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Understanding and Treating the Psychosocial Consequences of Infertility

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Understanding and Treating Adjustment to Infertility

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[–] Abstract and Keywords

Psychological distress and infertility are linked in a complex pattern, such that distress may be a cause of infertility and reduce the probability of achieving a pregnancy at the same time that infertility may be a cause of psychological distress. Although infertile women are not more likely to be characterized by psychopathology, they are more likely to experience higher levels of distress than comparison groups. Infertile men also experience psychological distress, but women experience more infertility distress than men. Both infertility and its treatment are stressors putting a heavy psychological strain on couple relationships. Whereas there is general agreement about the need for psychological interventions to treat infertility distress, little is known about the efficacy and effectiveness of psychosocial intervention. Given the prevalence of infertility and the fact that the numbers of individuals and couples seeking infertility treatments are increasing, it is essential that mental health professionals understand the emotional challenges faced by this population.

Keywords: infertility, psychological distress, coping, stress, interventions

The attainment of parenthood is central to many people's identities and, among parents, is often one of their most salient roles. Few people in any society want or expect to be childless, and children are viewed as providing core life meaning, social support, social integration, and in later life, material and social assistance. Although not all adults embrace parenthood, most people assume they can become parents when they are ready. The experience of infertility is thus often an unwelcome interruption to one's planned life course.

There have always been couples who were unable to conceive. One of the earliest written descriptions about involuntary childlessness is from Genesis, where Rachel said to Jacob: "Give me children, or else I die" (Genesis 30:1). Rachel decided that her maid should give her children with Jacob, and the maid delivered two sons. This is likely one of the first descriptions of surrogate motherhood. Historians have identified written statements from infertile women and health professionals over the last 300 years documenting the manner in which infertile women have suffered and the manner in which they have sought a range of different treatments in order to become mothers (Marsh & Ronner, 1996). In other words, infertility and seeking help for infertility are not recent phenomena. What *is* recent is the development of substantially improved reproductive technologies over the past 30 years, resulting in higher treatment-success rates. Another phenomenon that has occurred in recent years is that more women are postponing childbearing until they are older. Advanced female age, in combination with advanced male age, increases the risk of infertility, fetal deaths (e.g., spontaneous abortion, ectopic pregnancy, stillbirth), involuntary childlessness, and having smaller families than desired (Schmidt, Sobotka, Bentzen, & Nyboe Andersen, 2012).

Prevalence of Infertility

Infertility is defined clinically by the World Health Organization (WHO) as "a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse" (Zegers-Hochschild et al., 2009). Primary infertility means that the woman has never achieved a

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pregnancy, whereas secondary infertility is used for infertile women who have previously been pregnant (irrespective of the outcome of previous pregnancies, such as abortion, extrauterine pregnancy, live birth, or still birth). Estimates of the prevalence of infertility vary depending on whether: (a) prevalence is estimated among all women in a certain age group or among only those women who have tried to have at least one child, and (b) the estimate is for lifetime prevalence or current prevalence not including those who have been infertile previously in their life. In general, an infertility prevalence estimation among all women is highly dependent on the proportion of women having tested their fertility (population at risk for infertility) and the proportion of women not (yet) having tried to achieve a childbirth. When infertility is estimated among only those women who have tried to achieve at least one birth (the population at risk for infertility), the lifetime prevalence of infertility in developed countries varies between 16 and 28%, indicating that 16–28% of those who have tried to become mothers were infertile or have been infertile for one or more periods during their fertile ages (Schmidt, 2006). Approximately 3–6% of women aged 40 years or older are involuntarily childless, having never delivered a child due to either their own or their partner's infertility. A further 4–6% have had fewer children than desired due to infertility (Schmidt, 2006).

Biological Causes of Infertility

Infertility may be caused by factors associated with the woman, the man, or both partners. Approximately 80% of fertility is explainable, and approximately 20% is not explainable (i.e., no biological/medical cause for infertility can be ascertained). Of infertility that is explainable, approximately one-third is due to female factors, one-third due to male factors, and one-third due to combined female and male infertility.

Female Infertility

Female infertility can be categorized as being due to factors related to (a) ovulation, (b) the cervix or uterus, and/or (c) the fallopian tubes. Polycystic Ovary Syndrome (PCOS) is the most frequent cause of oligo-ovulation (i.e., infrequent ovulation) or anovulation (i.e., no ovulation); other causes of anovulation and oligo-ovulation include hormonal deficiencies, obesity, excessive physical activity, and depression. Female infertility can also be caused by endometriosis, a condition in which the uterine lining migrates outside the uterine cavity. When uterine endometrium is located outside the uterine cavity it can cause infertility (e.g., by blocking the fallopian tubes). Uterine fibroids (i.e., benign tumors) may lead to infertility by leading to a reduced probability of the implantation of the fertilized egg. Infertility can also be caused by blockages in one or both tubes as a result of pelvic inflammatory disease, usually following a sexually transmitted infection, such as chlamydia. Important risk factors for female infertility are advanced age, obesity, smoking, and sexually transmitted diseases. Smoking is a risk factor for female infertility primarily by accelerating the age-related decline in oocyte reservoir leading to increased risk of infertility and also increases the risk of spontaneous abortions (American Society for Reproductive Medicine [ASRM], 2008). Passive smoking presents a similar risk to active smoking. Furthermore, female smoking during pregnancy increases the risk for later male infertility among male offspring (Jensen et al., 2004).

Male Infertility

Male infertility is often associated with low quantities of semen or poor quality semen. Of young men with fewer than 15 million spermatozoa/ml (WHO, 2010), 20% will have difficulty fathering a child. Reduced semen quality may be due to such causes as congenital malformations, nondescensus of the testis, cystic fibrosis, and parotitis as an adult. Estrogen-like substances, such as pesticides, in the environment are suspected to negatively influence semen quality (Skakkebaek, Rajpert-De Meyts & Main, 2001). Other risk factors for male infertility are being overweight (Ramlau-Hansen et al., 2007) and mothers having smoked during pregnancy (Jensen et al., 2004).

Infertility Treatment

Medically assisted reproduction (MAR) includes reproduction brought about through ovulation induction, insemination with semen of husband/partner or donor semen, and assisted reproductive technology (ART), such as in vitro handling of both human oocytes and sperm or embryos (Zegers-Hochschild et al., 2009). See Table 1 for an overview of the different MAR- treatments.

Table 1 Medically Assisted Reproduction

Assisted Reproductive Technology (ART) treatments

In vitro fertilization (IVF)

Hormone stimulation of the woman in order to increase the number of eggs.
Eggs are retrieved and eggs and semen of partner/donor (IVF-D) are placed in a Petri dish.
Fertilization.
One or more embryos are transferred to the uterus.

Intracytoplasmic sperm injection (ICSI)

Same as IVF except that a single spermatozoon is injected into the oocyte cytoplasm.

Frozen/thawed embryo transfer cycle (FET)

Initiated by a prior IVF or ICSI treatment.
One or more frozen, thawed embryos are transferred to the uterus.

Oocyte donation (OD)

Eggs are retrieved from a donor.
Fertilization.
One or more embryos are transferred to the uterus of the female recipient.

Embryo donation

The transfer of an embryo resulting from gametes (spermatozoa and oocytes) that did not originate from the recipient or her partner.

Non-ART treatments

Ovulation induction (OI)

Pharmacological treatment of women with anovulation or oligo-ovulation with the intention of inducing normal ovulatory cycles.

Intrauterine insemination with husband/partner's semen (IUI-H)

+/- hormonal stimulation of the woman.
Husband/partner's semen inseminated in the uterus.

Intrauterine insemination with donor semen (IUI-D)

+/- hormonal stimulation of the woman.
Donor semen inseminated in the uterus.

Source: Zegers-Hochschild et al. (2009).

Most often, fertility patients have to be infertile according to the WHO definition before treatment is initiated. However, if there is an obvious reason for the couple's infertility, such as azospermia (no spermatozoa) or anovulation, or if the woman is of advanced age (> 35 years) where fertility is reduced, fertility treatment is initiated without waiting the one-year period of trying to conceive.

Population-based studies find that 56% of infertile people seek fertility treatment in developed countries, with a slightly smaller percentage (51%) seeking treatment in less developed countries (Boivin, Bunting, Collins, & Nygren, 2007; see also Chandra & Stephen, 2010; Vahratian, 2008). A larger proportion of people having primary infertility (i.e., never having achieved a pregnancy/live birth) seek MAR compared to those with secondary infertility (i.e., having been pregnant/delivered a child). Treatment seeking depends on a range of different factors, including

whether infertile people desire fertility treatment, whether the infertility is primary versus secondary, social support and social pressure, socioeconomic status, and the extent to which infertile people have affordable access to high-quality assisted reproduction (Eisenberg et al., 2010; Greil & McQuillan, 2004; Greil, McQuillan, Shreffler, Johnson, & Slauson-Blevins, 2011; Moreau, Bouyer, Ducot, Spira, & Slama, 2010; Olsen, Basso, Spinelli, Koppers-Chinnow, & the European Study Group on Infertility/Subfecundity, 1998). Even in countries with free access to public fertility treatment, some studies find that infertile people from lower social classes utilize fertility treatment to a lower extent than those from higher social classes (see review in Schmidt, 2006). Across the world, an increasing number of infertile people are seeking treatment (de Mouzon et al., 2010; Nygren, Sullivan, Zegers-Hochschild, Mansour, Ishahara, Adamson, & de Mouzon., 2011). Compared to Europe, the number of ART cycles per million inhabitants is lower in the United States (478 ART cycles/million versus 658 cycles/million in Europe) (Nygren et al., 2011). One of the reasons for this remarkable difference is the access to ART treatment in a public-health-care system with no or low self-payment in several European countries. Another remarkable difference is in the percentages of ART multiple-pregnancies and deliveries (34% in the United States compared to 23% in Europe and 22% in Australia). This difference is due to a much higher percentage of transferring more than two embryos in the United States (Nygren et al., 2011).

The proportion of children born after ART varies between 1% and 4% across European countries and the United States. Furthermore, an additional 2–8% of children are born after ovulation induction (Schieve, Devine, Boyle, Petrini, & Warner, 2009). On average, the live birth rate after one fertility treatment cycle among women < 40 years old varies between 15% and 25% depending on type of treatment. The overall live birth rate after more than one treatment cycle depends, among other things, on whether fertility treatment is free in a public-health-care system or whether the couple must pay for treatment. This indicates that only a portion of the patients can afford to pay for several treatment cycles. On the basis of data from a country with equal access to a public, tax-financed, health-care system where couples are able to continue treatment after unsuccessful treatment cycles and they do not have to pay themselves, Pinborg, Hougaard, Nyboe Andersen, Molbo, and Schmidt (2009) reported that, at a 5-year follow-up in a complete cohort of 1,338 new couples in fertility treatment, 75% had delivered at least one live born child among the 1,018 women less than 35 years of age when treatment was initiated. However, only 52% of the 320 women 35 or older when treatment was initiated had a live birth. The success rate in this study was higher compared to studies from countries in which patients cannot afford to stay in treatment for financial reasons.

Characterizing the Infertile

There exists a substantial descriptive literature, primarily qualitative in nature, that attempts to characterize the psychosocial experience of infertility (Becker, 2000; Greil, 1991a; Onnen-Isemann, 2000; Sandelowski, 1993; Wirtberg, Moller, Hogström, Tronstad, & Lalos, 2007). One dominant theme that emerges from the descriptive literature on the infertility experience is the centrality of the parenthood identity for both men and women (Becker, 2000; Greil, 1991a; Johansson & Berg, 2005; Sandelowski, 1993). Taken as a whole, the descriptive literature presents a picture of infertility as a devastating experience, especially for women.

Ulrich and Weatherall (2000) described infertility as an “unanticipated life course disruption.” But, in fact, infertility is not an event, but a “nonevent transition” (Koropatnick, Daniluk, & Pattinson, 1993) characterized by an inability to achieve a desired life course change (Matthews & Martin-Matthews, 1986). Because infertility represents a failure to achieve a desired status, it is often experienced as a threat to identity (Greil, 1991a; McCarthy, 2008; Olshansky, 1987; Williams, 1997), leading to perceptions of defectiveness and reduced competence, especially for women (Mahlstedt, MacDuff, & Bernstein, 1987; Matthews & Martin-Matthews, 1986). The sense of not being able to accomplish something that seems so easy for others can lead to a sense of isolation and of alienation from the “fertile world” (Exley & Letherby, 2001; Johansson & Berg, 2005; McCarthy, 2008; Riessman, 2000; Sandelowski, 1993).

Many researchers have reported that infertile women believe they are stigmatized (Exley & Letherby, 2001; Greil, 1991b; Miall, 1985, 1986; Sandelowski & Jones, 1986). Ulrich and Weatherall (2000) found that the infertile women in their sample believed that infertility is perceived as a failure. Women perceived they were being simultaneously told that they were not trying hard enough and that they wanted children too much. Parry (2005) reported that women are very aware of pronatalist attitudes and try to cope by focusing on other activities and by joining support groups. Clarke, Martin-Matthews, & Matthews (2006) argued that, whereas women experience infertility

stigma in terms of failure to have a child, men experience it more in terms of a challenge to virility.

Not surprisingly, the failure to realize important life goals can result in perceptions of loss of control (Clark et al., 2006; Greil, 1991a) and attempts to regain control (Mahlstedt, MacDuff, & Bernstein, 1987). In an attempt to get their lives "back on course," many infertile couples become immersed in the treatment process (Becker & Nachtigall, 1994; Sandelowski, 1993). At the same time that couples pursue treatment in an effort to regain control, they often find the treatment process itself stressful and disempowering (Becker & Nachtigall, 1991, 1994; Carmeli & Birenbaum-Carmeli, 1994; Redshaw, Hockley, & Davidson, 2006; Sandelowski, Harris, & Holditch-Davis, 1989). Given that infertility is perceived as a liminal state in which technological advances offer the promise that success is "just around the corner," many couples experience difficulty in accepting infertility as an identity and in coming to terms with it spiritually (Greil, 1991a; Greil, Porter, Leitko, & Riscilli, 1989), although some see infertility as an opportunity for personal growth (Exley & Letherby, 2001).

One of the strengths of much of the descriptive literature on infertility is that it analyzes the experience of infertility within its social context, paying special attention to gender roles (Greil, Leitko, & Porter, 1988; Nachtigall, Becker & Wozny, 1992), family structure and couple relationships (Greil, 1991a), the effects of medical institutions (Becker & Nachtigall, 1991), and the importance of reproductive technology (Sandelowski, 1993; Sandelowski et al., 1989; Sandelowski, Harris, & Holditch-Davis, 1990; Williams, 1988; Williams, 1997) in shaping the experience of infertility. Kirkman and Rosenthal (1999) argued that the degree of availability of reproductive technology plays an important role in shaping the experience of infertility. Given the state of contemporary medical technology, few couples are ever told that they will never achieve parenthood. Contemporary infertility may, therefore, be characterized by a state of statuslessness and ambiguity (Greil, 1991a; Sandelowski, 1987, 1993; Sandelowski et al., 1990; Sandelowski, Harris, & Black, 1992) in which couples can neither achieve a desired goal nor give up in that goal and chart a new life course. Martin-Matthews and Matthews (2001) have discussed the sense of "time slipping away" and have examined the interaction between family/societal timetables, body timetables, and treatment timetables.

An important weakness of the descriptive literature is that, with a few exceptions (e.g., Bell, 2009, 2010), it has focused primarily on treatment seekers. Evidence suggests that the characterization of infertile woman as struggling with identity and as totally immersed in the process of trying to become pregnant describes only treatment seekers (Greil & McQuillan, 2004; White, McQuillan, Greil, & Johnson, 2006) and may not be applicable to other infertile women. On the basis of data from The National Survey of Fertility Barriers, a population-based study of U.S. women, Greil, McQuillan, Johnson, Slauson-Blevins, and Shreffler (2009) divided infertile women into the "infertile with intent" (i.e., women who say they tried to conceive for at least 12 months without conception) and the "infertile without intent" (i.e., women who report having had unprotected intercourse without conception but who do not say that they were consciously trying to conceive at the time) and discovered that the two groups differ with regard to both psychological distress levels and help-seeking behavior. The infertile with intent were both more likely to seek treatment (49.8% of the infertile with intent talked to a doctor, as compared to 7.1% for the infertile without intent, $p < .001$) and to experience fertility-specific distress.

Psychological Distress as a Source of Infertility

Psychological distress and infertility are linked in a complex pattern in which distress may be a cause of infertility and reduce the probability of achieving a pregnancy, and at the same time infertility may cause psychological distress (van Balen, 2002). We first examine research that investigates the effects of psychological distress on infertility before turning our attention to research that investigates the effects of infertility on psychological distress. Throughout this section, we use "psychological distress" as a generic term encompassing anxiety, depression, and stress.

It is certainly plausible that stress and other negative emotional states can reduce the chances of pregnancy (Henning, Strauss, & Strauss, 2002; Pook, Tuschen-Caffier, & Krause, 2004). In a literature review on psychological distress and infertility, Wischmann (2003) argued that stress and anxiety are likely to be contributing causes but are rarely the sole cause of infertility and asserted that methodological improvements are necessary before definitive statements about the causal roles of stress and anxiety can be made. In another literature review, Eugster and Vingerhoets (1999) cited evidence that psychological factors may influence in vitro fertilization (IVF)

success rates. In a study of 818 Danish infertile couples, fertility-problem stress was found to be significantly related to treatment outcomes for both women (pooled within groups correlation = .517) and men (pooled within groups correlation = .392), with a significantly more pronounced effect ($z = 3.19, p < .001$) for women (Boivin & Schmidt, 2005; see also Boivin, Sanders, & Schmidt, 2006). Anxiety has also been found to influence pregnancy rates (Gulseren et al., 2006). General well-being (Anderheim, Holter, Bergh, & Möller, 2005), personality factors, and psychopathology (Salvatore et al., 2001), however, appear to be unrelated to pregnancy rates. Strauss, Hepp, Staeding, & Mettler (1998) examined a variety of psychological treatments and reported that psychological variables, including causal attributions and expectations for treatment, explained a very small proportion of the variance in treatment outcomes, such that very little of the variance in treatment outcomes can be attributed to psychological factors. There is evidence that stress levels and coping strategies have an impact on sperm quality. For example, in a study of 63 patients at an andrology clinic, Pook and Krause (2005) found that those with reduced sperm counts over time reported a score of 2.08 on the Infertility Distress Scale compared to a score of 1.35 for those whose sperm counts increased ($p = .001$). One hypothesis is that the HPA (hypothalamic-pituitary-adrenal) axis and gonadotropin-releasing hormone increase during stress and causes reduced reproductive function (Ferin, 1999). In another study, the level of infertility-specific distress was shown to be a significant risk factor for a decrease in sperm quality (Pook et al., 2004).

Two meta-analyses of prospective studies of the effects of emotional distress on pregnancy rates among women in assisted reproduction treatment have been published recently (Boivin, Griffiths, & Venetis, 2011; Matthiesen, Frederiksen, Ingerslev, & Zachariae, 2011). Boivin et al. (2011) found that pretreatment anxiety and depression were not associated with treatment outcome when studying a single treatment cycle. On the other hand, Matthiesen et al. (2011) reported small but statistically significant pooled effect sizes for stress, trait anxiety, and state anxiety, indicating that a higher level of stress and/or anxiety was associated with a reduced probability of pregnancy rates after assisted reproduction treatment. The analysis showed no effect for an association between depression and clinical pregnancy.

Infertility as a Source of Psychological Distress

Much more work has been conducted that examines the effect of infertility on psychological distress. Numerous studies have shown that infertility and its treatment cause stress and are risk factors for anxiety and depression symptoms (Verhaak et al., 2007). Infertility and its treatment are low-control stressors; that is, they are stressful situations in which the infertile couple can do little or nothing to influence the nature or outcome of their situation (Terry & Hynes, 1998). Further, infertility is a chronically stressful situation; stress caused by chronic stressors is typically more severe than that caused by discrete events. Tests of the hypothesis that infertility is a source of psychological distress have typically used standardized measures normed on the general population to determine whether the infertile score differently than the population at large or whether they have higher scores than women in a noninfertile comparison group.

Methodological Issues

Research on psychosocial aspects of infertility have traditionally been characterized by several methodological limitations, including an over-reliance on clinic-based samples, overuse of cross-sectional designs, and overdependence on general measures of distress.

Clinic-based samples. First, until recently, most studies on the psychosocial consequences of infertility were limited to clinic-based samples of treatment seekers. Because nontreatment seekers differ substantially from treatment seekers on race, socioeconomic status, and other characteristics, the generalizability of findings from this literature is questionable (Greil, Slauson-Blevins, & McQuillan, 2010). In addition, the use of clinic samples confounds the consequences of treatment seeking, treatment itself, and fertility status. There have been some important studies using non-clinic-based samples. King (2003) used the National Survey of Family Growth, a nationally representative sample that included infertility status data for women in the United States to assess whether treatment seekers and nontreatment seekers are more likely to meet the criteria for anxiety relative to fertile women. Sundby (1997), Sundby, Mboge, and Sonko (1998), and Leonard (2002a, 2002b) selected infertile respondents in Gambia and in southern Chad using systematic sampling techniques in order to obtain a picture of the experience of infertility in those nations. The National Survey of Fertility Barriers, a population-based study of

4,796 U.S. women aged 25–45 has been developed as a means of allowing researchers access to a large data set that includes infertile women who have not received treatment (see, for example, Greil, Lowry, McQuillan, & Shreffler, 2011; Greil, Shreffler, Schmidt, & McQuillan, 2011).

Reliance on clinic samples gives rise to difficulty in finding appropriate controls. If one compares means for clinic patients to means for the population of women as a whole, one must contend with the fact that the population of women as a whole undoubtedly includes some infertile women. This is not a major problem if one finds significant differences between the clinic sample and population norms, but if there are no significant differences, the possibility that the lack of a difference was due to the presence of infertile women in the “control” sample cannot be dismissed. If one chooses a more specific control group, it is not at all obvious what the most appropriate comparison group should be. Monga, Alexandrescu, Katz, Stein, & Ganiats (2004) compared couples seeking infertility treatment to couples seeking elective sterilization. Matsubayashi, Hosaka, Izumi, Suzuki, and Makino (2001) and Fido and Zahid (2004) compared infertile women to pregnant controls. Neither of these groups seems ideal insofar because there are two important differences—parity and presumed fertility—between groups. A better strategy might be that employed by Jordan and Ferguson (2006), who compared infertile women to others in the family-practice clinics from which their sample was drawn.

Longitudinal cohort studies. Second, until recently, most studies were cross-sectional in nature. Although cross-sectional studies can uncover associations between infertility and psychological distress, they do not allow unambiguous causal inferences to be drawn. There have been more longitudinal designs in recent years, but most employ a fairly narrow time frame. Several studies have assessed fluctuations in stress levels during a reproductive cycle (e.g., Edelman & Connolly, 1998; Holter, Anderheim, Bergh, & Möller, 2006; Verhaak, Smeenk, van Minnen, Kremer, & Kraaijmaat, 2005). Other studies have examined change over a 6-month period (Anderson, Sharp, Rattray, & Irvine, 2003; Hjelmstedt, Widström, Wramsby, & Collins, 2004). Much can be learned from longitudinal studies with expanded time frames. The Copenhagen Multi-Centre Psychosocial Infertility study of Infertile Danish couples (see, for example, Schmidt, 2006; Peterson, Pirritano, Block, & Schmidt, 2011) represents an attempt to follow a sample of 2,250 fertility patients during 10 years. Schneider and Forthofer (2005) used data collected in 1988, 1989, and 1990 from the U.S.-based Study of Marriage, Family, and Life Quality.

General versus infertility-specific stress measurement. A third reason for concern about findings regarding the psychological sequelae of infertility is the use of general measures of psychological distress. General measures of distress are unlikely to be sufficiently sensitive or specific to the problems of infertility to adequately reflect the experience of many women (Jacob, McQuillan, & Greil, 2007; Schmidt, 2009). A number of research groups have developed fertility-specific stress measurements in order to better capture the stress caused by infertility and its treatment, such as the Fertility Problem Stress Inventory (Abbey, Halman, & Andrews, 1992), the Fertility Problem Inventory (Newton, Sherrard, & Glavac, 1999), the The Copenhagen Multi-Centre Psychosocial Infertility (COMPI) Fertility Problem Stress Scales (Schmidt, 2006), and Fertility-Specific Distress (Greil, Shreffler, et al., 2011). One study compared their Fertility-Specific Distress (FSD) measure with a general stress measure and reported the FSD measure to be more sensitive to effects of variation in the experience of infertility than the general distress measure (Greil, Shreffler, et al., 2011). Because fertility-specific measures are only relevant to populations with fertility barriers, they cannot be used to compare infertile individuals to those who are not infertile. Instead, they are better suited to discovering differences among the infertile or tracking changes over time.

The methodological concerns expressed here are not intended to imply that there is nothing to be learned from previous research. On the contrary, much has been learned from cross-sectional studies of clinic-based samples. Several caveats are, however, important to keep in mind. First, we should remember that results from clinic samples should not be generalized to those who do not seek treatment. Second, given the cyclical nature of the relationship between psychological distress and infertility, we should be very cautious in drawing inferences from studies employing cross-sectional designs. Third, given the tendency of some research strategies to underestimate differences between infertile individuals and presumably infertile controls, we should be cautious about placing too much faith on null findings, as lack of significant findings is more likely to be an artifact of study design than are significant findings. Results of research using both general and fertility-specific measures of psychological distress are discussed in the following section.

Absence of Psychopathology

At present, there appears to be a general consensus that most infertile women and men do not evidence clinically significant psychopathology. In several British Studies, Edelman and Connolly (1986, 1998) failed to find evidence of psychopathology among infertility patients. In a literature review of studies on patients undergoing IVF, Eugster and Vingerhoets (1999) concluded that IVF couples are well-adjusted. In another literature review, Wischmann, Stammer, Scherg, Gerhard, and Verres (2001) suggested that, although most couples who seek infertility treatment do not have psychopathology, there is a small proportion that needs psychological help (see also Drosdzol & Skrzypulec, 2008; Volgsten, Ekselius, Poromaa, & Svanberg, 2010; Volgsten, Skoog Svanberg, Ekselius, Lundqvist, & Poromaa, 2010). The finding that most infertile couples are not characterized by psychopathology does not contradict the findings of the descriptive literature described previously. That literature suggests, not that infertile patients are fundamentally different from others in their psychological functioning, but rather that the experience of infertility is a source of psychological distress (Greil, 1997).

Higher Levels of Psychological Distress Among the Infertile

Studies of women. Most studies employing standardized measures of general psychological distress have shown that, although infertile women are not necessarily more likely to be characterized by psychopathology, they are more likely to experience higher levels of distress than comparison groups (Drosdzol & Skrzypulec, 2008; Klemetti, Raitanen, Sihvo, Saarni, & Kopenen, 2010; Matsubayashi et al., 2001; Monga et al., 2004; Sexton, Byrd, & von Kluge, 2010). Miles, Keitel, Jackson, Harris, and Licciardi (2009) found that 42% of the 119 women being treated for infertility that they studied had clinically significant levels of distress (as indicated by a score 63 or higher on the General Symptom Inventory). Wischmann et al. (2001) found that 275 German clinic women had slightly higher psychological distress (e.g., 51.9 versus 49.3 for depression and 52.7 versus 50.7 for anxiety on the Symptom Checklist [SCL-90-R], $p < .001$) than norms and also scored slightly lower (e.g., 0.5 versus 0.0 on the marriage and partnership subscale of the Life Satisfaction Questionnaire, $p < .001$) than norms on a number of subscales of life satisfaction. All significant differences were associated with small effect sizes. Infertile women had higher distress scores (e.g., $t = 2.842$, $p = .009$ for depressive symptoms; $t = 2.848$, $p = .009$ for anxiety symptoms) on the Patient Health Questionnaire than did other women who attended family practice clinics (Jordan & Ferguson, 2006). Women currently experiencing infertility problems were more likely to have depressive disorders (24.9%) than counterparts who have eventually conceived naturally (6.8%) (Oddens, den Tonkelaar, & Nieuwenhuyse, 1999). Using the National Survey of Family Growth, King (2003) found that subfecund women have more anxiety symptoms than fecund women. However, several studies (Holter et al., 2006; Verhaak, Smeenk, van Minnen, Kremer, & Kraaimaat, 2005) have found that IVF women do not differ significantly from norms on general distress.

Much of the research on variations in distress among women with infertility has focused on differences in coping strategies and other psychological attributes (Bayley, Slade, & Lashen, 2009; Benyamini et al., 2008; Miles et al., 2009; Peterson, Pirritano, Christensen, Boivin, Block, & Schmidt, 2009; Sexton et al., 2010; Van den Broeck, Emery, Wischmann, & Thorn, 2010). For example, Miles et al. (2009) found, in a study of 119 infertile women, that differences in coping strategies, career-role salience, and social pressure for motherhood accounted for 32% of the variance in scores on the Brief Symptom Inventory. Much less research has examined differences by type of infertility or demographic, situational, and attitudinal correlates of infertility distress. Some studies utilizing standardized measures of anxiety and stress have found no differences between levels of distress among women with primary as opposed to secondary infertility (Downey & McKinney, 1992; Edelman, Humphrey, & Owens, 1994), whereas other studies have found that women with primary infertility exhibit higher levels of distress than women with secondary infertility (Epstein & Rosenberg, 2005; Upkong, 2006; Verhaak et al., 2007). For example, Epstein and Rosenberg (2005) found that egg donation recipients with primary infertility scored higher (6.8 versus 3.7, $p = .001$) than those with secondary infertility on the Beck Depression Inventory (BDI). However, it should be noted that both of these scores are regarded as being reflective of "none to minimal depression" on the BDI, suggesting that, regardless of type of infertility, women in this sample were psychologically healthy.

Studies of men. Studies of men using general measures of distress have also found, for the most part, that infertile men experience psychological distress. Baluch, Nasser, and Aghssa (1998) found that Iranian men with infertility, especially those with male-factor infertility, have higher scores for depression (15.2 for male factor versus 10.3 for female factor versus 7.9 for controls on the BDI, $F [2, 81] = 5.0$, $p = .008$), and state anxiety (41.7 for male factor versus 39.1 for female factor versus 29.6 for controls, $F [1, 81] = 18.0$ on the State-Trait Anxiety Index [STAI], $p < .001$) than controls with no history of infertility. On the basis of a longitudinal study in Denmark,

Peronace, Boivin, and Schmidt (2007) concluded that infertility is stressful for men regardless of the source (male factor, female factor, combined, or unexplained) of infertility. Webb and Daniluk (1999) found that six men experiencing infertility described a sense of profound grief and loss, embarrassment over treatment, powerlessness and loss of control, sense of inadequacy, betrayal and isolation, and a sense of threat and foreboding. Malik and Coulson (2010) reported that infertile men experience "emotional anguish" and perceive that they are neglected in the infertility treatment process. According to Lee and Chu (2001), Chinese infertile men have similar reactions to male infertility as Western men. Dyer, Abrahams, Mokoena, and van der Spuy (2004) showed that men in her South African sample were very bothered by involuntary childlessness. Folkvord, Odegaard, and Sundby (2005) reported that one-third of infertile men in Zimbabwe showed signs of mild clinical depression. On the other hand, Monga et al. (2004) discovered that men in infertile couples do not differ from men who are not infertile on a scale of psychological well-being. Interestingly, Wischmann et al. (2001) found that infertile men were higher than norms (based on a sample that both fertile and infertile men) on most subscales of life satisfaction relative to men who were not infertile. On balance, the evidence seems to indicate that infertile men experience a certain degree of psychological distress.

Distress and coping. There is a sizable literature on the relation between distress and coping strategies among the infertile (e.g., Abbey, 2000; Benyamini et al., 2008; Schmidt, Tjornhoj-Thomsen, Boivin, & Nyboe Andersen, 2005; van den Akker, 2004). A multiple-regression study conducted by Gibson and Myers (2002) demonstrated that social-coping resources, ($t = -3.20, p = .002$), partner support ($t = -2.26, p = .03$), and family support ($t = -2.12, p = .04$) all contributed to lessened infertility stress among 83 infertile women. Hansell, Thom, Prentice-Dunn, & Floyd (1998) reported that women who responded to infertility as a "challenge" were less distressed than women who responded to infertility as "loss." Brothers and Maddux (2003) found that perceiving a strong link between future happiness and becoming a parent ($r = .30, p < .01$) and rumination ($r = .521, p < .01$) are correlated with higher levels of psychological distress as measured by the Global Severity Index of the SCL-90-R among a sample of 69 infertile women.

Recently, a few studies have investigated resilience among fertility patients (Sexton et al., 2010; Herrmann et al., 2011). Resilience is the capacity of individuals to maintain relatively stable and healthy levels of psychological and physical functioning when exposed to negative events (Sexton et al., 2010). Hence, resilience is a protective factor in this case against fertility-specific stress and impaired quality of life for infertile couples (Herrmann et al., 2011). Among their sample of 196 women and 199 men, high resilience was associated with lower scores on fertility-specific stress for both men ($r = -.17$ for men, $p < .05$ for global stress) and women ($r = -.44, p < .001$). In addition, it was associated with higher scores on quality of life ($r = .28, p < .001$, for men and $r = .28, p < .001$ for women). Further, in a study of infertile women, resilience was positively associated ($r = .28, p = .024$) with the use of action-focused coping strategies, such as planful problem solving and seeking social support, as opposed to emotion-focused strategies, such as escape-avoidance, accepting responsibility, and distancing (Sexton et al., 2010). Overall, the research on coping and resilience suggests that although infertility is difficult, some coping strategies can mitigate the stress it causes. The implication is that counselors can help clients deal with infertility through work on coping strategies.

Gender and Psychological Distress

Higher psychological distress among women. Much research on both fertility-specific distress and general distress has focused on gender differences on levels of distress. Authors of several literature reviews (Abbey, 2000; Eugster & Vingerhoets, 1999; Henning et al., 2002; Savitz-Smith, 2003) have reported evidence that women experience more infertility stress than men. However, Edelman and Connolly (1998, 2000) have suggested that this finding may simply reflect the tendency for women generally to be more distressed than men. Despite this caution, the vast majority of recent studies have confirmed earlier research that concluded that infertility is more distressing for women than it is for men (Anderson et al., 2003; Franco et al., 2002; Hjelmstedt et al., 1999; Monga et al., 2004; Peterson, Newton, Rosen, & Skaggs, 2006; Peterson, Pirritano, Christensen, & Schmidt, 2008). In a study of 1,153 infertile women and 1,149 infertile men, female fertility patients reported higher level of social concern ($F [1, 895] = 26.6, p < .01$), sexual concerns ($F [1, 895] = 31, p < .001$), and need for parenthood ($F = [1, 895] 17, p < .001$) (Newton et al., 1999). A recent longitudinal study (Lund, Sejbaek, Christensen, & Schmidt, 2009) concluded that women (14.8%) were more likely than men (5.7%) to report severe depressive symptoms a year after beginning treatment. Anderson et al. (2003) found that women score higher (25.7% above 10, the cutoff for

clinical significance) than men (8.9% above 10) on the Hospital Anxiety and Depression scale and on infertility-specific distress prior to their first clinic visit as well as six months later. Women were more likely to report clinically significant levels of anxiety as measured by the same scale when compared to men ($M = 5.0$ for women; $M = 2.5$ for men; $t = 6.5$, $p < .001$), whereas men were more likely to report stronger links between anxiety and sexual infertility stress ($R^2 = .21$ for men; $R^2 = .14$ for women, $p < .01$) (Peterson, Newton, & Rosen, 2003). In a study of 59 Chinese couples, Lee and Sun (2000) found that Chinese wives have higher infertility stress compared to their husbands. Pasch and Christensen (2000) have written that women are more invested in having children and are more treatment-oriented than men. Additionally, White and McQuillan (2006) found that relinquishing a strong intention to have a child is associated with elevated distress (a 0.45 greater increase in depressive symptoms [as measured by the Center for Epidemiological Studies Depression Scale] between Time 1 and Time 2, $p = .004$) for women but not for men.

Moving beyond differences in levels of distress. Rather than focusing simply on whether infertile men or infertile women experience higher levels of psychological distress, some researchers have examined differences in the ways that men and women are affected by infertility. Beutel, Kupfer, Kirchmeyer, Kehde, Kohn, and Schroeder-Printzen (1998) posited that whereas infertile wives experience infertility as having a greater impact on their daily lives and feel a need for more support, their husbands feel more responsible. Hjelmstedt et al. (1999) argued that both men and women report perceptions of injustice but asserted that women are more likely to admit to changes in mood, jealousy of those who are not infertile, and a sense that their “biological clocks are ticking away.” In contrast, men are concerned about loss of control and are worried about their partner’s reaction (Hjelmstedt et al., 1999). Much of this pattern of results is reminiscent of Greil’s (1991a) argument that wives experience infertility as a direct threat to self-identity, whereas husbands experience infertility indirectly through the effect that infertility has on their wives. Hjelmstedt et al. (1999) reported that women are more concerned about having a child, whereas men are more concerned about the social role of being a parent. Andrews, Abbey, & Halman (1992) reported that, for women, there is a substantial difference between infertility and other problems, whereas men are affected by infertility in much the same way that they are affected by other problems. It is important for researchers to move beyond the question of whose infertility is “worse” to begin to discuss the ways in which women’s and men’s experiences of infertility differ (Berg, Wilson, & Weingartner, 1991). From a theoretical perspective, doing so will help us to better understand the relation between gender roles and psychological distress. From a practical point of view, it will enable counselors of infertile couples to address the differing needs of both partners.

Gender differences in coping. The focus on gender differences is also evident in studies of coping strategies (Dhillon, Cumming, & Cumming, 2000; Gerrity, 2001; Hjelmstedt et al., 1999; Kowalcek, Wihstutz, Buhrow, & Diedrich, 2001; Mikulincer, Horesh, Levyshiff, Manovich, & Shalev, 1998; Peterson, Newton, Rosen, & Skaggs, 2006). A meta-analysis of six studies using the Ways of Coping Checklist led Jordan and Revenson (1999) to conclude that, relative to infertile men, infertile women displayed higher levels of seeking social support, escape/avoidance, planful problem solving, and positive reappraisal. In a study of 695 infertile couples (Lund et al., 2009), infertile men who reported a lack of emotional support from their partners were over twice as likely to report severe depressive symptoms as infertile men who reported always receiving emotional support from their partners ($OR = 2.69$, $95\% CI = 0.98 - 7.40$). Some evidence suggests that distress levels are related to one’s partner’s coping strategies as well as to one’s own (Amir, Horesh, & Lin-Stein, 1999; Peterson, Newton, Rosen, & Schulman 2006; Schmidt, Holstein, Christensen, & Boivin, 2005). A fascinating discovery comes from Pasch, Dunkel-Schetter, and Christensen (2002), who observed, in a study of 48 infertile couples, that husbands whose wives reported wanting to talk more about infertility reported more negative affect toward their wives than husbands whose wives were less eager to talk about the problem ($r = .30$, $p = .03$). Better understanding of gender differences in coping strategies should enable mental health professionals to work more productively with both partners in a couple to develop strategies that work for them as a couple.

Infertility, Treatment, and Distress

Because only about half of the infertile worldwide seek treatment, the question of what factors influence help seeking is an intriguing one. On the basis of a study of a population-based sample of infertile women, White et al. (2006) concluded that self-definition as infertile is key to seeking treatment. Because this was a cross-sectional study, it remains unclear whether defining oneself as infertile is a prerequisite to seeking treatment or whether it is

treatment that leads individuals to define themselves as infertile. Although it seems self-evident that one would not seek treatment without defining oneself as infertile, it is equally plausible that some patients may not accept an identity as infertile until that identity is endorsed by a physician or other health professional. Greil and McQuillan (2004) have found that the infertile with intent were more likely to seek treatment than were the infertile without intent (54% vs. 14%).

The experience of treatment. Greil (1991a) found in a qualitative study that wives were much more likely to initiate treatment than husbands. More recently, Daniluk (2001) reported that, of the 65 infertile couples she interviewed, it was the woman who initiated treatment in all cases (see also Webb & Daniluk, 1999; Throsby & Gill, 2004). Although women are “eager for medicalisation” (Becker & Nachtigall, 1992, p. 456), they nonetheless find the treatment experience highly stressful. Redshaw et al. (2006) found that patients reported perceiving that they have little control over treatment and that they are not being treated like people. Several studies have shown that patients are intimidated by biomedical language about technical aspects of infertility, especially in situations in which language barriers exist (Becker, Castrillo, Jackson, & Nachtigall, 2005; Ulrich & Weatherall, 2000).

The infertility treatment experience has been described as a situation that engulfs patients and dominates their daily routine (Daniluk, 2001; Redshaw et al., 2006). Greil (2002) summarized the experience of treatment in terms of three paradoxes: (a) infertile women’s sense of loss of control leads them to treatment where they lose even more control; (b) infertile women’s perception of loss of bodily integrity leads them to treatment in which the body is invaded; and (c) infertile women’s sense of loss of identity leads to treatment in which they perceive they are not treated as whole people. Still Greil (2002) insisted that infertile women in the United States should not be seen as passive victims because they work creatively to expand their options within the structural confines of the treatment setting (see also Letherby, 2002a, 2002b; Parry, 2005; Riessman, 2000, 2002; Todorova & Kotzeva, 2003).

Redshaw et al. (2006) reported that infertility patients complained about the lack of continuity of care, about the inconvenience of treatment, and about the emotional and financial costs of treatment. Nonetheless, women expressed stoicism and saw the difficulties of treatment as the price they had to pay to have a child. Malin, Hemminki, Raikonen, Sihvo, and Perala (2001) found that, of 340 Finnish women with difficulty conceiving, women treated during the 1990s were more likely to be dissatisfied (61%) than women who received treatment prior to that time (19%). Patients expressed satisfaction if they perceived that care was individualized, supportive, and friendly and if they perceived that everything possible had been done. Sources of dissatisfaction were the slow progress of treatment and poor relationship with health-care providers. These findings suggest that advances in technology may actually lead to an increase in dissatisfaction with treatment; as patients become more optimistic about available option and the odds of success, they may become more dissatisfied if they are unsuccessful or if they think that all possible treatment options have not been tried.

Most researchers who have investigated the relation between infertility diagnosis and distress have reached the conclusion that diagnosis does not exercise an influence over distress levels. Some studies have shown higher stress among those women and men facing male infertility compared to those facing female infertility (Newton et al., 1999; Lykeridou, Gouranti, Deltsidou, Loutradis, & Vaslamatzis, 2009), but most studies have found no differences in stress levels among men in fertility treatment according to whether the infertility diagnosis was male or female (Edelmann & Connolly, 1998; Hjelmstedt et al., 1999; Kowalcek et al., 2001; Lukse, 1991; Peronace, Boivin, & Schmidt, 2007; Verhaak et al., 2005; Wischmann et al., 2001).

A few studies have addressed the extent to which distress among the infertile may be attributed to infertility treatment rather than infertility itself. On the basis of a national probability sample of women in the United States, King (2003) concluded that the effects of subfecundity on generalized anxiety disorder (GAD) are not moderated by treatment, but her study was limited by both the dichotomous nature of its measure of its measure of GAD (clinically significant or not) and its cross-sectional design. In a recent study based on two waves of data from the National Survey of Fertility Barriers, Greil et al. (2011) reported that infertility treatment caused fertility-specific distress over and above that caused by infertility itself. A study based on a clinical sample among couples in fertility treatment showed that the level of fertility-specific stress among both women and men was positively associated with treatment costs and with number of tests and treatments received (Abbey et al., 1992).

Some studies have shown that length of treatment is not related to level of stress (Anderson et al., 2003; Edelmann & Connolly, 2000), but several researchers have reported contradictory findings (Chiba et al., 1997; Nasser,

2000). One unanswered question is whether changes in distress over time are a response to treatment or whether they are a result of the duration of infertility. Studies of IVF women have provided evidence that it is the success or failure of treatment rather than the duration of treatment that gives rise to increased levels of distress (Beutel et al., 1998; Holter et al., 2006; Mindes, Ingram, Kliever, & James, 2003). Most women eventually adjusted to unsuccessful treatment, but a significant minority showed signs of emotional problems (Verhaak et al., 2001; Verhaak et al., 2005; Verhaak et al., 2007). For example, Verhaak et al. (2005) reported that 20% of women who did not become pregnant following IVF showed elevated (but subclinical) levels of depression and anxiety six months later.

Terminating treatment. It is not known precisely how many people stop treatment for any reason, but well-controlled studies of ART patients found that somewhere between 24% and 30% of IVF patients discontinue treatment (Boivin et al., 2012). The difficulties patients have in putting a stop to treatment have also been addressed (Greil, 1991a; Sandelowski, 1991; Williams, 1988). According to Throsby and Gill (2004), women find it especially hard to stop treatment, but their husbands step in to exercise a “rational veto” by bringing in considerations of the emotional and physical health of wives. Although it is difficult to stop treatment, Verhaak et al. (2007) found that stopping treatment leads to reduced depression and anxiety among IVF women, even if they do not conceive. Unsuccessful IVF couples do not regret the IVF experience; instead they view it as their best chance to conceive (Daniluk, 2001; Johansson & Berg, 2005; Throsby & Gill, 2004).

Adjustment to unsuccessful treatment. A study of Scandinavian women 2 years after unsuccessful IVF found that the women refocus on other concerns but still retain hope for a child. Johansson and Berg (2005) described women who, even after they discontinued treatment, do not relinquish hope, at least until they reach menopause. Small-sample studies of women who are not able to have biological children have found that many restructure their definition of family to include adoption and child-free lifestyles (Parry, 2005; Su & Chen, 2006; Ulrich & Weatherall, 2000). Daniluk and Tench (2007) studied 38 infertile couples adjusting to unsuccessful treatment over a period of 33 months and observed that self-esteem increased over that period, whereas sexual satisfaction decreased. They also discovered that poor long-term outcomes were associated with the perception of having few or no options, low levels of social support, poor emotional and physical health, and emotion-focused coping. Wirtberg et al. (2007) conducted in-depth interviews with 14 Swedish women 20 years after unsuccessful tubal surgery. They found that the women still had vivid memories of their time as infertility patients, although all but three were able to develop a satisfying child-free lifestyle. With peers beginning to have grandchildren, however, several felt as if they were experiencing infertility all over again. Qualitative interviews conducted by Zucker (1999) revealed that, compared to women with other reproductive problems, infertile women were more likely to recall perceptions of failure and uncertainty. In a 10-year follow-up study of IVF women, Sundby, Schmidt, Heldaas, Bugge, and Tanbo (2007) found that women remembered the period of infertility as a difficult time in their lives.

In a 5-year longitudinal analysis among fertility patients who had not achieved a live birth and who had not adopted a child (most of whom have discontinued treatment), fertility-specific stress was measured in three different domains: personal, marital, and social (Peterson et al., 2009). Infertility-specific stress in the personal domain decreased significantly among both women (baseline $M = 8.44$, year 5 $M = 7.73$,) and men (baseline $M = 5.38$, year 5 $M = 4.64$,) over time. However, fertility-specific stress in the marital domain increased significantly among women (baseline $M = 4.48$, year 5 $M = 5.63$,) and men (baseline $M = 4.22$, year 5 $M = 5.31$,) (Peterson et al., 2009). These results indicate that, involuntarily, childlessness is a severe stressor for the marriage. This result is in line with a study of 270 infertile couples who terminated treatment without having achieved a live birth and reported lower general well-being (69.6 versus 81.2 on the Psychological General Well-Being Index, $p = .001$) and lower sense of coherence (59.2 versus 67.7 on the Sense of Coherence Scale, $p < .001$) compared to couples that have become parents (Johansson et al., 2009). In a population-based study of women in the Midwestern United States, McQuillan, Greil, White, and Jacob (2003) found that the long-term negative consequences of infertility exist only among those with no biological or adopted children (see also Jacob et al., 2007; McQuillan, Stone, & Greil, 2007). A review study on women’s emotional adjustment to IVF (Verhaak et al., 2007) showed that unsuccessful treatment raises negative emotions, which continued after consecutive unsuccessful cycles. A recent large cohort study among over 50,000 Danish women with primary or secondary infertility who were referred to fertility treatment during 1973–1998 reported a twofold greater risk of suicide among those women not having achieved a childbirth after fertility evaluation compared to those women having at least achieved one child after fertility evaluation, when women having psychopathology had been excluded (Kjaer et al., 2011).

Effects of Infertility and Treatment on Couples' Relationships

Infertility and its treatment are stressors that put a heavy psychological strain on the couple's relationship. It is a challenge to face the fact that family formation is not as easy as one expected, and the couple is in a liminal situation as they wait for possible future parenthood. Studies measuring marital satisfaction among infertile couples have found that infertility leads to stress on marital and sexual relations (Greil, 1991a; Williams, 1997). However, at the same time, there exists the potential for infertility to strengthen the couple's relationship and bring the partners closer together (Freeman, Boxer, Rickels, Tureck, & Mastroianni, 1985; Greil, 1991a; Greil, 1997; Lalos, Lalos, Jacobssen, & Von Schoultz, 1985). Sydsjö and colleagues (Sydsjö, Skoog Svanberg, Lampic, Jablonowska, 2011; Sydsjö, Eckholm, Wadsby, Kjellberg, & Sydsjö, 2005) reported that among those couples not having achieved a child and who continued to stay together, the couples had good and stable relationships (as measured by the ENRICH marital inventory) over time; measurements were taken 1.5 years after the last treatment attempt and also around 20 years after treatment. Peterson et al. (2011) found, in a five-year follow-up study among a clinic sample of involuntary childless women and men, that more women compared to men reported high marital benefit (i.e., that involuntary childlessness brought the partners closer together and strengthened their relationship). Among men, 22% and 27%, respectively, reported high marital benefit (baseline and five-year follow-up); among women, the percentages were 28% and 30%. The use of meaning-based coping was significantly related to higher levels of marital benefit among men and women (Peterson et al., 2011).

Several studies have reported that (temporary) sexual disorders resulting from infertility diagnosis and fertility treatment attempts are frequent (see review in Wischmann, 2010). Women in infertile couples are likely to have difficulties with arousal, whereas the men are affected more by premature ejaculation than by erectile dysfunction (Khademi, Alleyassin, Amini, & Ghaemi, 2008). Regarding the long-term impact of infertility on sex life, there are both studies showing no differences in sexual satisfaction (e.g., Sydsjö et al., 2005 and other studies showing life-long negative impact of involuntarily childlessness on sex life (Slade, Emery, & Lieberman, 1997).

Given that infertility treatment is demanding and stressful, it is reasonable to suspect that infertile couples who seek fertility treatment and decide to continue treatment may have particularly strong relationships, because those with weak relationships might not decide to embark on fertility treatment. Thus, when studies report many fertility patients having high marital benefit and good and stable relationships over time among those couples staying together, this may reflect selection effects. It may be that couples with particularly strong relationships are those who have the psychosocial resources that enable them to pursue and endure treatment. It may also be that couples with stronger relationships are more likely to be able to endure the rigors of participating in long-term longitudinal cohort studies involving several waves of responding to questionnaires and interviews. Pinborg, Loft, Schmidt, and Nyboe Andersen (2003) showed, in a study of divorce rates among parents of three- and four-year-old twins, that the divorce rate for parents who spontaneously conceived was double that of parents who conceived after ART treatment (13% versus 6%). It may be that this finding can be explained by the idea that couples strong enough to withstand the stresses of infertility are a select group with especially strong relationships.

Pregnancy and Parenting after Infertility

Achieving pregnancy does not necessarily restore "normalcy" to the lives of the infertile. Eugster and Vingerhoets (1999) concluded from a literature review that pregnancy after IVF is more stressful than for people without fertility problems (see also Bevilacqua, Barad, Youchah, & Witt, 2000). Similarly, McMahon (1999) concluded that women who become pregnant after IVF experience more anxiety about the outcome of the pregnancy than women who conceived without assistance and that they are, therefore, slower to acknowledge the pregnant state, to prepare for pregnancy by reading and attending childbirth classes, and to engage in "nesting behaviors," such as preparing the nursery. A literature review of studies of adjustment to pregnancy and parenthood after assisted reproduction (Hammarberg, Fisher, & Wynter, 2008) found that, although there is some evidence that ART women experience higher levels of anxiety during pregnancy than women who conceived without assistance, there is no evidence of differences in levels of depression. The same study found that it is not yet possible to draw clear conclusions about the effects of infertility on antenatal self-regard or emotional adjustment to pregnancy. Shreffler, McQuillan, and Greil (2011) found that women with a history of infertility displayed more fertility-specific distress following a pregnancy loss than women without a history of infertility.

Although pregnancy may be more problematic for the infertile, there is no evidence of parenting differences after

infertility. Letherby (1999) stated that infertile women who have given birth through ART report feelings of anxiety and guilt as well as an obligation to be perfect mothers. On the other hand, Hjelmstedt et al. (2004) reported that, at 6-months postpartum, successful infertility patients believed they had left infertility behind them. Ulrich and Weatherall (2000) observed that infertile women who eventually give birth discover that motherhood presented more challenges than they had expected, but that there is no evidence that this finding is unique to infertile couples. Distress levels for ever-infertile mothers, whether they have biological or adopted children, are not significantly different from those found among the fertile (Abbey, 2000; Golombok et al., 2002; Hammarberg et al., 2008; Pearlman, 2011). For example, Flykt et al. (2009) determined, on the basis of a study of 745 Finnish couples, that parenting among couples who had children after receiving infertility treatment is not associated with higher levels of stress than parenting among those who conceived spontaneously. In a study of 176 women who adopted, used ART, or pursued surrogacy, van den Akker (2004) found that women with children reported a higher quality of life than childless women, regardless of the process by which they obtained children. Parents who had children following infertility perceive that infertility has led them to have stronger feelings for children, to have greater tolerance for the difficulties of parenting, and to be more grateful than they otherwise would have been (Hjelmstedt et al. 2004; Sundby et al., 2007). Men stated that infertility had made them emotionally closer to their children than they would otherwise have been.

Eugster and Vingerhoets (1999) found no differences in parenting between parents who have conceived through IVF and other parents. In their literature review, Hammarberg et al. (2008) concluded that there are no significant differences in parent-child relationships between parents who have become pregnant after infertility and those who have conceived without assistance. In a multinational study of families with a child between the ages of 4 and 8, Golombok et al. (1996) found that the quality of parenting was actually superior among parents who had conceived via MAR than it was for parents who had conceived without assistance. A follow-up study conducted when the same children were 11 and 12 years of age confirmed the earlier findings (Golombok et al., 2002). To summarize the findings on pregnancy and parenting, we can say that, although pregnancy may be especially stressful for the infertile, there do not appear to be any long-term negative consequences for either previously infertile parents or their children.

Interventions

Therapeutic Interventions

Over the past several decades, clinicians, researchers, regulatory bodies, and infertile couples themselves have called for the provision of counseling services for infertile couples (Boivin, 2003). Although there is a general agreement about the need for psychological interventions to treat infertility distress, a recent review of this literature revealed a significant gap between the number of studies recommending specific interventions (94%) and those evaluating treatment effectiveness (6%) (Boivin, 2006). Thus, there remains a lack of outcome studies examining the effectiveness of psychosocial interventions used to treat infertility distress. As a result, there have been calls for increased studies examining the link between psychological interventions and distress for men and women experiencing infertility to support the emerging knowledge base (Boivin, 2006).

Outcome studies examining the effectiveness of therapy for infertile couples have typically focused on psychological interventions and their impact in (a) reducing negative emotional states, and (b) improving pregnancy rates. Although some studies have found a link between psychotherapy interventions and increased pregnancy rates, literature reviews and meta-analyses have concluded that a direct causal relation between these variables remains unclear and cannot be made at this time (Boivin, 2003; Domar, Clapp, Slawsky, Dusek, et al. 2000; de Liz & Strauss, 2005). However, the debate remains contested, as a 2009 meta-analysis found that psychological interventions improved some patients chances of becoming pregnant (Hammerli, Znoj, & Barth, 2009), whereas a 2011 review on this topic found opposite results and proposed that such claims cannot be made due to methodological flaws and statistical problems in the majority of studies examining this issue (Morreale, Balon, Tancer, & Diamond, 2011). Such methodological flaws include the frequent use of not-yet validated infertility-specific questionnaires, inconsistent definitions of live-birth delivery outcomes, variability in the reports of number of embryos transferred among patients, and a lack of data on past psychiatric history and the impact of psychiatric medications on pregnancy rates and outcomes. For the purposes of this chapter, we limit our review to therapeutic interventions at reducing the negative emotional states associated with infertility.

One of the earliest studies examining the effectiveness of psychological interventions in treating the emotional aspects of infertility was conducted by Domar, Seibel, and Benson (1990). The study followed 54 women who participated in the Mind/Body Program for Infertility—a 10 week behavioral treatment program. Participants were trained in therapeutic interventions such as relaxation training, exercise, stress management training, group support, and cognitive behavioral exercises. Results indicated a significant decrease in depression, anxiety, and fatigue among all the participants following the 10-week program, and they set the stage for controlled studies to confirm the preliminary results of their initial study (Domar et al., 1990). In 2003, a review of 25 outcome studies using psychosocial interventions to reduce infertility distress found that psychological interventions are effective in reducing negative affect (Boivin, 2003). A more recent meta-analysis examining the effectiveness of group and individual/couple therapies in 22 outcome studies concluded that psychotherapeutic interventions are effective in reducing infertility stress, depression, and anxiety symptoms with individuals and couples, with effect sizes of 0.17 for individual/couple therapy and 0.36 for group therapy (de Liz & Strauss, 2005).

Studies examining group psychotherapies to treat infertility distress have found favorable results. Domar, Clapp, Slawsky, Kessel, et al. (2000) studied 184 infertile women who had been trying to conceive for 1–2 years and randomly assigned participants to one of three groups: a cognitive-behavioral group (CBT), a support group, or a routine-care control group. Participants in the CBT group attended 10 sessions of therapy, and all participants completed a variety of psychological measures at intake, 6 months, and 12 months. Interventions in the CBT group included relaxation-response training, cognitive restructuring, emotional expression, and education regarding nutrition and exercise relative to infertility. Participants in the support group discussed the impact of infertility on self-esteem, marriage, family and friends, spirituality, and occupation. Results showed that at 6 months, women in the CBT and support group showed significant improvement, and participants in the control group worsened on ratings of stress management skills, anxiety, marital distress, and mood disturbances. Women in the CBT group also reported lower marital distress scores ($M = 16.6$, $F[1, 175] = 4.27$, $p = .04$), whereas women in the control group showed increased psychological distress over time. In addition, participants in the CBT group had continued improvement at one year follow-up by reporting lower depression scores on the HRSD when compared to the support group ($M = 1.4$, $F[2, 16] = 6.13$, $p = .011$), and higher reports compared to the control group on the Health Promoting Lifestyle Profile scales of Stress Management Skills ($M = 2.9$, $F[2, 16] = 4.2$, $p = .034$), and Interpersonal Support ($M = 2.9$, $F[2, 16] = 4.64$, $p = .026$) (Domar, Clapp, Slawsky, Kessel, et al., 2000).

Studies have also been conducted comparing CBT to pharmacotherapy. A randomized control trial comparing these two treatments found that, although both treatments were efficacious, CBT was superior to pharmacotherapy alone in reducing depression and anxiety in women diagnosed with infertility (Faramarzi et al., 2008). In the study, 89 mild to moderately depressed infertile women were split randomly into three groups: CBT, antidepressant therapy, and a control group. Participants in the CBT group received 10 sessions of group therapy. Interventions included patient education regarding infertility, relaxation training, and cognitive restructuring (i.e., identification and challenging of core dysfunctional and irrational beliefs underlying the automatic thoughts regarding infertility). Participants in the antidepressant group received 20 mg of fluoxetine daily for 90 days. Participants in the control group did not receive any intervention and completed questionnaires at the beginning of the study and 3 months after the initial interviews. Results indicated a resolution of depression in 50% of the participants who were administered fluoxetine, 79% of the participants in the CBT group, and 10% of the participants in the control group. There was also a significant decrease in anxiety in the CBT group compared to the fluoxetine and control group, but the decrease of anxiety in the fluoxetine group was no more than in the control group.

Studies have also examined educational programs aimed at skill building in couples experiencing infertility, as well as various types of coping strategies in reducing infertility distress. Schmidt, Tjornhoj-Thomsen, Boivin, and Nyboe Andersen (2005) conducted a study examining the impact of patient education, communication, and stress management for infertile couples. Thirty-seven couples attended a six-week workshop where they received education and training in communication strategies and stress management. The couples were compared to a control group of couples in fertility treatment who did not receive the intervention, but who completed questionnaires regarding the topics. Women in the study reported an increase in marital benefit following the intervention. Furthermore, more women started talking to their close family and close friends about the fertility treatment and about the emotional consequences of treatment compared to those who stopped talking about these topics. In contrast, more women had stopped talking with close colleagues about infertility and its treatment. More men started talking with their close family about their emotions related to infertility, and more men had stopped

talking to close family about the reason for being childless, the emotions related to treatment and their future plans for having children. McQueeney, Stanton, and Sigmon (1997) examined emotion-focused coping versus problem-focused coping in a study with 29 women who had been trying to conceive for almost four years. Participants were assigned to six sessions of training in problem-focused coping, emotion-focused coping, or to a no-treatment control condition. Results revealed that, at one month follow-up, the emotion-focused group was significantly less depressed as measured by the BDI than those in the control group ($M = 6.1$ versus $M = 14.4$; $F[1, 25] = 7.31, p < .05$). Furthermore, the emotion-focused group reported higher infertility-specific well-being than the control group ($M = 69.7$ vs. 48.4 ; $F[1, 25] = 7.49, p < .05$).

Mindfulness-based therapeutic interventions have received increasing attention over the past several years and are becoming more plentiful in the health psychology and general treatment outcome literature (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). These interventions have been anecdotally recommended as a way to cope with infertility stress (Domar, 2002). However, there is a paucity of empirical studies testing whether mindfulness-based therapies reduce infertility distress. Mindfulness-based therapeutic interventions have been found to effectively reduce depression, anxiety, and distress in patients diagnosed with cancer and arthritis (Foley, Baillie, Huxter, Price, & Sinclair, 2010; Zautra et al., 2008), and outcomes studies using mindfulness-based interventions in the infertility literature base may prove valuable. A recently published case study found that Acceptance and Commitment Therapy (ACT)—an experiential mindfulness-based behavior therapy—may work to reduce stress across several infertility related domains (Peterson & Eifert, 2011). The case study found that a mindfulness-based treatment was linked to a significant decrease in depression and psychological distress in a woman undergoing IVF treatments, and it even found decreases in depression immediately following an IVF treatment failure—an important finding because individuals typically experience increased depression following IVF treatment failure (Olivius, Friden, Borg, & Bergh, 2004). The results of this preliminary case study show promise; however, larger, controlled studies are needed to examine the impact of mindfulness-based coping strategies on infertility distress.

Clinical Implications

Infertility counseling has now emerged as a specialized form of treatment that requires professional expertise, training, and qualifications (Van den Broeck et al., 2010). Given the increasing need for therapeutic interventions to treat infertility stress, and given the emerging outcome literature showing that psychological interventions are effective in reducing infertility stress, it is incumbent on mental health and medical professionals to work together to provide the best patient care possible.

New emerging models for infertility counseling aim to create interdisciplinary networks of mental health and medical professionals in order to comprehensively address the emotional and physical stresses of infertility (Van den Broeck et al., 2010). If such networks are created and utilized correctly, the contributing parties benefit by providing well-balanced, comprehensive care to the patients. Recommendations for the development of collaborative relationships include clarifying the division of labor between medical and mental health professionals concerning different stages of the counseling process, developing an understanding of when and how to refer individuals and couples to an infertility counselor, and encouraging counseling for infertility stress as well as specific medical interventions such as third party reproduction.

In addition to developing collaborative professional networks, clinicians should educate themselves regarding the basic therapeutic approaches and interventions for men and women experiencing infertility. This basic education can begin by consulting Covington and Burns' (2006) comprehensive guide to infertility counseling, which provides an in-depth exploration of infertility-related topics including assessment, treatment, medical issues, and modalities of counseling including individual, couple, and group therapies. Counselors should also consider various frameworks when planning therapeutic interventions including biopsychosocial perspectives, developmental frameworks, and cognitive-behavioral therapies (Gerrity, 2001; Newton, 2006; Stark, Keathley, & Nelson, 2011; Watkins & Baldo, 2004).

Several other clinical implications should be noted when working with individuals and couples experiencing infertility. First, counselors must avoid minimizing the stressful nature of the infertility experience (Peterson, Gold, & Feingold, 2007). By having an incomplete knowledge of the typical psychological reactions to infertility, inexperienced clinicians may be prone to discount the severity of emotional and psychological pain the client is experiencing. In addition, it is essential that counselors validate the clients' full range of emotional experiences

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(e.g., sadness, guilt, anger, loneliness, fear) and normalize them as common to the experience of infertility (Stammer, Wischmann, & Verres, 2002).

Infertility counseling can be conducted using individual, couple, or group modalities (Van den Broeck et al., 2010). Basic counseling interventions include improving couple communication, normalizing crises and negative emotions, externalizing infertility, and allowing sorrow in the counseling process (Stammer et al., 2002). These interventions commonly lead to grief work as couples acknowledge the severity of their loss and begin to consider the possibility that they may not become biological parents. This is an important step for couples, as infertility represents an invisible loss and couples often fail to receive the same degree of social support as people dealing with more obvious losses including the death of a loved one (Peterson et al., 2007). Counselors can help individuals and couples successfully move through the stages of grief with the ultimate goal of helping couples to accept their experience and the struggles they have overcome. If acceptance is achieved, couples can regain a sense of identity and can begin to once again move forward with their lives (Peterson & Eifert, 2011). As part of this process, counselors may need to help facilitate couples' discussions about when to stop treatments (Savitz-Smith, 2003).

Clinicians must also consider the importance of cultural issues relating to infertility. For individuals coming from cultures in which childbearing defines a woman's worth and childlessness is shunned, infertility may be a subject that is not easily discussed with others (Bos, van Balen, & Visser, 2005). Although studies that examine the relation between culture and emotional response to infertility can be a great resource for clinicians, research in this area has begun only recently, and it needs to be expanded greatly (Hynie & Hammer Burns, 2006). Counselors should identify and discuss the manner in which a couple's cultural backgrounds and cultural patterns impact their reactions to the infertility experience.

Conclusions and Future Directions

The publication of scholarly research on the infertility experience has grown in the past 10 years. Scholars continue to explore the extent to which infertility is a source of psychological distress, and they continue to accumulate evidence about the importance of gender for the experience of infertility. New trends are evident as well. More attention is now being devoted to the investigation of the long-term consequences of infertility. It is also possible to discern some movement toward an increased emphasis on the study of the dialectical association between infertility and stress and on the assessment of the effectiveness of psychological interventions. Some methodological weaknesses persist, but there is also progress. There is increased recognition of the importance of studying couples and of learning more about the male experience of infertility. There is a growing recognition that reliance on small, nonrepresentative, clinic-based samples of treatment seekers is a problem, and researchers have begun to address these issues.

Given the prevalence of infertility and the fact that the numbers of individuals and couples seeking infertility treatments are increasing, it is essential that mental health professionals understand the emotional challenges faced by this population. Mental health and medical professionals should work together to provide a comprehensive health-care delivery model for couples experiencing infertility. New emerging models, which create interdisciplinary collaborative networks, can assist in this process. Infertility counselors should become aware of the many interventions they can use to improve patient care including improving couple communication, allowing for the expression of sorrow and grief, and working toward acceptance of a couple's situation. Counselors who follow these recommendations will be better able to provide couples the full range of support they need when dealing with the stresses of the infertility experience.

Future research should pay more attention to the social context surrounding the experience of infertility. We need to learn more about the ways in which psychological distress among the infertile is affected by access to resources, access to treatment, couples' social relationships, and other contextual variables. It would be especially useful to have more studies that treat the couple, rather than the individual as the unit of analysis. There is also a need for more studies of nontreatment seekers in order to allow us to generalize to a wider group of individuals and to distinguish the psychological consequences of infertility from the psychological consequences of treatment. More long-term longitudinal studies would provide knowledge of adjustment to infertility throughout the life course. Finally, careful studies of the effectiveness of interventions would aid in helping infertile couples cope

with a stressful situation

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