

Detection of people at risk of having diabetes in the community pharmacy with the Findrisc test 2014–2021

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KEYWORDS

Community pharmacist, Community Pharmacy Services, Diabetes, Findrisc test, risk factors, screening

ABBREVIATIONS

AFG: abnormal fasting glucose
 AGT: abnormal glucose tolerance
 BG: basal glycaemia
 BMI: body mass index
 BP: blood pressure
 CG: capillary glycaemia
 CIOMS: Council for International Organizations of Medical Sciences.
 CREC: Clinical Research Ethics Committee
 DM: diabetes mellitus
 F: Findrisc questionnaire (score)
 F: follow up
 GP: family/primary care doctor
 HbA1c: glycated haemoglobin
 HBP: high blood pressure
 HE: health education
 ICH: International Conference on Harmonization
 IDF: International Diabetes Federation
 LOPD: Spanish Organic Law for Data Protection
 m: arithmetic mean
 NICE: The National Institute for Health and Care Excellence
 NSC: National Screening Committee
 PF: pharmacotherapeutic follow up
 R: referral to the doctor
 SD: standard deviation
 SED: Spanish Society for Diabetes
 SEFAC: Spanish Society for Clinical, Family and Community Pharmacy

ABSTRACT

Aim: To analyze the results of the SEFAC campaigns to screen for the risk of having diabetes, performed in Spanish community pharmacies from 2014.

Methods: Descriptive cumulative study of the results of campaigns from Global Diabetes Day, in 2014, 2016–2018, 2020 and 2021.

Variables: Findrisc test score, mean (m) and standard deviation (SD) and subjects at risk intervals, n (%). Demographic (sex, age) and anthropometric variables, body mass index (BMI) (kg/m²), waist circumference (cm), capillary glycaemia (SD) (mg/dL).

Results: A total of 1146 pharmacists took part; 12,402 users. A total of 8799 (70.9%) had BMI ≥25 kg/m²; 7366 (59.4%) were taking anti-hypertensives, 6047 (48.8%) with excessive abdominal circumference. In total, 5962 (48.0%) had a family history of diabetes.

Average risk (Findrisc score) was 11.3 (4.6), without any sex differences ($P>0.05$). The number of subjects with high/very high risk ($F\geq 15$) was 3107 (25.0%) without any sex differences ($P>0.05$). The high/very high risk increased with age, from 282 (15.1%) people aged 45 to 54 up to 1695 (40.1%) people aged >64. A total of 1762 (14.2%) were referred to the doctor. There are no data on the result.

Average interview time: 10.3 (5.3) minutes, no differences between sexes ($P>0.05$).

Conclusions: One quarter of those surveyed had a high/very high risk and one in seven were referred to the doctor.

The most prevalent risk factors were BMI, hypertension, abdominal circumference and family history of diabetes.

Interprofessional communication should be improved as no result was obtained from referrals to the doctor.

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INTRODUCTION

Diabetes mellitus (DM) is a chronic disease, defined as metabolic abnormalities of multiple aetiologies marked by chronic hyperglycaemia and carbohydrate, fat and protein metabolism disorders, arising from defects in insulin secretion, insulin action or both. The study Di@betes (1), on the prevalence of DM in Spain, revealed that virtually 30% of the study population had some kind of carbohydrate metabolism abnormality and that the global prevalence of DM adjusted by age and sex was 13.8%, whereby approximately half (6%) had undiagnosed DM. The prevalence rates of abnormal glucose during fasting (AGF), impaired glucose tolerance (IGT) and combined AGF-IGT adjusted by age and sex were 3.4%, 9.2% and 2.2%, respectively. According to the 10th edition of the Atlas for Diabetes of the International Diabetes Federation (IDF) (2), in Spain there are 5.1 million adults with diabetes, which means an increase of 42% since 2019. This same report declares that there are approximately 22 million undiagnosed cases in Europe. The prevalence of diabetes and glucose abnormalities increased significantly with age and is higher in men than women.

In Spain a total of 21 people per 100,000 inhabitants died in 2020, due to diabetes. This figure, although still impacted by the pandemic, was higher than the four previous years (3).

People with undiagnosed type 2 DM present a high risk of suffering from heart diseases, dyslipidaemias, hypertension and obesity compared to the non-diabetes population. For this reason, early detection and immediate treatment reduce disease severity, as well as future hospital complications and admissions (4). This situation was exacerbated by the COVID-19 pandemic (5). Although there are contradictions in terms of the effectiveness (6-8), not to mention the efficacy, of screening as to the reduction of morbi-mortality in populations with a low risk of developing DM2; studies performed in Spain (9) and institutions such as the American NSC (National Screening Committee) (10), recommend screening for the risk of DM2.

Currently, there are scales to measure the risk of diabetes similar to those applied to estimate cardiovascular risk. In Europe, to detect whether or not a person is at risk of presenting diabetes in the future, the Findrisc scale is available, based on the collection of clinical and demographic information, which enables both screening and non-invasive screening (11). This scale has been translated, adapted and validated in various European populations (11). Its score is related to the levels of glycated haemoglobin (HbA1c) and glycaemia (12). In Spain it was validated by Soriguer et al (13), by means of the Pizarra study in 2012.

Calculating the risk of suffering from diabetes by means of the Findrisc test, is currently recommended by Spanish

institutions such as the Spanish Society for Diabetes (SED)M and international institutions such as the National Institute for Health and Care Excellence (NICE) (14) and the Canadian Task Force (15).

The Findrisc test (16) is a simple, cost effective and quick tool to screen in large groups. Moreover, it is an opportunity to promote in people with a medium-high risk or healthy lifestyles that modify the risk of developing DM2 or delay the onset of the disease (17,18). It is comprised of eight questions with predetermined scores and estimates the likelihood of developing DM2 over the next 10 years. It is filled out in 5-10 minutes and has been used in various campaigns to detect diabetes, both public and in community pharmacies (18-23). These campaigns have revealed that there is a high percentage of people who have a significant risk of developing the disease or, failing a diagnosis, their glycaemia figures suggest that this has already commenced, but they are unaware of this situation.

Therefore, from the diabetes group of the Spanish Society for Clinical, Family and Community Pharmacy (SEFAC), considering the accessibility and proximity to the population of community pharmacies and pharmacists, an annual programme was set out to detect people at risk of suffering from DM; and the collaboration with other health professionals in reducing this risk by means of a structured educational intervention and referral to the family doctor (GP) if necessary.

This work gathers together the results obtained in the six campaigns to screen for the risk of diabetes performed among community pharmacy users by SEFAC partner and collaborator pharmacists. This enables analyzing a high number of data and, therefore, obtaining a picture that reliably reflects the situation.

AIMS

Primary endpoint

- Analyze the results of screening campaigns performed by SEFAC of people at risk of having diabetes in Spanish community pharmacies since 2014.

Specific aims

- Report the characteristics of subjects in the SEFAC diabetes screening programme and the interventions performed by collaborating pharmacists during its implementation.
- Quantify the percentage of people at high to very high risk of having diabetes and refer them to the doctor.
- Determine the prevalence of risk factors for diabetes in subjects.

METHODS

Design

Cumulative analysis of transversal observational studies performed in the week of Global Diabetes Day, in November 2014, 2016–2018, 2020 and 2021, in Spanish pharmacies by SEFAC partners and collaborators. During the years 2015 and 2019 this analysis was not performed. In 2015 a nutrition study was performed and in 2019 this was not implemented.

Subjects

Inclusion criteria

Pharmacy users, aged 18 and older not diagnosed with diabetes, with sufficient cognitive capacity and who agreed to undergo the survey.

Exclusion criteria

Users under 18 and 18 or older who were unable to fill out the questionnaire or who did not agree to do so. All those users who would have been previously diagnosed with diabetes and/or were in treatment with medicines for diabetes.

Collaborator pharmacists

Each year information was given on the activity of all SEFAC partners and the necessary material sent via e-mail: capture poster, protocol, dedicated website access, Findrisc questionnaire and case report form, explanatory leaflet and SEFAC recommendations form on diabetes and healthy lifestyles. The annual campaign website was enabled for data collection and entry.

Sample size

Non probabilistic or opportunistic sampling was performed. Incorporation into the study was offered to the first two people who entered the pharmacy in the morning and the afternoon. Those who, in light of the campaign's advertising posters, requested the service, were also accepted.

Each year users were recruited over the period set out. A specific sample size goal was not established.

Measurement variables and instruments

Primary endpoint

Average score obtained in the Findrisc questionnaire (16), expressed overall as mean (m) and standard deviation (SD), as categoric variable in terms of % of subjects at each risk level and as % of response to each item. Five risk subgroups were set out:

1. Low risk: under 8 points.
2. Mildly high risk: 8–11 points.
3. Moderate risk: 12–14 points.
4. High risk: 15–20 points.
5. Very high risk: over 20 points.

Anthropometric variables

Body mass index (BMI)

Expressed in kg/m², as m (SD) and % of subjects with expression of the categoric variable (normal, overweight and obesity) according to Obesity Society criteria (24). To measure this, electronic scales with calibrated tallimeter were used (24).

Waist circumference

Expressed in cm, as m (SD) and as a % of people with different values for the categoric variable (normal and abnormal). Measurement was with non-extensible tape measure, according to a standardized protocol drawn up by the researchers.

Metabolic indicator

A capillary glycaemia (CG) was performed, which was considered at random if not fasting and a basal reading during fasting; when the questionnaire score was ≥ 15 , expressed in mg/dL, as m (SD).

An *ad hoc* record sheet (Figure 1) was drawn up in which the answers to the Findrisc questionnaire were collected; the demographic characteristics of subjects, their medication, the intervention performed and time taken.

Procedure (Figure 2)

1. Capture of subjects during the weeks of November selected for the different years. Pharmacy users aged over 18 were informed of the risk of having diabetes in the future and they were offered the chance to take part in the study. Explanatory posters were put up and they were actively captured.

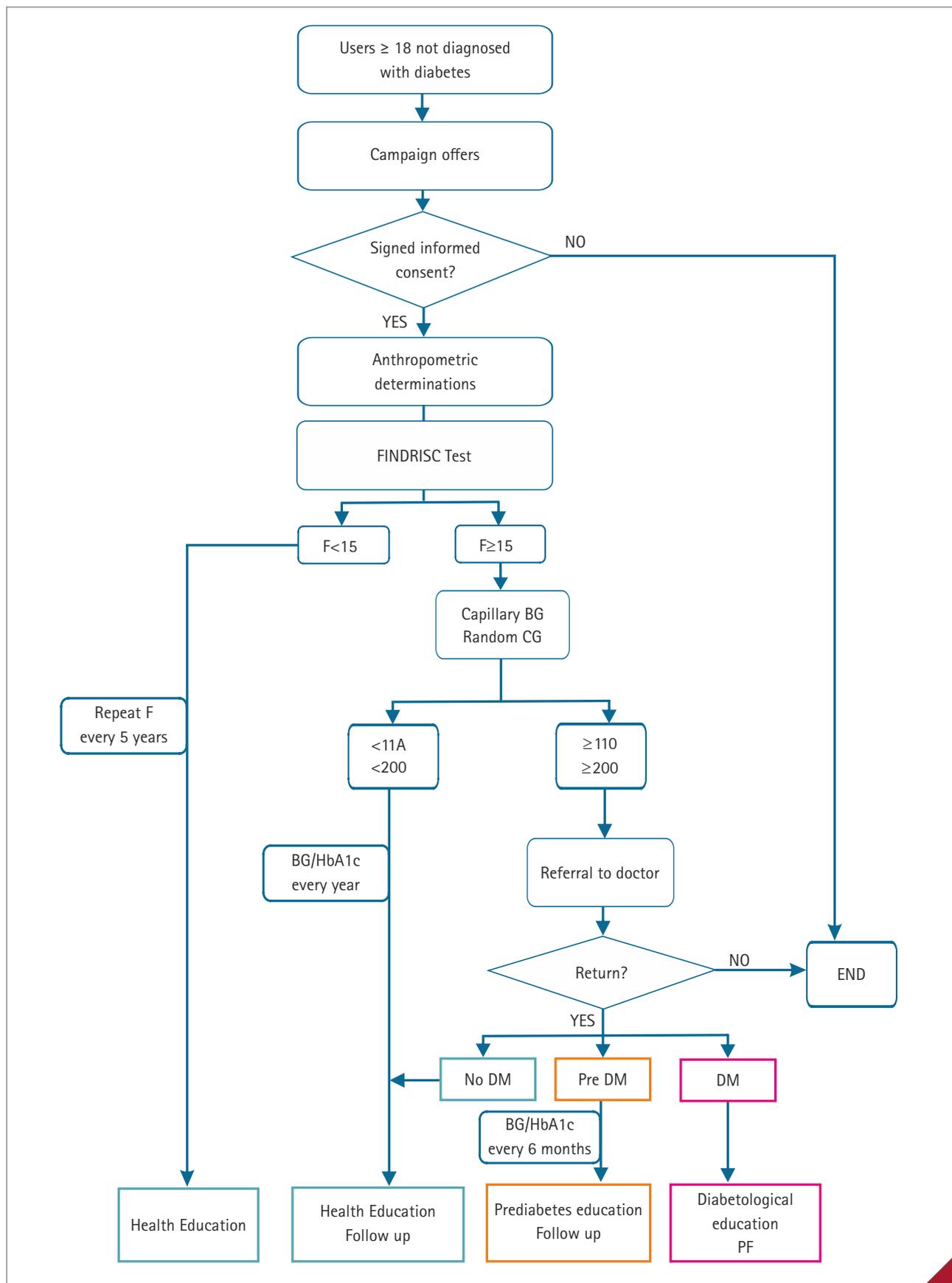
2. Data record for the subject, administration of the questionnaire and filling out of the registration sheet. The corresponding anthropometric measures (weight, height and waist circumference) included in the Findrisc questionnaire were taken. The degree of risk of having DM was thus determined.

3. If the score from the Findrisc questionnaire was under 15 health education was provided based on healthy hygiene-dietary habits and repetition of the questionnaire after five years was recommended. All users taking part were issued the leaflets with SEFAC recommendations on diabetes and healthy lifestyles (Figure 3).

¿CONOCE SU RIESGO DE PADECER DIABETES?		Test de Findrisc		
1. ¿Qué edad tiene? Menos de 45 años 0 puntos <input type="checkbox"/> 45-54 años 2 puntos <input type="checkbox"/> 55-64 años 3 puntos <input type="checkbox"/> Más de 64 años 4 puntos <input type="checkbox"/>	5. ¿Con qué frecuencia toma verduras o frutas? Cada día 0 puntos <input type="checkbox"/> No cada día 1 punto <input type="checkbox"/>			
2. Índice de masa corporal (IMC) Menos de 25 kg/m ² 0 puntos <input type="checkbox"/> 25-30 kg/m ² 1 punto <input type="checkbox"/> Mayor de 30 kg/m ² 3 puntos <input type="checkbox"/>	6. ¿Toma medicamentos para la hipertensión de forma regular? NO 0 puntos <input type="checkbox"/> Sí 2 puntos <input type="checkbox"/>			
3. Perímetro de cintura <i>Hombres</i> <i>Mujeres</i> Menos de 94 cm Menos de 80 cm 0 puntos <input type="checkbox"/> 94-102 cm 80-88 cm 3 puntos <input type="checkbox"/> Más de 102 cm Más de 88 cm 4 puntos <input type="checkbox"/>	7. ¿Le han encontrado alguna vez valores de glucosa altos? NO 0 puntos <input type="checkbox"/> Sí 5 puntos <input type="checkbox"/>			
4. ¿Realiza diariamente al menos 30 minutos de actividad física, en el trabajo y/o en el tiempo libre? Sí 0 puntos <input type="checkbox"/> NO 2 puntos <input type="checkbox"/>	8. ¿Alguno de sus familiares, allegados u otros parientes han sido diagnosticados de diabetes? NO 0 puntos <input type="checkbox"/> Sí: Abuelos, tíos, primos 3 puntos <input type="checkbox"/> Sí: Padres, hermanos o hijos 5 puntos <input type="checkbox"/>			
Escala de RIESGO TOTAL: <input style="width: 40px;" type="text"/> puntos				
		Glucemia basal	Hb1Ac	TA (mmHg)
+	RIESGO MUY ALTO: Más de 20 puntos			
	RIESGO ALTO: Entre 15 y 20 puntos			
	RIESGO MODERADO: Entre 12 y 14 puntos			
	RIESGO LIGERAMENTE ELEVADO: Entre 8 y 11 puntos			
-	RIESGO BAJO: Menos de 8 puntos			
Farmacia:		Población:		Nº socio SEFAC
Paciente:		Código:	Tfno:	
Hombre <input type="checkbox"/>	Mujer <input type="checkbox"/>	Fumador: Sí <input type="checkbox"/> No <input type="checkbox"/>		
Medicamento		Pauta		
		Evaluación/Intervención: <input type="checkbox"/> Educación sanitaria y F a 5 años <input type="checkbox"/> Educación sanitaria y GB al año <input type="checkbox"/> Derivación al médico y seguimiento <input type="checkbox"/> Tiempo de la intervención: minutos		
		Firma:		
		Farmacéutico col. nº:	Fecha:	
Médico de familia (Información para el farmacéutico)		Fecha:		

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Figure 1 Study registration sheet



BG: basal glycaemia; CG: capillary glycaemia; DM: Diagnosed with diabetes; F: Findrisc questionnaire; HbA1c: glycated haemoglobin; No DM: Undiagnosed; PF: Pharmacotherapeutic follow up; Pre-DM: diagnosed with prediabetes.

Figure 2 Algorithm for the procedure

Recomendaciones de la Sociedad Española de Farmacia Comunitaria a la población.



Consejos para prevenir y tratar la diabetes

La epidemia del siglo XXI

La diabetes es una enfermedad que afecta al metabolismo y se caracteriza por tener niveles altos de glucosa en sangre (hiperglucemia). En España, afecta a cerca del 14% de la población, de los que el 6%, aún están sin diagnosticar. La hiperglucemia crónica provoca daños en varios órganos, sobre todo en riñones, ojos, nervios y sistema cardiovascular. Por eso es importante su diagnóstico precoz y tratamiento.

Los principales tipos son:

Diabetes mellitus tipo 1: aparece principalmente en niños y se caracteriza por ausencia de una hormona denominada insulina, por lo que su tratamiento consiste en aportar esta sustancia al organismo.

Diabetes mellitus tipo 2: supone el 90% de los casos, aparece principalmente en adultos y se caracteriza por que el organismo no utiliza bien la insulina de la que dispone y, en ocasiones, ésta además no es suficiente. Su tratamiento se basa en hábitos de vida saludables en combinación con antidiabéticos orales y, en algunos casos, con insulina". Las señales de alarma son, entre otras, tener mucha sed, hacer mucho pis, tener hambre continuamente y pérdida de peso. Se debe acudir al médico si aparecen.



Recomendaciones

EJERCICIO: la práctica regular es clave para personas con diabetes porque ayuda a controlar la glucemia, perder peso y a controlar latensión.

LA ALIMENTACIÓN: una correcta alimentación ayuda a mantener los niveles de glucosa y lípidos en sangre y a conseguir y mantener un peso adecuado.

PÉRDIDA DE PESO: la diabetes se asocia al sobrepeso y a la obesidad, y ambas son un factor de riesgo independiente para las complicaciones que pueden surgir en las personas con diabetes. Por ello es necesario alcanzar el peso adecuado y mantenerlo.

TABACO: la persona con diabetes no debe fumar, es un factor de riesgo cardiovascular que añade a los propios de la diabetes.

MEDICACIÓN: al ser una enfermedad crónica, el tratamiento es de por vida. Aunque no presente síntomas, la hiperglucemia está dañando el organismo, y esto solo se puede prevenir tomando bien la medicación para controlar el nivel de azúcar en sangre.

HIPOGLUCEMIA: es el efecto secundario más grave de los antidiabéticos orales y de la insulina. Si aparece se deben tomar zumos, leche o bebidas azucaradas mejor que azúcares simples, que pueden producir hiperglucemia de rebote.

AUTOANÁLISIS Y AUTOCONTROL DE GLUCEMIA: un buen control de la diabetes requiere un equilibrio entre alimentación saludable, ejercicio y medicación. La información que proporciona el autoanálisis (medida de glucosa) sirve para hacer ajustes por el propio paciente (autocontrol) que permitan mantener este equilibrio. La frecuencia del autoanálisis es distinta para cada paciente, por lo que se deben seguir las indicaciones del personal sanitario.

CHEQUEOS PERIÓDICOS: son esenciales para prevenir las complicaciones en distintos órganos. Hay que visitar al oftalmólogo, al nefrólogo y otros especialistas periódicamente, aunque no se noten síntomas.

DIABETES GESTACIONAL: esta diabetes está presente en un 12% de todos los embarazos de mujeres sin diabetes previa. El riesgo depende de la edad, obesidad y antecedentes previos o familiares. Es necesario un buen control de la glucemia para evitar las consecuencias sobre la madre y sobre el feto.

EDUCACIÓN DIABETOLÓGICA: cuanto mejor conozca todo lo relacionado con la diabetes más fácil le va a ser cumplir con su tratamiento y todas las recomendaciones de hábitos saludables que se dan. No olvide que lo importante es mantener el azúcar en sangre en unos niveles correctos para evitar o retrasar la aparición de complicaciones.

Figure 3 Recommendations leaflet on diabetes for the subject (obverse)

Recomendaciones de la Sociedad Española de Farmacia Comunitaria a la población.

Preguntas frecuentes

¿Qué es la "hemoglobina glicosilada"?

La hemoglobina (proteína que circula en la sangre y transporta el oxígeno) se une a la glucosa formando la hemoglobina glicosilada (HbA1). Cuanto mayor es la cantidad de glucosa en sangre, más se une a la hemoglobina y su porcentaje de unión indica cuál ha sido la cantidad media de glucosa circulante durante el tiempo de vida de la hemoglobina (120 días). No debe superar el 7%. Su medida permite saber el promedio del nivel de azúcar en las últimas semanas, mientras que un examen de glucosa en la sangre indica el estado de control de la diabetes en ese momento determinado.

¿Voy a tener que hacer régimen toda la vida?

Una correcta alimentación es importante en cualquier persona, pero aún más en la persona con diabetes. Junto con el ejercicio, una alimentación saludable es la base del tratamiento. Esto no quiere decir que haya que seguir un régimen estricto de por vida o que haya alimentos que no pueda volver a probar. Saber comer bien le va a permitir comer variado. Eso sí, sin cometer excesos y sabiendo qué alimentos son recomendables y cuáles no, podrá integrar en su vida normal los hábitos saludables en cuanto a nutrición se refiere; unos hábitos que, por otra parte, debería seguir toda la población.

¿Me voy a quedar ciego?

Una de las complicaciones más frecuentes de la diabetes es la aparición de retinopatías (causadas por el daño a los vasos sanguíneos de la retina), y está relacionada con la duración de la enfermedad. Ante los primeros síntomas de pérdida de visión u otras alteraciones oftálmicas se debe acudir al médico. Para prevenir la retinopatía diabética hay que tener un control estricto del azúcar en la sangre, la presión arterial y el colesterol. Actualmente existen procedimientos para tratar este problema, como la fotocoagulación con láser.

¿La diabetes puede afectar a mi salud sexual?

Existe la posibilidad de que la diabetes afecte a la salud sexual produciendo impotencia o disfunción eréctil. Esto se debe a que las arterias que irrigan los genitales pueden obstruirse, al igual que otros órganos del cuerpo. Mientras más cuide usted de su diabetes y sus niveles de azúcar, menor es el riesgo de que esto ocurra.

Me han diagnosticado diabetes, ¿me tendré que pinchar?

En la diabetes tipo 2 la mayoría de los pacientes, al inicio de la enfermedad, sólo hacen dieta y ejercicio, aunque también pueden necesitar tomar fármacos en comprimidos, los antihipertensivos orales. Estos ayudan al organismo para que pueda utilizar su insulina sin tener que inyectarse. Las inyecciones se usan sólo tras agotar todos los demás recursos terapéuticos.

¿Qué es el "pie diabético"?

Una de las consecuencias más frecuentes de la diabetes es la aparición de lesiones en los pies que pueden evolucionar a ulceraciones e infecciones, y que pueden llegar en casos graves a la gangrena e incluso a la amputación. Es muy importante cuidarlos bien, y esto incluye una buena higiene, elegir un calzado adecuado, observarse los pies para detectar cualquier herida o lesión y tratarla antes de que evolucione, etc.

Me acatarro más y durante más tiempo, ¿puede ser por la diabetes?

Sí. Las personas con diabetes presentan más infecciones que la población general, sobre todo respiratorias, urinarias, de tejidos blandos (pie diabético) y enfermedad periodontal. La hiperglucemia produce una peor respuesta inmunitaria, y a su vez las infecciones producen descompensación hiperglucémica.

Cifras para reflexionar

- Los dos tipos más frecuentes de diabetes son tipo 1 y tipo 2. Esta última se presenta principalmente en adultos y es, con mucho, la forma más habitual. Representa entre el 85 y el 90% de todos los casos de diabetes.
- Actualmente hay aproximadamente 382 millones de personas con diabetes en todo el mundo, 5 de ellos, en España. La mayoría de ellos tienen edades comprendidas entre los 40 y los 59 años. Se estima que en 2035, la cifra de personas con diabetes tipo 1, tipo 2 o gestacional aumentará hasta los 592 millones. El 80% de las personas con diabetes viven en países de ingresos medios y bajos.
- Se estima que 175 millones de personas con diabetes están sin diagnosticar.
- Está demostrado que el abordaje multidisciplinar de la diabetes reduce las estancias hospitalarias hasta el 58%, lo que implica un enorme beneficio económico.
- Está ampliamente demostrado que el coste humano y económico de la diabetes se podría reducir notablemente si se invirtiera en prevención, sobre todo en el diagnóstico temprano, para evitar la aparición de complicaciones.

Fuentes: Federación Internacional de la Diabetes (IDF, según sus siglas en inglés) (2013) y Estudio Di@betes, del Centro de Investigación Biomédica en Red de Diabetes y Enfermedades Metabólicas Asociadas (CIBERDEM) (2010).

Si quiere más información puede consultar a su farmacéutico de confianza.

Revisada por



Figure 3 Recommendations leaflet on diabetes for the subject (reverse)

4. If the questionnaire score was ≥ 15 , determining fasting a random capillary glycaemia reading was proposed. Subjects with BG ≥ 110 mg/dL or CG at random ≥ 200 mg/dL were referred to the doctor for evaluation. Those who obtained a random result BG < 110 mg/dL or CG < 200 mg/dL were given SEFAC leaflets on diabetes and healthy lifestyles and recommended to have a BG reading after a year.

5. Registration sheets were filled out in duplicate. One copy was handed to the subject and the pharmacist kept the other. The data recorded were loaded into a form on the SEFAC website every year and in SEFAC *expert* (www.sefacexpert.org) in the last few years.

6. Expected result of the referral:

- Not diagnosed with diabetes: when the doctor sets out there is no DM.
- Prediabetes: when the doctor sets out there are abnormal glucose and/or HbA1c values corresponding to the state of prediabetes.
- Diagnosis of diabetes: when the doctor diagnoses DM.

Statistical processing

The statistical programme SPSS® 22.0 para Windows® was used for data analysis. Qualitative and quantitative data were expressed as percentages, and mean and standard deviation (SD), respectively; 95% confidence intervals (CI) were calculated. The chi-squared test or Fisher test was used for comparison of proportions or in the event of small samples, respectively. To compare means the student-*t* test was used for variables following a normal distribution (Kolmogorov Test with Lilliefors corrections) and U-Mann-Whitney or nonparametric tests Wilcoxon test for variables without a normal distribution. Correlations were determined by means of Pearson *r* or Spearman Rho according to whether or not they were parametric variables. Statistical significance was set at $P < 0.05$. Unconditional logistic regression analysis was performed with the variables that turned out to be significant during univariate analysis to estimate the independent contribution of each variable to the existence of a high risk of diabetes (≥ 15 points).

Ethics considerations

Each annual study was approved by a Clinical Research Ethics Committee (CREC). All studies were performed in accordance with rules of Good Clinical Practice of the International Conference on Harmonization (ICH E6) for studies of this nature. All prevailing legal requirements were considered; in particular, the Declaration of Helsinki, CIOMS recommendations, Spanish laws 41/2002 of 14 November, on patient autonomy, Spanish law 14/2007 on biomedical research, Spanish Royal Decree (SRD) 1720/2007 of 21 December, SRD 1716/2011, SRD 1090/2015, rules of Good Clinical Practice (CPMP/

ICH/135/95), EU Regulation no. 2016/679 General Data Protection Regulation, etc.

Confidentiality of the information

Pharmacists complied with high level safety measures, which fulfilled that set out by the Spanish Data Protection Law for high level security files (Spanish Organic Law on Data Privacy).

Study data were processed anonymously and in an aggregate manner. They underwent a coding and dissociation process prior to notifying SEFAC, such that it was not possible to identify subjects.

Informed consent

Prior to taking part in the study, the collaborator pharmacist notified subjects in writing of the purpose and nature of the study, that they could leave at any time and requested their written informed consent.

RESULTS

A total of 1146 (191/year) pharmacists from the 17 Spanish Autonomous Communities took part in the study. A total of 12,402 Findrisc questionnaires (1520, 2802, 3522, 3144, 567 and 847 over the different years), were filled out with a mean of 10.7 (SD=4.1). Distribution by sex of the population studied was 8198 (66.1%) women and 4204 (33.9%) men. The remaining characteristics and the corresponding totals for each row, including the Findrisc questionnaire questions are shown in **Table 1**. We highlight that of the total, 8799 (70.9%) had BMI ≥ 25 Kg/m²; 7366 (59.4%) were taking antihypertensive medicines. A total of 6047 (48.8%) with high abdominal circumference and 5962 (48.0%) had a family history of diabetes.

The average number of medicines was 1.4 (SD=1.8) and 1.3 (SD=1.7) in women and men, respectively, $P=0.3510$.

The average score for the Findrisc questionnaire was 11.3 (SD=4.6): 11.5 (SD=5.0) and 11.1 (SD=4.2) in women and men, respectively. The difference was not statistically significant ($P=0.3104$). The number of individuals with high or very high risk (score in the Findrisc questionnaire ≥ 15) was 3107 (25.1%) (95%CI 24.1%–27.2%) for the total 12,402 surveyed.

Of the 3107 subjects with high/very high risk, 1762 were detected; 56.7% of these and 14.2% of the total sample, with glycaemia greater or equal to 110 mg/dL and, therefore, they were referred to the doctor. No results of the referral were received. By age brackets; 4.1% < 45 , 12.3% 45–54 years, 30.2% 55–64 years and 35.1% > 64 years ($P < 0.0001$).

The overall risk of the sample was 11.3 (SD=4.6), with 3007 (25.0%) subjects with high or very high risk; of which 1762 (58.6%) were referred to the doctor. The average time spent by pharmacists taking part in the surveys was 10.3 minutes (SD=5.3).

Table 1 Characteristics of the population studied in the years 2014, 2016–2018, 2020 and 2021

Variable	2014 n (% total)	2016 n (% total)	2017 n (% total)	2018 n (% total)	2020 n (% total)	2021 n (% total)	TOTAL n (% total)
Age							
<45	417 (27.4)	406 (14.5)	571 (16.2)	364 (11.6)	70 (12.4)	41 (4.8)	1869 (15.1)
45–54	349 (23.0)	714 (25.5)	737 (20.9)	871 (27.7)	150 (26.5)	229 (27.1)	3050 (24.6)
55–64	333 (21.9)	752 (26.8)	904 (25.6)	840 (26.7)	163 (28.7)	262 (30.9)	3254 (26.2)
>64	421 (27.7)	930 (33.2)	1310 (37.2)	1069 (34.0)	184 (32.4)	315 (37.2)	4229 (34.1)
Total	1520 (100.0)	2802 (100.0)	3522 (100.0)	3144 (100.0)	567 (100.0)	847 (100.0)	12402
BMI							
<25	457 (30.1)	723 (25.8)	993 (28.2)	950 (30.2)	203 (35.8)	277 (32.6)	3603 (29.1)
25–30	667 (43.8)	1292 (46.1)	1578 (44.8)	1421 (45.2)	229 (40.4)	358 (42.3)	5545 (44.7)
>30	396 (26.1)	787 (28.1)	951 (27.0)	773 (24.6)	135 (23.8)	212 (25.1)	3254 (26.2)
Total	1520 (100.0)	2802 (100.0)	3522 (100.0)	3144 (100.0)	567 (100.0)	847 (100.0)	12402
Waist circumference							
W: <80 M: <94	362 (23.8)	477 (17.0)	672 (19.1)	667 (21.2)	109 (19.2)	169 (20.0)	2456 (19.8)
W: 80–88 M: 94–102	495 (32.6)	874 (31.2)	1113 (31.6)	1045 (33.9)	151 (26.6)	221 (26.1)	3899 (31.4)
W: >88 M: >102	663 (43.6)	1451 (51.8)	1737 (49.3)	1432 (45.6)	307 (54.2)	457 (53.9)	6047 (48.8)
Total	1520 (100.0)	2802 (100.0)	3522 (100.0)	3144 (100.0)	567 (100.0)	847 (100.0)	12402
Exercise							
Yes	907 (59.7)	1714 (61.2)	2202 (62.5)	2085 (66.3)	364 (64.2)	590 (69.7)	7862 (63.4)
No	613 (40.3)	1088 (38.8)	1320 (37.5)	1059 (33.7)	203 (35.8)	257 (30.3)	4540 (36.6)
Total	1520 (100.0)	2802 (100.0)	3522 (100.0)	3144 (100.0)	567 (100.0)	847 (100.0)	12402
Eats fruit and vegetables							
Every day	1143 (75.3)	2130 (76.0)	2740 (77.8)	2455 (78.1)	190 (33.5)	652 (77.0)	9310 (75.1)
Not every day	377 (24.8)	672 (24.0)	782 (22.2)	689 (21.9)	377 (66.5)	195 (23.0)	3092 (24.9)
Total	1520 (100.0)	2802 (100.0)	3522 (100.0)	3144 (100.0)	567 (100.0)	847 (100.0)	12402
HBP medicines							
Yes	1027 (67.6)	1054 (37.6)	1342 (38.1)	1084 (34.5)	208 (36.7)	321 (37.9)	5036 (40.6)
No	493 (32.4)	1740 (62.4)	2180 (61.9)	2060 (65.5)	359 (63.3)	526 (62.1)	7366 (59.4)
Total	1520 (100.0)	2802 (100.0)	3522 (100.0)	3144 (100.0)	567 (100.0)	847 (100.0)	12402
Prior high glycaemia							
Yes	247 (16.2)	420 (15.0)	449 (12.8)	520 (16.5)	106 (18.7)	141 (16.7)	1883 (15.3)
No	1273 (83.8)	2382 (85.01)	3073 (87.3)	2624 (83.5)	461 (81.3)	706 (83.3)	10519 (84.8)
Total	1520 (100.0)	2802 (100.0)	3522 (100.0)	3144 (100.0)	567 (100.0)	847 (100.0)	12402
Family history							
No	755 (49.7)	1433 (51.1)	1913 (54.3)	1591 (50.6)	278 (49.0)	470 (55.5)	6440 (51.9)
2nd Degree	261 (17.1)	401 (14.3)	534 (15.2)	523 (16.6)	95 (16.8)	125 (14.8)	1939 (15.6)
1st Degree	504 (33.2)	968 (34.6)	1075 (30.5)	1030 (32.8)	194 (34.2)	252 (29.7)	4023 (32.4)
Total	1520 (100.0)	2802 (100.0)	3522 (100.0)	3144 (100.0)	567 (100.0)	847 (100.0)	12402
Smoker							
Yes	339 (22.3)	598 (21.3)	674 (19.1)	619 (19.7)	109 (19.2)	165 (19.4)	2504 (20.2)
No	1181 (77.7)	2204 (78.7)	2848 (80.9)	2525 (80.3)	458 (80.8)	682 (80.6)	9898 (79.8)
Total	1520 (100.0)	2802 (100.0)	3522 (100.0)	3144 (100.0)	567 (100.0)	847 (100.0)	12402

BMI: body mass index; W: women; M: men; HBP: hypertension.

Table 2 Total risk, risk stratification, intervention and average time spent on each case

Variable	2014 n (% group) (% total)	2016 n (% group) (% total)	2017 n (% group) (% total)	2018 n (% group) (% total)	2020 n (% group) (% total)	2021 n (% group) (% total)	TOTAL
CATEGORIZATION OF THE RISK							
Risk [m (SD)]	10.9 (5.1)	11.61 (4.7)	11.20 (4.6)	11.20 (4.6)	11.6 (4.8)	11.3 (4.6)	11.3 (4.6)
Very high >20	81 (5.3)	141 (5.0)	79 (2.2)	91 (2.9)	18 (3.1)	26 (3.1)	436 (3.5)
High 15-20	289 (19.0)	604 (21.6)	784 (22.3)	666 (21.2)	137 (24.2)	191 (22.5)	2671 (21.5)
Moderate 12-14	305 (20.1)	666 (23.8)	792 (22.5)	725 (23.1)	137 (24.2)	180 (21.3)	2805 (22.6)
Mild 8-11	441 (29.0)	865 (30.9)	1111 (31.5)	963 (30.6)	155 (27.3)	266 (31.4)	3801 (30.6)
Low <8	404 (26.6)	526 (18.8)	756 (21.5)	699 (22.2)	120 (21.2)	184 (21.7)	2689 (21.7)
Total	1520 (100.0)	2802 (100.0)	3522 (100.0)	3144 (100.0)	567 (100.0)	847 (100.0)	12402 (100.0)
INTERVENTION							
HE and F at 5 years ^a	1150 (75.7)	1671 (59.7)	1979 (59.2)	1625 (51.7)	411 (72.5)	529 (62.4)	7365 (59.4)
HE and CG at 1 year ^b	163 (10.7)	822 (29.3)	1156 (32.8)	955 (30.4)	19 (3.4)	160 (18.9)	3275 (26.4)
R to doctor and F ^c	207 (13.6)	309 (11.0)	387 (11.0)	564 (17.9)	137 (24.2)	158 (18.7)	1762 (14.2)
Total	1520 (100.0)	2802 (100.0)	3522 (100.0)	3144 (100.0)	567 (100.0)	847 (100.0)	12402 (100.0)
Time [min (SD)]	9.9 (5.1)	10.2 (5.0)	10.4 (5.6)	10.5 (5.1)	10.9 (5.3)	10.1 (5.2)	10.3 (5.3)

^a Health education (HS) and repetition of the Findrisc questionnaire (F) after five years.

^b Health education and repetition of capillary glycaemia (CG) after one year.

^c Referral to the doctor (R) and follow up (F) of the result of her evaluation.

The risk stratification according to the scores obtained in the total sample for each year is shown in **Table 2**. This table also shows the kind of intervention performed by the pharmacist for the action as a whole. All users taking part were given health education on diabetes, aimed at improving dietary habits. They were handed SEFAC training leaflets (**Figure 3**).

DISCUSSION

Population screening programmes in community pharmacies (18-23,25-32) and specifically those that detect people with a high to very high risk of having diabetes, enable referring these people to the health team; from whom they will receive, a diagnosis, as appropriate. Therefore, they enter the primary care circuit, in which the community pharmacist should be incorporated.

Limitations

In successive annual campaigns pharmacies from all Spanish autonomous communities took part. However, the sample is not representative of the national population, whereby results are only valid for the group of pharmacy users. Non- probabilistic or opportunistic sampling (mixed: systematic offer and demand) may lead to some bias, which we believe is offset by the size of the sample. During administration of the Findrisc questionnaire we have to

consider a possible over-evaluation by the subjects of her habits in regard to exercise and fruit and vegetables in her diet; whereby the actual risk result might be slightly higher than that obtained.

Against this backdrop, we highlight that we observed a clear increase in the percentage users who declare having performed exercise; from 59.7% in 2014 to 67.9% in 2021, which appears to objectively suggest a gradual increased awareness of its importance.

As for age of subjects, age ≥ 45 was set out initially in the procedure as one of the inclusion criteria. Nonetheless, the high number of users forced pharmacists to perform this on a certain number of subjects under this age, just as occurred in other studies (13,23); which again takes representativeness from our sample. However, this gradually went down over successive years. The incorporation of these users means a lower percentage of referrals to the doctor. However, it is interesting to observe that they were also performed at these ages because they were deemed necessary.

Demographic characteristics of the sample

The demographic characteristics of the sample are similar to those found in other studies performed in community pharmacies (20,23,33,34). More than 66% are women and more than 70% present overweight or obesity in all the years studied. These figures are higher than those estimated for the adult population in Spain (35) and in another study similar to ours (23). More than 80% have higher than

normal waist circumference values. A higher percentage of obesity was revealed in women and in men the percentage of overweight and waist circumference is higher. More than 60% declare performing at least 30 minutes exercise a day; and more than 75% declare eating fruit and/or vegetables every day; these data are maintained in all the years studied. However, as we have shown, these statements should be taken with caution. Women declare eating vegetables every day to a greater extent than men.

The mean number of smokers was 20.2%. Nonetheless, a trend towards continual reduction was observed from 22.3% in 2014 to 19.4% in 2021. Men declare smoking more than women.

The percentage of anti-hypertensive users (40.6%) was notable. However, we observed that except for the first year (2014) that was 67.6%, in the remaining years this was approximately 37%. We did not find an explanation for such a high deviation from the mean.

Almost half (48.0%) of users interviewed had a history of family members with diabetes. This percentage was similar for all years studied and in other studies (1,21,23).

Risk of diabetes

The mean Findrisc score detected was 11.3 (SD=4.6), with a minimum 10.9 (SD=5.1) and a maximum 11.6 (SD=4.8) in 2014 and 2016, respectively. Moreover, the categorization of risk as high/very high led to a total of 3007 people as a result (25.0%), which varied in the different campaigns from 24.1% in 2018 to 27.3% in 2020. In other Spanish studies we detected variations ranging from 19.5% of people with high/very high risk (36) to values that approximated those of our own study: 23.5% in the largest study performed in Spain (21) and 24.7% performed in another study also in Pontevedra in 2013 (18). This was in any case much higher than the figure 16.1% for the total 1194 surveyed for the first time in a Spanish community pharmacy in 2001, in the province of Pontevedra. The Diabetes Risk Test by the American Diabetes Association (ADA) (26) was used in this study.

The review by Waugh et al (10) in 2013, reports studies with different screening strategies, most using the Findrisc questionnaire. The Spanish Society for Diabetes (SED) in its consensus (37) recommends the use of the Findrisc questionnaire in individuals over 40 and sets $F \geq 15$ as cut-off. Some studies use other scores as cut-off and, therefore, for example in the Pizarra study (13) it is concluded that the best predictor of risk of incidence of DM2 is in subjects aged over 18 with $F \geq 9$ and basal glycaemia >100 mg/dL.

In various countries with the same cut-off, $F \geq 15$, from 9.6% of people at high/very high risk of having diabetes, to 45% (36,38-40) was detected. In our campaigns for these years, the average was 25.0%, from 24.1% to 27.3%.

However, we have to record that subjects were aged 18 and over. When in most studies age is over 45 and in some limited to <65 . Nonetheless, ruling out those users under 45, the average was 28.5%. in the study by Soriguer et al, of reference for having been performed on a Spanish population, the prevalence of high/very high risk was 14.1%, in a sample aged 18 to 65 (13); and in the study closest in time, also in Spain, the Detecta Sucre study (23) revealed 17.9% of people with high/very high risk.

It has been verified that risk is higher with age. From the point of view of efficiency, the cut-off would be 45.

For all six campaigns, the average number of people referred to the doctor was 14.2% (11.0% to 24.2%). These results are much higher than the closest study performed in Spain (29). Nonetheless, despite the effort to refer those users with a high-very high risk and abnormal glycaemia, the doctor's response was insignificant and unquantifiable. This was not so in the DEDIPO study (21) in which of the 384 (9.1%) subjects referred to the doctor, the Galician Health Service sent information on 83: 28 (33.7%) diagnosed with diabetes (3.1% of the sample) and 26 (31.3%) prediabetes (2.8% of the sample); extrapolating in our study we would have, of the 12,402 subjects screened, 384 new cases of hidden diabetes. Therefore, although the sought after information was not obtained, we can be sure that these annual campaigns entail a significant contribution of SEFAC partner and collaborator pharmacists to the diagnosis of hidden diabetes. We must consider, nonetheless, that the procedure does not consider a follow up mechanism of the results of pharmacist interventions, whereby it would be recommendable for future editions of the campaign, to set out an effective protocol for evaluation of the outcome of educational interprofessional recommendations and communication with the doctor to whom they are referred.

Although costs are not quantified in these studies, approximately 10 minutes and little use of material mean that these kinds of programmes are quite cheap and would be very efficient for the health administrations should they be incorporated as agreed professional pharmaceutical services, as revealed in the DEDIPO study (20).

The taking part in these studies of pharmacies from all Spanish autonomous communities and the high/very high percentage of subjects with a high/very high risk of having diabetes referred to their family doctor with the aim of evaluating the results obtained, support the collaboration of the pharmacy to perform this kind of screening. As this provides an early diagnosis of the situation of abnormal glucose metabolism. The minimal educational intervention performed with all subjects is a call to attention over the importance of attaining and maintaining a healthy lifestyle aimed to prevent metabolic diseases.

CONCLUSIONS

Successive annual campaigns have enabled access to a high number of people who received health education on diabetes.

A quarter of those surveyed had a high/very high risk and one in seven were referred to a doctor.

Three quarters of subjects with a low to moderate risk, received specific health education tailored to their risk level.

BMI, blood pressure, abdominal circumference and family history of diabetes, in this order, were the most prevalent risk factors in the population studied.

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