



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

ARCHIVIO ISTITUZIONALE
DELLA RICERCA

Alma Mater Studiorum Università di Bologna Archivio istituzionale della ricerca

Self-efficacy, coping strategies and quality of life in women and men requiring assisted reproductive technology treatments for anatomical or non-anatomical infertility

This is the final peer-reviewed author's accepted manuscript (postprint) of the following publication:

Published Version:

Andrei F., Salvatori P., Cipriani L., Damiano G., Dirodi M., Trombini E., et al. (2021). Self-efficacy, coping strategies and quality of life in women and men requiring assisted reproductive technology treatments for anatomical or non-anatomical infertility. EUROPEAN JOURNAL OF OBSTETRICS, GYNECOLOGY, AND REPRODUCTIVE BIOLOGY, 264, 241-246 [10.1016/j.ejogrb.2021.07.027].

Availability:

This version is available at: <https://hdl.handle.net/11585/837367> since: 2021-11-06

Published:

DOI: <http://doi.org/10.1016/j.ejogrb.2021.07.027>

Terms of use:

Some rights reserved. The terms and conditions for the reuse of this version of the manuscript are specified in the publishing policy. For all terms of use and more information see the publisher's website.

This item was downloaded from IRIS Università di Bologna (<https://cris.unibo.it/>).
When citing, please refer to the published version.

(Article begins on next page)

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

Title

Self-efficacy, coping strategies and quality of life in women and men requiring assisted reproductive technology treatments for anatomical or non-anatomical infertility

Author names and affiliations:

Federica Andrei^{a*}, Paola Salvatori^a, Linda Cipriani^b, Giuseppe Damiano^b, Maria Dirodi^b, Elena Trombini^a, Nicolino Rossi^a, Eleonora Porcu^{b,c}

^a University of Bologna - Department of Psychology, Bologna, Italy

^b Infertility and IVF Unit, IRCCS Azienda Ospedaliero-Universitaria di Bologna, Italy

^c University of Bologna – DIMEC, Bologna, Italy

Corresponding author:

Dr. Federica Andrei, Department of Psychology, University of Bologna, Viale Berti Pichat 5, 40127, Bologna, Italy.

Email: federica.andrei2@unibo.it; Phone number: 0039 051 2091330

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

Abstract

Objective: To examine the magnitude and the predictors of emotional reactions to an infertility diagnosis, comparing women and men who were clinically diagnosed with an anatomical cause of infertility or non-anatomical cause of infertility.

Study design: Cross-sectional study involving a total of 133 adults waiting for infertility treatment at the IVF and Infertility Unit of the S. Orsola University Hospital in Bologna (Italy). Of these, 107 patients (55 with anatomical causes of infertility and 52 with non-anatomical causes of infertility; response rate: 80%) took part to the study. After providing informed written consent, each participant was asked to complete the Infertility Self-efficacy Scale, the Fertility Quality of Life, and the Brief Coping Orientation to Problem Experienced, which they returned at their second access to the Unit. Differences between the groups were analyzed through a series of univariate ANOVA, whereas a multiple regression analysis was used to jointly examine the predictors of fertility quality of life.

Results: Results showed both gender related and diagnosis related differences. Women had statistically significant lower scores than men on the Infertility Self-Efficacy Scale and on the global, emotional, and mind-body subscales of the Fertility Quality of Life, while they scored significantly higher on the emotion focused and socially supported subscales of the Coping Orientation to Problem Experienced. Independently of gender, patients with non-anatomical causes of infertility scored poorly than patients with anatomical causes of infertility on the relational subscale of the Fertility Quality of Life and on the Avoidant scale of the Brief Coping Orientation to Problem Experienced. Hierarchical multiple regression analyses revealed that higher levels of

1 self-efficacy and a lower use of avoidant coping strategies predicted a more positive quality of life
2 over and above gender and cause of infertility.
3

4 **Conclusion:** This study partly confirms data on gender differences in experiencing the
5 psychological burden of infertility and adds some new information, particularly with respect to the
6 prediction of quality of life indicators over and above infertility cause.
7
8
9
10

11
12
13 *Keywords:* infertility, assisted reproductive technology, coping strategies, self-efficacy, quality of
14 life, health psychology
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

1. Introduction

Worldwide around 186 million people suffer from infertility [1]. Though causes of infertility may be attributed to female, male, mixed, or unknown factors, epidemiological data show a prevalence of female-specific infertility diagnosis in one out of seven couples in the western world and in one out of four couples in developing countries [2]. At the same time, male-specific factors are found to be responsible for approximately 20–30% of infertility cases [2- 3]. Given these numbers, the demand for Assisted Reproductive Technology (ART) treatments is on the rise, as well as the need for an improvement in techniques attempting to ensure the preservation of reproductive health even in serious pathological conditions, such as in the case of cancer patients [4-6].

Despite the progresses made in infertility treatments, both involuntary childlessness and ARTs may negatively impact on several domains of a person's life [7,8], including marital relationship [9,10], sexuality [11], quality of life, and mood [12]. Besides, current literature shows that emotional responses to infertility and ARTs may have a negative effect on treatment outcomes, thus decreasing the probabilities of achieving pregnancy [13,14]. For this reason, expanding our understanding of the diverse psychological profiles of infertile patients may be essential to improve tailored intervention, which could lead to potential positive outcomes on treatment results.

Although infertility is an equally exhausting condition for both women and men [15], studies generally report that women are more vulnerable to the emotional experience of infertility than men [16-19]. Even if some investigators suggest that men may experience a greater distress when infertility is due to the male factor [20-22], others found no evidence to support the hypothesis that male factor infertility affects men more negatively than other diagnoses of infertility (i.e., female, mixed, or unexplained) [23-24]. A study by Dhillon and colleagues [25] showed that

1 mood and coping styles in oligospermic, euspermic and fertile men were similar, suggesting that
2 men's psychological adjustment to their own infertility is generally healthy.
3

4
5 However, not many studies have taken into account the potential role of specific conditions
6 of infertility. Existing research focuses mainly on psychological wellbeing either of infertile women
7 or men in general. A few studies have been conducted on populations of infertile women being
8 diagnosed with specific conditions such as endometriosis [26], pelvic inflammatory disease [27],
9 and diminished ovarian reserve (DOR) [28]. To our knowledge, only a recent study by Nicoloro-
10 SantaBarbara and colleagues [29] took into account simultaneously women diagnosed with DOR
11 and women with anatomical cause of infertility (ACI; e.g., tubal occlusion, tubal damage, and
12 intrauterine adhesions) showing that women with DOR had greater infertility distress but similar
13 self-esteem and emotional reactions to women whose infertility was caused by anatomical or
14 physiologic factors. These findings aside, we are unaware of any report examining potential
15 differences in the experience of infertility in men and women seeking treatments to conceive
16 depending on whether the underlying cause of their infertility is known or unknown. At the same
17 time, to our knowledge there is no study focusing on the differences between men diagnosed with
18 ACI (e.g., varicocele, maldescended testes, and testicular tumor) and infertile men whose medical
19 examinations did not reveal any physical and/or hormonal alterations.
20
21

22
23
24 The present study aimed to describe and compare levels of infertility self-efficacy, coping
25 strategies and quality of life in women and men waiting for ART treatments by taking into account
26 whether the diagnosis of infertility had anatomical or non-anatomical causes. In line with the
27 existing literature, showing worse psychological adjustment for women, we expected women to
28 have lower levels of both quality of life and self-efficacy compared to men. With regards to
29 differences based on the cause of infertility, we did not have specific hypothesis given the lack of
30 prior investigation. However, according to a recent study by Nicoloro-SantaBarbara and colleagues
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

[29], we can expect patients with a diagnosis of anatomical infertility to show a better adjustment compared to men and women with a non-anatomical infertility diagnosis. We also examined the predictive role of coping strategies and infertility self-efficacy on quality of life in both men and women controlling for infertility causes. In the field of infertility, self-efficacy was defined as the individuals' confidence level on their cognitive, emotional and behavioral skills related to the impossibility to conceive and to the experience of ARTs [30]. Though self-efficacy has proven to be a relevant psychological variable regarding health promotion and outcomes, few studies investigate this construct with infertile women and men. Findings from these studies suggest that higher infertility self-efficacy may be protective against depression, anxiety and infertility related stress [31]. Hence, we expected higher self-efficacy to predict a more positive quality of life irrespective of gender and cause of infertility.

2. Material and Methods

Participants were enrolled from October 2018 through October 2019 at the Infertility and IVF Unit of the S. Orsola University Hospital (Bologna, Italy) during their first medical consultation. All patients had received a diagnosis of infertility and took part in a larger study on the psychological impact of ARTs supported by the Italian Ministry of Health (study reference number J33C17000560001). The time since diagnosis was not recorded. The causes of infertility for each patient were supported by patient's medical reports.

Regarding women, the Anatomical Cause of Infertility (ACI) group included conditions such as bilateral tubal occlusion or damage, unilateral tubal occlusion or damage if deemed likely to have affected both tubes, surgical removal of one or both ovaries, chemotherapy or radiation therapy, Turner syndrome, endometriosis, myomas distorting the uterine cavity, congenital uterine anomalies, and other less frequent anomalies of the reproductive tract. The ACI group was aged 18–46 years at enrollment, had regular menstrual cycles, and was deemed ovulatory at the time of

1 enrollment by the physician. The non-anatomical cause of infertility (non-ACI) group, included
2 women who received the following clinical diagnoses: (1) unexplained Premature Ovarian
3
4 Insufficiency (POI) based on elevated but not postmenopausal FSH levels timed to their menstrual
5
6 cycle and low antimüllerian hormone (AMH) levels for their age; (2) unexplained Diminished
7
8 Ovarian Reserve (DOR) based on low AMH levels for women's age or elevated FSH or few antral
9
10 follicles, despite the presence of regular menstrual cycles in the last six months.
11
12

13
14 With regards to men, the ACI group included conditions such as varicocele, cryptorchidism,
15
16 testicular cancer, chemotherapy or radiation therapy, injuries or trauma, Y-chromosome
17
18 microdeletions, Klinefelter syndrome, which determined an alternation of semen analysis if
19
20 compared to the guidelines on semen parameters established by the World Health Organization
21
22 [32]. The non-ACI group included instead those men who showed abnormal semen analysis [32],
23
24 without reporting physical and/or hormonal alterations [33] on their medical examinations.
25
26
27

28
29 The study was approved by the Hospital's Ethics Committee and was conducted in
30
31 accordance with the Helsinki Declaration. After providing informed written consent, demographic
32
33 and clinical data were recorded during a first medical consult. Both women and men who took part
34
35 in the study received an envelope with a set of self-report questionnaires to assess infertility-related
36
37 emotional and psychological variables. Questionnaires were returned approximately after three
38
39 months, during a second medical consult.
40
41
42

43 **2.1 Measures**

44
45 **2.1.1 Self-Efficacy.** Self-efficacy was assessed with the 16-item Infertility Self-Efficacy
46
47 Scale (ISE) [30], which evaluates the levels of self-efficacy in individuals with fertility problems.
48
49 Items are scored on a nine-point Likert scale (1 strongly disagree – 9 strongly agree), with higher
50
51 scores indicating a more positive perception of individual's self-efficacy. The ISE has strong
52
53 reliability as evidenced in the current study (Cronbach's $\alpha = .85$).
54
55
56
57
58
59
60
61
62
63
64
65

2.1.2 Coping strategies. The Brief Coping Orientation to Problem Experienced (Brief COPE) [34] evaluates the individual's capacity to cope with life's problems through 28 items rated on a five-point Likert scale ranging from 1 to 5. It measures 14 different coping strategies: active coping, planning, positive reframing, acceptance, humor, religion, using emotional support, using instrumental support, self-distraction, denial, venting, substance use, behavioral disengagement, and self-blame. Each of the 14 coping strategies is indicated by two items and can be grouped into four major coping strategies categories: Avoidant, Emotion Focused, Problem Solving, and Socially Supported [35]. The Italian version of Brief COPE has been psychometrically tested and proved adequate properties [36]. In the current study, the instructions asked each participant to indicate what they generally do and feel when they experience infertility-related distress. The dimensions of the Brief COPE showed good reliability levels (Cronbach's α ranged between .80 and .84).

2.1.3 Quality of Life. The FERTIQoL (FERTIQoL) [37] assesses the quality of life in couples with fertility problems. It consists of 24 items scored according to a five-point Likert scale ranging from 0 to 4, with higher scores meaning higher quality of life. The FERTIQoL provides a global score and yields four subscales consisting of six items each: Emotional, Mind-Body, Relational and Social. Reliability levels for each subscale and the for the global FERTIQoL score were satisfactory (Cronbach's α ranged between .83 and .86).

2.2 Statistical analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences Version 25 for Windows (NY, USA). A series of Chi-Squared test were run to analyze for differences between ACI and non-ACI groups in demographic and clinical variables. Univariate Analysis of Variance (ANOVA) was performed to examine mean-level differences on psychological variables between ACI and non-ACI groups, and gender effects on those differences.

1 A three-block hierarchical regression was used to test the predictive value of gender, cause of
 2 infertility, coping strategies, and infertility self-efficacy on fertility quality of life.
 3

4 **3. Results**

5 **3.1 Sample composition**

6
 7 Overall, 69 infertile women (ACI = 38, non-ACI = 31) and 38 infertile men (ACI = 17, non-
 8 ACI = 21) took part to the study, out of 133 patients who were asked to complete the
 9 questionnaires. All participants were Italian, married, and seeking treatment to conceive with a
 10 partner. Table 1 shows comparisons for demographic and clinical variables between women and
 11 men by cause of infertility. Both women and men with non-ACI were older than their ACI
 12 counterparts, however this comparison did not reached significance ($p > .05$). The most common
 13 causes of ACI for women were endometriosis (52.6%), surgery to the fallopian tubes (17.6%), and
 14 chemotherapy or radiation therapy (8.8%), with some women reporting more than one cause. Non-
 15 ACI conditions for women were DOR (67.8%) and POI (32.2%). With regards to men, the most
 16 common causes of ACI were varicocele (58.8%) and chemotherapy or radiation therapy (29.4%).
 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27
 28
 29
 30
 31
 32
 33

34 **3.2 Comparison between women and men with ACI or non-ACI on study variables**

35
 36 The results of univariate ANOVA are displayed in Table 2. Overall, non-ACI women and
 37 men presented significant lower levels of relational quality of life assessed with the FertiQoL (i.e., a
 38 greater impact of fertility problems on couples sexuality, communication, and commitment) as well
 39 as a prevalent use of avoidant coping strategies to face infertility distress compared with women
 40 and men with ACI. The ACI group also presented higher levels at all dimensions of the FERTIQoL
 41 and at the global fertility quality of life score, though such differences did not reach significant
 42 levels. No significant interaction cause of infertility x gender was detected (all $ps > .05$). Moreover,
 43 compared to men, women reported significant lower levels of infertility self-efficacy, global,
 44 emotional, and mind-body quality of life, while they scored significantly higher on emotion focused
 45
 46
 47
 48
 49
 50
 51
 52
 53
 54
 55
 56
 57
 58
 59
 60
 61
 62
 63
 64
 65

and socially supported coping strategies. On these variables, the differences related to the cause of infertility did not reach significance.

3.3 Prediction of quality of life

Results from multiple regression analysis to jointly examine the predictors of fertility quality of life are presented in Table 3. We did not include problem solving among predictors of regression models given that the differences we found on this variable did not reach statistical significance. The cause of infertility was instead included as a predictor in the first step of the regression model together with gender, even though results from univariate ANOVA indicated that four out of five dimensions of the FERTIQoL did not differ by infertility diagnosis (see Table 2). Results of the regression models showed that in the first step, gender predicted significantly the global score of the FERTIQoL as well as the subscales Mind-Body ($p < .05$) and Emotional ($p < .01$), while infertility diagnosis was a statistically significant predictor of the subscale Relational of the FERTIQoL only ($b = -.24$, $B = -1.85$, $t = -2.43$, $p < .01$). Such results indicate that women show an overall worse quality of life compared to men, and that infertility caused by non-anatomical factors predicted lower levels of relational quality of life. In the second step of all regression models, avoidant coping negatively predicted overall quality of life ($p < .001$), and the dimensions Social ($P < .05$), Mind-Body ($p < .01$), and Emotional ($p < .001$) of the FERTIQoL. In the third step, self-efficacy resulted a positive predictor of all FERTIQoL scores (all P s $< .001$) over and above the effects of other variables included in the model.

4. Discussion

This study wanted to explore the differences in emotional responses to infertility between women and men who were clinically diagnosed with an anatomical cause of infertility (ACI) or a non-anatomical cause of infertility (non-ACI). Moreover, the present study examined the predictive

1 effects of gender, etiology of infertility (ACI vs. non-ACI), infertility self-efficacy, and coping
2 strategies on quality of life levels in two samples of men and women seeking treatment to conceive with
3
4 their partners.
5

6 We observed that women and men with a diagnosis of infertility caused by non-anatomical
7 factors presented significant lower levels of relational quality of life assessed with the FertiQoL
8 (i.e., a greater impact of fertility problems on couples sexuality, communication, and commitment)
9 as well as a prevalent use of avoidant coping strategies to face infertility distress compared with
10 women and men with ACI. Contrary to patients diagnosed with non-anatomical infertility, women
11 and men with ACI have the possibility to identify a reason for their childlessness, and such
12 “tangible reason” may contribute to a better emotional adjustment [29, 38] in coping with infertility
13 challenges. Our data also showed that the non-ACI group presented lower overall levels of quality
14 of life and self-efficacy compared to both men and women diagnosed with ACI, though these
15 differences did not reach significance. We believe that childlessness might be a plausible
16 explanation for the absence of significant group differences found in infertility-related variables,
17 since most participants didn’t reach pregnancy before data were collected (only 12% and 11% of
18 the ACI and non-ACI participants reported previous pregnancies respectively). Moreover, it has to
19 be acknowledged that all patients accessed the infertility clinic to seek treatment to conceive and
20 that most of them (76% and 56% of the ACI and non-ACI groups respectively) were at their first
21 experience with ART.
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44

45 In line with the existing literature [7, 12, 18-19, 39], the present study found that women
46 have worse psychological conditions compared to men, irrespectively of the etiology of infertility.
47 Particularly, we found that women showed statistically significant lower levels of self-efficacy and
48 quality of life, represented by the global, emotional, and mind-body subscales’ scores of the
49 FertiQoL. At the same time, women used more positive coping strategies to face infertility
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

1 challenges, namely, focusing on emotions and seeking social support. These findings are in line
2 with existing literature on the topic [40-41] thus suggesting the need to consider gender differences
3
4 in coping strategies in the treatment of infertility.
5
6

7 Particularly, findings from hierarchical regressions demonstrated that, irrespective of both
8
9 gender and cause of infertility, self-efficacy was the strongest predictor of quality of life indicators,
10
11 together with avoidant coping strategy. Such result seems to indicate that good levels of self-
12
13 efficacy as well as a minor use of avoidant coping strategies may be protective against the
14
15 emotional burden of infertility assessed with the FertiQoL, a well-validated measure of infertility-
16
17 related quality of life, over and above infertility etiology (anatomical vs. non-anatomical). Along
18
19 this line, we would recommend future studies to expand our findings by comparing the results
20
21 obtained over the FertiQoL with other useful tools assessing the risk for emotional distress and pre-
22
23 treatment dropout among patients, such as the SCREENIVF [42], despite less research is
24
25 currently available on its cross-cultural stability of its psychometric properties.
26
27
28
29
30

31 Understanding the factors that influence fertility related quality of life, a multidimensional
32
33 construct relevant to the psychological health and wellbeing of infertile patients [37], can help
34
35 fertility clinic professionals to identify patients in greater need for support, as well as to develop
36
37 effective interventions. Counseling provided by mental health professionals with specific training in
38
39 infertility may be especially beneficial to patients seeking for treatment [43], and such new
40
41 knowledge may help to provide more effective support to individuals in need.
42
43
44
45

46 Several limitations have to be acknowledged. Our findings rely on a small, homogeneous
47
48 sample comprising only patients seeking treatment with their partner. Yet, the time since diagnosis
49
50 was not recorded systematically and this might have affected our results. Along this line, it is
51
52 important to consider that the emotional burden experienced by women and men with infertility
53
54 issues may vary in response to different psychosocial and medical factors [44], including how and
55
56
57
58
59
60
61
62
63
64
65

1 when they learn about their chances for natural conception, the particular diagnostic procedures
2 they have to undergo, the social support they receive, the quality of counseling given by members
3 of the clinical staff. Therefore, future studies should take these variables into account.
4
5
6

7 In conclusion, despite these limitations, the present study is one of the first investigation
8 examining associations among coping strategies, infertility self-efficacy, and fertility quality of life
9 in two well-defined infertility cohorts of men and women seeking treatment for infertility. Study
10 results show that beyond the differences related to the etiology of infertility, a good self-efficacy
11 and a low use of avoidant coping may be protective factors for a better psychological and emotional
12 adjustment. Hence, these evidences offer a foundation for further investigations using more
13 heterogenous samples and a wider range of clinical and psychosocial variables.
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

Acknowledgments

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

The authors thank the Italian Ministry of Health for their research funding and support.

We would also like to thank all the patients for their willingness to participate in the study and Ms.

Francesca Sonia Labriola for her ongoing assistance throughout the project.

References

- 1
2
3 (1) Inhorn MC, Patrizio P. Infertility around the globe: new thinking on gender, reproductive
4 technologies and global movements in the 21st century. *Hum Reprod Update* 2015; 21: 411-426.
5 doi: 10.1093/humupd/dmv016
6
- 7
8 (2) Vander Borcht M, Wyns C. Fertility and infertility: Definition and epidemiology. *Clin Biochem*
9 2018; 62: 2-10. doi: 10.1016/j.clinbiochem.2018.03.012
10
- 11 (3) Barratt CRL, Björndahl L, De Jonge CJ, Lamb DJ, Martini FO, McLachlan R, Oates RD, van der
12 Poel S, St John B, Sigman M, Sockol R, Tournaye H. The diagnosis of male infertility: an analysis
13 of the evidence to support the development of global WHO guidance—challenges and future
14 research opportunities. *Hum Reprod Update* 2017; 23(6): 660–680. doi: 10.1093/humupd/dmx021
15
16
- 17 (4) De Geyter C, Calhaz-Jorge C, Kupka MS, Wyns C, Mocanu E, Mothrenko T, Scaravelli G,
18 Smeenk J, Vidakovic S, Goossens V. ART in Europe, 2015: results generated from European
19 Registries by ESHRE. *Hum Reprod Open* 2020; 1-17. doi:10.1093/hropen/hoz038
20
21
- 22 (5) De Geyter C, Wyns, C, Calhaz-Jorge C, de Mouzon J, Ferraretti AP, Kupka M, Nyboe Andersen
23 A, Nygren KG, Goossens V. 20 years of the European IVF-monitoring Consortium registry: what
24 have we learned? A comparison with registries from two other regions. *Hum Reprod* 2020; 35:
25 2832-2849. doi:10.1093/humrep/deaa250
26
27
- 28 (6) Porcu E, Cillo GM, Cipriani L, Sacilotto F, Notarangelo L, Damiano G, Dirodi M, Roncarati I.
29 Impact of BRCA1 and BRCA2 mutations on ovarian reserve and fertility preservation outcomes in
30 young women with breast cancer. *J assist Reprod Genet* 2020; 37: 709-7015. doi: 10.1007/s10815-
31 019-01658-9.
32
33
- 34 (7) Greil AL, Slauson-Blevins K, McQuillan J. The experience of infertility: a review of recent
35 literature. *Sociol Health Illn* 2010; 32:140–162. doi: 10.1111/j.1467-9566.2009.01213.x.
36
37
- 38 (8) Luk BH, Loke AY. The impact of infertility on the psychological well-being, marital
39 relationships, sexual relationships, and quality of life of couples: a systematic review. *J Sex Marital*
40 *Ther* 2015; 41:610–25. doi: 10.1080/0092623X.2014.958789.
41
42
- 43 (9) Johansson M, Adolfsson A, Berg M, Francis, Hogström L, Janson PO, Sogn J, Hellström AL.
44 Gender perspective on quality of life, comparisons between groups 4-5.5 years after unsuccessful or
45 successful IVF treatment. *Acta Obstet Gynecol Scand* 2010; 89:683–691.
46
47
- 48 (10) Samadaee-Gelekholaee K, Mccarthy BW, Khalilian A, Hamzehgardeshi Z, Peyvandi S, Elyasi
49 F, Shahidi M. Factors associated with marital satisfaction in infertile couple: a comprehensive
50 literature review. *Glob J Health Sci* 2016; 8: 96-109. doi: 10.5539/gjhs.v8n5p96
51
52
- 53 (11) Starc A, Trampus M, Jukic DP, Rotim C, Jukic T, Mivsek AP. Infertility and sexual
54 dysfunctions: A systematic literature review. *Acta Clin Craot* 2029; 58: 508-515.
55
56
57
58
59
60
61
62
63
64
65

- 1 (12) Verhaak CM, Smeenk JMJ, Evers AWM, Kremer JA, Kraaimaat FW, Braat DDM. Women's
2 emotional adjustment to IVF: a systematic review of 25 years of research. *Hum Reprod Update*
3 2007; 13: 27-36. doi: 10.1093/humupd/dml040.
- 4 (13) Brandes M, Van Der Steen JOM, Bokdam SB, Hamilton CJCM, De Bruin JP, Nelen, WLDM,
5 Kremer JAM. When and why do subfertile couples discontinue their fertility care? A longitudinal
6 cohort study in a secondary care subfertility population. *Hum Reprod* 2009; 24: 3127-3135. doi:
7 10.1093/humrep/dep340
- 8 (14) Gameiro S, Boivin J, Peronace L, Verhaak CM. Why do patients discontinue fertility
9 treatment? A systematic review of reasons and predictors of discontinuation in fertility treatment.
10 *Hum Reprod Update* 2012;18:652–669. doi: 10.1093/humupd/dms031.
- 11 (15) Dooley M, Dineen T, Sarma K, Nolan A. The psychological impact of infertility and fertility
12 treatment on the male partner. *Hum Fertil* 2014, 17:203-209. doi: 10.3109/14647273.2014.942390.
- 13 (16) Malik SH, Coulson N. The male experience of infertility: a thematic analysis of an online
14 infertility support group bulletin board. *J Reprod Infant Psychol* 2008; 26:18–30.
- 15 (17) Barbore A, Stuppia L, Trumello C, Candelori C, Antonucci I. Male factor infertility and lack of
16 openness about infertility as risk factors for depressive symptoms in males undergoing assisted
17 reproductive technology treatment in Italy. *Fertil Steril* 2017; 107: 1041-1047.
- 18 (18) El Kissi Y, Romdhane AB, Hidar S, Bannour S, Idrissi KA, Khairi H, Ali BBH. General
19 psychopathology, anxiety, depression and self-esteem in couples undergoing infertility treatment: a
20 comparative study between men and women. *Eur J Obstet Gynecol Reprod Biol* 2013; 167:185-
21 189. doi: 10.1016/j.ejogrb.2012.12.014.
- 22 (19) Wright J, Duchesne C, Sabourin S, Bissonnette F, Benoit J, Girard Y. Psychosocial distress
23 and infertility: men and women respond differently. *Fertil Steril* 1991;55:100–8.
- 24 (20) Throsby, K., & Gill, R. (2004). It's different for men: masculinity and IVF. *Men and*
25 *Masculinities*, 6(4), 330-338.
- 26 (21) Petok WD. Infertility counselling (or the lack thereof) of the forgotten male partner. *Fertil*
27 *Steril* 2015;104:260–6.
- 28 (22) Nachtigall RD, Becker G, Wozny M. The effects of gender-specific diagnosis on men's and
29 women's response to infertility. *Fertil Steril* 1992;57:113–21.
- 30 (23) Holter H, Anderheim L, Bergh C, Moller A. The psychological influence of gender infertility
31 diagnoses among men about to start IVF or ICSI treatment using their own sperm. *Hum Reprod*
32 2007;22:2559–65.
- 33 (24) Peronace LA, Boivin J, Schmidt L. Patterns of suffering and social interactions in infertile
34 men: 12 months after unsuccessful treatment. *J Psychosom Obstet Gynaecol* 2007; 28:105–14.
- 35 (25) Dhillon R, Cumming CE, Cumming DC. Psychological well-being and coping patterns in
36 infertile men. *Fertil Steril* 2000; 74: 702-706
- 37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

- 1 (26) Siedentopf F, Tariverdian N, R€ucke M, Kentenich H, Arck PC. Original article: Immune
2 status, psychosocial distress and reduced quality of life in infertile patients with endometriosis. *Am*
3 *J Reprod Immunol* 2008;60:449–461. doi: 10.1111/j.1600-0897.2008.00644.x.
- 4 (27) Haggerty CL, Schulz R, Ness RB. Lower quality of life among women with chronic pelvic
5 pain after pelvic inflammatory disease. *Obstet Gynecol* 2003;102:934–9. doi: 10.1016/s0029-
6 7844(03)00695-1.
- 7
8
9 (28) Cizmeli C, Lobel M, Franasiak J, Pastore LM. Levels and associations among self-esteem,
10 fertility distress, coping, and reaction to potentially being a genetic carrier in women with
11 diminished ovarian reserve. *Fertil Steril* 2013;99:2037–2044. doi: 10.1016/j.fertnstert.2013.02.033.
- 12
13 (29) Nicoloro-SantaBarbara JM, Lobel M, Bocca S, Stelling JR, Pastore LM. Psychological and
14 emotional concomitants of infertility diagnosis in women with diminished ovarian reserve or
15 anatomical cause of infertility. *Fertil Steril* 2017; 108:161-167doi: 10.1016/j.fertnstert.2017.05.008.
- 16
17
18 (30) Cousineau TM, Green TC, Corsini EA, Barnard T, Seibring AR, Domar AD. Development and
19 Validation of the Infertility Self-Efficacy Scale. *Fertil Steril* 2006; 85:1684- 1696. doi:
20 10.1016/j.fertnstert.2005.10.077.
- 21
22
23 (31) Galhardo A, Cunha M, Pinto- Gouveia J. Measuring self- efficacy to deal with infertility:
24 Psychometric properties and confirmatory factor analysis of the portuguese version of the infertility
25 self- efficacy scale. *Res Nurs Health* 2013; 36:65-74. <https://doi.org/10.1002/nur.21516>
- 26
27
28 (32) World Health Organization. Department of Reproductive Health and Research. WHO
29 laboratory manual for the examination and processing of human semen. 5th edn, 2010. WHO,
30 Geneva, Switzerland.
- 31
32
33 (33) Jungwirth A, Diemer T, Kopa Z, Krausz C, Tournaye H. European Association of Urology
34 (EAU) guidelines on male infertility. Arnhem, The Netherlands: European Association of Urology,
35 2015. Available at [https://uroweb.org/](https://uroweb.org/wp-content/uploads/17-Male-Infertility_LR1.pdf)
36 [wp-content/uploads/17-Male-Infertility_LR1.pdf](https://uroweb.org/wp-content/uploads/17-Male-Infertility_LR1.pdf) [Accessed
37 12 July 2017].
- 38
39 (34) Carver CS. You want to measure coping but your protocol's too long: consider the Brief
40 COPE. *Int J Behav Med* 1997;4:92-100. doi: 10.1207/s15327558ijbm0401_6.
- 41
42 (35) Bose CN, Bjorling G, Elfstrom ML, Persson H, Saboonchi F. Assessment of coping strategies
43 and their associations with health related quality of life in patients with chronic heart failure: The
44 Brief COPE restructured. *Cardiol Res* 2015; 6:239-248. doi: 10.14740/cr385w.
- 45
46
47 (36) Sica C, Magni C, Ghisi M, Altoè G, Sighinolfi C, Chiri LR, Franceschini S. Coping
48 Orientation to Problems Experienced – Nuova Versione Italiana (COPE-NVI): uno strumento per la
49 misura degli stili di coping. *Psicoterapia Cognitiva e Comportamentale*, 2008; 14:27-53.
- 50
51
52 (37) Boivin J, Takefman J, Bravemann A. The Fertility Quality of Life (FERTIQoL) tool:
53 development and general psychometric properties. *Hum Reprod* 2011; 26: 2084-2091
54 doi: [10.1093/humrep/der171](https://doi.org/10.1093/humrep/der171)
- 55
56
57
58
59
60
61
62
63
64
65

- 1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
- (38) Bonanno GA. Loss, trauma, and human resilience: have we underestimated the human capacity to thrive after extremely aversive events? *Am Psychol* 2004; 59: 20-28
- (39) Agostini F, Monti F, Andrei F. *et al.* Assisted reproductive technology treatments and quality of life: a longitudinal study among subfertile women and men. *J Assist Reprod Genet* 2017; 34: 1307–1315. <https://doi.org/10.1007/s10815-017-1000-9>
- (40) Jordan C, Revenson TA. Gender differences in coping with infertility: a meta-analysis. *J Behav Med* 1999; 22.4: 341-358. doi.org/10.1023/A:1018774019232
- (41) Peterson BD, Newton CR, Rosen KH, Skaggs GE. Gender differences in how men and women who are referred for IVF cope with infertility stress. *Hum Reprod* 2006; 21: 2443–2449. doi.org/10.1093/humrep/del145
- (42) Verhaak CM, Lintsen AME, Evers AWM, Braat DDM. Who is at risk of emotional problems and how do you know? Screening of women going for IVF treatment. *Hum Reprod* 2010; 25: 1234-1240. doi.org/10.1093/humrep/deq054
- (43) Ying, L, Wu LH, Loke AY. The effects of psychosocial interventions on the mental health, pregnancy rates, and marital function of infertile couples undergoing in vitro fertilization: a systematic review. *J Assist Reprod Genet* 2016; 33: 689-701. doi: 10.1007/s10815-016-0690-8.
- (44) Cousineau TM, Domar AD. Psychological impact of infertility. *Best Pract Res Clin Obstet Gynaecol* 2007; 21: 293-308.

Table 1. Demographic and clinical variables of both men and women stratified by anatomical versus non-anatomical cause of infertility.

Sample characteristics	Women		Men	
	Non-ACI (n = 31)	ACI (n = 38)	Non-ACI (n = 21)	ACI (n = 17)
Mean age in years (SD)	39.8 (4.3)	37.4 (4.9)	39.7 (4.9)	36.7 (5.6)
Level of education (%)				
High school or below	6 (19.5)	6 (15.8)	8 (38.1)	6 (35.3)
University	11 (35.6)	17 (44.8)	8 (38.1)	6 (35.3)
Postgraduate	8 (25.9)	10 (26.4)	5 (23.8)	5 (29.4)
Occupational status (%)				
Employed	29 (93.6)	36 (94.7)	21 (100)	17 (100)
Unemployed	2 (6.4)	2 (5.3)	0	0
Previous ARTs attempts (%)				
Yes	16 (51.6)	10 (26.3) ^a	7 (33.3)	3 (17.6)
No	15 (48.4)	28 (73.7)	14 (66.7)	14 (82.4)
Previous pregnancies (%)				
Yes	3 (9.7)	5 (13.2)	2 (9.5)	1 (5.9)
No	28 (90.3)	33 (86.8)	19 (90.5)	16 (94.1)

Note. ACI = anatomical cause of infertility; Non-ACI = non anatomical cause of infertility; SD = standard deviation.

^a $p < .05$

Table 2. Comparisons on study variables between women and men with anatomical and non-anatomical cause of infertility.

	Women			Men			Gender	Cause of infertility	Gender and Cause of Infertility
	ACI (n = 38)	Non-ACI (n = 31)	Total (n = 69)	ACI (n = 17)	Non-ACI (n = 21)	Total (n = 38)			
Infertility self-efficacy	6.6 ± 1.5	6.1 ± 1.5	6.4 ± 1.5	7.2 ± 3.8	7 ± 1.2	7.1 ± 1	F (1, 106) = 7.04 ^b	F (1, 106) = 1.46	F (2, 104) = .29
Coping strategies									
Avoidant	2.8 ± .9	3.3 ± 1.1	3.1 ± .9	2.8 ± .8	3.2 ± .9	3 ± .9	F (1, 106) = .5	F (1, 106) = 6.1 ^b	F (2, 104) = .1
Problem Focused	7.2 ± 19.7	7.1 ± 21.2	7.2 ± 1.7	7.1 ± 23.8	7.3 ± 22.5	7.2 ± 1.5	F (1, 106) = .00	F (1, 106) = .01	F (2, 104) = .18
Emotion Focused	6.5 ± 1.1	6 ± 1.3	6.2 ± 1.2	5.8 ± 1.2	5.6 ± 1.8	5.7 ± 1.5	F (1, 106) = 4.6 ^c	F (1, 106) = 1.5	F (2, 104) = .29
Socially Supported	5.8 ± 1.4	5.8 ± 1.7	5.8 ± 1.5	4.6 ± 1.3	4.5 ± 1.5	4.6 ± 1.3	F (1, 106) = 14.4 ^a	F (1, 106) = .00	F (2, 104) = .03
Fertility Quality of Life									
Emotional	16.9 ± 4.8	15.7 ± 5.5	16.4 ± 5.1	20.2 ± 4.3	18.7 ± 3.9	19.4 ± 4.1	F (1, 106) = 9.2 ^b	F (1, 106) = 1.9	F (2, 104) = .3
Mind-Body	18.8 ± 5	18.2 ± 5	18.6 ± 5	22 ± 2.8	20 ± 3.8	20.9 ± 3.5	F (1, 106) = 6.5 ^c	F (1, 106) = 1.9	F (2, 104) = .5
Relational	19.8 ± 3.4	17.6 ± 4.5	18.8 ± 4.1	20.2 ± 3.8	18.9 ± 2.4	19.5 ± 3.3	F (1, 106) = 1.1	F (1, 106) = 4.9 ^c	F (2, 104) = .27

	Women			Men			Gender	Cause of infertility	Gender and Cause of Infertility
	ACI (n = 38)	Non-ACI (n = 31)	Total (n = 69)	ACI (n = 17)	Non-ACI (n = 21)	Total (n = 38)			
Social	17.8 ± 4.8	17.3 ± 4.8	17.5 ± 4.8	19.6 ± 2.9	18 ± 3.8	18.8 ± 3.4	F (1, 106) = 1.9	F (1, 106) = 1.2	F (2, 104) = .29

Note. Data are presented as mean ± standard deviation. ACI = anatomical cause of infertility; Non-ACI = non anatomical cause of infertility.

^a $p < .001$

^b $p < .01$

^c $p < .05$

Table 3. Hierarchical regressions testing the effects of coping strategies and self-efficacy on quality of life indicators.

Predictor	Global Quality of Life		Relational		Social		Mind-Body		Emotional	
	$F(6, 107) = 18.36^a, R^2 = .55$		$F(6, 107) = 4.84^a, R^2 = .24$		$F(6, 107) = 6.39^a, R^2 = .30$		$F(6, 107) = 14.6^a, R^2 = .49$		$F(6, 107) = 20.19^a, R^2 = .57$	
	β	ΔR^2_{adj}	β	ΔR^2_{adj}	β	ΔR^2_{adj}	β	ΔR^2_{adj}	β	ΔR^2_{adj}
Step 1		.07 ^c		.06 ^c		.02		.07 ^c		.09 ^c
Gender	-.23 ^c		-.09		-.12		-.24 ^b		-.28 ^a	
Cause of infertility	-.17		-.24 ^c		-.09		-.11		-.13	
Step 2		.25 ^a		.09 ^b		.13 ^a		.20 ^a		.31 ^a
Avoidant coping	-.42 ^a		-.28 ^b		-.32 ^a		-.35 ^a		-.42 ^a	
Socially supported	-.15		-.02		.06		-.21 ^a		-.27 ^a	
Emotion focused	.26 ^b		.12 ^c		.16		.23 ^a		.33 ^b	
Step 3		.23 ^a		.09 ^a		.15 ^a		.23 ^a		.17 ^a
Self-efficacy	.62 ^a		.39 ^a		.51 ^a		.62 ^a		.54 ^a	

^a $p < .001$ ^b $p < .01$ ^c $p < .05$

Highlights

- Common and diagnosis-specific factors for a better adjustment to infertility were detected
- Common and gender-specific factors for a better adjustment to infertility were detected
- Higher levels of self-efficacy and a lower use of avoidant coping strategies predicted a better infertility quality of life
- Self-efficacy and coping strategies can help to identify patients in greater need for emotional support