Ankara Med J, 2017;(2):111-8
DOI: 10.17098/amj.323187

Antenatal Anxiety in Pregnant Women with Gestational Diabetes Mellitus

Gestasyonel Diabetes Mellitusu Olan Gebelerde Antenatal Anksiyete

Ekrem Orbay[1], Sabah Tüzün[1], Berfu Çınkıt[1], Muhammed Burak Ölmez[1], Sinem Tekin[2], Emre Purut[2], Sadullah Bulut[2], Mehmet Sargın[1]

[1]İstanbul University of Health Sciences, Kartal Dr Lütfi Kırdar Training and Research Hospital, Family Medicine Clinic
[2]İstanbul University of Health Sciences, Kartal Dr Lütfi Kırdar Training and Research Hospital, Obstetrics ang Gynecology Clinic

Abstract
Objectives: The incidence of gestational diabetes mellitus (GDM) is gradually increasing all over the world. Some studies determined that the prevalence of anxiety and depression is higher in pregnant women with versus without GDM. The present study aimed to determine whether GDM enhances anxiety level in pregnant women.
Materials and Methods: This cross-secitonal study was performed in 281 pregnant women presented to the Kartal Dr. Lütfi Kırdar Training and Research Hospital, Gynecology and Obstetrics Clinic between June 2014 and June 2015 and were diagnosed with or without GDM based on 75 gram oral glucose tolerance test. A survey form created by the researchers and Hospital Anxiety and Depression (HAD) Scale were performed in all pregnant women.
Results: A total of 281 pregnant women were enrolled in the study and 133 (47.33%) were healthy, whereas 148 (52.67%) had GDM. The mean age of the participants was 30.17 ± 5.62 years and gestational age was 202.71 ± 56.31 days. According to educational status, 178 (66.90%) of the participants were primary school graduates. The mean scores of anxiety subscale and depression subscale were determined as 9.16 ± 2.88 and 9.05 ± 2.42, respectively. While the score of anxiety subscale was found 10 or higher in 108 (40.30%) pregnant women, the score of depression subscale was 7 or higher in 236 (88.40%) of them.
Conclusion: In our study, the average anxiety score of pregnant women with GDM was significantly higher than women without GDM and no difference was found between the two groups in terms of depression level. Further researches are needed to clarify that diabetes in pregnancy causes anxiety, but this study has shown us that GDM may cause an increase in antenatal anxiety scores.
Key words: Gestational diabetes, Anxiety, Depression, Prenatal Diagnosis

Öz
Amaç: Gestasyonel diabetes mellitus (GDM) tüm dünyada giderek artan sıklıkla görülmektedir. Bazı çalışmalarda GDM olan gebelerde anksiyete ve depresyon sıklığının olmayanlara göre daha fazla olduğu saptanmıştır. Bu çalışmada GDM'nin gebelerde anksiyete düzeyinde artışa neden olup olmadığının saptanması amaçlanmıştır.
Materyal ve Metot: Bu kesitsel çalışma Kartal Dr. Lütfi Kırdar Eğitim ve Araştırma Hastanesi Kadın Hastalıkları ve Doğum Kliniği'ne Haziran 2014 - Haziran 2015 tarihleri arasında başvuran ve 75 gram oral glikoz yükleme testi sonucunda GDM saptanan ve saptanmayan 281 gebede yapılmıştır. Tüm gebelere araştırmacılar tarafından oluşturulan bir anket formu ve Hastane Anksiyete ve Depresyon (HAD) Ölçeği uygulanmıştır.
Bulgular: Çalışmaya toplamda 281 gebe dahil edilmiş olup, 133 (%47,33)'ü sağlıklı gebe iken 148 (%52,67)'i gestasyonel diyabet tanısı almıştır. Katılımcıların yaş ortalaması 30,17 ± 5,62 yıl, gebelik süresi 202,71 ± 56,31 gün idi. Eğitim durumlarına göre katılımcıların 178 (%66,90)'i ilkokul mezunuydu. Gebelerin anksiyete alt ölçek puan ortalaması 9,16 ± 2,88 ve depresyon alt ölçek puan ortalaması 9,05 ± 2,42 olarak saptandı. Tüm gebelerin 108 (%40,30)'inde anksiyete alt ölçek puanı 10 ve üzerinde saptanırken, 236 (%88,40) gebede depresyon alt ölçeği 7 ve üzerinde saptandı.
Sonuç: Çalışmamızda GDM olan gebelerde anksiyete skoru ortalaması GDM olmayanlara göre anlamlı yüksek saptanmış olup depresyon düzeyi açısından iki grup arasında fark tespit edilmemiştir. Her ne kadar gebelikte ortaya çıkan diyabetin anksiyeteye neden olup olmadığı konusunda daha kapsamlı

çalışmalar gerekse de, bu çalışma gestasyonel diyabetin antenatal anksiyete skorunda artışa neden olabileceğini düşündürtmektedir.
Anahtar kelimeler: Gebelik diyabeti, anksiyete, depresyon, prenatal tanı

Correspondence / Yazışma Adresi
Dr. Ekrem Orbay
Kartal Dr Lutfi Kırdar Training and Research Hospital, Diabetes Unit, Cevizli, Kartal, İstanbul
e-mail: ekremorbay@yahoo.co.uk
Date of submission: 08.09.2016
Date of admission: 13.06.2017

Introduction

The incidence of gestational diabetes mellitus (GDM) is 9.2% and is gradually increasing all over the world.[1]The prevalence of depression throughout pregnancy period was determined to be 9.9%–45%. Both GDM and antenatal depression may cause maternal and fetal complications.[1,3,4] Although some studies determined the prevalence of depression to be higher in pregnant women with versus without GDM, there are studies suggesting just the opposite.[1,5-7] In a study, antenatal depression was found in 20% of pregnant women with GDM and in 13% of pregnant women without GDM. Another study determined 3-fold increase in the prevalence of depressive mood in pregnant women with GDM.[1,8] Moreover, the incidence of anxiety disorder throughout pregnancy period was found to be between 6.6% and 75%.[7,9] Despite the studies suggesting that GDM enhances anxiety in pregnant women, a study determined that GDM enhances neither anxiety nor depression.[8,10,11] In addition to the studies demonstrating that anxiety during pregnancy leads to complications such as premature birth and low birth weight, there are also studies revealing just the opposite.[11-13] The present study aimed to investigate whether GDM enhances the anxiety level in pregnant women.

Material and Methods

Study Universe

Pregnant women presented to the Gynecology and Obstetrics Clinic of Kartal Dr. Lütfi Kırdar Training and Research Hospital between June 2014 and June 2015 were enrolled in the study. Pregnant women with fasting blood glucose level ≥126 mg/dL in the first visit or pregnant women diagnosed with gestational diabetes based on 75 g oral glucose tolerance testing (OGTT) on the 24^{th}-28^{th} weeks of pregnancy were considered to have GDM. The control group consisted of pregnant women who were in the last trimester and have never been diagnosed with GDM throughout the follow-up period of pregnancy. Pregnant women with GDM detected during routine control visits for pregnancy were followed in the diabetes unit of our hospital. Sample size was calculated regarding on the prevalence of antenatal depression in pregnant women with gestational diabetes as 20%[1], with 95% confidence rate and 10% nonresponse; estimated minimum sample size needed was 271.

The method of measurement used in the study

The guideline released in 2015 by the American Diabetes Association (ADA) was accepted as the diagnostic criteria for GDM.[14] According to this guideline, the diagnosis of GDM is made if ; 75 g OGTT performed in the 24^{th}-28^{th} week of pregnancy revealed a

fasting blood glucose ≥ 92 mg/dL or 1st-hour blood glucose ≥180 mg/dL or 2nd-hour blood glucose ≥153 mg/dL. At diagnosis, a questionnaire inquiring socio-demographic characteristics of the pregnant women and Hospital Anxiety and Depression (HAD) scale were performed for all pregnant women, and they were let to complete HAD scale on their own. HAD is a 4-point Likert scale consisting of 14 questions. It was developed to measure the risk and the level of anxiety and depression among people who have physical disorder and seek for health service.[15,16] In this scale, the sum of the points of odd numbers indicate the score of anxiety subscale and the sum of the points of even numbers indicate the score of depression subscale.[15] Anxiety subscale is rated as 3-2-1-0, whereas depression subscale is rated as 0-1-2-3. The lowest score is 0 and the highest score is 21 for each subscale. The cut-off point is 10 for the anxiety subscale and 7 for the depression subscale. Validity and reliability study for the Turkish version of the scale is available.[15,17] In the present study, primarily the anxiety levels of the participants were assessed, but depression levels were also assessed because of the characteristic of the scale performed. However, since the primary aim of the present study was 'evaluation of anxiety level', the risk factors of antenatal depression were not evaluated.

Variables of the study

Age, education, total number of pregnancies, gestational age and body mass index (BMI) are the independent variables, whereas the scores of anxiety subscale and depression subscale of HAD scale are the dependent factors.

Exclusion criteria

Illiterate pregnant women and those with documented diabetes or any chronic disease prior to the pregnancy were not enrolled in the study.

Data analysis

The data were evaluated using SPSS 22.0 program. Student t-test and Pearson correlation analyses were performed for continuous variables and the results were presented as frequency, mean± standard deviation, percentage and median. In addition, Chi-square test was used for the analysis of categorical variables. Furthermore, Mann Whitney U test and Spearman correlation test were used for the comparison of continuous variables with abnormal distribution. A $p<0.05$ value was considered statistically significant. The study was approved by the Kartal Dr. Lütfi Kırdar Training and Research Hospital Ethics Committee (Protocol No: B10.4ISM.4.34.0029/1009/63).

Results

Of the 281 pregnant women enrolled in the study, 133 (47.33%) were healthy, 148 (52.67%) had gestational diabetes, the mean age was 30.17 ± 5.62 years. Considering literacy, 178 (66.90%) were primary school graduates, 88 (33.10%) were high school or higher graduates, mean BMI was 29.98 ± 5.04 kg/m², and gestational age was 202.71 ± 56.31 days. Sociodemographic characteristics of the pregnant women are summarized in Table 1.

The score of anxiety subscale was found 10 or higher in 108 (40.30%) and the score of depression subscale was found 7 or higher in 236 (88.40%) of all pregnant women. The

mean scores of anxiety and depression subscales were determined to be 9.16 ± 2.88 and 9.05 ± 2.42, respectively.

Table 1. Sociodemographic characteristics of the participants

	Pregnant women without GDM (n=133)	**Pregnant women with GDM (n=148)**	***p***
	Mean±SD	**Mean±SD**	
Age (year)	28.07±5.05	32.08±5.44	***<0.001*** *
BMI (kg/m²)	29.53±4.57	30.40±5.43	*0.176**
Gestational age (day)	236.19±26.74	170.68±58.56	***<0.001*** *
	Median (min-max)	**Median (min-max)**	
Number of pregnancies	2.00 (1.00-8.00)	3.00 (1.00-12.00)	***<0.001*** **
Education status	**n (%)**	**n (%)**	
Primary school	87 (69.60)	91 (64.53)	*0.433****
High school and above	38 (30.40)	50 (35.47)	

**Student's* t Test, ***Mann Whitney* U Test, ****Chi-Square Test*

Scores of anxiety and depression subscales in both groups are summarized in Table 2.

Table 2. Scores of anxiety and depression subscales in each group

	Pregnant women without GDM (n=133)	**Pregnant women with GDM (n=148)**	***p***
Anxiety subscale score	8.33±2.60	9.88±2.93	***<0.001***
Depression subscale score	8.89±2.43	9.18±2.40	*0.328*

Student's t-Test

Comparison of the age of participants with the scores of anxiety and depression subscales revealed a positive correlation with anxiety subscale, but no significant correlation was determined with depression subscale (*p=0.020* and *r=0.142;* p=0.220 and r=0.075, respectively).When the education status of pregnant women was dichotomized as below high school and over high school, no significant correlation was determined between the score of anxiety subscale and education status, whereas the score of depression subscale was significantly higher in primary school graduates (p=0.630 and *p=0.016,* respectively). With regard to the relation between total number of pregnancies, BMI and anxiety and depression subscales, no significant relation was determined with either subscale (p=0.233 and 0.060; p=0.372 and 0.278, respectively). When gestational age was compared with the scores of anxiety and depression subscales, significantly negative correlation was determined with the score of anxiety

subscale, whereas no significant correlation was determined with the score of depression subscale (*p=0.003* and r=-0.180; p=0.432 and r=-0.049, respectively).

It was determined that 68 (63.0%) of the pregnant women with anxiety subscale score of 10 and higher had GDM but 40 (37.0%) did not (*p=0.004*). Of the pregnant women with depression subscale score of 7 and higher, 125 (53.0%) had GDM but 111 (47.0%) did not (p=0.704). The relation of the scores of anxiety and depression subscales with socio-demographic characteristics and history of pregnancy is summarized in Table 3.

Table 3. Relation of the scores of anxiety and depression subscales with sociodemographic characteristics and history of pregnancy

	Anxiety subscale score		***p*** *	**Depression subscale score**		***p*** *
	Below 10	**Over 10**		**Below 7**	**Over 7**	
Age (year)	29.45 ± 5.57	31.15 ± 5.60	***0.016***	29.20 ± 5.26	30.28 ± 5.69	*0.299*
Gestational age (day)	208.25 ± 55.49	194.18 ± 57.35	***0.050***	208.71 ± 51.83	201.40 ± 57.47	*0.471*
BMI (kg/m$^{2)}$	29.50 ± 4.47	30.65 ± 5.79	*0.085*	30.43 ± 5.00	29.86 ± 5.10	*0.569*
	Median (min – max)		***p*** **	**Median (min – max)**		***p*** **
Number of pregnancies	2.00 (1.00-8.00)	3.00 (1.00-12.00)	*0.112*	2.00 (1.00-6.00)	2.00 (1.00-12.00)	*0.919*

**Student's* t Test, ***Mann Whitney* U Test

Discussion

GDM shows an increasing prevalence all over the world with limited number of studies evaluating whether it is a risk factor for antenatal anxiety and depression.[1,6,8,18] The present study was performed to evaluate whether GDM is a risk factor for antenatal anxiety and depression.

In the present study, the mean age of pregnant women with GDM was 32.08 ± 5.44 years and the median number of pregnancies was 3.00 (1.00-12.00), which were significantly higher as compared to the pregnant women without GDM (p<0.001 for both). This has been considered as an expected outcome since age is a risk factor for GDM.[19] Moreover, gestational age was found to be significantly higher in pregnant women without GDM. One of the reasons for this might be the fact that diagnosis of GDM is made regarding a FBG ≥ 126 mg/dl detected during follow-up visits before the 24th week of pregnancy and, consequently, pregnant women detected to have GDM in the earlier weeks of pregnancy have been enrolled in the study. The other reason might be the fact that, pregnant women who did not have GDM regarding OGTT on week 28 of pregnancy and were in the last trimester were also enrolled in the control group.

In the pregnant women of the present study, the mean score of anxiety subscale was 9.16 ± 2.88 and the mean score of depression subscale was 9.05 ± 2.42. With regard to the all pregnant women enrolled in the study, anxiety level was over 10, which is the

cut-off point, in 108 (40.30%) and depression level was over 7, which is the cut-off point, in 236 (88.40%). Pregnancy not only may cause anxiety and stress due to biopsychosocial alterations, but also it is a period when depression could be observed more frequently.[20] Studies conducted in Turkey determined the prevalence of antenatal depression between 27.3% and 36.3%.[4] The risk factors for antenatal depression include; history of previous antenatal depression, presence of any psychiatric disorder prior to the pregnancy, marital problems, unplanned pregnancy, low economic status, lack of social support, pregnancy in early ages, dead delivery, and presence of domestic violence.[4] We found the prevalence of depression in pregnant women in our study higher than the literature. The risk factors for antenatal depression were not evaluated in this study, because the primary aim was anxiety levels. A study determined positive correlation between depression during pregnancy and the anxiety pregnant women experienced, and another study demonstrated signs of anxiety in almost all pregnant women with depression.[21,22] Earlier studies have demonstrated that birth is a cause of anxiety. In Turkey, the prevalence of anxiety in the second and third trimester of pregnancy was found to be 46% and 40.2%, respectively and the prevalence of depression was found to be 26.2% and 38.3%, respectively.[12,13] In the present study, ratio of the pregnant women with anxiety was consistent with the Turkish literature.

When the scores of anxiety and depression subscales in pregnant women were evaluated according to the presence of GDM, the mean score of anxiety subscale was 9.88 ± 2.93 in pregnant women with GDM and 8.33 ± 2.60 in pregnant women without GDM indicating significantly higher mean anxiety subscale score in those with GDM ($p<0.001$). With regard to the mean score of depression subscale, it was found to be over 7, which is the cut-off value, in both groups with no significant difference between the groups. It is known that being diabetic before pregnancy enhances the risk of depression during pregnancy.[6] Some studies demonstrated that GDM does not cause mood alterations in pregnant women and is not a risk factor for antenatal depression.[6,23-25] Nevertheless, there are studies revealing that the diagnosis of GDM may lead to anxiety and depression in pregnant women.[8,11,18,26] There is a study suggesting that GDM enhances emotional stress in pregnant women.[26] Although studies have determined an increase in the level of anxiety and depression at the diagnosis of GDM, no significant difference was determined between pregnant women with and without GDM in terms of anxiety level during pregnancy follow-up.[8,11] The same study determined an increase in anxiety level at initial diagnosis of GDM in pregnant women, but this increase was state rather than trait anxiety and similar in both groups in the 36th week of pregnancy and during postpartum period. On the other hand, no significant difference was determined between pregnant women with and without GDM in terms of anxiety level at diagnosis or throughout follow-up period.[8] Although a similar study determined high levels of anxiety and depression in pregnant women diagnosed with GDM, no significant difference was determined between pregnant women with and without GDM in terms of the level of anxiety and depression in the 36th week of pregnancy.[10] In another study, an increase was determined in anxiety level of pregnant women with GDM.[27,28] The present study determined no anxiety in pregnant women with GDM, whereas the score of anxiety subscale was significantly higher in pregnant women with GDM.

In the present study, a positive correlation was determined between the mean age of pregnant women and the score of anxiety subscale, whereas no significant correlation was determined with depression subscale. In a study, likewise, a relation was determined between the age and anxiety level of pregnant woman.[9] Other studies found a negative correlation between the age of pregnant women and the incidence of depression and determined that getting pregnant at early age is a risk factor for antenatal depression.[12,29,30]

In addition, while no significant relation was determined between education level and score of anxiety subscale, the score of depression subscale was found significantly higher in primary school graduates, which is consistent with the literature.[4,9]

In the present study, the mean age was significantly higher and gestational age was significantly lower in pregnant women with anxiety, whereas no significant difference was determined in terms of these variables in pregnant women with depression. A study found no significant difference between anxiety disorder, depression and the age of pregnant woman.[13]

The limitation of the present study is the fact that potential risk factors that would cause such high prevalence of depression among overall participants have not been evaluated since the present study aimed to assess the prevalence of anxiety in pregnant women with and without GDM.

In conclusion, although pregnancy is a natural event in a woman's life, it is a process that leads to substantial biological and psychosocial changes. Consequently, pregnancy is a high-risk period in a woman's life for experiencing many factors that would generate anxiety and stress. Therefore, in line with the principle of biopsychosocial approach of primary care, anxiety and depression status should also be taken into consideration in pregnant women diagnosed with gestational diabetes.

References:

1. Byrn M, Penckofer S. The Relationship Between Gestational Diabetes and Antenatal Depression. J Obstet Gynecol Neonatal Nurs 2015;44(2):246-55.
2. Melville JL, Gavin AR, Guo Y, Fan MY, Katon WJ. Depressive disorders during pregnancy: Prevalence and risk factors in a large urban sample. Obstet Gynecol 2010;116(5):1064-70.
3. Crowther CA, Hiller JE, Moss JR, McPhee AJ, Jeffries WS, Robinson JS. Effect of Treatment of Gestational Diabetes Mellitus on Pregnancy Outcomes. N Engl J Med 2005;352(24):2477-86.
4. Çalık KY, Aktaş S. Gebelikte Depresyon: Sıklık, Risk Faktörleri ve Tedavisi. Psikiyatride Güncel Yaklaşımlar-Current Approaches in Psychiatry 2011;3(1):142-62.
5. Kim C, Brawarsky P, Jackson RA, Fuentes-Afflick E, Haas JS. Changes in health status experienced by women with gestational diabetes and pregnancy-induced hypertensive disorders. J Womens Health (Larchmt) 2005;14(8):729-36.
6. Katon JG, Russo J, Gavin AR, Melville JL, Katon W. Diabetes and depression in pregnancy: Is there an association? J Womens Health (Larchmt) 2011;20(7):983–9.
7. Vesga-Lopez O, Blanco C, Keyes K, Olfson M, Grant BF, Hasin DS. Psychiatric Disorders in Pregnant and Postpartum Women in the United States. Arch Gen Psychiatry 2008;65(7):805–15.
8. Daniells S, Grenyer BF, Davis WS, Coleman KJ, Burgess JA, Moses RG. Gestational diabetes mellitus: is a diagnosis associated with an increase in maternal anxiety and stress in the short and intermediate term? Diabetes Care 2003;26(2):385-9.
9. Eskicı L , DemırAkca AS , Atasoy N, Arıkan İ, Harma M. Gebelerde Depresyon Ve Anksiyete Bozukluğunun Obstetrik Sonuçlari ve Yenidoğan Üzerine Etkileri. Anatol J Clin Investig 2012;6(1):10-6.

10. Rumbold AR, Crowther CA. Women's experiences of being screened for gestational diabetes mellitus. Aust N Z J ObstetGynaecol 2002;42:131-7.
11. Moyer VA. U.S. Preventive Services Task Force: Screening for Gestational Diabetes Mellitus: U.S. Preventive Services Task Force Recommendation Statement. Ann Intern Med 2008;148:759-65.
12. Tekgöz İ, Sunay D, Çaylan A, Kısa C. Gebeliğin son 3 ayında anksiyete bozukluğu ve ilişkili faktörlerin değerlendirilmesi. Türk Aile Hek Derg 2009;13(3):132-6.
13. Ortaarık E, Tekgöz İ, Ak M, Kaya E. İkinci Trimestır Gebelerde Depresyon ve Anksiyete Bozukluğuile İlişkili Faktörlerin Değerlendirilmesi. İnönü Üniversitesi Sağlık Bilimleri Dergisi 2012;1:16-20.
14. Standarts of Medical Care in Diabetes 2015. American Diabetes Association. Diabetes Care 2015;38(Suppl 1):8-16.
15. Aydemir Ö, Köroğlu E (editors). Bölüm 2: Klinik Ölçekler. In: Psikiyatride Kullanılan Klinik Ölçekler. 4th ed. Ankara: HYB Basım Yayın. 2009:206-10.
16. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand 1983;67(6): 361-70.
17. Aydemir Ö, Güvenir T, Küey L, Kültür S. Hastane Anksiyete ve Depresyon Ölçeği Türkçe Formunun Geçerlik Güvenilirlik Çalışması. Türk Psikiyatri Derg 1997;8(4):280-7.
18. Trutnovsky G, Panzitt T, Magnet E, Stern C, Lang U, Dorfer M. Gestational diabetes: women's concerns, mood state, quality of life and treatment satisfaction. J Matern Fetal Neonatal Med 2012; 25(11):2464–6.
19. Satman İ, İmamoğlu Ş, Yılmaz C, Akalın S, Salman S, Dinççağ N. TEMD Diabetes Mellitus Çalışma ve Eğitim Grubu: Glisemik Bozukluklarda Tanı, Sınıflama ve Tarama. In: Diabetes Mellitus ve Komplikasyonlarının Tanı, Tedavi ve İzlem Kılavuzu. 7th ed., Ankara: BAYT Bilimsel Araştırmalar Basın Yayın ve Tanıtım Ltd Şti. 2015:28-30.
20. Vırıt O, Akbaş E, Savaş HA, Sertbaş G, Kandemir H. Gebelikte depresyon ve kaygı düzeylerinin sosyal destek ile ilişkisi. Arch Neuropsychiatr 2008;45:9-13.
21. Karaçam Z, Ançel G. Depression, anxiety and influencing factors in pregnancy: A study in a Turkish population. Midwifery 2009;25:344-56.
22. Bödecs T, Horvath B, Kovacs L, Diffellne Nemeth M, Sandor J. Prevalence of depression and anxiety in early pregnancy on a population based Hungarian sample. Orv Hetil 2009;150:1888-93.
23. Langer N, Langer O. Comparison of pregnancy mood profiles in gestational diabetes and preexisting diabetes. Diabetes Educ 2000;26:667-72.
24. Kim C, Brawarsky P, Jackson RA, Fuentes-Afflick E, Haas JS. Changes in health status experienced by women with gestational diabetes and pregnancy-induced hypertensive disorders. J Womens Health 2005;14:729-36.
25. Mautner E, Greimel E, Trutnovsky G, Daghofer F, Egger JW, Lang U. Quality of life outcomes in pregnancy and postpartum complicated by hypertensive disorders, gestational diabetes, and preterm birth. J Psychosom Obstet Gynaecol 2009;30:231–7.
26. Lawson EJ, Rajaram S. A transformed pregnancy: the psychosocial consequences of gestational diabetes. Sociol Health Illn 1994;16(4):536–62.
27. Lapolla A, Di Cianni G, Di Benedetto A et al. Quality of Life, Wishes, and Needs in Women with Gestational Diabetes: Italian DAWN Pregnancy Study. Int J Endocrinol 2012;2012:784726.
28. Beucher G, Viaris de Lesegno B, Dreyfus M. Maternal outcome of gestational diabetes mellitus. Diabetes Metab 2010;36(6 Pt 2):522–37.
29. Lau Y, Keung DWF. Correlates of depressive symptomatology during the second trimester of pregnancy among Hong Kong Chinese. Soc Sci Med 2007;64:1802-11.
30. Figueiredo B, Pacheco A, Costa R. Depression during pregnancy and thepostpartum period in adolescent and adult Portuguese mothers. Arch Womens Ment Health 2007;10:103-9.