



Spiritual Well-Being and Associated Factors among Women with Primary Infertility Attributed to Male-Factor Infertility: A Cross-Sectional Study

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Abstract

Background: Infertility is associated with substantial psychological and spiritual distress. In pronatalist societies, women with primary infertility—even when attributed to male-factor causes—often experience disproportionate stigma and emotional burden. Spiritual well-being (SWB) may serve as an important coping resource. This study aimed to assess SWB and its socio-demographic, clinical, and interpersonal determinants among women with male-factor primary infertility.

Materials and Methods: In this cross-sectional study (2024–2025), 150 women with confirmed male-factor primary infertility who were candidates for intrauterine insemination (IUI) were recruited using proportionate stratified sampling from two tertiary infertility centers in Kerman, Iran. Data were collected using a structured questionnaire and the Paloutzian and Ellison Spiritual Well-Being Scale. Statistical analyses included independent-samples t-tests and one-way analysis of variance (ANOVA).

Results: The mean age of participants was 31.36 ± 5.12 years, and the mean duration of infertility was 4.78 ± 3.37 years. Mean scores were 35.29 ± 3.86 for existential well-being, 28.01 ± 3.22 for religious well-being, and 63.30 ± 5.76 for total SWB, indicating a moderate level. Higher educational level was significantly associated with existential well-being and total SWB ($P=0.003$ and $P=0.002$, respectively). Greater religious adherence was associated with higher total SWB ($P=0.048$). Perceived family support was significantly associated with all SWB dimensions ($P<0.05$). The number of prior IUI attempts was positively associated with religious well-being and total SWB ($P=0.009$ and $P=0.008$, respectively).

Conclusion: Women with male-factor primary infertility demonstrated a moderate level of SWB, influenced by educational level, religiosity, family support, and treatment history. Integrating holistic, family-centered, and culturally sensitive spiritual care into infertility services may help reduce psychosocial burden and improve overall well-being.

Key Words: Family support, Infertility treatment, Iran, Male-factor infertility, Primary infertility, Spiritual well-being.

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1- INTRODUCTION

Infertility is increasingly recognized not only as a reproductive disorder but also as a complex biopsychosocial condition with substantial emotional, relational, and social consequences (1, 2). Affecting a considerable proportion of couples worldwide, infertility constitutes an important public health concern (3, 4). Clinically, infertility is defined as the failure to achieve pregnancy after 12 months of regular unprotected intercourse, with earlier evaluation recommended for women aged ≥ 35 years (4).

Beyond its biomedical aspects, infertility is frequently associated with significant psychological distress, including anxiety, depression, guilt, and hopelessness, as well as reduced quality of life (1, 2, 5). These challenges are particularly pronounced in pronatalist societies, where childbearing is highly valued and infertility may carry social stigma, exposing women to blame, family pressure, and social isolation (1, 6). Although male factors contribute substantially to infertility and the condition should be conceptualized as a couple-based issue (7, 8), women often experience a disproportionate share of the emotional and social burden, even when the underlying cause is male-related (6, 8).

Spiritual well-being (SWB) may serve as an important coping resource in this context. It reflects a sense of meaning, purpose, inner peace, and connectedness, encompassing both religious and existential dimensions (9–11). The Spiritual Well-Being Scale developed by Paloutzian and Ellison distinguishes religious well-being (i.e., perceived relationship with God) from existential well-being (i.e., meaning, purpose, and life satisfaction) (11). Empirical evidence indicates that spirituality and SWB are associated with better mental health, more effective coping, and greater resilience in the context of chronic stress and illness (9, 10), underscoring their relevance in

culturally and religiously oriented societies.

Despite increasing attention to the psychological dimensions of infertility, evidence regarding spiritual well-being among women with primary infertility due to male-factor causes remains limited. This subgroup warrants particular attention because, although the biological etiology is male-related, women often bear a disproportionate psychosocial burden. Interpersonal resources—especially family and spousal support—may play a critical role in shaping women’s adaptation and spiritual well-being, alongside socio-demographic and clinical factors (12). Therefore, this study aimed to assess spiritual well-being and its associated socio-demographic, clinical, and interpersonal determinants among women with primary male-factor infertility.

2- MATERIALS AND METHODS

2-1. Study design and setting

This multicenter cross-sectional study assessed spiritual well-being (SWB) and its associated factors among women with primary infertility attributed to male-factor infertility. The study was conducted between October 2024 and March 2025 in two tertiary infertility centers in Kerman, southeastern Iran: Afzalipour Infertility Center, a public referral center affiliated with Kerman University of Medical Sciences, and Najmieh Infertility Center, a private clinic. The study was designed and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement (13).

2-2. Participants and eligibility criteria

The target population comprised women with primary infertility due to male-factor infertility who were candidates for intrauterine insemination (IUI) and attended one of the study centers during the recruitment period. Infertility was

defined according to current clinical guidelines as failure to achieve pregnancy after 12 months of regular unprotected intercourse in women aged <35 years, or after 6 months in women aged ≥ 35 years (4). Male-factor infertility was confirmed by an infertility specialist based on clinical evaluation and documented abnormal semen parameters in medical records, in accordance with standard diagnostic criteria (14).

Inclusion criteria were: age 20–40 years; Iranian nationality; ability to read and write Persian; first marriage for both partners; diagnosis of primary infertility attributable to male-factor infertility; candidacy for IUI; absence of structural uterine abnormalities; absence of severe systemic disease; and provision of written informed consent. Women with ovulatory disorders were not excluded if male-factor infertility remained the primary documented cause; however, those with other established female-factor causes were excluded. Additional exclusion criteria included severe emotional distress or major psychological crisis within the previous 6 months, inability to complete the questionnaires, substantial missing data, and withdrawal at any stage.

2-3. Sampling and sample size

A proportionate stratified sampling approach was employed. The sampling frame was stratified by infertility center to ensure representation from both public and private sectors. The number of participants recruited from each center was determined in proportion to the volume of eligible women attending each center during the study period. Within each stratum, eligible women were consecutively invited to participate until the required sample size was reached. A total of 150 women were included in the final analysis.

2-4. Data collection instruments

Data were collected using two instruments: (1) a structured questionnaire assessing

demographic, social, reproductive, and treatment-related variables, and (2) the Spiritual Well-Being Scale (SWBS).

The researcher-developed questionnaire was based on study objectives and relevant literature and included variables such as age, spouse's age, age at marriage, duration of marriage, duration of infertility, educational level of both partners, employment status, perceived economic status, family size, type of treatment center, treatment history, number of previous IUI attempts, quality of family relationships, perceived spousal and family support, and adherence to religious beliefs.

Spiritual well-being was assessed using the Spiritual Well-Being Scale developed by Paloutzian and Ellison (12). The SWBS consists of 20 items rated on a 6-point Likert scale (from strongly disagree to strongly agree) and includes two 10-item subscales: Religious Well-Being (RWB) and Existential Well-Being (EWB). The RWB subscale reflects the individual's perceived relationship with God, whereas the EWB subscale assesses meaning in life, purpose, and life satisfaction. Negatively worded items were reverse-scored prior to analysis. Total scores range from 20 to 120, with higher scores indicating greater spiritual well-being. Scores of 20–40 indicate low, 41–99 moderate, and 100–120 high spiritual well-being (12).

2-5. Validity and reliability

The Persian version of the SWBS has demonstrated acceptable psychometric properties in Iranian populations. Previous studies have confirmed its construct validity, as well as satisfactory internal consistency and test-retest reliability (15). In the present study, internal consistency was evaluated using Cronbach's alpha coefficient.

2-6. Data collection procedure

Following ethical approval and administrative permissions from both centers, potentially eligible participants were identified during clinic visits. Eligibility was assessed using medical records and, when necessary, confirmed by the treating infertility specialist. Eligible women received verbal and written information regarding the study objectives, procedures, confidentiality, voluntary participation, and their right to withdraw at any time without affecting their treatment.

After obtaining written informed consent, participants completed the questionnaires in a quiet area of the clinic. The questionnaires were self-administered; however, standardized explanations were provided when necessary to ensure comprehension without influencing responses. Completed questionnaires were reviewed for completeness immediately after submission, and those with substantial missing or inconsistent data were excluded.

2-7. Bias control

Several strategies were implemented to minimize bias. Proportionate stratified sampling enhanced representativeness across study settings. Confirmation of infertility etiology through medical records reduced misclassification bias. Anonymous coding of questionnaires minimized social desirability bias, particularly for sensitive variables such as spirituality and family relationships. Standardized data collection procedures were also applied across both centers to reduce measurement variability.

2-8. Ethical considerations

The study protocol was approved by the Ethics Committee of Kerman University of Medical Sciences (IR.KMU.REC.1402.444). The study was conducted in accordance with the ethical principles of the Declaration of Helsinki for research involving human participants. Prior to enrollment, all participants

received verbal and written information about the study objectives, procedures, voluntary nature of participation, and their right to withdraw at any time without any effect on their treatment or access to infertility services. Written informed consent was obtained from all participants before data collection. To ensure confidentiality, questionnaires were coded anonymously, and no personal identifiers were recorded in the dataset. Access to the data was limited to the research team, and the findings were reported in aggregate form to prevent individual identification.

2-9. Statistical analysis

Data were analyzed using IBM SPSS Statistics (version 26.0). Descriptive statistics were used to summarize participants' sociodemographic, clinical, and interpersonal characteristics. Continuous variables are presented as mean $\pm$ standard deviation (SD) with minimum and maximum values, while categorical variables are reported as frequencies and percentages.

The normality of SWBS total and subscale scores (RWB and EWB) was assessed using the Kolmogorov-Smirnov test. Bivariate analyses were conducted to compare mean scores of SWB and its subdimensions across participant subgroups. Independent-samples t-tests were used for comparisons between two groups, and one-way analysis of variance (ANOVA) for comparisons involving more than two groups. When ANOVA results were statistically significant, Tukey's post hoc test was applied for pairwise comparisons. All statistical tests were two-tailed, and $P < 0.05$ was considered statistically significant.

3- RESULTS

3-1. Socio-Demographic and Clinical Characteristics of the Participants

A total of 150 women with primary infertility attributed to male-factor

infertility were included in the study. The mean age of participants was 31.36 ± 5.12 years (range: 18–40), and the mean age at marriage was 25.54 ± 6.03 years. The mean duration of marriage and infertility were 5.83 ± 3.82 and 4.78 ± 3.37 years, respectively.

Regarding educational status, 37.3% of women and 52.0% of their husbands had completed high school. Most participants were housewives (69.3%), whereas the majority of their husbands were self-employed (70.0%). In terms of interpersonal characteristics, most women reported a good relationship with their

husbands (86.0%), rated their communication as excellent (54.0%), and reported receiving spousal support after marriage (84.0%). The most commonly used contraceptive method was the natural method (45.3%).

Clinically, 22.0% of participants had undergone intrauterine insemination (IUI), including 16.0% with one cycle and 6.0% with two cycles. In addition, 44.7% of women reported high adherence to religious beliefs, 47.3% rated their family relationships as excellent, and 40.7% reported very high levels of family support during difficult situations (**Table 1**).

Table-1: Socio-demographic and clinical characteristics of the participants (n = 150).

Variables	Category / value	n (%) or mean $\pm$ SD
Age of women (years)	Mean $\pm$ SD	31.36 ± 5.12
	Range	18–40
Age at marriage (years)	Mean $\pm$ SD	25.54 ± 6.03
	Range	13–39
Duration of marriage (years)	Mean $\pm$ SD	5.83 ± 3.82
	Range	0.75–15
Duration of infertility (years)	Mean $\pm$ SD	4.78 ± 3.37
	Range	0.75–15
Women's educational level	Below diploma	12 (8.0)
	Diploma	56 (37.3)
	Associate degree	21 (14.0)
	Bachelor's degree	41 (27.3)
	Master's degree	20 (13.3)
Husband's educational level	Below diploma	13 (8.7)
	Diploma	78 (52.0)
	Associate degree	12 (8.0)
	Bachelor's degree	34 (22.7)
	Master's degree	11 (7.3)
	PhD or higher	2 (1.3)
Women's employment status	Housewife	104 (69.3)
	Governmental employee	22 (14.7)
	Student	4 (2.7)
	Self-employed	20 (13.3)
Husband's employment status	Governmental employee	41 (27.3)
	Student	4 (2.7)
	Self-employed	105 (70.0)
Relationship with husband	Good	129 (86.0)
	Moderate	21 (14.0)
Spousal support after marriage	Yes	126 (84.0)

	No	24 (16.0)
History of IUI	Yes	33 (22.0)
	No	117 (78.0)
Number of IUI attempts	None	117 (78.0)
	Once	24 (16.0)
	Twice	9 (6.0)
Contraceptive method	No method	38 (25.3)
	Condom	40 (26.7)
	Natural method	68 (45.3)
	Condom + LD pill	4 (2.7)
Adherence to religious beliefs	Very high	45 (30.0)
	High	67 (44.7)
	Moderate	36 (24.0)
	Very low	2 (1.3)
Family relationships	Excellent	71 (47.3)
	Good	66 (44.0)
	Moderate	11 (7.3)
	Poor	2 (1.3)
Communication with husband	Excellent	81 (54.0)
	Good	55 (36.7)
	Moderate	14 (9.3)
Family support during difficulties	Very high	61 (40.7)
	High	47 (31.3)
	Moderate	25 (16.7)
	Low	9 (6.0)
	Very low	8 (5.3)

Note: Data are presented as number (%) or mean $\pm$ SD. SD, standard deviation; IUI, Intrauterine insemination; LD, Low-dose.

3-2. Status of Spiritual Well-Being

Preliminary assessment of data distribution using the Kolmogorov-Smirnov test showed that total spiritual well-being (SWB) scores ($P=0.200$), as well as Religious Well-Being (RWB; $P=0.084$) and Existential Well-Being (EWB; $P=0.112$) subscale scores, did not significantly deviate from normality. Therefore, parametric statistical tests were

considered appropriate. Descriptive statistics for SWB and its subdimensions are presented in **Table 2**. The mean total SWB score was 63.30 ± 5.76 (range: 49–86). The mean EWB and RWB scores were 35.29 ± 3.87 (range: 25–52) and 28.01 ± 3.23 (range: 16–38), respectively. Based on the Paloutzian and Ellison classification, the observed scores were within the moderate range.

Table-2: Descriptive statistics of spiritual well-being dimensions (n = 150).

Variables	Possible range	Observed range	Mean $\pm$ SD	Level
Existential well-being (EWB)	10–60	25–52	35.29 ± 3.86	Moderate
Religious well-being (RWB)	10–60	16–38	28.01 ± 3.22	Moderate
Total spiritual well-being (SWB)	20–120	49–86	63.30 ± 5.76	Moderate

Note: SD, standard deviation.

3-3. Association of Personal and Family Characteristics with Spiritual Well-Being Dimensions

Bivariate analyses (independent-samples t-test and one-way ANOVA) demonstrated significant associations between several socio-demographic and clinical variables and dimensions of spiritual well-being (Table 3).

Educational level was significantly associated with EWB ($P=0.003$) and total SWB ($P=0.002$), whereas no significant association was found with RWB ($P=0.855$). Participants with lower educational levels (below diploma) reported higher mean EWB and total SWB scores than those with higher education.

Employment status was not significantly associated with any SWB dimension, although a borderline trend was observed for EWB and total SWB ($P=0.061$ and $P=0.064$, respectively).

Regarding interpersonal and belief-related factors, perceived family support during difficult situations was significantly associated with all dimensions: RWB ($P=0.022$), EWB ($P=0.014$), and total SWB ($P<0.001$). Self-reported adherence to religious beliefs was significantly associated with total SWB ($P=0.001$), but not with RWB ($P=0.690$) or EWB ($P=0.923$).

Table-3: Bivariate analysis of spiritual well-being dimensions according to selected participant characteristics (n = 150).

Variables	Category	n	Religious well-being, Mean $\pm$ SD	P-value	Existential well-being, Mean $\pm$ SD	P-value	Total spiritual well-being, Mean $\pm$ SD	P-value
Educational level	Below diploma	12	28.83 $\pm$ 4.90	0.855	37.50 $\pm$ 3.34	0.003	66.33 $\pm$ 4.88	0.002
	Diploma	56	27.93 $\pm$ 3.52		35.96 $\pm$ 4.50		63.89 $\pm$ 5.61	
	Associate degree	21	28.14 $\pm$ 3.95		36.33 $\pm$ 3.21		64.47 $\pm$ 4.90	
	Bachelor's degree	41	28.05 $\pm$ 2.14		33.80 $\pm$ 3.27		61.85 $\pm$ 5.82	
	Master's degree	20	27.50 $\pm$ 2.24		34.05 $\pm$ 2.65		61.55 $\pm$ 5.95	
Women's employment	Housewife	104	28.00 $\pm$ 3.53	0.946	35.50 $\pm$ 3.66	0.061	63.50 $\pm$ 5.48	0.062
	Governmental employee	22	28.23 $\pm$ 2.76		33.95 $\pm$ 5.20		62.18 $\pm$ 6.12	
	Student	4	28.50 $\pm$ 0.58		32.00 $\pm$ 0.00		60.50 $\pm$ 0.58	
	Self-employed	20	27.70 $\pm$ 2.36		36.35 $\pm$ 3.00		64.05 $\pm$ 5.11	
Religious adherence	Very high	45	28.09 $\pm$ 3.91	0.690	35.11 $\pm$ 2.83	0.923	63.20 $\pm$ 6.02	0.048
	High	67	27.75 $\pm$ 2.92		35.31 $\pm$ 4.74		63.06 $\pm$ 5.41	
	Moderate	36	28.28 $\pm$ 2.93		35.56 $\pm$ 3.32		63.84 $\pm$ 5.98	
	Very low	2	30.00 $\pm$ 0.00		34.00 $\pm$ 0.00		64.00 $\pm$ 0.00	

Variables	Category	n	Religious well-being, Mean $\pm$ SD	p-value	Existential well-being, Mean $\pm$ SD	p-value	Total spiritual well-being, Mean $\pm$ SD	p-value
Family support	Very high	61	27.89 $\pm$ 3.12	0.022	34.02 $\pm$ 2.99	0.014	61.91 $\pm$ 5.56	<0.001
	High	47	27.87 $\pm$ 2.74		36.55 $\pm$ 4.97		64.42 $\pm$ 5.32	
	Moderate	25	29.24 $\pm$ 2.60		35.80 $\pm$ 3.16		65.04 $\pm$ 4.98	
	Low	9	28.78 $\pm$ 1.56		35.56 $\pm$ 2.88		64.34 $\pm$ 3.99	
	Very low	8	25.00 $\pm$ 6.80		35.75 $\pm$ 3.15		60.75 $\pm$ 8.12	
IUI attempts	None	117	27.60 $\pm$ 3.21	0.009	34.96 $\pm$ 3.84	0.125	62.56 $\pm$ 5.65	0.008
	Once	24	29.17 $\pm$ 2.57		36.33 $\pm$ 3.55		65.50 $\pm$ 5.02	
	Twice	9	30.22 $\pm$ 3.73		36.89 $\pm$ 4.59		67.11 $\pm$ 6.82	

Note: Data are presented as mean $\pm$ SD. P-values were calculated using independent-samples t-test or one-way analysis of variance (ANOVA), as appropriate. Statistically significant values ($P < 0.05$) are highlighted in bold. SD: Standard deviation; IUI: Intrauterine insemination.

4- DISCUSSION

The present study showed that spiritual well-being (SWB) among women with primary infertility attributed to male-factor infertility was at a moderate level. The existential well-being (EWB) subscale score was slightly higher than the religious well-being (RWB) score. This pattern suggests that, in the context of infertility-related distress, women may rely not only on explicit religious resources but also on broader existential capacities such as meaning-making, purpose, and inner balance. Infertility is a stressful biopsychosocial condition with substantial emotional consequences (1, 2). In pronatalist societies, even when infertility is medically attributed to male factors, women often bear a disproportionate share of the psychological burden and social stigma (6–8, 14). In this context, spiritual well-being may serve as an important adaptive resource for coping with chronic uncertainty, emotional strain, and social pressure (17).

The moderate level of SWB observed in this study is consistent with the conceptual

framework of Paloutzian and Ellison, in which spirituality is viewed as a source of coherence and support during major life challenges (11, 12). The relatively higher EWB compared with RWB may indicate that women's coping is more strongly grounded in maintaining hope, finding meaning in life, and preserving emotional stability than in purely ritual or doctrinal religious practices (9, 10). This interpretation is consistent with previous literature suggesting that the spiritual needs of infertile individuals extend beyond formal religiosity and include hope, emotional security, and existential reassurance throughout the treatment process (18). Despite the burden of male-factor infertility, the participants appeared to retain a moderate degree of spiritual adaptation, particularly in the existential domain.

One of the key findings of this study was the significant association between perceived family support and all dimensions of SWB. This finding underscores the central role of the immediate social environment in shaping women's spiritual and emotional

adaptation to infertility. In the Iranian cultural context, family support may buffer the effects of social stigma, reduce feelings of isolation, and help women preserve a sense of worth and connectedness. Supportive family relationships may also reinforce hope and facilitate more meaningful interpretations of infertility-related suffering. This finding is consistent with previous studies showing that perceived social support is closely linked to lower psychological distress and better coping among infertile women (17, 19). Thus, the family should be viewed not only as an emotional support system but also as an important context for sustaining SWB.

Educational level was also significantly associated with EWB and total SWB. In the present study, women with lower educational levels reported higher EWB and total SWB scores. This may reflect greater reliance on spiritual and religious frameworks for coping among women with less formal education, whereas those with higher education may approach infertility more through biomedical or analytical perspectives. Another possible explanation is that educational differences influence how women interpret infertility, seek support, and engage in meaning-making. Although some previous studies have not found significant associations between education and spirituality-related constructs, such discrepancies may reflect differences in population characteristics, cultural context, and the distinction between SWB and related constructs such as spiritual intelligence (20). The present study focused specifically on women experiencing male-factor infertility, a situation that may require considerable cognitive and emotional adaptation (7, 14).

Another important finding was the significant association between the number of prior IUI attempts and both RWB and total SWB. Women with a history of IUI tended to report higher RWB and overall

SWB than those without prior IUI, and those with two attempts had the highest mean scores. This pattern may indicate that ongoing treatment is accompanied by greater mobilization of spiritual coping resources. Repeated exposure to infertility treatment may increase uncertainty and emotional vulnerability, thereby encouraging women to rely more strongly on faith, hope, and meaning-oriented coping. Rather than reflecting simple emotional deterioration, the higher scores among women with previous IUI may indicate adaptive strengthening of spiritual resources in response to the demands of treatment. This interpretation is consistent with studies suggesting that spirituality can support hope, resilience, and psychological endurance during infertility care (21, 22).

Religious adherence was significantly associated with total SWB, although its relationship with the separate RWB and EWB subscales was not statistically significant. This pattern may suggest that self-reported religiosity contributes more to the broader experience of spiritual integration than to isolated dimensions of spirituality when examined separately. In other words, stronger religious adherence may not always translate into a distinctly higher score in one specific domain, but it may still contribute meaningfully to overall spiritual coherence and coping.

Overall, the present study suggests that SWB in women with male-factor infertility is shaped by educational, familial, religious, and treatment-related influences. Although the biological cause of infertility lies with the male partner, women continue to experience a substantial psychosocial and existential burden (1, 6). Therefore, infertility care should move beyond a narrowly biomedical focus and address the broader spiritual and relational needs of affected women (14). Assessing SWB and strengthening family support may be particularly valuable in promoting adaptive

coping and preserving psychological balance during infertility treatment.

4-1. Study Limitations

The present study has several limitations. First, its cross-sectional design precludes any causal inference regarding the relationships between SWB and associated factors. Second, the use of self-report questionnaires may have introduced response bias, particularly for sensitive issues such as religiosity, family support, and interpersonal relationships. Third, the study was conducted in two infertility centers in one region of Iran; therefore, caution is warranted in generalizing the findings to other populations or cultural settings.

In addition, although several interpersonal and treatment-related variables were assessed, other potentially relevant factors such as marital adjustment, infertility-related stigma, and financial burden were not comprehensively examined. Future studies using longitudinal and qualitative approaches may provide a deeper understanding of how women experience and construct SWB during infertility treatment.

5- CONCLUSION

Women with primary infertility attributed to male-factor infertility demonstrated a moderate level of SWB, with EWB slightly higher than RWB. SWB in this population was significantly associated with educational level, family support, religious adherence, and prior IUI treatment experience. These findings highlight the importance of addressing spiritual as well as psychosocial dimensions in infertility care. Integrating culturally sensitive, family-centered, and spiritually informed support into infertility services may help strengthen hope, meaning, and adaptive coping, thereby improving the comprehensiveness of care for infertile women.

6- CONFLICT OF INTEREST: None.

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