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# Hyperemesis and Threatened Abortion in Early Pregnancy: Relationship with Anxiety and Depression and Review of the Literature

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**HYPEREMESIS (HG) AND THREATENED ABORTION (TA) IN EARLY PREGNANCY: THE RELATIONSHIP WITH ANXIETY AND DEPRESSION AND REVIEW OF THE LITERATURE**

**ABSTRACT**

**Objective:** This study evaluated the current state of anxiety and depression levels in patients with HG and TA and compared the prevalence of anxiety and depression levels with healthy pregnant controls. The aim of this prospective case-control study was to investigate the possible relationship between anxiety, depression and HG and TA and compare the results with healthy pregnant controls.

**Patients and Methods:** A prospective case–control study was performed at our tertiary referral centre. 84 consecutive women with HG and 88 consecutive women with TA constituted our study group and 98 healthy pregnant women constituted our control group. Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI) were administered to patients during the psychiatric interview for the anxiety and depression evaluation.

**Results:** The mean BAI scores in HG, TA and healthy control groups were 17.34 ± 8.97, 17.23 ± 8.71 and 7.03 ± 5.45, respectively. The mean BDI scores in HG, TA and healthy control groups were 15.54 ± 7.81, 16.27 ± 6.72 and 6.68 ± 5.28, respectively.

**Conclusion:** The findings of this study indicated a potential link between HG, TA and anxiety and depression disorders. Therefore, patients with HG and TA during pregnancy should be evaluated in terms of anxiety and depression disorders as much as their medical conditions. Medical professionals should be sensitive to psychological consequences of HG and TA.

**Keywords:** anxiety, depression, hyperemesis, pregnancy, threatened abortion.

**ERKEN GEBELİKTE HİPEREMEZİS VE DÜŞÜK TEHTİDİ: ANKSİYETE VE DEPRESYON İLE İLİŞKİSİ VE LİTERATÜR TARAMASI**

**ÖZET**

**Amaç:** Bu çalışma hiperemezis (HG) ve düşük tehtidi (Aİ) olan hastaların mevcut anksiyete ve depresyon seviyelerini değerlendirmekte ve ayrıca anksiyete ve depresyon prevelanslarını sağlıklı gebe kontrolleri ile karşılaştırmaktadır. Bu prospektif vaka-kontrol çalışmasının amacı anksiyete ve depresyon ile HG ve Aİ arasındaki olası ilişkiyi araştırmak ve bu sonuçları sağlıklı gebe kontrolleri ile karşılaştırmaktır.

**Hastalar ve Yöntemler:** Bu prospektif vaka-kontrol çalışması üçüncü basamak referans hastenemizde gerçekleştirildi. Hiperemezisli 84 hasta ve düşük tehtidi olan 88 hasta çalışma grublarımız oluşturken; 98 sağlıklı gebe kadın ise kontrol grubumuzu oluşturdu. Hastalara anksiyete ve depresyon değerlendirmesi için psikiyatrik değerlendirme sırasında Beck Anksiyete Ölçeği (BAI) ve Beck Depresyon Ölçeği (BDI) uygulandı.

**Sonuçlar:** Ortalama BAI skoru HG, Aİ ve sağlıklı kontrol grubunda sırasıyla 17.34 ± 8.97, 17.23 ± 8.71 ve 7.03 ± 5.45 idi. Ortalama BDI skoru HG, Aİ ve sağlıklı kontrol grubunda sırasıyla 15.54 ± 7.81, 16.27 ± 6.72 ve 6.68 ± 5.28 idi.

**Sonuç:** Bu çalışmanın bulguları HG ve Aİ ile anksiyete ve depresyon arasında potansiyel bir bağlantı göstermektedir. Bu nedenle, gebelikte HG ve Aİ hastaları tıbbi durumları kadar anksiyete ve depresyon açısından da değerlendirilmelidirler. Klinisyenler HG ve Aİ'in psikolojik sonuçları konusunda duyarlı olmalıdırlar.

**Anahtar sözcükler:** anksiyet, depresyon, düşük tehtidi, hiperemezis, gebelik

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Nausea and vomiting during pregnancy (NVP), known as morning sickness, and first-trimester bleeding are the two most common pregnancy-related diseases in early pregnancy. NVP affects about 70 - 80 percent of pregnant women and first-trimester bleeding is seen in about 16 – 25% of all pregnancies (1-3). Hyperemesis gravidarum (HG) is an extreme form of morning sickness characterized by severe, intractable nausea and vomiting in early pregnancy and associated with dehydration, ketonuria, fluid- electrolyte imbalance, nutrition deficiency and weight loss (4,5). It affects about 0.3 – 2% of all pregnancies (4). Threatened abortion (TA) is a pregnancy-related complication characterized by vaginal bleeding before 20 weeks of pregnancy while the cervix is closed and an intrauterine viable fetus is confirmed by the ultrasound (6). HG and TA are the leading causes of maternal hospitalisation during pregnancy (2). Although the exact etiology and pathophysiology of HG and TA are not completely known, it currently accepted that HG is a multifactorial disorder of pregnancy resulting from the combination of various unrelated conditions such as genetic, environmental, hormonal and psychiatric and the cause of the first-trimester bleeding is due to a minor condition that requires no treatment (4).

Many studies have investigated the association between HG and maternal psychological morbidity (7-10). The relationship between anxiety, depression and HG has also been investigated in some previous studies (11-18). However, most of these studies have provided conflicting results. In addition to conflicting results, most studies on the psychological components of HG had significant limitations such as retrospective study design, lack of proper sample size, lack of a control group, lack of objective diagnostic criteria, bias and varying definitions of disease. A possible relation between anxiety, depression and HG has been reported by some authors while others have not found this connection (7,8,14-18). The negative emotional impact of miscarriage and pregnancy loss on maternal psychology has also been shown previously. Several clinical studies reported that for most women HG and miscarriage are quite distressing conditions and that the psychological consequences can be enormous (19-28). All of these studies have focused on abortions associated with early pregnancy loss such as spontaneous abortion, induced abortion and recurrent abortion. However, there is no comprehensive study specific to psychological morbidities, such as anxiety and depression disorders, in patients with TA. After sonographic confirmation of fetal cardiac activity, nearly 95% to 98% of TA continue beyond 20 weeks of gestation and do not result in miscarriage or pregnancy loss (3,29,30).

Understanding the emotional impact, psychological aspects and psychiatric consequences of these fairly common complications of early pregnancy is therefore an important contribution to obstetric care and public health. In literature, there are many studies investigating the psychological aspects and sequelae of HG, miscarriage and early pregnancy loss, but prospective case-controlled studies specific to anxiety and depression disorders in patients with HG and TA are limited.To the best of our knowledge, this is the first prospective case-controlled study in which HG, TA and healthy control groups have been included together. This study evaluated the current state of anxiety and depression levels in patients with HG and TA and compared the prevalence of anxiety and depression levels with healthy pregnant controls. The aim of this prospective case-control study was to investigate the possible relationship between anxiety, depression and HG and TA and compare the results with healthy pregnant controls.

## Material and methods

A prospective case–control study was performed at our Obstetrics and Gynecology Clinic, between April 2013 and September 2014. The study was approved by the institutional ethics committee and all participants signed an informed consent form regarding participation in the study.

Eighty-four consecutive women with HG and eighty-eight consecutive women with TA who were hospitalized in our Obstetric Inpatient Clinic constituted our study groups. 98 healthy pregnant women, admitted to our obstetric outpatient clinic for routine antenatal care, without signs or symptoms of HG or miscariage, matched for age, parity, body mass index and gestational age constituted our healthy control group. All patients included in the study had a singleton pregnancy.

Inclusion criteria for HG and TA groups were as follows: age 18 years or older; a single viable intrauterine pregnancy confirmed by precise date of the last menstrual period and an ultrasound scan; normal closed cervix on cervical examination; written approval and willingness to comply with the study. Our exclusion criteria for all groups were as follows: history of any pregnancy loss (e.g., spontaneous abortion, induced abortion, recurrent abortion and still births), history of any medical problem (e.g., endocrine abnormalities, gastrointestinal, cardiovascular and pulmonary system diseases) or psychiatric disorder (e.g., depression, anxiety, bipolar disorder, delirium, eating disorders, and psychotic disorder), multiple pregnancies, history of any gynecological or obstetric pathology (e.g.,

uterine anomalies, placenta praevia, placental abruption, and preterm delivery), known obstetric complications such as gestational hypertension, gestational trophoblastic disease or ectopic pregnancy, history of trauma during current pregnancy, congenital fetal anomalies, hydrops, intrauterine fetal deaths, any systemic diseases or medication (including antidepressant, anti-psychotic or other psychiatric drugs during the last 6 months) that would affect the test results, current or past history of illegal drug or narcotic use and cognitive incompetence which can make it difficult to understand how to score The Beck Anxiety or Depression Inventory. Moreover, pregnancies under 4 weeks of gestation and pregnancies over 20 weeks of gestation were also excluded from the study. In addition, patients who refused the vaginal examination with transvaginal ultrasonography and vaginal speculum were also excluded from the study. Patinets with recurrent admissions for HG or TA to our Obstetric Inpatient Clinic were only recruited during their first hospitalization.

Diagnosis of HG was made based on clinical criteria. Other causes of vomiting, such as gastroenteritis, cholecystitis, acute pancreatitis, gastric outlet obstruction, pyelonephritis, primary hyperthyroidism, primary hyperparathyroidism, or liver dysfunction were excluded. Threatened abortion is defined as a history of vaginal bleeding before the twentieth week of pregnancy while the cervix is closed and an intrauterine fetal cardiac activity is confirmed by the ultrasound. Diagnosis of TA was made based on clinical criteria while other causes of vaginal bleeding, such as cervical polyps, cervicitis, cervical erosion and other gynecological pathologies were excluded.

All patients who met eligibility criteria were sequentially recruited by a research coordinator (U.A.) at the study site. All participants were educated about the study and gave their informed written consents for study participation. After informed consent, the participants completed an enrollment questionnaire assessing sociodemographic characteristics and medical information. The final study group was composed of 270 subjects. Each subject underwent a comprehensive medical and obstetric examination along with obstetric ultrasound to confirm the intrauterine pregnancy as well as to exclude any relevant obstetric pathology (e.g., twin pregnancy, molar pregnancy or missed abortion). Gestational age was determined with ultrasound screening on the basis of the last menstrual period. All obstetric procedures and study informing were performed by a single obstetrician (U.A.) to avoid interobserver variability. After recording the socio-demographic and clinical characteristics of participants in the obstetric clinic, patients were referred to the psychiatry department. All of the psychiatric interviews were conducted by a single experienced psychiatrist (Y.U.) to avoid possible observer-dependent factors (counseling, patient preparation, moral and psychological support). The Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) (SCID-I), was used to evaluate anxiety and depression. A Beck Anxiety Inventory (BAI) and a Beck Depression Inventory (BDI) were administered to patients during the psychiatric interview and were evaluated by the same psychiatrist.

## Measures

SCID-I is a semi-structured interview instrument used to establish Axis I psychiatric disorders according to DSM-IV criteria (31). This instrument is widely used in clinical practice and for research purposes all over the world. The interview instruments have been standardized for Turkish populations (32). In this study, we used The Beck Anxiety Inventory and The Beck Depression Inventory.

The Beck Anxiety Inventory (BAI): The BAI is a 21-item multiple-choice self-report inventory that measures the severity of anxiety with a 0-3 scoring system (33). The total score ranges 0–63. Higher total scores indicate more severe anxiety symptoms. The Turkish version of the BAI used in this study has been validated in Turkish populations (34).

The Beck Depression Inventory (BDI): The BDI is a 21-item, multiple-choice, self-report inventory that measures the severity of depression with a 0-3 scoring system (0 = "least" and 3 = "most") (35). The total score is obtained by the sum of all BDI item scores. The total score ranges 0 – 63 with higher scores indicating more severe depressive symptoms. The Turkish version of the BDI used in this study has been validated in Turkish populations (36). Scores from 0 to 9 represent no depression, scores of 10 to 16 indicate mild depression, scores of 17 to 29 indicate moderate depression, and scores of 30 to 63 indicate severe depression (37). Questionnaires take approximately 15 minutes to fill. However, this period may vary depending on the patient's level of education.

## Statistical analysis

Continuous variables were expressed as mean ± standard deviation and median (min - max), whereas categorical variables were denoted as numbers or percentages where appropriate. Kolmogorov-Smirnov Goodness of Fit test was used to test the distribution of data. For the normal disrtibuted data the One Way ANOVA test (Bonferroni

**Table 1**. Some demographic and clinical characteristics of groups.

| | *HG Group (n=84) (Mean±SD)* | *TA Group (n=88) (Mean±SD)* | *Control Group (n=98) (Mean±SD)* | *P* |
|---|---|---|---|---|
| **Age** | 27.28 ± 5.70 | 27.63 ± 6.19 | 26.77 ± 5.76 | 0.639** |
| **BMI** | 25.70 ± 3.64 | 25.42 ± 4.67 | 26.29 ± 4.21 | 0.356* |
| **Gravidity** | 2.51 ± 1.16 | 2.48 ± 1.33 | 2.57 ± 1.31 | 0.870** |
| **Parity** | 1.32 ± 0.94 | 1.26 ± 1.03 | 1.30 ± 1.04 | 0.876** |
| **Gestational age** | 8.84 ± 1.84 | 8.72 ± 1.87 | 8.93 ± 1.95 | 0.653** |

*One Way ANOVA (Bonferroni adjusted)
**Kruskal Wallis Test

adjusted) was used to compare clinical outcomes and scores between groups. When the distributions were not normal the Kruskal Wallis Test (Bonferroni adjusted Mann Whitney U Test) was used to compare these variables. The Chi-square Test was used to compare categorical data. Collected data were analyzed by Statistical Package for Social Sciences version 22.0 (SPSS Inc., Chicago, IL, USA). Two-tailed P value less than 0.05 was accepted to be statistically significant.

## Results

326 patients enrolled in the study, 56 patients were excluded, , 27 of which refused to participate in the study, and 29 did not meet the inclusion criteria.Therefore our analyses included a total of 270 patients who fulfilled the inclusion criteria. A total of 84 women with HG, 88 women with TA and 98 healthy pregnant women completed the survey. Some demographic and clinical characteristics for each of the groups are shown in Table 1. There was no statistically significant difference among the 3 study groups in terms of mean age, gravidity, parity, gestational age or BMI which are listed in Table 1. All of the participants were married and were in the first trimester of gestation.

The mean BAI scores in HG, TA and healthy control groups were 17.34 ± 8.97, 17.23 ± 8.71 and 7.03 ± 5.45, respectively. The mean BDI scores in HG, TA and healthy control groups were 15.54 ± 7.81, 16.27 ± 6.72 and 6.68 ± 5.28, respectively. Significant differences were found between two study groups (HG and TA) and the healthy control group regarding mean BAI and BDI scores ($P < 0.001$). Mean BAI and BDI scores of the participants in three groups are presented in Table 2. A total of 42 (50%) of the women in the HG group, 45 (51.2%) in the TA group and 5 (5.1%) in the healthy control group had BAI scores of ≥ 16 and were classified as having moderate or severe anxiety levels.

The prevalence of anxiety and depression levels of patients in each group, according to anxiety and depression degree, are shown in Table 3.

The prevalence of moderate or severe depression levels (BDI score of ≥ 17) in HG, TA and control groups were 32 (38.1%), 38 (43.1%) and 5 (5.1%), respectively. There was a significant difference between two study groups (HG and TA) and the healthy control group regarding the anxiety and depression level distributions ($P < 0.001$). Significantly higher mean BAI and BDI scores were found in HG and TA study groups. When the results were investigated, Beck anxiety and Beck depression scores were higher in HG and TA study groups ($P < 0.001$).

## Discussion

We evaluated the current state of anxiety and depression levels in patients with HG and TA and compared the prevalence of anxiety and depression levels with healthy pregnant controls. The most important finding of this study is that approximately half of the patients with HG and TA had moderate or severe anxiety levels, and roughly forty percent of patients with HG and TA had moderate or severe depression levels. These prevalence rates were quite higher than the rates for healthy control subjects.

In literature, there are many studies investigating the relationship between anxiety, depression and HG (7-18). However, most studies investigating this link have provided conflicting results (7,8,14-18). Several studies have also demonstrated that there is a possible relationship between anxiety, depression and HG (11,12). In 2008, Köken et al performed a prospective analysis of 230 women with NVP where a significant correlation between severity of NVP and both anxiety and depression scores was found (8). Tan et al. analyzed 209 hospitalized patients with HG to determine the prevalence and the risk factors of anxiety

**Table 2**. Comparison of the mean BAI and BDI scores of groups.

| | | *HG Group (Mean±SD)(n=84)* | *TA Group (Mean±SD)(n=88)* | *Control Group (Mean±SD)(n=98)* | *P* |
|---|---|---|---|---|---|
| **Mean Score** | **BAI** | 17.34 ± 8.97 | 17.23 ± 8.71 | 7.03 ± 5.45* | <0.001* |
| **Mean Score** | **BDI** | 15.54 ± 7.81 | 16.27 ± 6.72 | 6.68 ± 5.28** | <0.001** |

*One Way ANOVA (Bonferroni adjusted)
**Kruskal Wallis Test (Bonferroni adjusted Mann Whitney U Test)

**Table 3**. The prevalence of anxiety and depression levels in groups.

| *Psychiatric Disorders, n (%)* | *HG Group (n=84)* | *TA Group (n=88)* | *Control Group (n=98)* | *P* |
|---|---|---|---|---|
| **Anxiety** | | | | |
| Minimal | 11 (13.1) | 10 (11.4) | 57 (58.2) | <0.001* |
| Mild | 31 (36.9) | 33 (37.5) | 36 (36.7) | |
| Moderate | 26 (31.0) | 29 (33.0) | 3 (3.1) | |
| Severe | 16 (19.0) | 16 (18.2) | 2 (2.0) | |
| **Depression** | | | | |
| No | 20 (23.8) | 9 (10.2) | 72 (73.5) | <0.001* |
| Mild | 32 (38.1) | 41 (46.6) | 21 (21.4) | |
| Moderate | 28 (33.3) | 34 (38.6) | 4 (4.1) | |
| Severe | 4 (4.8) | 4 (4.5) | 1 (1.0) | |

*Chi-square Test

and depression at their first hospitalization for HG (11). They reported that anxiety and depression disorders were common in women affected by HG and the psychological distress associated with HG was a direct consequence rather than a cause of HG. However, the Hospital Anxiety and Depression Scale was used in these studies as the psychiatric symptom scale, and this scale has low clinical value. This potential relationship between psychiatric disorders and HG during pregnancy was described by some other researchers (7,17,38). These studies using psychiatric symptom scales suggest that nausea and vomiting in early pregnancy were significantly correlated with anxiety and depression symptoms. In an extensive study conducted by, Seng et al. a retrospective analysis of 11,016 singelton pregnancies over a 4-year period (10) was performed. The authors analyzed insurance data for all 11,016 patients, 208 of whom had HG. It was found that patients with HG had more frequent psychiatric diagnoses preceding the pregnancy compared to the control subjects. In another study conducted by Pirimoglu et al using a psychiatric symptom scale showed that women with HG had higher psychological distress scores than those in the control group. In this prospective case-control, data of 34 women with HG who were hospitalized were analyzed over a 2-year period (9).

The mean BAI and BDI scores in the HG study group were 17.34 ± 8.97 and 15.54 ± 7.81, respectively. These findings were comparable with a mean BAI score of 17.38 ± 12.58 and a mean BDI score of 15.38 ± 9.18 for the patients with HG in the first trimester reported in a previous study conducted by Annagür (13). Another study conducted by the same author Annagür et al., reported similar BAI and BDI scores . (38). The mean BAI and BDI score for the patients with HG were 17.8 ± 12.8 and 15.7 ± 9.3 respectively. The rate of anxiety and depression disorder for patients in the HG group obtained in our study was 50% and 38.1%, respectively. These results were consistent with the rate of 46.2% reported by Uguz (12).

In our study, the current prevalence rate of moderate and severe anxiety levels in patients with HG, TA and healthy control subjects were 50%, 51.2% and 5.1%, respectively. The current prevalence rate of moderate and severe depression levels in patients with HG, TA and healthy control women were 38.1%, 43.1% and 5.1%, respectively. Epidemiological studies have indicated that 2.2% – 15.6% of women in the first trimester have anxiety or depression disorder (39,40). When our study results compared with these large-scale epidemiological studies, our study suggest that patients with HG more commonly experience anxiety or depression disorders compared to healthy pregnant controls without HG. In a systematic review, Bennett et al investigated the prevalence of depression during pregnancy (39). Authors reported that the prevalence of depression in the first trimester was 7.4% (range from 2.2% to 12.6%). The results of this systematic review are similar to our findings. In our study, only 5.1% of patients in the healthy pregnant group had moderate or severe depression levels.

Over the past three decades, numerous studies have also been published indicating the negative emotional impact of miscarriage and pregnancy loss on maternal psychology. There is increasing evidence that miscarriage causes significant adverse maternal psychological outcomes such as depression, anxiety, anger, and grief (19-28). In 1989,

Friedman et al. analyzed 67 women who had spontaneous abortions four weeks prior to determine the prevalence of depressive disorder following miscarriage (19). They reported that up to 50% of women developed depressive disorder following miscarriage and depressive symptoms were significantly associated with a history of previous spontaneous abortion. Recently, Chojenta et al. using the data of the Australian Longitudinal Study on Women's Health (ALSWH) which is a prospective cohort study investigating the health of over 40,000 Australian women, reported that women with a previous pregnancy loss were more likely to experience sadness or low mood, and excessive worry during a subsequent pregnancy (26). In a systematic review, Geller et al. reviewed the literature regarding anxiety symptomatology and disorders following miscarriage (21). Authors reported that miscarrying women were at increased risk for anxiety symptoms immediately following miscarriage and continuing until approximately 4 months post-loss. In 2011, another systematic review conducted by Coleman et al analyzed the studies published between 1995 and 2009 to measure the association between abortion and indicators of adverse mental health (27). It was found that abortion is a statistically validated risk factor for the development of various psychological disorders. Neugebauer et al. performed a prospective analysis of 459 pregnant women (20). In this prospective case-control study, data from 229 patients with spontaneous abortion and 230 control women were analyzed and it was found that 10.9% of women with sporadic miscarriages experienced at least one episode of major depression. In another study, Craig et al. reported depression disorders in 33% of patients with recurrent miscarriages (28).

In our study, the overall prevalence rate of moderate or severe anxiety and depression levels were significantly higher in the patients with TA than in the healthy control cases. We found no published reports including a comparison of prevalence rates of anxiety and depression levels between patients with TA and healthy controls. However, to compare our study findings with findings of previous studies is difficult because all previous studies have focused on abortions that resulted in fetal loss such as spontaneous abortion, induced abortion and recurrent abortion. However, there is no comprehensive, prospective case-controlled study specific to emotional and psychological consequences such as anxiety and depression levels in patients with TA. Threatened miscarriage is different from other types of abortion, because after the documentation of a living embryo, 95% to 98% of threatened abortions do not miscarry and continue beyond 20 weeks of gestation (3,29,30,41). Although the present study was different from the previous studies, the results of these previous studies were similar to our findings when a comparison was made. The most comprehensive review evaluating psychological morbidity following miscarriage was conducted by Lok et al in 2007 (22). In this comprehensive review, there were numerous studies showing the association between miscarriage and anxiety or depression disorders. The prevalence of major depressive disorder among the miscarrying women in the Friedman's study was 48% (19). Garel et al reported a similar prevalence rate of 51% for major depression. (42). However, both studies lacked a gestational age-matched healthy comparison group. In many other studies, elevated anxiety and depressive symptoms were reported in 10 - 55% of miscarrying women shortly after miscarriage (23-25).

The data collection from a single obstetrics clinic from one geographic region is the potential limitation of the study. Therefore, the generalizability of our findings is limited. The absence of longitudinal data as well as control data on psychological symptoms pre-conceptionally and after recovery from illness is another limitation of this study. In this current study psychological distress scores were obtained in only physical illness period in the first trimester of gestation. This study has many strengths. The major strength of this study was its prospective nature and the inclusion of HG, TA and healthy control groups together. Other important strengths of the study include wide and strict exclusion criteria, and the use of both psychiatric interviews and self-report measures standardized for study populations to assess anxiety and depression scores. In addition, all psychiatric interviews were performed by a single experienced psychiatrist (YU) to avoid possible observer-dependent factors.

Until now, the possible relationship between anxiety, depression and these fairly common early pregnancy-related diseases have been investigated separately. This is the first study in which HG, TA and healthy control groups were included together. Anxiety and depression disorders are the most common psychiatric conditions among patients with HG and miscarrying women. The present study showed that TA can produce an anxiety and depression reaction as substantial as pregnancy loss. For pregnant women, the possibility of pregnancy loss has always been a source of psychological distress. Therefore, given the often sudden and unexpected nature of the event, TA could be the cause of a range of psychological reactions, ranging from grief to anxiety and depression. Psychological symptoms in patients with HG are probably a response to physical illness associated with HG.

In conclusion, roughly half of patients with HG and TA had moderate or severe anxiety and depression levels. The psychological distress associated with TA and physical discomfort associated with HG were direct consequences rather than causes of diseases. The findings of this study indicated a potential link between HG, TA and anxiety and depression disorders. Therefore, patients with HG and TA during pregnancy should be evaluated in terms of anxiety and depression levels as much as their medical conditions. Medical professionals should be sensitive to the psychological consequences of HG and TA. However, further larger scale, prospective controlled and homogeneous studies are needed to confirm these results.

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