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Psychological Adjustment of Infertile Men Undergoing Fertility Treatments: An Association With Sperm Parameters

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A B S T R A C T

Background: The difficulties in the psychological adaptation to the infertility diagnosis and assisted reproductive technology (ART) treatments have shown influence on the sperm quality. The biological and psychological aspects of infertility seem not to be independent.
Objective: To analyze the impact of depressive symptoms, anxiety, dyadic adjustment and infertility stress on the sperm quality of the men proposed to ART first or repeated experience.
Materials and Methods: This transversal study was conducted in the Medically Assisted Reproduction Unit of Centro Hospitalar de São João, in Porto, Portugal. 112 men with infertility diagnosis were included to initiate an ART cycle. Participants completed the Inventory State–Trait Anxiety-Form Y (STAI-Y), the Beck Depression Inventory-II (BDI-II), the Dyadic Adjustment Scale (DAS) and the Inventory of Fertility Problems (IFP) before the beginning of the treatment.
Results: The state-anxiety had a negative linear impact on the slow progressive motility ($p < 0.05$). However, depressive symptoms assumed a suppressor effect on this variable, enhancing its importance as a predictor.
Conclusion: Results show that psychopathological symptoms before an ART cycle can influence the sperm motility. However, this association seems to only be present in men undergoing first experience ART treatments. Thus, this research shows the need for mental health professionals to respond to emotional difficulties of the male gender, through the development of psychological interventions adjusted, so as to minimize the impact of exposure to ART treatments.

The infertility condition causes emotional adaptation and relationship difficulties in couples (Cousineau & Domar, 2007), by preventing the satisfaction of the parental project. In these populations, there is the presence of psychopathological symptoms (Cassidy & Sintrovani, 2008; Galhardo, Cunha, & Pinto-Gouveia, 2011; Lee & Sun, 2000) and low quality of life in social terms (Chachamovich et al., 2009). Moreover, a negative impact on the quality of the conjugal relationship seems to be verified (Valsangkar, Bodhare, Bele, & Sai, 2011).

Most investigations are focused on the psychological adjustment of women and identify them as the gender that experiences more distress (Kissi et al., 2013). However, the infertility condition is equally exhausting for men (Dooley, Dineen, Sarma, & Nolan, 2014) and the psychological stress that occurs can be one of the reasons for the unexplained infertility diagnosis, that seems to affect 16% of couples (Ray, Shah, Gudi, & Homburg, 2012). Studies consistently show its negative association with sperm quality parameters (Li, Lin, Li, & Cao, 2011; Nordkap et al., 2016; Pook, Röhrle, & Krause, 1999). One of the primary appointed biological explanations refers to testosterone secretion variations in response to stress (Bhongade et al., 2015; Nargund, 2015).

Sperm motility is the parameter that seems to be most influenced by anxiety and depression symptoms experienced by infertile men or men proposed to fertility treatments (Gürhan, Akyüz, Atici, & Kisa, 2009; Pook et al., 1999; Vellani et al., 2013). Nonetheless, other aspects, such as DNA fragmentation, morphology and concentration have also presented alterations (Gollenberg et al., 2010; Vellani et al., 2013).

In our study, we seek to understand the relations between the sperm quality and the psychopathological symptomatology, specifically on the context of fertility treatments. This being a physical invasive procedure (Montagnini, Blay, Novo, Freitas, & Cedenho, 2009) and which the literature shows to cause high levels of anxiety (Merari, Chetrit, & Modan, 2002; Reis, Xavier, Coelho, & Montenegro, 2013) and worst dyadic adjustment (Holter, Anderheim, Bergh, & Möller, 2006) in men, before and during a cycle, we sought to understand the relation of the emotional difficulties, experienced immediately before the beginning of the ART treatment, with the negative impact of the sperm quality.

Conflict of Interest: There is no conflict of interest for any of the authors of this manuscript. There was no financial support for this study.

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In our assessment, we also considered that the failure of an ART cycle (Maroufizadeh, Karimi, Vesali, & Omani, 2015; Verhaak, Smeenk, Eugster, van Minnen, & Kraaimaat, 2001) or the exposure to consecutive cycles (Reis et al., 2013) can cause more psychopathological symptomatology. In this sense, the present study aimed at analyzing the adjustment of men proposed to first or repeated ART treatment experiences and their relation with sperm quality within these groups.

The following hypotheses were considered:

(1) Men undergoing repeated ART treatments will present more depression and anxiety symptoms, higher infertility stress and worse dyadic adjustment than men undergoing first experience ART treatment.
(2) The presence of depression and anxiety symptoms, infertility stress and worse dyadic adjustment will be associated with worst sperm quality.

MATERIALS AND METHODS

Subjects

This study included men that were proposed to ART treatments in the Medically Assisted Reproduction Unit of Centro Hospitalar de São João, in Porto, Portugal. Among the 198 men contacted, 112 agreed to participate in the study. From these men, 56 were proposed to the first cycle of ART and the remaining 56 were proposed to repeat the cycle by design. Our exclusion criteria were: (i) not having a primary or secondary infertility diagnosis or being on a waiting list; and (ii) having addictive disorders. Men undergoing ART repeatedly were older and had a longer infertility history when compared to men undergoing the first cycle. However, this last group demonstrated to have more family history of psychiatric disorders (see Table 1).

Assessment

A questionnaire was applied so as to collect demographic and clinical information, namely age, education, history of psychiatric disorders, duration and causes of infertility, number of previous treatments, number of previous miscarriages, etc.

We use the State–Trait Anxiety Inventory-Form Y (STAI-Y) for the assessment of the levels of anxiety (Santos & Silva, 1997; Spielberger, 1983). This inventory included two scales with 20 items to assess state and trait anxiety. The participants self-reported their feelings through a 4-point scale, ranging between "Almost Never" and "Almost Always". For the response to the state-anxiety and trait-anxiety scales, men had to describe feelings at the time of completing the questionnaire or in general, respectively. The internal consistency for the Portuguese population is satisfactory. Cronbach's alpha coefficient is 0.91 and 0.93 for state-anxiety and 0.89 and 0.90 for trait-anxiety, for men and women, respectively (Santos & Silva, 1997). In the sample of men included in this study, Cronbach's alpha coefficient for state-anxiety is 0.89, whereas for trait-anxiety it is 0.82.

Levels of depression were assessed using the Beck Depression Inventory II (BDI-II) (Beck, Steer, & Brown, 1996; Martins, Coelho, Ramos, & Barros, 2000). This scale included 21 items and can be used in 13 year old adolescents or in adults. The scores were grouped into three factors: cognitive, affective and somatic, and their sum can vary between 0 and 63 points. The participants were instructed to self-report the severity of depressive symptoms and their scores were classified into minimal depressive symptoms (13 points), mild depression (14 to 19 points), moderated depression (20 to 28 points) and severe depression (29 to 63 points) (Martins et al., 2000). The Cronbach's alpha value for the Portuguese population is 0.89 (Martins, Coelho, & Barros, 2002). For this sample, the internal consistence is also satisfactory, assuming a Cronbach's alpha of 0.82.

Table 1
Sociodemographic and Clinical Characteristics.

Variables	Men undergoing ART treatment			
	First ART (n = 56)	Repeated ART (n = 56)	*t*-value/$\chi 2$	p
Age (mean ± SD)	34.1 ± 4.1	36.4 ± 4.1	−3.020[a]	0.003
Educational status				
Primary school	1.8% (n = 1)	1.8% (n = 1)	1.338[b]	0.855
Preparatory	23.2% (n = 13)	19.6% (n = 11)		
Secondary school	46.4% (n = 26)	42.9% (n = 24)		
University/college degree	25.0% (n = 14)	33.9% (n = 19)		
Technical education	3.6% (n = 2)	1.8% (n = 1)		
Relationship length in years (mean ± SD)	8.2 ± 4	9.1 ± 4.1	−1.140[a]	0.257
Personal history of psychiatry disorders				
Yes	3.6% (n = 2)	1.8% (n = 1)	0.343[b]	0.558
No	96.4% (n = 54)	98.2% (n = 55)		
Family history of psychiatry disorders				
Yes	14.3% (n = 8)	3.6% (n = 2)	3.953[b]	0.047
No	85.7% (n = 48)	96.4% (n = 54)		
Smoke habits				
Yes	25.0% (n = 14)	26.8% (n = 15)	0.047[b]	0.829
No	75.0% (n = 42)	73.2% (n = 41)		
Alcohol habits				
Yes	21.4% (n = 12)	32.1% (n = 18)	1.639[b]	0.200
No	78.6% (n = 44)	67.9% (n = 38)		
Drug habits				
Yes	1.8% (n = 1)	7.1% (n = 4)	1.884[b]	0.170
No	98.2% (n = 55)	92.9% (n = 52)		
Infertility duration in years (mean ± SD)	4.7 ± 2.8	6.2 ± 2.8	−2.797[a]	0.006
Infertility cause				
Female	12.5% (n = 7)	19.6% (n = 11)	3.888[b]	0.274
Male	55.4% (n = 31)	39.3% (n = 22)		
Combined	21.4% (n = 12)	21.4% (n = 12)		
Idiopathic	10.7% (n = 6)	19.6% (n = 11)		
Previous treatments	_	2.1 ± 1.5	_	

[a] Test t-student for independent samples.
[b] Chi-square test.

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