ 60 mg/dL or 1.5 mmol/L, real risk = risk - 0,5

10-YEAR RISK:

Very high (> 39%) High (20-39%) Moderate (10-19%) Mild (5-9%) Low (<5%)

Conclusions

Preventive measures at population and individual levels should be based on the epidemiological characteristics of the risk factors of our population. Risk factors are present distinctly in men and women, and even more so throughout the different stages of life which should be taken into account when applying preventive measures in the population and to an individual.

The important epidemiological impact of vascular risk in our population as a whole –overweight/obesity, hypertension and hyperglycaemia– demands a renewed impetus on the part of the health professionals to identify and manage patients.

The measurement of the waist circumference should be part of the daily clinical practice during the physical examination of patients. This is a basic tool to detect central obesity and to evaluate global vascular risk.

It is necessary to improve the detection and intervention of hypertension. Special attention should be given to systolic hypertension. Self-measurements of arterial blood pressure is recommended in hypertensive patients to improve self control.

The high presence of impaired basal glucose and the opportunity to implement intensive interventions in promoting healthy lifestyles (physical activity and diet) make this disorder along with diabetes a priority in the care of our population.

Individual interventions with regard to hypercholesterolemia should take into account the lipid profile and global vascular risk. The TC/HDL–c index is of interest as an indicator of risk exposure, given the high level of HDL-c in our population.

It is necessary to maintain and intensify population and individual based strategies to avoid the initiation and facilitate the abandonment of excess alcohol consumption. Advice to stop smoking should be intensified especially in women.

The estimations from the tables proceeding from the RIVANA study are a more adjusted alternative to the evaluation of risk in our population. The calculation of global vascular risk is necessary for individual interventions with at least one cardiovascular risk factor.

The transfer of the responsibility of personal health care to the individual directs the strategy of individual intervention to improving lifestyle habits and the control of vascular risk factors. Individual “prescription” of physical activity should be incorporated in daily clinical practice and physical exercise should be promoted during leisure time throughout the population by all cultural, social, sport and health care institutions.

Individual and population directed interventions for the prevention of obesity and smoking is a priority for health systems and health care professionals within our province.

References

1. Riesgo vascular en Navarra (RIVANA). Grupo Técnico de Trabajo. Departamento de Salud: Viñes JJ, Guembe MJ, González-Diego P, Amézqueta C, Soberano I, Grijalba A, Moreno C, Serrano M. Pamplona: Gobierno de Navarra, Anales del Sistema Sanitario de Navarra, 2008; Monografía nº 4: 1-117.

2. Viñes JJ, Díez J, Guembe MJ, González P, Amézqueta C, Barba J, Sobejano I, Martínez Vila E, Grigalba A, Serrano M, Moreno C, Los Arcos E, Guerrero D. Estudio de riesgo vascular en Navarra: objetivos y diseño. Prevalencia del síndrome metabólico y de los factores de riesgo vascular. An Sist Sanit Navar. 2007; 30:113-124.

3. Executive Summary of the Third Report of the National Cholesterol Education Program (NCEP). Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adutl Tratment Panel III). JAMA 2001;285:2486-2497.

4. PAPPS: Recomendaciones sobre el estilo de vida.C. Cabezas Peña,T. Robledo de Diosa, F. Marquésa, R.Ortega Sánchez , Pinillab,M. Nebot Adella, M.J. Megido Badía, E. Muñoz Seco, J.A. Prados Castillejo y R. Córdoba García. Aten Primaria. 2007;39(Supl 3):27-46.

5. The IDF consensus worldwide definition of the metabolic syndrome. International Diabetes Federation, 2005. Disponible en: www.idf.org/webdata/docs/IDF_Metasyndrome_definition.pdf

6. Alberti KGMM, Zimmet PZ, Shaw JE. The metabolic syndrome: a new world-wide definition from the International Diabetes Federation consensus. Lancet. 2005; 366:1059-62.[Medline]

7. Guía Valoración y tratamiento del riesgo vascular. Junta de Castilla y León 2008. Cap. 6. Intervención sobrepeso y obesidad Pag. 185. Disponible en http://www.guiasalud.es/home.asp

8. 2007 Guidelines for the Management of Arterial Hypertension. The Task Force for the Management of Arterial Hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). Journal of Hypertension 2007;25: 1105–1187.

9. International Diabetes Federation 2005. Clinical Guidelines Task Force. Global guideline for type 2 diabetes. Available from www.idf.org

10. Medical Management of Hyperglycemia in Type 2 Diabetes: A Consensus Algorithm for the Initiation and Adjustment of Therapy: A consensus statement of the American Diabetes Association and the European Association for the Study of Diabetes. Diabetes Care January 2009 32:193-203; published ahead of print October 22, 2008, doi:10.2337/dc08-9025

11. Park YW, Zhu S, Palaniappan L, Heshka S, Carnethon MR, Heymsfield SB. The metabolic syndrome: prevalence and associated risk factor findings in the US population from the Third National Health and Nutrition Examination Survey, 1988-1994. Arch Intern Med 2003; 163: 427-36.

12. Ford ES, Giles WH, Mokdad AH. Increasing prevalence of the metabolic syndrome among US adults. Diabetes Care 2004;27:2444-2449.

13. Álvarez León EE, Ribas Barba L, Serra Majem L. Prevalencia del síndrome metabólico en la población de la comunidad Canaria. Med Clin (Barc) 2003;120:172-4.

14. San Vicente Blanco R., Pérez Irazusta I., Ibarra Amarica J., Berraondo Zabalegui I.,Uribe Oyarbide.F., Urraca Garcia de Madinabeitia J., Samper Otxotorena.R.,Aizpurua Imaz I., Almagro Mugica F., Andrés Novales J., Ugarte Libano R. Guía de Práctica Clínica sobre el manejo de los lípidos como factor de riesgo cardiovascular. Osakidetza. Vitoria-Gasteiz. 2008

15. Gérvas J, Pérez Fernández M. Uso y abuso del poder médico para definir enfermedad y factor de riesgo, en relación con la prevención cuaternaria. Gac Sanit. 2006;20(Supl 3):66-71.

16. Baigent C, Keech A, Kearney PM, Blackwell L, Buck G, Pollicino C, et al; Cholesterol Treatment Trialists' (CTT) Collaborators. Efficacy and safety of cholesterol-lowering treatment: prospective meta-analysis of data from 90,056 participants in 14 randomised trials of statins. Lancet. 2005;366:1267-78.

17. López Andrés A. Estatinas en Prevención Primaria de la enfermedad cardiovascular. ¿Uso basado en la evidencia o evidencia tergiversada? Boletín de Información Farmacoterapéutica de Navarra 2007;15 (1):1-14.

18. Unal B, Critchley JA, Capewell S. Modelling the decline in coronary heart disease deaths in England and Wales, 1981-2000: comparing contributions from primary prevention and secondary prevention BMJ 2005;331:614

19. Gonzalo Grandes, Alvaro Sanchez, Ricardo Ortega Sanchez-Pinilla, Jesus Torcal, Imanol Montoya, Kepa Lizarraga, Javier Serra, for the PEPAF Group Effectiveness of Physical Activity Advice and Prescription by Physicians in Routine Primary Care A Cluster Randomized Trial. Arch Intern Med. 2009;169(7):694-701.

20. Reynolds K, Lewis B, Nolen JD, Kinney GL, Sathya B, He J. Alcohol consumption and risk of stroke: a meta-analysis. JAMA 2003;289(5):579-588.

21. Mazzaglia G, Britton AR, Altmann DR, Chenet L. Exploring the relationship between alcohol consumption and non-fatal or fatal stroke: a systematic review. Addiction (Abingdon, England). 2001;96 (12):1743-1756.

22. Corrao G, Rubbiati L, Bagnardi V, Zambon A, Poikolainen K. Alcohol and coronary heart disease :a meta-analysis. Addiction (Abingdon, England) 2000;95 (10):1505-1523.

23. Rimm EB, Williams P, Fosher K, Criqui M, Stampfer MJ. Moderate alcohol intake and lower risk of coronary heart disease: meta-analysis of effects on lipids and

haemostatic factors. BMJ (Clinical research ed) 1999; 319(7224):1523-1528.

24. González Diego P, Moreno Iribas C, Guembe MJ, Viñes JJ, Vila J. Adaptación de la función de riesgo coronario de Framingham-Wilson para la población de Navarra (RICORNA). Rev. Esp Cardiol 2009;62 (8) 275-285.

25. Jaume Marrugat, Pascual Solanas, Ralph D'Agostino, Lisa Sullivan, José Ordovas, Ferran Cordón, Rafael Ramos, Joan Sala, Rafael Masià, Izabella Rohlfs, Roberto Elosua, William B Kannel. Estimación del riesgo coronario en España mediante la ecuación de Framingham calibrada Rev Esp Cardiol. 2003;56:253-61.

Servicio Navarro de Salud
Osasunbidea

ISSN
1138-1043

INFORMATION AND SUSCRIPTION
Servicio Navarro de Salud / Osasunbidea
Plaza de la Paz, s/n
31002 Pamplona
T +34 848429047
F +34 848429010

E-mail
farmacia.atprimaria@cfnavarra.es

WEB PAGE
http://www.cfnavarra.es/WebGN/SOU/publicac/BJ/sumario.htm