# estudio di@bet.es

SED | SOCIEDAD ESPAÑOLA DE DIABETES

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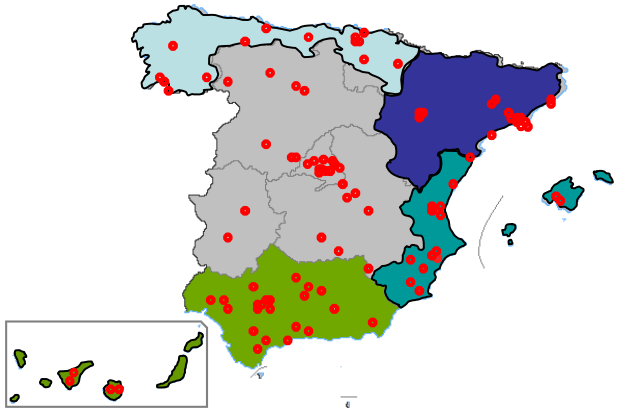
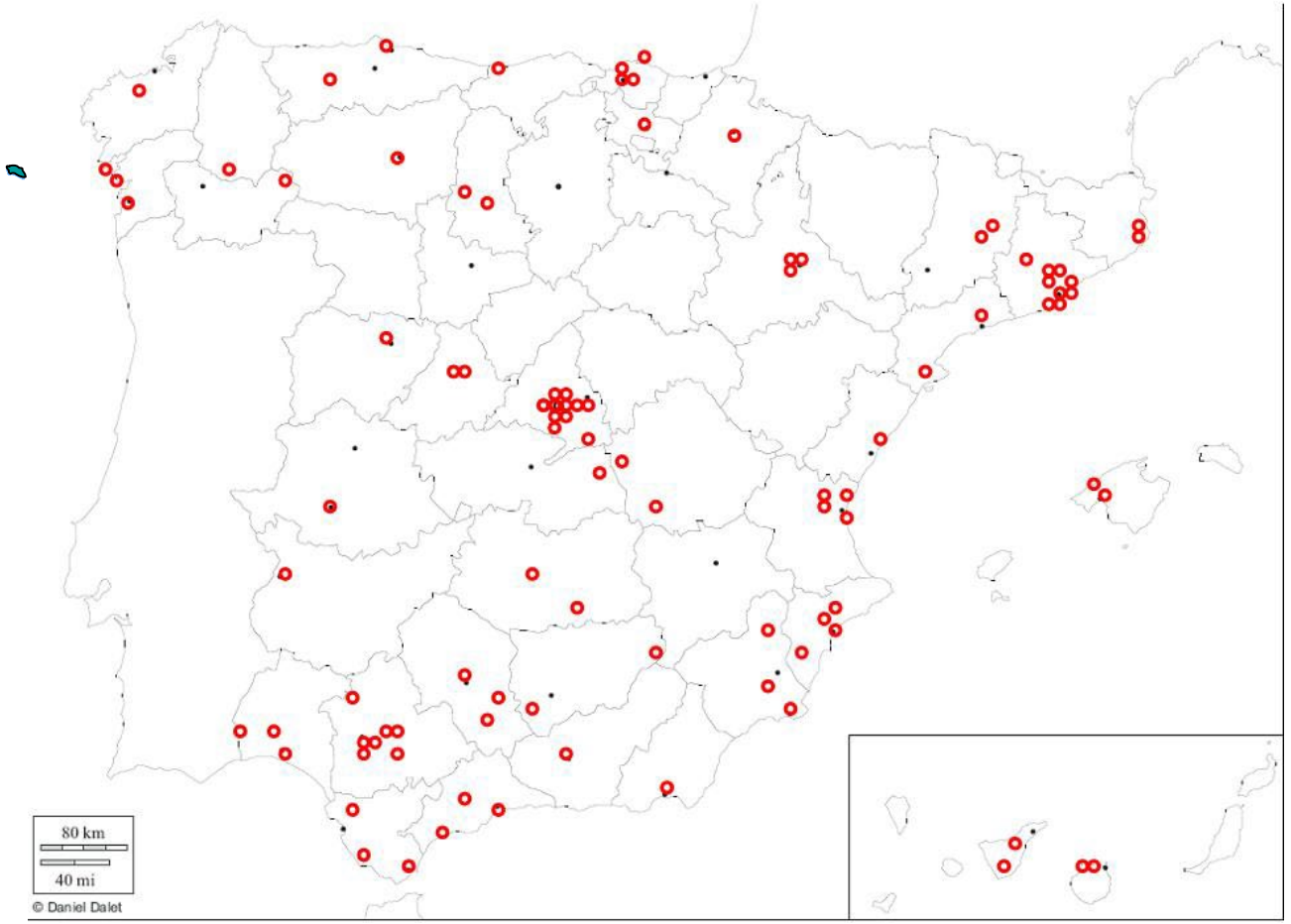
# Diseño: cohorte prospectiva de base poblacional






110 conglomerados→ 5104 participantes

# Objetivos

Estudios de campo 2007-2010 y 2016-2017

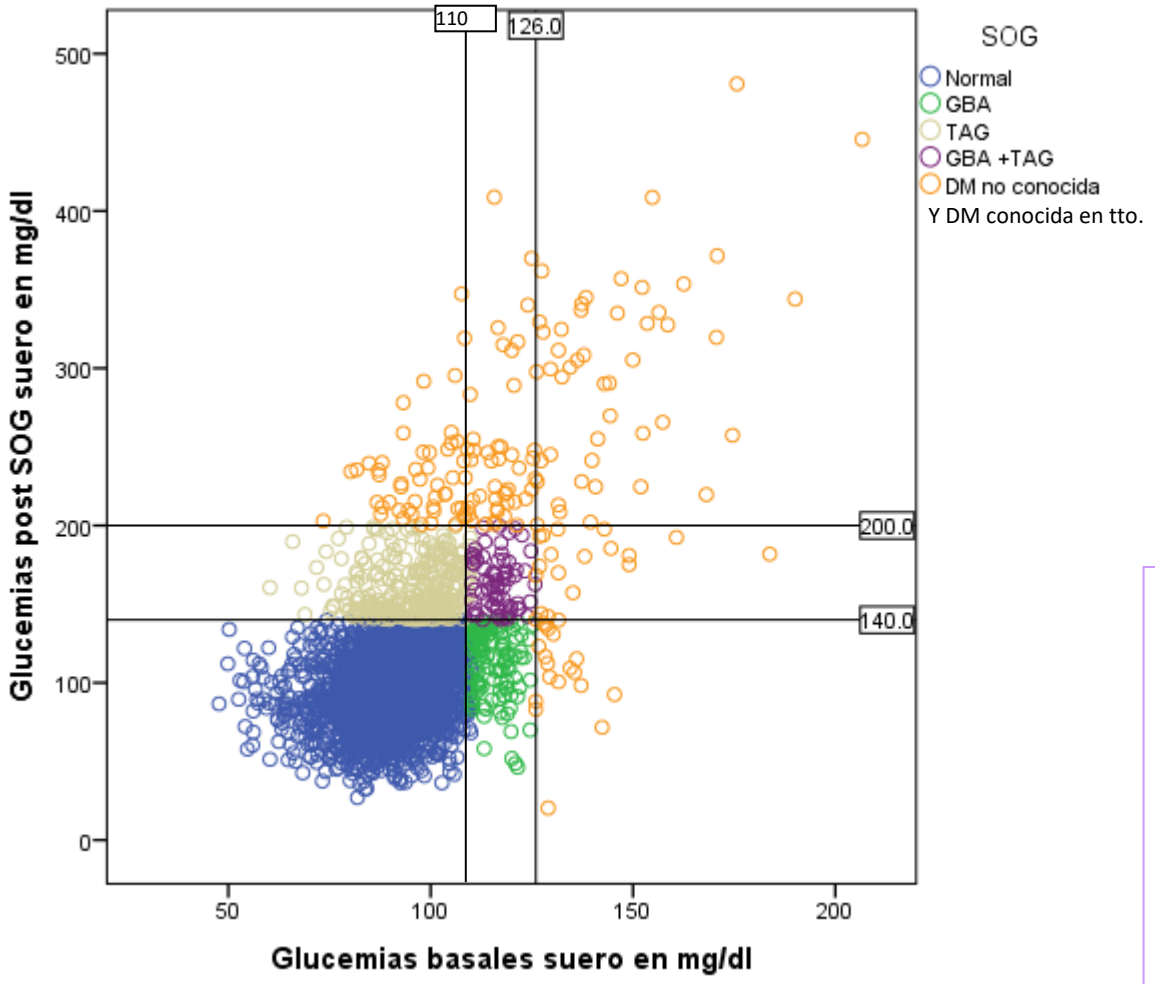
- Conocer las prevalencias e incidencias de diabetes y enfermedades metabólicas relacionadas
- Factores de riesgo relacionados: alimentación, ejercicio, contaminantes…
- Colección de muestras y datos para estudios bioquímicos, genéticos, etc.

# Métodos generales
## (Métodos similares en transversal y seguimiento)

- Un única visita en un centro de salud con un profesional de enfermería especialmente entrenado para el proyecto.
- Cuestionario estructurado con preguntas cerradas:
  - **Encuesta sociodemográfica y clínica**: Edad, sexo, nivel educativo, situación laboral, área de residencia, historia familiar de DM, historia previa de DM, HTA, dislipemia, cardiopatía isquémica, consumo de fármacos.
  - **Encuesta sobre hábitos**: tabaquismo, consumo de alcohol, ejercicio físico (encuesta IPAQ), frecuencia de consumo de alimentos.
  - **Encuesta de calidad de vida** SF-12 (en transversal)
  - **Encuesta de salud periodontal** (en seguimiento)
- Antropometría: Medida de peso, talla, circunferencias de cintura y cadera realizadas por métodos estandarizados.
- Tensión arterial: dos medidas con el sujeto sentado tras 5’ de Descanso y separadas por 5’. (Monitor Hem 703-C, Omron; Barcelona, Spain).

- Se midió glucemia capilar (One Touch, Lifescan) en ayunas y a los 120’ de una sobrecarga con 75g de glucosa.
- Se obtuvieron muestras de sangre venosa en ayunas y tras la SOG para confirmar las glucemias y realizar otras determinaciones bioquímicas (lípidos, insulina) y HbA1c (en seguimiento).
- La medidas en sangre venosa se realizaron en un único laboratorio centralizado (Cerba [Barcelona] en transversal y Hospital Regional Universitario de Málaga en seguimiento).

# Criterios de diagnóstico de diabetes




**Alberti and Zimmet 1998:**

-Diabetes previamente conocida en tratamiento con medicación y/o dieta

-Glucemia en ayunas >=126mg/dl

-Glucemia post SOG >=200mg/dl

-HbA1c>=6.5% (sólo en seguimiento)

# Prevalencia de diabetes ajustada en España

| | Prevalence | IC 95% |
|---|---|---|
| **Total Diabetes Mellitus (DM)** | **13,8%** | **12,8-14,7%** |
| **DM conocida** | **7,8%** | **6,97- 8,59%** |
| **DM unkno conocida** | **6%** | **5,4-6,7%** |
| **Glucemia basal Alterada aislada (GBA)** | **3,4%** | **2,9-4%** |
| **Tolerancia alterada a la glucosa aislada (TAG)** | **9,2%** | **8,2-10,2%** |
| **GBA + TAG** | **2,2%** | **1,7-2,7%** |

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Casi el 30% de la población presenta alguna alteración del metabolismo de los carbohidratos.

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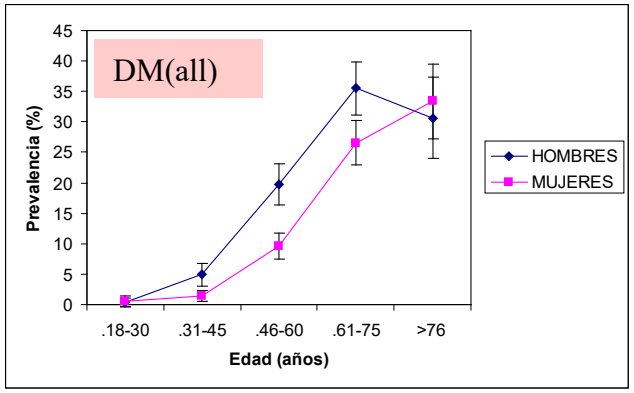
Prevalence of diabetes mellitus and impaired glucose regulation in Spain: the Di@bet.es Study.

Soriguer F, Goday A, Bosch-Comas A, Bordiú E, Calle-Pascual A, Carmena R, Casamitjana R, Castaño L, Castell C, Catalá M, Delgado E, Franch J, Gaztambide S, Girbés J, Gomis R, Gutiérrez G, López-Alba A, Martínez-Larrad MT, Menéndez E, Mora-Peces I, Ortega E, Pascual-Manich G, Rojo-Martínez G, Serrano-Rios M, Valdés S, Vázquez JA, Vendrell J.

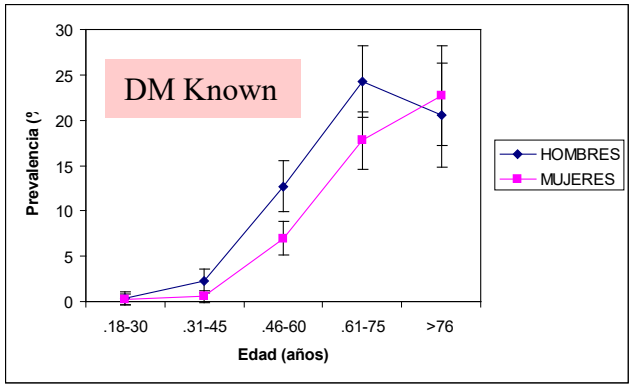
Diabetologia. 2012 Jan;55(1):88-93. doi: 10.1007/s00125-011-2336-9. PMID: 21987347

# Prevalencia de disglicemia en función de la edad y el sexo



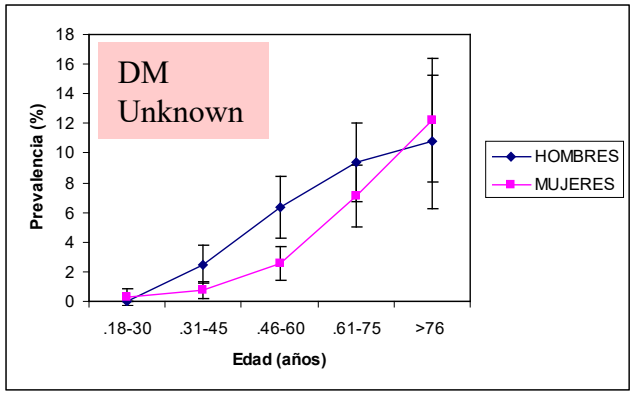

Men 15,85 %; (IC95%=14,31-17,38)

Women 11,80; (IC95%=10,63-12,98)



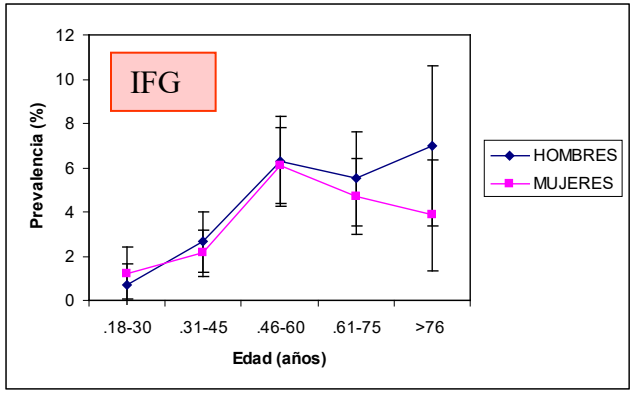

Men 8,50; IC95%=7,17-9,83%)

Women 7,09; (IC%%=6,09-8,08%)



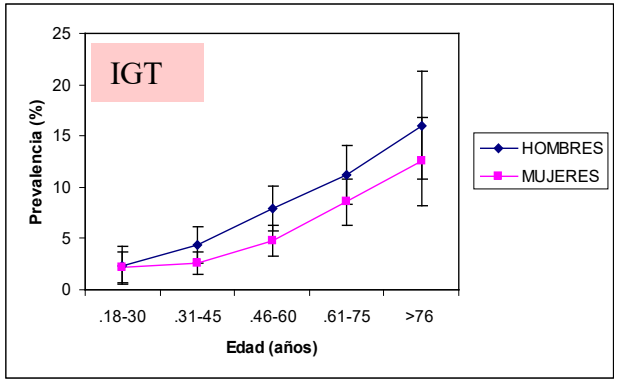

Men : 7,35 %; (IC95%=6,25-8,44%)

Women : 4,72 %;(IC 95%=3,95-5,49 %)



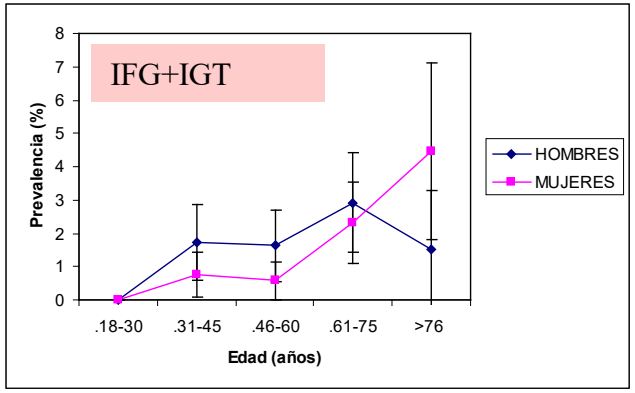

Men 3,63%; (IC95%=2,79-4,46%)

Women 3,27 %; (IC 95=2,58-3,96%)




Men 9,56%; (IC95%=7,99-11,13%)

Women 8,87 %; (IC 95=7,64-10,11%)



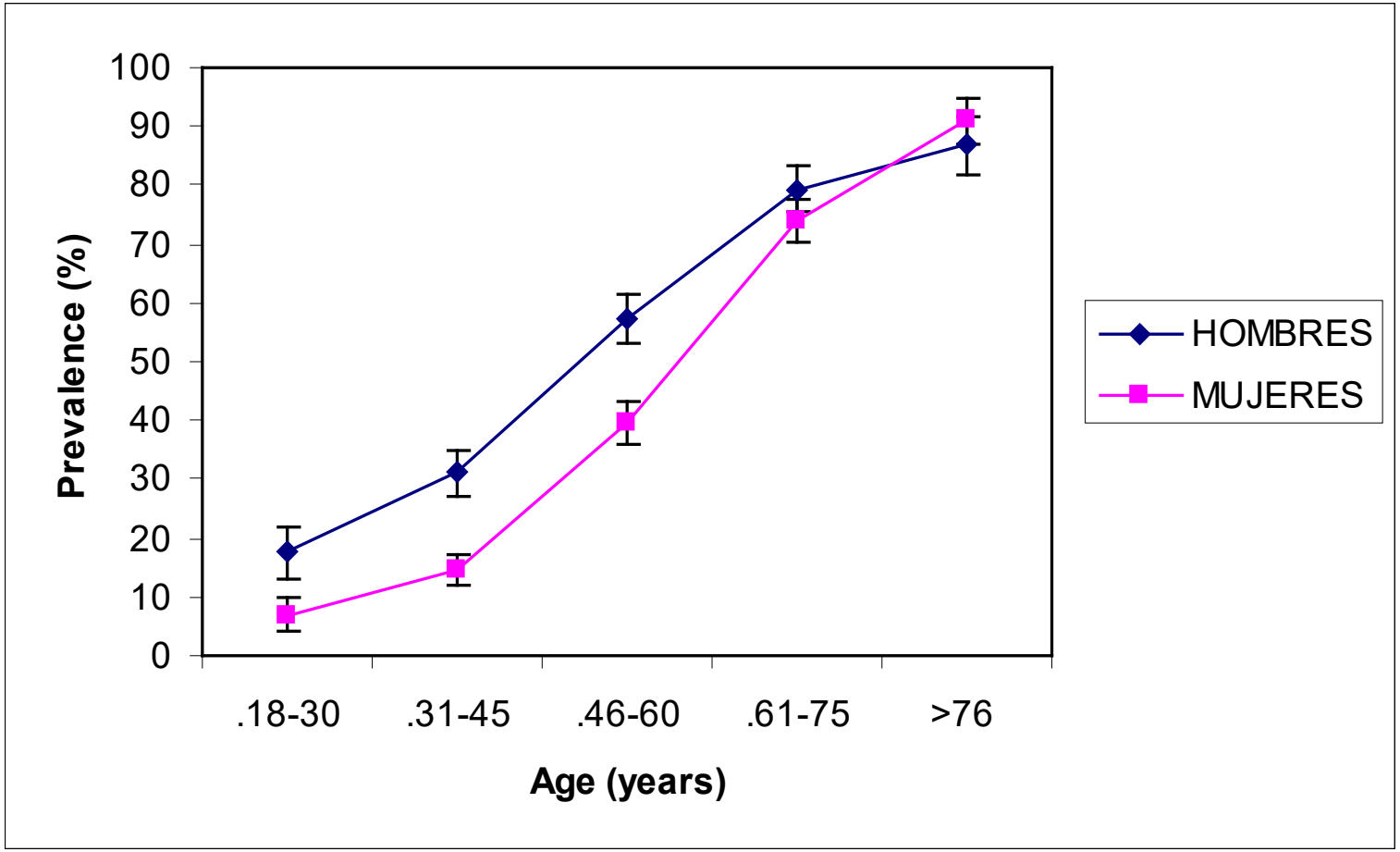

Men 2,28%; (IC95%=1,45-3,10%)

Women 2,19 %; (IC 95=1,53-2,84%)

# Prevalence og HBP (41,23 % IC 95%:39,86-42,61 %)

Men (45,53%: 43,34-47,72%)

Women (37,06%:35,18-38,93%)

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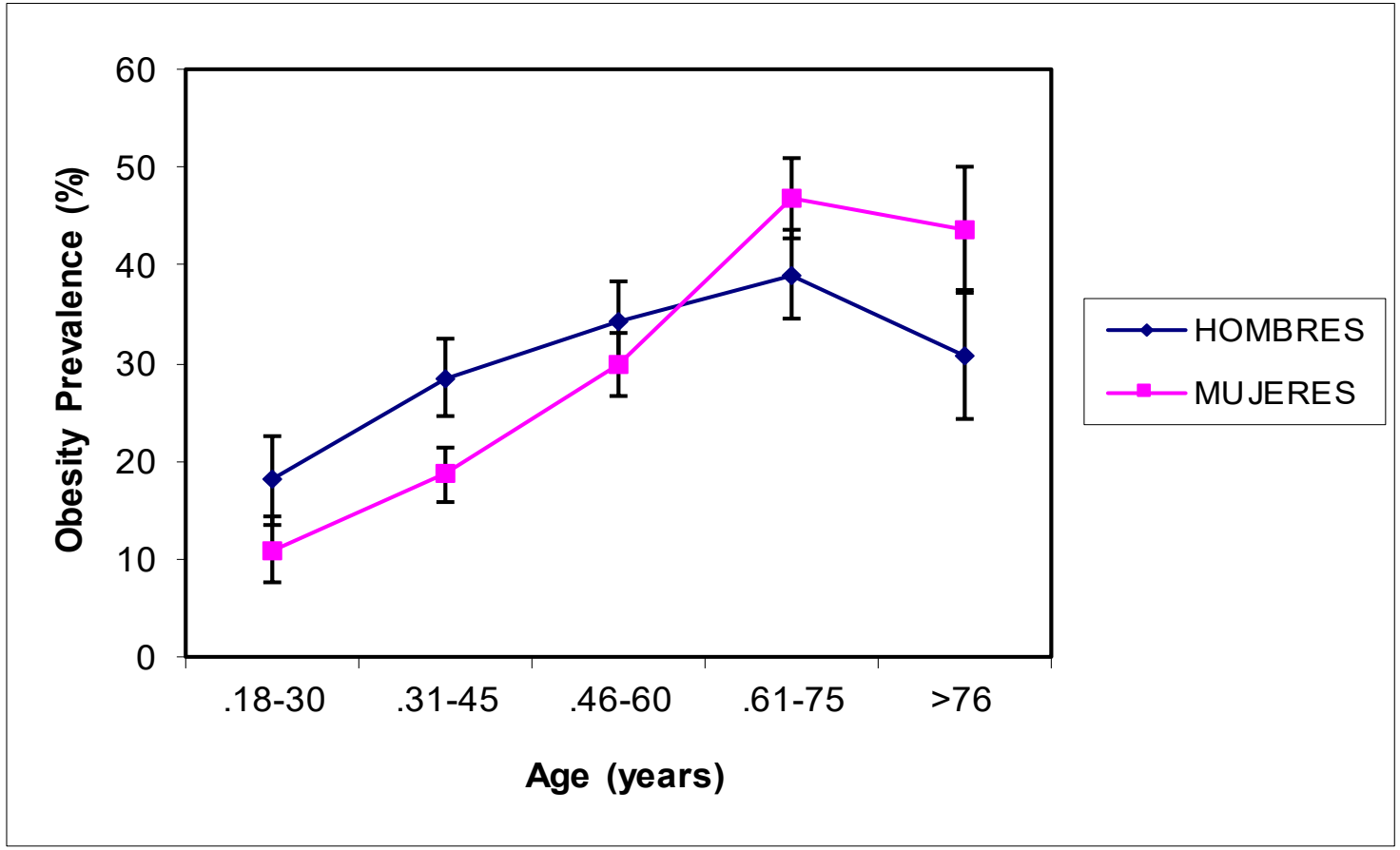
# Prevalence of obesity (BMI>=30)

28,25 % (26,97-29,52%) Adjusted for age, sex and population

Men 28,97 % (27,01-30,93%)

Women 27,55 % (25,88-29,23%)

Adjusted for age and population

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**ORIGINAL ARTICLE**

European Journal of Clinical Nutrition (2013) **67**, 911–916

# Olive oil has a beneficial effect on impaired glucose regulation and other cardiometabolic risk factors. Di@bet.es study

F Soriguer[1,2], G Rojo-Martínez[1,2], A Goday[3], A Bosch-Comas[1,4], E Bordiú[5], F Caballero-Díaz[6], A Calle-Pascual[7], R Carmena[1,8], R Casamitjana[1,9], L Castaño[1,10], C Castell[11], M Catalá[1,8], E Delgado[12], J Franch[13], S Gaztambide[1,10], J Girbés[14], R Gomis[1,4,15], G Gutiérrez[1,10], A López-Alba[16], M Teresa Martínez-Larrad[1,17], E Menéndez[12], I Mora-Peces[18], E Ortega[1,4,15], G Pascual-Manich[1], M Serrano-Rios[1,17], I Urrutia[1,10], S Valdés[1,2], J Antonio Vázquez[19] and J Vendrell[1,20]

## Risk according type of oil consumed

| | Always olive oil | | Any of the oils | | Always sunflower oil | |
|---|---|---|---|---|---|---|
| | OR | CI95%[a] | OR | CI95% | OR | P adjusted by age, sex and BMI |
| Obesity | 0.62 | 0.41-0.93 | 0.76 | 0.51-1.14 | 1 | 0.02 |
| IGR (vs Normal OGTT) | 0.49 | 0.28-0.86 | 0.51 | 0.29-0.87 | 1 | 0.04 |
| Triglycerides >150 | 0.53 | 0.33-0.84 | 0.55 | 0.35-0.85 | 1 | 0.03 |
| Low HDL cholesterol | 0.40 | 0.26-0.59 | 0.42 | 0.28-0.63 | 1 | 0.0001 |

# Variables associated with prediabetes/unknown diabetes (PRE/UKDM)

| | PRE/UKDM probability |
|---|---|
| | **OR (95% CI)** |
| Age (10 years increment) | **1.56 (1.45-1.66)** |
| Male sex | **1.40 (1.16-1.71)** |
| BMI (5 Units kg/m$^2$ increment) | **1.31 (1.13-1.53)** |
| Waist circumference (5 cm increment) | **1.12 (1.05-1.20)** |
| Social status (married) | 0.96 (0.78-1.16) |
| Education (university level) | 0.98 (0.74-1.30) |
| Current Smoker | 1.06 (0.85-1.33) |
| Hypertension (yes) | **1.50 (1.24-1.82)** |
| Dyslipidemia (yes) | **1.24 (1.04-1.48)** |
| Physical Exercise (≥ once a week) | 1.06 (0.88-1.28) |
| First degree relatives with diabetes | **1.69 (1.41-2.02)** |
| **MEdScore (5 units increment)** | **0.89 (0.82-0.98)** |

Original Paper

Annals of Nutrition & Metabolism

Ann Nutr Metab 2013;62:339–346
DOI: 10.1159/000346553

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Published online:

**Mediterranean Diet Adherence in Individuals with Prediabetes and Unknown Diabetes: The Di@bet.es Study**

E. Ortega[a,b] J. Franch[c] C. Castell[d] A. Goday[e] L. Ribas-Barba[f] F. Soriguer[a,g] J. Vendrell[a,h] R. Casamitjana[a,b] A. Bosch-Comas[a,b] E. Bordiú[m] A. Calle-Pascual[m] R. Carmena[a,j] L. Castaño[a,k] M. Catalá[a,j] E. Delgado[l] S. Gaztambide[a,k] J. Girbés[i] A. López-Alba[n] M.T. Martínez-Larrad[a] E. Menéndez[l] I. Mora-Peces[p] G. Pascual-Manich[a] G. Rojo-Martínez[a,g] M. Serrano-Rios[a] I. Urrutía[a,k] S. Valdés[a,g] J.A. Vázquez[o] R. Gomis[a,b]

**Table 3** Prevalence (%) and multivariate adjusted odd ratios (ORs) for prediabetes, diabetes and insulin resistance in the study population divided according to mean annual ambient temperature quartiles.

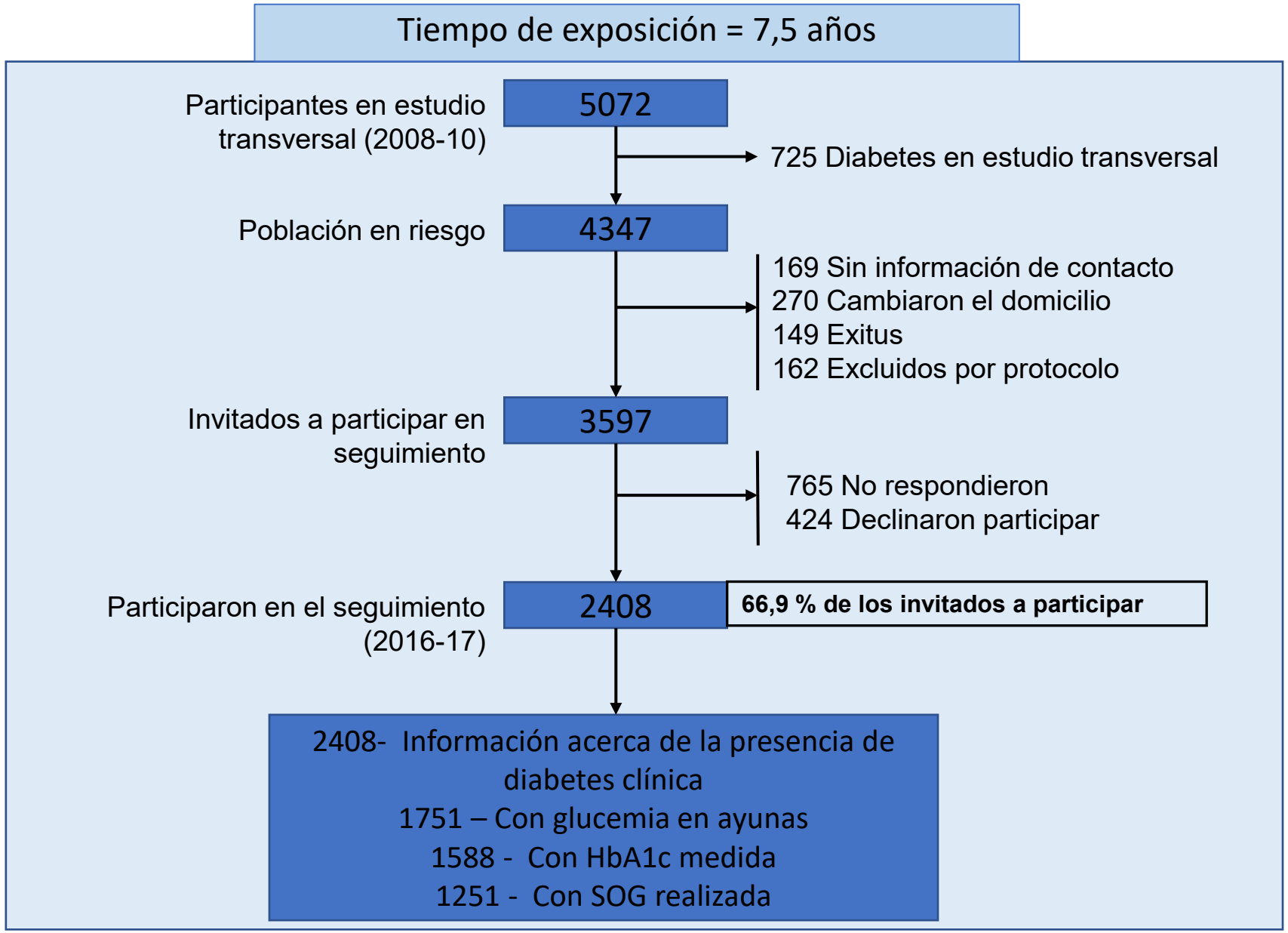
| | Mean annual temperature | | | | *P* value for trend |
|---|---|---|---|---|---|
| | Quartile 1 | Quartile 2 | Quartile 3 | Quartile 4 | |
| Total number | 1308 | 1236 | 1397 | 1131 | |
| Prediabetes (WHO 1999) | | | | | |
| Number | 135 | 143 | 154 | 154 | |
| Prevalence (%) | 10.3 | 11.6 | 11.0 | 13.6 | |
| OR crude | 1 | 1.13 (0.88–1.46) | 1.11 (0.86–1.40) | 1.42 (1.10–1.82) | 0.012 |
| OR multivariate | 1 | 1.27 (0.97–1.67) | 1.11 (0.84–1.47) | 1.56 (1.16–2.09) | 0.014 |
| OR multivariate + IPAQ | 1 | 1.27 (0.96–1.66) | 1.12 (0.84–1.48) | 1.48 (1.10–1.99) | 0.029 |
| OR multivariate + IPAQ + BMI | 1 | 1.26 (0.95–1.66) | 1.08 (0.81–1.44) | 1.37 (1.01–1.85) | 0.086 |
| Diabetes (WHO 1999) | | | | | |
| Number | 176 | 162 | 213 | 174 | |
| Prevalence (%) | 13.5 | 13.1 | 15.2 | 15.4 | |
| OR crude | 1 | 0.99 (0.78–1.24) | 1.17 (0.94–1.46) | 1.23 (0.98–1.54) | 0.032 |
| OR multivariate | 1 | 1.08 (0.82–1.43) | 1.33 (1.01–1.75) | 1.70 (1.26–2.29) | 0.001 |
| OR multivariate + IPAQ | 1 | 1.06 (0.81–1.40 | 1.33 (1.01–1.76) | 1.54 (1.14–2.09) | 0.003 |
| OR multivariate + IPAQ + BMI | 1 | 1.05 (0.79–1.39) | 1.20 (0.91–1.59) | 1.39 (1.02–1.90) | 0.037 |
| [#]Insulin resistance (HOMA-IR >p75 in subjects without known diabetes) | | | | | |
| Number | 248 | 249 | 294 | 286 | |
| Prevalence (%) | 19.9 | 23.7 | 25.3 | 29.9 | |
| OR crude | 1 | 1.11 (0.91–1.36) | 1.21 (1.00–1.47) | 1.53 (1.26–1.87) | <0.001 |
| OR multivariate | 1 | 1.11 (0.90–1.37) | 1.24 (1.00–1.53) | 1.63 (1.30–2.04) | <0.001 |
| OR multivariate + IPAQ | 1 | 1.10 (0.89–1.36) | 1.25 (1.01–1.55) | 1.45 (1.15–1.82) | 0.001 |
| OR multivariate + IPAQ + BMI | 1 | 1.03 (0.82–1.30) | 1.22 (0.96–1.54) | 1.26 (0.98–1.63) | 0.046 |

Multivariate ORs and *P* values were calculated by logistic regression. Multivariate model: adjusted to age, gender, ethnicity, education level, family history of diabetes, MedScore, and geographical elevation. Quartile 1: 10.0–14.0°C; Quartile 2: 14.1–15.1°C; Quartile 3: 15.2–17.3°C; Quartile 4: 17.4–21.3°C.

[#]For this analysis subjects with known diabetes ($n = 480$) were excluded. The 75th percentile of the distribution of HOMA-IR in the study population without known diabetes was 2.51.

BMI, body mass index; IPAQ, International Physical Activity Questionnaire (18).

# Seguimiento



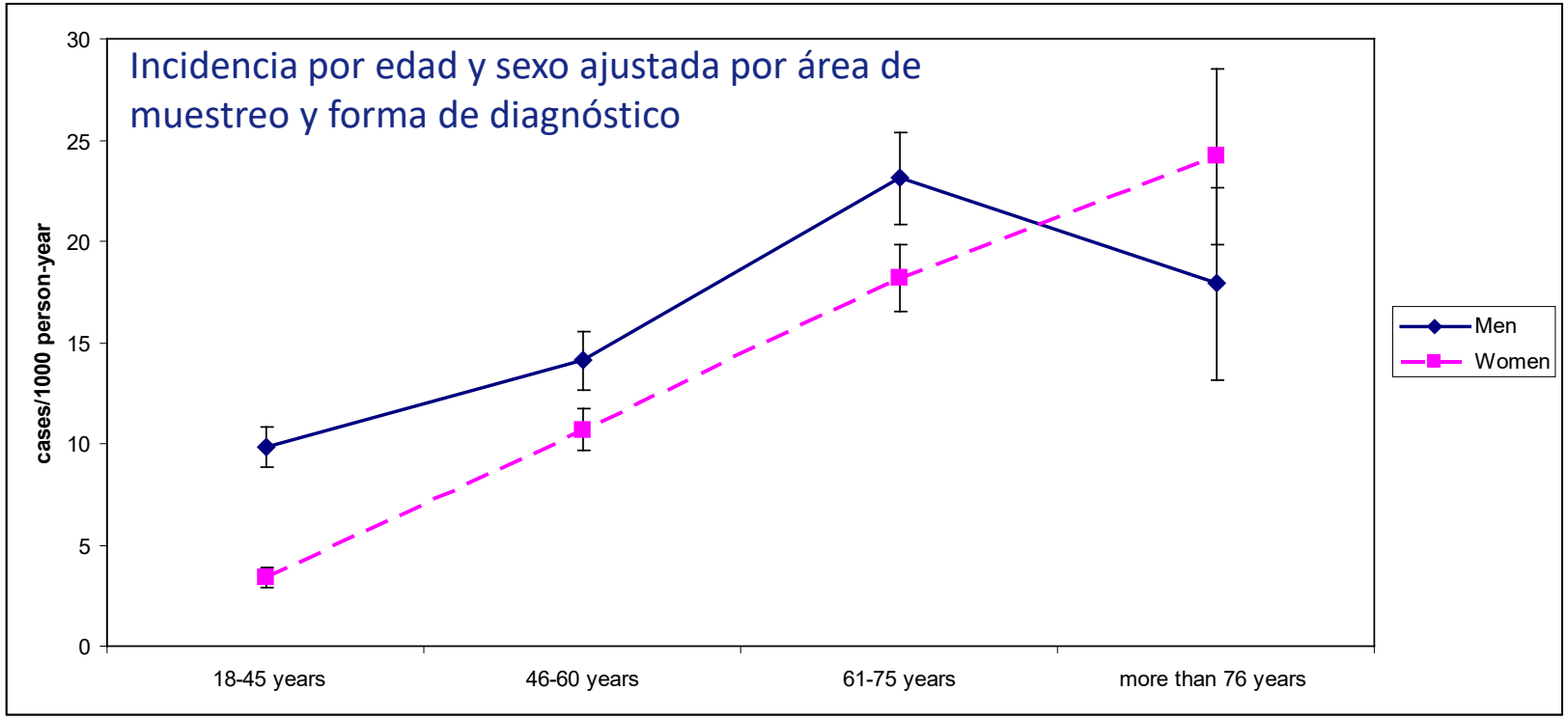
# Incidencia ajustada de diabetes tipo 2 en España

**11.6 (11.1-12.1) casos / 1000 personas-año (CI95%)***

* Ajustado por forma de diagnóstico, edad, sexo y área de muestreo.

**386.003** nuevos casos de diabetes al año en España

**1.057** nuevos casos por día




Incidence of diabetes mellitus in Spain as results of the nation-wide cohort di@bet.es study.

Rojo-Martínez G, Valdés S, Soriguer F, Vendrell J, Urrutia I, Pérez V, Ortega E, Ocón P, Montanya E, Menéndez E, Lago-Sampedro A, González-Frutos T, Gomis R, Goday A, García-Serrano S, García-Escobar E, Galán-García JL, Castell C, Badía-Guillén R, Aguilera-Venegas G, Girbés J, Gaztambide S, Franch-Nadal J, Delgado E, Chaves FJ, Castaño L, Calle-Pascual A.

Sci Rep. 2020 Feb 17;10(1):2765.

doi: 10.1038/s41598-020-59643-7. PMID: 32066839

# Incidencia de diabetes en función de los principales factores de exposición

| | N° at risk | n° developing diabetes | person/years | Incidence rate per 1000 person-years (95% CI) | OR[a] (95% CI) | OR[b] (95% CI) |
|---|---|---|---|---|---|---|
| All sample | 2408 | 156 | 18088 | 8.6 (7.3–10.1) | — | — |
| Sex | | | | | | |
| Women | 1451 | 81 | 10883 | 7.4 (5.9–9.3) | Ref. cat. | Ref. cat. |
| Men | 957 | 75 | 7205 | 10.4 (8.2–13) | 1.5 (1.1–2.1) | 2.7 (1.6–4.5) |
| OGTT result | | | | | | |
| Normoglycemia | 2115 | 75 | 15892 | 4.7 (3.7–5.9) | Ref. cat. | Ref. cat. |
| Isolated IGT | 154 | 35 | 1156 | 30.3 (21.1–42.1) | 10.8 (5.7–20.2) | 7.9 (4–15.5) |
| Isolated IFG | 102 | 27 | 761 | 35.5 (23.4–51.6) | 14.4 (7.5–27.6) | 11.7 (5.9–23.3) |
| Combined IFG-IGT | 37 | 19 | 278 | 68.3 (41.1–106.6) | 42.3 (16.3–109.5) | 48.8 (17.1–139.8) |
| P for trend | | | | | <0.0001 | <0.0001 |
| Obesity | | | | | | |
| BMI < 25 kg/m$^2$ | 749 | 15 | 5628 | 2.7 (1.5–4.4) | Ref. cat. | Ref. cat. |
| BMI 25–30 kg/m$^2$ | 1018 | 57 | 7662 | 7.4 (5.6–9.6) | 1.9 (0.9–3.9) | 1.2 (0.6–2.3) |
| BMI ≥ 30 kg/m$^2$ | 626 | 82 | 4691 | 17.5 (13.9–21.7) | 4.6 (2.3–9.2) | 2.3 (1.1–4.6) |
| P for trend | | | | | <0.0001 | <0.0001 |
| Central obesity (Waist ≥94 cm in men and ≥80 cm in women) | | | | | | |
| No | 718 | 8 | 5400 | 1.5 (0.6–2.9) | Ref. cat. | Ref. cat. |
| Yes | 1677 | 146 | 12596 | 11.6 (9.8–13.6) | 10.6 (2.6–43.5) | 3.4 (1.5–7.8) |
| Family History of diabetes (first-degree relatives) | | | | | | |
| No | 1569 | 73 | 11794 | 6.2 (4.9–7.8) | Ref. cat. | Ref. cat. |
| Yes | 839 | 83 | 6294 | 13.2 (10.5–16.3) | 2.4 (1.5–3.9) | 2.3 (1.6–3.3) |

**Table 2.** Incidence of diabetes according to the main exposure factors present in the cross-sectional study. [a]ORs were calculated for each variable by logistic regression adjusted for age and sex (sex was adjusted for age). [b]ORs were calculated using a single logistic regression model (all variables listed are introduced in the analysis at once) and additionally adjusted for presence of high blood pressure, level of physical activity (IPAQ), education level, and Mediterranean diet score. Ref. cat. = Reference category.

Rojo-Martínez G, et al. Sci Rep. 2020;10:2765.