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Is there any effect of demographic features on development of hyperemesis gravidarum in the Turkish population?

Zeynep KAMALAK[1], Nermin KÖŞÜŞ[2], Aydın KÖŞÜŞ[2], Deniz HIZLI[2,*], Aylin AYRIM[2], Gonca KURT[1]

[1]Department of Obstetrics and Gynecology, Afşin State Hospital, Kahramanmaraş, Turkey

[2]Department of Obstetrics and Gynecology, Faculty of Medicine, Turgut Özal University, Ankara, Turkey

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Aim: To assess the effect of maternal demographic variables on development of hyperemesis gravidarum (HG) in pregnant Turkish women.

Materials and methods: Two hundred consecutive women with HG were defined as the study group, and 200 consecutive pregnant women without any signs or symptoms of HG matched for age, parity, and gestational age were defined as the control group. Personal information, including lifestyle, educational level, occupation, and economic status were obtained via questionnaire.

Results: The number of abortions was higher but parity was lower in the HG group. The time interval between 2 pregnancies was significantly shorter in the HG group than in the control group. HG developed in all women who had HG in a previous pregnancy. HG was significantly higher in women who graduated from high school or university. Level of monthly income and communication within the family have an effect on development of HG. Logistic regression analysis showed that the most important parameters for prediction of HG were education level, age at marriage, and previous history of abortus.

Conclusion: Living conditions, life standards, communication, and experiences in previous pregnancies might affect development of HG.

Key words: Hyperemesis, pregnancy, demographic features, communication

1. Introduction

Hyperemesis gravidarum (HG) is described as unexplained excessive nausea and vomiting during pregnancy, leading to fluid and electrolyte imbalance, nutritional deficiency, and weight loss that might require hospital admission. It occurs in about 0.5% to 2% of pregnant women and is the most common cause of admission to the hospital in early pregnancy (1–4).

HG is an important condition since the diagnosis of HG is associated with low birth weight, intrauterine growth restriction, preterm delivery, and fetal and neonatal death if maternal weight gain is restricted (5–7). It also worsens the quality of life of women.

Many etiopathogenic factors have been considered for HG, including endocrine-hormonal factors, especially higher levels of human chorionic gonadotropin, progesterone, and thyroid hormones during early pregnancy; hepatic dysfunction; changes in lipid metabolism; presence of *Helicobacter pylori* or dysmotility of the upper gastrointestinal system; and psychological factors. However, no specific causative factor has been established (8).

It was shown in previous studies that HG is associated with young maternal age, first pregnancy, obesity, and stress (9). It is also more common in housewives and women with a history of HG in a previous pregnancy or in a family more likely to have nausea and vomiting during pregnancy (10). On the other hand, despite the adverse effects of smoking on pregnancy, the chance of having HG is decreased in smokers (10,11). Demographic characteristics of patients with HG may differ with regard to genetic and sociocultural factors. However, demographic features of women with HG have not been studied in the Turkish population to date.

In this study we examined the effect of maternal demographic variables on development of HG in a Turkish pregnant population.

2. Materials and methods

This was a case-control study, and all singleton pregnancies with a diagnosis of HG at the Afşin Public Hospital Department of Obstetrics and Gynecology between September 2010 and September 2011 were included in

* Correspondence: denizhizli@yahoo.com

the study. Pregnancies with congenital anomalies and/or women with any systemic disease were excluded.

Two hundred consecutive women with HG were defined as the study group, and 200 consecutive pregnant women without any signs or symptoms of HG and matched for age, parity, and gestational age were defined as the control group. The study was approved by the local ethics committee, and an informed consent form was obtained from all participants.

Diagnosis of HG was made based on the criteria of observation of at least 3 vomiting episodes a day, loss of at least 5% of total body weight, and ketonuria. Patients with known thyroid disease, multiple gestation, gestational trophoblastic disease, and psychological and gastrointestinal disorders were excluded.

Personal information, including lifestyle, educational level, occupation, and economic status were obtained via questionnaire. Gestational age was determined by crown rump length measurement in the first trimester of pregnancy. Groups were comparable for age, parity, and gestational age.

Data were analyzed with SPSS 15.0 for Windows (SPSS Inc., Chicago, IL, USA). Data were transferred to a computer. Error control and necessary corrections were performed. Groups were controlled in terms of conformity to normal distribution by graphical check and Shapiro–Wilk test. Median (IQR) was used for groups that were not distributed normally. Categorical variables are expressed as number and percentage. Chi-square tests were conducted to test the distribution between categorical variables. The Mann–Whitney test was used to compare groups. Logistic regression analysis was used to evaluate the value of parameters to predict hyperemesis gravidarum. $P \leq 0.05$ was taken as significant. Power analysis of the study showed that with a total of 352 patients, 176 cases for each group were needed to gain 80% power when the alpha error was set at 0.05, beta error at 0.20, and effect size at 0.30.

3. Results

Two hundred women with HG and 200 consecutive pregnant women without any signs or symptoms of HG were included in the study. Median age, gravida, and parity were 25 (9) years, 2 (2), and 1 (2), respectively. There was no difference between groups in terms of age, age at marriage, and age at first pregnancy ($P = 0.160$, $P = 0.980$, and $P = 0.447$, respectively). Demographic variables according to the groups are shown in the Table.

Comparison of the case and control groups in terms of gravida revealed no difference ($P = 0.544$), whereas a significant difference was observed in terms of parity and abortus. The number of aborti was higher in the HG group, but parity was lower in the HG group than the control group ($P < 0.001$, $P = 0.045$, respectively). Time interval between 2 pregnancies was significantly shorter in the HG group than in the control group ($P < 0.001$).

HG developed in all women who had HG in their previous pregnancy ($P < 0.001$). For women who did not experience HG in a previous pregnancy, HG was seen in 36.7% of cases.

HG was seen in 47.7% of women who delivered vaginally in a previous pregnancy and 49.3% of women who had a cesarean section in a previous pregnancy. There was no difference between the HG and control groups in terms of previous route of delivery ($P = 0.825$). Preterm delivery was seen in 2 cases in the HG group. There was no case in the control group with preterm labor. Previous premature labor had no significant effect on HG development ($P = 0.230$). There was no difference between groups in terms of fetal sex ($P = 0.483$). Gestational diabetes and hypertension were seen in none of the patients. None of the women were smoking or drinking alcohol.

HG was detected in 44.6% of illiterate women, 45.4% of women who graduated from primary school, 69.7% of women who graduated from high school, and 100% (6 cases) of women who graduated from university. Comparison of case and control groups revealed that HG was significantly higher in women who graduated from high school or university ($P < 0.001$).

Evaluation of groups in terms of occupation revealed no difference ($P = 0.499$). Most of the women were housewives. HG was seen in 49.7% of women who had no occupation. Only 2 women in the HG group were employed.

Evaluation of the occupation of the husband showed that HG developed in 47.6% of women whose husbands were laborers and 100% of women whose husbands were civil servants. HG was seen at a significantly higher ratio in women whose husbands were civil servants ($P < 0.001$). Comparison of groups according to minimum wage showed that HG was seen in 45.9% of patients whose level of monthly income was below minimum wage and all of the women whose level of monthly income was over minimum wage. We concluded that the level of monthly income does have an effect on development of HG ($P < 0.001$).

Communication within the family was another parameter that was evaluated. HG was seen in 45.7% of women with good communication within the family, while poor communication was associated with HG in all of the women ($P < 0.001$). It was found that a good social relationship with others was associated with HG in 51.8% of cases, while patients with poor social relationships developed HG in 44.1% of cases ($P = 0.193$).

Logistic regression analysis showed that the most important parameters for prediction of HG were education level, age at marriage, and previous history of abortus ($P < 0.001$).

Table. Demographic features of groups [data presented as median (IQR), number, and percentage].

		HG (+)		HG (-)		P-value
N		200		200		
Age (SD)		24 (8)		25 (10)		0.160
Age at marriage		19 (4)		18 (2)		0.980
Age at first pregnancy		20 (4)		19 (3)		0.447
Gestational age		9 (1.75)		8 (1)		0.270
Gravida		2 (2)		2 (2)		0.544
Parity		1 (2)		1 (2)		**0.045**
Abortus		0 (0)		0 (0)		**<0.001**
Occupation	No	198	49.7	200	50.3	0.499
	Yes	2	100.0	0	0.0	
Occupation of husband	Laborer	182	47.6	200	52.4	**<0.001**
	Civil servant	18	100.0	0	0.0	
Monthly income	Below min. wage	170	45.9	200	54.1	**<0.001**
	Above min. wage	30	100.0	0	0.0	
Education	Illiterate	45	44.6	56	55.4	**<0.001**
	Primary school	103	45.4	124	54.6	
	High school	46	69.7	20	30.3	
	University	6	100.0	0	0.0	
Communication within family	Good	168	45.7	200	54.3	**<0.001**
	Poor	32	100.0	0	0.0	
Social communication	Good	159	51.8	148	48.2	0.193
	Poor	41	44.1	52	55.9	
HG in previous pregnancy	Yes	47	100.0	0	0.0	**<0.001**
	No	79	36.7	136	63.3	
Previous delivery	Vaginal	93	47.7	102	52.3	0.825
	Cesarean	33	49.3	34	50.7	
Previous premature delivery	Yes	2	100.0	0	0.0	0.230
	No	124	47.7	136	52.7	
Fetal sex	Female	97	51.9	90	48.1	0.483
	Female	103	48.4	110	51.6	
Induction in previous preg.	Yes	66	52.4	60	47.6	0.181
	No	60	44.1	76	55.9	
Interval between pregnancies		2 (3)		3 (2)		**<0.001**

$P < 0.05$ is significant.

4. Discussion

HG affects 0.5%–2% of pregnant women (1–4). It usually begins 4–7 weeks after the last menstrual period and resolves in 90% of women by the 20th week of gestation (12). It is more common in urban women than in rural women (13). Weigel et al. found that HG risk increased in housewives and decreased in women over 35 years of age with a history of infertility (14). In the study of Roseboom et al. (15), it was shown that women who suffered from HG were slightly younger, more often primiparous, had a lower socioeconomic status, and had more often conceived through assisted reproduction techniques. They also had

preexisting hypertension and diabetes mellitus more often and were more likely to be carrying a female fetus.

On the other hand, in the study of Tsang et al. (16), women with HG had demographic characteristics that were similar to the general obstetric population. It was found that racial status, marital status, age, and gravidity were similar between HG patients and the general population. Bashiri et al. (17) stated that women with HG had fewer pregnancies and deliveries and more spontaneous abortions in the past than the control population. Premature contractions and vaginal bleeding during the first trimester were more common among women with HG. Other complications of pregnancy were no more common than among controls. Perinatal outcome was no different in women with HG than in controls.

In this study, we found that maternal age had no effect on development of HG. We examined the effect of age at marriage and age at first pregnancy on HG. These also had no effect on HG. Patients with a history of previous abortus had a higher incidence of HG.

In previous studies, it was stated that there is an association between sex of the fetuses and HG, showing a male sex ratio of 0.461 (18). Most of the studies confirmed the higher female/male ratio in pregnancies complicated by HG; overall, 55% of the offspring in the HG pregnancies were female compared with 49% in the control group, with an odds ratio of 1.27 (19). However, in our study we did not find any difference between groups in terms of fetal sex.

The risk of hyperemesis in a woman's second pregnancy was 15.2% if hyperemesis had occurred in the first, compared with only 0.7% if it had not occurred before (20). There was a high degree of familial clustering of hyperemesis (21). Siblings and mothers of women with HG in pregnancy are more likely to have experienced the same symptoms (12,22,23). In our study, all of the women who experienced HG in a previous gestation also had HG in the present pregnancy. These findings suggest that there might be a genetic predisposition to HG, possibly involving maternal, paternal, and fetal genes.

Mullin et al. (24) concluded that no significant differences were observed between the control group and the HG short-duration group (HG symptoms that resolved before 27 gestational weeks). However, members of the HG long-duration group (symptoms lasting until birth) were significantly more likely to be younger and weigh more than members of the other groups.

In our study, comparison of groups in terms of type of previous labor showed no difference. Route of delivery, either vaginal or cesarean section, did not affect development of HG. Induction of labor in a previous pregnancy and previous premature labor were not associated with development of HG. The only observed association with HG was the interval between 2 pregnancies. The interval was significantly shorter in HG patients than in control cases.

We found that being a housewife versus having an occupation also had no effect on development of HG. However, there were few working women in our study, so the results must be supported by new studies that include more working women. Although there was no difference between groups in terms of gravida, history of previous abortus was significantly higher and parity was significantly lower in the HG group than in the control group. We thought that previous abortus might increase stress in the index pregnancy and might cause HG.

In a departure from the literature, HG was seen more frequently in women with high socioeconomic levels and high educational levels in our study. Significantly higher incidence of high school and post-high school educational attainment were noted in the HG group relative to controls. It is surprising to see HG more frequently in women with a good quality of life. Examination of the cases revealed that the women whose level of monthly income was over minimum wage and whose husbands were civil servants usually had good communication within the family and had a high educational level. These results suggested to us that there must be other factors in these women causing HG in spite of high educational levels and high socioeconomic status. Educated women might be psychologically more sensitive than illiterate women.

Stress and communication problems are other factors that might be responsible for HG. Iatrakis et al. (25) found that HG in pregnancy was associated with stress; lack of information about pregnancy, childbirth, and the health of the fetus; and poor communication with the husband and the physician. Biological, psychological, and social factors are in continuous and dynamic interaction in the biopsychosocial model (26). Women with HG may be more susceptible to some environmental factors that trigger vomiting. This might cause emesis as a conditioned response to a specific environmental agent. The Minnesota Multiphasic Personality Inventory (MMPI) was administered to pregnant women with HG. The MMPI data showed that women with HG have hysteria, excessive dependence on their mothers, and infantile personalities. However, the study findings were not conclusive because there was no control group, and comparative testing was not performed (27).

In our study we found that poor communication within the family was associated with HG, while poor communication with others did not show such a correlation. Communication within the family and stress related to this might be important for the development of HG in the Turkish population.

There are some limitations of this study. First, although the number of cases was sufficient, new studies with larger series are needed for generalization of the results to the greater population. Second, there may be other factors, such as ethnicity, religion, cultural factors, beliefs, or nutritional habits, that could affect development of HG. Examination of these parameters would increase the power of the study.

In conclusion, living conditions, life standards, communication, and experiences of previous pregnancies might affect the development of HG. Determination and correction of these possible etiologic factors could decrease the incidence and severity of HG. New studies with larger series are needed to correctly identify the causes and predisposing factors of HG.

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