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CASE STUDY

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Alexithymia, Stress and Depression in Infertile Women: a Case Control Study

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ABSTRACT

Background: Alexithymia and stress are two main psychological factors which affect not only fertility, but also the outcome of assisted reproductive technology treatment. **Objective:** The primary aim of this study was to compare the levels of alexithymia and stress between infertile women undergoing assisted reproductive treatment and women with no fertility issues. The present study aims to: (i) explore the relation between alexithymia and infertility, (ii) investigate whether women with infertility problems show elevated levels of alexithymia compared to women with no fertility problems, and (iii) compare stress levels between women undergoing assisted reproductive technology treatment and women with no fertility problems. **Methods:** A case control trial was conducted. In total, data from 177 women were collected. The control group consisted of 102 women with no fertility problems, whilst the study group included 75 women undergoing assisted reproductive program. In order to measure the levels of alexithymia and the fertility-related stress among women in both groups and compare the results, validated questionnaires were distributed to every participant. Self-report instruments were used to measure alexithymia (TAS-20), fertility-related stress (FPI), depressive symptomatology (CES-D) and anxiety (STAI). Univariate and bivariate statistical analyses were used. **Results:** The mean values of alexithymia, anxiety and depressive symptomatology were higher in women with lower educational background and not within a marriage than in women with higher education and within marriage. Additionally, infertile women had similar levels of alexithymia, anxiety and depressive symptomatology compared to women with no fertility problems. **Conclusion:** Results from the present study suggest that infertile women show similar levels of alexithymia and stress in comparison to women who have not been confronted with fertility problems. Our study

findings are in accordance with many previous published studies that have concluded that alexithymia rates are similar between group of patients and group of healthy individuals. However, future studies should aim to investigate the prevalence of alexithymia in infertile women with idiopathic and non-idiopathic infertility as well as to assess the levels of alexithymia in infertile women that are not in a fertility treatment.

Keywords: alexithymia, depression, anxiety, fertility-related stress, case-control study.

1. INTRODUCTION

Infertility, based on the clinical definition of the World Health Organization (WHO), is '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' (1). In accordance with the European Society of Human Reproduction and Embryology (ESHRE) 2014, one in six couples worldwide encounter some form of infertility at least once in their reproductive life (2). Assisted reproductive technology (ART) is used to treat infertility and refers to any treatment that involves procedures where gametes are manipulated outside the human body, i.e. in the laboratory (3, 4). The relationship between psychological factors and infertility is rather complex and multifactorial. An abundance of research papers has already proven the close relation of stressful situations and fertility. Stress is a psychological factor that negatively affects fertility and its treatment and vice versa the diagnosis of infertility induces a substantial amount of stress (5-8).

The term alexithymia was first introduced by the Greek psychiatrist Petros Sifneos in the early 1970s in order to describe patients with psychosomatic disorders. Alexithymia is a per-

sonality characteristic, referred to the inability to identify and narrate feelings (9). To begin with, alexithymia, which literally means “no words for emotions”, consists of four aspects: a) difficulty in identifying and describing subjective feelings to others e.g. anger, desolation, fear, happiness, b) difficulty in differentiating feelings and bodily sensations of emotional excitation, c) limited imaginal ability and d) an externally oriented thinking (9, 10). It is estimated that approximately 10-13% of the general population is alexithymic (11). A great body of literature has been published about alexithymia, stress somatization and psychosomatic phenomena (i.e. eating disorders, dermatologic diseases). Correspondingly, alexithymia can also be seen as a trend to struggle with psychological stress in the form of somatic symptoms (12). There are strong conjectures relating significantly high levels of alexithymia with diabetes type 1 and type 2 (13), skin diseases (psoriasis) (14-16), caffeine consumption (17) as well as eating disorders (18-20) and infertility. A small number of studies proved that infertile women show greater levels of alexithymia when compared to women with no fertility problems, have been conducted till this time. Studies by Kakatsaki et al. (2009) and Lamas et al. (2006) proved that alexithymia is positively associated with the outcome of in vitro fertilization treatment and that infertile women show significantly higher levels of alexithymia compared to fertile women, respectively (21, 22). Affirmation of this supposition already came from the study by Gourounti et al. (2016), in which alexithymia and fertility-related stress, were positively associated (10). In addition, a recent study by Basirat and colleagues (2019) confirmed that women with polycystic ovarian syndrome (PCOS) showed soaring alexithymia rates than women without PCOS (23). It has also been proved that alexithymia affects prevalence of health care use (24).

2. AIM

The present study aims to: (i) explore the relation between alexithymia and infertility, (ii) investigate whether women with infertility problems show elevated levels of alexithymia compared to women with no fertility problems, and (iii) compare stress levels between women undergoing assisted reproductive technology treatment and women with no fertility problems.

3. METHODS

Sample and data collection

The Research and Ethics Committee of ‘MITERA’ private clinic approved this study protocol (165a/SB, 2020). One hundred seventy-seven (177) women in total agreed to participate in the present study and completed the questionnaires. One hundred and two (102) women with no fertility problems formed the control group, whereas the study group consisted of 75 women undergoing assisted reproductive treatment. The questionnaires were distributed to the participants during their appointment to the clinic, prior to the ovulation induction, the intrauterine insemination (IUI) procedure or the embryo transfer. All participants in this study were thoroughly informed about the purpose of the study. Eligible women were reassured that the data collected would be used only for the scope of the study. All

participants provided signed informed consent.

A necessary prerequisite for completing the questionnaires was that women who participated, fully understood the Greek language and were able to read and write in Greek. Additionally, pregnant women or women with any psychiatric disorder were excluded from this study. Non-participation in the trial was for the most part due to time constraints.

Study Instruments

Basic demographic data and information regarding women’s medical history were collected with the standard demographic instrument of the Compenhagen Multi-centre Psychosocial Infertility (COMPI) and included age, marital status, educational and income level, cause and duration of infertility, fertility treatments (25).

Alexithymia was assessed by the self-report Toronto Alexithymia Scale-20 (TAS-20) (26). The scale consists of three factors that evaluate three components of alexithymia construct: difficulty identifying feelings, difficulty communicating to others and externally oriented thinking. It includes 20 items, graded from 1 to 5. Total score ranges from 20 to 100. The TAS-20 is used extensively, since it constitutes the “gold standard” for alexithymia assessment, and the empirically established cut off of ≥ 61 was used in the present study as this cut-off has been used in previous Greek studies (10, 24, 27). Thus, women scoring 61 or more have been considered to be alexithymic. A validated Greek version of the TAS-20 was used.

The Fertility Problem Inventory (FPI) is a 46-item self-administered, multidimensional measure that identifies infertility-related problems in five domains: social, sexual and relationship concern, need for parenthood and rejection of childfree lifestyle. Total scores range from 46 to 276. The higher the score, the higher the infertility-related stress (28). The FPI has been adapted to the Greek language and has been found to have satisfactory psychometric properties. Cronbach’s alpha of 0.91 was obtained in the present study.

Anxiety was assessed with the Spielberger State Trait Anxiety Inventory (STAI), a widely used anxiety rating scale. It consists of 40 items, each graded from 1 to 4. The scale differentiates anxiety into (a) anxiety caused by a specific condition (state subscale) and (b) anxiety as a more permanent characteristic of personality (trait subscale) (29). The STAI has been adapted to the Greek language as well, having satisfactory psychometric properties. Cronbach’s alpha of 0.90 was obtained in the present study.

Last but not least, depressive symptoms were assessed with the Center for Epidemiologic Studies-D (CES-D) scale. The CES-D is a short self-report scale designed to measure depressive symptomatology and specifically current level of depressive symptoms occurring the past week. Overall scores fluctuate from 0 to 60, and the higher the score, the more frequent the depressive symptoms (30). The CES-D has been adapted to Greek, having satisfactory psychometric properties. Cronbach’s alpha of 0.89 was obtained in the present study.

Data Analyses

The statistical analyses were conducted using SPSS version 22.0, with statistical significance set at $p < 0.05$.

Univariate frequency distributions, means and standard deviations were calculated for the variables (medical and demographic characteristics of participants). the relationships between individual independent variables and dependent variables were explored by using independent t-test, chi-square, one-way ANOVA and pearson’s correlation.

4. RESULTS

Characteristics of participants and descriptive analysis

Data from overall 177 participants were collected. The mean age of women was 39.1 years (age range 27-48 years). Fifty-five percent (55%) of women had education level beyond high school; 35% had completed only high school, whilst 10% had a lower level of education (secondary or elementary school). Seventy-four percent (74%) of women were married and 67% of them participated in the work-force. These parameters are listed in Table 1. Substantially all participants (24%) had a low family annual income level (9.600-14.400 euros), followed by the 18% of the participants who had a medium family annual income (14.400-18.000 euros).

Characteristic	N	%
Education		
High educational level (college or university degree)	98	55%
Low educational level (below high school)	79	45%
Marital Status		
Married	131	74%
Cohabitation	46	26%
Employment Status		
Employed	119	67%
Unemployed	58	33%

Table 1. Basic sociodemographic characteristics of the participants

The mean duration of infertility was 3.7 years. The cause of infertility was mainly attributed to female factor (52%), whereas 24% was attributed to male factor. Twenty percent had unexplained infertility, whilst 4% had a combined female and male factor infertility. For the 20% of women who participated in this study, this was their first attempt of assisted reproductive treatment. In vitro fertilization (IVF) was the treatment of choice for the 80% of the cases, followed by IUI (7%) and natural cycles (5%).

Furthermore, the vast majority of infertile women (64%) stated that infertility has no impact on their relationship with their partner/husband, in fact, 51% of infertile women reported that infertility strengthened the relationship with their companion. Thirty-nine percent (39%) of infertile women said they felt capable of coping with the infertility problem. The highest percentage (70%) of infertile women was satisfied with their life, despite the infertility problem.

The mean score for fertility-related stress (FPI) was 138.3 (SD=33.12), the mean score for depressive symptoms (CES-D) was 15.1 (SD=9.97), the mean anxiety value (STAI) was 46.5 (SD=5.17), and the mean score for alexithymia (TAS-20) was 48.7 (SD=12.58).

Correlations between demographical/medical variables, alexithymia, and psychological stress

As illustrated in Table 2, the mean value of alexithymia was higher in women with lower educational background. As a consequence, women with higher educational level showed lower values of alexithymia. Interestingly, the educational status was also statistically significantly correlated with the fertility-related stress (FPI). Thus, women with college or university degrees demonstrated increased stress related with infertility.

	Education	N	Mean	Sig.
TAS-20	Primary school	6	56.6	0.041
	Secondary school	11	51.9	
	High school	62	50.9	
	College/University	98	46.4	
	Overall	177	48.7	
STAI	Primary school	6	49.8	0.090
	Secondary school	11	48.9	
	High school	62	45.6	
	College/University	98	46.6	
	Overall	177	46.5	
CES-D	Primary school	6	20.0	0.611
	Secondary school	11	16.6	
	High school	62	14.6	
	College/University	98	14.9	
	Overall	177	15.1	
FPI	Primary school	0	-	0.003
	Secondary school	3	103.3333	
	High school	24	155.0833	
	College/University	48	132.1458	
	Overall	75	138.3333	

Table 2. Study instruments in correlation with the educational level

Moreover, the findings of this research revealed that depressive symptoms were statistically related with the marital status of women. Specifically, married women had lower levels of depressive symptomatology (mean 13.7) than unmarried women (mean 19.0) (p= 0.002).

Alexithymia, anxiety and psychological stress between infertile and fertile women

Comparison of the infertile group of women with the control group reached no statistically significant conclusion in terms alexithymia. In addition, alexithymia and fertility-related stress were not related with the cause and duration of infertility as well as with the treatment of choice and the number of ART attempts. Correspondingly, there was no statistical difference regarding depressive symptoms or even anxiety between the group of infertile women and the control group. Table 3 presents these findings.

	Groups	N	Mean	SD	Sig.
TAS-20	Cases	75	49.5	12.4	0.423
	Controls	102	48.0	12.7	
STAI	Cases	75	46.6	5.0	0.797
	Controls	102	46.4	5.3	
CES-D	Cases	75	14.8	9.3	0.773
	Controls	102	15.3	10.4	

Table 3. Statistical analysis of study instruments cases vs. control group.

5. DISCUSSION

Since investigations regarding alexithymia in reproduction are still scarce, the present study was mainly an attempt to compare levels of alexithymia among fertile and infertile Greek women.

The results of our study showed that there was no significant difference in rates of alexithymia between the group of infertile and the group of fertile women. Therefore, our results are not consistent with the previous infertility studies (10, 21-23). Nevertheless, it should be pointed that our findings may be attributed to the fact that the percentage of unexplained infertility (a situation that may be related to a stress somatization) in our sample was much lower in comparison to that of previous similar studies. However, our study findings are in accordance with many previous published studies that have concluded that alexithymia rates are similar between group of patients and group of healthy individuals. Results from a case-control trial conducted in Turkey by Sunay and colleagues (2011) revealed no statistically significant difference in terms of alexithymia between a group of 111 patients with acne vulgaris (blockage and/or inflammation of pilosebaceous units) and a group of 78 healthy individuals (31). In this direction, Selami et al. (2014) compared a group of 50 patients suffering from alopecia areata (unexpected appearance of areas of hair loss on the scalp and other hair-bearing regions) and a group of 50 healthy controls. Their study results failed to prove that patients with alopecia experienced higher levels of alexithymia than the controls (32). Vitiligo (acquired depigmenting skin disorder) is another skin condition that the correlation with alexithymia was investigated on several occasions. Maghami et al., (2018) concluded that alexithymia was not significantly more prevalent in vitiligo patients than in the controls ($p=0.56$) (11). Much has also been written about eating disorders and alexithymia. Previous research showed that individuals with eating disorders, such as anorexia nervosa, bulimia or obesity presented higher levels of alexithymia compared to healthy controls (18, 33-35). However, it is of interest to note that in a recent publication by Di Monte et al. (2020), obesity and alexithymia were not significantly related, using the same study instrument (TAS-20) as we used in our study. Surprisingly, the obese participants acquired statistically lower alexithymia score, using the TAS-20, than the control population (36). At that point, the present findings need to be interpreted in a broader manner and suggest that 'being infertile does not have to be alexithymic'.

In this regard, the present findings need to be elucidated in light of some limitations. First and foremost, the sample size was relatively small ($N=177$ overall, 75 infertile women, 102 controls), thus increasing the probability of random error. As a result, this does not permit to suggest that our sample is a representative sample of the general population of infertile women. A second plausible interpretation of our findings could be given based on the fact that the research was carried out at one specific infertility clinic, which may significantly limit the representativeness of the investigation. Future multicenter research with greater study groups may give a definite result. However, the sample of the present study is representative (with regard to demo-

graphic characteristics, type of infertility diagnosis, length of treatment, number of IVF treatments) of the population of women undergoing fertility treatment in Greece.

An additional limitation could be the fact that the questionnaires were distributed to participants (infertile group) in anticipation of their in vitro fertilisation treatment (prior to IUI, ovulation induction or embryo transfer). Certainly, during this specific time women experience various intense emotional feelings (for instance, anxiety, fear, stress, impatience), leading them to rushed or under pressure answers. Despite these limitations, this study had many strengths. Firstly, both general and fertility-specific psychological stressors were assessed. Moreover, psychometric variables were measured by validated instruments.

Further studies should be undertaken in order to investigate not only the correlation of alexithymia and infertility but also the role of alexithymia in the outcome of assisted reproductive treatments. It is an incontestable fact that the present study contributes to the broader literature even with its limitations. Even though the outcomes are opposite to those of previous infertility studies, our study paves the way for additional debate in the field of reproductive health. That being said, the evaluation of alexithymia in the course of infertility treatment by applying a standard instrument could aid the recognition of women at risk and reinforce services for infertile women undergoing assisted reproductive treatment.

6. CONCLUSION

The current study was an attempt to understand whether certain psychosocial factors were associated with greater vulnerability to stress among infertile women undergoing fertility treatment. The assessment of alexithymia during fertility treatment by using a standard instrument would facilitate the identification of women at risk and the implementation of interventions and support services for infertile women undergoing fertility treatment. Future studies should aim to investigate the prevalence of alexithymia in infertile women with idiopathic and non-idiopathic infertility as well as to assess the levels of alexithymia in infertile and fertile women.

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