Pregnancy-Related Anxiety in Women Who Conceive Via In Vitro Fertilization: A Mixed Methods Approach

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ABSTRACT

The process of in vitro fertilization (IVF) causes anxiety, but it is unclear whether this anxiety continues into pregnancy and affects childbirth preparation. This study administered the pregnancy-related anxiety measure to 144 women during their second trimester. Anxiety scores were slightly higher among IVF compared to non-IVF pregnant women. Thirty-one participants provided narrative data about their pregnancy-specific anxiety. Themes emerged from qualitative analysis related to anxiety about the health of their babies, perception of maternal health and safety, and perception of their abilities to fulfill the role of mother. Because of their relationship with patients during pregnancy, nurses and perinatal educators play a critical role in identification of women with pregnancy-specific anxieties and providing relevant care to address these anxieties.

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On any given day in many labor and delivery units across the United States, there is a woman giving birth who conceived her pregnancy via in vitro fertilization (IVF). IVF is a process that involves the fertilization of ovum with sperm in a laboratory and subsequent replacement of resulting embryo(s) into the uterus (American Society for Reproductive Medicine, 2015). What once was a rare occurrence now is fairly commonplace. The number of pregnancies that are conceived via IVF increases every year, with

over 63,000 live births resulting from IVF in 2013, representing about 1.6% of all birth in the United States (Centers for Disease Control and Prevention, 2015; Society for Reproductive Technology [SART], 2015). In addition, pregnancies conceived

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via assisted reproductive technologies (ART), of which IVF is the most common, are at increased risk of preterm birth as compared to those conceived naturally (Wisborg, Ingerslev, & Henriksen, 2010). Pregnancy-specific anxiety has been found to be elevated in women pregnant via IVF (Hjelmstedt, Widström, Wramsby, & Collins, 2003; Hjelmstedt, Widström, Wramsby, Matthiesen, & Collins, 2003; McMahon et al., 2013; McMahon, Ungerer, Beaurepaire, Tennant, & Saunders, 1997). In the general preterm birth literature, there is support for a positive relationship between pregnancy-related anxiety and preterm birth (Dominguez, Dunkel-Schetter, Glynn, Hobel, & Sandman, 2008; Dunkel-Schetter, 2011; Glynn, Schetter, Hobel, & Sandman, 2008); however, it is currently not known if this is a contributing factor to the elevated preterm birth risk in IVF pregnancies.

The IVF process is an expensive, physically invasive process that can be repeated for months or years before a woman either achieves a pregnancy or abandons the pursuit of biological parenthood. Occurrence of psychological stress during the IVF process is well supported in the literature (An, Sun, Li, Zhang, & Ji, 2013; Verhaak, Smeenk, van Minnen, Kremer, & Kraaimaat, 2005). Little is known, however, about the psychological experience of pregnancy following IVF. Although research indicates the process of IVF is stressful (Lord & Robertson, 2005; Wang et al., 2007), investigators are less clear as to whether stress persists into the resulting pregnancy. Qualitative research indicates that women who conceived via IVF experience their pregnancies differently than women who conceive without assistance, such as perceiving their pregnancies as hard-won and special (Hjelmstedt, Widström, Wramsby, & Collins, 2003).

Lobel and colleagues (Lobel & Dunkel-Schetter, 1990; Lobel, Yali, Zhu, De Vincent, & Meyer, 2002) have done considerable research on stress, specifically in the pregnant population. They view stress as a multidimensional construct in which there is shared variance among three components: the environmental, perceptual, and emotional response

components. Pregnancy-related anxiety, one type of emotional response, has gained attention recently because it has a potential link to preterm birth in the general pregnancy population as well as other poor pregnancy outcomes (Dominguez et al., 2008; Glynn et al., 2008). Moreover, in these mothers with high-level fear of childbirth or severe pregnancy-related anxiety, an association with dissatisfaction with the actual childbirth process has been recorded (Poikkeus et al., 2014). However, if properly addressed with targeted therapies, the impact on birth outcomes can be affected, including a reduction of cesarean surgeries and increases in satisfaction with birth experience (Rouhe et al., 2013).

Despite the fact that the usage of infertility services such as IVF has increased dramatically during the past two decades (SART, 2015), there is a paucity of research aimed at understanding the psychological picture of women who become pregnant. To fully capture the experience of pregnancy-specific anxiety, the objectives for this study were to measure pregnancy-specific anxiety quantitatively and evaluate this anxiety qualitatively in women pregnant via IVF using a mixed methods approach by describing the level of pregnancy-related anxiety in women pregnant via IVF during early second trimester, and to identify themes in anxiety specific to pregnancy.

METHOD

Subjects were recruited from a private infertility practice in Northern New Jersey, which performed approximately 2,700 cycles of IVF during the time of data collection. A convenience sample of 144 women who conceived using IVF technology was examined. To be considered for the study, women had to be between the ages of 25 and 40 years, be pregnant with one or two fetuses, be between gestational weeks of 12 and 18, and have the ability to read and write English. They were excluded if they had selective reduction in the current pregnancy or were deemed medically or obstetrically high risk. Ethical approval for this study was obtained from the New York University Committee on Activities Involving Human Subjects.

Subjects were recruited during their 8-week discharge visit from the infertility practice to their obstetrical provider at the time of check-in via an invitation letter. They were asked to return the form in a white envelope to the receptionist, who forwarded them to the study staff via mail. All women who expressed interest were contacted at 12 weeks

and provided an electronic invitation to the study site via the Qualtrics platform. One hundred and ninety-nine participants declined to participate and 109 expressed interest and were contacted but never logged into the study. One hundred and forty-four participants logged into the study site from her home computer to complete a quantitative measure of anxiety specific to pregnancy and were asked a qualitative question about this same anxiety.

Quantitative Assessment

Pregnancy-related anxiety measure (PRAM; Rini, Dunkel-Schetter, Wadhwa, & Sandman, 1999) is a 10-item scale used to assess maternal fears and anxiety related to the health of the baby, toward the labor and birth process, and confidence in the obstetrician and other health-care providers. It assesses the extent to which women worry or feel concerned about their health, their baby's health, labor and birth, and caring for the baby. Responses were made on a scale ranging from 1 (*never or not all*) to 4 (*a lot of the time or very much*). Calculated totals to the responses range from 10 to 40 with a higher score indicating more pregnancy-related anxiety. The English version of the PRAM was found to have acceptable internal reliability Cronbach's $\alpha = .78$.

Descriptive statistics, including frequency distributions, measures of central tendency, skewness, and other evidence of outliers were explored for the PRAM, and demographic variables including frequency distributions, measures of central tendency, skewness, and other evidence of outliers were explored for all variables including both demographic and scale variables to check normality of the distribution (Tabachnick & Fidell, 2006). In addition, reliability of the PRAM was calculated.

Qualitative Assessment

In addition to the formal PRAM questions, subjects were asked, "Are you experiencing any additional anxieties specifically related to the pregnancy not asked in the previous 10 questions?" Participants who chose to respond to this item were offered unlimited space for comments. Asking an open-ended question should provide greater depth in the understanding of anxieties specifically related to pregnancy. Krippendorff's content analysis was used to organize and integrate data from the comments into themes or patterns, which involved six major steps, including unitizing, sampling, recording/coding, reducing, inferring, and narrating (Krippendorff, 2004).

RESULTS

Description of the Sample

Most of the sample were married (98.6%), had a mean age of 33.3 years (range 25–40 years), and a mean gestational age of 14.4 weeks. Most of the respondents were White (74.1%) followed by Asian (16.2%) and Black or African American (2.1%). A majority (73%) were pregnant with a singleton, whereas the remaining 27.1% were pregnant with twins. Three quarters of the sample had no other children. The sample was highly educated and affluent, with 85.5% having at least an associate's degree, and 69.7% reported household incomes of $\geq \$100,000$ (Table 1).

TABLE 1
Descriptive Statistics of Sample ($n = 144$)

Variables	%	<i>n</i>
Race		
White	74.1	106
Asian	16.2	23
Other	6.3	9
Black or African American	2.1	3
Native Hawaiian or other Pacific Islander	0.7	1
Not specified	1.4	2
Marital status		
Married/living with partner	98.6	142
Single	0.7	1
Divorced	0.7	1
History of children		
No previous children	75.0	108
Previous children (number unknown)	25.0	36
Gestational size		
Singleton	72.9	105
Twins	27.1	39
Income		
$\leq \$75,000$	13.9	20
\$75,001–\$100,000	16.0	23
\$100,001–\$125,000	20.9	30
\$125,001–\$150,000	10.4	15
$> \$150,000$	38.4	55
Not reported	0.4	1
Educational achievement		
Trade/Technical School	1.3	2
High school graduate or GED	2.0	3
Some college (no degree)	6.9	10
Associate's degree	3.4	5
Bachelor's degree	31.9	46
Some graduate school	5.5	8
Graduate/professional degree	43.7	63
Other	4.8	7
	<i>n</i>	<i>M</i>
Age (years)		Range
< 35	83	33.27
35–37	34	57.6
38–40	27	23.6
Gestational age (weeks)	144	18.8
		14.46
		11.78–19.92

Note. GED = general educational development.

Figure 1. Distribution of PRAM scores in study sample ($M = 21$). PRAM = pregnancy-related anxiety measure.

PRAM Data

The coefficient alpha for this sample was .87, indicating high internal consistency. One hundred forty-four subjects completed the PRAM, which had a mean score of 20.49 ($SD = 5.96$). See Figure 1.

Three Themes in Qualitative Data

Thirty-one women (21.5%) provided a response to the open-ended question about additional anxieties related to the pregnancy. Several themes emerged from the analysis.

Theme 1. The most common anxiety reported by patients was regarding the health of their unborn baby(ies).

Twelve of the 31 subjects cited having this as their additional anxiety, using such words as fear, worry, anxiety, and stress.

“Nothing really specific . . . just after everything we went through, there is always an underlying fear that something will happen to the baby . . . I don’t think I’ll relax till he/she is here.”

Another stated,

“Just scared that the baby is not okay.”

Some women continued to think about the health of their baby even when not awake.

“Dreams that are about me being nervous or things not going correctly.”

Several subjects cited their older age as affecting the anxiety about the health of their baby, specifically mentioning upcoming genetic testing.

“I would say the biggest stress I’m having is my upcoming amniocentesis. It’s happening at week 16 and I’m worried my results won’t be normal. My age is a big factor in the odds of having a baby with a genetic disorder. My age is higher because I couldn’t get pregnant. It seems unfair that you go through the emotional and physical stress of fertility treatments, only to get the outcome you desire, only to continue to be stressed about the health of the baby. Seems like you just trade on stress for another, I’m anxiously waiting to feel calm and excited about my baby, rather than concerned about his/her health because I waited too long to conceive.”

Theme 2. A second theme that emerged was related to the woman’s perception of her own health and safety. Six subjects reported having this anxiety.

“I am very worried about my recovery after childbirth and the postpartum period.”

Some of these anxieties were specific to self-care and making sure their body was as healthy as possible for their pregnancy. One subject reported having an anxiety about

“Appropriate weight gain: too much, too little, when it happens, etc., eating the right foods, getting the right nutrition.”

The changes of pregnancy can often be an adjustment for some women. One woman stated:

“I worry about every single ache and pain. I wish I could enjoy my pregnancy.”

Theme 3. Another theme that emerged from the data was about a woman’s perception of her own abilities in the role of mother.

Three subjects cited this as an additional anxiety they were experiencing. Sometimes it is related to the new experience, having not had a child before and not knowing what to expect. One subject reported having anxiety:

“That I will not be able to properly care for my first child.”

In another instance, multiple gestation was a significant contributor to anxieties related to abilities to parent.

“Having twins is making me anxious about my ability to care for them as well as my daughter who will be 3 years old at their birth.”

DISCUSSION

This study advanced previous evidence on anxiety among women who conceived their pregnancies with IVF, further identifying an increase in this population. It also expanded the reasons for this anxiety via the qualitative results, allowing a richer understanding of this experience. Despite the fact that this study sampled during the second trimester which is normally associated with the lowest levels of anxiety during the pregnancy (Hjelmstedt, Widström, Wramsby, Matthiesen, et al., 2003), this population still had elevated levels and articulated specific anxieties they were concerned about. In addition, participants were also given the opportunity to complete study surveys from their home, which is in contrast to most other studies that data collect within the setting of office visits, which can impact anxieties. This suggests that this sample was at risk for greater anxiety at other points during their pregnancies, particularly at the beginning of the pregnancy when the pregnancy’s future is less certain or toward the

end as childbirth approaches. This adds to existing literature and illustrates the need to examine this concept longitudinally in future research.

By quantifying anxiety using the PRAM, this sample demonstrated a slightly higher level of anxiety as compared to non-IVF pregnant samples in previous research (Rini et al., 1999). This is reasonable, and there are a few comparable studies that also used the PRAM with sample of women pregnant via IVF and showed similar anxiety levels. Hammarberg, Fisher, and Wynter (2008) found in their systematic review of the literature that women pregnant via IVF had increased pregnancy-specific anxiety, specifically anxiety about the survival of their baby and perceptions of their parenting abilities as compared to non-IVF. This increase may be related to how precious they perceived the pregnancy to be because of IVF (Olshansky, 2003). Pregnancies conceived through IVF are often categorized as high risk either by health-care providers based on the woman’s medical history or by the women themselves who perceive themselves as high risk by virtue of conception via highly technical methods (Olshansky, 1990).

Although a limitation of the quantitative part of the study was that only a single time point was collected (in early second trimester), it is important to note that anxiety has been shown to fluctuate during pregnancy and traditionally is lowest during the second trimester (Hjelmstedt, Widström, Wramsby, Matthiesen, et al., 2003). This may be because women are beyond the first trimester during which most pregnancy loss occurs, thus providing confidence to the sustainability of the pregnancy; they are not yet encumbered by the physical limitations associated with later pregnancy, and it will be essential to further measure pregnancy-specific anxiety at several points throughout pregnancy.

The other objective of this study was to identify themes in anxiety specific to pregnancy. Qualitative themes that emerged helped expand and enhance the data from the PRAM by providing underlying meaning, emphasis, and nuance beyond what is obtainable from quantitative measures. These themes included anxiety about the health of their unborn baby, their perception of their own health and safety, and their perception of their abilities in the role of mother, which will be discussed specifically in the following paragraphs.

The first theme to emerge was related to their anxiety about the health of their unborn baby(ies). Previous research (Hjelmstedt, Widström, Wramsby, &

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Collins, 2003) reported that many women felt that the IVF pregnancy might be their only pregnancy, were “fixated” on it, and thinking about it incessantly. For these women, anxiety about their baby’s health often manifested itself in disrupted sleep, increased nightmares, and compulsive behaviors such as constant checking for vaginal bleeding. Although positive fetal cardiac activity at 6 weeks’ gestation was found to be an excellent predictor of first-trimester outcomes in IVF pregnancy (Seungdamrong et al., 2008), only during certain milestones such as movement seen on ultrasound did this anxiety temporarily ease (Hjelmstedt, Widström, Wramsby, & Collins, 2003). Women in this study expressed angst about their anxiety, wishing for a more sense of ease so that they could enjoy the pregnancy which had taken so long to achieve.

The second theme to emerge from this data was anxiety about the woman’s perception of her own health and safety. With such intense focus on their reproductive function, this population understandably expressed this concern. Moreover, women who have increases in pregnancy-related anxiety and specifically fear of childbirth may not be able to prepare properly for their birth (Rouhe et al., 2013), and if they have not made adequate preparations or be fully informed of the process and what to expect, they are more likely to be emotionally vulnerable during childbirth and be unprepared for certain obstetrical procedures and complications. Perception of women’s inadequacy in labor or control over their health was found in previous research (Bryanton, Gagnon, Johnston, & Hatem, 2008). Collectively, these anxieties can have a significant impact on the birth process. For example, women with high levels of fear of childbirth significantly increase their use of epidural anesthesia during labor (Hall, Stroll, Hutton, & Brown, 2012) which can increase risk of other potential negative outcomes. In addition, other research has

found a correlation between prenatal anxiety and increased rates of cesarean surgery (Zhou & Li, 2011).

The third theme that emerged from the data was the anxiety about a woman’s perception of her own abilities in the role of a mother. The few days following birth are a critical process of maternal role attainment (Mercer & Walker, 2006; Rubin, 1967), and stress has been found to influence this process (Mercer, 2004). The challenging journey required for a woman to achieve IVF pregnancy may contribute to questions about her capabilities as a mother. This may be a common theme for all expectant mothers—but in this population, the stakes are likely to be higher to be that “perfect parent.” Perinatal nurses, providers, and doulas caring for women in both the days and weeks following birth should be in tune with this adaptation process and make appropriate recommendations.

CLINICIAN IMPLICATIONS

Realizing the increased overall anxiety level and themes that emerged from this research should offer significant implications for perinatal nurses, providers, and childbirth educators caring for women going through the IVF process, the pregnancy, or subsequent birth and postpartum period. Indeed, nurses and clinicians in the infertility setting often establish a solid and significant relationship with women going through IVF and will continue this relationship with them until they are transferred to their obstetrician or midwife in the first trimester. These nurses are in an optimal position very early on in pregnancy to identify those who are beginning to experience increased anxiety, and while listening and observing these women, may develop a specific plan to address these situations.

Assuming there may be an increased possibility for these anxieties to extend throughout the pregnancy, there are implications in the childbirth education settings. Perinatal education professionals caring for this population must be aware of this anxiety and its possible effect on the birth process. These professionals could consider allowing more time to counsel women pregnancy during antenatal screening tests, helping women to interpret results, and provide support as needed. Women who have increased pregnancy anxiety and fear of childbirth may benefit from certain care models such as the CenteringPregnancy group visit prenatal care model (Ickovics et al., 2007). Other interventions may

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include psychoeducation group therapy (Rouhe et al., 2013; Toohill et al., 2014), relaxation techniques (Rouhe et al., 2015), and mindfulness (Woolhouse, Mercuri, Judd, & Brown, 2014).

In conclusion, throughout the journey from IVF through birth, a woman may understandably have increased anxiety. Although additional research is necessary to further understand stress and anxiety during pregnancies conceived by IVF, this study has provided insight about the experience of anxiety during the pregnancy and has identified specific anxieties mothers experience about the health of their babies, themselves, and their perceived ability to parent. Future research should examine this stress longitudinally and explore mediating and moderating variables, as well as ascertain potential interventions targeted at reducing anxiety in this population.

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