SEMI

GRUPO DE TROMBOEMBOLISMO

III Fórum Multidisciplinar de la

Enfermedad Tromboembólica

Gerona
22 al 24 de Marzo 2007

Palacio de Congresos de Gerona

SOCIEDAD ESPAÑOLA DE NEUMOLOGIA Y CIRUGIA TORACICA (SEPAR)

FUENTE
Fundación para el Estudio de la Enfermedad Tromboembólica en España

Capítulo Español de Flebología

SETH

Relación entre Índice de Masa Corporal (IMC) y Enfermedad TromboEmbólica (ETV)

Dra Raquel Barba Martín

Fundación Hospital Alcorcón

$$\text{IMC} = \frac{\text{peso (kg)}}{[\text{talla (m)}]^2}$$

Medida antropométrica que relaciona el peso con la talla de un individuo

IMC = peso (kg) / [talla (m)]^2

Clasificación de la OMS

- IMC< 16 (riesgo vital)
- IMC <18.5 (delgado)
- IMC 18,5-24,9 kg/m^2 (normalidad).
- IMC 25-29,9 kg/m^2 (sobrepeso)
- IMC > 30 kg/m^2 (obesidad)
- IMC>40 kg/ m^2 (obesidad mórbida)

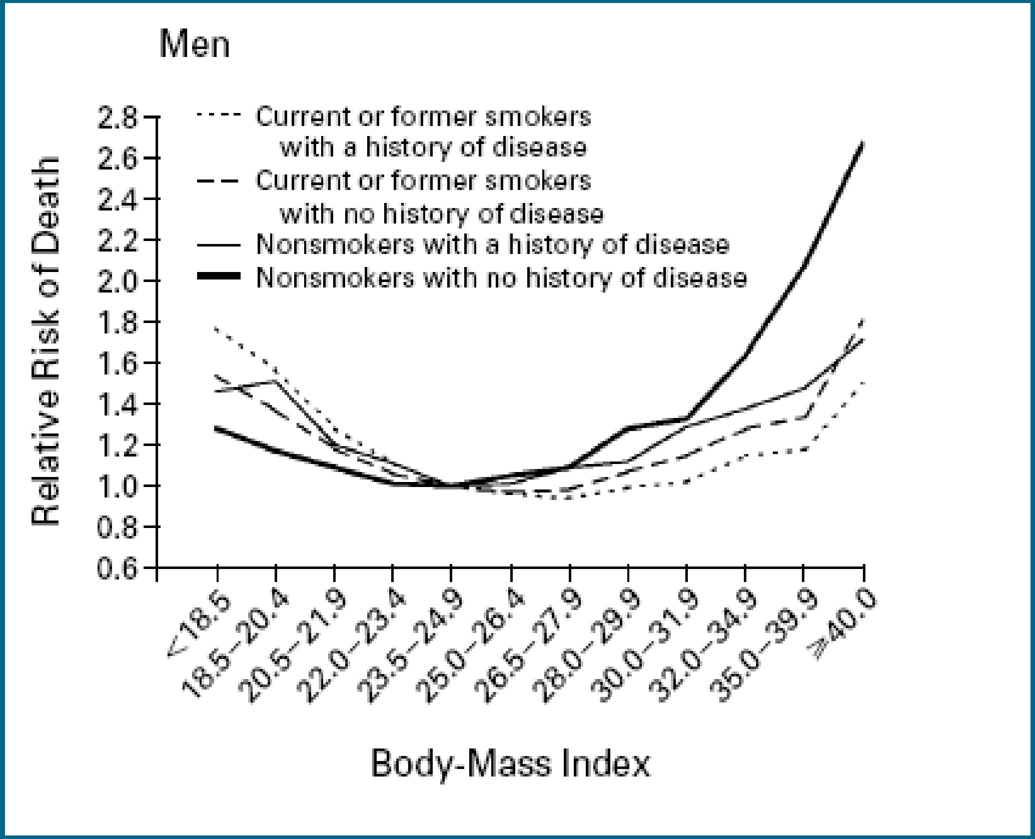
Fórum Multidisciplinar de la Enfermedad Tromboembólica

$$IMC = \text{peso (kg)} / [\text{talla (m)}]^2$$

- Existen diversos estudios epidemiológicos que han puesto en relación en Indice de Masa Corporal y la mortalidad, tanto en poblaciones generales como en grupos de pacientes con patologías concretas.

- En general, en la mayoría de los estudio se demuestra una relación en 'J' o 'U' de Sharp entre mortalidad e IMC

$\text{IMC} = \text{peso (kg)} / [\text{talla (m)}]^2$



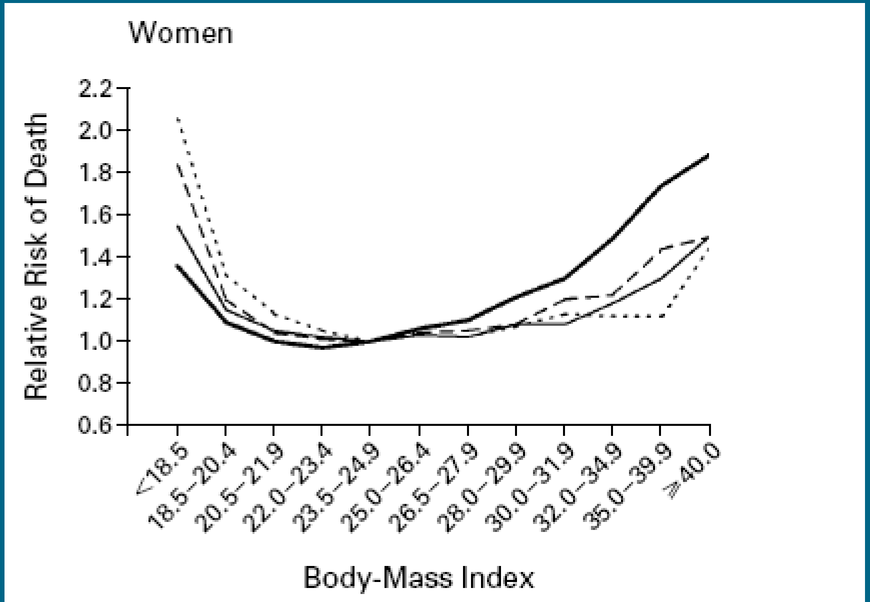


Figure 1. Multivariate Relative Risk of Death from All Causes among Men and Women According to Body-Mass Index, Smoking Status, and Disease Status.

The four subgroups are mutually exclusive. Nonsmokers had never smoked. The reference category was made up of subjects with a body-mass index of 23.5 to 24.9.

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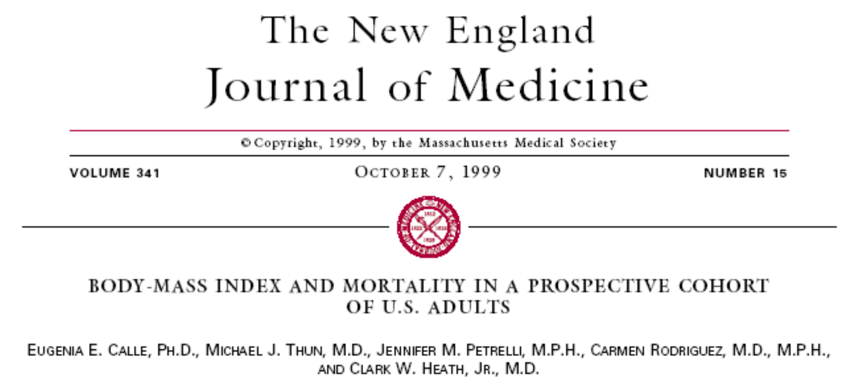
Relación Mortalidad- IMC



The New England
Journal of Medicine

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VOLUME 341 OCTOBER 7, 1999 NUMBER 15

BODY-MASS INDEX AND MORTALITY IN A PROSPECTIVE COHORT OF U.S. ADULTS

EUGENIA E. CALLE, PH.D., MICHAEL J. THUN, M.D., JENNIFER M. PETRELLI, M.P.H., CARMEN RODRIGUEZ, M.D., M.P.H., AND CLARK W. HEATH, JR., M.D.

- 457.785 hombres y 588.369 mujeres, mayores de 30 años y con una edad promedio de 57, fueron seleccionados del Cancer Preventive Study II (un estudio de mortalidad llevado a cabo por la American Cancer Society).
- Los participantes habían completado un cuestionario en 1982 y se registraron todas las muertes ocurridas hasta diciembre de 1996.

Relación Mortalidad- IMC

- IMC: se estratificó en categorías desde menor de 18.5 hasta mayor o igual a 40.0.
- Se establecieron subgrupos de riesgo en base a la:
  - presencia tabaquismo (TBQ)
  - ausencia de tabaquismo (TBQ)
  - presencia enfermedades concomitantes [EC] (cáncer, ACV, ECV, respiratoria, cualquier otra enfermedad y perdida de peso de 4.5 kg en el año previo).
  - ausencia de dichas enfermedades [EC]

No TBQ ni EC

No TBC si EC

Si TBQ no EC

Si TBQ si EC

E Calle et al. Body-mass index and mortality in a prospective cohort of US adults. The New England Journal of Medicine 1999 341: 1097-1105.

- Las tasas de mortalidad se expresaron en riesgo relativo comparando cada categoría de IMC con la de referencia: **23.5- 24.9.**

- Para cada uno de los cuatro subgrupos se midió asociación entre IMC y mortalidad de acuerdo al sexo.

Figure 1: Relative risk of all cause death for men who never smoked and who had no history of disease

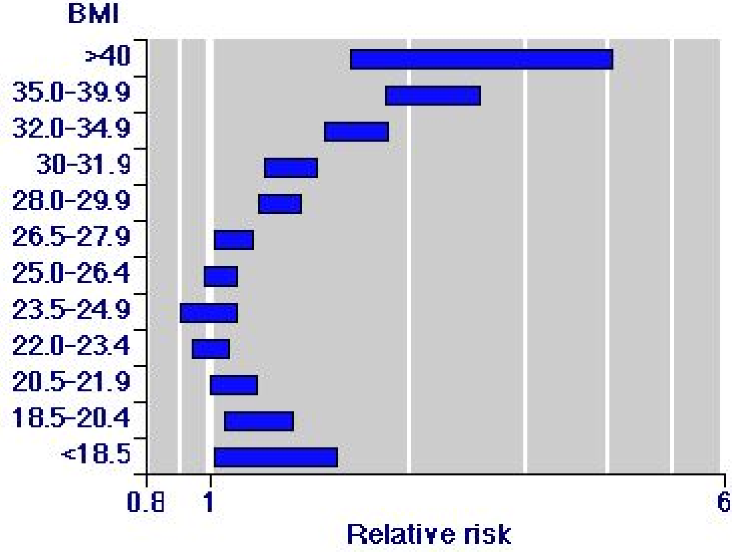
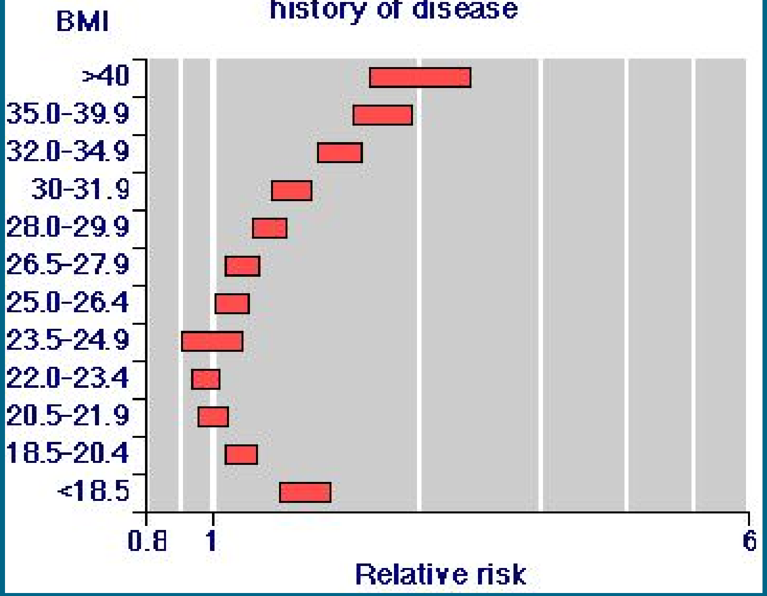


Figure 2: Relative risk of all cause death for women who never smoked and who had no history of disease



Relación Mortalidad- IMC

Las conclusiones más relevantes del estudio:

1.- Los pacientes con **IMC mínimo** tenían más riesgo de fallecer que el grupo de referencia

___*RR 1.28 (IC 95% 1.04-1,58) en hombres

*RR 1.36 (IC 95% 1.26-1.48) en mujeres

Relación Mortalidad- IMC

2.- Un **alto IMC** fue predictor de muerte especialmente en hombres, donde se observó un RR para la categoría de máximo IMC de 2.90 (IC 95% 2.37- 3.56) en relación con el grupo de referencia

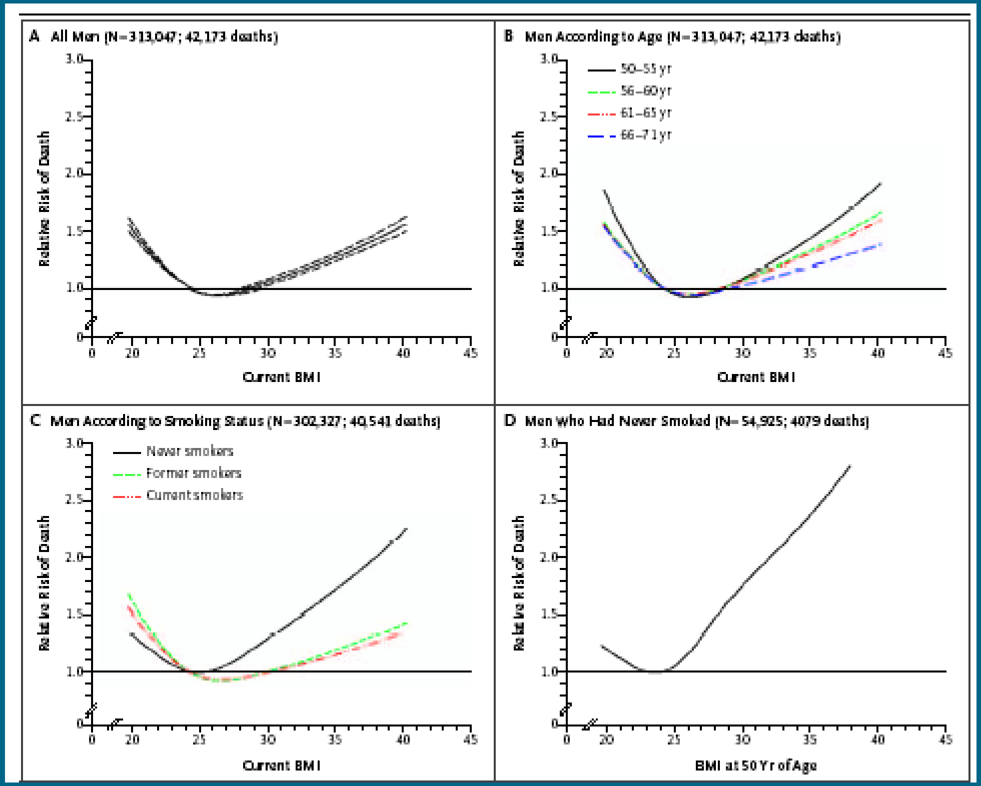
Relación IMC y diferentes patologías

- Se ha estudiado la relación existente en el pronóstico en diferentes enfermedades y el IMC:
    - cáncer de colon,
    - cáncer ovario,
    - cáncer pulmón,
    - enfermedad cardiovascular,
    - pacientes ingresados en UCI

[1] Burton BT,. Health implications of obesity: an NIH Consensus Development Conference. Int J Obes 1985; 9(3):155-170.
[2] Dignam JJ, et al. Body mass index and outcomes in patients who receive adjuvant chemotherapy for colon cancer. J Natl Cancer Inst 2006; 98(22):1647-1654.
[3] Doria-Rose. Body mass index and the risk of death following the diagnosis of colorectal cancer in postmenopausal women (United States). Cancer Causes Control 2006; 17(1):63-70.
[4] Gates EJ,. Body mass index as a prognostic factor in endometrioid adenocarcinoma of the endometrium. J Natl Med Assoc 2006; 98(11):1814-1822.
[5] Hebert JR,. Weight, height and body mass index in the prognosis of breast cancer: early results of a prospective study. Int J Cancer 1988; 42(3):315-318.
[6] Hoffmans MD,. Body Mass Index at the age of 18 and its effects on 32-year-mortality from coronary heart disease and cancer. A nested case-control study among the entire 1932 Dutch male birth cohort. J Clin Epidemiol 1989; 42(6):513-520.
[7] Kuriyama S. Impact of overweight and obesity on medical care costs, all-cause mortality, and the risk of cancer in Japan. J Epidemiol 2006; 16(4):139-144.

Relación IMC y diferentes patologías

- En la mayoría de los casos se demuestra que los pacientes con índices de masa corporales extremos tienen peor evolución/mayor mortalidad



R atologías

- En la ma stra que los pacientes ales extremos or mortalidad

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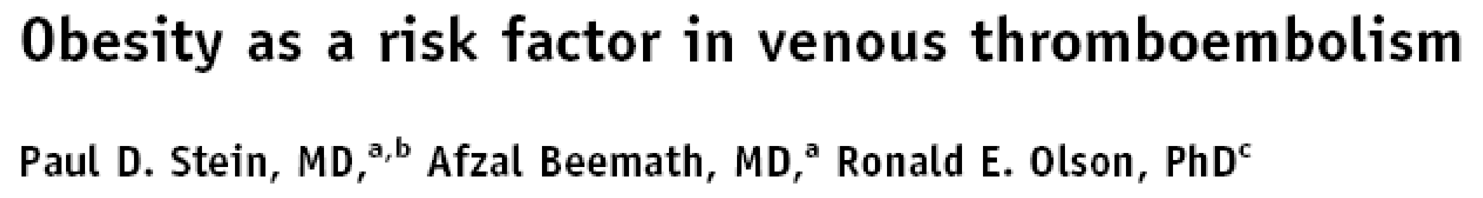
SETH

¿Existe relación entre IMC y ETV?

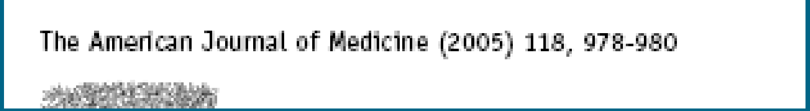
- La obesidad es un **factor de riesgo** de ETV en estudios poblacionales, en mujeres, en embarazadas, en tomadoras de terapia hormonal…
- Además la obesidad aumenta el riesgo de **recurrencia** de trombosis

1. *Obesity as a risk factor in venous thromboembolism. Am J Med. 2005 Sep;118(9):978-80*
2. *Maternal smoking, obesity, and risk of venous thromboembolism during pregnancy and the puerperium: A population-based nested case-control study. Thromb Res. 2007 Jan 24*
3. *Obesity and risk of venous thromboembolism among postmenopausal women: differential impact of hormone therapy by route of estrogen administration. The ESTHER Study. J Thromb Haemost. 2006 Jun;4(6):1259-65.*
4. *VTE Risk assessment - a prognostic Model: BATER Cohort Study of young women. Thromb J. 2005 Apr 18;3(1):5*
5. *Obesity and thrombosis. Eur J Vasc Endovasc Surg. 2007 Feb;33(2):223-33.*
6. *Epidemiology and risk factors of venous thromboembolism. Semin Thromb Hemost. 2006 Oct;32(7):651-8.*
7. *Circulating procoagulant microparticles in obesity. Diabetes Metab. 2006 Feb;32(1):82-5.*
8. *Smoking and abdominal obesity: risk factors for venous thromboembolism among middle-aged men: "the study of men born in 1913". Arch Intern Med. 1999 Sep 13;159(16):1886-90*
9. *Risk factors for deep vein thrombosis and pulmonary embolism: a population-based case-control study. Arch Intern Med. 2000 Mar 27;160(6):809-15*
10. *Predictors of recurrence after deep vein thrombosis and pulmonary embolism: a population-based cohort study. Arch Intern Med. 2000 Mar 27;160(6):761-8.*

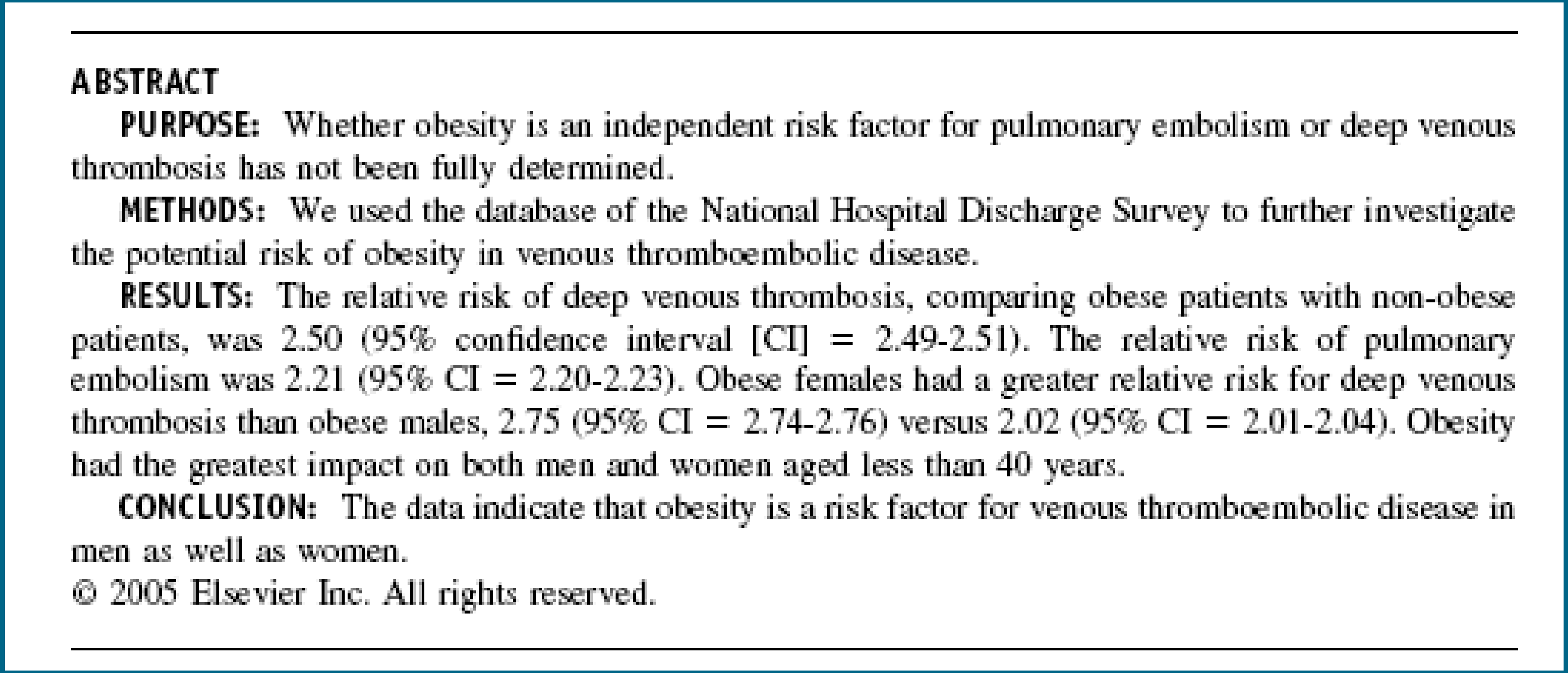


Obesity as a risk factor in venous thromboembolism

Paul D. Stein, MD,[a,b] Afzal Beemath, MD,[a] Ronald E. Olson, PhD[c]



The American Journal of Medicine (2005) 118, 978-980



ABSTRACT

PURPOSE: Whether obesity is an independent risk factor for pulmonary embolism or deep venous thrombosis has not been fully determined.

METHODS: We used the database of the National Hospital Discharge Survey to further investigate the potential risk of obesity in venous thromboembolic disease.

RESULTS: The relative risk of deep venous thrombosis, comparing obese patients with non-obese patients, was 2.50 (95% confidence interval [CI] = 2.49-2.51). The relative risk of pulmonary embolism was 2.21 (95% CI = 2.20-2.23). Obese females had a greater relative risk for deep venous thrombosis than obese males, 2.75 (95% CI = 2.74-2.76) versus 2.02 (95% CI = 2.01-2.04). Obesity had the greatest impact on both men and women aged less than 40 years.

CONCLUSION: The data indicate that obesity is a risk factor for venous thromboembolic disease in men as well as women.

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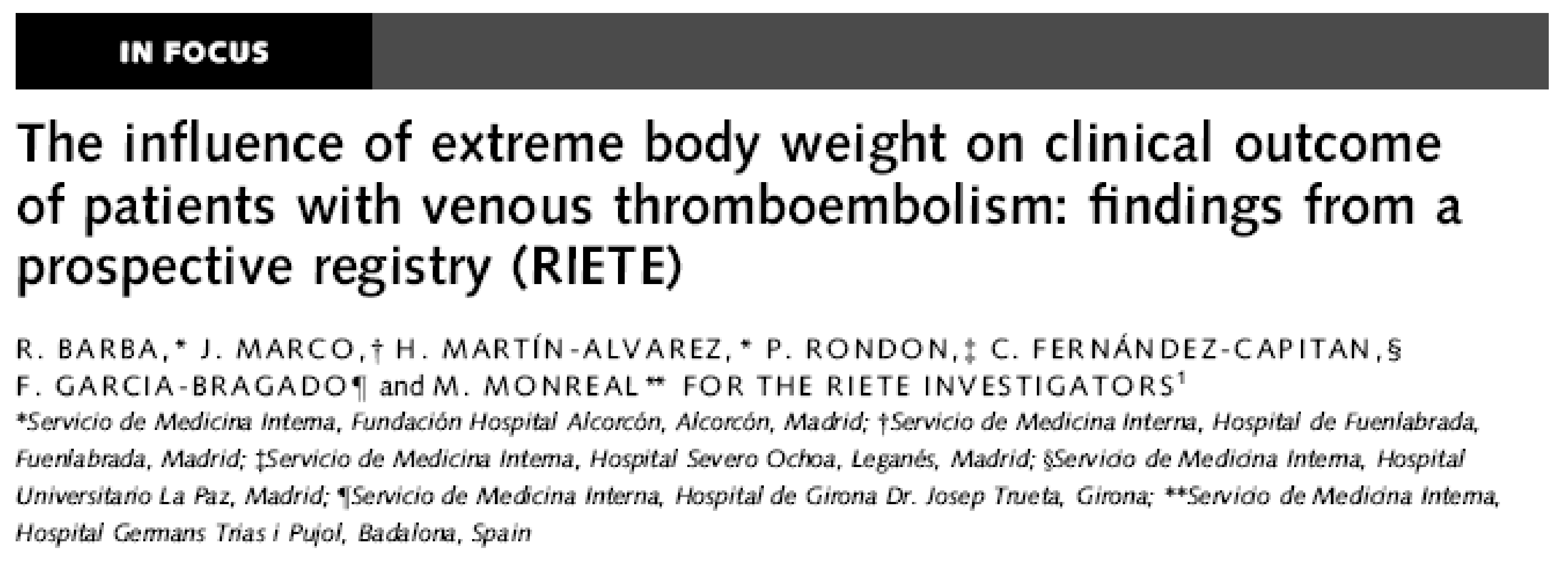
IMC y ETV

- **No** existía ningún estudio que hubiera relacionado la enfermedad tromboembólica con el índice de masa corporal bajo.

IMC y ETV



IN FOCUS

The influence of extreme body weight on clinical outcome of patients with venous thromboembolism: findings from a prospective registry (RIETE)

R. BARBA,* J. MARCO,† H. MARTÍN-ALVAREZ,* P. RONDON,‡ C. FERNÁNDEZ-CAPITAN,§
F. GARCIA-BRAGADO¶ and M. MONREAL** FOR THE RIETE INVESTIGATORS[1]
*Servicio de Medicina Interna, Fundación Hospital Alcorcón, Alcorcón, Madrid; †Servicio de Medicina Interna, Hospital de Fuenlabrada, Fuenlabrada, Madrid; ‡Servicio de Medicina Interna, Hospital Severo Ochoa, Leganés, Madrid; §Servicio de Medicina Interna, Hospital Universitario La Paz, Madrid; ¶Servicio de Medicina Interna, Hospital de Girona Dr. Josep Trueta, Girona; **Servicio de Medicina Interna, Hospital Germans Trias i Pujol, Badalona, Spain

Primer artículo que relaciona el peso con la evolución de los pacientes con ETV

IMC y ETV

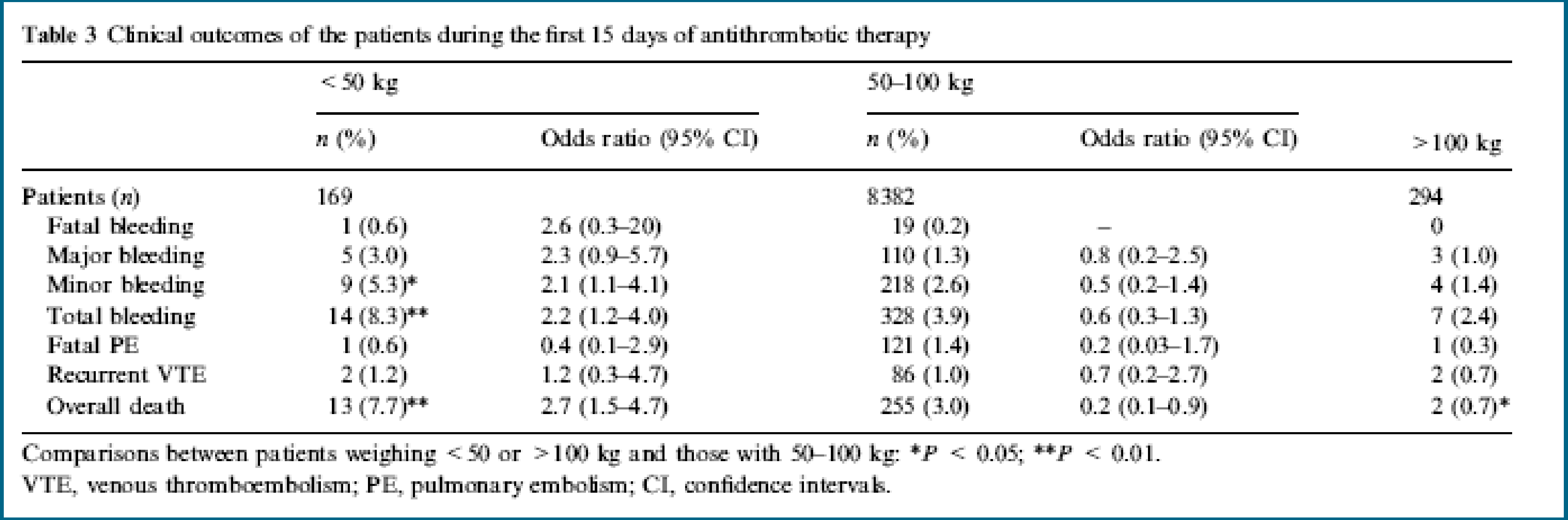


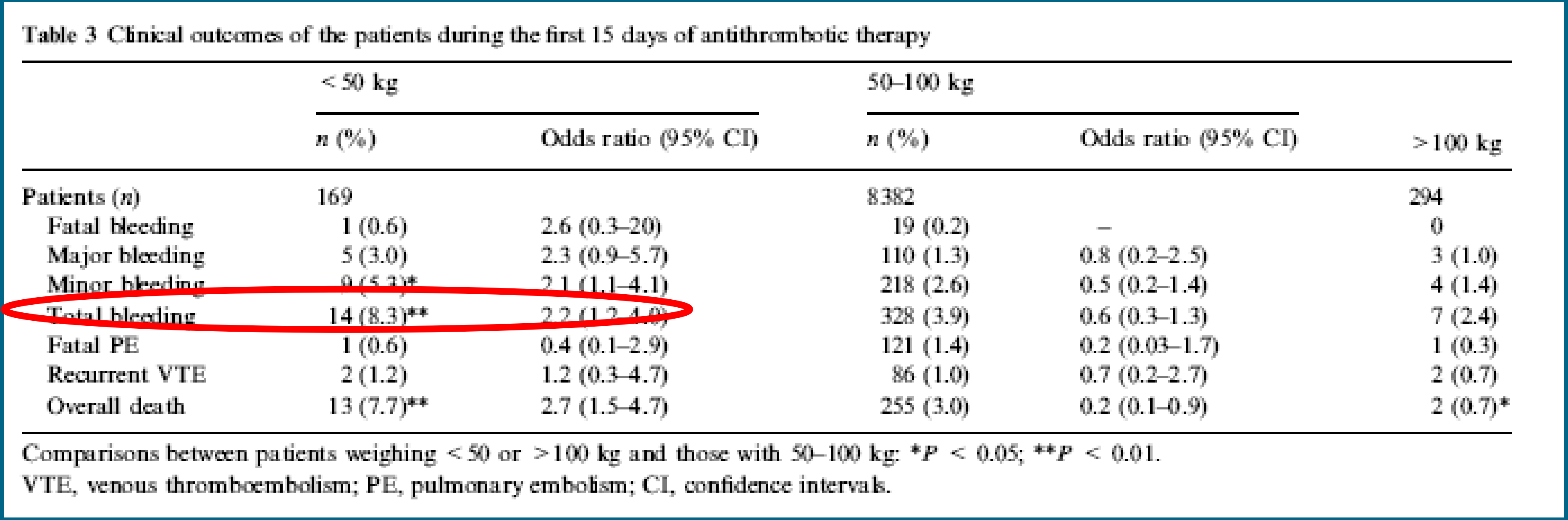
Table 3 Clinical outcomes of the patients during the first 15 days of antithrombotic therapy

	< 50 kg		50–100 kg		
	n (%)	Odds ratio (95% CI)	*n* (%)	Odds ratio (95% CI)	> 100 kg
Patients (*n*)	169		8382		294
Fatal bleeding	1 (0.6)	2.6 (0.3–20)	19 (0.2)	–	0
Major bleeding	5 (3.0)	2.3 (0.9–5.7)	110 (1.3)	0.8 (0.2–2.5)	3 (1.0)
Minor bleeding	9 (5.3)*	2.1 (1.1–4.1)	218 (2.6)	0.5 (0.2–1.4)	4 (1.4)
Total bleeding	14 (8.3)**	2.2 (1.2–4.0)	328 (3.9)	0.6 (0.3–1.3)	7 (2.4)
Fatal PE	1 (0.6)	0.4 (0.1–2.9)	121 (1.4)	0.2 (0.03–1.7)	1 (0.3)
Recurrent VTE	2 (1.2)	1.2 (0.3–4.7)	86 (1.0)	0.7 (0.2–2.7)	2 (0.7)
Overall death	13 (7.7)**	2.7 (1.5–4.7)	255 (3.0)	0.2 (0.1–0.9)	2 (0.7)*

Comparisons between patients weighing < 50 or > 100 kg and those with 50–100 kg: *$P < 0.05$; **$P < 0.01$.

VTE, venous thromboembolism; PE, pulmonary embolism; CI, confidence intervals.

IMC y ETV



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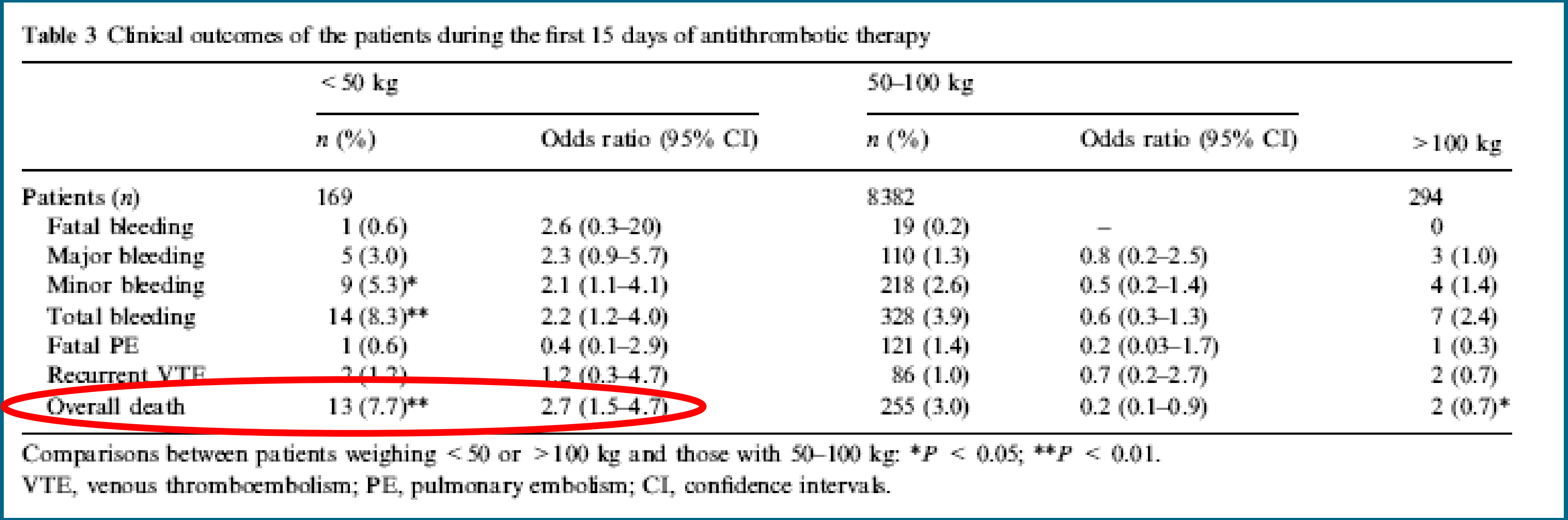

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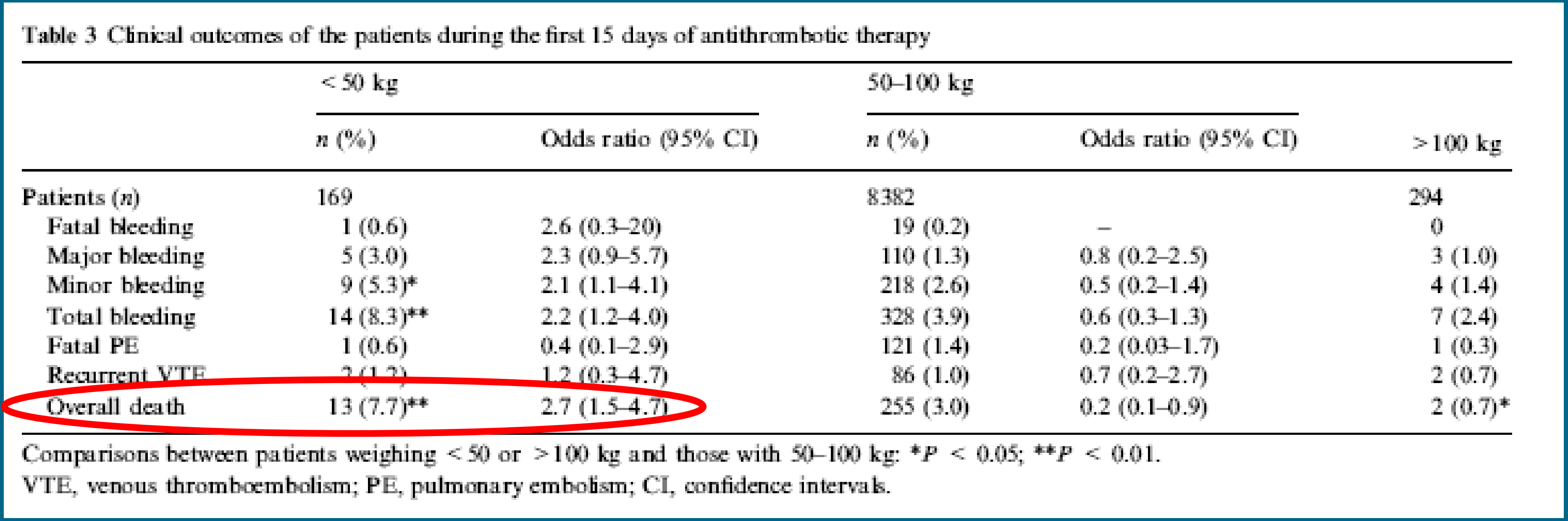

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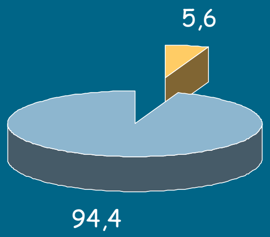
VTE, venous thromboembolism; PE, pulmonary embolism; CI, confidence intervals.

Los pacientes de menos de 50 kilos sangraban más y se morían más en la fase aguda de la enfermedad

Complications in Patients with Venous Thromboembolism and Low Body Mass Index. Findings from the RIETE Registry

- Decidimos seguir profundizando en el tema...
- Relación entre el IMC bajo y el mayor riesgo de sangrado en pacientes con ETV (RIETE).
- Partíamos del conocimiento de que los pacientes con bajo peso sangran más en la **fase aguda** y queríamos demostrar si los pacientes con bajo peso tenían más complicaciones de **durante la evolución**

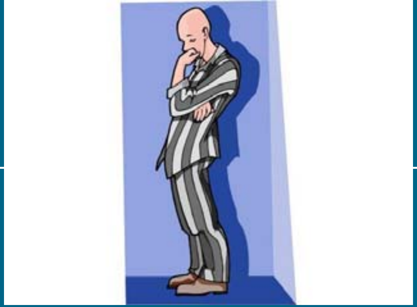


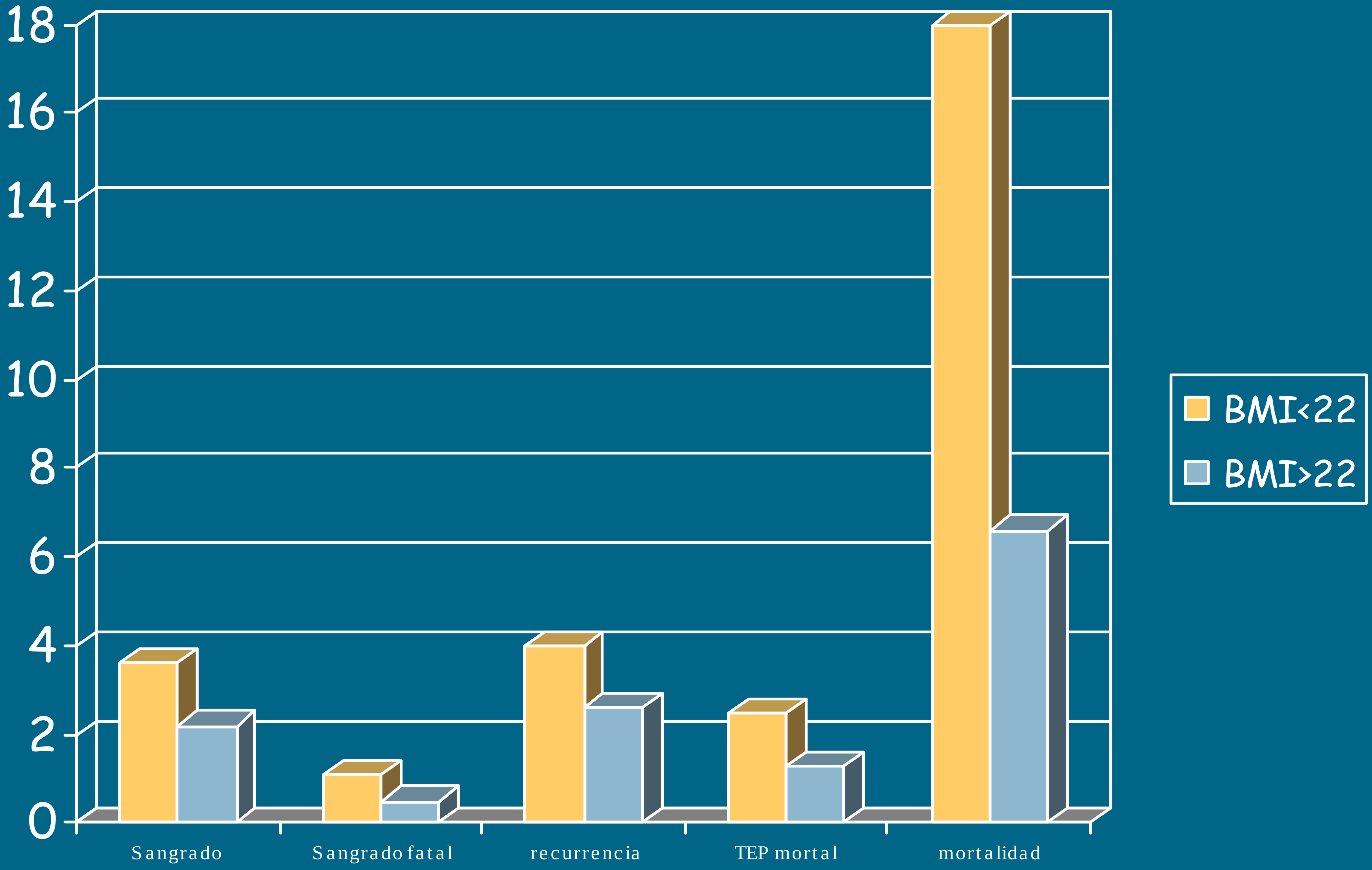
Complications in Patients with Venous Thromboembolism and Low Body Mass Index. Findings from the RIETE Registry

Se incluyeron 10112 pacientes.

5.6 % tenían un BMI por debajo de 22

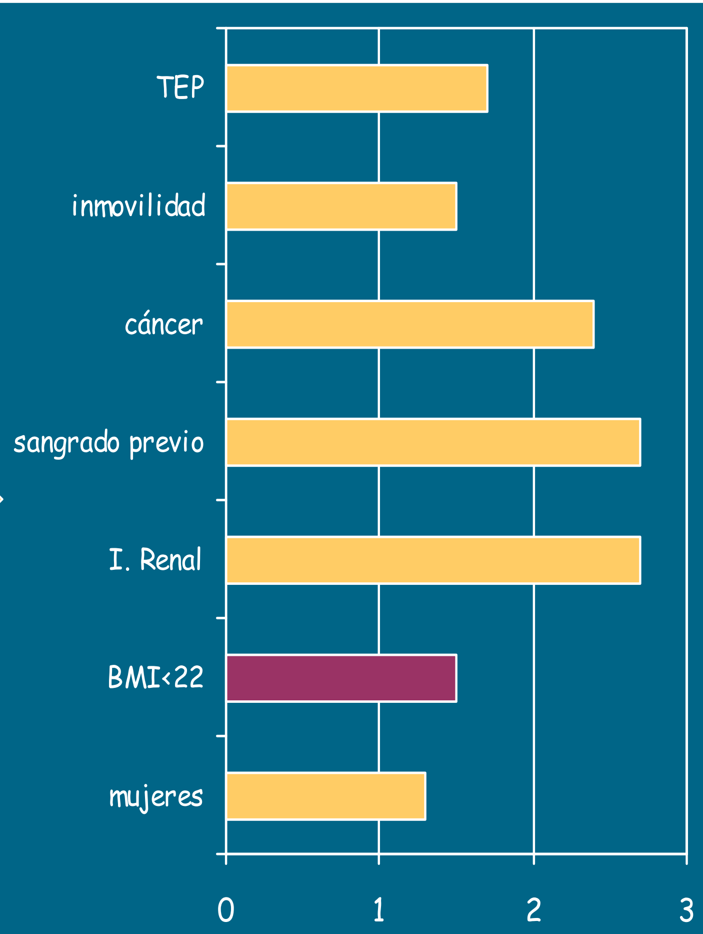
- Los pacientes delgados tiene más riesgo de **sangrar**(3.6% vs 2.2%, OR 1.7 IC95% 1.2-2.5)
- Más riesgo de **sangrado fatal** (1.1% vs 0.5% OR 2.4 IC95% 1.2-4.9)
- Mas riesgo de recurrir (4.0% vs 2.6% OR 1.5 IC95% 1.1-2.2)
- Más riesgo de tener un TEP mortal (2.5 vs 1.3, OR 1.9 IC95% 1.2-3.1)
- Mas riesgo de **fallecer** (18% vs 6.6% OR 3.1 IC95% 2.5-3.7)




18
16
14
12
10
8
6
4
2
0
Sangrado
Sangrado fatal
recurrencia
TEP mortal
mortalidad
BMI<22
BMI>22

Factores de riesgo de sangrado en la evolución

- El sexo femenino
- Edad
- IMC <22
- Insuficiencia renal
- Sangrado previo
- Cáncer
- Inmovilidad
- TEP al ingreso



Complications in Patients with Venous Thromboembolism and Low Body Mass Index. Findings from the RIETE Registry

BMI	Major bleeding	Fatal bleeding	Recurrent VTE	Fatal PE	Overall death
<20	4.7%	2.1%	3.5%	2.4%	23.0%
20-22	3.0%	0.6%	4.3%	2.6%	14.8%
22-25	2.6%	0.5%	3.5%	1.9%	10.2%
25-30	2.1%	0.5%	2.4%	1.2%	6.2%
>30	2.1%	0.3%	2.4%	0.8%	4.2%

Complications in Patients with Venous Thromboembolism and Low Body Mass Index. Findings from the RIETE Registry

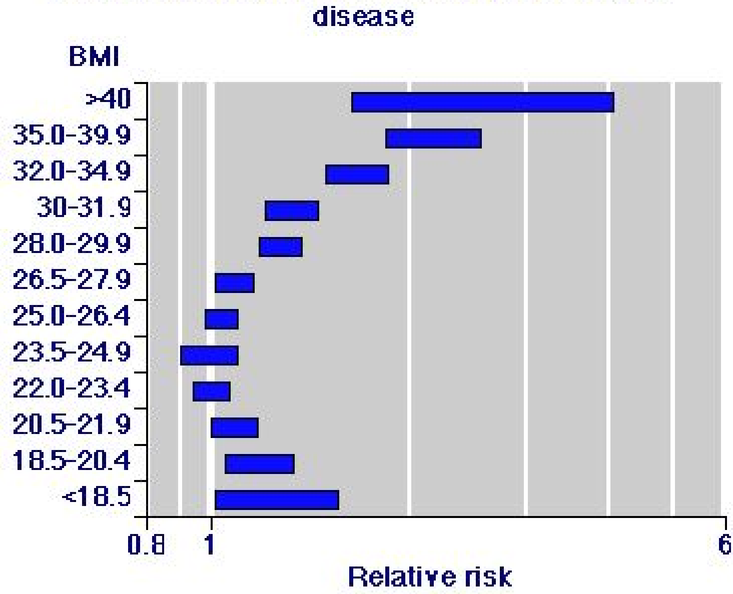


Figure 1: Relative risk of all cause death for men who never smoked and who had no history of disease

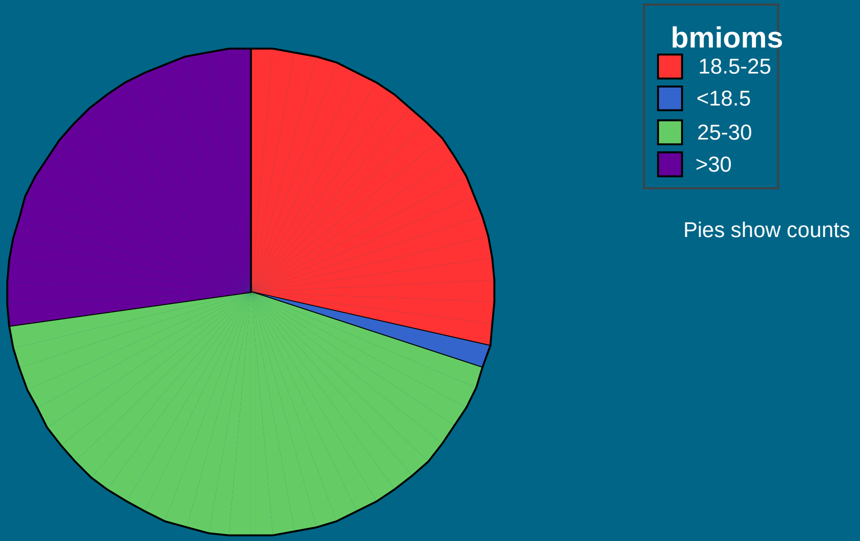
BMI	Ma ble		t	Fatal PE	Overall death
<20	4.7			2.4%	23.0%
20-22	3.0			2.6%	14.8%
22-25	2.6			1.9%	10.2%
25-30	2.1			1.2%	6.2%
>30	2.1%	0.3%	2.4%	0.8%	4.2%

IMC y motalidad en pacientes con ETV

- Y vamos a seguir profundizando…
- Relación entre el IMC y la mortalidad en pacientes con ETV.
- No existe ningún estudio que haya relacionado las dos patologías.

IMC y motalidad en pacientes con ETV

- Analizamos 10.112 pacientes con ETV seguidos durante 3 meses
- Se dividió a los pacientes en función de IMC según definiciones de OMS
  - <18.5 ⇒ 1%
  - 18.5-25 ⇒ 18.5%
  - 25-30 ⇒ 27.8%
  - >30 ⇒ 17.7%



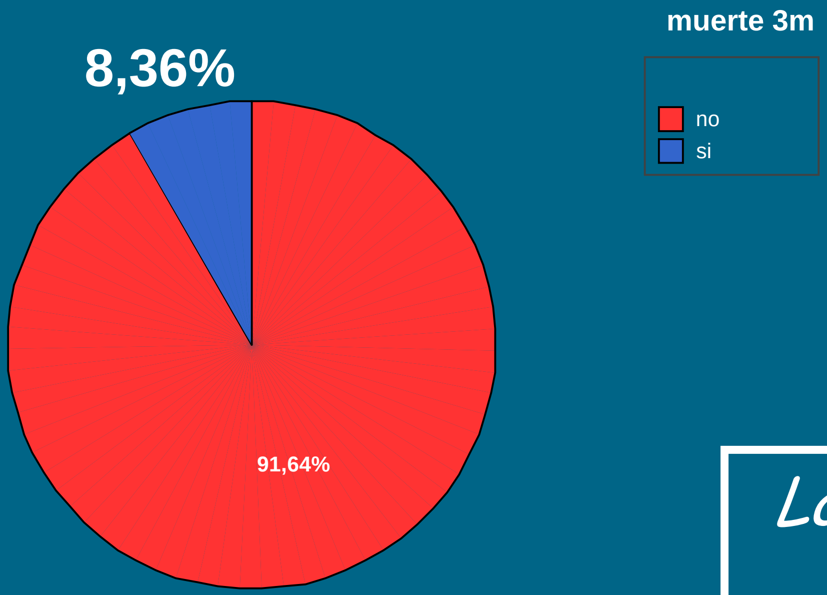
20% de los pacientes tienen cáncer

50.3% son mujeres

2.6% tienen antecedentes de sangrado previo

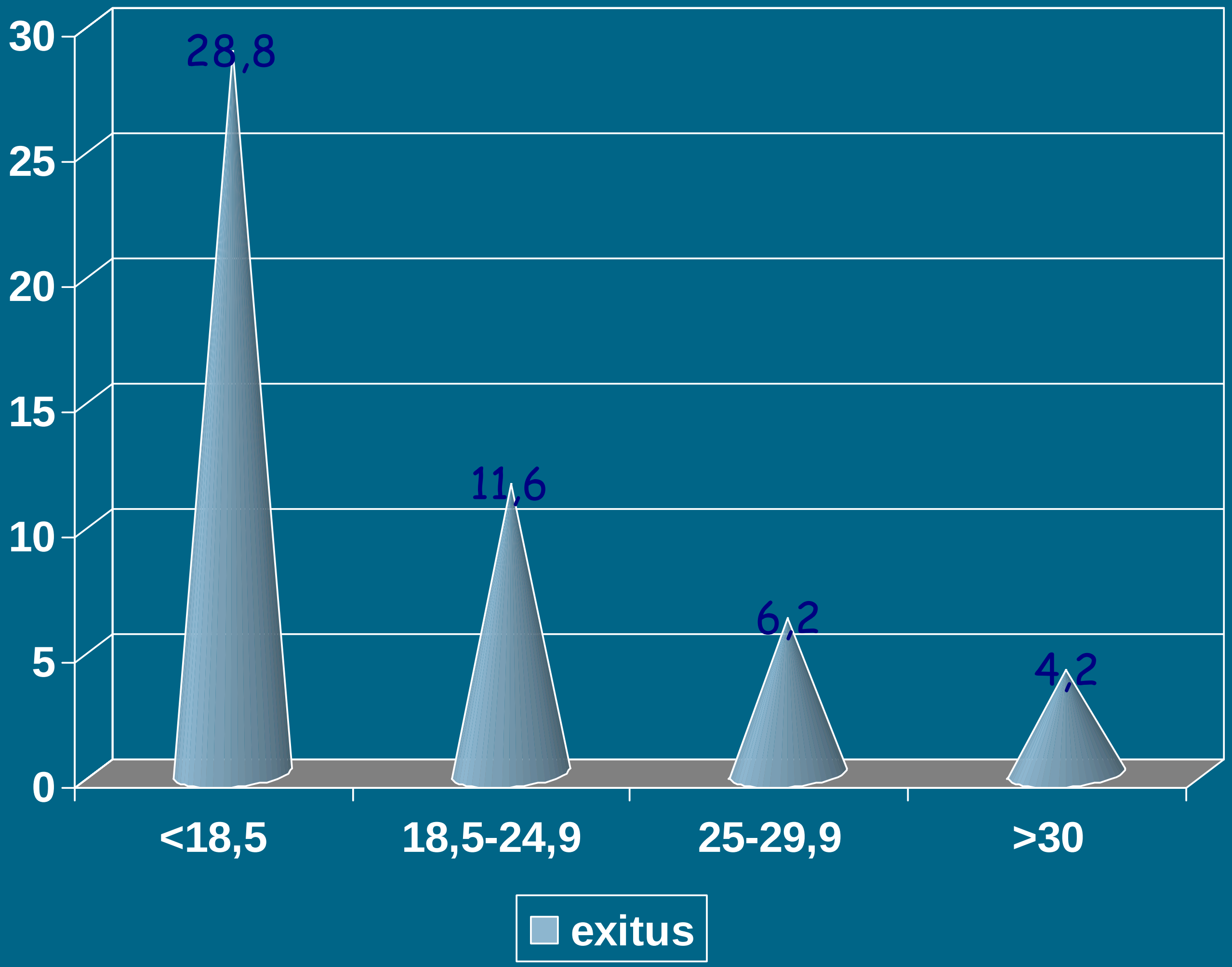
26.4% tienen antecedentes de inmovilización

IMC y motalidad en pacientes con ETV



La mortalidad global a los 3 meses fue del 8.3%

Relación BMI con mortalidad a los 3m

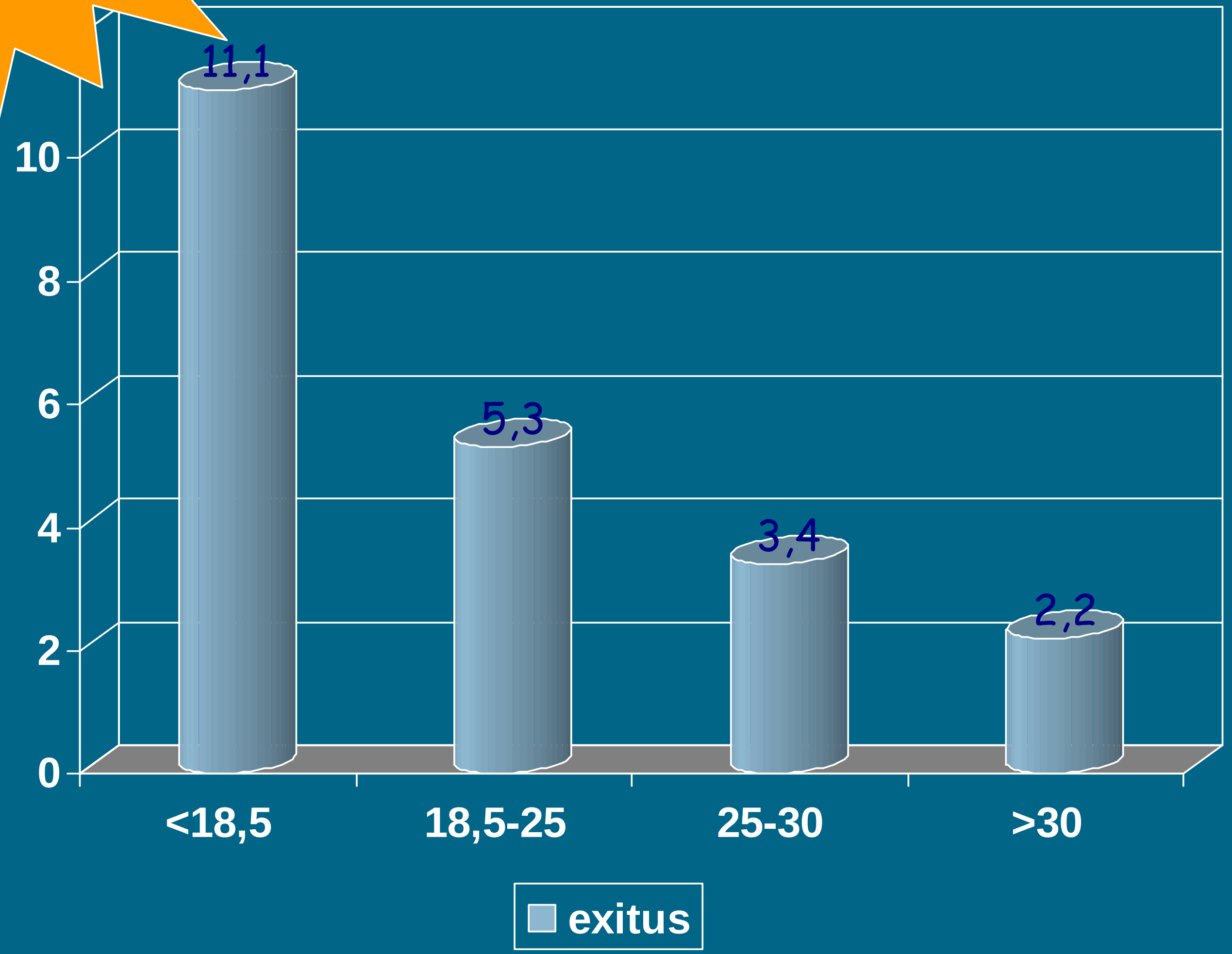


% casos

Mortalidad global 8.3%

ion BMI con mortalidad a los 3m

Excluidos pacientes con cáncer

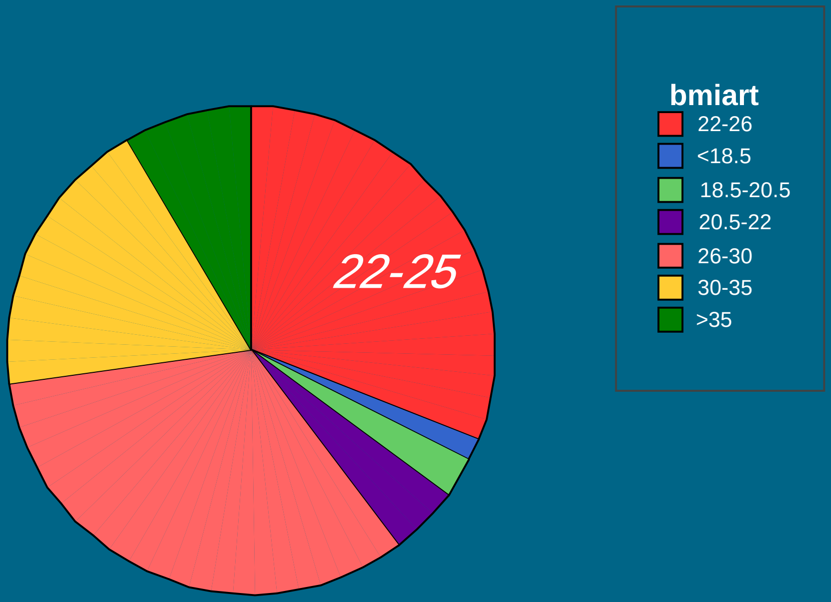


% casos

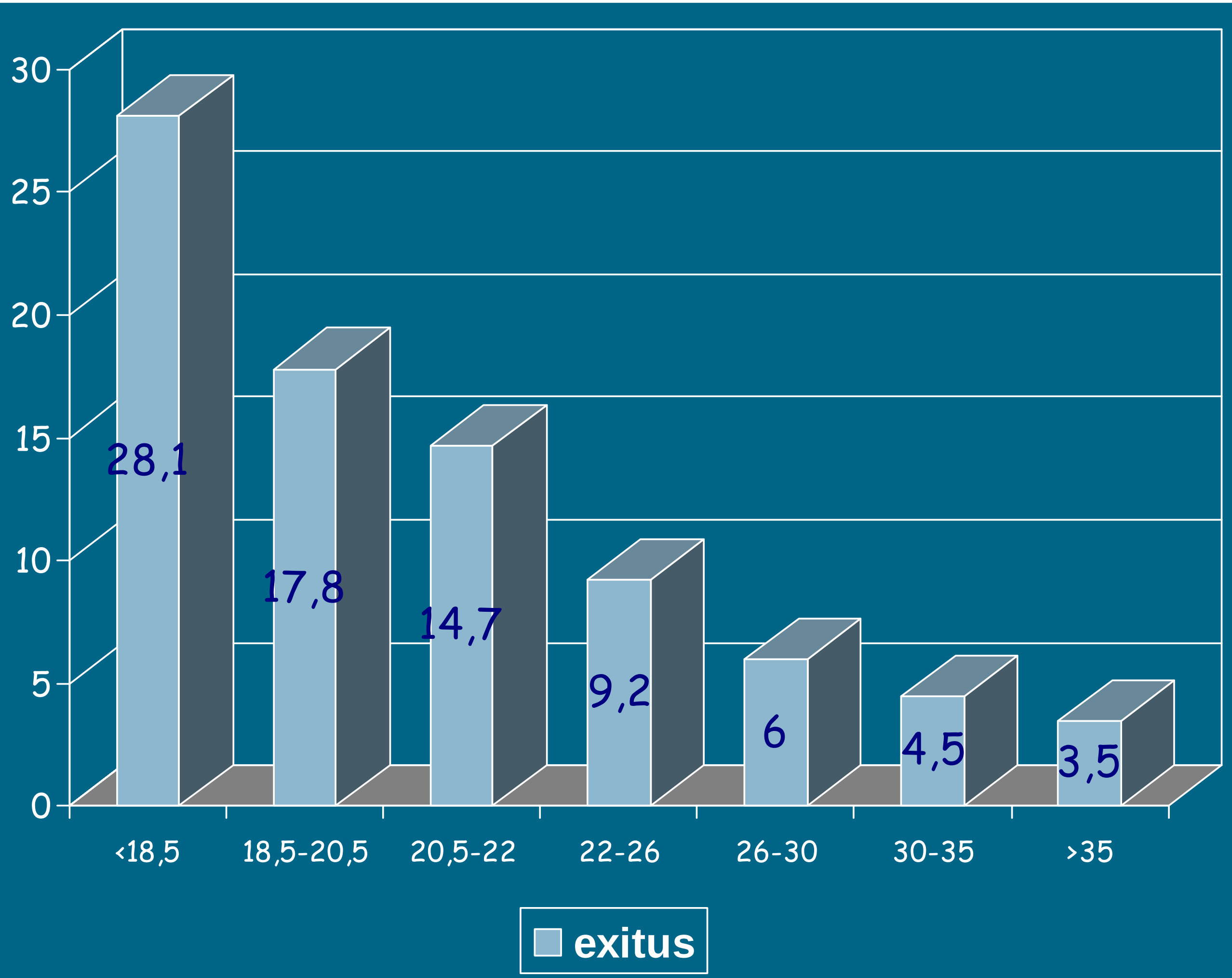
Mortalidad global 3.6%

IMC y motalidad en pacientes con ETV

- Se repitió el análisis con más subgrupos en función de IMC
  - <18.5 ⇒ 1%
  - 18.5-20.5⇒ 1.7%
  - 20.5-22 ⇒ 3%
  - 22-26 ⇒ 20.1%
  - 26-30 ⇒ 21.5%
  - 30-35 ⇒ 12.5%
  - >35 ⇒ 5.5%



Relación BMI con mortalidad a los 3m

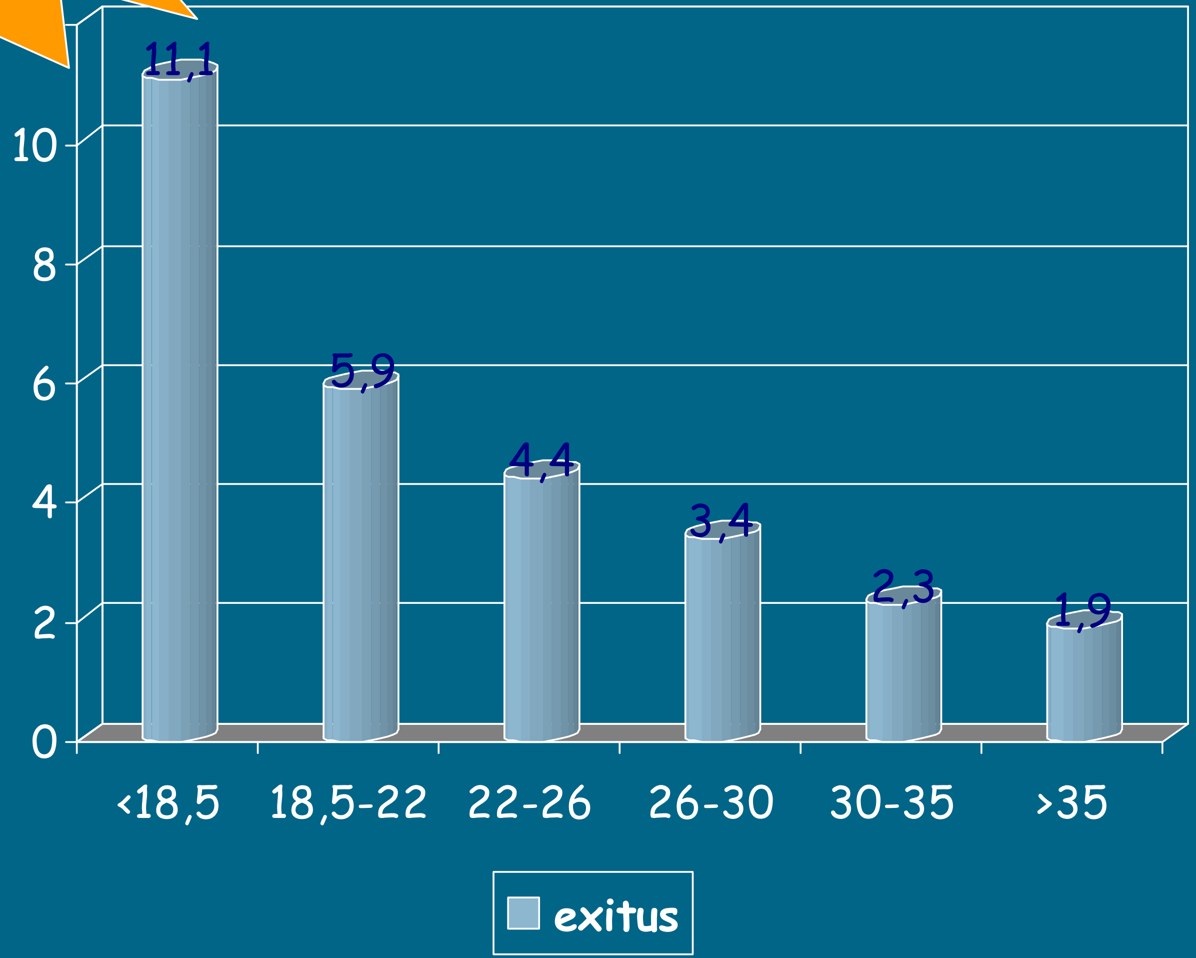


% casos

Mortalidad global 8.3%

ion BMI con mortalidad a los 3m

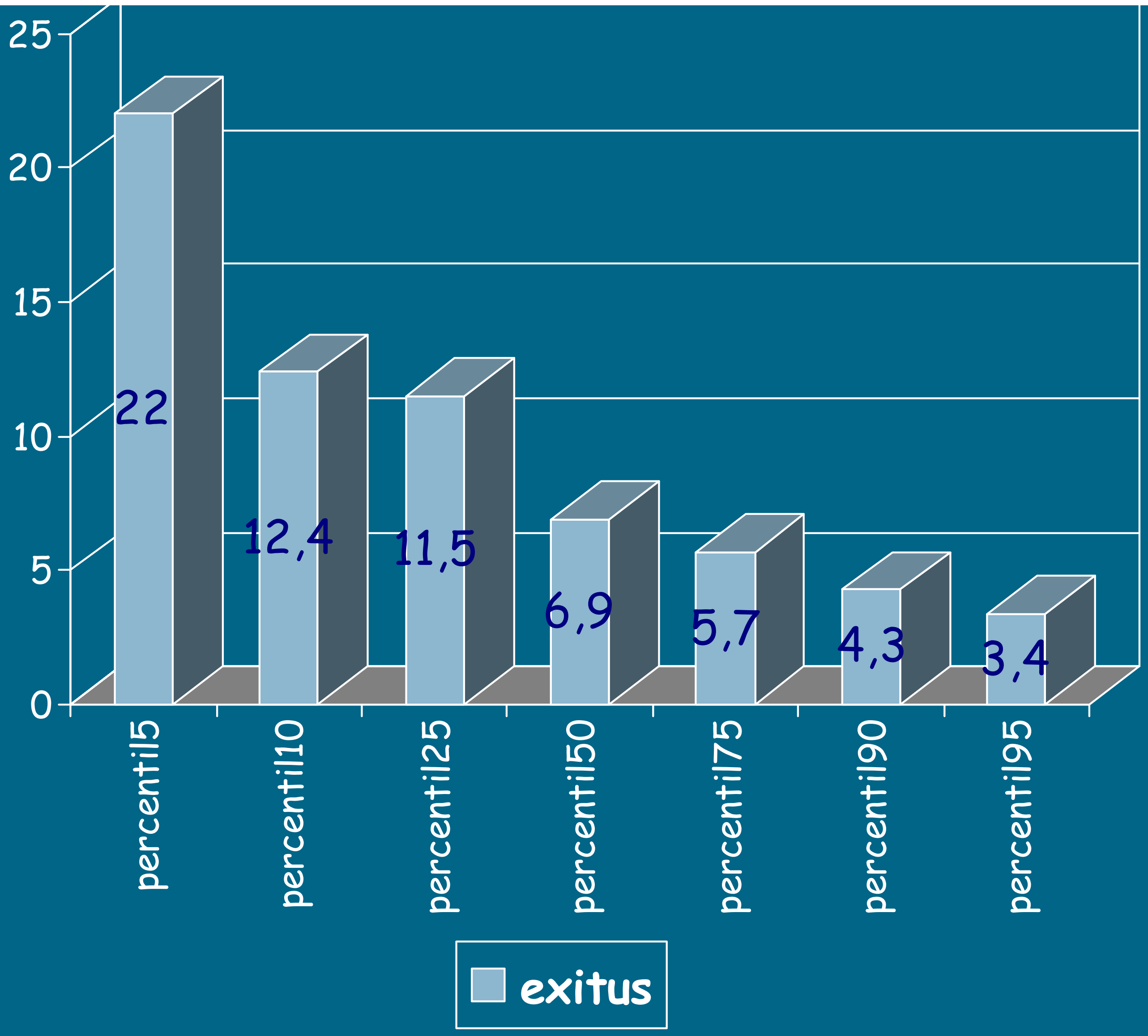
Excluidos pacientes con cáncer



% casos

Mortalidad global 3.6%

Relación BMI con mortalidad a los 3m

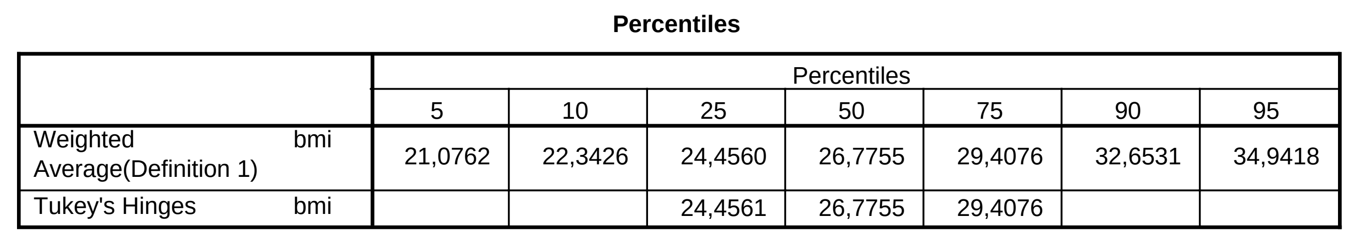


% casos

Mortalidad global 8.3%

IMC en función del sexo

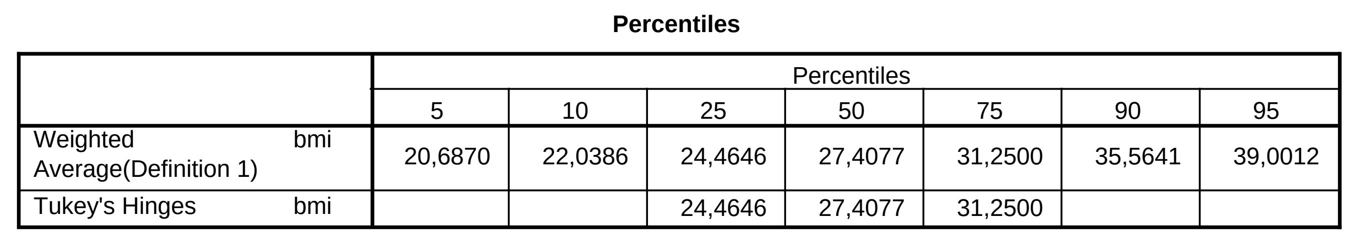
Hombres



Percentiles

		Percentiles						
		5	10	25	50	75	90	95
Weighted Average(Definition 1)	bmi	21,0762	22,3426	24,4560	26,7755	29,4076	32,6531	34,9418
Tukey's Hinges	bmi			24,4561	26,7755	29,4076		

Mujeres

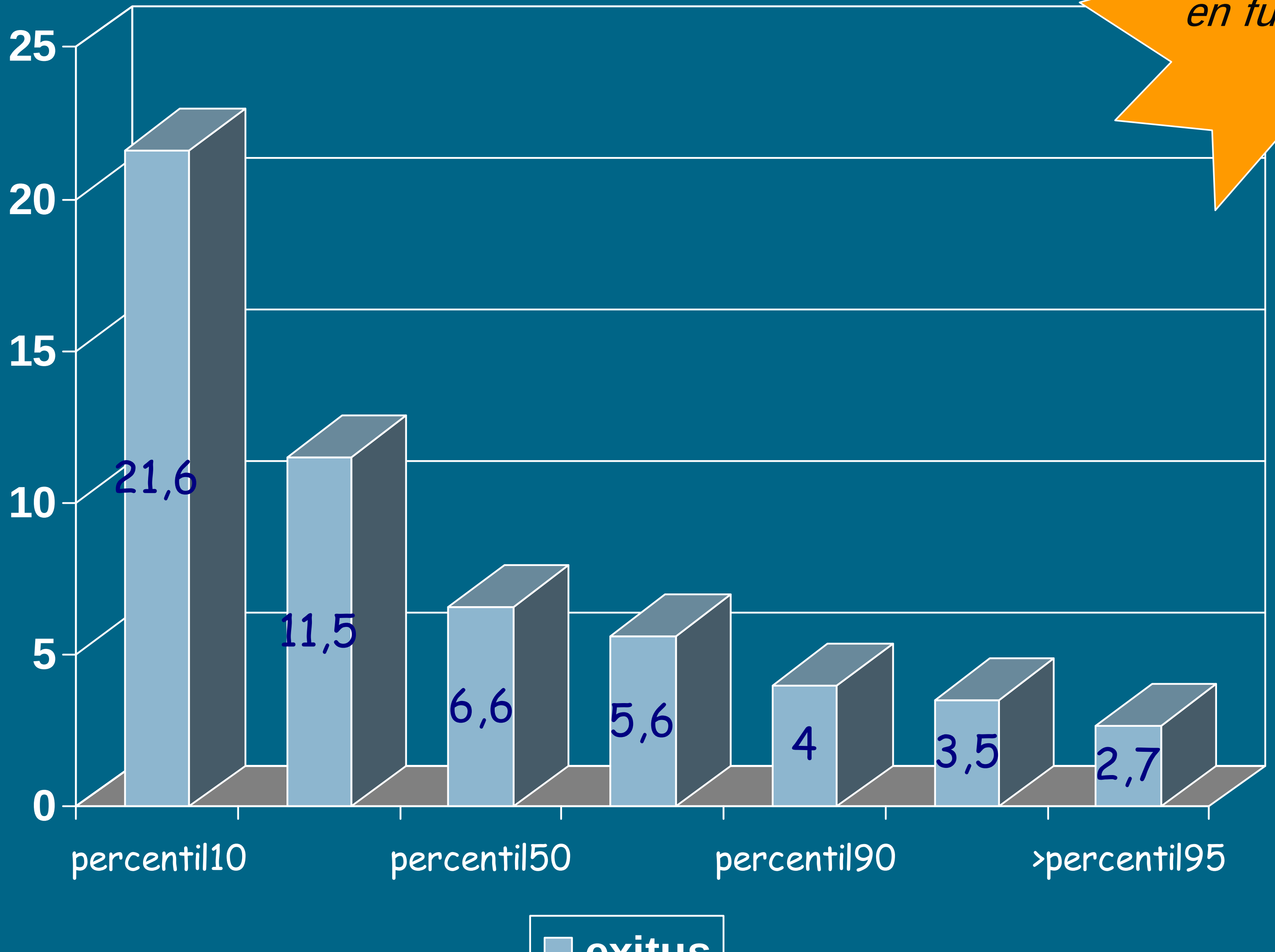


Percentiles

		Percentiles						
		5	10	25	50	75	90	95
Weighted Average(Definition 1)	bmi	20,6870	22,0386	24,4646	27,4077	31,2500	35,5641	39,0012
Tukey's Hinges	bmi			24,4646	27,4077	31,2500		

Relación BMI con mortalidad

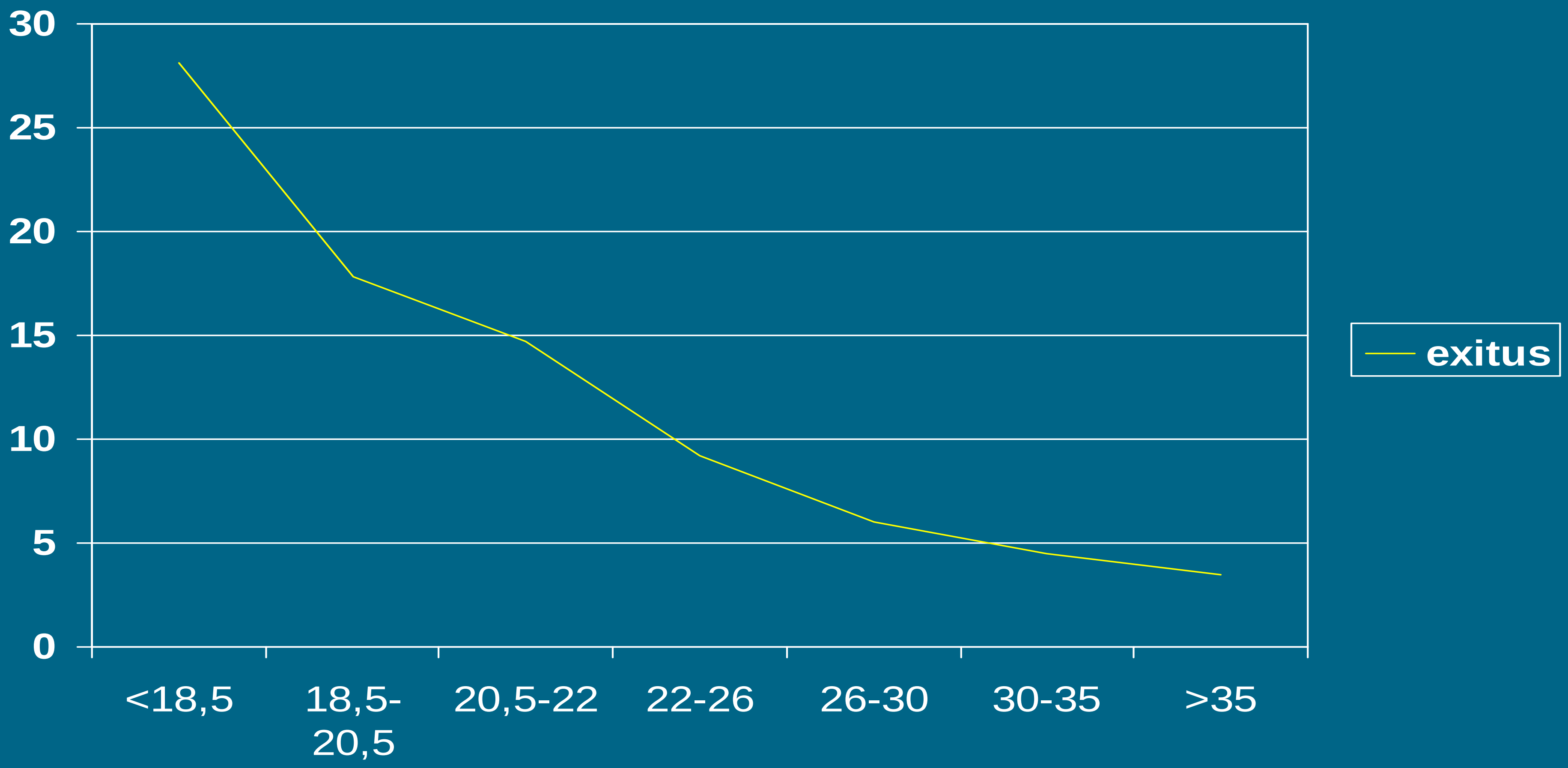
Calculados
los percentiles
en función del sexo



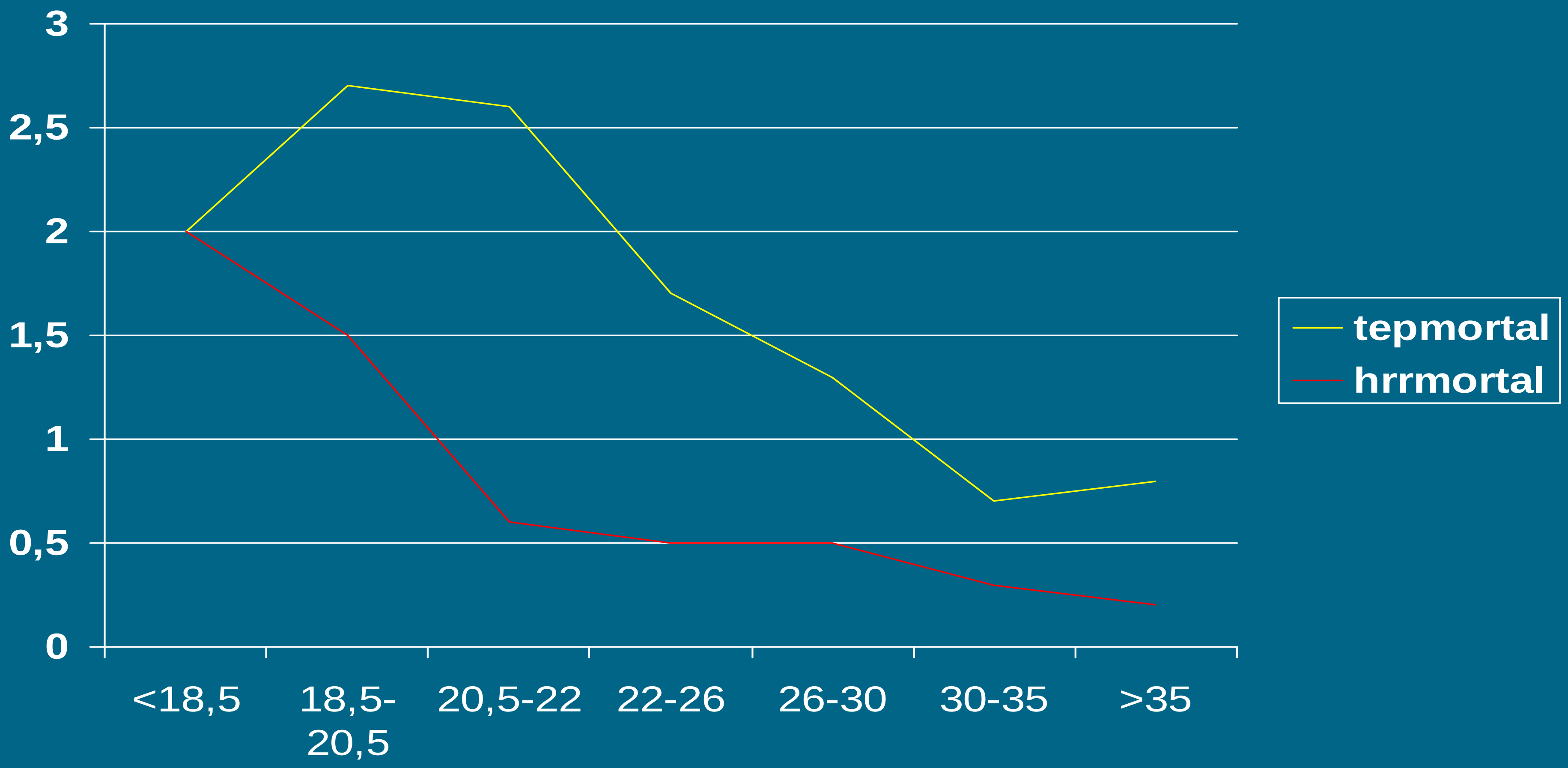
% casos

Mortalidad global 8.3%

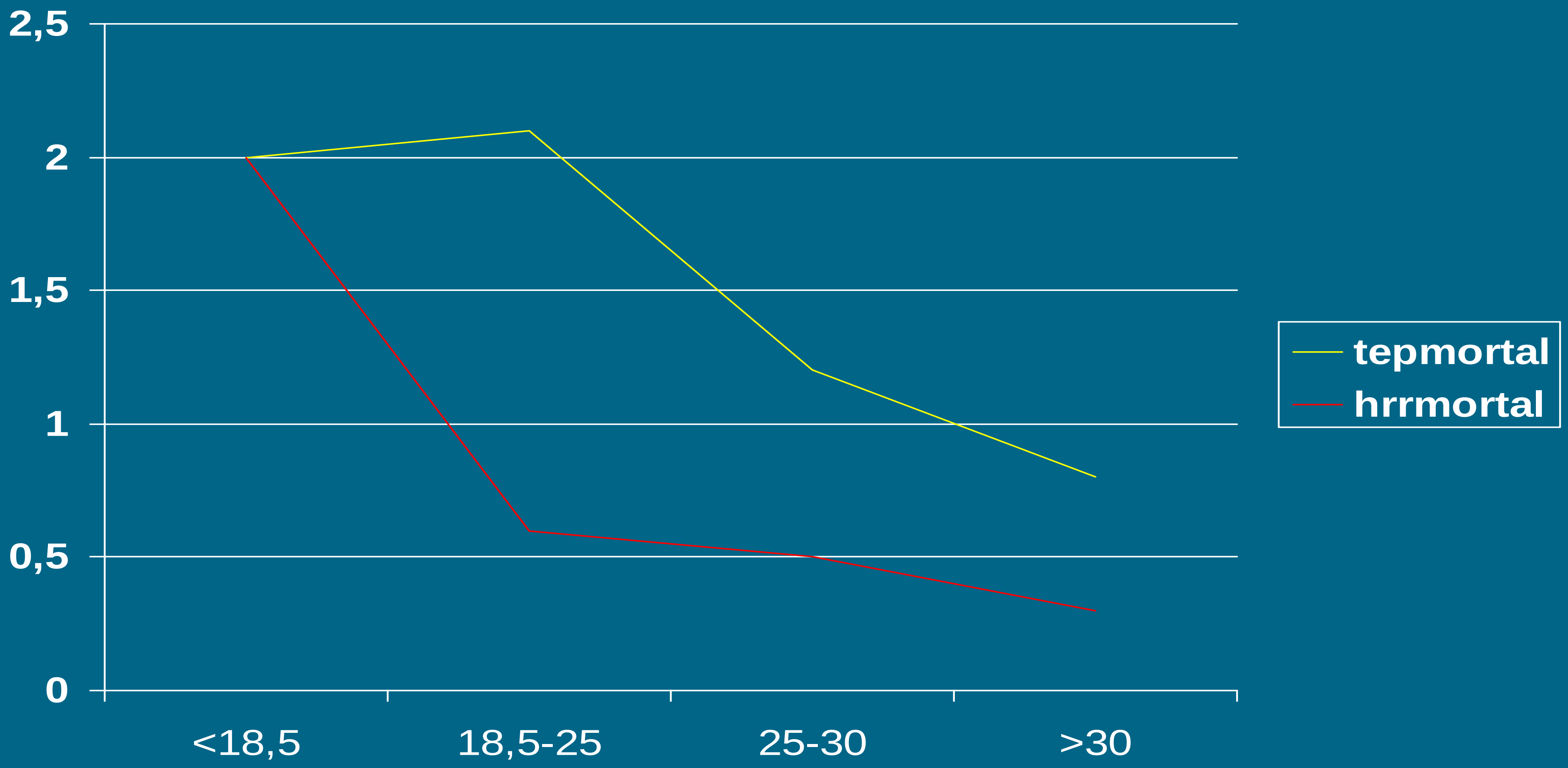
Relación BMI con mortalidad a los 3m



Relación BMI con TEP/HRR mortal

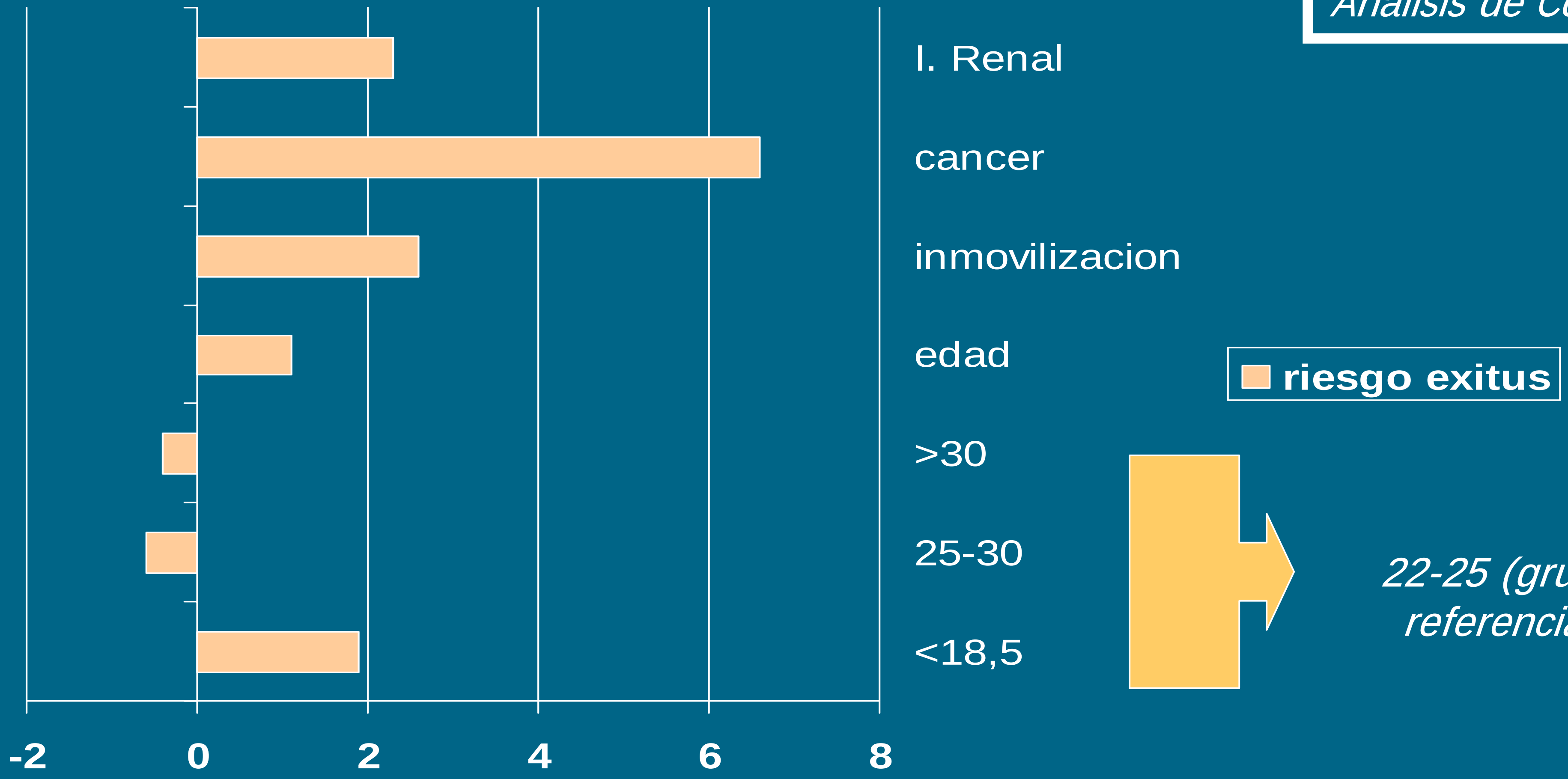


Relación BMI con TEP/HRR mortal



Riesgo de exitus a los 3m

Análisis de Cox

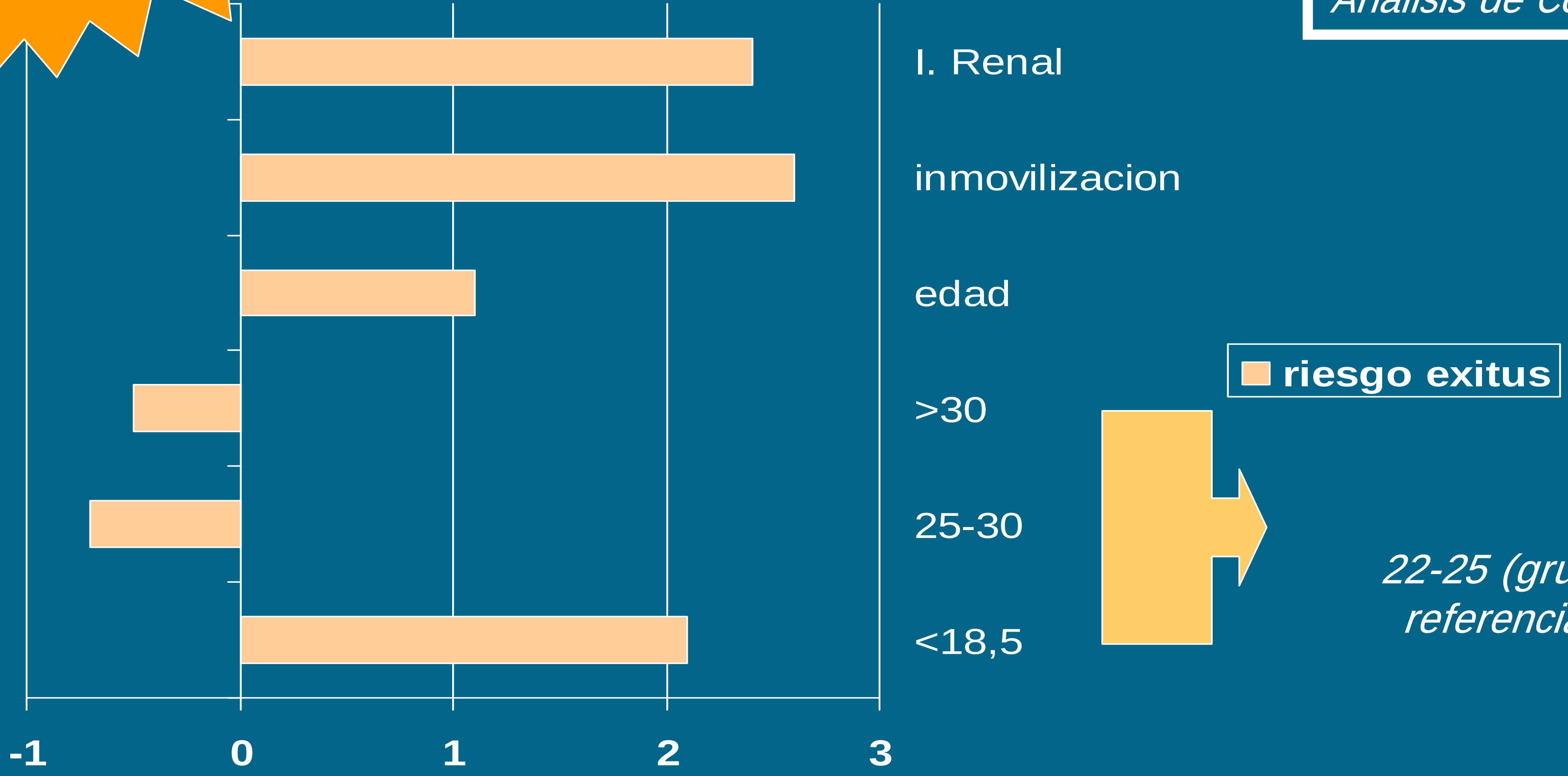


22-25 (grupo referencia)

Riesgo de exitus a los 3m

Excluidos pacientes con cáncer

Análisis de Cox



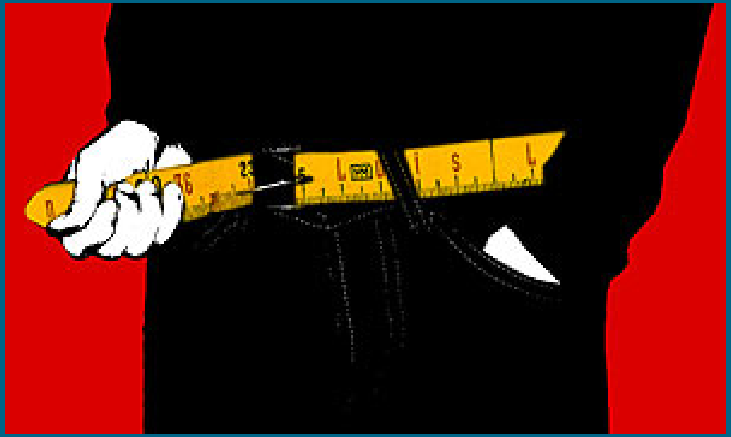
22-25 (grupo referencia)

Relación IMC y ETV

Existe una relación lineal **inversa** entre el IMC y la mortalidad

Los pacientes con IMC bajo tienen más riesgo de fallecer en el seguimiento

Los pacientes con IMC elevado tienen un riesgo menor de fallecer a los 3 meses del evento



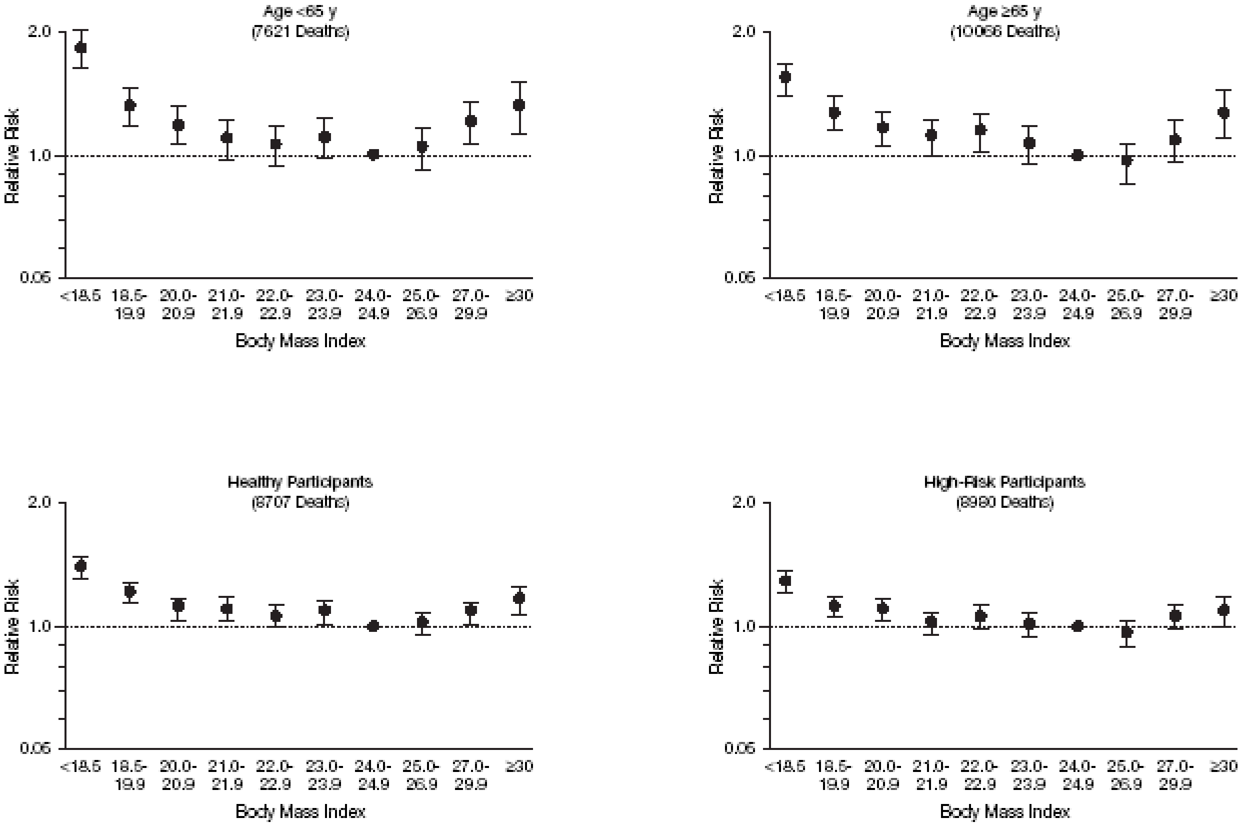
Relación IMC y ETV

- No existe ninguna explicación clara a este fenómeno

- Por lo general la obesidad es un factor de mal pronóstico en la mayoría de las patologías en las que se ha estudiado, con una magnitud más o menos marcada en función de los pacientes estudiados.

Body Weight and Mortality Among Men and Women in China

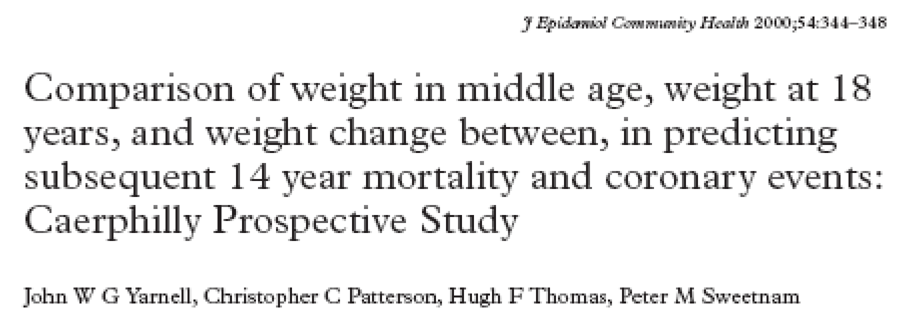
Figure. Multivariate-Adjusted Relative Risks of All-Cause Mortality According to Categories of Body Mass Index by Age and Health Status



Error bars indicate 95% confidence intervals. The high-risk participants included those who had prevalent cardiovascular disease, stroke, cancer, end-stage renal disease, or chronic obstructive pulmonary disease at the baseline examination, or who were heavy alcohol drinkers (consumed ≥3 drinks per day), or who were cigarette smokers. Multivariate-adjusted relative risk was calculated using study participants with a body mass index (calculated as weight in kilograms divided by square of height in meters) of 24.0 to 24.9 as the reference group, adjusted for age, sex, cigarette smoking, alcohol consumption, physical activity, education, geographic region (north vs south), and urbanization (urban vs rural), and stratified by sampling clusters. All *P* values for the quadratic term were significant ($P<.001$).

Conclusions Our results indicate that both underweight and obesity were associated with increased mortality in the Chinese adult population. Furthermore, our findings support the use of a single common recommendation for defining overweight and obesity among all racial and ethnic groups.

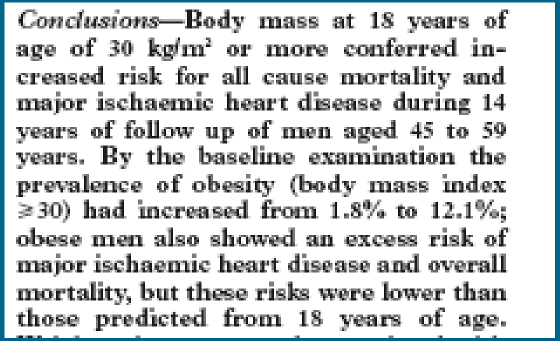
JAMA. 2006;295:776-783



J Epidemiol Community Health 2000;54:344–348

Comparison of weight in middle age, weight at 18 years, and weight change between, in predicting subsequent 14 year mortality and coronary events: Caerphilly Prospective Study

John W G Yarnell, Christopher C Patterson, Hugh F Thomas, Peter M Sweetnam



Conclusions—**Body mass at 18 years of age of 30 kg/m² or more conferred increased risk for all cause mortality and major ischaemic heart disease during 14 years of follow up of men aged 45 to 59 years. By the baseline examination the prevalence of obesity (body mass index ≥30) had increased from 1.8% to 12.1%; obese men also showed an excess risk of major ischaemic heart disease and overall mortality, but these risks were lower than those predicted from 18 years of age.**

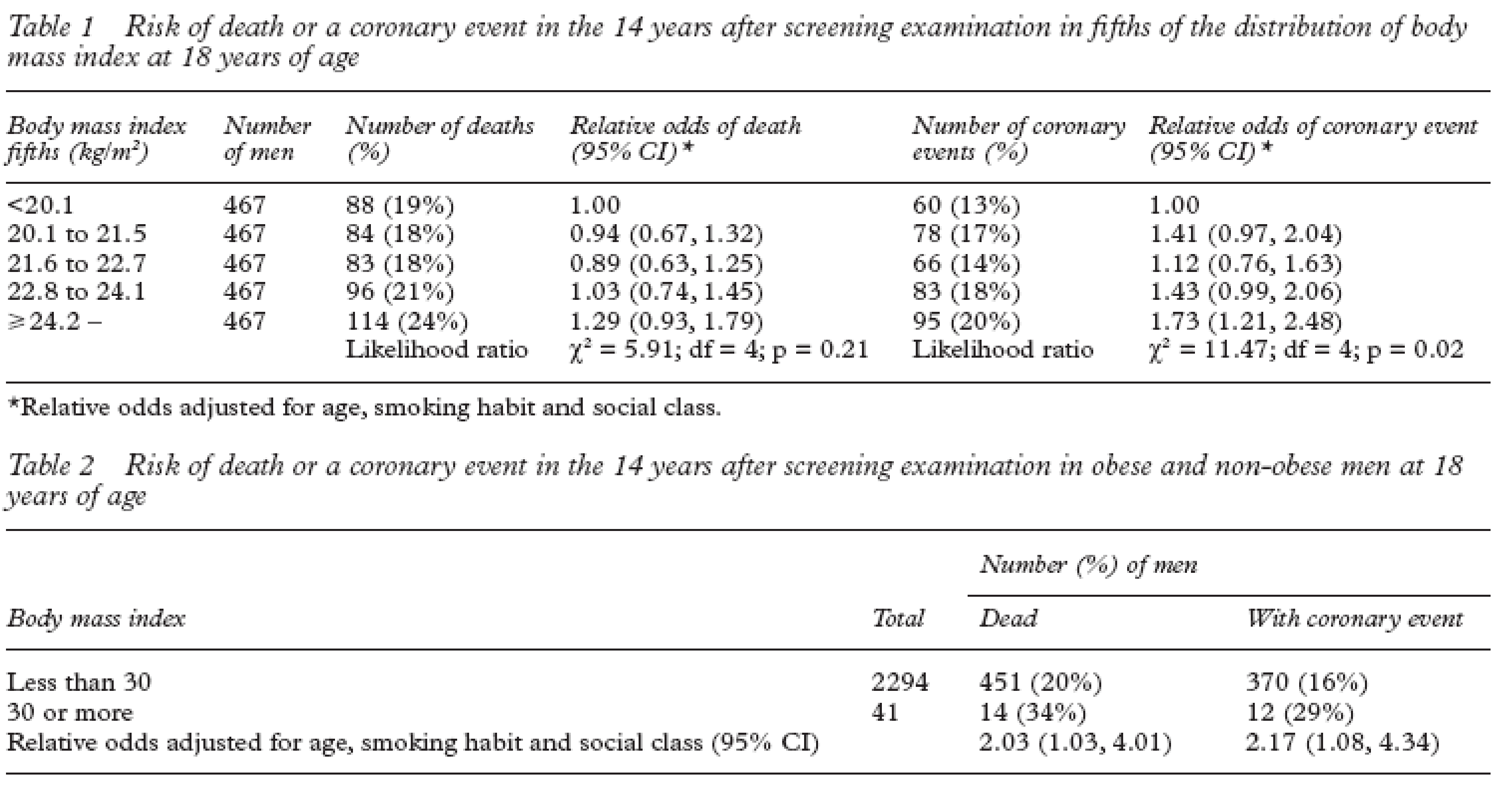


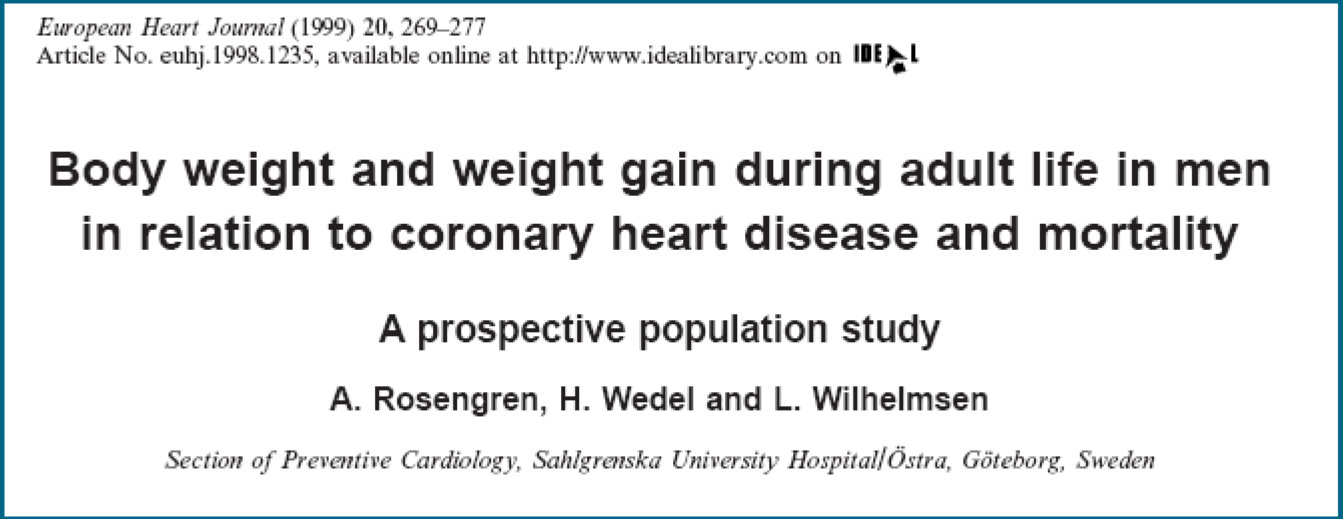
Table 1 Risk of death or a coronary event in the 14 years after screening examination in fifths of the distribution of body mass index at 18 years of age

Body mass index fifths (kg/m²)	*Number of men*	*Number of deaths (%)*	*Relative odds of death (95% CI)**	*Number of coronary events (%)*	*Relative odds of coronary event (95% CI)**
<20.1	467	88 (19%)	1.00	60 (13%)	1.00
20.1 to 21.5	467	84 (18%)	0.94 (0.67, 1.32)	78 (17%)	1.41 (0.97, 2.04)
21.6 to 22.7	467	83 (18%)	0.89 (0.63, 1.25)	66 (14%)	1.12 (0.76, 1.63)
22.8 to 24.1	467	96 (21%)	1.03 (0.74, 1.45)	83 (18%)	1.43 (0.99, 2.06)
≥24.2 –	467	114 (24%)	1.29 (0.93, 1.79)	95 (20%)	1.73 (1.21, 2.48)
		Likelihood ratio	$\chi^2 = 5.91$; df = 4; p = 0.21	Likelihood ratio	$\chi^2 = 11.47$; df = 4; p = 0.02

*Relative odds adjusted for age, smoking habit and social class.

Table 2 Risk of death or a coronary event in the 14 years after screening examination in obese and non-obese men at 18 years of age

		Number (%) of men	
Body mass index	*Total*	*Dead*	*With coronary event*
Less than 30	2294	451 (20%)	370 (16%)
30 or more	41	14 (34%)	12 (29%)
Relative odds adjusted for age, smoking habit and social class (95% CI)		2.03 (1.03, 4.01)	2.17 (1.08, 4.34)



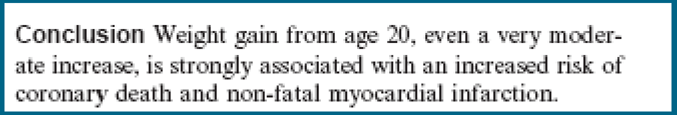
European Heart Journal (1999) 20, 269–277
Article No. euhj.1998.1235, available online at http://www.idealibrary.com on IDEAL

Body weight and weight gain during adult life in men in relation to coronary heart disease and mortality

A prospective population study

A. Rosengren, H. Wedel and L. Wilhelmsen

Section of Preventive Cardiology, Sahlgrenska University Hospital/Östra, Göteborg, Sweden



Conclusion Weight gain from age 20, even a very moderate increase, is strongly associated with an increased risk of coronary death and non-fatal myocardial infarction.

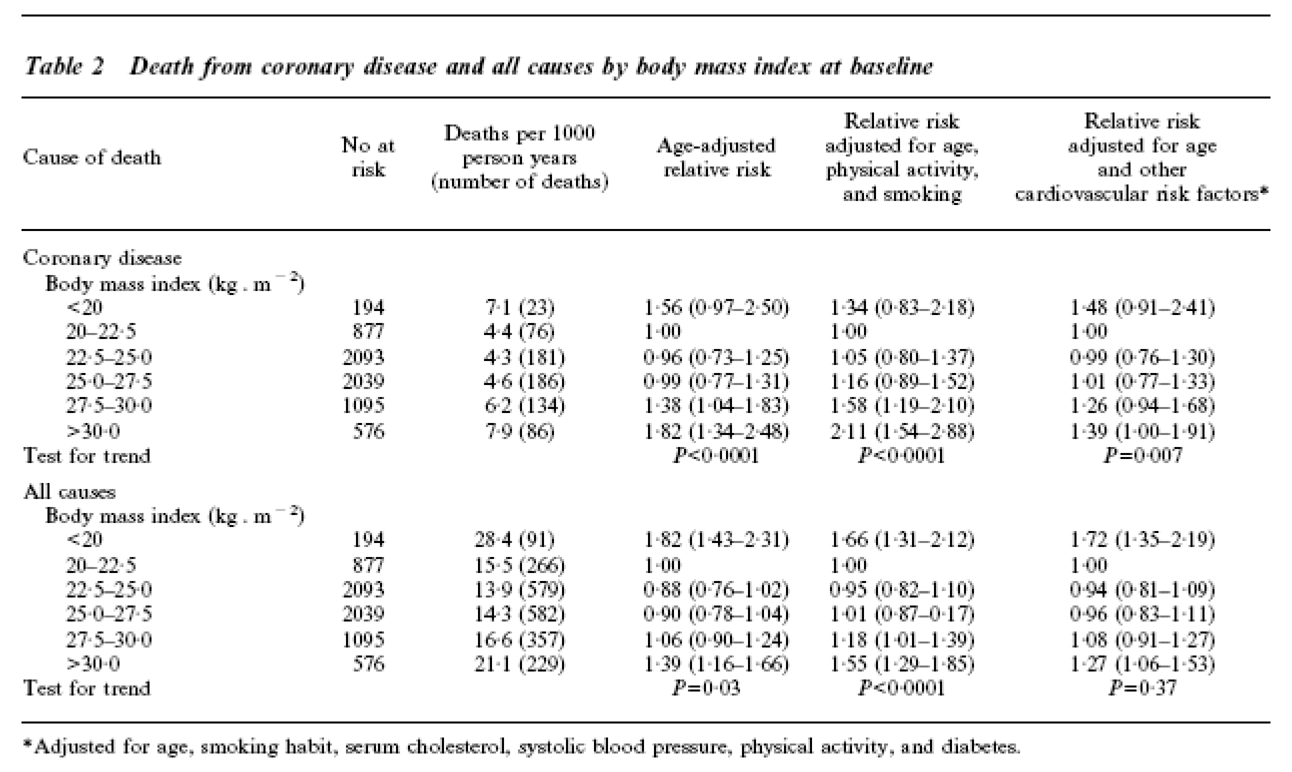


Table 2 Death from coronary disease and all causes by body mass index at baseline

Cause of death	No at risk	Deaths per 1000 person years (number of deaths)	Age-adjusted relative risk	Relative risk adjusted for age, physical activity, and smoking	Relative risk adjusted for age and other cardiovascular risk factors*
Coronary disease					
Body mass index (kg . m^{-2})					
<20	194	7·1 (23)	1·56 (0·97–2·50)	1·34 (0·83–2·18)	1·48 (0·91–2·41)
20–22·5	877	4·4 (76)	1·00	1·00	1·00
22·5–25·0	2093	4·3 (181)	0·96 (0·73–1·25)	1·05 (0·80–1·37)	0·99 (0·76–1·30)
25·0–27·5	2039	4·6 (186)	0·99 (0·77–1·31)	1·16 (0·89–1·52)	1·01 (0·77–1·33)
27·5–30·0	1095	6·2 (134)	1·38 (1·04–1·83)	1·58 (1·19–2·10)	1·26 (0·94–1·68)
>30·0	576	7·9 (86)	1·82 (1·34–2·48)	2·11 (1·54–2·88)	1·39 (1·00–1·91)
Test for trend			*P*<0·0001	*P*<0·0001	*P*=0·007
All causes					
Body mass index (kg . m^{-2})					
<20	194	28·4 (91)	1·82 (1·43–2·31)	1·66 (1·31–2·12)	1·72 (1·35–2·19)
20–22·5	877	15·5 (266)	1·00	1·00	1·00
22·5–25·0	2093	13·9 (579)	0·88 (0·76–1·02)	0·95 (0·82–1·10)	0·94 (0·81–1·09)
25·0–27·5	2039	14·3 (582)	0·90 (0·78–1·04)	1·01 (0·87–0·17)	0·96 (0·83–1·11)
27·5–30·0	1095	16·6 (357)	1·06 (0·90–1·24)	1·18 (1·01–1·39)	1·08 (0·91–1·27)
>30·0	576	21·1 (229)	1·39 (1·16–1·66)	1·55 (1·29–1·85)	1·27 (1·06–1·53)
Test for trend			*P*=0·03	*P*<0·0001	*P*=0·37

*Adjusted for age, smoking habit, serum cholesterol, systolic blood pressure, physical activity, and diabetes.

Relación IMC y ETV

Relación IMC y ETV

Podemos explicar la mayor mortalidad en pacientes de bajo peso

- porque hablemos de pacientes enfermos (bajo peso como marcador de enfermedad)

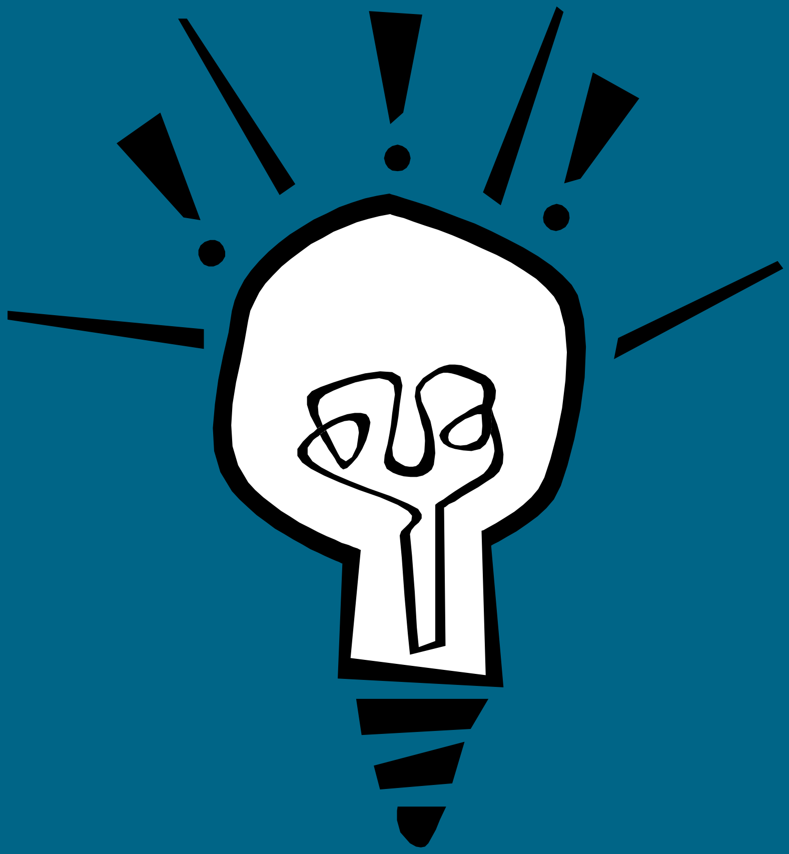
- por tendencia a sobredosificar a esos pacientes

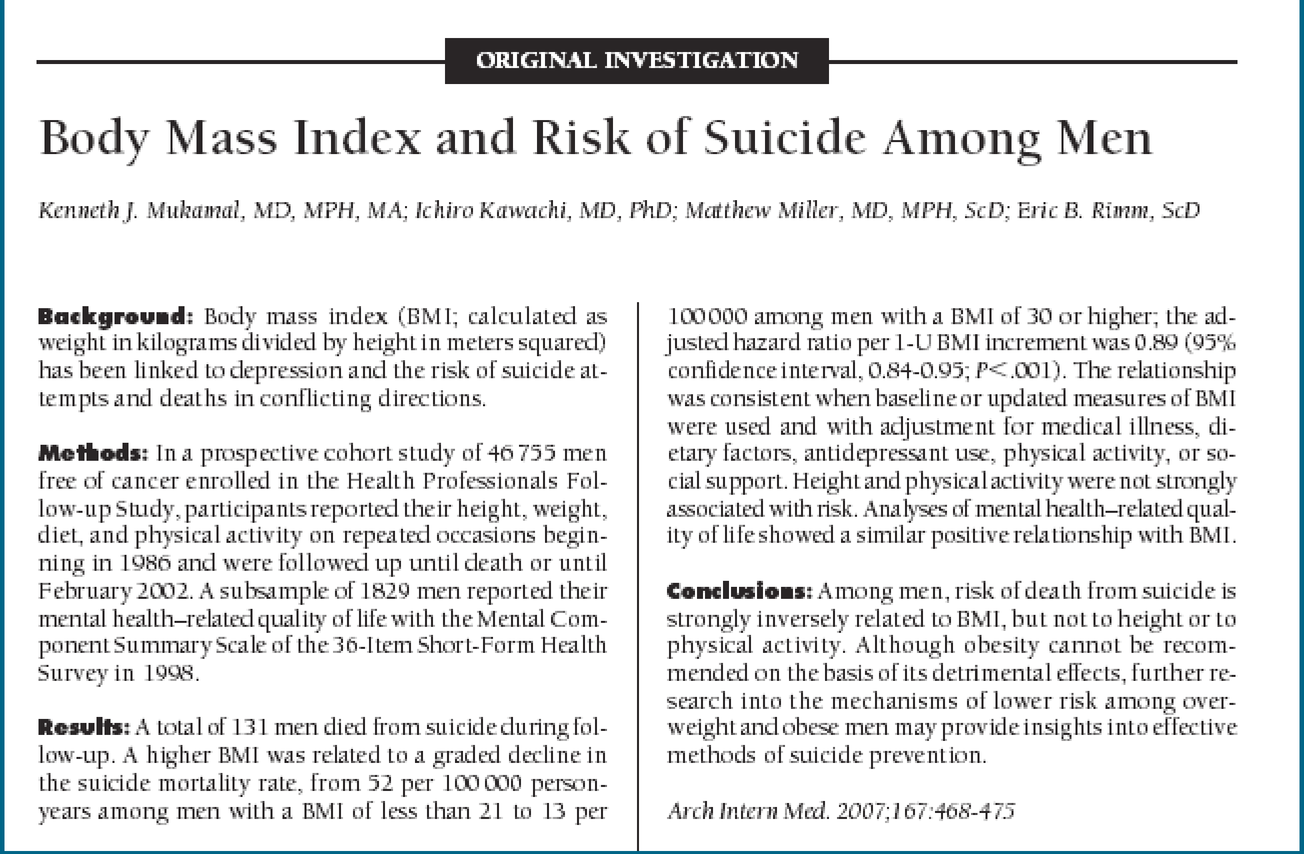
Relación IMC y ETV

-Parece más difícil la explicación de la obesidad como 'protector' en pacientes con ETV

-Es probable que la ETV en pacientes obesos se deba básicamente a problemas venosos 'locales', mientras que la ETV de pacientes más delgados nos esté reflejando otros problemas de salud 'sistémicos'

-Habrá que seguir investigando esta relación para poder encontrar explicaciones a este 'fenómeno'





ORIGINAL INVESTIGATION

Body Mass Index and Risk of Suicide Among Men

Kenneth J. Mukamal, MD, MPH, MA; Ichiro Kawachi, MD, PhD; Matthew Miller, MD, MPH, ScD; Eric B. Rimm, ScD

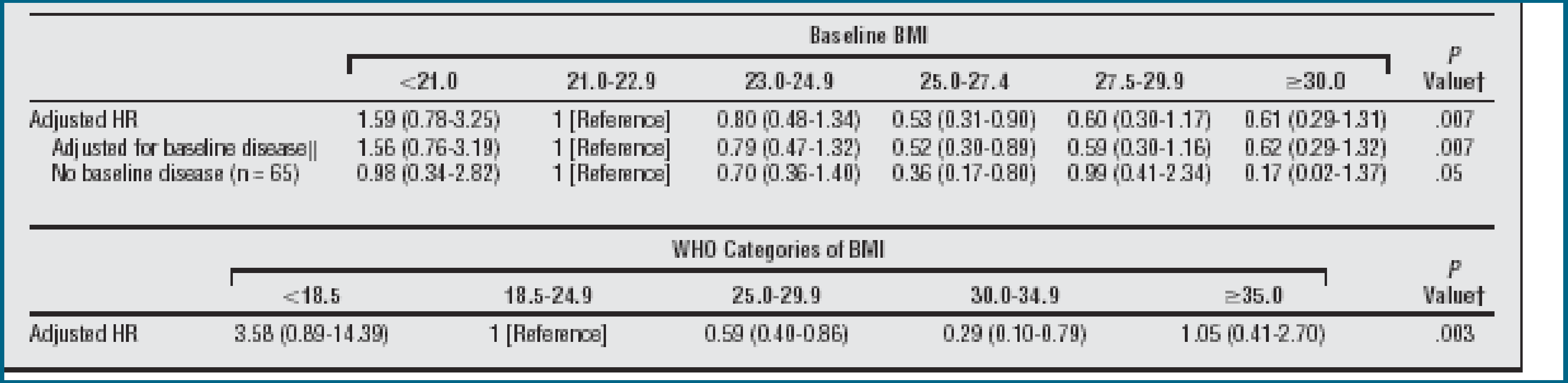
Background: Body mass index (BMI; calculated as weight in kilograms divided by height in meters squared) has been linked to depression and the risk of suicide attempts and deaths in conflicting directions.

Methods: In a prospective cohort study of 46 755 men free of cancer enrolled in the Health Professionals Follow-up Study, participants reported their height, weight, diet, and physical activity on repeated occasions beginning in 1986 and were followed up until death or until February 2002. A subsample of 1829 men reported their mental health–related quality of life with the Mental Component Summary Scale of the 36-Item Short-Form Health Survey in 1998.

Results: A total of 131 men died from suicide during follow-up. A higher BMI was related to a graded decline in the suicide mortality rate, from 52 per 100 000 person-years among men with a BMI of less than 21 to 13 per 100 000 among men with a BMI of 30 or higher; the adjusted hazard ratio per 1-U BMI increment was 0.89 (95% confidence interval, 0.84-0.95; $P<.001$). The relationship was consistent when baseline or updated measures of BMI were used and with adjustment for medical illness, dietary factors, antidepressant use, physical activity, or social support. Height and physical activity were not strongly associated with risk. Analyses of mental health–related quality of life showed a similar positive relationship with BMI.

Conclusions: Among men, risk of death from suicide is strongly inversely related to BMI, but not to height or to physical activity. Although obesity cannot be recommended on the basis of its detrimental effects, further research into the mechanisms of lower risk among overweight and obese men may provide insights into effective methods of suicide prevention.

Arch Intern Med. 2007;167:468-475



	Baseline BMI						P Value†
	<21.0	21.0-22.9	23.0-24.9	25.0-27.4	27.5-29.9	≥30.0	
Adjusted HR	1.59 (0.78-3.25)	1 [Reference]	0.80 (0.48-1.34)	0.53 (0.31-0.90)	0.60 (0.30-1.17)	0.61 (0.29-1.31)	.007
Adjusted for baseline disease‖	1.56 (0.76-3.19)	1 [Reference]	0.79 (0.47-1.32)	0.52 (0.30-0.89)	0.59 (0.30-1.16)	0.62 (0.29-1.32)	.007
No baseline disease (n = 65)	0.98 (0.34-2.82)	1 [Reference]	0.70 (0.36-1.40)	0.36 (0.17-0.80)	0.99 (0.41-2.34)	0.17 (0.02-1.37)	.05

	WHO Categories of BMI					P Value†
	<18.5	18.5-24.9	25.0-29.9	30.0-34.9	≥35.0	
Adjusted HR	3.58 (0.89-14.39)	1 [Reference]	0.59 (0.40-0.86)	0.29 (0.10-0.79)	1.05 (0.41-2.70)	.003