The Association Between Great-Grand Multiparity and the Development of Type 2 Diabetes Mellitus

Great-Grand Multiparite ile Tip 2 Diabetes Mellitus Gelişimi Arasındaki İlişki

Baki Erdem[1], Nuri Peker[2]

[1]Department of Obstetrics and Gynecology, Kanuni Sultan Süleyman Training and Research Hospital, İstanbul, Turkey
[2]Department of Obstetrics and Gynecology, Uşak Training and Research Hospital, Uşak, Turkey

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ABSTRACT

Objective: We planned to reveal the relationship between great-grand multiparity and type 2 diabetes mellitus development.

Methods: Between April 1, 2011 and April 1, 2012, the information of the patients who applied to the obstetrics and gynecology polyclinic in our hospital with various complaints was collected retrospectively. The patients' age, height, weight, body mass index, number of births, and presence of diabetes mellitus were noted.

Results: The study was conducted in the ethnic Arab-inhabited regions of southern Turkey and included 179 patients. The participants were illiterate women of low socioeconomic stature and who were under 18 years of age and had married before 18 as well. The mean age of the patients was 64.8±6.3 years and 67.7±6.2 years in nulliparous and great-grand multiparous patients, respectively. The median body mass index (BMI) values of the patients were 30.95±7.0 and 30.11±6.1, respectively. There was no statistically significant difference between the two groups in terms of mean age and BMI (body mass index). Twenty-eight (18.5%) patients were diagnosed with type 2 diabetes mellitus, while 3 (10.7%) patients were diagnosed with type 2 diabetes mellitus in the non-delivery group. There was a statistically significant relationship between the two groups in terms of the development of type 2 diabetes mellitus ($p<0.05$).

Conclusion: A statistically significant relationship was found between great-grand multiparity and type 2 diabetes mellitus development.

Keywords: Great-grand multiparity, type 2 diabetes mellitus, post menopause

ÖZ

Amaç: Great grand multiparite ile tip 2 diabetes mellitus gelişimi arasındaki ilişkiyi ortaya koymayı planladık.

Yöntemler: 1 Nisan 2011- 1 Nisan 2012 yılları arasında kadın hastalıkları ve doğum polikliniğine çeşitli şikeyetler ile başvuran hastaların bilgilerine dosyaları geriye doğru taranarak ulaşıldı. Hastaların yaş, boy, kilo, vücut kitle indeksi, doğum sayısı ve diabetes mellitus varlığı not edildi.

Bulgular: Çalışmaya 179 hasta dahil edildi. Çalışma Türkiye'nin güney sınırında etnik köken olarak arapların yaşadığı bölgede yapılmıştır. Çalışmaya katılan hastalar, sosyo ekonomik düzeyi düşük, okuma yazma bilmeyen, büyük bir kısmı 18 yaş altı evlenen ve ilk doğumunu 18 yaş altı dönemde yapan kadınlardır. Nullipar ve great-grand multipar hastalarda yaş ortalaması sırasıyla 64,8±6,3 yıl, 67,7±6,2 yıl olarak saptandı. Hastaların ortlama vücut kitle indeksi değerleri sırasıyla 30,95±7,0 ve 30,11±6,1 olarak saptandı. İki grup arasında ortalama yaş ve vücut kitle indeksi açısından istatistiksel olarak anlamlı fark saptanmadı. On ve üzere doğum yapan grupta 28 (%18,5) hasta da tip 2 diabetes mellitus, saptanırken, doğum yapmayan grupta tip 2 diabetes mellitus saptanan hasta sayısı 3 (%10,7) olarak bulundu. Her iki grup arasında tip 2 diabetes mellitus gelişimi açısından istatistiksel olarak anlamlı ilişki saptanmıştır ($p<0,05$).

Sonuç: Great grand multipartite ile tip 2 diabetes mellitus gelişimi arasında istatistiksel olarak anlamlı ilişki saptanmıştır.

Anahtar kelimeler: Great grand multiparite, tip 2 diabetes mellitus, postmenapoz

INTRODUCTION

Grand multiparity is defined as 5 or more live births and/or stillbirths after 20 weeks of gestation and great-grand multiparity is defined as 10 or more live births and/or stillbirths after 20 weeks of gestation (1). However, different definitions may be used. The prevalence was reported as 2.8% for 5 births, 1.7% for 6 births, 7% for overweight births, and 0.7% for overweight births in the United States (2). The frequency of multiparity is increasing in Africa and mid-east, and more so in south Asia. There is a relationship between birth number and development of antenatal and postnatal complications. In particular, placenta previa, placental abruption, postpartum hemorrhage, macrosomia, and umbilical cord prolapse and grand multiparity have been reported in many publications (3-6). Among long-term complications, the incidence of pelvic organ prolapse development is increased, however, in some studies it has been shown that the increase in parity

ORCID IDs of the authors: B.E. 0000-0002-6407-8718; N.P. 0000-0002-4854-3851.

Corresponding Author / Sorumlu Yazar: Nuri Peker,
E-mail / E-posta: dr.ata1980@hotmail.com

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is inversely proportional to breast cancer and some gynecologic cancers such as endometrial and ovarian cancer (7-11). On the other hand, the relationship between the number of parities and the development of type 2 diabetes mellitus is controversial.

In our retrospective cohort study, we planned to reveal the relationship between great-grand multiparity and development of type 2 diabetes mellitus.

METHODS

Between April 1, 2011 and April 1, 2012 at Uşak Training and Research Hospital's polyclinic for women's' diseases and obstetrics, the data of patients with varied complaints were scanned. Patient consent and ethics committee approval was not obtained because of the retrospective nature of the study. The study was carried out in accordance with the criteria of the Declaration of Helsinki.

The patients' age, height, weight, BMI, number of births, and presence of diabetes mellitus was noted. Demographic information about the marital status (married, widowed, divorced, not married) and education (primary or secondary school, high school, college and above) was collected. The patients who had diabetes according to the American Diabetes Association criteria, those undergoing antidiabetic treatment, and those who had a fasting plasma glucose level of 7.0 mmol/L were diagnosed with type 2 diabetes mellitus and were included in the study.

Patients were divided into two groups according to the number of births: those who had never given birth and those who had given birth to 10 or more children.

Statistical Analysis

When evaluating the findings obtained in this study, Statistical Package for Social Sciences version 22.0 for statistical analysis (IBM Corp.; Armonk, NY, USA) programs were used. When the study data were evaluated, the normal distribution of parameters was evaluated by the Shapiro Wilks test. One-way ANOVA test was used to compare the normal distribution of the parameters with the descriptive statistical methods (mean, standard deviation, frequency) as well as the quantitative data. Tukey HDS test was used to determine the difference group. The Kruskal-Wallis test was used to compare the groups with no normal distribution and the Mann-Whitney U test was used to determine the group that caused the difference. Chi-square test was used for comparison of qualitative data. Significance was assessed at $p<0.05$ level.

RESULTS

The study was conducted between April 1, 2011 and April 1, 2012 in the ethnic Arab-inhabited regions of southern Turkey and included 179 patients. The participants were illiterate women of low socioeconomic stature and who were under 18 years of age and had married before 18 as well. The use of alcohol, cigarettes, and other addictive was not detected on detailed questioning. When feeding habits were questioned, it was found that there was widespread daily consumption of meat, milk, and dairy products in regions where agriculture and livestock are the main sources of income.

Table 1 shows the demographic characteristics of the three groups. The mean age of the women was found to be 64.8±6.3 years and 67.7±6.2 years in nulliparous and great-grand multiparous patients, respectively. No statistically significant age difference was found between the two groups. The BMI of the nulliparous and great-grand multiparous genders were 30.95±7.0 and 30.11±6.1, respectively and no statistically significant difference was found.

Table 1. Comparison of those who did not give birth with those who gave birth to 10 or more children

Features	Birth		p
	Ten and/or more (n=151)	Nullipar (n=28)	
Age, mean±SD	67.7±6.2	64.8±6.3	0.024
BMI, mean±SD	30.11±6.1	30.95±7.0	0.558
Menopause age, mean±SD	17.9±7.5	10.6±8.2	0.000
Diabetes mellitus	28 (%18.5)	3 (%10.7)	0.05

SD: standard deviation; BMI: body mass index

Twenty-eight (18.5%) patients were diagnosed with type 2 diabetes mellitus in the first group, and 3 (10.7%) patients were found to have type 2 diabetes mellitus in the non-parturition group. There was a statistically significant relationship between type 2 diabetes mellitus development and great-grand multiparity between the two groups ($p<0.05$).

DISCUSSION

The mechanism underlying the link between birth rate and diabetes development is unclear but there are many publications in the literature that hold a contrary opinion. The possible mechanism explaining the relationship between the occurrence of parity and type 2 diabetes mellitus development is described below.

There are dramatic changes in physiology, metabolism, and lifestyle during pregnancy. Insulin resistance causes an increase in some diabetogenic hormones and changes in cortisol levels, especially in the peripheral tissues. It is manifested by the increase in placental growth hormones including placental lactogen, circulating insulin-like growth factor I, gestational hormones, and tumor necrosis factor-alpha. The B-cell mass expands to accommodate progressive insulin resistance and increases insulin secretion to maintain normal blood sugar levels during pregnancy and postpartum period. This metabolic stress has been suggested to lead to the consumption of B-cells, which in turn causes dysfunction in insulin secretion and subsequent development of diabetes mellitus later in life (12-14).

In our study, we found that the relationship between great-grand multiparity and type 2 diabetes development was statistically significant and that the development of type 2 diabetes was significantly higher in patients with a birth number of 10 and above. Results of a large number of studies that have been published in the literature were similar to our study and a significant part of these studies have shown a statistically significant relationship between the development of multiparity and type 2 diabetes (15-17). Li et al. (18) found a positive correlation between multiparity and type 2 diabetes development in a meta-analysis of 296,923 individuals that included 7 cohort studies, 1 case-control study, and 9 cross-sectional studies. In another study Rosario et

al. revealed that patients who delivered 6 and over children had a significantly higher risk of developing type 2 diabetes independent of family history, level of adiponectin and adipose tissue, and other risk factors (19).

On the other hand, some studies suggest that there is no significant association between multiparity and type 2 diabetes mellitus (20, 21). Gunderson EP and colleagues have suggested that gestational diabetes is the most important risk factor for the development of type 2 diabetes in the elderly and that the risk of type 2 diabetes does not increase in the age range of patients with normal glucose levels during pregnancy (20). In a similar study conducted by Fowler-Brown et al. (21) on elderly women, it was found that grand multiparity and diabetes development were related to one another. Body weight and sociodemographic factors were also found to be influential on this relationship.

The retrospective nature of our work and the smaller number of participants were the limitations we faced. However, the research is important because it is the first study to reveal the relationship between parity and diabetes development in patients with 10 and or more births.

CONCLUSION

The relationship between multiparity and type 2 diabetes mellitus is controversial in the literature but the development of type 2 diabetes was found to be significantly higher in patients with 10 and over maternal births in our study.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects", (amended in October 2013).

Informed Consent: Informed consent was not taken from patients due to the retrospective nature of the study.

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Hasta Onamı: Çalışmanın retrospektif tasarımından dolayı hasta onamı alınamamıştır.

Hakem Değerlendirmesi: Dış bağımsız.

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