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Prevalence and screening for risk factors of type 2 diabetes in Rize, Nourtheast Turkey: findings from a population-based study

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ABSTRACT

Aims: We aimed to determine the prevalence of diagnosed and undiagnosed diabetes, risk factors affecting the healthy population, and factors that increase diabetes risk in the adult northeast Turkish population.

Methods: Using population proportional cluster sampling, 930 adults were selected. After excluding people with diabetes, risk screening was conducted in the healthy population (*n*: 825) using the Information Form and FINDRISK questionnaire. Fasting venous blood and biochemical parameters were measured.

Results: Prevalence of diabetes was 13.6% (new % 2.3), translating to approximately 44 thousand adults. Among the healthy population, 37.5% had high risk. Prevalence of not exercising (78.2%), obesity (36.1%), and hypertension (24.5%) were high. Predictors of risk of diabetes were aging (OR 1.09), low education (OR 0.51), familial diabetes history (OR 15.27), not exercising (OR 0.41), obesity (OR 5.17), high waist circumference (OR 1.05), heart disease (OR 4.81), and hypertension (OR 2.60).

Conclusions: This study can stimulate early screening for cardiovascular diseases and hypertension and initiating aggressive treatments in people with high diabetes risk. In primary health services, number of doctors and nurses trained in diabetes should be increased and dieticians should be involved. People with high risk should receive lifestyle regulations training.

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1. Introduction

The increase in type 2 diabetes presents a real and serious challenge for public health in Turkey, as well as other industrialized countries [1]. The International Diabetes Federation (IDF) estimates that there are 381.8 million people with diabetes in 2013 [2]. In the Turkey Diabetes Epidemiology study (TURDEP-II), it was determined that the prevalence of diabetes is 16.5% in the Turkish population, that 45.5% of people with diabetes were unidentified, and that the deterioration of glucose tolerance (IGT) increased by 106% in the last 12 years [1] as a result of a combination of a number of factors including: under-performing health systems, low awareness among the general public and health professionals [3–5].

Numerous studies showed that type 2 diabetes can be prevented at a rate of 58% by implementing early interventions aimed at altering lifestyle behaviors of high risk groups [6–10]. It is recommended to use two methods for determining high risk populations. The first method involves clinical and demographic characteristics, while the second method involves questionnaires that provide risk evaluation by examining the presence or absence or risk factors [11,12]. The correct population-wide strategy is initiating risk identification and then conducting glucose tests for high risk patients. In international population-based studies, venous blood glucose measurements are the gold standard for determining the prevalence of diagnosed and undiagnosed diabetes [13–15]. With this method, asymptomatic diabetes and abnormal glucose tolerance can be detected and also the 10-year risk of type 2 diabetes can be predicted with 85% accuracy [11,15].

The American Diabetes Association (ADA) recommends that people who have a BMI of 25 kg/m^2 or above and who also have the following should be screened: physical inactivity, history of diabetes in first-degree relatives, being in a high risk race group, giving birth to a baby that weights >9 Ib, hypertension (≥140/90 mmHg or receiving antihypertensive treatment), women with PCOS, A1c ≥5.7%, IGT or IFG on previous testing, and obesity [16]. In addition to the ADA criteria, the Society of Endocrinology and Metabolism of Turkey (SEMT) determined dyslipidemia; coronary, peripheral, and cerebral vascular disease; habit of consuming saturated fats and lack of pulp intake; and antipsychotic medication use to be diabetes risk factors specific to the Turkish population [17].

There is currently no screening program for diabetes or impaired fasting glucose in Northeast Turkey. There is no known risk assessment questionnaire that is used in Northeast Turkey. In order for health authorities to implement preventive interventions, solid data on risk factors that affect the population and on the regional distribution of asymptomatic individuals who have high risk is needed.

2. Methods

The aim of this study is to determine the prevalence of diagnosed and undiagnosed diabetes in the Turkish population aged 20–79 years living in the northeast, to screen the healthy population for diabetes risk factors, to determine factors that affect high risk of diabetes, and to provide regional data for health authorities.

2.1. Study design, settings, and procedures

This research was planned as a descriptive and cross-sectional study. The universe of the study consisted of the population aged older than 20 years living in Rize. By means of population proportional systematic cluster sampling, adults registered at 30 FHC's were selected using a random numbers table. Among those who were invited to the study, 87% participated. In the study, the participants were screened for diabetes and phases of population based screening for diabetes were taken into account [18].

Venous blood samples were collected from the participants after 10 h of fasting. Analyses were conducted using an Architect C 1600 (Abbott, USA) at the RTEU Hospital Biochemistry Laboratory[19].

Among 930 people who were selected with random methods, 105 people who were known and confirmed by FPG [16] were separated. The healthy population (*n*: 825) was screened for diabetes risk. Systolic and diastolic blood pressures (sBP, dBP), weight, height, waist and hip circumferences were measured according to the standard protocols [18]. Body mass index (BMI) was calculated as weight (kilograms) divided by square of height (meters) [20]. Considering ethics, the group with diabetes took biochemical tests and received counseling services.

2.2. Data Collection Instruments

Patient Information Form: Includes sociodemographic characteristics, questions for evaluating diabetes risk, biochemical analyses, and anthropometric measurement records.

Type 2 Diabetes Risk Assessment (FINDRISK) Form: It was developed in 2001 as a DEHKO project by the National Public Health Institute [21,22]. This has been validated for use in a multi-ethnic population in the UK [15] and is widely used in the Turkish population. The Risk Test Form had eight questions, with the total test score providing a measure of the probability of developing type 2 diabetes over the following 10 years. Total scores of <7 correspond to low 10-year diabetes risk (1%), 7–11 points correspond to mild risk (4%), 12–14 points correspond to medium risk (16%), 15–19 points correspond to high risk (33%), and 20 points and above correspond to very high risk (50%) [21,22].

2.3. Statistical analysis

For data analysis, the SPSS 20.0 software was used. Risk of diabetes was calculated according to the FINDRISK model. In the comparison of risk factors of high and low risk groups within the healthy population, Pearson chi square and the independent samples *t* test was used. Risk factors were determined considering the ADA (2013) and TEMD (2013) guidelines and demographic characteristics. For determining the factors that contribute to increased risk of diabetes, logistic regression analysis was used. In logistic regression analysis, diabetes risk (low/high) was the dependent variable while sex, age, education (≤8 years/>8 years), marital