

Comparison of the Cardiovascular Risk Factors for Nondiabetic Individuals' First Degree Relatives Who have Type 2 Diabetes and Who Haven't

Birinci Derece Akrabalarında Tip 2 Diyabet Bulunan ve Bulunmayan Nondiyabetik Bireylerin Kardiyovasküler Risk Faktörleri Yönünden Karşılaştırılması

Hayriye Yolcu Uludağ¹, Sadiye Uysal²

¹Spec.Dr., Keciborlu Governmental Hospital, Family Medicine Polyclinic,, Isparta, Turkey

²Res.Assist.Dr., Suleyman Demirel University, Department of Emergency Medicine, Isparta, Turkey

Summary

Objective: In the study; it is aimed to search out the importance of genetic familiarity in diabetes formation, and to determine the socio-demographic properties of type-2 diabetes patients' first degree relatives.

Material and Methods: That study, is a prospective investigation which is performed in Isparta Yedişehitler Family Health Center (FHC) and planned as prospective. 490 persons (245 persons whose first degree relative has diabetes, and 245 persons whose first degree relative doesn't have diabetes) who are bounded to FHC before are included to the study. A questionnaire about sociodemographic properties, nutrition forms, physical activities and risk factors of diabetes was performed. Length, weight, waist length and random blood glucose measurements were performed. Data was transferred to SPSS 10.0 programme.

Results: People attending to the study were highly primary school graduates, 57,55% (n:282). Almost half of the study group was constituted from low socioeconomic status. Most of the people of were never making sports (66,9%-71,0%). Alcohol usage rate in persons whose first degree relative has diabetes was 9%, whose first degree relative doesn't have diabetes was 8,2%; smoking was at the rate of 22,6%. In the study obesity frequency was 33,5% in persons whose first degree relative has diabetes and 32,7% in persons whose first degree relative dont have diabetes. People whose systolic blood pressure 140 mmHg and higher were 14,8% (n=71), people whose diastolic blood pressure was 90 mmHg and higher were 18,97% (n=93). 48,6% (n=237) of the same study group had abdominal obesity.

Conclusion: First degree relatives of the diabetic patients has high familiarity for DM. These patients must be researched and detected in earlier stages of the disease.

Key Word: Diabetes, relative, risk

Özet

Amaç: Çalışmada; diyabet oluşumunda genetik yakınlığın önemini araştırmak ve tip -2 diyabetli hastaların birinci derece akrabalarının sosyodemografik özelliklerini belirlemek amaçlanmıştır.

Gereç ve Yöntem: Bu çalışma, Isparta Yedişehitler Aile Sağlığı Merkezinde (FHC) gerçekleştirilen ve prospektif olarak planlanan prospektif bir araştırmadır. Daha önce FHC'ye bağlı olan 490 kişi (birinci derece akrabası diyabetli olan 245 kişi ve birinci derece akraba diyabetli olmayan 245 kişi) araştırmaya dahil edildi. Diyabetin sosyodemografik özellikleri, beslenme biçimleri, psikolojik aktiviteleri ve risk faktörleri ile ilgili bir anket yapıldı. Uzunluk, ağırlık, bel uzunluğu ve rastgele kan şekeri ölçümleri yapıldı. Veriler SPSS 10.0 programına aktarıldı.

Bulgular: Araştırmaya katılanlar ilköğretim mezunları,%57,55 (n:282) idi. Çalışma grubunun neredeyse yarısı düşük sosyoekonomik statüydü. İnsanların çoğu spor yapmıyorlardı (%66,9-%71,0). Birinci derece görel diyabetli kişilerde alkol kullanım oranı %9, ilk derece görel diyabet hastalığı bulunmaması %8,2; sigara kullanım oranı %22,6'dır. Çalışmada obezite sıklığı, birinci derece görel diyabetli kişilerde %33,5, birinci derece eşinde diyabetik olmayan kişilerde %32,7 idi. 140 mmHg ve üstü sistolik kan basınçları %14,8 (n=71), diastolik kan basıncı 90 mmHg ve daha yüksek olan kişiler %18,97 (n=93) idi. Aynı çalışma grubunun %48,6'sında (n=237) abdominal obezite vardı.

Sonuç: Diyabetli hastaların birinci derece yakınları DM için oldukça fazla bilinçlidir. Bu hastalar, hastalığın erken aşamalarında araştırılmalı ve tespit edilmelidir.

Anahtar Kelimeler: Diyabet, akraba, risk.

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Introduction

Diabetes Mellitus (DM) is a chronic and progressive disease that is characterized by hyperglycemia and disorders of carbohydrate, protein, lipid metabolism. It is formed as a result of absolute or relative deficiency of pancreatic insulin secretion or ineffectiveness of insulin molecules. It is a heterogeneous syndrome with genetic and clinical feature (1,2,3).

DM is one of the major health problems all over the world because of its high morbidity and mortality rates. It constitutes high treatment expenses and brings burden to the patient and society (4,5). Its' genetic switch is foreground; shows high frequency ratio for people whose first degree relatives have DM. Although DM is a preventable disease; it affects many organs and hence, disrupts life quality (6). Worldwide, more than 135 million people are diabetics. In 2025, this number is expected to reach 300 million (7). In Turkey, according to Turkey Diabetes Epidemiology Project (TURDEP) results, diabetes rate was found to be 7.2% for individuals ≥ 20 years old (8). Each year, 6% increment is seen more over this rate (9). In a different study, prevalence of DM was found 12.9% for men and 10.9% for women (10). In the study by Kelestimur et al., according to oral glucose tolerance test (OGTT) over 30 years old; 4% of the subjects was determined DM, 2.9% was not DM, 9% was impaired glucose tolerance (IGT) and the total glucose intolerance was 15.9% (11).

Emerging technology and industrial progress with adopted urban lifestyle, transition from physical strength based to still life, fast food style nutrition, increased consumption of soft drinks, spending more time with television and computer that supports sedentary life are the reasons for rapid rise of diabetes. In extensive configurated studies, success of lifestyle changes as well as pharmacological agents has been demonstrated to prevent type 2 diabetes. Diabetes Prevention Program (DPP) study showed that nutrition, exercise and body weight control prevent diabetes

especially in ethnic groups prone to type 2 diabetes at a high rate, nearly 58%. To achieve this, losing 7% of body weight and exercising that spends 700cal/week is enough (12).

Specified risk factors of DM are obesity, advanced age, genetic factors, developing DM during pregnancy, to breed a baby over 4,5kg, hypertension (HT) and heart diseases (13,14).Up to date; when studies on diabetes are investigated, it's seen that they are usually on patients who are diagnosed as type 2 diabetes; studies on first-degree relatives were found to be rare. In a study, 76,6% of the patients who were diagnosed type 2 diabetes, ment of diabetes in at least one of their first-degree relatives (15). This ratio is up to 87% in some articles (16). Moreover, it's been identified that development of type 2 diabetes becomes at earlier ages in 31,6% of patients' family history of maternal ment and 12,6% of patients family history of paternal ment and additionally mother and/or father (17).

Aim of the study is to evaluate the risc factors for non-diabetic individuals' first-degree relatives who have type 2 diabetes and who haven't. Moreover, sociodemographic characteristics of the study group and the major risc factors for DM is tried to be exposed.

Material and Methods

Type of the study is an urban-sectional case-control research. It's planned prospectively and performed in Isparta Yedişhitler Family Health Center between December 2007 and September 2008. In the study 245 individuals (non-diabetic persons whose first degree relatives have diabetes) and 245 persons of control group (healthy people whose first degree relatives haven't diabetes) are included. Simple random sampling method was carried out in the sample selection. Acceptance criterias to the research were determined as; not previously diagnosed with DM, to be registered to Family Health Center, to be over 18

years old age, to be signed the information consent form.

First of all; a questionnaire (age, gender, education level, monthly income, number of the people living together at home, number of children, profession, dietary patterns, physical activity, diabetic relatives, smoking, alcohol usage, family obesity, hypertension, hyperlipidemia history, history of breeding an obese baby) was applied to the people who had been included to the study. Height, weight, systolic and diastolic blood pressure measurement, waist circumference measurement, random blood glucose levels were measured. Data were transferred to the computer (SPSS 13.0) statistical package program.

Results

Study's demographic characteristics are given in table-1.

Related with the risk factors; watching television more than 2 hours per day is considered in terms of cardiovascular risk. In the study group, watching television more than 2 hours per day rate was 45,29%. 68,97% of the subjects were found as not doing any sports; regular daily sport rate was 7,34%. Sunflower oil usage rate was high (73,90%), the use of butter and olive oil was lower (3,3%). The rate of people who eats fried at least 1-2 times per week or more was 50,82%, people who eat 1-2 times per month was 40,61%, not eating any fried ratio was %8,57. 1,2% don't eat any fruit and vegetables; rate of consuming fruit and vegetable everyday was 64,48%. People who drink alcohol regularly every day was at a low rate (0,6%). Rate of smokers was 22,6%.

In the study group; ratio of the subjects whose first-degree relative have diabetes with a history of hypertension was %23,3; rate for the non-diabetic group was 22,9%. First-degree relatives of those who have a history of cholesterol disease was 18,0% for the group with diabetes and 20,4% for the non-diabetic group. First-degree relatives of those who have family history of obesity was 35,9% for the diabetic and 18,4% for the nondiabetic group. Ratio for people without history of obese childbirth was, relatively, 12,8% and 10,6%.

Body Mass Index (BMI), waist circumference measurements, random blood sugar levels, systolic-diastolic blood pressure measurements for the study group are given in table 2.

Discussion

In the study; participation of women was higher (77,15%) and 79,6% of those were housewives. Housewives constituted the majority of the cases because they were mostly visiting the Family Health Center (FHC) in working hours and they were willing much more to participate the study. Recent studies in Europe indicates the increment of IGT which occurs before type 2 DM. Prevalence of IGT was found 3-5% in the 20-44 age group and 20-30% in the 65-74 age group (18). In the study, majority of the population was between 18-45 ages (64,07%) and it was considered that identifying risk factors for diabetes during early ages is important. According to Turkey Demographic and Health Survey (2003) report; for Turkey, family structure with four-persons constitutes the highest group (24,2%) (19). In terms of family structure, both groups showed four-persons family type (34,08%) in the study too. Majority of the study group were under low educational level (68,77%); suggests us that they have less information about diabetic risk factors and complications. Almost half of the research group showed lower income levels (45,71%). It is thought that this situation can have a negative impact on their life style, particularly nutritional habits and the emergence of diabetes.

Related with the risk factors; watching television has two negative effects; reducing energy expenditure and increasing energy intake with negative eating habits (20). Regular physical activity reduces insulin resistance and prevents type 2 diabetes for risky individuals (21). For the study group watching television more than 2 hours a day was higher (45,29%), ratio for making physical activity at least half an hour per week was too low (7,34%). Regarding with obesity; it's been emphasized that type 2 diabetes is not only associated with familial predisposition, at the same time, amount and type of daily dietary fat is important (22). Less usage of butter and usage much sunflower oil (73,90%) were considered to have positive effects on cardiovascular diseases.

Table 1. Demographic characteristics of the study group

	Whose first degree relatives have DM		Whose first degree relatives don't have DM	
	N	%	N	%
Gender				
Male	49	20.0	63	25.7
Female	196	80.0	182	74.3
Age				
<35	86	35.1	95	38.8
35-45	71	29.0	62	25.3
45-55	44	18.0	36	14.7
55-65	36	14.7	32	13.1
> 65	8	3.3	20	8.2
Educational Status				
Primary school	145	59.2	137	55.9
Secondary school	17	6.9	24	9.8
High school	36	14.7	32	13.1
University	22	9.0	22	9.0
Not lettered	25	10.2	30	12.2
Monthly income				
<500 TL	109	44.5	115	46.9
500-1000 TL	91	37.1	92	37.6
1000-2000 TL	23	9.4	27	11.0
>2000 TL	6	2.4	4	1.6
Not lettered	16	6.5	7	2.9
Number of the people living at home				
1	6	2.4	10	4.1
2	63	25.7	52	21.2
3	49	20.0	55	22.4
4	83	33.9	84	34.3
5	28	11.4	34	13.9
6	10	4.1	8	3.3
6>	6	2.4	2	0.8
Number of the kids				
0 kids	35	14.3	23	9.4
1 kid	25	10.2	38	15.5
2 kids	99	40.4	101	41.2
3 kids	55	22.4	43	17.6
4 kids	20	8.2	24	9.8
5 kids	7	2.9	10	4.1
>5 kids	4	1.6	6	2.4
Job				
Officer				
Worker	10	4.1	16	6.5
Retired	19	7.8	24	9.8
Private sector	23	9.4	36	14.7
Housewife	11	4.5	11	4.5
None	156	63.7	145	59.2
	26	10.6	13	5.3
TOTAL	245	100	245	100

Table 2. Measurements of the study group related with diabetes

	Whose first degree relatives have DM				Whose first degree relatives don't have DM			
	N		%		N		%	
BMI								
26-30	78		31.8		68		27.8	
<26	85		34.7		97		39.6	
≥30	82		33.5		80		32.6	
Waist circumference	M	F	M	F	M	F	M	F
Normal	24	35	49.0	17.8	35	41	67.3	22.4
Low risk *	12	53	24.5	27.0	12	41	23.0	22.4
High risk **	13	108	26.5	55.2	15	101	28.7	55.2
Random measurement of fingertip blood sugar level (mg/dl)								
<100	90		36.7		127		51.8	
100-140	126		51.5		108		44.1	
≥140	29		11.8		10		4.1	
Systolic Blood Pressure (mmHg)								
<120	102		41.6		118		48.2	
120-139	102		41.6		97		39.6	
140-159	28		11.4		21		8.5	
≥160	13		5.4		9		3.7	
Diastolic Blood Pressure (mmHg)								
<80	186		73.9		196		80.0	
80-89	15		6.1		5		2.0	
90-99	33		13.5		30		12.2	
≥100	16		6.5		14		5.8	
TOTAL	245		100		245		100	

*: 80-88 cm for female, 94-102 cm for male

**: ≥88 cm for female, ≥102 cm for male

Consumption of soft drinks and fried foods increases obesity and diabetes prevalence (23). Highly consumption of these kind of foods indicate cardiovascular risk for the study group. In some studies, prevalence of alcohol consumption varies between 11,6% and 56,2% (24). In the study, those who regularly use alcohol every day showed very low ratio (0,4-0,8%); this situation was assessed as a protective factor for development of cardiovascular diseases. Smoking prevalence for our country is 62,8% for men and 24,3% for women over 15 years old (25). In the study, smoking prevalence was 22,6%; this low ratio was related with the high ratio of the women participated in the study (77,15%). In the group whose first degree relatives have diabetes; men were smoking harder than women (d:0364, p:0.000) and smoking rate was reducing significantly by progressing age (d:-0,105,

p:0,049). This correlation shows the high risk for cardiovascular diseases in young population. In the group whose first degree relatives have diabetes; there was a significant increment of hypertension history by progressive age (r:0,392, p:0,000); there was a significant increment of cholesterol disease (r:0,253, p:0,000). These findings showed us the increased risk for cardiovascular diseases for people whose first degree relatives have diabetes. There was no significant difference between groups about history of breeding an obese baby (12,7%-10,6%).

Related with the measuremental values; in the group whose first degree relatives have diabetes, waist circumferences of women in the group whose first degree relative have diabetes and history of breeding an obese baby were more than the women who didn't have a history of breeding an obese baby

($d=0,124$, $p=0,016$). This shows the increased risk for CVD in women who has a history of breeding an obese baby. Familial obesity history was much more in the group whose first degree relative has diabetes when compared with the group who haven't ($t=4,447$, $p=0,000$). This thoughts us that the group whose first degree relative have diabetes is under more risk for obesity in case CVD. Obesity prevalence (waist circumference ≥ 102 cm in men, ≥ 88 cm in women) is 36,2% in our country (54,8% in women, 17,2% in men) (26,27).

In the study obesity prevalence is 33,5% in the group whose first degree relative have diabetes and 32,6% in the group whose first degree relative don't have. There was no significant difference between two groups. BMI had a significant increment by age in the group whose first degree relative have diabetes ($d=0,139$, $p=0,009$). Women were more obese than the men in the group whose first degree relative don't have diabetes ($t=2,375$, $p=0,018$).

In the study 121 persons had high risk in the group whose first degree relative have diabetes (24,64%), and 116 persons had high risk in the group whose first degree don't have diabetes (23,96%).

It's thought to be that the cause of obesity prevalence in the study is higher than the Turkey mean is most of the participants of our study were women. Obesity prevalence was increasing by the rising number of persons of diabetes in family in the group whose first degree relative have diabetes ($d=0,132$, $p=0,023$). According to these results people have more risk whose family members more than one person have diabetes. In the group whose first degree relative have diabetes, waist circumferences of the men were increasing by age ($d=0,299$, $p=0,006$) and hypertension disease history was much more in these men ($d=0,29$, $p=0,009$). Waist circumferences of women in the group whose first degree relative haven't diabetes were increasing significantly by rising monthly income ($d=0,164$, $p=0,017$).

Cystolic blood pressure measurements were significantly high by progressive age in both groups ($p=0,000$, $p=0,000$). Cystolic blood pressure measurement levels were higher in the group whose first degree relative have diabetes than the group

whose haven't ($t=2,441$, $p=0,015$). Cystolic blood pressure measurements in men were significantly higher than the women in the group whose first degree relative haven't diabetes ($t=4,088$, $p=0,000$). Cystolic blood pressure measurement was significantly rising correlated to education level in the group whose first degree relative have diabetes ($d=0,114$, $p=0,040$). Cystolic blood pressure measurements were higher in people whose parent-brother-sister have diabetes in the group whose first degree relative have diabetes ($d=0,111$, $p=0,050$). Diastolic blood pressure measurements were higher in the group whose first degree relative have diabetes than the group whose haven't ($t=2,311$, $p=0,021$). Randomly blood sugar measurement levels were higher in the group whose first degree relative have diabetes than the group whose haven't ($t=3,238$, $p=0,001$). IGT had a significant increment rate by progressive age in both groups ($d=0,174$, $p=0,001$) ($p=0,000$, $p=0,001$). According to these findings there is an increased risk for diabetes and CVD in people whose first degree relative have diabetes.

Conclusion

Diabetes disease initially should be recognized before the appearance of the complaints and attempts should be made in the early period for the prevention of complications. High-risk individuals must determined for early diagnosis and prevention whether to delay the appearance of diabetes, and this persons must be provided in accordance with a permanent change in behavior. In the process, Family Medicine has a great approach and importance as in all chronic diseases, the basic principles such as continuous, comprehensive, holistic and people-oriented health care of the discipline of Family Medicine.

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Correspondence:

Spec.Dr.Hayriye Yolcu Uludağ
Keciborlu Governmental Hospital,
Family Medicine Polyclinic, Isparta, Turkey
Tel: +90.505.3596732
E-mail: drhayriyeuludag@yahoo.com