



Impact of in Vitro Fertilization (IVF) on Women's Quality of Life: FertiQoL Questionnaire Validation Study

Silva Silva^{a*}, Suzanne Maroun Souaid^b, Pascale Salameh^c

^{a,b}*Lebanese University, Faculty of public health, Beirut, Lebanon, Paris Saclay University, Faculty of medicine, Paris, France*

^c*Lebanese University, Faculty of pharmacy, Beirut, Lebanon, National institute of public health health – Clinical epidemiology and toxicology (INSPECT-LB), Beirut, Lebanon*

^a*Email: silvahelou14@outlook.com*

^b*Email: Suzanne.souaid.24@gmail.com*

Abstract

Infertility presents a significant global challenge, with In Vitro Fertilization (IVF) emerging as a widely employed intervention. Women undergoing infertility treatments often face considerable physical and psychological obstacles; however, the factors influencing their quality of life remain insufficiently explored. This study aimed to assess the fertility-related quality of life among Lebanese women undergoing IVF and to identify the factors affecting it. A cross-sectional survey was conducted from July to September 2023, targeting women undergoing IVF across Lebanon via snowball technique. The survey collected demographic information and treatment details, utilizing several validated instruments, including the Fertility Quality of Life Scale (FertiQoL), the Couple Satisfaction Index (CSI-4), the WHO-5 Wellbeing Index, and the Patient-Doctor Relationship Questionnaire (PDRQ-9). A General Linear Model was employed to identify predictors of fertility quality of life. A total of 403 women participated in the survey. The mean FertiQoL score was 61.98 (SD = 21.15). The average scores for the CSI-4 and WHO-5 were 10.15 (SD = 5.76) and 11.15 (SD = 6.56), respectively, while the mean PDRQ-9 score was 29.33 (SD = 8.50). The General Linear Model identified several risk factors associated with diminished fertility quality of life, including prolonged duration of infertility, childlessness, social stigma, being underweight, and lack of income.

Received: 7/9/2025

Accepted: 9/9/2025

Published: 11/19/2025

** Corresponding author.*

Conversely, male factor infertility, sedentary occupational status, and culturally supportive beliefs regarding IVF correlated with improved FertiQoL scores. Notably, the CSI-4 and WHO-5 scores were significantly positively associated with FertiQoL. This study indicates that Lebanese women undergoing IVF generally report an acceptable quality of life. Various factors influence this quality of life, and the FertiQoL measurement tool demonstrated high reliability (Cronbach's $\alpha = 0.949$). Further research with larger sample sizes is necessary to validate these findings and enhance understanding of the complex interplay of factors affecting women's quality of life during IVF treatment.

Keywords: IVF; Infertility; FertiQoL score; Lebanese women; Quality of life.

1. Introduction

Infertility, defined as the inability to conceive after one year of unprotected intercourse (or six months for women over 35), is a significant global health issue. Its prevalence varies, affecting approximately 17.8% of couples in high-income countries and 16.5% in low- and middle-income countries, while Lebanon reports a notably higher rate of 34.3% [1,2]. Contributing factors to infertility include advanced maternal age, polycystic ovarian syndrome, endometriosis, and socio-demographic variables such as educational level [3,4].

Lebanon has experienced a marked decline in fertility rates, decreasing from 4.84 children per woman in 1971 to 2.06 in 2020 [5]. This decline is compounded by economic instability and the absence of regulatory frameworks governing reproductive health, which further exacerbate challenges related to accessing infertility treatment [6]. The experience of infertility and its associated treatments, particularly in vitro fertilization (IVF), impose substantial psychological, emotional, and financial burdens on individuals. Research indicates that infertility ranks among the most distressing life experiences, with women undergoing IVF facing increased levels of stress, anxiety, and depression [7,8]. Cultural factors in Lebanese society often stigmatize infertility, placing additional social and marital pressures disproportionately on women [9]. This study seeks to address the research question: what is the impact of IVF treatment on the quality of life of Lebanese women, and how can the FertiQoL questionnaire be effectively adapted and validated for use within the Lebanese context? The hypothesis posits that Lebanese women undergoing IVF experience a decline in quality of life, as measured by the FertiQoL instrument. The main objective of this study is to explore the quality of life of Lebanese women undergoing IVF treatment. The specific objectives include identifying factors that influence their quality of life, validating the FertiQoL questionnaire for use within the Lebanese context, and comparing the quality of life of Lebanese women undergoing IVF with those reported in other countries, as measured by the FertiQoL instrument.

2. Materials and Methods

2.1. Study Design

This study utilized a cross-sectional survey methodology conducted among women undergoing in vitro fertilization (IVF) treatment. Data was collected over a period from July 18, 2023, to September 8, 2023. The questionnaire was distributed electronically via WhatsApp, allowing participants to complete it at their convenience. To ensure the clarity and effectiveness of the questionnaire, a pilot test was performed with ten

women. The feedback and data from this pilot study were incorporated into the final questionnaire. Participation in the survey was entirely anonymous and voluntary, with no compensation provided to participants for their involvement.

2.2. Inclusion and Exclusion Criteria

2.2.1. Inclusion Criteria

Participants were required to meet the following criteria:

- Be Lebanese women of reproductive age (18 years and older).
- Have a diagnosed case of infertility, irrespective of whether the infertility is attributable to themselves or their partner.
- Reside in Lebanon at the time of the study.
- Be currently undergoing IVF treatment.

2.2.2. Exclusion Criteria

Individuals were excluded from the study if they met any of the following conditions:

- Presence of cognitive impairments that could hinder their understanding and accurate completion of the study questionnaire.
- Diagnosis of severe psychological disorders, including significant anxiety or depression.

2.3. Sample Size Calculation

The minimum sample size required for this study was calculated using G*Power software, version 3.0.10. Anticipating a squared multiple correlation of 0.05 (R^2 deviation from 0) in relation to the omnibus test of multiple regression, the computed effect size was determined to be 0.0526. Based on these parameters, a minimum sample size of $n = 371$ was necessary, considering an alpha error of 5%, a statistical power of 80%, and the inclusion of 15 predictors in the regression model. To account for potential missing data, an overall target sample size of 400 participants was established.

2.4. Selection Procedure

Women who participated in the study accessed the survey through a link sent via the WhatsApp application on their mobile phones. The distribution of the survey was further enhanced through the snowball technique.

2.5. Data Collection Procedure

The online survey consisted of closed-ended questions presented in both English and Arabic. The questionnaire was developed using Google Forms, with the link distributed through the WhatsApp application. To align with the study objectives, a comprehensive questionnaire was created using standardized measures for assessing quality of

life [23], couple satisfaction [14], the patient-doctor relationship [17], and overall well-being [16]. The questionnaire underwent a double translation from English to Arabic, adhering to the World Health Organization (WHO) guidelines for translation. Once finalized, the questionnaire was saved as a link available for distribution (https://docs.google.com/forms/d/e/1FAIpQLSeuNUcOiGUuJyDTR6xKDal1b0qbXBp6uQUzjLfeFx1sB7kxXA/viewform?usp=sf_link). Participants were required to answer all questions in sequence to reduce the risk of missing data.

2.6. Questionnaire and variables

Primary variable: Quality of life of women undergoing IVF, which can be measured using a standardized questionnaire: FertiQoL.

Secondary variables: Socio-Demographic variables: Age, education level, occupation, and geographic location, hobby, type of work and income, physical activity (sport), living near family members, quality of the marital relationship, access to support from family and friends (social support), access to infertility counseling and support groups, religious or cultural beliefs related to fertility and IVF, Household income, relationship with the health care provider.

Infertility-related variables: Duration of infertility, cause of infertility, and number of IVF cycles, type of infertility (male factor, female factor, combined, unexplained), use of additional fertility treatments or medications (such as IUI, ovarian stimulation drugs), pregnancy outcome (successful or unsuccessful), adverse effects experienced during IVF treatment, success rate of IVF (pregnancy and live birth rates), number of embryos transferred, time since last IVF cycle, use of donor gametes (egg or sperm), previous history of pregnancy or miscarriage, treatment protocol, access to information about IVF.

Health-related variables: Presence of comorbidities, pregnancy complications, mode of delivery of previous pregnancy if applicable, alcohol consumption, smoking, medical history (e.g. PCOS, endometriosis, thyroid disorders) and surgical history, weight, height, alimentation, medication, Mental health status (such as anxiety and depression), presence of children.

2.6.1. Questionnaire

The questionnaire was constructed after a thorough review of the existing literature and consists of five sections, with an expected duration for completion of 10 to 15 minutes.

Section 1: Consent

This section includes a brief explanation of the study's objectives, identification of the researchers, and clarification of ethical rights. It emphasizes respect for anonymity and confidentiality, as well as the participants' right to withdraw from the study before submitting their responses. Informed consent is required as a mandatory statement that participants must agree to in order to continue to the subsequent questions.

Section 2: Demographic and Health-Related Variables

This section captures demographic variables, infertility-related variables, and health-related variables. It also includes the WHO-5 Well-Being Index [16], which consists of a multiple-choice grid featuring five questions.

Section 3: FertiQoL Questionnaire

This section incorporates the FertiQoL questionnaire, comprised of 34 items presented on a Likert scale [23].

Section 4: Couple's Satisfaction Index (CSI-4)

This section includes the Couple's Satisfaction Index (CSI-4), which consists of four questions rated on a Likert scale [14].

Section 5: Patient-Doctor Relationship Questionnaire (PDRQ-9)

This section contains the Patient-Doctor Relationship Questionnaire (PDRQ-9), comprised of nine questions also rated on a Likert scale [17].

The standardized questionnaires, which assess couple satisfaction and the patient-doctor relationship, underwent a rigorous double translation process. Initially, they were translated from English to Arabic according to the WHO translation guidelines. This was followed by a back-translation from Arabic to English to ensure linguistic accuracy and cultural relevance.

2.7. Description of CSI-4 Score

The Couples Satisfaction Index (CSI-4) is a brief self-report questionnaire designed to assess relationship satisfaction within couples. It is a concise version of the more comprehensive Couples Satisfaction Index. Participants are prompted to provide their perceptions of their relationships using multiple scales:

- **Reward and Satisfaction:** Participants rate the level of reward in their relationship and their general satisfaction on a scale from 0 (indicating no reward or satisfaction) to 5 (indicating complete reward or satisfaction).
- **Overall Happiness:** Participants assess their overall happiness in the relationship using a scale from 0 (Extremely Unhappy) to 6 (Perfect).
- **Truthfulness of a Relationship Statement:** Participants evaluate the truthfulness of the statement, "I have a warm and comfortable relationship with my partner," on a scale from "Not at all TRUE" to "Completely TRUE."

The combination of these scales allows participants to express various aspects of their relationship perceptions, including reward, satisfaction, happiness, and truthfulness.

For scoring the CSI-4, respondents' answers to all items are summed, yielding a total score that ranges from 0 to

21. Higher scores on this scale indicate greater relationship satisfaction, while scores below 13.5 suggest significant dissatisfaction within the relationship [14].

The scale was validated in English by Funk and Rogge (2007), who authorized its use [7]. The Cronbach's alpha for the CSI-4 in this study was 0.974, indicating excellent internal consistency.

2.7.1. Description of WHO-5 Score

The WHO-5 Well-Being Index consists of the following five questions:

1. I have felt cheerful and in good spirits.
2. I have felt calm and relaxed.
3. I have felt active and vigorous.
4. I woke up feeling fresh and rested.
5. My daily life has been filled with things that interest me.

Each question in the WHO-5 scale is rated on a 6-point Likert scale, ranging from 0 (at no time) to 5 (all of the time). Participants select the response that best reflects their well-being over the past two weeks. The total score on the WHO-5 Well-Being Index is calculated by summing the scores for each of the five questions, resulting in an overall score that can range from 0 to 25. Higher scores indicate better well-being, suggesting that the individual has experienced more positive emotions, vitality, and overall well-being in the past two weeks. Conversely, a lower score may indicate diminished well-being or potential mental health concerns [15].

A study validated the WHO-5 questionnaire within an infertile population, finding a Cronbach's alpha of 0.858, which indicates good reliability [16]. The WHO-5 scale has consistently demonstrated strong reliability, with Cronbach's alpha values ranging from 0.991.

2.7.2 Description of PDRQ-9 Score

The Patient-Doctor Relationship Questionnaire (PDRQ-9) consists of nine items, each assessed using a 5-point Likert-type scale, with ratings ranging from 1 (indicating 'not at all appropriate') to 5 (representing 'totally appropriate') [17]. These items have been thoughtfully designed to evaluate various facets of the doctor-patient relationship, encompassing vital elements such as trust, communication, and satisfaction.

The total score is derived by summing the responses to each item, yielding scores within a range of 9 to 45. Higher total scores denote a more positive perception of the doctor-patient relationship [18]. The reliability of this instrument, as assessed through Cronbach's alpha, demonstrated remarkable internal consistency, with a calculated value of approximately 0.969, signifying a high degree of reliability. Previous research has consistently reported substantial internal consistency, indicating a Cronbach's alpha of 0.94, reaffirming its reliability in various contexts [19].

The PDRQ scale has been effectively utilized for evaluating doctor-patient relationships across diverse patient

populations, including those with physical ailments [20] and mental health conditions [21]. It has consistently exhibited exceptional reliability and validity across different cultural settings [21,22].

2.7.3. Description of FertiQoL International 2008: Scores and Subscales

The FertiQoL instrument serves as a valid tool for evaluating the well-being of individuals facing infertility challenges. Developed through collaborative efforts by researchers and clinicians from the European Society of Human Reproduction and the American Society of Reproductive Medicine (ASRM), it includes two key components: the Core FertiQoL module and an Optional Treatment.

The Core FertiQoL comprises 24 items divided into four domains:

- Emotional: Measuring the emotional impact of infertility, including feelings of sadness, resentment, and grief.
- Cognitive and Physical: Exploring how infertility affects physical health, cognitive function, and behavior.
- Relational: Evaluating the influence of infertility on partnerships.
- Social: Examining the impact on social inclusion, expectations, and support.

The Optional Treatment Module of FertiQoL consists of two domains aimed at assessing the treatment environment and the tolerability of infertility treatment. All items in the FertiQoL questionnaire, whether in the core or optional sections, are rated on a scale from 0 to 4. Scores are then calculated and transformed into a range between 0 and 100. While subscale scores are computed out of 100, the total FertiQoL score can range from 0 to 120. A higher FertiQoL score indicates better quality of life, while lower scores suggest a poorer quality of life among individuals experiencing infertility.

Importantly, the FertiQoL tool has been translated into over 20 languages, including Arabic and English. In this study, researchers utilized the officially printed Arabic/English translation of FertiQoL, which can be accessed on the FertiQoL website (<http://www.fertiqol.org>) [23]. It has demonstrated good reliability, with Cronbach's alpha values ranging from 0.949.

3. Statistical Analysis

Statistical analyses were conducted using SPSS software version 25. The dataset showed no missing values. Reliability analysis was performed for all scales, and Cronbach's alpha values were recorded. For descriptive statistics, absolute frequencies and percentages were used for categorical variables, while means and standard deviations (SD) were calculated for continuous measures. The total FertiQoL score was treated as the dependent variable.

Based on visual inspection of the histogram and the calculations of skewness and kurtosis (both lower than one), the sample was considered normally distributed. These conditions are consistent with normality for sample sizes greater than 300, as noted by Mishra and his colleagues (2019) [24].

Bivariate analyses employed the Student's independent t-test to compare the FertiQoL score (a continuous variable) against dichotomous variables. For comparisons involving three or more groups, Analysis of Variance (ANOVA) and Independent Samples Kruskal-Wallis tests were utilized, with checks for normality assumptions where appropriate. Following significant findings from ANOVA or Kruskal-Wallis tests, post hoc analyses were conducted using Bonferroni adjustment. Pearson correlation coefficients were calculated to assess linear correlations between continuous variables.

For multivariable analysis, three linear regression models were performed, using the FertiQoL score as the dependent variable. Assumptions of normality of residuals, absence of multicollinearity, and homoscedasticity were checked, employing a forward selection method.

Finally, a General Linear Model (GLM) was conducted on the same dependent variable (FertiQoL), utilizing the Enter method to develop an appropriate model while ensuring that model assumptions were satisfied. Independent variables included in the model had p-values less than 0.2 in the bivariate analysis, to minimize confounding while considering the maximum allowable number of variables based on the sample size. A significance level of $p < 0.05$ was used for all statistical tests.

4. Results

In total, 403 women were included in this study as shown in the flow diagram in figure1.

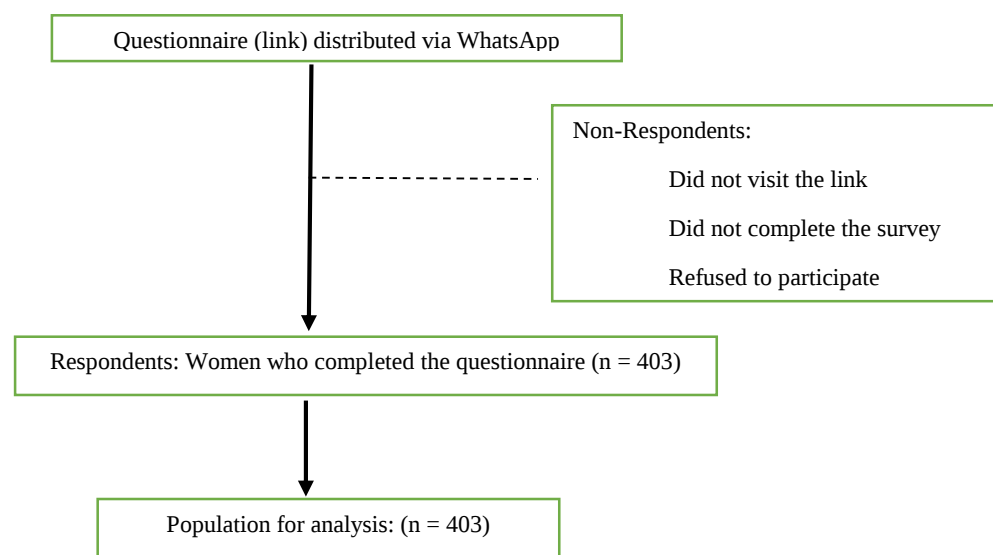


Figure 1: Flow diagram of participants

4.1. Description of socio-Demographic characteristics of Participants

A total of 403 questionnaires were collected from women undergoing, or who have undergone, IVF with negative pregnancy outcomes. The average age of the participants was 35.2 years (SD = 5.451), and the average Body Mass Index (BMI) was 23.21 kg/m² (SD = 3.366).

More than half of the women in the study reported having a high level of education and were employed full-time, primarily in occupations with light to moderate physical work demands. The sample was distributed across eight governorates in Lebanon, with a notable concentration from Beirut and Mount Lebanon.

Most participants reported living in urban settings, cohabiting with their partners, and having no children. Specific socio-demographic results are presented in Table 1.

4.2. Medical history of participants

See table 2.

4.3. Infertility Related Data of Participants

Among the surveyed women, 37.2% had undergone IVF treatment for less than one year, while 41.2% had been undergoing treatment for more than one year. The primary causes of infertility identified were female factors (48.6%) and combined factors (32.3%), with nearly half of the women reporting that they had never been pregnant.

Most participants underwent between one to four IVF cycles and experienced multiple adverse effects during treatment. They primarily followed either a long protocol or a frozen embryo transfer protocol. Although 63% did not report experiencing stigma, they indicated a lack of support from their surroundings and had not disclosed their IVF journeys. Further details are provided in Table 3.

4.4. Tools

In this study, the mean scores for the various assessment tools were as follows:

- Couples Satisfaction Index (CSI-4): 10.15 (SD = 5.76)
- WHO-5 Well-Being Index: 11.15 (SD = 6.56)
- Patient-Doctor Relationship Questionnaire (PDRQ-9): 29.33 (SD = 8.5)

Specific scores for each tool are presented in Table 4.

Table 1: Scores of the studied population

Scores of the studied population (N=403)	
Variables	Mean (SD)
FertiQoL scale	61.98±21.15
PDRQ9-scale	29.33±8.50
CSI- 4 scale	10.15±5.76
WHO-5 scale	11.15±6.56

4.5. FertiQoL Scoring Results

According to the scoring standards of the FertiQoL, the total FertiQoL score, the Core FertiQoL score, and the Treatment FertiQoL score were calculated as follows:

- Total FertiQoL Score: 61.98 (SD = 21.15)
- Core FertiQoL Score: 42.51 (SD = 15.08)
- Treatment FertiQoL Score: 19.47 (SD = 6.93)

Further breakdown of the Core FertiQoL score reveals the following mean subscale scores:

- Emotional Subscale Score: 38.86 (SD = 16.74)
- Mind-Body Subscale Score: 38.17 (SD = 25.28)
- Relational Subscale Score: 55.47 (SD = 11.09)
- Social Subscale Score: 44.62 (SD = 18.57)
- Environment Subscale Score: 56.05 (SD = 16.80)
- Tolerability Subscale Score: 37.62 (SD = 24.56)

Specific scores are detailed in Table 5.

Table 2: FertiQoL score of the studied population

FertiQoL score of the studied population (N=403)									
	Core_ FertiQoL	TREATM ENT_ferti qol	Total_ FertiQoL_sco re	Emotional _subscale	MindBody _subscale	Relational _subscale	Social subscale	Environment subscale	Tolerability subscale
Mean	42.5112	19.4715	61.9826	38.8648	38.1720	55.4694	44.6237	56.0484	37.6241
Median	39.0000	20.0000	59.0000	33.3333	29.1667	54.1667	41.6667	54.1667	31.2500
Mode	34.00	14.00	48.00	33.33	25.00	50.00	33.33	41.67	25.00
Std. Deviation	15.08522	6.92936	21.15713	16.74005	25.28216	11.09154	18.57474	16.79805	24.56446
Minimum	19.00	8.00	28.00	12.50	.00	8.33	12.50	20.83	.00
Maximum	84.00	40.00	120.00	95.83	100.00	91.67	100.00	100.00	100.00

*indicates the presence of significant association

The variables "Mental health therapy" and "Infertility counselling" were excluded from the analysis as all responses were "No," and thus there were no two groups to compare.

4.5. Bivariate Analysis: Variables Associated with Total FertiQoL Score

The bivariate analysis indicated several categorical variables significantly associated with the total FertiQoL score, including: Physical Work Demands, Employment Status, Monthly Income, Governorate, Household Arrangement, Conceiving Duration, Infertility Treatment Duration, Infertility Type, IVF Success Rate, Stigma, IVF Beliefs, IVF Adverse Effects, Treatment Protocol, BMI, Educational Level, Previous Pregnancy Miscarriage, and Number of IVF Cycles. Results are detailed in Table 7.

Post-hoc tests revealed key findings regarding factors associated with FertiQoL scores:

- Work Demands: Light work had the highest association, followed by sedentary work, with moderate work showing the lowest association.
- Employment Status: Self-employed women had higher FertiQoL scores than full-time employees. Women not receiving payment demonstrated a stronger association compared to those earning less than \$600 or between \$1,000 and \$3,000.
- Geographic Location: Women in Baalbek-Hermel exhibited the highest association with FertiQoL scores.
- Household Arrangement: Living only with a husband was more strongly associated with FertiQoL than living with extended family.
- Conceiving Duration: A duration of infertility of less than six months was linked to higher FertiQoL scores.
- Infertility Type: Male factor infertility was associated more strongly with FertiQoL compared to other

causes.

- **Treatment Experience:** Women without adverse effects from IVF had higher FertiQoL scores. A normal BMI correlated more strongly with higher FertiQoL scores than being overweight or underweight.
- **Educational Level:** Women with a high school diploma showed higher FertiQoL scores compared to those with a bachelor's degree or higher.
- **IVF Cycles:** Women who had undergone four or more IVF cycles showed the highest association with FertiQoL.

The correlation analysis revealed a strong positive linear association between FertiQoL and the CSI-4 score, with weaker positive associations with the PDRQ-9 and WHO-5 scores. Further details can be found in Tables 7 and 8.

Table 3: Correlation between total FertiQoL scores and CSI-4 score, PDRQ-9 score and WHO-5 score

FertiQoL Variable	P value	r coefficient	Test
CSI4 score	<0.001*	0.825	Pearson correlation
PDRQ9 score	<0.001*	0.661	Pearson correlation
WHO5 score	<0.001*	0.697	Pearson correlation

*indicates the presence of significant association

4.6. Multivariable Analysis: FertiQoL Score Predictors

The general linear model results are presented in Table 9 and highlight the following predictors of the total FertiQoL score:

Positive Associations

- **Male Factor Infertility:** A significant positive association was identified ($p < 0.001$), with women experiencing male factor infertility revealing an increase in their total FertiQoL score by $B = 11.268$ compared to women with unexplained infertility.
- **Physical Work Demands:** There is a significant positive association ($p = 0.001$). Sedentary office workers reported an increase in their total FertiQoL score by $B = 4.543$ compared to women with light physical work.
- **Religious or Cultural Beliefs:** Women possessing religious or cultural beliefs that positively influence their perspective on IVF showed a significant increase in their FertiQoL score by $B = 8.413$ compared to those without such beliefs ($p = 0.17$).
- **WHO-5 and CSI-4 Scores:** Both the WHO-5 score and CSI-4 score were positively associated with the total FertiQoL score; the WHO-5 score increased it by $B = 0.630$, while the CSI-4 score increased it by $B = 1.968$ ($p < 0.001$).

Negative Associations

- **Conceiving Duration Failure:** A significant negative association was found ($p < 0.001$). Women with a conceiving duration failure of less than six months exhibited a decrease of $B = -21.850$ in their total FertiQoL score compared to those with no infertility. Durations of 6 months to one year and over one year also decreased the total score by $B = -18.892$ and $B = -21.024$, respectively.
- **Childbearing Status:** Not having a child was negatively associated with the FertiQoL score, resulting in a decrease of $B = -11.781$ compared to women with one or more children ($p < 0.001$).
- **IVF Adverse Effects:** Women experiencing multiple adverse effects from IVF showed a negative association with the total FertiQoL score, reducing it by $B = -7.229$ compared to women who did not experience any adverse effects.
- **Stigma:** Facing stigma from family and friends was significantly associated with lower FertiQoL scores ($p < 0.001$; $B = -5.494$) compared to those who did not face stigma.
- **BMI:** Being classified as underweight was negatively associated with FertiQoL, resulting in a decrease of $B = -6.206$ in scores compared to women with normal weight ($p = 0.005$).
- **Income Status:** Not having income was negatively associated with FertiQoL, reducing the score by $B = -5.547$ compared to women earning between \$600 and \$1,000 ($p = 0.13$).

Non-Significant Associations

- The total FertiQoL score was not significantly associated with the following variables: previous pregnancy miscarriage, IVF success rate, environmental support, and educational level.

5. Discussion

To our knowledge, this study is the first in Lebanon to assess the quality of life (QoL) of women undergoing IVF and its main determinants. The results show that fertility treatments have a strong negative effect on women's well-being. The *Treatment FertiQoL* mean score (19.47 ± 6.93) was much lower than that reported in Taiwan (56.03 ± 10.7) [25], suggesting that Lebanese women face more difficulties during IVF. These challenges may be related to longer treatment cycles, limited healthcare services, long waiting times, and lack of psychological support. Differences in physician training and resources may also affect women's experiences. Improving training, counseling, and support could help enhance women's QoL during treatment.

When compared with other countries, Lebanese women had a mean *FertiQoL* score of 61.98 ± 21.16 , similar to Kazakhstan (59.6 ± 11.5) and Iran (62.57 ± 16.89), but higher than Serbia (48.88 ± 12.02). Scores were lower than those in countries like China (64.54 ± 16.90), Turkey (66.97 ± 14.35), and Western nations such as the Netherlands (70.80 ± 13.90), the United States (72.30 ± 14.80), and Germany (73.00 ± 12.00). These differences can be explained by variations in healthcare quality, cost of IVF, and the presence of psychological support programs.

Some factors improved the *FertiQoL* score. Women with male factor infertility reported higher scores ($B = 11.268$), probably because they felt less emotional burden. Sedentary office work ($B = 4.543$) was also associated

with better QoL, possibly because these women can rest during treatment. Moreover, religious or cultural beliefs that support IVF improved emotional well-being ($B = 8.413$).

Other factors were linked to lower *FertiQoL* scores. Prolonged infertility, especially beyond one year, childlessness ($B = -11.781$), social stigma ($B = -5.494$), poor physical health such as being underweight ($B = -6.206$), and lack of income ($B = -5.547$) all negatively affected women's well-being. In Middle Eastern cultures, infertility often carries strong social pressure, which may increase emotional distress and reduce QoL [30, 35, 37].

Finally, higher *CSI-4* and *WHO-5* scores were associated with better *FertiQoL*, showing the importance of social and marital support during IVF. Strengthening psychological and emotional support within fertility clinics can help women cope better with treatment.

Further studies with larger samples are needed to confirm these findings and explore other factors that affect the QoL of Lebanese women undergoing IVF.

6. Public Health Implications and Clinical Relevance

Addressing the public health implications of infertility treatments, including IVF, requires a multifaceted approach. The significant emotional burden of in vitro fertilization (IVF) underscores the need for integrating routine psychological assessments, such as the *FertiQoL* tool, into standard treatment protocols. This allows for early identification of psychological distress and timely intervention, improving both treatment adherence and patient outcomes. The study also highlights the importance of individualized counseling, enabling healthcare providers to tailor support based on diverse psychosocial responses, which in turn fosters greater patient satisfaction and engagement.

Moreover, the study advocates for integrated, multidisciplinary care models that incorporate reproductive specialists, mental health professionals, and primary care providers, ensuring a holistic approach to patient care. Additionally, it provides valuable evidence to inform clinical guidelines and policies, particularly in promoting equitable access to mental health support within fertility treatment. Training healthcare providers to address the psychological dimensions of infertility is essential for improving communication and building stronger therapeutic relationships. Technological advancements, such as mobile applications and online support platforms, can further support patients by offering accessible resources and reducing isolation. Lastly, advocating for comprehensive insurance coverage that include psychological care will alleviate financial barriers and reinforce the importance of mental health in fertility treatment.

7. Strengths and Limitations

The strengths of this study include, first and foremost, the use of validated assessment tools that have been implemented in numerous countries. Additionally, this study is significant as it is the first to investigate the quality of life status and associated predictors specifically among Lebanese women undergoing IVF. Furthermore, the study encompasses a diverse sample from multiple Lebanese districts, enriching the findings.

However, this study presents several limitations. First, its cross-sectional design restricts our ability to establish causality; rather, it generates hypotheses regarding the relationships observed. Second, there is a potential selection bias, as only educated women with internet access were able to complete the online survey. Consequently, the representativeness and generalizability of our findings are limited.

Finally, although our study incorporated a rich array of demographic measures, it is possible that some factors associated with the quality of life of Lebanese women undergoing IVF were overlooked. Nonetheless, a notable strength of our research lies in the inclusion of numerous novel predictors that had not been previously studied.

8. Conclusion

This study highlights that Lebanese women undergoing IVF generally report an acceptable quality of life, with a mean FertiQoL score of 61.98. Despite these findings, various factors significantly influence their quality of life, particularly prolonged infertility duration, childlessness, social stigma, and socioeconomic status. The FertiQoL measurement tool demonstrated high reliability, underscoring its utility in evaluating fertility-related quality of life in this demographic. Given the identified risk factors, we recommend the implementation of targeted support programs that address the psychological and social challenges. These programs could include counseling services focused on coping strategies for managing societal stigma and emotional distress associated with infertility.

Additionally, further research is warranted to explore the specific cultural and religious beliefs affecting women's experiences with IVF. Understanding these nuances will be crucial for developing culturally sensitive interventions that can enhance quality of life for infertile women. Policy changes should aim to improve access to fertility treatments and psychological support services, particularly for women from low-income backgrounds. Governments and healthcare providers should consider integrating mental health resources into fertility treatment protocols, as a comprehensive approach to infertility can significantly improve outcomes for women.

Future studies should involve larger and more diverse samples, as well as longitudinal designs, to better understand the dynamic interplay of factors influencing quality of life. Additionally, exploring the varied experiences of individuals across different cultural and socioeconomic backgrounds is essential. Investigating the impact of FertiQoL scores on IVF/ICSI outcomes should also be prioritized, as it may provide further insights into the predictive value of quality of life assessments in fertility treatment success. By addressing these areas, we can contribute to a more holistic understanding of infertility and enhance support for affected individuals..

9. Declarations

9.1. Ethics Approval and Consent to Participate

Informed consent was obtained from each participant at the beginning of the questionnaire, emphasizing that participation was voluntary and that taking part in the study posed no harmful effects. No monetary compensation was provided for participation. Furthermore, confidentiality and anonymity were assured throughout the study. All procedures were conducted in accordance with relevant ethical guidelines.

Ethical approval was granted by the Ethics Committee of the National Institute of Public Health – Clinical Epidemiology and Toxicology (INSPECT-LB) on July 17th, 2023, under reference number 2023REC-008-INSPECT-06-09. Additionally, the procedures followed in this article adhered to the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) statement checklist [13].

10.Consent to publication

Not applicable.

11.Availability of data and materials

All data generated or analyzed during this study are not publicly available to maintain the privacy of the individual's identities.

12.Competing interests

No competing interests.

13.Funding

This research received no external funding.

14.Author contribution

Silva Silva (SS) and Suzanne Maroun Souaid (SMS) designed the study, drafted the manuscript, and conducted the analysis with interpretation of the results. Pascale Salameh (PS) provided supervision.

Acknowledgment

Not applicable.

References

- [1] Practice Committee of the American Society for Reproductive Medicine. Electronic address: asrm@asrm.org. (2020). Definitions of infertility and recurrent pregnancy loss: A committee opinion. *Fertility and Sterility*, 113(3), 533–535. <https://doi.org/10.1016/j.fertnstert.2019.11.025>
- [2] 1 in 6 people globally affected by infertility: WHO. (2023, April 4). [News release]. <https://www.who.int/news/item/04-04-2023-1-in-6-people-globally-affected-by-infertility>
- [3] Dia, N., Mansour, S., Kharaba, Z., Malaeb, B., Sarray El Dine, A., Kokash, S., Nasser, S., Hallit, S., & Malaeb, D. (2023). Factors associated with infertility among the Lebanese population: A cross-sectional study. *International Journal of Environmental Health Research*, 0(0), 1–9.

<https://doi.org/10.1080/09603123.2023.2190084>

- [4] Li, Y., Zhang, X., Shi, M., Guo, S., & Wang, L. (2019). Resilience acts as a moderator in the relationship between infertility-related stress and fertility quality of life among women with infertility: A cross-sectional study. *Health and Quality of Life Outcomes*, 17, 38. <https://doi.org/10.1186/s12955-019-1099-8>
- [5] World Bank Open Data. (n.d.). World Bank Open Data. Retrieved November 6, 2023, from <https://data.worldbank.org>
- [6] Novelli, M., Cazzola, A., Angeli, A., & Pasquini, L. (2021). Fertility Intentions in Times of Rising Economic Uncertainty: Evidence from Italy from a Gender Perspective. *Social Indicators Research*, 154(1), 257–284. <https://doi.org/10.1007/s11205-020-02554-x>
- [7] Kooli, C. (2019). Review of assisted reproduction techniques, laws, and regulations in Muslim countries. *Middle East Fertility Society Journal*, 24(1), 8. <https://doi.org/10.1186/s43043-019-0011-0>
- [8] Lasheras, G., Mestre-Bach, G., Clua, E., Rodríguez, I., & Farré-Sender, B. (2020). Cross-Border Reproductive Care: Psychological Distress in A Sample of Women Undergoing In Vitro Fertilization Treatment with and without Oocyte Donation. *International Journal of Fertility & Sterility*, 14(2), 129–135. <https://doi.org/10.22074/ijfs.2020.5997>
- [9] Aimagambetova, G., Issanov, A., Terzic, S., Bapayeva, G., Ukybassova, T., Baikoshkarova, S., Aldiyarova, A., Shauyen, F., & Terzic, M. (2020). The effect of psychological distress on IVF outcomes: Reality or speculations? *PloS One*, 15(12), e0242024. <https://doi.org/10.1371/journal.pone.0242024>
- [10] Micie, J., Aimagambetova, G., Terzic, S., Bapayeva, G., Kongrtay, K., Laganà, A. S., & Terzic, M. (2021). Psychological factors and infertility. In *Advances in Health and Disease* (Vol. 38, pp. 67–95). Nova Science Publishers, Inc. <http://www.scopus.com/inward/record.url?scp=85116817227&partnerID=8YFLogxK>
- [11] Sahakian, J.-P. K. K., El Helou, E., Azoury, J., Salameh, L., Abou Jaoude, I., & Sleilaty, G. (2020). Infertility within the Lebanese population: Beliefs and realities. *Middle East Fertility Society Journal*, 25(1), 27. <https://doi.org/10.1186/s43043-020-00037-0>
- [12] Sexty, R. E., Griesinger, G., Kayser, J., Lallinger, M., Rösner, S., Strowitzki, T., Toth, B., & Wischmann, T. (2018). Psychometric characteristics of the FertiQoL questionnaire in a German sample of infertile individuals and couples. *Health and Quality of Life Outcomes*, 16(1), 233. <https://doi.org/10.1186/s12955-018-1058-9>
- [13] Cuschieri, S. (2019). The STROBE guidelines. *Saudi Journal of Anaesthesia*, 13(Suppl 1), S31–S34. https://doi.org/10.4103/sja.SJA_543_18

- [14] El Frenn, Y., Akel, M., Hallit, S. *et al.* Couple's Satisfaction among Lebanese adults: validation of the Toronto Alexithymia Scale and Couple Satisfaction Index-4 scales, association with attachment styles and mediating role of alexithymia. *BMC Psychol* **10**, 13 (2022). <https://doi.org/10.1186/s40359-022-00719-6>.
- [15] The WHO-5 Well-Being Index – Validation based on item response theory and the analysis of measurement invariance across 35 countries" by Sischka, P.E., Costa, A.P., Steffgen, G., & Schmidt, A.F. (2020) DOI:10.1016/j.jadr.2020.100020
- [16] OMANI-SAMANI, R., MAROUFIZADEH, S., ALMASI-HASHIANI, A., SEPIDARKISH, M., & AMINI, P. (2019). The WHO-5 Well-Being Index: A Validation Study in People with Infertility. *Iranian Journal of Public Health*, 48(11), 2058–2064.
- [17] Wang, Y., Wu, A., Jiang, Y., Duan, Y., Geng, W., Wan, L., Li, J., Du, J., Hu, J., Jiang, J., Shi, L., & Wei, J. (2023). The Chinese version of patient-doctor-relationship questionnaire (PDRQ-9): Factor structure, validation, and IRT psychometric analysis. *Frontiers in Psychiatry*, 14, 1117174. <https://doi.org/10.3389/fpsyt.2023.1117174>
- [18] Hegazy, N., Farahat, T., Elakkad, A., Mohasseb, M. (2021). Validation of the Patient-Doctor Relationship and Patient Satisfaction Questionnaire for An Arabic Adult Population in an Egyptian Sample. *The Egyptian Journal of Hospital Medicine*, 83(1), 1514-1519. doi: 10.21608/ejhm.2021.170523
- [19] Wollmann, L., Hauser, L., van der Feltz-Cornelis, C., Mengue, S. S., Roman, R., Rech, M. R. A., & Harzheim, E. (2025). Defining quality categories for evaluation of the doctor-patient relationship assessed through the patient-doctor relationship questionnaire (PDRQ-9). *Family practice*, 42(2), cmae068. <https://doi.org/10.1093/fampra/cmae068>
- [20] Calderón, C., Lorenzo-Seva, U., Ferrando, P. J., Martínez-Cabañes, R., Higuera, O., Gómez, D., Palacin-Lois, M., Pacheco-Barcia, V., Hernández, R., Fernández-Andújar, M., Ferreira, E., Carmona-Bayonas, A., & Jiménez-Fonseca, P. (2021). Psychometric Properties of the PDRQ-9 in Cancer Patients: Patient-Doctor Relationship Questionnaire. *Psicothema*, 33(2), 304–311. <https://doi.org/10.7334/psicothema2020.393>
- [21] Psychometric qualities of the 9-item patient-doctor relationship questionnaire in stable Nigerian patients with schizophrenia. (n.d.). Retrieved september 6, 2023, from <http://jbehavioralhealth.com/index.php/article/Psychometric+qualities+of+the+9-item+patient-doctor+relationship+questionnaire+in+stable+Nigerian+patients+with+schizophrenia>
- [22] Wang, Y., Wu, A., Jiang, Y., Duan, Y., Geng, W., Wan, L., Li, J., Du, J., Hu, J., Jiang, J., Shi, L., & Wei, J. (2023). The Chinese version of patient-doctor-relationship questionnaire (PDRQ-9): Factor structure, validation, and IRT psychometric analysis. *Frontiers in Psychiatry*, 14.

DOI:10.3389/fpsy.2023.1117174

- [23] Woods, B.M., Bray, L.A., Campbell, S., Holland, A.C., Mrug, S., & Ladores, S.L. (2023). A review of the psychometric properties and implications for the use of the fertility quality of life tool. *Health and Quality of Life Outcomes*, 21. DOI:10.1186/s12955-023-02125-x
- [24] Hatem, G., Zeidan, J., Goossens, M., & Moreira, C. (2022). Normality Testing Methods and the Importance of Skewness and Kurtosis in Statistical Analysis. *BAU Journal - Science and Technology*, 3(2). <https://doi.org/10.54729/KTPE9512>
- [25] Hsu, P.-Y., Lin, M.-W., Hwang, J.-L., Lee, M.-S., & Wu, M.-H. (2013). The fertility quality of life (FertiQoL) questionnaire in Taiwanese infertile couples. *Taiwanese Journal of Obstetrics and Gynecology*, 52(2), 204–209. <https://doi.org/10.1016/j.tjog.2013.04.009>
- [26] Ni, Y., Shen, H., Yao, H., Zhang, E., Tong, C., Qian, W., Huang, L., Wu, X., & Feng, Q. (2023). Differences in Fertility-Related Quality of Life and Emotional Status Among Women Undergoing Different IVF Treatment Cycles. *Psychology Research and Behavior Management*, 16, 1873–1882. <https://doi.org/10.2147/PRBM.S411740>
- [27] Suleimenova, M., Lokshin, V., Glushkova, N., Karibayeva, S., & Terzic, M. (2022). Quality-of-Life Assessment of Women Undergoing In Vitro Fertilization in Kazakhstan. *International Journal of Environmental Research and Public Health*, 19(20), 13568. <https://doi.org/10.3390/ijerph192013568>
- [28] Khalesi, Z.B., & Kenarsari, F.J. (2024). Anxiety, depression, and stress: a comparative study between couples with male and female infertility. *BMC Women's Health*, 24. DOI:10.1186/s12905-024-03072-5.
- [29] Civan, E., & Beydağ, K.D. (2023). Investigation of the Relationship Between Infertility Stress and Spouse Support Levels of Infertility Women and Men. *Artuklu International Journal of Health Sciences* DOI:10.58252/artukluder.1228443.
- [30] Song, D., Li, X., Yang, M., Wang, N., Zhao, Y., Diao, S., Zhang, X., Gou, X., & Zhu, X. (2021). Fertility quality of life (FertiQoL) among Chinese women undergoing frozen embryo transfer. *BMC Women's Health*, 21(1), 177. <https://doi.org/10.1186/s12905-021-01325-1>
- [31] Suleimenova, M., Lokshin, V., Glushkova, N., Karibayeva, S., & Terzic, M. (2022). Quality-of-Life Assessment of Women Undergoing In Vitro Fertilization in Kazakhstan. *International Journal of Environmental Research and Public Health*, 19(20), 13568. <https://doi.org/10.3390/ijerph192013568>
- [32] Maroufizadeh, S., Ghaheri, A., & Omani-Samani, R. (2016). Factors associated with poor quality of life among Iranian infertile women undergoing IVF. *Psychology, Health & Medicine*, 22, 1–7. <https://doi.org/10.1080/13548506.2016.1153681>

- [33] Department of Psychology, Faculty of Philosophy, University of Nis (Serbia), Opsenica Kostic, J., Mitrovic, M., & Panic, D. (2021). THE EXPERIENCE OF INFERTILITY AND QUALITY OF LIFE OF WOMEN UNDERGOING THE IVF PROCESS – A STUDY IN SERBIA. 22–26. <https://doi.org/10.36315/2021inpact005>
- [34] Karabulut, A., Özkan, S., & Oğuz, N. (2013). Predictors of fertility quality of life (FertiQoL) in infertile women: Analysis of confounding factors. *European Journal of Obstetrics, Gynecology, and Reproductive Biology*, 170(1), 193–197. <https://doi.org/10.1016/j.ejogrb.2013.06.029>
- [35] Jing, X., Gu, W., Xu, X., Yan, C., Jiao, P., Zhang, L., Li, X., Wang, X., & Wang, W. (2022). Stigma predicting fertility quality of life among Chinese infertile women undergoing in vitro fertilization–embryo transfer. *Journal of Psychosomatic Obstetrics & Gynecology*, 43(1), 35–41. <https://doi.org/10.1080/0167482X.2020.1778665>
- [36] Pati, S., Irfan, W., Jameel, A., Ahmed, S., & Shahid, R. K. (2023). Obesity and Cancer: A Current Overview of Epidemiology, Pathogenesis, Outcomes, and Management. *Cancers*, 15(2), 485. <https://doi.org/10.3390/cancers15020485>
- [37] Ni, Y., Huang, L., Zhang, E., Xu, L., Tong, C., Qian, W., Zhang, A., & Fang, Q. (2022). Psychosocial correlates of fertility-related quality of life among infertile women with repeated implantation failure: The mediating role of resilience. *Frontiers in Psychiatry*, 13, 1019922. <https://doi.org/10.3389/fpsy.2022.1019922>

15. List of abbreviation

ANOVA: Analysis of Variance

ASRM: American Society of Reproductive Medicine

BMI: Body Mass Index

CSI-4: The couple's satisfaction Index – 4 items

FertiQoL: fertility quality of life scale

IVF: In Vitro Fertilization

PCOS: Polycystic ovary syndrome

PDRQ-9: patient-doctor relationship questionnaire – 9 items

QoL: quality of life

SPSS: Statistical Package for the Social Sciences

STROBE: Strengthening the Reporting of Observational Studies in Epidemiology

WHO: World Health Organization

Table 4 : Socio-demographic characteristics of the studied population

Socio-demographic characteristics of the studied population (N=403)	
Variables	Mean (SD) or N (%)
Age, years(N=403)	35.20 ±5.451
BMI, kg/m ² (N=403)	23.21 ±3.366
Educational level	
Bachelor and more	230(57.1%)
Below high school	22(5.5%)
High school	150(37.2%)
None	1(0.2%)
Physical work demands	
Heavy physical work	7(1.7%)
Light physical work	194(48.1%)
Moderate physical work	141(35.0%)
Sedentary/Office work	60(14.9%)
Not working	1(0.2%)
Employment status	
Unemployed	34(8.4%)
Employed part-time	66(16.4%)
Employed full-time	255(63.3%)
Self-employed	48(11.9%)
Monthly Income	
None	27(6.7%)
Less than \$600	56(13.9%)
\$600 - \$1000	157(39.0%)
\$1000 - \$3000	129(32.0%)
\$3000 - \$6000	25(6.2%)
More than \$6000	9(2.2%)
Governate	
Beirut	119(29.5%)
Mount Lebanon	96(23.8%)
Nabatiyeh	20(5.0%)
North Lebanon	93(23.1%)

South Lebanon	22(5.5%)
Akkar	18(4.5%)
Baalbek-Hermel	18(4.5%)
Bekaa	17(4.2%)
Place of residence	
Urban	315(79.1%)
Rural	83(20.9%)
Household arrangement	
Living with partner	307(76.2%)
Living alone	27(6.7%)
Living with my partner and his family	49(12.2%)
Living with my partner and my family	15 (3.7%)
Living with my partner, his family, and my family in one house.	5(1.2%)
Children status	
Yes, I have one or more children	86 (21.3%)
No, I do not have any children	317(78.7%)
Hobby	
No	190(47.1%)
Yes	213(52.9%)

Table 5: Medical history of the studied population

Medical history of the studied population (N=403)	
Variables	Mean (SD) or N (%)
Medical history	
None of the above	201(49.9%)
Respiratory conditions	40(9.9%)
Heart disease	2(0.5%)
Blood clotting disorders	20(5.0%)
Cancer	1(0.2%)
Stroke or other cerebrovascular diseases	2(0.5%)
Endocrine diseases	16(4.0%)
Gynecological diseases	15(3.7%)
Autoimmune disease	21(5.2%)
Infectious diseases	14(3.5%)
More than one disease	71(17.6%)
Surgical history	

None	210(52.1%)
Tubal ligation or sterilization	9(2.2%)
Cesarean section	16(4.0%)
Polyp removal	3(0.7%)
Endometrial ablation	3(0.7%)
Laparoscopy or laparotomy for reproductive conditions	37(9.2%)
Ovary removal	1(0.2%)
Operation due to abortion	74(18.4%)
More than one surgery	50(12.4%)
Mental Health Therapy	
No	403(100%)
Yes	0(0%)
Smoking status	
No	307(76.2%)
Yes	96(23.8%)
Alcohol consumption	
No	219(54.3%)
Yes	184(45.7%)

Table 6 : Infertility related variable of the studied population

Infertility related variable of the studied population (N=403)	
Variables	Mean (SD) or N (%)
Conceiving duration failure	
Not applicable	13(3.2%)
Less than six months	49(12.2%)
Six month to one year	79(19.6%)
More than one year	262(65.0%)
Infertility treatment duration	
Not applicable	87(21.6%)
Less than one year	150(37.2%)
More than one year	166(41.2%)
Infertility Type	
Not diagnosed with infertility	14(3.5%)
Female factor infertility	196(48.6%)
Male factor infertility	35(8.7%)
Combined	130(32.3%)
Unexplained infertility	28(6.9%)
Previous pregnancies-miscarriages	
Only successful pregnancies	32(7.9%)
Experienced abortion and successful pregnancies	156(38.7%)
Never been pregnant	215(53.3%)
IVF success rate	
More than 50%	19(4.7%)
Lower than 50%	164(40.7%)
Not sure	220(54.6%)
Number of IVF cycles	
One cycle	101(25.1%)
Two cycles	99(24.6%)
Three cycles	42(10.4%)
More than four cycles	63(15.6%)
None	91(22.6%)
Not sure	7(1.7%)
Donor gametes	
Preferred not to answer	17(4.2%)
No donor gametes usage	364(90.3%)
Yes donor gametes usage	9(2.2%)
Don't know	13(3.2%)

IVF treatment protocol	
Don't know	11(2.7%)
Long protocol	121(30.0%)
Short protocol	2(0.5%)
Mild stimulation protocol	91(22.6%)
Natural cycle protocol	26(6.5%)
Frozen embryo transfer protocol	152(37.7%)
IVF Adverse effects	
None	18(4.5%)
Abdominal discomfort or bloating	5(1.2%)
Nausea or vomiting	10(2.5%)
Mood swings or emotional changes	11(2.7%)
Headaches	12(3.0%)
Fatigue or tiredness	2(0.5%)
Injection site reactions	2(0.5%)
More than one symptom	343(85.1%)
Stigma	
No	254(63.0%)
Yes from both family and friends	104(25.8%)
Yes from friends	11(2.7%)
Yes from family members	34(8.4%)
Disclosed IVF journey	
No	267(66.3%)
Yes	136 (33.7%)
Environment support	
No	270(67.0%)
Yes	133(33.0)
Infertility counselling	
No	403(100%)
Yes	0(0%)
IVF beliefs	
Yes, religious and/or cultural beliefs that influence negatively the perspective on IVF.	9(2.2%)
Yes, religious and/or cultural beliefs that positively influence the perspective on IVF.	98(24.3%)
No, I do not have any religious or cultural beliefs that influence my perspective on fertility and IVF.	296(73.4%)

Table 7: Association of total FertiQoL scale with dichotomous variables

FertiQoL Variable	P value	Mean difference	Lower CI	Upper CI
Place of residence 0 Urban 1 Rural	0.596	-1.39	-6.55	3.76
Environment support 0 Yes 1 No	0.007*	5.98	1.61	10.36
Smoking status 0 No 1 Yes	<0.001*	-16.62	-21.21	-12.03
Alcohol consumption 0 No 1 Yes	0.056	4.12	-0.97	8.33
Hobby 0 No 1 Yes	<0.001*	9.44	5.39	13.49
Disclosed IVF journey 0 Yes 1 No	0.01*	5.72	1.37	10.07
Children status 0 Yes children 1 No children	<0.001*	26.98	22.67	31.3
Surgical history 0 one surgery 1 More than one surgery	0.191	-2.99	-7.47	1.5

Table 8: Association of categorical variables with total FertiQoL score

FertiQoL Variable Categories	Post hoc test (bonferroni / adjusted)			
	P value	Significant associations and levels (descending order)	P value	Mean difference + [CI]
Physical work demands Not working Sedentary/ office work Light work	<0.001*	Light work > Moderate work	<0.001*	
		Office work > Moderate work	<0.001*	

Moderate work				
Heavy work				
Employment status	0.001*	Self-employed & Employed full time	0.001*	12.3 [3.64 ; 20.97]
Unemployed				
Employed part-time				
Employed full-time				
Self-employed				
Monthly income	<0.001*	None > less than 600\$	0.047*	
None				
Less than \$600		less than 600\$ >1000\$- 3000\$	<0.001*	
\$600 - \$1000				
\$1000 - \$3000		Less than 600\$ > 600\$- 1000\$	0.001*	
\$3000 - \$6000				
More than \$6000		1000\$-3000\$ > 600\$- 1000\$	0.033*	
		1000\$-3000\$ > 3000- 6000\$	0.005*	
Governate	<0.001*	Baalbek Hermel > North Lebanon	0.009*	
Beirut				
Mount Lebanon		Baalbek-hermel > Beirut	0.009*	
Nabatiyeh				
North Lebanon		Akkar > Bekaa	0.017*	
South Lebanon		Nabatiyeh > North Lebanon	0.002*	
Akkar				
Baalbek-Hermel		Nabatiyeh > Beirut	0.002*	
Bekaa		Mount Lebanon > Bekaa	0.004*	
		North Lebanon > Bekaa	<0.001*	
		Bekaa > Beirut	<0.001*	
Household arrangement	<0.001*	Living with partner > living with partner and his family	0.004*	
Living with partner.				
Living alone.				
Living with my husband and his family.		Living with partner > Living with my husband and my family	0.021*	
Living with my husband and my family.				

Living with my partner, his family, my family in one house.				
Conceiving duration Not applicable. Less than 6 month. Six month to one year. More than one year.	<0.001*	Less than six month > not applicable	0.001*	
		less than six months > More than one year	<0.001*	
		not applicable > More than one year	<0.001*	
		not applicable > Six month to one year	0.004*	
		More than one year > six month to one year	<0.001*	
Infertility treatment duration Not applicable. Less than one year. More than one year.	<0.001*	Not applicable > Less than one year	0.023*	
		Not applicable > More than one year	<0.001*	
		Less than one year > More than one year	<0.001*	
Infertility type Not diagnosed with infertility. Female factor. Male factor. Combined. Unexplained.	<0.001*	Male factor > Female factor	<0.001*	
		Not diagnosed with infertility > Female factor	<0.001*	
		Not diagnosed with infertility > Combined	<0.001*	
		Female factor > unexplained	<0.001*	
		Female factor & Combined	0.014*	
IVF success rate More than 50%. Lower than 50%. Not sure.	<0.001*	Lower than 50% > more than 50%	0.007*	
		Lower than 50% > Not sure	<0.001*	
Donor Gametes I prefer not to answer. No use for donor gametes. Yes, use for donor gametes. I do not know.	0.455			
Stigma	<0.001*	No stigma from family	<0.001*	

-No, I have not experienced any stigma from family or friends -Yes, from both family members and friends -Yes, from family members only -Yes, from friends only.		and friends > yes stigma from both family members and friends.		
		No stigma from family members or friends > yes from family members	<0.001*	
		No stigma from family members or friends > yes from friends.	0.001*	
IVF beliefs Yes cultural and/or religious beliefs that positively influence my perspective on fertility and IVF Yes cultural and/or religious beliefs that negatively influence my perspective on fertility and IVF No beliefs	<0.001*	Yes cultural and/or religious beliefs that positively influence my perspective on fertility and IVF & No beliefs	<0.001*	20.32 [14.83; 25.81]
Medical History Gynecologic disease. Others than gynecological disease. None.	0.509			
IVF adverse effect None. One symptom. More than one symptom.	<0.001*	None > More than one symptom	<0.001*	
		More than one symptom > one symptom	<0.001*	
Treatment protocol I do not know. Long protocol. Short protocol. Mild stimulation protocol. Natural cycle protocol. Frozen embryo transfer (FET) protocol.	<0.001*	Mild stimulation protocol & frozen embryo transfer protocol	<0.001*	
BMI category Normal weight underweight overweight obesity	<0.001*	Normal weight > Overweight	<0.001*	
		Overweight > underweight	0.001*	

Educational Level Bachelor and more Below high school High School None	0.004*	High school > Bachelor or more	0.008*	
Previous pregnancy miscarriage -Only successful pregnancies. -Experienced abortion and successful pregnancies. -Never been pregnant.	<0.001*	Only successful pregnancies & abortion + successful pregnancy Only successful pregnancies & never been pregnant	<0.001* <0.001*	28.93 [19.73; 38.13] 28.54 [19.55;37.53]
Number of IVF cycles None one cycle Two cycle Three cycles Four cycles or more Not sure	<0.001*	Four cycles or more > None 1 four cycles or more > Two cycles None > Two cycles Two cycles > Three cycles 3 four cycles or more > One cycle 4 none > One cycle 4 None > Three cycles 5	0.019* <0.001* <0.001* 0.018 * 0.001* <0.001* 0.001*	
Age categories 18-25 years 26-30 years 31-35 years 36-40 years 41 or above	0.619			

*indicates the presence of significant association

> indicates a higher level of association

Table 9 : Results Of The General Linear Model To Study Fertiql Predictor

Parameter	B	Std. Error	Sig.	95% Confidence Interval	
				Lower Bound	Upper Bound
Conceiving duration failure					
1 = less than 6 months	- 21.850	3.440	.000*	-28.615	-15.085
2 = 6 months - 1 year	- 18.892	3.528	.000*	-25.829	-11.954
3 = More than 1 year	- 21.024	3.409	.000*	-27.727	-14.321
4 = none	0a				
Infertility Type					
1 = female factor	0.651	1.999	.745	-3.280	4.582
2 = male factor infertility	11.268	2.391	.000*	6.567	15.969
3 = combined	1.549	1.907	.417	-2.201	5.298
4 = unexplained	0a				
Previous pregnancy/miscarriages					
1 = Experienced abortions and successful pregnancies	-2.289	2.139	.285	-6.495	1.916
2 = Never been pregnant	1.202	2.362	.611	-3.442	5.846
3 = only successful pregnancies	0a				
IVF success rate					
1 = lower than 50%	4.350	2.395	.070	-0.359	9.059
2 = not sure	3.333	2.306	.149	-1.201	7.867
3 = more than 50%	0a				
Child					
1 = no children	- 11.781	1.734	.000*	-15.190	-8.372
2 = One or more children	0a				
IVF adverse effects					
1 = one symptom	-0.967	2.852	.735	-6.575	4.642

2 = more than one symptom	-7.229	2.557	.005*	-12.257	-2.200
3 = none	0a				
Stigma					
1 = From family members and friends	-5.494	1.372	.000*	-8.192	-2.796
2 = From family or friends	2.282	1.672	.173	-1.006	5.571
3 = none	0a				
Physical workloads					
1 = sedentary office work	4.543	1.407	.001*	1.776	7.311
2 = moderate work	0.263	1.112	.813	-1.923	2.449
3 = heavy work	1.769	3.609	.624	-5.328	8.866
5 = light physical work	0a				
Environment social support					
1 = no	-1.379	1.067	.197	-3.478	0.720
2 = yes	0a				
Education level					
1 = below high school	-2.059	2.391	.390	-6.760	2.643
2 = high school	0.475	1.054	.652	-1.597	2.547
4 = bachelor and more	0a				
IVF beliefs					
1 = beliefs that positively influence the perspective on IVF	8.413	3.519	.017*	1.493	15.333
2 = beliefs that negatively influence the perspective on IVF	0.604	1.323	.648	-1.998	3.206
3 = no beliefs	0a				
BMI					
1 = underweight	-6.206	2.183	.005*	-10.499	-1.912
2 = overweight	-1.405	1.226	.253	-3.815	1.006
3 = obesity	-6.266	3.334	.061	-12.822	0.290
4 = normal weight	0a				
Monthly income					
1 = less than \$600	-0.405	1.626	.803	-3.602	2.792
3 = \$1000–\$3000	1.773	1.157	.126	-0.502	4.047
4 = \$3000–\$6000	1.260	2.048	.539	-2.768	5.288
5 = more than \$6000	-6.578	3.357	.051	-13.181	0.024

6 = \$600–\$1000	0a			
WHO-5 Score	0.630	0.124	.000* 0.387	0.874
CSI-4 Score	1.968	0.140	.000* 1.692	2.244