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Research Article

The Relationship Between Type D Personality, Medical Adherence, and Infertility Treatment Outcome

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Abstract

Background: Infertility as a chronic condition could be a crisis. Experiencing infertility and assisted reproductive techniques (ARTs) would be hard for patients. Based on the literature review, women perceive ARTs as more stressful than men. Type D personality has been studied in patients with chronic heart problems, showing that it makes patients vulnerable to more stress and psychological consequences. This can significantly impact the outcomes of their treatments. As infertility could be seen as a chronic condition and ARTs just help patients to have children in most cases, it raises the question of whether type D personality has the same side effects on infertile women undergoing ARTs.

Objectives: The present study investigated the relationship between type D personality, medical adherence, and treatment outcomes in infertile women.

Methods: This cross-sectional study was conducted on 502 infertile women at Royan Institute. All participants were in the final stages of in vitro fertilization (IVF), intracytoplasmic sperm injection (ICSI), or intrauterine insemination (IUI) and were surveyed from February to May 2017. Type D Scale-14 (DS14) and Morisky Medication Adherence Scale-8 (MMAS-8) were used to measure type D personality and medical adherence. Data were analyzed using IBM SPSS statistics 22 developed in the USA, and statistical tests such as one-way analysis of variance (ANOVA), chi-square, and Fisher exact tests.

Results: Infertile women with low medical adherence reported significantly higher levels of type D personality than those with moderate medical adherence ($F = 76.49$; $P < 0.001$). The frequency of infertile women with type D personality who reported low medical adherence (51.8%) was significantly higher than those without type D personality (23.1%). No significant relationship was observed between type D personality/medical adherence and treatment outcome.

Conclusions: Although type D personality is associated with the patient's desire to have low medical adherence, other factors can prevent the effect of low medical adherence on the treatment outcome. However, further research is necessary to fully understand and explore these factors.

Keywords: Assisted Reproductive Techniques, Infertility, Medication Adherence, Type D Personality

1. Background

Infertility is a multidimensional crisis in marital life, with negative consequences (1-4). It is defined as the inability to conceive after 12 months of unprotected vaginal intercourse (5). Recent epidemiological studies indicate that 48 to 186 million couples worldwide experience infertility during their marital life (4).

Type D personality, known as distressed personality type, includes two subscales: Negative affectivity (NA) and social inhibition (SI) (6-8). Individuals with type D personality experience negative emotions and tend to avoid discussing them with others (7, 8). Denollet's studies on patients with heart disorders elucidate type D personality (9). This personality type is associated with negative health outcomes, with medical adherence

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being a probable link (9). Medical adherence refers to following treatment protocols and medication regimens as prescribed by healthcare professionals (10). Poor medical adherence is linked to increased healthcare costs and adverse health outcomes (11).

Most research on type D personality has focused on patients with heart diseases, showing that those with type D personality report lower medical adherence compared to those without (12). Although chronic diseases typically last at least a year and require ongoing medical interventions or lifestyle changes, infertility differs from chronic conditions like heart disease. Infertility may last more or less than a year and requires periodic medical interventions through assisted reproductive techniques (ARTs). Moreover, ARTs such as in vitro fertilization (IVF), intrauterine insemination (IUI), and intracytoplasmic sperm injection (ICSI) often impose significant side effects and interventions on women, even in cases of male infertility.

2. Objectives

The present study primarily aimed to address the following questions: Do female patients with type D personality exhibit low medical adherence during temporary and periodic medical interventions? Additionally, does this low adherence negatively impact their treatment outcomes?

3. Methods

3.1. Study Design

This cross-sectional study enrolled 550 women referred to the IVF Department of Royan Institute. Following psychological evaluation, 502 women remained in the study. The study was conducted during the final stages of their IVF, ICSI, and IUI from February to May 2017. Inclusion criteria included married women without known psychological disorders [as determined by the General Health Questionnaire-28 (GHQ-28) and a psychological interview conducted by a psychologist)], aged 18 to 40 years, and literate in Persian. Exclusion criteria were incomplete questionnaires and incomplete embryo transfer or IUI procedures.

Participants met the researcher in the waiting room on their embryo transfer or IUI days. They were informed about the study objectives, provided informed consent, and assured of data confidentiality. Participants completed the GHQ-28. If their score was 23 or below, they underwent further evaluation for signs of depression and anxiety disorders based on DSM V by a professional psychologist before completing additional study questionnaires. Five weeks post-embryo transfer or IUI, clinical results were collected and provided to the researcher (13).

Four questionnaires were utilized in the study. The GHQ-28 assessed general psychological health, while the type D Scale-14 (DS14) determined personality type (14). The Morisky Medication Adherence Scale-8 (MMAS-8) evaluated medical adherence (15). A researcher-developed questionnaire with 11 items gathered demographic information, including birth date, economic status, cause and duration of infertility, primary or secondary infertility, history of infertility treatment failure, and history of abortion.

The ART outcomes included chemical pregnancy, pregnancy failure, ectopic pregnancy, embryonic demise, and clinical pregnancy; the first four outcomes indicate non-pregnancy. Data were analyzed using SPSS version 22 (SPSS Inc, Chicago, IL, USA) with statistical tests such as one-way analysis of variance (ANOVA), chi-square, and Fisher exact tests. Data reporting adhered to the strengthening the reporting of observational studies in epidemiology (STROBE) guidelines (16).

As previously mentioned, the GHQ-28 was utilized to assess patients' general psychological health. It comprises 28 items evaluating four subscales: Somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression. Its internal consistency has been reported in the Iranian population (Cronbach $\alpha = 0.97$) (17, 18).

The DS14 is a tool consisting of 14 items designed to assess personality types, rated on a 5-point Likert scale. It includes two subscales: Negative affectivity and SI, each assessed using seven items. The score range for each subscale is 0 to 28, with a total score range of 0 to 56. Individuals scoring at least 10 on each subscale are classified as having a type D personality (12). The reliability of each subscale has been acceptable in several studies, with Cronbach α values exceeding 0.8 in all (8, 9, 19).

The MMAS-8 consists of eight items, seven with "yes" or "no" answers, and one requiring a response on a 5-point Likert scale. The total score range is 0 to 8. Individuals scoring 8 demonstrate high medical

Table 1. Demographic/Research Variables Details

Demographic/Research Variables	No. (%)
Education level	
Undergraduate	120 (23.9)
Graduate	155 (30.9)
Postgraduate	227 (45.2)
Job	
Housewife	378 (75.3)
Working woman	124 (24.7)
Economic level	
Low	71 (14.1)
Moderate	222 (44.2)
High	209 (41.6)
Treatment outcome	
Clinical pregnancy	136 (27.1)
Chemical pregnancy	12 (2.4)
Fail	313 (62.4)
Null pregnancy	22 (4.4)
Dead fetus	2 (0.4)
Abortion	2 (0.4)
Out of reach	5 (1)
Personality	
Type D	255 (50.8)
Type non-D	247 (49.2)
Medical adherence	
Low	188.75 (37.6)
Moderate	313.24 (62.4)
High	0 (0)

adherence, those scoring 6 to 8 exhibit moderate adherence, and scores below 6 indicate low adherence (20, 21). The scale has been updated for diabetics in Iran, with internal consistency evaluated (Cronbach α = 0.72) (22).

4. Results

The participants' mean age was 32.17 years (SD = 5.64). The majority were postgraduates (n = 227, 45.2%), and the average duration of infertility was 5.66 years (SD = 4.26). Most participants were housewives (n = 378, 75.3%) and reported a moderate economic level (n = 222, 44.2%). A majority reported a moderate level of medical adherence (n = 313, 62.4%), and most treatment outcomes were negative (n = 313, 62.4%). Additional demographic and research details are presented in Table 1.

The average score for type D personality was 26.59 (SD = 9.22), with a range of 10 to 51. Participants' average scores for negative emotions and SI were 11.81 (SD = 7.91) and 14.78 (SD = 3.05), respectively, with ranges of 0 to 28 for negative emotions and 4 to 23 for SI.

The results of the one-way ANOVA (Table 2) indicated that the mean score for type D personality was significantly higher in the low medical adherence group compared to the moderate adherence group ($F = 76.49$; $P < 0.001$). The Fisher exact test (Table 3) revealed a significant relationship between type D personality and medical adherence ($X^2 = 43.99$; $P < 0.001$), with patients having type D personality more likely to exhibit lower medical adherence (51.8%) than those without (23.1%).

According to the Fisher exact test (Table 4), no significant interaction was observed between medical adherence and treatment outcomes. Table 5 illustrates the relationship between type D personality and treatment outcomes ($P > 0.001$).

5. Discussion

Table 2. One-Way Analysis of Variance of D Personality Type by Medical Adherence

Medical Adherence	Mean of Type D Personality (Mean ± SD)	F	P-Value [a]
Low	30.92 ± 9.4	76.49	< 0.001
Moderate	23.99 ± 8.07	-	-

Abbreviation: SD, standard deviation.

[a] P < 0.001.

Table 3. Fisher's Exact D Personality Type and Medical Adherence [a]

Medical Adherence	Type D Personality	Type Non-D Personality	χ^2	P-Value [b]
Low	132 (51.8)	57 (23.1)		
Moderate	123 (48.2)	190 (76.9)	43.99	< 0.001
High	0 (0)	0 (0)		

[a] Values are expressed as No. (%).

[b] P < 0.001.

The present study primarily aimed to investigate the relationship between type D personality, medical adherence, and treatment outcomes in infertile women undergoing IUI or ICSI. Our findings indicate that patients with higher type D personality scores exhibited lower scores on the medical adherence questionnaire, demonstrating a significant relationship between type D personality and medical adherence. However, no relationship was found between type D personality or medical adherence and IUI or ICSI outcomes.

According to the literature, previous studies have predominantly focused on the relationship between type D personality and medical adherence in patients with heart disease, consistently finding a significant negative relationship. Patients with type D personality and low medical adherence experienced worse treatment outcomes (12, 23-25).

The medical adherence questionnaire includes three questions reflecting the patient's inner desire for adherence, such as "Do you sometimes forget to take your medicine?" Patients were asked to name the forgotten drug if they answered affirmatively, often reporting thyroid medications or sedatives, but not the main IUI or ICSI drugs. Other questions addressed feelings of inconvenience and difficulties remembering to take medication. Some patients reported using strategies like mobile alarms for injections and emphasized the importance of spousal support. Patients with type D personality answered affirmatively to these questions and reported lower medical adherence than those without type D personality. However, treatment outcomes showed no significant difference between patients with type D personality exhibiting low adherence and those without type D personality exhibiting moderate adherence.

One possible explanation for this could be related to the impacts of infertility stigma. Type D personality is characterized by NA and SI, with individuals avoiding social interactions due to fear of disapproval (26). The social stigma of infertility differs from that of heart illnesses, potentially causing stigmatized individuals to feel worthless (27). Despite declaring lower medical adherence, participants with type D personality followed medical instructions for assisted reproductive procedures, reporting non-adherence to chronic condition medications instead. This contradiction may stem from the difference between chronic conditions requiring lifelong adherence and short-term interventions perceived as temporary and beneficial.

Our results suggest that women with type D personality adhere to medical instructions during ARTs, and type D personality does not significantly affect treatment outcomes. This study has limitations, including the use of convenience sampling, which may limit the generalizability of findings. Further studies on larger populations across different ART centers and cultures are recommended.

Table 4. Fisher's Exact of Medical Adherence and Treatment Outcome [a]

Treatment Outcome	Medical Adherence			χ^2	P-Value [b]
	Low	Moderate	High		
Positive	50 (36.8)	86 (63.2)	0 (0)	0.032	0.85
Negative	134 (37.6)	222 (62.4)	0 (0)		

[a] Values are expressed as No. (%).
[b] $P < 0.001$.

Table 5. Chi-square of D Personality Type with Treatment Outcome [a]

Infertility Outcome	Type D Personality	Type Non-D Personality	χ^2	P-Value [b]
Positive	67 (26.9)	69 (28.4)	0.13	0.71
Negative	182 (73.1)	174 (71.6)	-	-

[a] Values are expressed as No. (%).
[b] $P < 0.001$.

5.1. Conclusions

Although type D personality is associated with a tendency toward low medical adherence, other factors may mitigate the impact of low adherence on treatment outcomes. Further research is necessary to fully understand and explore these factors.

Footnotes

Authors' Contribution: Study concept and design: S. A., R. O. S., and B. N.; Acquisition of data: S. A.; Analysis and interpretation of data: S. A. and B. N.; Drafting of the manuscript: S. A.; Critical revision of the manuscript for important intellectual content: R. O. S. and B. N.; Statistical analysis: M. M.; Administrative, technical, and material support: R. O. S. and B. N.; Study supervision: R. O. S.

Clinical Trial Registration Code: 95000011

Conflict of Interests Statement: Sh. A. was a volunteer as a researcher. As the correspondent author, she claims no conflict of interest. R. O. S. works as a researcher and employee for Royan Institute, and he reported that he gave the consulting fees from the institute. B. N. worked with Royan Institute as a researcher and an employee, and she reported that she gave the consulting fees from the institute. M. M. works with Royan Institute as a data analyzer, researcher, and employee. She also reported that she gave the fees.

Data Availability: The dataset presented in the study is available on request from the corresponding author during submission or after publication. The data are not publicly available due to confidentiality of patients' personal and medical information.

Ethical Approval: IR.ACECR.ROYAN.REC.1395.102.

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Informed Consent: Informed consent was obtained from all participants.

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