Erectile Dysfunction Associated with Cardiovascular Risk Factors

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Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.69104

Abstract

Objectives: (1) Determine erectile dysfunction (ED) prevalence in patients with cardiovascular risk factors (CVRF). (2) Assess ED incidence in relation to the extent of controlling CVRF. Methodology: Patients: Enrolled participants came to the health centres in the study area. In accordance with the incidence of diseases with cardiovascular risks (CVR) in the Basic Health Regions of the study area, sample size was calculated with a 95% confidence interval and an alpha error of 0.005, resulting in a sample of 210 people, of which 30 could not complete the study for various reasons (change of address, death, refused to complete questionnaire, etc.). A full awareness and diffusion campaign was organized with talks and leaflets. Letters: A standard letter was given to patients which explained the importance of sexual health, offering them an appointment with a DUE (Diploma in Nursing) survey taker. The questionnaire was devised by the research group and was given by a fully trained DUE survey taker. Previously, contact was made with all the health centres, physicians and nursing staff to give them information on ED and CVRF and to inform them about the work to be done in their health region. Those patients who did not come to the appointment were telephoned to insist on the importance of attending and completing the questionnaire. Variables analysis: We analysed age, level of education, civil status, height, weight and body mass index (BMI), SBP, DBP, smoking habit, number cigarettes/day, year smoking began, ex-smoker, year smoking stopped, alcohol consumption, grams alcohol/week, as well as consumption of other drugs, frequency and type. Blood test: glucose, haemoglobin glycated haemoglobin, total cholesterol, LDL cholesterol, HDL cholesterol, triglycerides, artherogenic index, creatinine, urea, GOT, GPT, gamma-GT and PSA. Urine test: micro-albuminuria, proteinuria and creatinine clearance. ECG: Diabetes diagnosed at least 1 year ago and prescribed drugs to treat it. High blood pressure diagnosed at least 1 year ago and prescribed drugs to treat it. Dyslipidaemia (hypercholesterolaemia) diagnosed at least 1 year ago and prescribed drugs to treat it. Concomitant diseases of at least 1 year and drugs (up to 3)

SHIM questionnaire and ED according to SHIM. Statistical analysis: an observational, descriptive, analytical, cross-sectional study. Qualitative variables are presented as exact values and a percentage; quantitative variables as the mean and standard deviation (SD). A means comparison was done with the Student's t-test for independent groups, or the Mann-Whitney U test if normality conditions (using the Kolmogorov-Smirnoff or Shapiro-Wilks test) were not fulfilled. The chi-squared test was used for qualitative variables. Results: Of the 210 selected people, 179 completed the questionnaire (85.2%). The mean age was 64.5 ± 11.6 years. When analysing all the study variables in relation to the main variable, presence or absence of ED, age played an important role in ED appearing as ED incidence rises with age. Blood pressure had no significant relationship with the studied variable, and the same hold for BMI and its subdivision into normal weight and obesity. As regards toxic habits, neither cigarette smoking nor alcohol consumption influenced the presence of ED. The same hold for the sociological-type variables (civil states, level of education). Regarding the biochemical variables from blood tests, a significant relationship with the atherogenic index and its recoded variable at high and low atherogenic risk ($p < 0.04$) was noted. In the glycaemic profile, a glycaemia mean of 126 mg/dl was obtained in the ED presence group, which is the cut-off point proposed by ADA117 (American Diabetes Association) to consider a subject diabetic. Likewise, glycated haemoglobin presented figures in the two groups can be considered an alternation of a practically diabetic glucose metabolism. In our study, the presence of diabetic disease, high blood pressure (HBP) and dyslipidaemia showed no significant relationship with ED presence for each disease. However, in the combination of these diseases, a statistically significant relationship was seen when CVR increases, according to the Framinghan tables. Neither did each disease's duration show a significant relationship with ED presence nor significant differences for the drugs used to treat the three pathologies were found. The coronary risk calculated according to the Framinghan tables indicated a statistically significant result, as did excessive risk (the difference between the coronary risk and the average assigned per age) for ED presence. The LISAT 8 test suggested that ED affected health-associated quality of life and was statistically significant in two items of sex life and economic situation and was borderline statistically significant in the general life and working life items. Conclusions: There is a high ED prevalence in patients with high CVR. When ED improves, the better CVRFs are controlled. These patients' pluripathology implies aggressive polymedication which doctors must consider as it increases the risk of ED.

Keywords: erectile dysfunction, cardiovascular risk, primary health care

1. Introduction

Erectile dysfunction (ED) is defined as a disorder characterized by the incapacity to sufficiently achieve and maintain an erection to enjoy a sexual relation and is, after premature ejaculation, the most common form of sexual dysfunction among men. The term 'erectile dysfunction' is recommended instead of 'impotence' because it defines the problem more accurately and has less social connotations [1–3].

Most cases are of an organic origin frequently owing to vascular diseases that diminish the blood flow to the penis, but can also be the result of psychological, neurological, hormonal, cavernous alterations, combinations of these and even cultural-type factors [2–4].

The first known reliable population data available are those of Kinsey's report dating back to 1948, in which 15,781 males aged 10–80 years participated who were stratified by ages, education and residence, of which only 4108 adults were assessed (older than 25 years), with half of these aged over 35 years and only 356 aged above 55 years. Therefore, conclusions are representative of males up to the age of 55 years and must be interpreted with caution for older populations. According to Kinsey's report, ED affects less than 1% of the population aged under 30 years; less than 35% of the population up to the age of 45 years; and 6.7% of those aged 45–55 years; 25% of those over the age of 65 years, and up to 75% in males above the age of 80 years [3–6].

In 1994, the Massachusetts Male Aging Study (MMAS) was published, which studied a population of 1270 American males aged 40–70 years. Among its results, it is worth stressing an ED prevalence of 52 ± 1.23% (9.6% complete, 25.2% moderate, 17.2% minimum) and a 5% risk of suffering ED at the age of 40 years, which triples to 15% at the age of 70 years [6].

In 1996, the first epidemiological study in Spain, known by the Spanish acronym EDEM (Study into Male ED), was conducted with an ED-based population. It included 2476 males aged between 25 and 70 years, and a simple overall self-assessment question to categorize subjects with ED, as well as the IEFI's (International Index of Erectile Function) erectile function domain. ED prevalence rate in our country is 12.1% according to the simple question and 19% according to the IEFI's erectile function domain. After making population-based estimations according to the corrected 1991 census, the number of Spanish males with some degree of ED ranges between 1 and 1.5 million, of whom around 850,000 have moderate or serious/complete ED [6].

In 2002, a study appeared which was performed as part of Primary Health Care in Spain (Guirao Sánchez, the APLAUDE study) [7], with a sample of 125 patients. It discovered that two out of every three patients with ED had associated illnesses, and that one out of three was not aware of his health problem. The control of chronic diseases improved significantly, and three out of every four patients responded to sildenafil.

Presence of sexual alterations is frequent in cases of high blood pressure [8–14], and hypertensive patients can be considered individuals with a higher likelihood of becoming impotent as they face a triple threat: hypertension itself can diminish the production of neurotransmitters involved in erection; arterial consequences of hypertension that alter the arterial wall and hypertension treatment may alter the erectile cycle.

The effect that hypertension has on the arterial wall is known and exercised at two levels: diminishing arterial elasticity and being capable of causing endothelial lesion. In all bifurcations of the arterial system, hypertension causes 'uprooting' of endothelial cells owing to increased blood flow clashing against the vascular wall. After every endothelial repair, these predilation zones become increasingly prone to new endothelial lesions since the structures exposed in each endothelial lesion induce platelets to cover the lesion [12–14].

Many medicines are able to altering men's sexual function at different levels. Anti-hypertensives are the main cause of medicine-related impotence. They may cause impotence because they lower perfusion pressure at the cavernous hypogastric arterial level. The most common

drugs are methyldopa or clonidine, which act at two levels: centrally, by diminishing sexual desire, and peripherally, by making erection difficult. Apart from these sympatholythics (including guanethidine, reserpine), alpha blockers, MAOI (nialamide) and vasodilators (hydralazine), beta blockers and diuretics, which are often used in combination in almost 15–30% of treated individuals, also may cause impotence.

It is necessary to bear in mind that anti-hypertensives are, in many cases, only a triggering factor and reveals a latent lesion. This occurs when atheromatous lesions exist in penis arteries, which on itself are not sufficient to alter erection but may cause impotence when combined with a treatment that drops blood pressure and withdraws blood [12–17].

Sexual impotence affects diabetics [12–16] at an estimated percentage of between 30 and 50%. It is important to stress that impotence is established in most cases in the year before the disease evolves. Nonetheless, and whatever the cause, diabetes causes 50% of cases of erectile alterations after it has gradually evolved over a 10-year period. The cause is multifactorial, but arterial and neuronal lesions clearly predominate. An arterial lesion is not necessarily found in the presence of neuronal lesions.

In one study, the prevalence of risk factors in 440 individuals with ED [14], 30% diabetics were found. This implies that diabetes is significantly more common in the ED population than in the general population for similarly aged individuals.

Diabetic microangiopathy significantly diminishes arteries' diameter (calibre) and reduces the blood flow required for erection. This is due to lesions forming that affect not only micro-vessels, but also surrounding interstitial tissue.

Disturbances in the bloodstream induced by diabetes also intervene in circulation alterations at the micro-circulation level, along with structural alterations of this micro-circulation. This phenomenon is linked to a higher proteins rate in the acute phase where fibrinogen is the most important of these proteins.

The vegetative neuropathy of diabetes affects the parasympathic medullary centres conditioning vesical atony and ED, since these are centres common to urination and erection [14].

Former studies have demonstrated that atherogenesis is responsible for LDL cholesterol although, in parallel, HDL cholesterol acts as a protector. Total cholesterol, therefore, reflects cholesterol in various lipoproteins, of which two factors play an opposing role in vascular diseases genesis [16–18].

Lipids' isolated or associated role in altering the metabolism in terms of participating in the organic disorder of ED is an important one, be it less significant than the action of tobacco or diabetes. Total cholesterol appears to play a more important role than triglycerides in the pathogenicity of lipid-caused metabolism alterations in ED. Its rate increases with age in individuals whose alteration has an arterial component.

Despite its high prevalence and unquestionable impact on men's self-esteem and quality of life, ED is still under-diagnosed owing to the social and cultural environment that leads to

fear and shame to consult it. In the next part, we describe a study into many factors probably involved in the prevalence of ED.

1.1. An observational, descriptive, analytical, cross-sectional study

The study was initiated at primary care in the area of Albacete county (Spain), in rural area as well as in an urban area. Three health centres participated in total.

The enrolled participants included in this study were those who visited the health centres.

In accordance with the cardiovascular risk (CVR) diseases incidence in the basic health regions of the study area [36], sample size was calculated with a 95% confidence interval and an alpha error of 0.005, which resulted in a sample of 210 people, of which 30 finally did not complete the study for various reasons (change of address, death, refusal to complete the questionnaire, etc.). The sample was chosen from the population in the basic health regions of the study area with CVR diseases.

Adequate awareness and diffusion tasks were carried out in the study population by means of:

1. Awareness talks: Three awareness talks were organised on ED to the population of Albacete.

2. Leaflets.

3. Letters: A standard type letter was given to patients which explained the importance of sexual health, and they were asked to an appointment with the DUE survey taker.

The questionnaire was devised by the research group and was conducted by a trained DUE survey taker.

A letter of presentation was sent by the research team informing about the work project to be conducted in the provinces of Albacete and Cuenca.

A second letter was sent inviting people to an appointment at their respective health centre on a given date and at a given time.

The research team and survey takers (DUE) met on several occasions to detail and plan the work. The time to perform the fieldwork took 6 months.

Previously, contact was made with all the health centres, doctors and nurses, offering them information via a colloquium on ED and CVRF and to inform them about the work to be done in their health region.

Those patients who did not come to the appointment were telephoned to insist on the importance of going to the appointment and completing the questionnaire.

Questionnaires were conducted in the time and manner agreed upon for their analysis.

The results obtained from the questionnaires were read by the research team to avoid any reading bias (see **Tables 1** and **2**).

Quantitative variables	Absence ED	Presence ED	p
Age (years), average (SD)	54.8 (10.97)	66.96 (10.38)	0.000*
BMI (kg/m²), average (SD)	30.3 (3.5)	29.01 (3.9)	0.18
Blood pressure	137.03 (20.9)	137.3 (10.12)	0.91
PAS (mm/hg), average (DE)	80.9 (10.1)	80.2 (9.05)	0.69
PAD	56.1 (19.11)	57.2 (16.1)	0.74
TA differential			
Cigarettes/day: average (SD)	18 (11.9)	15.25 (9.9)	0.45
Packs/year: average (SD)	23.5 (16)	29.7 (19.8)	0.42
Years smoking: average (SD)	35.1 (10.3)	42.4 (12.1)	0.1
Age start smoking: average (SD)	17 (4.5)	19,5 (8.4)	0.34
Grams/week alcohol: average (SD)	154.6 (109.3)	139.1 (110.4)	0.55
Glycemia: (mg/dl), average (SD)	120.5 (40.9)	126.5 (48.3)	0.59
Glycated haemoglobin, average (SD)	6.3 (1.5)	6.6 (1.5)	0.37
Total cholesterol: (mg/dl), average (SD)	208.3 (39.4)	205.5 (39.5)	0.7
LDL-cholesterol: (mg/dl), average (SD)	130.3 (33.1)	127.9 (34.9)	0.7
HDL-cholesterol: (mg/dl), average (SD)	46.9 (10,7)	51.8 (12.5)	0.034*
No HDL cholesterol: (mg/dl), average (SD)	161.4 (40.3)	153,8 (41.1)	0.3
Triglycerides: (mg/dl), average (SD)	170.7 (70,9)	144.5 (112)	0.3
Atherogenic index: average (SD)	4.7 (1.3)	4.2 (1.3)	0.047*
Creatinine: (mg/dl), average (SD)	1.00 (0.2)	0.99 (0.2)	0.8
Uric acid: (mg/dl), average (SD)	5.9 (1.5)	5.6 (1.5)	0.37
Urea: (mg/dl), average (SD)	39.4 (14.1)	41.2 (10.0)	0.5
SGOT: (U/L), average (SD)	27.1 (9.8)	22.8 (12.3)	0.15
SGPT: (U/L): average (SD)	34.7 (19.0)	23.3 (12.1)	0.001*
Gamma-GT: (U/L), average (SD)	63.2 (110.9)	29.8 (15.5)	0.008*
PSA: (ng/ml), average (SD)	2.4 (3.7)	2.9 (4.0)	0,8
MAU:	15.4 (31.7)	6.5 (8.0)	0.1
Proteinuria:	0.07 (0.2)	3.16 (16.9)	0.6
Score LISAT-8: average (SD)	39.4 (6,1)	32.6 (7.0)	0.000*
Diabetes last: (years), average (SD)	6.8 (4.8)	9.3 (8.2)	0.11
HTA last: (years), average (SD)	6.6 (4.8)	10.5 (10.0)	0.17
Dyslipidemia last: (years), average (SD)	6.1 (6.5)	7.4 (5.5)	0.5
Coronary risk (Framinghan)	36 (20.5%)	140 (79.5%)	0.033*
Risk excess (differ between coronary risk and average risk)	36 (20.5%)	140 (79.5%)	0.012*

*p < 0.05: statistically significant.

Table 1. Description of variables in relation to the main variable: ED (presence or absence) in the sample surveyed.

Variables	Absence ED	Presence ED	p
Age groups			
31–55 years	19 (50%)	19 (50%)	0.000*
56–70 years	14 (17.5%)	66 (82.5%)	
71–86 years	3 (4.9%)	58 (95.1%)	
Civil status			
Married	26 (19.4%)	108 (80.6%)	0.6
Living single	6 (24%)	19 (76%)	
Studies			
No studies	6 (15.4%)	33 (84.6%)	0.23
Primary studies	9 (14.1%)	55 (85.9%)	
Others	7 (29.2%)	17 (70.8%)	
BMI			
Normoweight	16 (25%)	48 (75%)	0.22
Obesity	20 (17.4%)	95 (82.6%)	
Tobacco consumption			
No	7 (17.5%)	33 (82.5%)	0.39
Daily	12 (27.3%)	32 (72.7%)	
Ex-smoker	17 (17.9%)	78 (82.1%)	
Type of ex-smoker			
1–5 years	6 (28.6%)	15 (71.4%)	0.2
Over 5 years	11 (15.5%)	60 (84.5%)	
Alcohol consumption			
Nothing	13 (18.8%)	56 (81.2%)	0.7
1–80 g/week	8 (17.4%)	38 (82.6%)	
Over 80 g/week	15 (23.4%)	49 (76.6%)	
Atherogenic			
<5 (low risk)	22 (16.8%)	109 (83.2%)	0.04*
>5 (high risk)	14 (31.1%)	31 (68.9%)	
Diabetes			
No	13 (21.7%)	47 (78.3%)	0.7
Yes	23 (19.3%)	96 (80.7%)	
Hypertension			
No	16 (21.1%)	60 (78.9%)	0.8
Yes	20 (19.4%)	83 (80.6%)	
Dyslipidemia			
No	20 (18.7%)	87 (81.3%)	0.6
Yes	16 (22.2%)	56 (77.6%)	

Variables	Absence ED	Presence ED	p
Diabetes drugs			
Can produce ED	8 (14.5%)	47 (85.5%)	0.22
No produce ED	15 (23.4%)	49 (76.6%)	
Hypertension drugs			
Can produce ED	16 (19.8%)	65 (80.2%)	0.85
No produce ED	3 (21.4%)	11 (78.6%)	

*p < 0.05: statistically significant.

Table 2. Description of qualitative variables in relation to the main variable: ED (presence or absence) in the sample surveyed.

2. Variables analysis

- Age.

- Level of education.

- Civil status.

- Height, weight and body mass index (BMI).

- SBP and DBP.

- Smoking habit, number of cigarettes/day, year smoking started, ex-smoker, year smoking stopped.

- Alcohol consumption, grams alcohol/week.

- Consumption of other drugs, frequency and type.

- Blood test: glucose, glycated haemoglobin, total cholesterol, LDL cholesterol, HDL cholesterol, triglycerides, atherogenic index, creatinine, urea, GOT, GPT, gamma-GT and PSA.

- Urine test: microalbuminuria, proteinuria and creatinine clearance.

- Electrocardiogram (ECG).

- Diabetes diagnosed at least 1 year ago and prescribed drugs to treat it.

- High blood pressure diagnosed at least 1 year ago and prescribed drugs to treat it.

- Dyslipidaemia (hypercholesterolemia) diagnosed at least 1 year ago and prescribed drugs to treat it.

- Concomitant diseases of at least 1 year and drugs (up to three).

- SHIM questionnaire and ED according to SHIM.

- LISAT-8 questionnaire set out per items:

- LISAT-8 Variable Test:

To all those surveyed, a quality-of-life test was provided, the LISAT-8. The Quality of Life Satisfaction questionnaire of Fugl-Meyer et al., or LISAT-8, is a list or inventory that assesses the satisfaction of the life of the adult population undergoing rehabilitation programmes, which have later been studied in ED patients. This list has been validated in several languages, including Spanish, in a masculine population with ED. This self-assessment questionnaire contains eight items that score on a Likert-type scale [31–35]:

(1) Highly insatisfactory; (2) insatisfactory; (3) somewhat insatisfactory; (4) somewhat satisfactory; (5) satisfactory and (6) highly satisfactory, which measure satisfaction with eight different facets of the patient's life: life in general, sex life, relations with partner, family life, relations with friends and people known, entertainment, occupational situation and economic situation.

2.1. Statistical analysis

The qualitative variables are presented as the exact value and percentages, while the quantitative values are mean and standard deviation (SD).

Statistical comparison between means used the Student's t test for independent groups or the Mann-Whitney U test was used if normality conditions (using the Kolmogorov-Smirnoff or the Shapiro-Wilks test) were not fulfilled. A chi-squared test was done with the qualitative variables.

3. Results

Of the 210 people selected, 179 correctly completed the questionnaire, 85.2%. The mean age was 64.5 ± 11.6 years.

When analysing all study variables in relation to the main variable, presence or absence of ED, age was seen to play an important role as ED incidence increased with age to reach 95% in the 71–86 years age group as opposed to 5% when ED was absent. Blood pressure showed no significant relationship in connection with the studied variable, and the same holds for BMI and its subdivision into two ranges: normal weight and obese. Neither cigarette smoking nor alcohol consumption appeared to influence the presence of ED. Likewise, the sociological-type variables (civil status, level of education) presented no significant relationship.

With the biochemical variables collected from blood tests, we found a significant relationship with the atherogenic index and its variable recoded as a high and low atherogenic risk (p < 0.04). A mean of glycaemia of 126 mg/dl was obtained in the group in which ED was present, which is the cut-off point proposed by the ADA117 (American Diabetes Association) to

consider a subject diabetic. Similarly, glycated haemoglobin showed data in the two groups, which could be considered an almost diabetic alteration to glucose metabolism.

In the hepatic profile, it is worth stressing that GPT transaminases and gamma GT showed a statistically significant relationship with ED presence. No significant results were obtained with the other parameters.
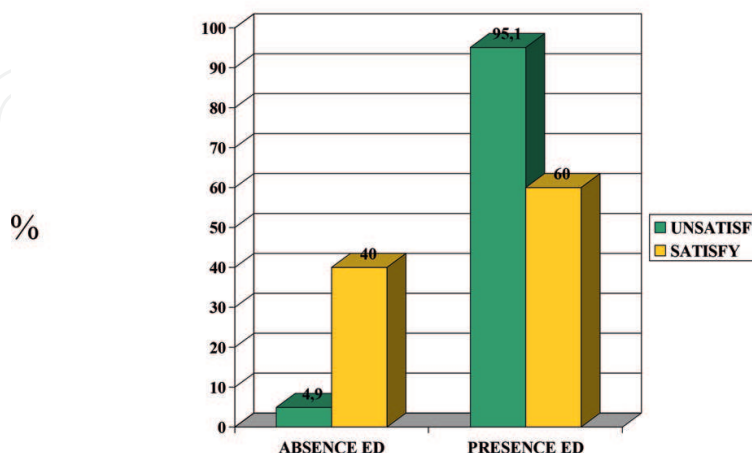
With the presence of diabetes, HBP and dyslipidaemia, this study revealed no significant relationship in relation to ED presence for each disease. However, a statistically significant association with these diseases was observed when CVR increased, according to the Framinghan
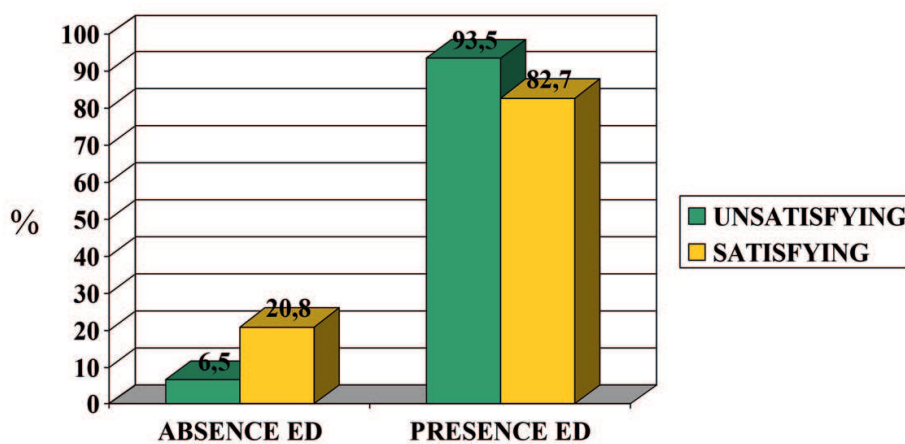
**Graph 1.** The LISAT-8 questionnaire results. **Sexual life, p < 0.00001 (statistically significant).**

tables (based on the study of Wilson et al. published in Circulation [61] (known as Framinghan study) to calculate the coronary risk in patients of our study).

Disease duration showed no such significant relationship, and the same holds for the drugs used to treat these three pathologies [37–39].

The coronary risk calculated according to the Framinghan tables obtained a statistically significant result, similarly to excess risk (the difference between coronary risk and the average risk assigned for each age) for the presence of ED.

No significant relationship was found for the diseases associated with these three pathologies (p < 0.46), but the drugs used for their treatment showed a relationship close to statistical significance (p < 0.07) [40–48].

In our study, the LISAT 8 test demonstrated that ED affected significantly health-associated quality of life, for two items, sex life and economic situation were statistically significant (see **Graph 1**), and the other general life and working life items tended to significance (see **Graph 2**). A significant relationship was also noted in the LISAT test score and was significantly lower among individuals with ED. Furthermore, a statistical relationship was seen when grouping the eight items into three dimensions or scales with love life and emotional life, a relationship close to significance was noted for those satisfied with the occupational life or the economic dimension, but no relationship was seen with the social life dimension [31–35].

DISTRIBUTION OF AGE IN SAMPLE SURVEYED
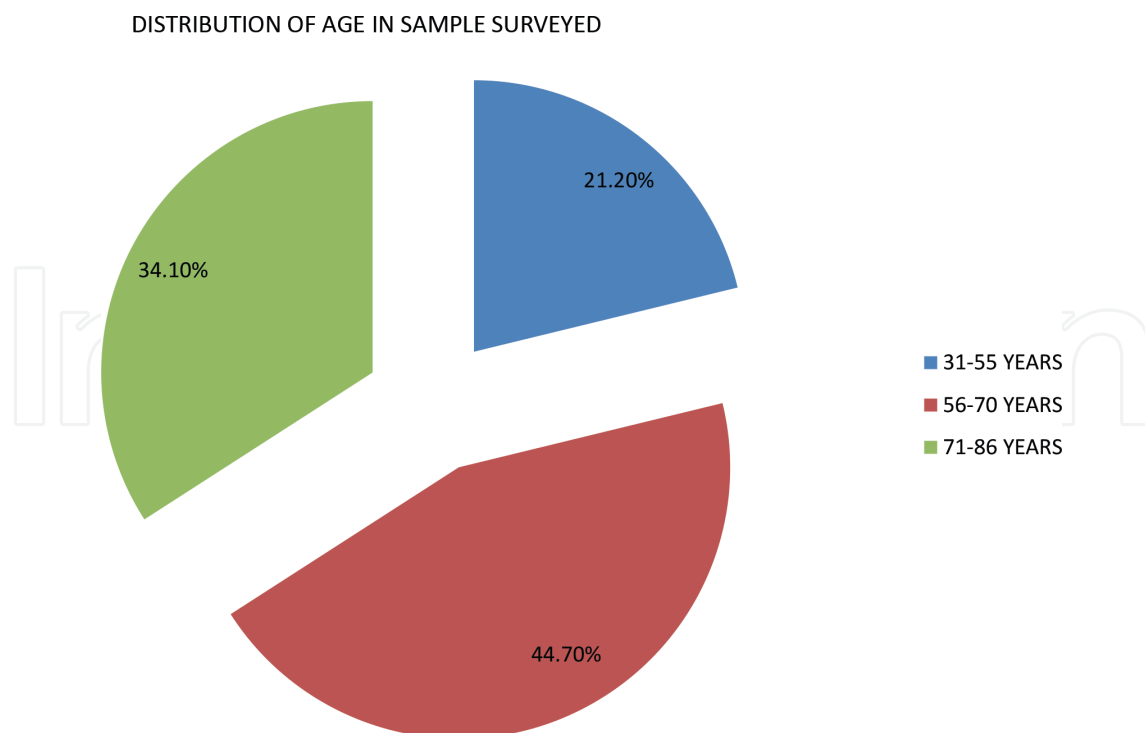
Graph 2. Distribution of age groups in the sample surveyed. **General life, p < 0.007 (not statistically significant).**

4. Discussion

Erectile dysfunction is defined as being unable to sufficiently obtain and maintain an erection to enjoy sexual satisfaction [1–6].

In the past, both physicians and the general population considered ED an inevitable consequence of age. Yet, our knowledge of masculine sexual function and dysfunction is increasing, and there is an important wide therapeutic range that needs to be explored. The World Health Organisation (WHO) has defined sexual health as a basic human right which includes the capacity to enjoy and control sexual behaviour, as a freedom that neither inhibits sexual responses nor is detrimental for sexual relations because of fear, shame, sense of guilt, false beliefs or other factors, and as a freedom so that organic diseases and other deficiencies do not interfere with either sexual or reproductive function. The WHO acknowledges ED as a health problem with the same degree of invalidity and severity as rheumatoid arthritis and heart angina [8–30].

Despite not being a pathology implying vital risk, ED greatly affects quality of life and could be a first sign of a serious underlying disease and is therefore of interest in patients who come to primary health care (PHC) consultations for this pathology [31–35].

Erectile dysfunction is a health problem and, unlike the traditional concept of it being merely a consequence of ageing, today it is considered a highly prevalent pathology. Apart from psychological factors to which much importance was attached in the 1950–1970s, the organic causes in the population assessed by the PHC are particularly interesting. Indeed in the NIH's consensus conference in 1993, it was assumed that most organic ED cases are associated with vascular risk factors: diabetes, hypercholesterolaemia, hypertension and smoking [9–17].

Atherosclerosis is the cause of 40% of ED cases in men aged over 50. Moreover, it damages endothelium and smooth muscle of the sinusoids of cavernous bodies, which makes the relaxation of arteries and smooth sinusoidal muscle in men difficult. This poor relaxation of smooth muscle in men is the most important pathogenic factor of ED [3].

Cardiac ischaemia, HBP, diabetes mellitus (DM), hyperlipidaemia, and smoking are pathological processes, which are indirectly associated with ED given their implication in the formation of atherosclerotic plates. Increased total cholesterol or LDL-c and lowered HDL-c are associated with arterial failure [37–40].

The relationship between ED and HBP is clearly well-established, which was confirmed by a study of Cuellar et al., who found a 46.5% prevalence for ED in patients with HBP. This high prevalence of ED in hypertensive patients can be basically due to two reasons: the lesions that HBP causes in arteries and the endothelium of cavernous bodies, and the effects on erections that anti-hypertensives may bring about [48–54].

As regards DM, ED prevalence varies between 20 and 50%. In Spain, a recent study places prevalence at 15.6% for diabetics type 1 and at 29.6% for diabetics type 2. The appearance of ED tends to take place before 10 years have elapsed since diagnosing DM. The occurrence of ED is between 10 and 15 years earlier among diabetics than in the general population; 12% of patients have ED as their first symptom of diabetes. Studies done in Italy and Spain have demonstrated that ED in patients with DM type 2 can be an indicator of a silent ischaemic cardiopathy [44–47].

ED presence in our study is associated with a significant index of patients with high CVR, which is substantially higher than that considered in other works which also include patients without CVRF. In relation to other studies, the differences in prevalence found could be due to these studies also including patients with no CVR.

In our study, we have been able to verify how vascular risk factors show high prevalence; we can observe how the mean figures for both glycaemia and glycated haemoglobin are clearly pathologic, and how 80.7% of diabetics present ED (See **Graph 3**). The HBP figures also reveal that hypertensive patients present 80.6% of ED (see **Graph 4**). Moreover, 77.6% of patients
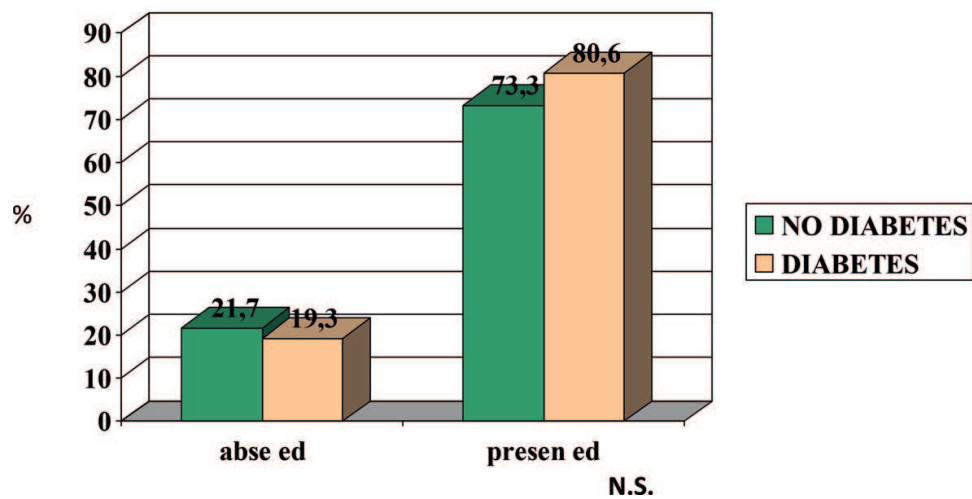
Graph 3. Diabetes%. N.S.
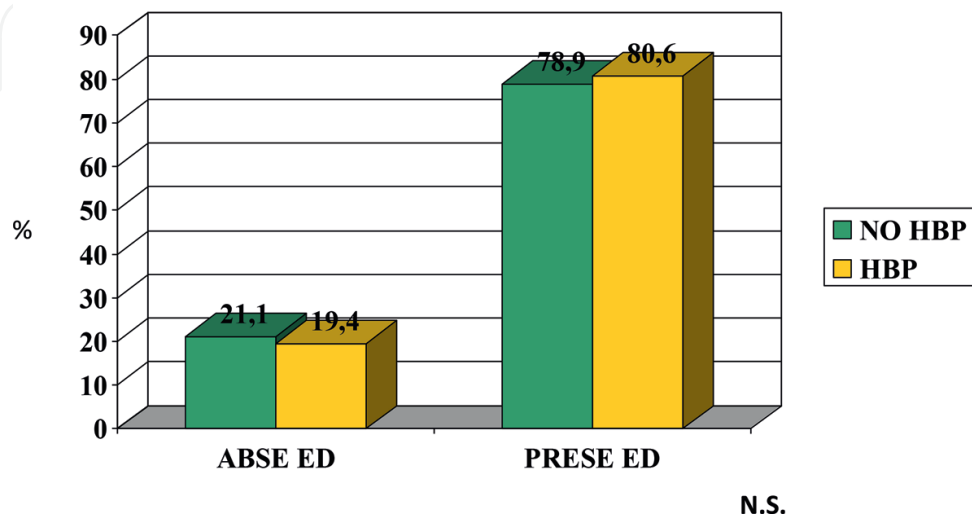
Graph 4. HBP%. N.S.

with dyslipidaemia show ED as opposed to 22.4% who do not. Our study also reveals that 72.7% of those who report smoking daily have ED.

Using the atherogenic index and CVR, and according to the Framinghan tables, the overall assessment indicates a highly significant relationship with ED [36–42] (see **Graph 5**).

CORONARY RISK (FRAMINGHAN)

RISK EXCESS (C.R.- AVERAGE RISK)
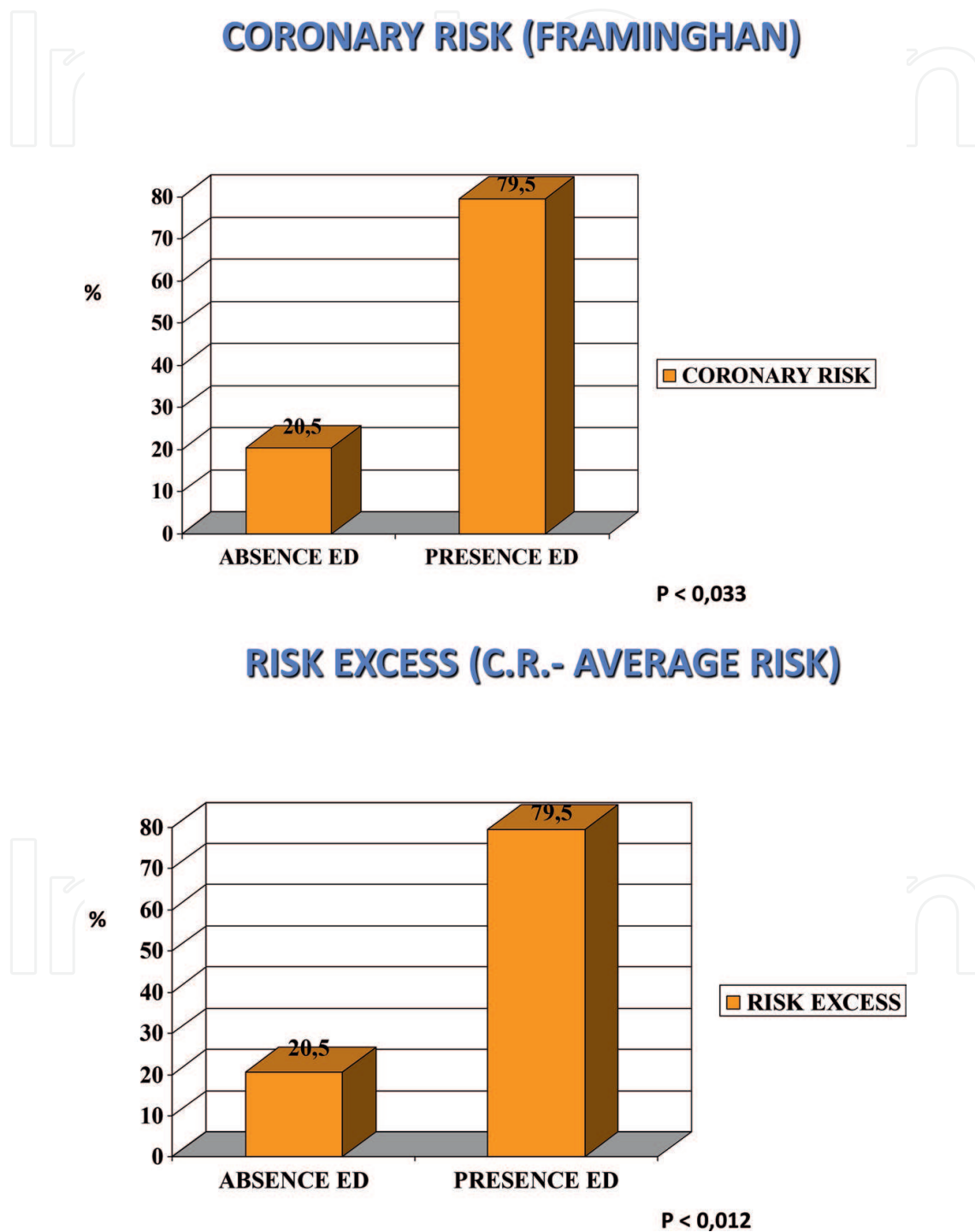
Graph 5. Coronary risk (Framinghan) %, p < 0.033.

It is worthwhile highlighting the consumption of drugs related with ED as none of them actually mention this side effect in their technical information, and many others do not consider it either. It is assumed that beta-blockers cause ED, but the effect of beta-adrenergics is rarely evaluated (or they are thought to not cause erectile alterations), yet terbutaline and salbutamol (greatly consumed in our sample) are indicated treatments in priapism with a subsequent effect on ED. This study shows a tendency to statistical significance between the consumption of certain drugs to treat associated diseases and ED, which confirms the suspicions of the relationship between these drugs and ED [41–45, 54–60].

From our study, the following conclusions may be drawn:

1. There is a high prevalence of erectile dysfunction in patients with high cardiovascular risk.

2. Advanced age is a risk factor for erectile dysfunction.

3. Erectile dysfunction improves if cardiovascular risk factors are better controlled.

4. Our patients' pluripathology status implies aggressive polymedication, which the doctor must consider as it increases the risk of erectile dysfunction.

5. Erectile dysfunction has a negative effect on quality of life and especially affects physical aspects, love life and life with a partner.

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