ANALYSIS OF THE RELATIONSHIP BETWEEN STRESS AND ANTI-MÜLLERIAN HORMONE LEVEL IN FEMALE PHYSICIANS

M. Anderson, BS[1]; K. Kostroun, MD[2]; A. Roshong, MD[2]; M. Goros, MS[3]; J. Gelfond, MD, PhD[3]; W. Mak, MD, PhD[2,4]

Department of Obstetrics and Gynecology **Long School of Medicine, UT Health San Antonio[1]; Division of Reproductive Endocrinology and Infertility, UT Health San Antonio [2]; Dept. of Population Health Sciences, UT Health San Antonio [3]; Dept. of Women's Health, Dell Medical School, UT Austin[4]**

Background

Previous research has shown that female physicians demonstrate higher rates of infertility and perceived stress than the general population.[1,2] Interestingly, there is evidence from animal studies of a potential relationship between high stress and diminished ovarian reserve.[3] Furthermore, a study showed a negative correlation between stress levels as determined by salivary α amylase levels and ovarian reserve as determined by anti-Müllerian hormone (AMH) levels in infertile women.[4] We hypothesized that female physicians could have increased risk of diminished ovarian reserve due to high levels of perceived stress.

Objective

To study and characterize the relationship between perceived stress and AMH levels in female physicians.

Materials and Methods

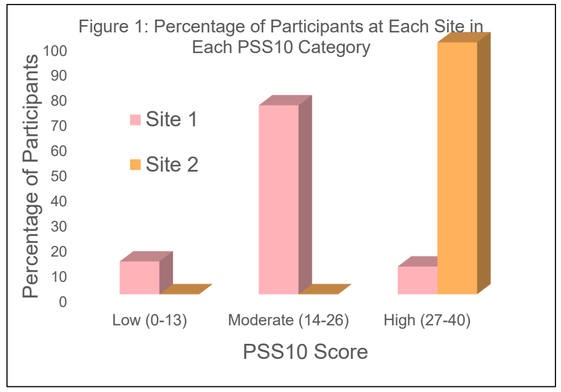
- Female physicians were recruited at two academic institutions in Central Texas (Site 1: n=45; Site 2: n=53).
  - Inclusion criteria: age 18-45 years old.
  - Exclusion criteria: menopausal/postmenopausal, pregnancy, or use of oral contraceptive pills.
- Participants were asked to anonymously self-report their stress levels using the standardized Perceived Stress Scale (PSS10).
- Single-use lancets were used to obtain finger-stick blood spot samples from each participant. Blood spots were analyzed for AMH levels at a commercial laboratory. AMH levels <1ng/ml were classified as low.
- Univariate analyses were conducted to compare sites 1 and 2. Continuous variables were assessed using the Wilcoxon rank-sum test, while categorical variables were evaluated with Fisher's exact test or chi-squared test as appropriate. We labeled the AMH levels smaller than 1 as low. PSS10 was split into low (0-13), moderate (14-26) and high (> 26). We fit a linear regression model (N = 96) to assess the adjusted association of PSS10 on AMH, adjusting for Age, BMI, Gravidity, Race and Sites. We used R (version 4.3.2) for all computations.

Results

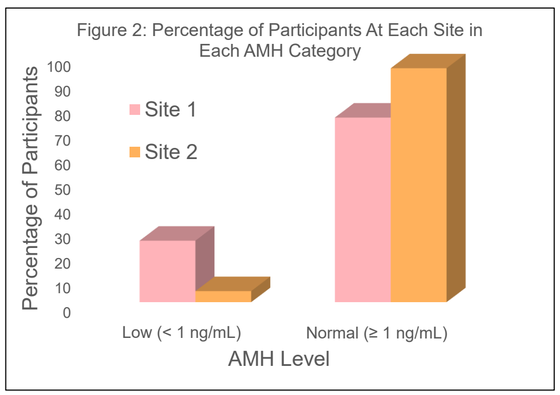
Table 1: Baseline characteristics of The Female physicians. Median (IQR), n (%).

Characteristic	Overall, N = 98	Site 1 N = 53	Site 2 N = 45	p-value
Age	30.0 (28.0, 33.3)	30.0 (28.0, 36.0)	30.0 (28.0, 31.5)	0.3
BMI	22.9 (21.2, 25.6)	22.8 (21.6, 24.9)	23.5 (20.6, 25.7)	0.7
Race				<0.001
Black/African American	5 (5.1%)	3 (5.7%)	2 (4.4%)	
White	67 (68%)	40 (75%)	27 (60%)	
White, Hispanic	11 (11%)	0 (0%)	11 (24%)	
Other	15 (15%)	10 (19%)	5 (11%)	

- All female physicians from site 2 reported high stress levels (100%) vs 11% in site 1 (p<0.001). (***Fig.1)***
- Majority of site 1 physicians reported moderate stress (75%).(***Fig.1)***



- The median (IQR) AMH of site 1 physicians was 2.2 ng/ml (1.1, 4.8) and site 2 was 6.2 ng/ml (2.8, 10.1)(p<0.001)
- 4.5% had low AMH at site 2 vs 25% at site 1 (p<0.001)(***Fig. 2***)



- Linear regression was performed (***Table 2***). There was no correlation between PSS10 and AMH in our cohort when adjusting for age, BMI, gravidity, race, and site (p = 0.4)

Characteristic	Beta	95% CI[1]	p-value
PSS10	-0.06	-0.21, 0.09	0.4
Age	-0.15	-0.38, 0.08	0.2

Table 2: Linear regression analysis of AMH with PSS10 and Age

Conclusions

- Our study is novel as we describe the relationship between female physicians' perceived stress levels and AMH.
- Most of the female physicians in our cohort experienced moderate to high perceived stress.
- We found no correlation between PS10 with AMH levels.
- Our study provides preliminary data that acute high stress is not a major factor affecting AMH levels in female physicians.
- Limitations: Small sample size per site. Possible batch effect as AMH testing done at 2 different timepoints.
- Future studies will need larger cohorts with AMH tests run at same time to minimize batch effect.

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