Risk calculation of developing type 2 diabetes in Libyan adults

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ABSTRACT

The aim of this study was to identify nationals at risk of developing type 2 diabetes within the next 10 years in some areas across Tripoli Health Authority in Libya.

In this questionnaire-based survey, a total of 400 Libyan nationals of both genders were randomly selected from seven areas across the central area of Tripoli Health Authority (Soug El-Juma, Zawet Dahmani, Al-Furnaj, Ain Zara, Al-Madena Centre, Al-Dhahra Centre, and Noflean).

All participants approached (400) completed the study and responded to the items of the survey. Based on a modified Finnish Type 2 Diabetes Risk Score test (FINDRISC), 129 (32.3%) were categorised as either at moderate or at high/very high risk of developing diabetes within the next 10 years of life. Among the 129 participants at risk, body mass index was >25kg/m^2 in 125 (96.9%) and waist circumferences were high (>88cm for females; >102cm for males) in almost 45% of the women and 22% of the men.

We found that in the sample studied the risk of developing diabetes was clear, and there is no doubt that interventions to reduce such risk are a priority rather than a need. Diabetes has a great impact on the health of the nation and also on the future resources of the country in managing the disease and its complications; a health education/health campaign could be one good answer to tackle the problem. Copyright © 2009 John Wiley & Sons.

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KEY WORDS

Libya; modified FINDRISC; type 2 diabetes risk score; diabetes screening; questionnaire survey

Introduction

Diabetes is one of the most significant health problems that challenge health care providers in both primary and secondary care sectors throughout the world, for three important reasons: firstly, the large number of affected individuals; secondly, the long-term vascular complications that account for the vast majority of morbidity and mortality as well as health care utilisation; and, thirdly, the cost.[1,2] It has been estimated that around 246 million people were suffering from diabetes around the world in the year 2007.[3] This figure is expected to rise to 380 million by 2025 – an increase of almost 55% over the figure for 2007.[3,4]

In developing countries, the situation may be worse and may explain the high worldwide prevalence, as third world people increasingly adopt the western lifestyle with its accompanying increase in obesity and decrease in physical activity.[5]

The prevalence of diabetes mellitus in Libya is not precisely known, although it has been estimated to be as high as 14.1%.[6] Furthermore, the World Health Organization (WHO) has reported that there were 88 000 diabetic people in Libya in the year 2000. This prevalence is estimated to reach 245 000 by the year 2030.[7] It seems necessary, with such a 2.8-fold prevalence increase, to develop interventions directed at the problem – otherwise 50% of the population will either have overt diabetes or be strongly predisposed to develop it within the coming few years. This increase, in most of the Arab countries, is mainly due to changes in lifestyle and the increasing incidence of obesity.[8] Another factor behind the high incidence in the Arab world is the consanguinity (blood-related marriage) which makes the population genetically at higher risk than most other populations in the world.[4]

The results of many trials have clearly shown that mass population screening programmes, based on age, are both costly and inefficient.[9,10] It has been suggested, in one particular study, that any screening programme should target individuals with three or four risk factors for diabetes.[11] On the other hand, a risk factor scoring method for screening of undiagnosed diabetes in the general population has been developed and extensively used, decreasing the number of subsequent tests – thereby possibly minimising the economic and personal costs of the screening strategy.[12,13] However, such a system of risk factor scoring has never been tried in Libya. In addition, health authorities in the Arab countries have never considered pharmacist involvement in the

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screening programmes for certain target populations. Pharmacists are at a regular point of contact with people who are at high risk of developing diabetes, and can play a central role in improved medicine management by identifying such individuals.

Against the above background, it was decided to undertake a study with the aim of identifying people at risk of type 2 diabetes within the next 10 years in some areas within Tripoli Health Authority, using a version of the Finnish Type 2 Diabetes Risk Score test (modified FINDRISC).[14]

Method

The method adopted for screening for people at high risk was originally developed and used in a comparable study conducted in Finland.[14] The Finnish Type 2 Diabetes Risk Score test (FINDRISC)[14] is designed to measure a person's probability of developing type 2 diabetes over the following 10 years. The modified FINDRISC questionnaire which we used was produced in English (Appendix I) and also in Arabic in order to suit the Libyan population.

A total of 400 Libyan nationals of both genders residing in different areas across Tripoli Health Authority were directly approached and invited to take part in the study. During personal interviews, comprehensive information about the nature of the study was supplied to each person and, once they fully understood the implications of the study, they were asked if they would complete the questionnaire. Participants were assured that their responses would be treated confidentially and that their participation in the study would not affect their job position.

A structured interview of 15–30 minutes was conducted with each of those who agreed to participate. Individuals were asked to provide information about their gender, body mass index (BMI [kg/m^2]), waist circumference, physical activity, eating habits, and personal and family disease history (hypertension and diabetes). The study was carried out over a four-month period (April to July 2008).

Table 1. Age, body weight and BMI for all participants (n=400)

	Male mean±SD (range)	Female mean±SD (range)
Age (years)	38.49±10.04 (20–70)	40.36±9.40 (21–73)
Body weight (kg)	82.65±12.41 (55–130)	75.21±17.46 (45–175)
BMI (kg/m^2)	28.08±4.01 (20–40)	28.57±6.88 (18–75)

Table 2. Total risk score of developing type 2 diabetes within the next 10 years

Risk category	Description	n (%)
Low/slight	Estimated 1 in 25 will develop the disease	271 (67.8)
Moderate	Estimated 1 in 6 will develop the disease	80 (20)
High/very high	Estimated 1 in 3 will develop the disease	49 (12.3)

The survey was scored according to the instructions published elsewhere.[14] The survey was encoded and the data were analysed using the Statistical Package for Social Sciences (SPSS) Version 14.0. The relevant responses were reduced to three categories of increased risk (low/slight, moderate and high/very high) so that the findings would be more presentable. In addition, relative proportions were calculated for categorical variables.

Results

The 400 randomly selected Libyan nationals were from seven areas across the central area of Tripoli Health Authority (Soug El-Juma, Zawet Dahmani, Al-Furnaj, Ain Zara, Al-Madena Centre, Al-Dhahra Centre, and Noflean). All 400 accepted to take part in the study, and were interviewed and evaluated by the researchers. All participants approached completed the study and responded to the items in the modified FINDRISC used for this particular study. Half of the sample (200, 50%) were female and 374 (93.5%) of the total sample were <54 years of age. The mean age of the pooled sample was 39.4±9.8 (20–73). The mean age, weight and BMI for both male and female participants are summarised in Table 1.

Almost three-quarters (74%) of the sample studied were classified as either overweight or obese (BMI >25kg/m^2). Waist circumferences were high (>88cm for females; >102cm for males) in 82 (41%) of the 200 females, and in 38 (19%) of the 200 males. Irregular fruit and vegetable intake was reported by 146 (37%) of all 400 study participants.

In all, 273 (68.3%) of the 400 participants were reported to have a family history of diabetes and more than half of the sample (229 [57.3%]) were classified as being physically inactive. Furthermore, almost 10% of the 400 participants reported that they use at least one medication for the management of different vascular diseases. Hypertension was the main disease and episodes of high blood glucose levels were reported by 4% of the participants throughout the study period.

The probability of developing type 2 diabetes within the coming 10 years was calculated for the 400 study participants according to the scoring system of the Finnish Type 2 Diabetes Risk Score (modified FINDRISC).[14] A total of 129 (32.3%) of the sample pooled were categorised as either at moderate or at high/very high risk of developing diabetes within the next 10 years of life. The risk description and the risk score proportion and percentage of the 400 study participants are shown in Table 2 and Figure 1a. Figures 1b and 1c present the risk scores by gender.

Table 3 summarises the prevalence of risk factors in the 129 participants at either moderate or high/very high risk of developing diabetes within the next 10 years of life.

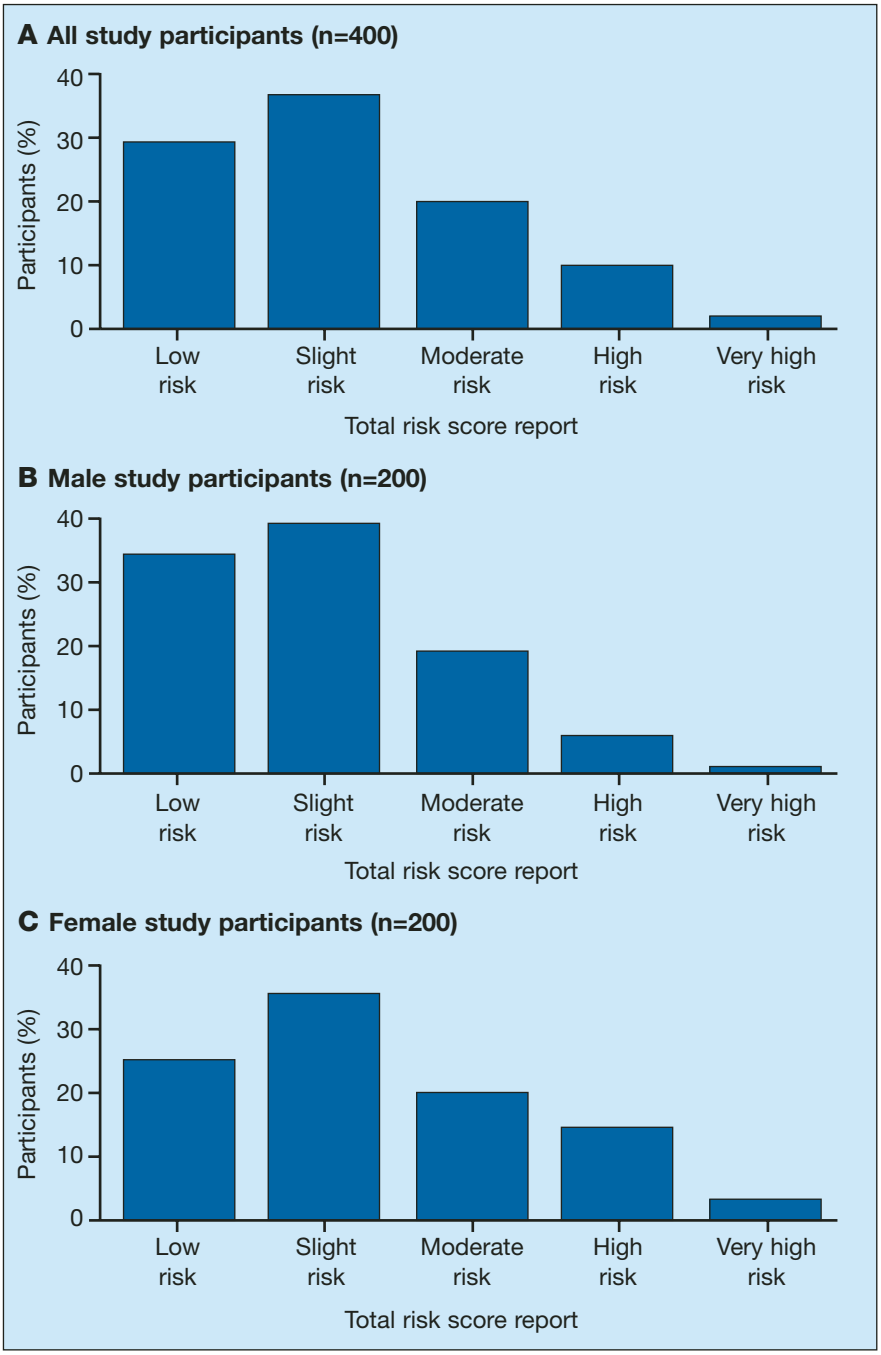
Discussion

Despite the encouragement by health authority organisations around the world for early detection of the disease, 30–50% of people at high risk of developing diabetes are still not identified at any one time.[11] The incidence of diabetes is progressively increasing worldwide; furthermore, many people in Libya and other similar Arab countries have limited resources and are associated with a high predisposition to the risk of developing type 2 diabetes – possibly due to the effort:reward imbalance which puts them under stressful conditions.[15] Consequently, this study aimed to screen randomly selected Libyan nationals focusing on risk factors for type 2 diabetes.

Both non-modifiable and modifiable risk factors for diabetes were identified in the sample pooled. While focusing on participants with either a moderate or a high/very high tendency towards developing diabetes, the results of our study did show that 273 (68.3%) of all study participants have a positive family history. This is a very important non-modifiable risk factor, particularly among those with first-degree relatives with diabetes. It has been previously reported that the decline in glucose tolerance over time in such individuals is strongly related to loss of beta-cell function, thus they are at risk of developing hyperglycaemia.[16] Furthermore, increased BMI and central obesity have been found to be very good predictors of diabetes that results from insulin resistance.[17] In view of such facts and our observation that 229 (57.3%) of the people interviewed were physically inactive, it can be contemplated that individuals in the sample studied are at high risk of developing diabetes and some interventions with the aim of reducing such risk are a priority rather than a need. It is worth noting that interventions based on lifestyle changes have been proved useful in decreasing the risk of developing diabetes by 56%.[18]

Other risk factors include hypertension and a personal history of elevated blood glucose levels and these were also positive in almost 10% and 4% of the study participants, respectively. The strong relationship between hypertension, elevated blood glucose levels and the development of diabetes[19] cannot be ignored.

Figure 1. Risk scores for developing type 2 diabetes within the next 10 years for all study participants (A), and by gender (B and C)



However, it is important to recognise that while one risk factor will not cause the disease, it may substantially increase health risks. Therefore, identification and screening of individuals with multiple risk factors strongly underpin the urgent need for interventions to prevent and/or reduce the incidence of type 2 diabetes, and decrease the incidence of both its microvascular and macrovascular complications.[20]

The Central Administration for Health Education and Primary Health Care in the Ministry of Health in the UAE has recently recommended carrying out a health education programme and this was launched under the name of 'Care is the Right of All'.[21] In addition, the WHO recommended the introduction of healthy lifestyle programmes in

Table 3. The prevalence of risk factors in the 129 participants at moderate or high/very high risk of developing diabetes within their next 10 years of life

Risk factor	n (%)
Age >45 years	65 (50.39)
BMI >25 kg/m^2	125 (96.99)
Waist circumference:	
>88cm for females	58 (44.96)
>102cm for males	28 (21.71)
Physical activity <30 minutes/day	103 (79.85)
Irregular fruit and vegetable intake	61 (47.29)
Usage of antihypertensive agent	27 (20.93)
Episode of high blood glucose	14 (10.85)
Positive family history of diabetes	120 (93.02)

schools in the Eastern Mediterranean region including the Gulf area, which focus on prevention of risk factors that predispose to non-communicable diseases in later life.[22] Considering the results presented here and the fact that both diabetes and hypertension are now very common in Libya, we find it tempting to suggest that such a programme that is started and tested in one of the Arabic countries, as recommended by the WHO, should be launched without delay in Libya. One of the possible ways in which to increase the rate of impact of such a programme is to start with primary and secondary school teachers, encouraging them to take part in health education of the nation. Teachers have a great influence on their pupils' behaviour; consequently, intervention may protect not only teachers but also schoolchildren and adolescents. Risk factor scoring methods including the one used in this study[14] are easy, useful and non-invasive tools which can be used by health care providers, including pharmacists who are at a regular point of contact with individuals at high risk of developing diabetes.

It is important to point out the need to design a questionnaire that fits the Arabic countries, since questionnaires designed for European,[13,14,23] American[24] or Australian[25] populations do not practically suit the Arab population due to cultural and lifestyle differences. Similar studies using such adjusted questionnaires should be carried out in most Arabic countries to pinpoint the risk factors predisposing to diabetes and to compare the success rates of various interventions tested.

Conflict of interest statement

There are no conflicts of interest.

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Key points

- Study participants (129/400) at moderate or at high/very high risk of developing diabetes were found to share high body mass index and have a sedentary lifestyle
- In all, 273 of the 400 study participants had a positive family history of diabetes

Appendix I. Questionnaire (based on the Finnish Type 2 Diabetes Risk Score test [FINDRISC]).[14] A copy of the Arabic version of the questionnaire is available from the authors

Please tick/complete the appropriate statement that applies to you

1. **Age (years):**
   - ☐ Under 45 yrs
   - ☐ 45–54 yrs
   - ☐ 55–64 yrs
   - ☐ Over 64 yrs

2. **Weight:** ..... kg
   Height: ..... metre
   (Equivalent calculated BMI = ... kg/m^2)

3. **Waist circumference measured below the ribs:**

Men	***Women***
☐ Less than 94cm	☐ Less than 80cm
☐ 94–102cm	☐ 80–88cm
☐ More than 102cm	☐ More than 88cm

4. **Do you usually have daily at least 30 minutes of physical activity at work or during leisure time?**
   - ☐ Yes
   - ☐ No

5. **How often do you eat vegetables and fruits?**
   - ☐ Every day
   - ☐ Not every day

6. **Have you ever taken antihypertensive medication regularly?**
   - ☐ Yes
   - ☐ No

7. **Have you ever been found to have high blood glucose during pregnancy, examination or illness?**
   - ☐ Yes
   - ☐ No

8. **Have any of the members of your family or other relatives been diagnosed with diabetes?**
   - ☐ Yes: grandparent, aunt, uncle or first cousin but not own parent, brother, sister or child
   - ☐ Yes: parent, brother, sister or own child
   - ☐ No