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The Temperament, Anxiety and Depression Status of Hemoglobinopathy Traits During First Trimester of Pregnancy

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ABSTRACT

To evaluate the temperament, depression, anxiety scores and pain level of first trimester pregnant women with a hemoglobinopathy trait undergoing chorionic villus sampling (CVS).

This was a prospective study of pregnant women undergoing CVS between March 2020-January 2021. Sixty pregnant women without preexisting psychiatric illnesses were asked to fill the Temperament Evaluation of Memphis, Pisa, Paris and San Diego – autoquestionnaire (TEMPS-A), Hamilton Anxiety and Beck Depression Inventory. Scores were evaluated before procedure and compared with clinical features such as and parity, history of abortus, employment and education status.

The highest TEMPS-A scores belonged to hyperthymic personality (11.5 ± 3.9). The employed pregnant women had lower scores of depressive (2.6±1.9 vs. 5.6±2.9, $p<0.005$) and anxious temperament (3.8±2.1 vs. 7.7±4.7, $p=0.01$) compared with housewives. Likewise university graduated pregnant women had lower scores of depressive (3.3±1.8 vs. 5.6±2.8, $p<0.05$) and anxious temperament (5.4±4.2 and 7.7 ±4.4, $p<0.05$) compared with less educated ones. Nearly one of the third pregnant women had moderate to severe depression scores and the mean depression scores were lower in employed women compared with housewives (6.7±2.9 vs. 14.2±4.2, $p<0.05$) and in university graduated compared with less educated ones (7.3±3.7 vs. 14.6±6.3, $p<0.05$) respectively.

The hyperthymic temperament had higher scores in pregnant women with a hemoglobinopathy trait over other temperament types and this was compatible with general pregnant population. Unemployment and less educated pregnant women required more psychological support since they had higher depression scores as well higher anxious and depressive temperament scores.

Keywords: Hemoglobinopathy, pregnant, depression, anxiety, temperament, pain, CVS

Introduction

Sickle cell anemia and beta-thalassemia are the most common hemoglobinopathies seen in Turkey, and the rates of those hemoglobinopathy traits in the Cukurova region were 8.2% and 3.7% respectively (1, 2). Beginning from year of 1994, the Turkish Health Ministry established premarital screening centers in three cities belong to this region and provided prenatal diagnosis testing (2).

In cases where couples are known to be sickle cell anemia or beta-thalassemia trait, testing of the fetus for homozygosity or trait could be performed by chorionic villus sampling (CVS) between 10-14 weeks of gestation (3). CVS has a 0.5-1% risk of pregnancy loss and this fact brings a psychological burden. While other pregnant women who required CVS due different conditions like having positive screening test for Down syndrome have the same risk of pregnancy loss related with procedure, still hemoglobinopathy traits have more stress due to 25% possibility of having a homozygous fetus in every pregnancy (4, 5). Moreover, being aware information from the beginning of pregnancy may bring a burden of chronic stress, which may cause further depression, and anxiety depending on a patient's underlying temperament. CVS is also more painful than other karyotyping tests like amniocentesis, and the pain level may change due to patient's psychological profile (6, 7).

In this study we evaluated the temperament status, depression and anxiety scores of pregnant women with a hemoglobinopthy trait that underwent a

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CVS procedure and investigated the factors that were associated with those scores. In addition, we studied pain thresholds during the procedure and identified any clinical factors that were associated with pain severity.

Material and Methods

This was a prospective cohort study of pregnant women with a hemoglobinopathy trait. Included patients were those with diagnosed sickle-cell trait or beta-thalassemia trait as well partners with similar traits. The study population composed from those who applied for prenatal diagnosis during March 2020 to January 2021 at 10-14 weeks of gestation for CVS procedure. Patients that had a known psychiatric condition such as psychosis, bipolar disorder or depression, had CVS indications for other reasons, such as increased risk of having a fetus with Down syndrome, or metabolic diseases were excluded from the study. All women that met inclusion criteria were informed about the study and written informed consent was gathered.

Patients were asked to fill an 11 pages questionnaire. Demographic information regarding the patient and her pregnancy were acquired. Patients filled the Turkish version of Temperament Evaluation of Memhis, Pisa and San Diego- autoquestionnaire (TEMPS-A) (8) before CVS procedure. This was set up by Akiskal et al. in 1997 and included 99 questions for evaluating 5 different temperaments, namely anxious, depressive, irritable, hyperthymic, and cyclothymic (9). Patients were asked to complete a Hamilton Anxiety Inventory and Beck Depression Inventory. Anxiety was categorized as total, psychic, and somatic. Beck Depression Inventory was classified as minimal ("0-9"), mild ("10-16"), moderate ("17-29"), or severe ("30-63"). After the CVS procedure, patients were asked to determine the pain that they felt between "0" to "10" points with "0" being no pain, and "10" was the most severe pain that the patient might feel. For classification of pain severity different scoring systems have been used (10) and like some others we classified the pain as mild ("0-3"), moderate ("4-6") or severe ("7-10") (11, 12).

Maternal age, gestational weeks, 5 different temperaments, anxiety states and depression scores are shown as mean ± standard deviation and median. The number of previous invasive procedures and the pain scores are shown as medians. Parity (multiparous or nulliparous), history of previous abortus, history of invasive procedure (exist or absent), education level and employment status are presented as percentages. The relation between socio-demographic features, medical history, temperaments, anxiety, depression and pain scores was assessed. The Shapiro–Wilk test was used to define normality of the parameters. Continuous variables were evaluated by Student's t test, while categorical variables were evaluated by Fischer's exact or Mann-Whitney U test. The data was analyzed by SPSS 20.0 version (IBM Corp., NY, USA) and a p value of <0.05 was accepted as statistically significant.

Informed consent form was signed by all participants and this study was approved by the local ethic committee (No: 47/97-06.03.2020) and the research complied with Declaration of Helsinki (13).

Results

Of the 62 screened patients, two were excluded as they did not complete the questionnaire. The socio-demographic and previous pregnancy history of the remaining 60 pregnant women with a hemoglobinopathy trait was shown in Table 1.

Patient temperament, anxiety, depression and pain scores are shown in Table 2. There was no predominant temperament in 93% (n=56) of hemoglobinopathy trait pregnant patients. However, anxious temperament was seen in 3 patients and cylothymic temperament was seen in 1 patient. The highest TEMPS-A scores belonged to hyperthymic temperament (11.5 ± 3.9). Of the 60 total patients, 17 (28.3%) had moderate and 1 (1.7%) had severe depressive scores. The main pain score was 3.5 ± 1.8 while 50% had mild, 40% moderate and 10% had severe pain during CVS. We could not find a statistical relation between pain scores and any other factors like parity, history of abortus, employment status, and education status.

The relation between temperament, anxiety, depression scores and parity, abort history, employment and education status are shown in Table 3. The employed pregnant women had lower depressive (2.6±1.9 vs. 5.6±2.9, $p<0.005$) and anxious temperament scores (3.8±2.1 vs. 7.7±4.7, $p=0.01$) compared with housewives and likewise university graduated pregnant women had lower depressive (3.3±1.8 vs. 5.6±2.8, $p<0.05$) and anxious temperament scores (5.4±4.2 and 7.7 ±4.4, $p<0.05$) compared with less educated ones, respectively.

Table 1. Socio-demographic and Pregnancy Histories of Study Population

Maternal age (years)	28.9±5.4
Gestational age (weeks)	12 (11-14)
Parity	
nulliparous	16 (26.7%)
multiparous	44 (73.3%)
Abortus history	
yes	20 (33.3%)
no	40 (66.7%)
History of invasive procedure	
yes	42 (70%)
no	18 (30%)
Number of previous invasive procedures	1 (0-5)
Education status (years)	
≤5	7 (11.6%)
5-8	16 (26.7%)
8-11	21 (35%)
≥11	16 (26.7%)
Employement status	
housewife	47 (78.3%)
employed	13 (21.7%)

Table 2. The Temperament, Anxiety, Depression and Pain Scores of Study Population

	Mean ± standard deviation, or percentage (%)	Median
TEMPS-A		
Depressive	5.0 ± 2.9	7 (1-12)
Cylothymic	8.1 ± 4.4	8.5 (1-18)
Hyperthymic	11.5 ± 3.9	12 (2-19)
Irritable	2.7 ± 2.4	2 (0-11)
Anxious	7.1 ± 4.9	7 (0-19)
Hamilton Anxiety Inventory		
Total	11.4±5.2	10 (0-34)
Psychic	5.9 ±3.2	5 (0-22)
Somatic	5.1±2.7	4 (0-18)
Beck Depression Inventory		
Minimal	25 (41.7%)	
Mild	17 (28.3%)	
Moderate	17 (28.3%)	
Severe	1 (1.7%)	
Beck depression score	12.7±7.6	11(1-36)
Pain score	3.5 ± 1.8	3 (0-8)
Pain code		
Mild	30 (50%)	
Moderate	24 (40%)	
Severe	6 (10%)	

Table 3. Relation Between Demographic Factors, Pregnancy History and Temperament, Anxiety, Depression, and Pain Status

	Parity			History of abortus			Employment status			Education Status (years)		
	Primi parous	Multi parous	p	Yes	No	p	Housewife	Employed	p	≤11	>11#	p
Depressive	5.6±2.3	4.9±2.2	NS	4.7±2.2	5.9±3.2	NS	5.6±2.9	2.6±1.9	<0.005	5.6±2.8	3.3±1.8	<0.05
Cylothymic	9.3±4.1	8.0±3.9	NS	8.4±4.1	8.1±3.7	NS	9.4±4.1	2.7±1.9	<0.001	8.8±4.5	6.4±4.4	NS
Hyperthymic	11.4±3.7	11.6±3.9	NS	11.8±3.9	11.1±3.8	NS	11.9±3.6	10.6±4.5	NS	11.7±3.5	11.4±4.6	NS
Irritable	3.7±1.9	2.4±1.3	NS	2.7±1.8	2.8±1.5	NS	3.1±1.7	2.4±1.2	<0.005	3.1±1.9	1.9±1.1	NS
Anxious	8.9±4.2	6.4±4.3	NS	7.2±3.8	6.9±4.4	NS	7.7±4.7	3.8±2.1	0.01	7.7±4.4	5.4±4.2	<0.05
Hamilton	13.3±6.9	10.3±5.9	NS	12.1±6.7	8.9±5.6	NS	11.3±6.2	9.1±4.2	NS	11.5±6.7	10.0±6.1	NS
Psychic	6.4±3.2	4.8±2.4	NS	6.2±3.4	4.8±2.6	NS	5.8±2.1	5.2±2.1	NS	6.0±3.4	5.8±3.6	NS
Somatic	6.6±3.1	4.9±2.4	NS	5.8±3.0	4.1±2.3	NS	5.4±1.9	3.8±1.8	NS	5.5±3.1	4.0±2.5	NS
Beck	14.9±6.1	12.3±4.9	NS	12.1±5.2	14.5±5.1	NS	14.2±4.2	6.7±2.9	<0.005	14.6±6.3	7.3±3.7	<0.05
Pain Score*	3 (0-7)	4 (0-8)	NS	4 (0-8)	3 (0-7)	NS	4 (0-8)	3(1-6)	NS	3 (1-7)	4 (0-8)	NS
Pain Code**			NS			NS			NS			NS
Mild	9 (56%)	21 (48%)		9 (45%)	21 (52%)		21 (45%)	9 (69%)		21 (48%)	9 (56%)	
Moderate	5 (31%)	19 (43%)		8 (40%)	16 (40%)		20 (42%)	4 (31%)		18 (41%)	6 (38%)	
Severe	2 (13%)	4 (9%)		3 (15%)	3 (7%)		6 (13%)	0		5 (11%)	1 (6%)	

NS: Non-significant
University graduated
* Mann-Whitney U test was used
**Fischer's exact test was used

Discussion

In this study the hyperthymic temperament was found to have higher scores among other 4 temperament types, in pregnant women with a hemoglobinopathy trait undergoing CVS procedures. Nearly 30% of the patients had moderate to severe depression scores and these levels were positively associated with unemployment and less education. Pain scores during CVS were not related with any of the analyzed factors.

The physiological and hormonal changes during pregnancy affect women's psychiatric status and may precipitate for mood disorders (14). One idea is that predominant temperaments can be a precursor of peripartum mood disorders and women with specific temperaments may be at increased risk especially for bipolar disorders and depression (15, 16). Therefore, it is highly important to identify the pregnancies with higher risk for these disorders in order to provide early diagnosis and close follow up. Pregnancies of women with hemoglobinopathy trait couples are more stressful due to the fact of having a 1/4 risk of homozygous fetus (17). The risk of hemoglobinopathy may create additional maternal stress and great psychological burden for couples. Depressive and anxious temperament scores were thus hypothesized to be more significant in women with hemoglobinopathy trait. Our findings confirmed this particularly as the mean anxious temperament scores were higher compared with the low-risk pregnancies (18). In addition employed and university graduated patients had lower anxious and depressive temperament scores. These findings were consistent with general population data of previous studies (9).

In the current study, 17 women had moderate and 1 had severe depressive scores. Moderate to severe depression was seen in nearly 30% of patients which was higher than previous studies that evaluating normal pregnancies (20). Rates of depression were higher in hemoglobinopathy patients like other chronic diseases such as diabetes and heart diseases (21-23). There are, however, few studies evaluating depression in pregnant women with a hemoglobinopathy trait. These pregnancies require invasive procedures and fetal risk, which may result in higher maternal depression scores. (24). The mean anxiety score in our study was 11.4 ± 8.4 and 11 patients (18%) had a ≥20 anxiety scores and this was compatible with general pregnant population (25). We could not find any relationship between pain scores during CVS and temperament, anxiety as well depression scores. While previous studies found a positive correlation between depression and anxiety scores and postoperative and acute pain syndromes as well pain during CVS (7, 26, 27), the level of pain during CVS in our series was significantly lower which may explain why a correlation was not found.

This was a cohort study and not having a control group was a limitation for this study. We tried to address this issue by comparing our data with previous studies in the literature. Likewise lower number of cases might have made identification of an associated clinical factor underpowered. Our questionnaire encompassed only a specific time point just before an invasive procedure and it was difficult to conclude about second or third trimester factors and how they impact patient psychology. Our study had several strengths, including being acquired in a prospective manner, the fact that questionnaire was completed by face-to-face interview, and support was given to the patients where they had any problem about questionnaire such as not understanding questions clearly. Our study of evaluating hemoglobinopathy trait and its effects on the wellness of pregnant women is also novel.

Hyperthymic type temperament was more prominent in pregnant women with hemoglobinopathy trait, similar to general population pregnancies. Pregnant women with a hemoglobinopathy trait, however, had higher anxious and depressive temperament scores compared with normal population. In addition, higher depression level was more likely seen in less educated and unemployed pregnant women. This data supports that pregnancies of women with hemoglobinopathy trait should be followed up more closely and the patients with high risks should be identified earlier in order to deliver psychological support in the perinatal period. Moreover, this work suggests that larger studies are needed at different trimester pregnancies of in order to evaluate the impact of hemoglobinopathy traits on maternal outcomes.

Conflict of Interest: We inform that none of the authors have any conflict of interest related with this study.

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