Prediabetes and Nurse Intervention. Does Health Education Prevent Negative Evolution? Pilot Test

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Abstract

Objective: Prediabetes is associated with an increased risk of developing DM2 and suffering from cardiovascular complications. Progression is avoidable, and it is possible to turn from a prediabetic state to normality. The objective is to know the risk of prediabetes in the adult population within the Palleter Health Center and to use Health Education to improve the quality of life of people at risk. Method: It is structured in three phases: Pilot phase: its main objective is to collect cases; Screening phase: completion of the FINDRISC questionnaire; Community Intervention Phase: through Group Health Education.

Results: 47 people participated (40% men and 60% women). 10.6% of the participants were under 45 years old, 14.9% between 45 - 54 years old, 27.6% between 55 - 64 years old and 46.8% were older than 64 years old. 100% of the participants have a BMI > 30 kg / m2. 53.2% did not carry out any type of physical activity. 68.1% of the participants had ever been prescribed anti-hypertensive drugs. 53% had never had high blood glucose levels detected. 76.6% consume fruits, vegetables and vegetables on a daily basis. Regarding a family history diagnosed with diabetes, 44.62% have a history of parents, siblings or children.

Conclusions: Screening with the findrisck test is feasible in nursing consultations as part of the EpS and community health work. Its implementation at the SNS level can mean a great development of Community health.

Keywords: Health Education; Prediabetic State; Diabetes Mellitus; Pilot Test; Healthy Lifestyle

Introduction

Diabetes Mellitus (DM) is one of the most prevalent chronic diseases, which might trigger the appearance of chronic complications, cardiovascular mortality and reduces the life expectancy of people who suffer from it [1].

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In Spain, the Di@bet.es study carried out in 2016 - 17, estimates the incidence of DM2 in the adult population at 11.58 cases per 1,000 person-years, being higher in men than in women. Based on this incidence, in a year 386,003 people develop metabolic disease throughout the country [2]. In the Valencian Community (CV), the prevalence of diagnosed diabetes is 7.8%, but at least 6% more than the population have type 2 DM and are unaware of it, so a figure of 14% could be acceptable as the prevalence of DM2 in the QOL [1].

The concept of prediabetes is defined as the presence of an altered basal glycemia (GBA), an intolerance to glucose (after two hours of the oral glucose tolerance test (TTOG) of 75 g), or both circumstances at the same time. Prediabetes is associated with an increased risk of developing DM2 and suffering from cardiovascular complications, but the progression can be prevented, and it is possible to go back from a prediabetic state to normality [3]. In a study done in Borriana (CV), it was detected that prevalence of prediabetes was around 14% [4].

In order to improve the identification of individuals at risk of suffering from prediabetes or diabetes without the need to systematically submit them to laboratory tests (TTOG, GB ...), a multitude of validation studies of clinical prediction rules have been published. The FIN-DRISC questionnaire is considered the one with the best diagnostic performance. It is based on the results on the incidence of DM2 during the prospective follow-up of a population-based cohort for 10 years, and was carried out to identify subjects at high risk of developing diabetes in the future. It is a self-administered 10-item questionnaire that allows the detection of people in the general population with high risk and in routine clinical practice in order to subsequently identify undetected DM2, glucose intolerance and metabolic syndrome. It is a diagnostic alternative, since TTOG is considered an invasive, expensive and long-lasting screening procedure [3,5,6].

Obesity, high blood pressure, and dyslipidemia are associated with both diabetes and prediabetes. In these patients we must control weight, dyslipidaemia, blood pressure, cardiovascular risk (questionnaire score), smoking, nutritional habits and physical activity [6].

We consider it is important to carry out our work in response to the high prevalence of diabetes throughout the world and the increasing demand for resources it requires. To face this serious public health problem, early detection and treatment, with changes in lifestyle, are key and highly cost-effective interventions that can prevent the onset of DM2. These prevention strategies empower the Nurse to hold the patient responsible for her care, thus highlighting the role of Primary and Community Care nursing in the control and monitoring of the chronic patient.

The pilot test (PP) is part of the Methodological Framework for Research Projects. Its objective is to use a small sample, with identical characteristics and in a similar situation to that of the population to be studied to test the methodological design. These results will be subject to expert judgment to validate the test, and can also serve to clarify doubts about the relevance of the initial hypothesis of the study [7].

Diabetes nurses in health centers represent the previous link to the Advanced Practice Nurse in hospital institutions. Its responsabilities are: to serve a group of people who share a health-disease situation. The primary care team is responsible to raise awareness on diabetes in order to develop attitudes and communication skills that facilitate health education and obtain the ability to perform advanced care and clinical management. All this is done from the experience and critical reflection, which endows leadership skills in teamwork [8].

The purpose of our work is to know the risk of pre-diabetes in the adult population belonging to the Palleter Health Center of the Department of Castelló, and to use Health Education (EpS) to improve the quality of life of people at risk.

The specific objectives are as per below:

- Analyze unhealthy eating habits and behaviors.

- Evaluate fitness patient levels and help them improve it.

- Verify the correlation between the presence of healthy habits and lifestyles with the decrease in the risk of pre-diabetes.

- Verify if there is a relationship between prediabetic patients and non-pathological elevated basal blood glucose levels.

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- Check the methodological viability of the pilot study, to develop the appropriate methodology that allows a multicenter study to be executed in all the health centers of the Castelló department (CV) that have assigned Internal Resident Nurses (EIR), family and community nursing.

- Training of departmental EIRs in the implementation of a multicenter study and in the practice of group education as one of the bases of community health.

Method

Study design

Pilot, descriptive, observational and cross-sectional study that after the necessary adjustments will allow a multicenter study to be implemented.

Population and sample

Multicenter study: Given that the population of the Health Centers studied with an age between 45 and 75 years is 58,662, and considering the prevalence of obesity (BMI ≥ 30) in 21.6%, the population eligible for study, would be 12,670 inhabitants. Of these, the prevalence of Type I and II Diabetes Mellitus (0.3 and 14% respectively) in the Valencian Community should be discounted, which would mean a target population of 10,850 inhabitants, for a confidence level 95% and a precision of 3%. Assuming a 15% loss, we would need a sample of 234 people to carry out the multicenter study.

Pilot Study: The CS Palleter Diabetes reference nurse (23,000 inhabitants in the area) assists a quota of 1,500 Inhabitants. Based on the available bibliography, a sample of 40 people would be sufficient for our objectives [8].

Inclusion criteria

Adults between 45 and 75 years of age, who attend the nursing consultation for any reason at the request of the diabetes referent, not diagnosed as diabetic, with a previous 6-month analytical control (basal glucose) with an index on the Findrisc scale > 12.

Patients who agree to undergo the screening test and to attend group education, and subsequent follow-up, after signing an informed consent, to participate in the study.

Exclusion criteria

Those with Findrisc < 12 and Body Mass Index (BMI) < 30 will be excluded. And all those who are diagnosed with diabetes, or who in the screening phase have basal blood glucose > 125 mg / dl, or do not meet the criteria inclusion, or do not sign the informed consent.

Sampling method

Sample selection is done by stratification random sampling.

Research variables

The study variables are: age, BMI (kg/m^2), abdominal circumference (measured at the level of the navel), have at least 30 minutes of physical activity a day, frequency of consumption of fruits, vegetables and vegetables, previous prescription of medication antihypertensive, detection at some point of high blood glucose levels and diagnoses of Diabetes Mellitus in the family.

Data collect

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Data collection will be carried out in the nursing consultation

Pilot phase

A screening was executed at the CS Palleter, for a month, with the aim of collecting 40 cases, and the purpose of detecting possible methodological or design flaws. The data collection in its electronic format and the transcription of the same in the computerized medical records of the patients in the SIA-Abucasis program was tested.

Group talks were rehearsed to obtain a unification of teaching based on the reactions and preferences of the attendees. Explanation times and content can be adjusted.

It was determined which were the exercise options led by nurses and / or Nursing Auxiliary Care Technicians (TCAE), which are better adapted to the needs of the different population groups participating in the study.

With the results obtained in the pilot, if pertinent, the necessary modifications will be made in the initial methodology of the study.

Screening phase: by completing a validated FINDRISC questionnaire (Annex I). It is made up of 10 questions and structured in five blocks.

The surveys will be answered individually and voluntarily in the nursing consultation.

The nurse will guard the informed consent and will reflect in the computerized medical history the result of the test and its inclusion in the study.

Community nursing intervention phase: through Health Education (EpS) and follow-up in nursing consultations.

EpS is organized as group education with three different objectives

1º Inform about the risks of pre-diabetes and healthy lifestyle habits that can prevent the development of the disease.

2nd Provide attendees with the necessary knowledge about the Mediterranean diet and the available resources and skills they must acquire to avoid being overweight.

3rd Promote healthy lifestyles with training in physical exercise and carrying out walks on foot, and / or physical exercise in the gym of the participating health centers, led by a collaborating nurse or TCAE.

Follow-up will be done every three months in order to control BMI and adherence to the Mediterranean diet using a questionnaire Based on the Predimed test, which is a brief dietary assessment instrument consisting of a set of 14 short questions whose evaluation aims to offer information on your adherence to the Mediterranean Diet pattern (Annex II).

For the pilot study, only the first follow-up will be taken into account to assess the adherence of the study participants and make the necessary methodological modifications.

The duration of data collection is from April to June 2019. (The multicenter study that began in September 2019 and was to last until September 2020, had to be suspended due to the state of alarm due to the COVID19 pandemic).

Analysis of data

The questionnaires were subsequently emptied into a Spreadsheet in the EXCEL 2010 Program and their subsequent analysis using the SPSS program in the basic descriptive biostatistics package. Likewise, the tables were made in the EXCEL program.

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Ethical aspects

The Clinical Research Commission (CIC) of the Castellón Health Department has approved the study project "Prediabetes and nursing intervention: Does health education prevent negative evolution?" with reference PIC 15-2019. This pilot study is part of this project. All participants in the pilot study signed the informed consent.

Results

Data collection was carried out on those who met the inclusion criteria, using the two self-administered questionnaires (Findrisc and Adherence to the Mediterranean diet) that were completed by the nurse during the on-demand consultation. The pilot was achieved between the months of April to June 2019.

47 people participated, of which 19 (40%) were men and 28 (60%) were women. All belonged to the Palleter Health Center in Castellón de la Plana and were captured by the leading diabetes nurse.
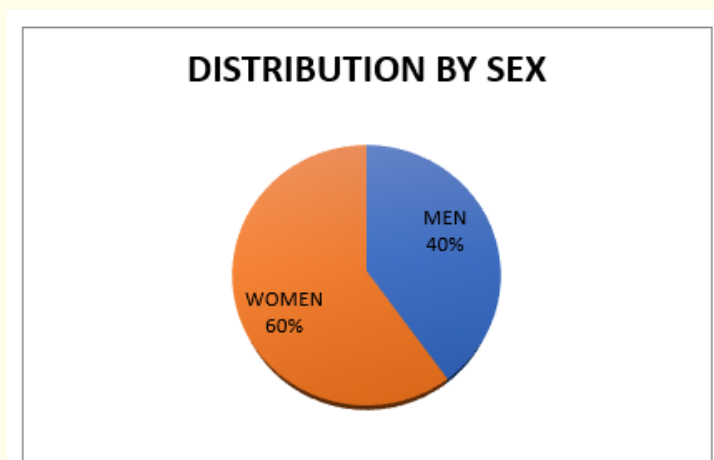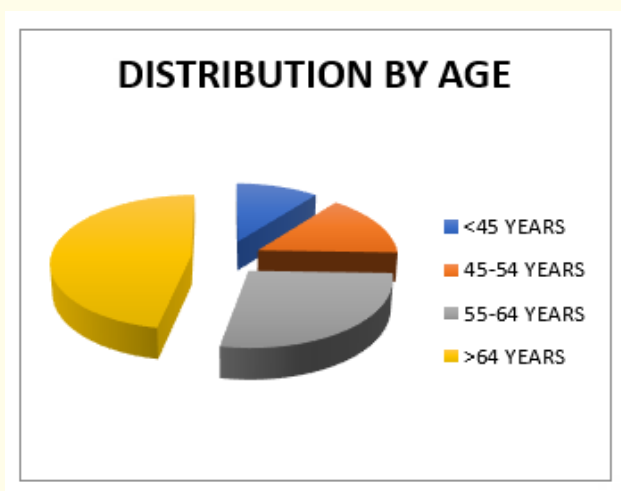

Figure 1: *Distribution by sex.*

Figure 2: *Distribution by age.*

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Of the participants 5 (10.6%) were under 45 years old, 7 (14.9%) between 45 - 54 years old, 13 (27.6%) between 55 - 64 years old and 22 (46.8%) people were older than 64 years.

100% of the participants have a BMI > 30Kg / m^2 and an abdominal girth greater than 88 cm in the case of women and 102 in the case of men.

46.8% performed at least 30 minutes of physical activity, of which 54.5% were women and 45.5 were men. 53.2% did not perform any type of physical activity, of which 36% were men and 64% were women.
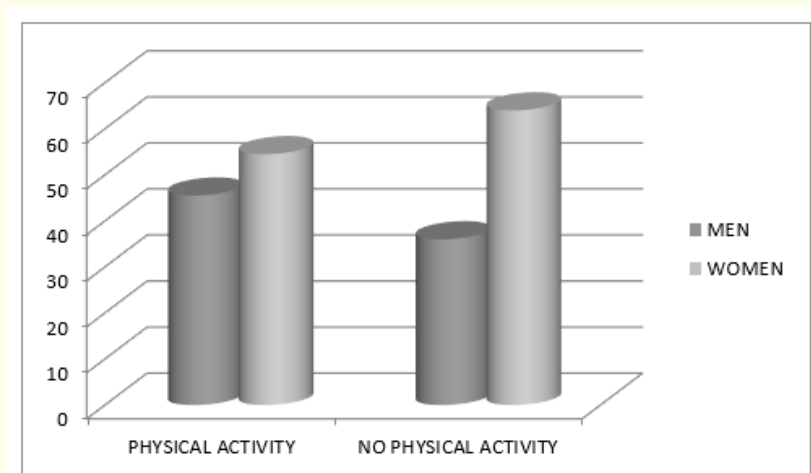

Figure 3: *Performing physical activity.*

68.1% had ever been prescribed anti-hypertensive drugs (62.5% were women and 37.5% were men), compared to 31.9% who had never been prescribed this type of drug, all of them were women.

46.8% (54.5% men and 45.5 women) had ever detected high blood glucose levels, whereas 53.2% had never detected any high value (28% men and 72% women).

Regarding the consumption of fruits, vegetables and vegetables, 76.6% (33.3% men and 66.7% women) consume this type of food daily and 23.4% (69.7% men and 30.3% women) consume consumes less frequently or does not consume them.

Regarding the family history diagnosed with diabetes, 49% (56.5 men and 43.5% women) have no family history, 6.38% (100% women) have a history of uncles or first cousins (but no parents, siblings or children) and 44.62% (28.6 men and 71.4% women) have a history of parents, siblings or children.

Regarding the evaluation with the Findrisc questionnaire, 21.3% (50% women and 50% men) have a score between 12 and 14 assuming a moderate risk, 57.4% (66.6% women and 33.4% men) presents between 15 and 20 points having a high risk and 21.3% have more than 20 points having a very high risk (70% women and 30% men).
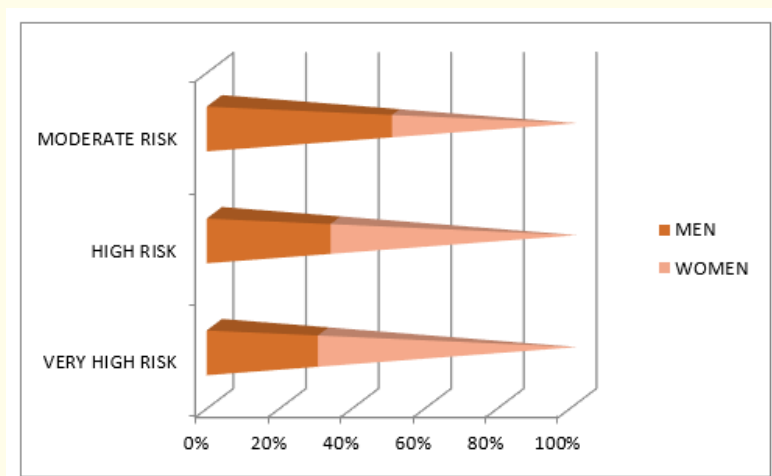

Figure 4: *Findrisc questionnaire score.*

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Of all the patients captured in the pilot screening, adherence to the EpS was obtained in 76%. 21.12% did not attend the initial meeting, and 2.12% canceled because they already had a diagnosis of diabetes.

In several meetings with the researchers and collaborators, and based on the difficulties detected, the different methodological modifications were outlined until a consensus was reached that allowed the implementation of the pilot study:

- Elimination of the initial assumption of screening from the age of 18.

- Unification of criteria in the use of questionnaires: only those previously validated.

- Establishment of an index on the Findrisc scale > 12, as an inclusion criterion, for having detected that elderly patients with a genetic history of DM2, without other risks, exceeded the initial cut of Findrisck >10.

- Organization of groups for group education: a maximum of 10 people per group was established, since the initial groups of 20 were ungovernable due to the continuous deviations from the topic incurred with the questions of the patients.

- Segregation of exercise groups according to the age and physical abilities of each patient.

- The organization of the controls in the consultation was established, in conjunction with the ATTs, who were in charge of anthropometric measurements. The nurse measured the rest of the constants and performed the follow-up questionnaires. All data collected were recorded in the computerized medical record. (Abucassis).

- To achieve adherence to the program, successive quarterly consultations were established. The final evaluation was given one year after receiving the group education.

Discussion

The pilot study has exceeded the collection of anticipated cases. To observe the viability of the project, it was the CS Palleter diabetes nurse who made the recruitment, and the rest of the team made the group education and follow-up in the nursing consultations, with the participation of both nurses and technicians. care aides. The bibliography consulted has been used in different studies, both as a prediction system6, and associated with other diagnostic hypotheses, such as the determination of glycosylated hemoglobin together with the questionnaire to detect which was the best predictive method [9-24].

Looking for a parallel with the study proposed by this research group, we can compare ourselves with the one carried out by Fornos-Perez, Andrés-Rodriguez., *et al*, 10 published in 2015, which did screening in pharmacies. The problem of this study, unlike ours, which will be based on the determination of basal glucose in the laboratory, lies in the use of digital determination of postprandial glucose, and, much more important, the choice of the population group, based on age 18, with the bias that the appearance of type 1 DM can produce in young people, and that would not be detected by the questionnaire, since it was designed for DM2. The studies that have been done in primary care have few samples, much lower than our objective, and, in certain cases, they were not associated with subsequent EpS or monitoring of evolution.

Our study presents the novelty of looking for the possible link between the risk results in the questionnaire with altered basal glucose, as well as trying to establish a relationship between adherence to the Mediterranean diet and healthy lifestyle habits, with a posteriori decrease of the risk detected with the Findrisc questionnaire.

In the bibliography consulted, we have not found alternative developments to solve this need or problem, although the need to link the screening with the questionnaire with the subsequent EpS is mentioned, in order to obtain optimal results that justify the need for screening.

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Vicente-Sánchez B, Vicente-Peña E, Altuna-Delgado A, Costa-Cruz M.18 point out in their study: "The first real possibility of preventing diabetes and its complications is to intervene on the set of risk factors through modification of lifestyles. Several studies have already demonstrated the efficacy of these interventions to reduce the incidence of diabetes under well-structured conditions of application. There is enough evidence in the literature to justify the indication of physical exercise as an effective therapeutic tool in the prevention and treatment of DM2. Different intervention studies have shown that in patients with impaired glucose tolerance, diet and exercise programs reduce the risk of developing DM2 by 60%."

A future line of research could be to complete the multicenter study (paused by the Covid 19 pandemic) and after its completion implement the follow-up of the cases detected over the next 10/15 years. Another line may be to study the effect of confinement by the state of alarm due to COVID 19, in patients already screened and who had received dietary hygiene instructions through the EpS.

Conclusions

It is feasible to carry out the multicenter study using the methodology developed.

Screening with the findrisc test is feasible in nursing consultations as part of the EpS and community health work.

Adherence to group talks, and subsequent control and follow-up in nursing consultations, makes this option viable because it is a consequent cost. Its implementation at the SNS level can mean a great development of Community health.

Funding

Conflict of Interest

Authors and/or contributors do not declareconflict of interest.

Acknowledgments

Attachments

Figure A

Prediabetes and Nurse Intervention. Does Health Education Prevent Negative Evolution? Pilot Test
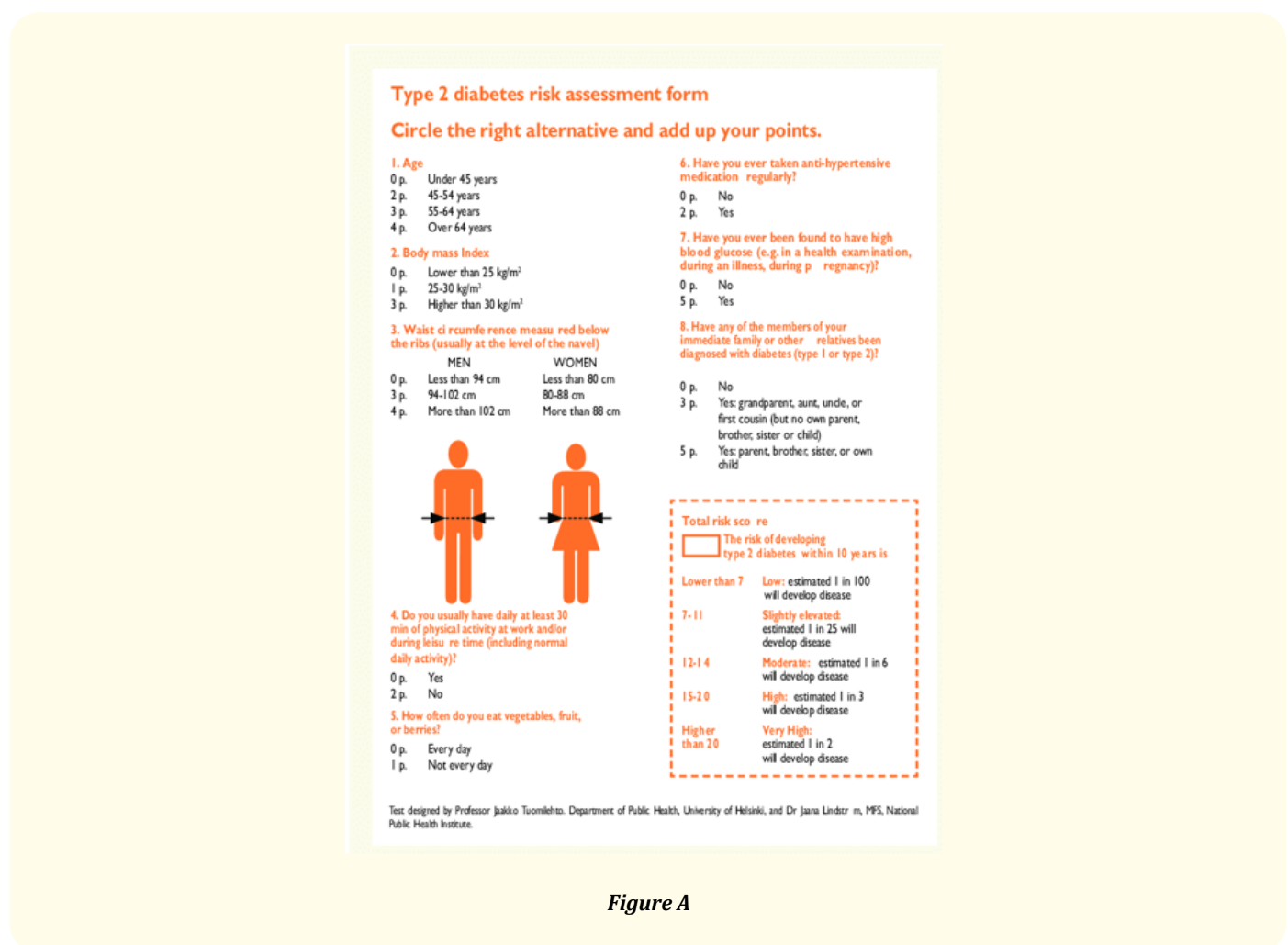
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Questions	Criteria for 1 point
1. Do you use olive oil as main culinary fat?	Yes
2. How much olive oil do you consume in a given day (including oil used for frying, salads, out-of-house meals, etc.)?	≥4 tbsp
3. How many vegetable servings do you consume per day? (1 serving : 200 g [consider side dishes as half a serving])	≥2 (≥1 portion raw or as a salad)
4. How many fruit units (including natural fruit juices) do you consume per day?	≥3
5. How many servings of red meat, hamburger, or meat products (ham, sausage, etc.) do you consume per day? (1 serving: 100–150 g)	<1
6. How many servings of butter, margarine, or cream do you consume per day? (1 serving: 12 g)	<1
7. How many sweet or carbonated beverages do you drink per day?	<1
8. How much wine do you drink per week?	≥7 glasses
9. How many servings of legumes do you consume per week? (1 serving : 150 g)	≥3
10. How many servings of fish or shellfish do you consume per week? (1 serving 100–150 g of fish or 4–5 units or 200 g of shellfish)	≥3
11. How many times per week do you consume commercial sweets or pastries (not homemade), such as cakes, cookies, biscuits, or custard?	<3
12. How many servings of nuts (including peanuts) do you consume per week? (1 serving 30 g)	≥3
13. Do you preferentially consume chicken, turkey, or rabbit meat instead of veal, pork, hamburger, or sausage?	Yes
14. How many times per week do you consume vegetables, pasta, rice, or other dishes seasoned with sofrito (sauce made with tomato and onion, leek, or garlic and simmered with olive oil)?	≥2

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Figure B

Findrisc scale

Source: Lindström J, Tuomilehto J. The Diabetes Risk Score: A Practical Tool to Predict Type 2 Diabetes Risk. Diabetes Care [Internet] 2003;26(3):725-31. Retrieved from: https://care.diabetesjournals.org/content/26/3/725.long.

Questionnaire of adherence to the mediterranean diet

Total score

< 9 low adhesion

>= 9 good adhesion.

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