Research Article

Relationships among Type-D Personality, Fatigue, and Quality of Life in Infertile Women

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SUMMARY

Purpose: The objective of the present study was to investigate the prevalence of the type-D personality and identify the relationship between type-D personality, fatigue, and quality of life (QoL) in infertile women.

Methods: A total of 149 infertile women were recruited between October 2020 and January 2021. The participants were assessed through self-administered questionnaires using the type- D personality scale-14, fatigue severity scale, and fertility QoL instrumental questionnaire. Data were analyzed using the independent t-test, chi-square test, Pearson's correlation coefficients, and multiple regression analysis using the SPSS/WIN 25.0 program for Windows.

Results: Approximately 40.9% of infertile women were classified into the type-D personality group, which showed significantly higher fatigue and lower QoL than the non-type-D personality group. Fatigue was the most influential factor on the QoL of infertile women ($\beta = -.23$, $p = .003$), followed by the duration of infertility treatment ($\beta = -.22$, $p = .003$), type-D personality ($\beta = -.18$, $p = .025$), and relationship with spouse ($\beta = -.17$, $p = .024$). These variables account for approximately 22% of the variance.

Conclusions: Intervention programs that consider fatigue, type-D personality, relationship with spouses, and treatment duration may be useful for improving QoL in infertile women.

Introduction

In general, infertility is defined as the inability to conceive after 1 year or longer of unprotected sexual intercourse [1]. About 19% of married women aged 15−49 years in the United States report being unable to conceive even after one year of trying [1]. Among 1,289 married women aged 15−49 years in South Korea, 52.1% experienced infertility [2]. Despite the increased cost of treating infertility, the domestic fertility rate remains low [3]. Among the Organization for Economic Cooperation and Development (OECD) member countries, South Korea has the lowest fertility rate (.84 in 2020, compared to 1.64 in the United States, 1.70 in China, 1.33 in Japan, and 1.24 in Italy) [4].

Infertility is a global public health problem, and the proportion of infertile couples worldwide is increasing [5]. Infertility can easily act as a chronic stressor [6] and is a low-control stressor [7]; even if the cause of infertility is in men, women are more affected than men [8]. Recently, infertility has been increasing due to frequent miscarriages, age, long-term use of contraceptives, social stress, changes in eating habits and lifestyle, increases in women's social activities, and delays in marriage [1]. Therefore, in situations where the number of infertile women is increasing and various health problems caused by infertility are related [9], it is necessary to investigate the factors related to the QoL of infertile women.

The QoL of infertile women is generally low [10]. According to previous research, infertile Italian women perceive QoL as very low [11], and infertile women in China also report lower QoL [12]. Compared with women of childbearing age, infertile women experience lower QoL [13]. Moreover, women undergoing in vitro fertilization (IVF) for infertility have a lower QoL than other women

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of childbearing age [14,15], which affects not only infertile women but also the QoL of their spouse [16].

Various factors have been reported to affect the QoL of infertile women. Infertile women experience various physical, psychological, and relational problems that affect their QoL [17]. Among these are demographic factors such as the duration of marriage and burden of the cost of infertility testing, burden of infertility, age [18], education level, duration of infertility treatment [19], relationship with spouse [10,20], physical factors such as fatigue [17,21], psychological factors such as stress [10], uncertainty [18], depression [17,22], and type-D personality [22].

Fatigue is a symptom of physical problems that occur when attempting to conceive through fertility procedures [17]. In a study of 140 infertile women, approximately 37% complained of fatigue, and the higher the fatigue of infertile women, the lower the QoL [17].

Type-D personality refers to a personality that is vulnerable to negative emotions, such as depression, anxiety, and stress, and tends to consciously suppress self-expression in social interactions [23,24]. Negative affectivity refers to a persistent negative emotional state regardless of time and place, and social inhibition means suppressing the expression of emotions and behaviors to avoid the potential fear of being rejected in social relationships with others [23,24]. According to previous studies, people with a type-D personality are more likely to experience lower QoL than people with a non-type-D personality [25]. According to a study on infertile women with type-D personality, depression and type-D personality were higher in the infertility group, and type-D personality had a significant correlation with infertility. In particular, it was confirmed that there was a negative correlation with young infertile women (<35 years old) [22]; therefore, it is necessary to investigate the QoL of infertile women according to their type-D personality.

Despite social changes, in which the number of subjects diagnosed with infertility is increasing, research so far has been limited to the fragmentary evaluation of each variable, and considering the classification according to the type-D personality of infertile women, it is difficult to find studies that affect QoL according to type-D personality. Therefore, researchers have identified factors affecting QoL in infertile women and investigated the correlation between fatigue and QoL according to the type-D personality. The specific purposes were as follows: i) to identify general characteristics, fatigue, and QoL related to infertility according to type-D personality of infertile women, ii) investigate QoL according to participant characteristics, iii) investigate the correlation between variables, and iv) identify factors affecting infertility-related QoL in infertile women.

Methods

Design

This study used a descriptive correlational research design to identify factors affecting fertility-related QoL in infertile women through a cross-sectional survey.

Setting and study participants

The present study was conducted on 150 infertile women who did not have children naturally, even after more than one year of marriage. All women with infertility problems, including primary and secondary infertility, were targeted, and the specific criteria were as follows. In the present study, convenience was extracted from women who were diagnosed with infertility at a fertility hospital located in the J province. As for the sample size, multiple regression analysis with a significance level of .05, power of .8, and effect size of .15 median based on a previous study [26], was performed using G*Power 3.1.9.7 (Universität Düsseldorf, Düsseldorf, Germany). When 11 predictors (women' age, spouse's age, religion, occupation, education level, monthly income, duration of infertility treatment, experienced infertility treatment methods, relationship with the spouse, fatigue, type-D personality) were input, 123 was the minimum sample size. A total of 150 questionnaires were distributed and collected considering the omission of responses. After excluding one questionnaire owing to insincere responses and errors in filling out, 149 subjects participated in the study (response rate: 99.3%). Data were collected from October 30, 2020, to January 8, 2021. Data were collected from two obstetrics and gynecology clinics and two public health centers. After obtaining permission from the heads of the institutions, a poster was attached to the centers to guide the recruitment of research participants. After obtaining voluntary consent, participants filled out the self-administered questionnaires in offices at centers with quiet, comfortable, and private places. The questionnaire took approximately 20 minutes and was sealed and collected thereafter. The inclusion criteria were as follows: i) infertile women older than 19 years and ii) diagnosed with infertility at a hospital. The exclusion criteria were as follows: i) those with diseases other than infertility, and ii) those who had been diagnosed with depression or had a disease that may affect fatigue.

Ethical considerations

This study was approved by the Institutional Review Board of Jeonbuk National University (no. 2020-08-008-001). In accordance with the Helsinki Declaration, voluntary written consent was obtained after explaining the privacy guarantee, research content, purpose, anonymity, and possibility of opting out.

Measures

Type-D personality

The type-D personality measured by the type-D scale-14 (DS14) [24] consists of seven items each for the "negative affectivity" (NA) and "social inhibition" (SI) domains. Each item is measured on a five-point Likert scale and composed of 0−4 points. The NA and SI scales range from 0 to 28 points, respectively. The cutoff on both subdomains is 10 points; a score of 10 or more in each domain is classified as a type-D personality (i.e., NA $\geq$ 10 and SI $\geq$ 10), and others are classified as non−type-D personality [24]. The Cronbach's α of original version of the DS 14 was .88 for the NA and .82 for the SI [24], and the those of Korean version was .88 for the NA and .86 for the SI [27]. In this study, Cronbach's α was .87 for the NA and .85 for the SI. It was used after receiving approval from the copyright holder (Copyright Clearance Center) of original version [24] and translator's Korean version.

Fatigue

The fatigue was measured The Fatigue Severity Scale (FSS) [28] The FSS consists of a total of nine questions, "not at all" 1 to "strongly agree" 7 points. The total score was calculated as the average of the scores for each item and ranged from 1 to 7, with a higher average value indicating more severe fatigue. If the average score was 4 or higher, it was interpreted as the fatigue group, and if it was less than 4, it was classified as the non-fatigue group. Cronbach's α of the original version of the FSS was .89 [28] and that of the Korean version of the FSS was .94 [29]. In this study, the Cronbach's α was .91. It was used after the receiving approval from the translator's Korean version and ©1985 Lauren B. Krupp. reproduced with permission from the author.

Table 1 *General Characteristics of the Type-D and Non-Type-D Personality Groups (N = 149).*

Variables	Categories	Total (n = 149)	Type-D (n = 61)	Non-type-D (n = 88)	t or χ^2 or F	p	Range
		M ± SD, n (%)					
Demographic characteristics							
Age (year)	Women	35.61 ± 4.62	35.75 ± 4.26	35.51 ± 4.88	.31	.754	25−46
	<35	64 (43.0)	22 (36.1)	42 (47.7)	2.00	.180	
	≥35	85 (57.0)	39 (63.9)	46 (52.3)			
	Husband	37.57 ± 5.00	37.49 ± 4.99	37.63 ± 5.04	−.16	.874	27−55
	<35	43 (28.9)	18 (29.5)	25 (28.4)	.02	.884	
	≥35	106 (71.1)	43 (70.5)	63 (71.6)			
Religion	Yes	75 (50.3)	30 (49.2)	45 (51.1)	.06	.868	
	No	74 (49.7)	31 (50.8)	43 (48.9)			
Occupation	Yes	95 (63.8)	41 (43.2)	54 (56.8)	.53	.465	
	No	54 (36.2)	20 (37.0)	34 (63.0)			
Education	≤High school	29 (19.5)	9 (14.8)	20 (22.7)	1.46	.294	
	≥University	120 (80.5)	52 (85.2)	68 (77.3)			
Monthly income (thousand won)	<3,000	45 (30.2)	18 (29.5)	27 (30.7)	2.92	.231	
	3,000−4,000	49 (32.9)	16 (26.2)	33 (37.5)			
	≥4,000	55 (36.9)	27 (44.3)	28 (31.8)			
Fertility-related characteristics							
Duration of infertility treatment (in months)		24.24 ± 18.61	29.26 ± 21.20	20.76 ± 15.78	−2.66	.009	
	<36	115 (77.2)	42 (68.9)	73 (83.0)	4.07	.044	
	≥36	34 (22.8)	19 (31.1)	15 (17.0)			
Experienced treatment (double choice)	OI (yes)	88 (59.1)	40 (65.6)	48 (54.5)	1.81	.178	
	(no)	61 (40.9)	21 (34.4)	40 (45.5)			
	IUI (yes)	74 (49.7)	32 (52.5)	42 (47.7)	.32	.570	
	(no)	75 (50.3)	29 (47.5)	46 (52.3)			
	IVF (yes)	81 (54.4)	35 (57.4)	46 (52.3)	.38	.538	
	(no)	68 (45.6)	26 (42.6)	42 (47.7)			
	Others (yes)	16 (10.7)	5 (8.2)	11 (12.5)	.70	.404	
	(no)	133 (89.3)	56 (91.8)	77 (87.5)			
Relationship with spouse	Good	128 (85.9)	48 (78.7)	80 (90.9)	4.44	.035	
	Bad	21 (14.1)	13 (21.3)	8 (9.1)			
Fatigue	Total	3.48 ± 1.24	3.97 ± .97	3.13 ± 1.29	4.52	<.001[a]	1.11−6.11
	Yes (≥4)	51 (34.2)	31 (50.8)	20 (22.7)	12.63	<.001	
	No (<4)	98 (65.8)	30 (49.2)	68 (77.3)			
Fertility-related Quality of Life	Total	58.98 ± 11.99	54.46 ± 12.93	62.11 ± 10.25	−3.86	<.001[a]	28.65−88.02
	Overall physical health	2.27 ± .71	2.21 ± .76	2.31 ± .68	−.79	.432[a]	1−4
	QoL Life satisfaction	2.50 ± .71	2.28 ± .66	2.66 ± .71	−3.31	.001[a]	0−4
	Core Ferti QoL	62.86 ± 14.94	57.55 ± 16.39	66.55 ± 12.69	−3.61	<.001[a]	21.88−92.71
	Emotional	61.86 ± 18.37	56.15 ± 21.06	65.81 ± 15.14	−3.08	.003[a]	12.50−100.0
	Mind-body	61.88 ± 19.19	57.04 ± 19.80	65.25 ± 18.11	−2.62	.010[a]	12.67−100.0
	Relational	65.41 ± 17.06	59.77 ± 17.49	69.32 ± 15.69	−3.48	.001[a]	20.83−100.0
	Social	62.30 ± 16.65	57.24 ± 17.64	65.81 ± 15.05	−3.19	.002[a]	12.50−95.83
	Treatment Ferti QoL	55.09 ± 11.56	51.37 ± 11.63	57.67 ± 10.85	−3.39	.001[a]	30.21−85.42
	Environment	51.96 ± 11.96	49.45 ± 12.21	53.69 ± 11.54	−2.15	.033[a]	25.00−87.50
	Tolerability	58.22 ± 18.47	53.28 ± 18.99	61.65 ± 17.40	−2.78	.006[a]	18.75−100.0

Note, IUI = intrauterine insemination; IVF = in vitro fertilization; OI = ovulation induction.

[a] ANCOVA adjusted relationship with spouse.

Quality of life

The Fertility QoL tool (FertiQoL) was used to measure the QoL of infertile women [30]. This scale was developed to measure the QoL of people with infertility problems, as presented by Boivin and Schmidt in collaboration with the European Association for Reproductive Embryology and the American Society of Reproductive Medicine [30]. The Korean version of the FertiQoL, translated into 45 languages, was used, and its validity was confirmed in Korean infertile women [31]. It has 34 items, and the higher the total score, the higher the QoL related to infertility. The Cronbach's α of the original version of the FertiQoL was .92 [30]. In this study, the Cronbach's α was .92.

General characteristics

General factors such as age (women with infertility, spouse), religion, occupation, education level, average monthly income, and fertility-related characteristics, including the duration of infertility treatment, experience of infertility treatment methods, and relationship with the spouse during infertility treatment.

Statistical analysis

The collected data were statistically analyzed using SPSS (version 25.0; IBM SPSS Statistics for Windows, IBM Corp., Armonk, NY, USA). An independent t-test and chi-square test were conducted to compare the differences in infertility-related QoL according to participants' demographic characteristics. Pearson's correlation analysis was performed to investigate the correlation between age, fatigue, and QoL. Hierarchical multiple regression analysis was used to identify the factors affecting the QoL of infertile women according to their type-D personality.

Results

General characteristics, fatigue, and QoL according to type-D personality

The mean age of the participants and spouses was 35.61 ± 4.62 years (range 25-46) and 37.57 ± 5.00 years (range 27−55), respectively. Of

Table 2 *Quality of Life According to General Characteristics (N = 149).*

Variables	Categories		Quality of life	t or F	p
			M ± SD		
Women's age (in years)	<35		59.37 ± 9.95	.36	.721
	≥35		58.68 ± 13.38		
Husband's age (in years)	<35		58.36 ± 11.64	−.41	.523
	≥35		59.23 ± 12.18		
Religion	Yes		57.83 ± 10.34	−1.17	.244
	No		60.14 ± 13.43		
Occupation	Yes		58.99 ± 12.44	.01	.990
	No		58.96 ± 11.28		
Education	≤High school		60.52 ± 12.59	.77	.440
	≥University		58.60 ± 11.87		
Monthly income (thousand won)	<3,000		58.60 ± 11.02	.37	.690
	3,000−4,000		60.17 ± 10.92		
	≥4,000		58.22 ± 13.69		
Duration of infertility treatment (month)	<36		61.11 ± 10.91	4.20	<.001
	≥36		51.78 ± 12.84		
Experienced treatment (double choice)	OI	Yes	57.64 ± 12.50	−1.64	.103
		No	60.90 ± 11.04		
	IUI	Yes	57.24 ± 12.54	−1.77	.080
		No	60.69 ± 11.25		
	IVF	Yes	57.36 ± 13.53	−1.86	.065
		No	60.90 ± 9.61		
	Others	Yes	62.21 ± 11.91	1.14	.255
		No	58.59 ± 11.99		
Relationship with spouse	Good		60.10 ± 11.53	2.90	.004
	Bad		52.11 ± 12.73		

Note, IUI = intrauterine insemination; IVF = in vitro fertilization; OI = Ovulation induction.

those who had undergone infertility treatment for >36 months, 22.8%. Among the participants, 40.9% belonged to the type-D personality group. Participants with and without type-D personality showed significant differences in their relationship with their spouses ($\chi^2 = 4.44$, $p = .035$) (Table 1). The group with type-D personality had significantly higher fatigue than the group with non-type-D personality (t = 17.38, $p < .001$), including prevalence of fatigue ($\chi^2 = 12.75$, $p < .001$). In addition, the group with type-D personality had significantly lower QoL than the group with non-type-D personality (t = 16.71, $p < .001$) in all QoL subscales except for overall physical health and environment (Table 1 and Figure 1).

QoL according to general characteristics

Women who had undergone over 36 months' duration of infertility treatment (t = 4.20, $p < .001$) and had a good relationship

with their spouse (t = 2.90, $p = .004$) had higher QoL scores than those with less than 36 months' duration of infertility treatment and poor relationship with spouse (Table 2).

Correlation between variables in infertile women

Fatigue in infertile women was negatively correlated with QoL (r = −.35, $p < .001$). Women's age showed a positive correlation with husband's age (r = .69, $p < .001$) (Table 3).

Factors affecting QoL in infertile women

A hierarchical regression analysis was performed to investigate the factors that affected QoL in women who were infertile. Based on previous studies [32−34], the main variables entered were general characteristics that showed differences in QoL (duration of infertility treatment and relationship with spouse) in the first model and fatigue and type-D personality as physical and psychological factors in the second model, respectively. To confirm the assumption of linear regression, the linearity of all variables and normality were examined. The Durbin−Watson value was close to 2 (1.87), which indicated no problem of autocorrelation. The tolerance ranged from .86 to .97, which was greater than .10, and the variation inflation factor showed that values of all variables were not greater than 10 (1.03 to 1.16), which indicated no issue of multicollinearity. The residual histogram and residual normal probability and homoscedasticity graphs were examined to confirm the normality of residuals. The results were deemed satisfactory. Cook's distance was less than 1.0, at .00 to .06, which implied that no cases needed to be deleted.

In model 1, duration of infertility treatment [>36 months] ($\beta = −.29$, $p < .001$) and relationship with spouse [bad] ($\beta = −.22$, $p = .006$) were demonstrated to be statistically significant. This model was statistically significant (F = 11.75, $p < .001$) and explained 13.0% of the variance in QoL in infertile women. In model 2, fatigue and type-D personality were added to the regression model, and

Table 3 *Correlation of Fatigue and Quality of Life (N = 149).*

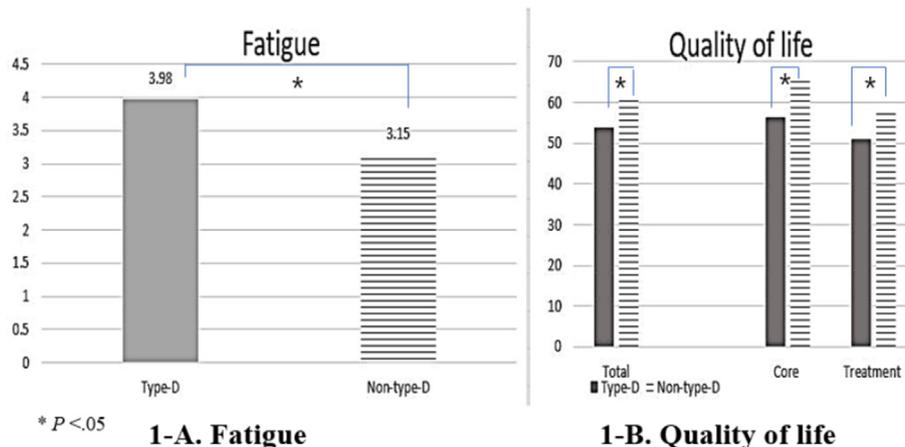| Variables	Women's age	Husband's age	Fatigue
	r (p)	r (p)	r (p)
Husband's age	.69 (<.001)		
Fatigue	−.01 (.920)	−.04 (.620)	
QoL	.04 (.658)	.02 (.806)	−.35 (<.001)

Note, QoL = quality of life.

Figure 1. Fatigue and Quality of Life according to Type-D Personality.

Table 4 *Factors Affecting Quality of Life in Infertility Women (N = 149).*

Variable (constant)	Step 1					Step 2				
	B	SE	β	t	p	B	SE	β	t	p
	62.38	1.16		53.80	<.001	71.19	2.59		27.45	<.001
Duration of infertility treatment[a]	−7.49	1.98	−.29	−3.78	<.001	−5.71	1.91	−.22	−2.99	.003
Relationship with spouse[b]	−7.42	2.64	−.22	−2.81	.006	−5.77	2.53	−.17	−2.28	.024
Fatigue						−2.25	.75	−.23	−2.99	.003
Type-D personality[c]						−4.30	1.90	−.18	−2.27	.025
Adjusted R^2	.13					.22				
Adjusted R^2 change	.13					.09				
F	11.75					11.64				
F change	11.75					10.07				
p	<.001					<.001				

Note, Dummy variable references [a]Duration of infertility treatment (≤36 month), [b]Relationship with spouse (good), [c]Type-D personality (no).
Durbin−Watson 1.87; tolerance: .86−.97; variable inflation factors: 1.03−1.16.

type-D personality was treated as a dummy variable. Fatigue (β = −.23, p = .003) was the most significant factor, followed by duration of infertility treatment [>36 months] (β = −.22, p = .003), type-D personality [yes] (β = −.18, p = .025), and relationship with spouse [bad] (β = −.17, p = .024). Model 2 was also statistically significant (F = 11.64, p < .001), and the explanatory power of model 2 was 22.0%, an increase of 9% from model 1 (Table 4).

Discussion

This study attempted to identify the factors affecting the QoL of infertile women and discuss the factors that have the greatest influence on QoL. The duration of treatment among the general characteristics had the greatest influence on the QoL. Fatigue had the greatest influence on the QoL of infertile women in this study. Infertility treatment causes physical and psychological fatigue during examinations [22]. Physical fatigue due to frequent hospital visits and invasive procedures (ovulation induction, intrauterine insemination, and in vitro fertilization) can cause anxiety and tension, making it difficult to treat infertility [35]. Therefore, considering that the fatigue of infertile women may be aggravated after the failure of the infertility treatment procedure, it is necessary for healthcare providers to understand the patient through information regarding their individual coping style checked in advance and induce them to use the active coping style and music therapy to reduce fatigue during treatment [36]; Therefore, various active nursing interventions or strategies are needed to reduce the fatigue of infertile women and improve their QoL in the future.

The second factor was the duration of treatment among the general characteristics. QoL was found to be low when the infertility treatment period was long, which was similar to the results of previous studies [37]. Thus, to improve the QoL related to infertility, an educational program can help infertile women recognize infertility early and actively treat it through education or promotion as a policy for infertile women.

The third factor influencing QoL was type-D personality. The type-D personality of infertile women also affects QoL. In this study, 40.9% of the participants had a type-D personality; 22.4% to 36.2% of foreign university students [25,38], 30.8% of college students in Korea [39], 34.5% of middle-aged women [40], and 56% of ovarian cancer patients receiving chemotherapy [41] had type-D personality. Considering that hemodialysis patients account for 42.9% of hemodialysis patients [42], the type-D personality of infertile women is higher than that of general college students and middle-aged women, showing a similar aspect to the type-D prevalence of subjects with disease, indicating that active management of infertile women with type-D personality is urgently needed. Considering that the type-D personality is vulnerable to negative affectivity, people belonging to this group experience many

negative emotions regardless of time and place and have a tendency to isolate themselves due to social inhibition [24,43]. It is thought that the special situation of infertile women and the phenomenon of infertility treatment increase their negative affectivity and social inhibition. One reason for this improvement is that infertile women express their feelings and negative emotions to those close to them, such as their spouses and family [44]. It seems that interventions that allow people to express their emotions are necessary. As social inhibition intensifies social alienation, it is necessary to find ways to alleviate social inhibition and strengthen social belonging by encouraging not only infertile women, but also their spouses to participate in social activities such as infertility-related lectures and self-help groups. As lifestyle interventions, including physical activity and stress reduction, were effective in reducing type-D personality traits in middle-aged women [45]. Further studies are needed to confirm the effect of applying a lifestyle intervention program for infertile women during the treatment process.

In the present study, participants with type-D personality had higher fatigue and lower QoL than those in the non-type-D group. Type-D personality has a direct impact on QoL [39], and people with type-D personality have been reported to have a lower QoL [46]. These personality traits are said to have a significant correlation with infertility. Therefore, there is a need for interest in and support for the QoL of infertile women with this type-D personality, and efforts are needed to actively cope with infertility problems, such as developing interventions including education, music therapy, lifestyle intervention, spousal cooperation, and active management to improve the type-D personality and QoL of infertile women. In this study, the type-D personality group had a negative relationship with the spouse. These results suggest that social isolation may have a relationship with one's spouse. Therefore, it is necessary to assess the type-D personality of women with infertility because those with a type-D personality have a worse relationship with their spouse.

The fourth factor was the relationship with the spouse, which influenced the QoL of infertile women. When the relationship with the spouse was poor, QoL related to infertility in infertile women was low. This is in line with a study [17] that shows that the spouse's attitude has an effect on QoL, and that QoL is higher when the spouse's attitude is active than when it is passive. Therefore, during the infertility treatment period, spouses' active cooperation with the treatment and support for infertile women is necessary. Infertility is not solely a woman's problem—couples must face it together, as there are limits to individual coping strategies [6]. Thus, it is necessary to develop and apply nursing education and related programs for infertile couples who value relationships with their spouses during infertility treatment.

This study had some limitations. First, there are various infertility treatment methods experienced by women, which may lead

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to differences in fatigue and QoL. Second, this study used a cross-sectional design; thus, we did not demonstrate the longitudinal impact of type-D personality on QoL. Nevertheless, this study identified the influence of fatigue, type-D personality, and demographic characteristics on QoL in infertile women.

Conclusion

The present study is significant as it is the first to be conducted in South Korea on infertile women according to type-D personality type. To improve the QoL of infertile women, it is necessary to develop and apply various nursing interventions such as education, lifestyle interventions, music therapy, and stress management programs in which the spouse participates in consideration of the infertility treatment period.

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Authorship

All authors listed meet the authorship criteria according to the latest guidelines of the international Committee of Medical Journal Editors, and all authors are in agreement with the article.

Conflicts of interest

The authors declare no potential conflicts of interest with respect to the research, authorship, or publication of this article.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author.

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