

# Psychological and emotional concomitants of infertility diagnosis in women with diminished ovarian reserve or anatomical cause of infertility

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**Objective:** To examine the magnitude and predictors of emotional reactions to an infertility diagnosis in two groups of women: those with diminished ovarian reserve (DOR), and those clinically diagnosed with an anatomical cause of infertility (ACI).

**Design:** Cross-sectional study.

**Setting:** Academic and private fertility clinics.

**Patient(s):** Women diagnosed with DOR (n = 51) and women diagnosed with ACI (n = 51).

**Intervention(s):** Not applicable.

**Main Outcome Measure(s):** Fertility Problem Inventory (infertility distress), Rosenberg Self-Esteem Scale, Health Orientation Scale (emotional reactions to receiving a diagnosis).

**Result(s):** Women with DOR had statistically significantly higher infertility distress scores than women with ACI and higher scores on subscales assessing distress from social concerns, sexual concerns, and a need for parenthood. In both groups, higher self-esteem was associated with lower infertility distress. Hierarchical multiple regression analyses revealed that for women with DOR and those with ACI lower infertility distress but not self-esteem predicted a more positive emotional reaction toward receiving a fertility diagnosis.

**Conclusion(s):** Women diagnosed with DOR have greater infertility distress but similar self-esteem and emotional reactions to their diagnosis compared with women who have an anatomical cause of infertility. These results suggest that for both groups distress surrounding infertility itself may influence the way women respond to learning the cause of their infertility. (Fertil Steril® 2017; ■: ■-■. ©2017 by American Society for Reproductive Medicine.)

**Key Words:** Diminished ovarian reserve, distress, female infertility, health psychology, self-esteem, tubal infertility, tubal obstruction

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**B**eing female is associated by many with the ability to conceive and bear a child. Thus, a diagnosis of infertility can leave a woman feeling defective, out of step with her peers, or stigmatized (1) as well as angry, shameful, and sad (2). Also, infertile

women often report feeling guilt over lifestyle choices that they believe caused their infertility, including waiting to have children (3). Although the psychological impact of infertility has received increasing attention over the past two decades as reviewed by various

investigators (1, 4–6), there has been little research examining whether the experience of infertility differs as a function of the underlying cause. Infertility attributed to advanced age or diminished ovarian reserve (DOR), for example, may elicit different emotional and psychological reactions than infertility resulting from anatomical or physiologic causes, especially unpreventable conditions. A study by Cizmeli et al. (7) investigated emotional distress in women with DOR, which is a reduction in oocyte quantity and quality associated with

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advanced age or with other causes (8). Cizmeli et al. (7) found that 24% of study participants were experiencing high distress related to their infertility but having an explanation for their condition was associated with better emotional status.

Women who receive a diagnosis of DOR may have similar emotional responses as women who receive a diagnosis of primary ovarian insufficiency (POI) because their fertility challenges have ovarian origins. It should be noted, however, that these two diagnoses differ (9, 10); most notably, women with DOR have regular menstrual periods whereas those with POI have four or more months of secondary amenorrhea before the age of 40 plus postmenopausal levels of follicle-stimulating hormone (FSH) (11). The cessation of menses in POI may lead to greater distress among those patients. Research on the psychological state of women with POI has found that they experience elevated shyness, anxiety, and depression, as well as diminished self-esteem, social support, and positive affect (12–14). Statistical modeling of approximately 100 women with POI has indicated that distress (composite measure of depression, anxiety, and general negative affect) at study enrollment predicted distress 12 months later and that psychosocial vulnerability (composite measure of neuroticism, stigma, and illness uncertainty) also predicted distress 12 months later with mediation by avoidant coping 4 months after study enrollment.

The primary aims of our study were to describe and compare levels of distress and identify predictors of emotional reactions to diagnosis in two groups of women: those with DOR and those whose infertility has been clinically attributed to an anatomical cause (anatomical cause of infertility, ACI), such as tubal occlusion or damage, intrauterine adhesions, or other uterine anomalies. In women seeking fertility assistance, DOR is diagnosed in approximately 10%, and tubal and peritoneal pathology is the primary diagnosis in 30% to 35% of infertile couples (15). Because they have regular menstrual periods, women with DOR may not be aware of their infertility problems until they try to conceive, which leads some to experience the diagnosis as a “rude awakening” (16). Women with DOR often report feeling angry and resentful while trying to conceive (17).

There has been little research examining the psychological impact of ACI. The research that does exist suggests that women with chronic pelvic pain due to pelvic inflammatory disease (18), endometriosis (19), or ectopic pregnancy (20, 21) report heightened levels of psychological distress. Pelvic inflammatory disease is known to cause tubal damage and ectopic pregnancy, and a history of ectopic pregnancy even without a known history of pelvic inflammatory disease is suggestive of tubal damage (22).

We examined whether the magnitude of infertility distress would differ between women with DOR and those with ACI. There was no a priori expectation of difference because of a lack of prior investigation of this possibility. We also examined whether lower emotional distress and higher self-esteem would be protective against negative reactions to an infertility diagnosis in both groups of women. Prior studies of infertile women (7, 23) suggest that self-esteem can ameliorate a woman’s distress and her

reaction toward receiving an infertility diagnosis. To our knowledge, this possibility has not been examined among women with ACI.

## MATERIALS AND METHODS

### Participants and Methods

Participants were enrolled from April 2012 through June 2014 at academic and private reproductive endocrinology and infertility clinics in Virginia (39% of DOR participants, 100% of ACI participants), California (35% of DOR participants), and North Carolina (24% of DOR participants), plus 1 DOR patient who self-referred from the Internet (2%). All had received a diagnosis of DOR or ACI, and all were participants in a larger study on the prevalence of fragile X trinucleotide repeat levels in women with DOR (23, 24). The average length of time between diagnosis and study enrollment was 1.03 years (median: 0.71 years) for DOR participants; 33% (n = 17) enrolled within 6 months of their diagnosis. The time since diagnosis was not recorded for the ACI group.

For the DOR group (n = 51), eligible women were those who received a clinical diagnosis of unexplained DOR based on [1] elevated but not postmenopausal-level FSH levels timed to their menstrual cycle, [2] low antimüllerian hormone (AMH) levels for their age, or [3] fewer than six antral follicles sized 2–10 mm on an ovarian ultrasound (antral follicle count, AFC). Additionally, the DOR participants were required to be  $\leq 41$  year old at time of diagnosis and to have had regular menstrual cycles for the previous 6 months. Only the Stanford University site, where the high patient volume provided confidence in the consistency of the AFC measurement, used AFC as an entrance criterion. The day 2–5 FSH enrollment criterion was adjusted for the different laboratory machines at each site to ensure consistency in the enrollment criteria across sites, as described elsewhere (24–26). The DOR diagnosis was based on elevated FSH in approximately 50% of the participants, on low AMH in 43%, and on low AFC in 9%, with a subset meeting more than one of those criteria. Women were excluded from the DOR group if there was a known cause of elevated FSH for their age unrelated to fragile X syndrome (e.g., surgical removal of one or both ovaries, chemotherapy or radiation therapy, Turner syndrome, or autoimmune disease) or a family history of fragile X syndrome or premenutation.

For the ACI group (n = 51), women were eligible if they were determined to have ACI, defined as bilateral tubal occlusion or damage, unilateral tubal occlusion or damage if deemed likely to have affected both tubes (e.g., hydrosalpinx), or intrauterine adhesions (e.g., Asherman syndrome), or if their fallopian tubes had been surgically closed for contraceptive purposes previously and the woman now desired children. The ACI group was aged 18–50 years at enrollment, had regular menstrual cycles at the time of ACI diagnosis, and were deemed ovulatory at the time of diagnosis by the physician. Women were excluded from the ACI group if their hormone levels (FSH or AMH) suggested they might also have DOR (by the enrollment criteria) or if they had a family history of fragile X syndrome or premenutation.

The study was approved by the human ethics board at all academic sites (#11448 in Virginia, #11-1535 in North

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