Original Research Article

Psychometric properties of the Indonesian online version of fertility quality of life tool: a cross-sectional study

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ABSTRACT

Background: The clinical measurement of an infertile couple’s quality of life (QoL) should be considered as a standard assessment of their pretreatment condition to aid in medical and psychological consultation. The study aimed to test the psychometric properties of the Indonesian online version of the fertility quality-of-life (FertiQoL) questionnaire.

Methods: This study applied cross-sectional methods among women/men over 18 years who have problems with infertility and have or have not undergone any medical treatment. PT. Integra Inovasi Indonesia helped develop the online FertiQoL questionnaire. This research applied R project version 3.6.3 to merge the data and conduct statistical analyses. Pearson correlation tests were used to ensure the validity. Cronbach’s alpha coefficient test was also used to measure the instrument’s quality and reliability.

Results: There were 214 participants enrolled from all over Indonesia. The total scores for core FertiQoL and treatment FertiQoL were 64.72±13.87 and 62.93±12.50, respectively. The total FertiQoL mean was 64.14±12.33. The reliability of the FertiQoL version of the Indonesian language was relatively high (Cronbach α was 0.92, and the value for each domain was >0.70 (0.76-0.94). The validity results of the FertiQoL questionnaire also showed that all question items were considered valid (r>0.1341).

Conclusions: The Indonesian version of FertiQoL is valid and reliable for assessment of the pre-treatment condition of infertile couples and the effects of treatment on QoL in infertile patients which can help in making more accurate diagnosis and providing diagnosis and treatment in infertility clinics.

Keywords: Fertility, Indonesia, Quality of life, Validity, Reliability

INTRODUCTION

Infertility is the absence of conception results after a year of sexual intercourse. Most normal and healthy young couples, approximately 85-90%, will become pregnant within one year of their marriage. Therefore, the high percentage of infertility (22.3%) experienced by some couples is a serious concern. The use of assisted reproduction technology (ART) is increasing throughout the world, especially in Indonesia, marked by an increase in the number of infertility clinics. However, the gap between the total prevalence of infertility and those seeking treatment is complex. The issue of costs is a very significant barrier to accessing treatment, particularly the costs for the ART program.
According to the Indonesian Health Profile in 2017, there were 37.3 million couples of childbearing age, with 8.3 million infertile couples (22.3%), and around 2.5 million (30%) infertile couples requiring in vitro fertilization (IVF) treatment. From these figures, it is estimated that those who get access to IVF treatment are less than 1%. This is because infertility clinics are only available in big cities and the IVF treatments have high costs. This type of ART program is still considered a luxury health service and can only be accessed by the rich.

It was estimated that the primary infertility prevalence of Indonesian women (aged 15-49 years) was 10.2%, and the largest group are those aged 15-19 years. Infertility can be caused by early marriage when women are not ready to get married physically and mentally. This condition leads to women avoiding having a baby. Depression is closely related to alternative stress, and anxiety. It affects the release of cortisol, and its symptoms can be noticed in about 37% of infertile women. Both depression and anxiety are commonly experienced by infertile women. This pattern often occurs in infertile couples and more in women with infertility than fertile women.

Infertile women are typically less satisfied in life and considered weaker than working women who have children. In contrast, one research found there was neither anxiety nor depression among fertile women. Disatisfaction with becoming a mother can negatively affect the quality of life (QoL) of a couple and severely hamper the success of infertility treatment.

Depression, avoidance, over active coping, and emotional expression give off the same consequences on the fertility of women. Depression is substantially correlated with anxiety, which is one of the manifestations of stress affecting the release of cortisol. The symptoms of depression are detected in approximately 37% of infertile women. These two emotions are consistently common in women. Moreover, there are more infertile women than fertile women.

In the ART cycle, women showed lower quality of life than men. In addition, the number of failures in experiencing pregnancy through ART treatment affects women's quality of life more than men. Prior to knowing the results of ART, women experiencing cognitive coping and relaxation in the IVF cycle first showed an improvement in their QoL, compared to those going through routine treatment.

From a different standpoint, numerous women in ART programs report symptoms of depression before starting a cycle. This problem is likely to reflect a repetitive impact, from prior unsuccessful and less invasive forms of treatment. However, it may also indicate a previous history of mood or anxiety disorders apart from the infertility issues.

The measuring tool used to observe the QoL for infertile people is FertiQoL. It has a reliable measurement on the effects of fertility problems and their treatment on patients’ QoL. This tool is recommended for measuring patient self-reported outcome in the QoL of infertile women. The FertiQoL questionnaire is the most common tool to determine the QoL of people with infertility. It measures reliably the impacts of problems concerning fertility as well as their treatments involving a couple’s QoL.

This study aimed to test the psychometric properties of the Indonesian online version of the FertiQoL questionnaire.

**METHODS**

**Design and data collection**

As mentioned previously, the total score of FertiQoL is the average QoL for all core and care domains. The total FertiQoL score is the mean of QoL for all core and care domains. The optional modules of FertiQoL care are relevant for people undergoing fertility medical services, including medical consultations and interventions.

**Project site and patient selection**

Data collections were administered simultaneously (Figure 1).

![Figure 1: Study design.](Image)

In the initial stage, each question and answer item choice was assessed before the online trial. It was because the Likert scale used in the international FertiQoL questionnaire in Indonesia was complicated and respondents were unfamiliar with the choices. To make it
for Human Reproduction and Embryology (ESHRE) to evaluate the QoL of infertile patients. The FertiQoL tool consisted of two main modules: the Core Module for FertiQoL and ten Items for FertiQoL Treatment. The 24 Core FertiQoL items are divided into four fields: the emotional and cognitive, the physical (mind/body), the relational, and the social subscales. The dynamic environment assesses the effect on emotions, e.g. resentment, sadness, or infertility grievance. The physical or mind/body part refers to the effect of infertility on physical health, cognition, and behavior. In terms of relational and social domains, the impact of infertility on partnerships and social aspects, such as social inclusion, expectations, and support, are quantified respectively. The optional module is comprised of two parts used for environmental assessment and tolerance for the treatment of infertility.

Elements of these domains are presented and rated randomly on a scale of 0 to 4. The FertiQoL subscale and total values are calculated and then converted to 100. Higher scores suggest better QoL. FertiQoL is available in 46 different languages, including Indonesian, on its website https://www.fertiqol.org/.

Reliability

The reliability level was empirically indicated by a number recognized as the reliability coefficient value. Cronbach’s alpha is a statistical measurement commonly cited by authors to validate that the created or adapted scales and tests in certain research project are fit for its purpose. Guidance is offered to authors who will act as reporters and readers acting as evaluators. Studies presented the results of Cronbach’s alpha coefficient as the evidence of instrument quality, indicating that alpha has an acceptable, sufficient, or satisfactory level threshold or cut-off, typically perceived as ≥0.70 or >0.70.14

Ethical considerations

This research was a cross-sectional study. Prior to its implementation, study approval was obtained from the Medical and Health Research Ethics Committee of the Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada (Ref No: KE/FK/0476/EC/2019).

Statistical analysis

R project version 3.6.3 was applied for data merging and statistical analysis. The alpha was set to 0.05. A p value of 0.05 was regarded as statistically significant. The Cronbach α-coefficient was calculated to evaluate the reliability of the FertiQoL instrument. Before conducting the comparison test, the distribution of the data was first checked. The validity test of the Pearson product-moment correlation applies the principle of making correlation or connection between each item score or question and the total score attained from the questionnaire.
RESULTS

Study sample

A total of 214 people with infertility contributed to this study for 9 months with mean age 33.05±6.66 years. The demographic characteristics of the participants can be seen in Table 1. As shown in Table 2 below, the participants rated their health conditions from normal to very bad. Those who felt very bad were 97.2%, while only 2.8% answered that they were in good health. This illustrates that the burden of infertility directly affects their physical health conditions or vice versa. Participants feel tired, and unhealthy with the burden of infertility they experience. In the answers to questions about satisfaction with their QoL, 92.1% answered mediocre to very dissatisfied, and those who expressed very little satisfaction was 7.9%. These percentages reflect that the problem of infertility is very influential on satisfaction with the QoL.

Table 1. Demographic characteristics of FertiQoL online samples (n=214).

| Demographic characteristics | N | %   |
|-----------------------------|---|-----|
| **Age (years)**             |   |     |
| ≤30                         | 67 | 31.3|
| 31-40                       | 124| 57.9|
| >40                         | 23 | 10.7|
| **Mean**                    | 33.05 | 6.66 |
| **Relationship status**     |   |     |
| Single                      | 30 | 14.0|
| Married                     | 184| 86.0|
| **Sex**                     |   |     |
| Male                        | 12 | 5.6 |
| Female                      | 202| 94.4|
| **Educational level**       |   |     |
| ≤High school               | 56 | 26.2|
| Bachelor                    | 118| 55.1|
| Master or higher            | 34 | 15.9|
| Other                       | 6  | 2.8 |
| **Medical condition**       |   |     |
| Have not consulted a doctor | 42 | 19.6|
| The consultation did not have a diagnostic test | 34 | 15.9|
| Have consulted and have diagnostic tests | 40 | 18.7|
| Have consulted, diagnostic tests and started treatment | 98 | 45.8|

The online FertiQoL questionnaire is a new psychometric measurement that has been adapted to Indonesia, especially in Yogyakarta. Therefore, the researchers collected answers from participants to find out the respondents’ understanding of each question item on FertiQoL. The results of this questionnaire were easy to understand, which was demonstrated by the 85.1% ‘yes’ answers from participants.

Score of FertiQoL

The distribution of the FertiQoL scores is shown in Table 2. The mind/body subscale was the lowest score among the other subscales: namely 59.52. This score was in line with the results in the previous table that indicated 97.2% stated that their health condition was mediocre to very bad. A low mind/body value indicates that infertility problems had an impact on their physical health, including pain/discomfort, draining energy, and changes in behavior because their infertility interferes with daily activities/activities and cognitive function, namely concentration and frequent feelings of being unable to achieve life goals and other plans attributable to problems in infertility.

Table 2: Assessment of health conditions and satisfaction with QoL.

| Assessment                      | N | %   |
|---------------------------------|---|-----|
| **Assessment of health conditions** |   |     |
| Very poor                       | 20 | 9.4 |
| Poor                            | 76 | 35.5|
| Neither good/nor poor           | 112| 52.3|
| Good                            | 6  | 2.8 |
| Very good                       | 0  | 0   |
| **Satisfaction with QoL**       |   |     |
| Not answering                   | 2  | 0.9 |
| Very dissatisfied               | 26 | 12.2|
| Dissatisfied                    | 58 | 27.1|
| Neither satisfied/nor dissatisfied | 113| 52.8|
| Satisfied                       | 15 | 7.0 |
| Very satisfied                  | 0  | 0   |
| **FertiQoL questions are easy to understand** |   |     |
| Yes                             | 182| 85.1|
| No                              | 32 | 14.9|

The average total score of FertiQoL was 64.14 (Table 3), with the score closer to 100 indicating that the patient’s QoL is high. By examining the number of participants in the range of interval values per subscale, it can be seen that many have scores below 50 points. In the emotional subscale, the percentage value below 50 points was the largest compared to other value ranges, which was only 43%. This result means that infertility has an emotional impact by causing sadness/loss, anger, hatred, and feelings of loss, as well as sadness/depression.

As a cycle, the inability to make decisions creates jealousy and hatred, which causes further emotional insecurity and inability to solve infertility problems.
Table 3: Recapitulation of FertiQoL scores per subscale.

| Sub scale          | Mean (SD) | Median | Min | Max | Q1   | Q3   |
|--------------------|-----------|--------|-----|-----|------|------|
| Mind/body          | 59.52 (16.65) | 58.33  | 16.67 | 100 | 50   | 70.83|
| Emotional          | 60.65 (17.44) | 62.50  | 16.67 | 100 | 50   | 73.96|
| Relational         | 77.12 (14.75) | 79.17  | 4.17  | 100 | 62.50| 87.50|
| Social             | 63.69 (18.84) | 62.50  | 12.50 | 100 | 50.00| 79.17|
| Core FertiQoL      | 64.72 (13.87) | 65.63  | 21.88 | 97.92| 55.21| 97.92|
| Environment        | 61.69 (14.50) | 62.50  | 29.17 | 100 | 50   | 70.83|
| Tolerability       | 64.94 (20.02) | 68.75  | 6.25  | 100 | 50   | 81.25|
| Total treatment    | 62.93 (12.50) | 62.50  | 35    | 97.50| 55   | 72.50|
| Total FertiQoL     | 64.14 (12.33) | 65.31  | 25    | 97.92| 55.58| 72.70|

Validity

Usually, it is important to conduct a validity test with the correlation coefficient at 0.05, in order to determine the feasibility of the items to be used in the psychometric measurement. It indicates that the level of an item was considered valid when it is significantly correlated to the overall score. In the data tabulation, the bold letter indicates the first item in each domain. The validity measurement uses the Pearson correlation test with the full N=214 (Table 4) and an r table of 0.1341, indicating all question items are considered valid. R table is calculated using the t distribution. At the 5% significance level, all H0 were rejected because r table<r count, so that all questionnaire items are considered valid. The Pearson correlation of 34 FertiQoL questions can be classified into 4 categories. The first category is low (8.8%), moderate (11.8%), high/strong correlation (55.9%) and very high/very strong correlation (23.5%). Table 5 explains the value of the Pearson correlation test in each question.

Table 4: Test the validity of online FertiQoL filling data in people with infertility.

| Questions                  | Question | Core FertiQoL | Optional treatment FertiQoL module |
|----------------------------|----------|--------------|-----------------------------------|
|                            |          | Emotional    | Mind/body Relational Social       | Treatment environment Treatment tolerability |
| Angry                      | Q23      | 0.770        |                                   |                                              |
| Grief/loss                 | Q8       | 0.783        |                                   |                                              |
| Sad/depressed              | Q16      | 0.815        |                                   |                                              |
| Fluctuate hope/despair     | Q9       | 0.778        |                                   |                                              |
| Jealously and resentment   | Q7       | 0.745        |                                   |                                              |
| Unable to cope             | Q4R      | 0.353        |                                   |                                              |
| Fatigue                    | Q18      | 0.757        |                                   |                                              |
| Pain/discomfort            | Q24      | 0.603        |                                   |                                              |
| Feel worn out              | Q3       | 0.782        |                                   |                                              |
| Disrupt activities         | Q12      | 0.638        |                                   |                                              |
| Concentration              | Q1       | 0.688        |                                   |                                              |
| Life on hold               | Q2       | 0.593        |                                   |                                              |
| Affectionate               | Q11R     | 0.910        |                                   |                                              |
| Difficult to talk          | Q20      | 0.891        |                                   |                                              |
| Negative impact on         | Q19      | 0.910        |                                   |                                              |
| relationship               |          |              |                                   |                                              |
| Content relationship       | Q21R     | 0.876        |                                   |                                              |
| Strengthen relationship    | Q15R     | 0.899        |                                   |                                              |
| Satisfied sexual           | Q6       | 0.888        |                                   |                                              |
| relationship               |          |              |                                   |                                              |
| Family understand          | Q14R     | 0.493        |                                   |                                              |
| Friend support             | Q5       | 0.497        |                                   |                                              |
| Society expect             | Q22      | 0.760        |                                   |                                              |
| Isolated                   | Q10      | 0.803        |                                   |                                              |
| Handle/pregnant, other     | Q17      | 0.772        |                                   |                                              |
| Shame, embarrassment       | Q13      | 0.817        |                                   |                                              |
| Interaction with staff     | T10      |              |                                   | 0.920                                          |

Continued.
| Questions                                      | Question | Core FertiQoL | Optional treatment FertiQoL module |
|------------------------------------------------|----------|---------------|-----------------------------------|
|                                                 |          | Emotional     | Mind/body Relational Social       | Treatment environment | Treatment tolerability |
| Quality treatment information                   | T9       |               |                                   |                      | 0.914                 |
| Quality surgery and medical treatment           | T8       |               |                                   |                      | 0.921                 |
| Fertility staff understand us                    | T5R      |               |                                   |                      | 0.831                 |
| Quality emotional services                      | T7       |               |                                   |                      | 0.819                 |
| Medical services desired available               | T2R      |               |                                   |                      | 0.831                 |
| Bothered effect daily activities and work        | T4       |               |                                   |                      | 0.914                 |
| Bothered physical effects                        | T6       |               |                                   |                      | 0.904                 |
| Complicated medication and procedures            | T3       |               |                                   |                      | 0.847                 |
| Treatment effect on mood                        | T1       |               |                                   |                      | 0.893                 |

Table 5: Classification of Pearson’s correlation test results.

| Classification                     | Question | r     | N   | %   |
|------------------------------------|----------|-------|-----|-----|
| Low r= <0.49                       | Q4R      | 0.354 | 3   | 8.82|
|                                    | Q5       | 0.498 |     |     |
|                                    | Q14R     | 0.493 |     |     |
| Moderate r= 0.50-0.69              | Q2       | 0.593 | 4   | 11.76|
|                                    | Q12      | 0.639 |     |     |
|                                    | Q1       | 0.688 |     |     |
|                                    | Q24      | 0.604 |     |     |
| High or strong r= 0.70-0.89        | Q6       | 0.888 |     |     |
|                                    | Q7       | 0.745 |     |     |
|                                    | Q8       | 0.783 |     |     |
|                                    | Q9       | 0.778 |     |     |
|                                    | Q16      | 0.816 |     |     |
|                                    | Q23      | 0.770 |     |     |
|                                    | Q3       | 0.782 |     |     |
|                                    | Q18      | 0.757 |     |     |
|                                    | Q20      | 0.892 |     |     |
|                                    | Q21R     | 0.876 | 19  | 55.88|
|                                    | Q10      | 0.803 |     |     |
|                                    | Q13      | 0.818 |     |     |
|                                    | Q17      | 0.772 |     |     |
|                                    | Q22      | 0.760 |     |     |
|                                    | T2R      | 0.813 |     |     |
|                                    | T5R      | 0.832 |     |     |
|                                    | T7       | 0.820 |     |     |
|                                    | T10      | 0.893 |     |     |
|                                    | T23      | 0.847 |     |     |
| Very high or very strong correlation r= 0.9-1 | Q11R    | 0.910 |     |     |
|                                    | Q15R     | 0.900 |     |     |
|                                    | Q19      | 0.910 |     |     |
|                                    | T8       | 0.921 |     |     |
|                                    | T9       | 0.914 |     |     |
|                                    | T10      | 0.920 |     |     |
|                                    | T4       | 0.914 |     |     |
|                                    | T6       | 0.904 |     |     |


Reliability

The reliability level was empirically indicated by a number known as the reliability coefficient value. The value of \( x \) close to number 1 shows high reliability. The general understanding is that reliability, if 0.7, is considered to be satisfactory. If the alpha value is >0.7, the sufficient reliability is adequate, while if it is >0.80, it means all items are considered reliable, and all of the test items consistently have a strong reliability (Table 3).

The results shows that all four main dimensions and two optional dimensions have an alpha value >0.7, so that the conclusion is that all question items have good reliability. Recapitulation of the results of the 6 subscales of FertiQoL sometimes showed that physically infertility was felt by the public in general not as a disease but we assessed the patients’ health conditions and satisfaction with the QoL survey only with participants who experience infertility problems (Table 6).

| Scale                      | N   | QoL domain                                                                 | Number of items | Cronbach alpha | Mean (SD) scaled |
|----------------------------|-----|-----------------------------------------------------------------------------|-----------------|----------------|------------------|
| **Core subscales**         |     |                                                                             |                 |                |                  |
| Emotional                  | 214 | Impact on emotions (eg. causes sadness, resentment, grief)                  | 6               | 0.80           | 60.65 (17.438)   |
| Mind-body                  | 214 | Impact on physical health (eg. fatigue, pain), cognition (eg. poor concentration) and behavior (eg. disrupted daily activities) | 6               | 0.76           | 59.52 (16.651)   |
| Relational                 | 185 | Impact on partnership (eg. sexuality, communication and commitment)         | 6               | 0.95           | 77.12 (14.751)   |
| Social                     | 214 | Impact on social aspects (eg. social inclusion, expectations and support)   | 6               | 0.79           | 63.69 (18.841)   |
| **Core FertiQoL**          | 214 | Average quality of life in all core domains                                 | 24              | 0.89           | 64.72 (13.873)   |
| **Treatment subscales**    |     |                                                                             |                 |                |                  |
| Environment                | 180 | Impacts related to treatment environment (eg. access, quality, interactions with staff) | 6               | 0.93           | 61.69 (14.501)   |
| Treatment tolerability     | 179 | Impacts due to consequences of treatment (eg. physical and mode effects, daily disruptions) | 4               | 0.84           | 64.94 (20.021)   |
| **Treatment FertiQoL**     | 214 | Average quality of life for all treatment domains                           | 10              | 0.94           | 62.93 (12.503)   |
| **Total FertiQoL**         | 214 | Average quality of life for all core and treatment domains                 | 34              | 0.92           | 64.14 (12.325)   |

DISCUSSION

Based on the results above, the Indonesian version of the FertiQoL is indicated as a valid and reliable measuring tool to assess the patients’ pretreatment condition and infertility problems as well as the treatment effect on the QoL of people with infertility. These results are also aligned with the systematic review of the results from researches using FertiQoL in 23 countries.

In the FertiQoL Indonesia, for question A for satisfaction of QoL, 92.1% answered mediocre to very dissatisfied, and those who expressed very little satisfaction were only 7.0%. These percentages prove that the problem of infertility is very significant on satisfaction with their QoL and how the patients experience an immaterial burden that considerably affects their health condition, as summarized in Table 2.

In this study, the subscale with the lowest average value was the mind/body and emotional domain, with 59.52 and 60.65 (Table 3), and the highest was the relational subscale, with 77.12. The results of the FertiQoL, generally describe the conditions felt by most people with infertility in Indonesia, which have an impact on their physical health, such as causing fatigue, pain, cognitive disorders such as low concentration, which have an effect on behavior, namely disrupting daily activities.

The same results obtained from a study in France that evaluated the impact of ART on painful symptoms and QoL in 206 women undergoing ART (IVF, IUI) at fertility...
clinic including those with and without endometriosis measured during treatment. The quality of those studies was moderate. In a prospective and controlled cohort study, it was found that women with infertility, whether having endometriosis or not, had similar FertiQoL scores, whereas those with endometriosis had a poorer quality of life in the mind-body domain.\textsuperscript{16} One study conducted by Santoro et al. in 2016 found out that women suffering from polycystic ovary syndrome (PCOS) had lower FertiQoL scores, in all domains except the relational subscale, than women with unexplained infertility. However, additional analyses indicated that the dissimilarity was due to the variation in disease symptoms, i.e. more body weight and hirsutism in the PCOS group.\textsuperscript{17}

In another study with average quality, Jordanian couples were observed to have a lower QoL in emotional, mind-body, and relational domains than Hungarian and German ones.\textsuperscript{18,19} A study by Chi et al in 2016 revealed that core subscale scores of a Korean sample were lower than the FertiQoL development sample.\textsuperscript{14} A study conducted by Valsangkar et al in 2011 also obtained similar results in comparing this FertiQoL development sample with a sample obtained from the Indian population.\textsuperscript{20} Another study by Madero et al in 2017 compared the scores of FertiQoL in men and women coming from France, Germany, as well as Italy who underwent cross-border oocyte donation in Spain.\textsuperscript{21} This study found that French patients presented lower quality of life in emotional and mind-body domains than Italian ones. Both German and French patients showed poorer QoL in the relational domain than those from Italy. However, in terms of social domain, Italian patients had a lower QoL than that of German patients.\textsuperscript{15}

Notably in this study, the average score of the relational subscale on FertiQoL Indonesia is the highest among other subscales with 77.12 and SD=14.75. This result differentiates this research from other studies. Based on the current analysis in Indonesia, the domain of relational infertility has not become a serious problem because Indonesian culture tends to see such a problem as a women's problem. Therefore, women prefer to accept the situation and try to live a married life even without children. Many infertile couples are aware that getting married is not always about having children. In many Asian countries, divorce is still considered a taboo subject.

Different countries have different cultures. A positive correlation among Italian couples who were approaching their first ART cycle was seen in the relational subscale and scores of FertiQoL on a relationship adjustment scale.\textsuperscript{22} Women experiencing a high marital distress indicated considerably poorer QoL in relational domain than those without troubled marriage.\textsuperscript{23} A study conducted by Lo et al in 2016 found the FertiQoL scores in relational domain of those suffering from sexual dysfunction were remarkably lower than people without it.\textsuperscript{24} Higher Treatment FertiQoL scores were linked to the measures of an improved patient-centered care in cross-sectional studies.\textsuperscript{25-27}

In this study, the reliability numbers in all domains are more significant than in previous studies which are marked by the size of Cronbach $\alpha$ for the total value of the questionnaire that was 0.92 and the value for each domain was >0.70 for an outline of the Cronbach’s coefficient alpha for each study that presented these data. In general, reliability is considered sufficient when $\geq 0.70$.\textsuperscript{28} In every study, the core FertiQoL reliability was >0.80. Furthermore, it was reported that the emotional, social, and mind/body subscales reliability was sufficient (>0.70) by excluding the social domain.\textsuperscript{19} On the other hand, an insufficient reliability was normally reflected in the relational subscale, with nearly all studies indicating alpha coefficients between 0.60 and 0.70. The reliability of the treatment module, as well as its environment and tolerability subscales, were >0.70 in all studies except the one conducted in Iran and another research in Turkey.\textsuperscript{29,30} Among five studies that reported it, all of them stated that the total reliability coefficient of FertiQoL was >0.90.

A total of 31 FertiQoL studies, which were conducted in various countries, indicated that the relational subscale was less reliable compared to other subscales.\textsuperscript{15} The same relational scales in the other measures of QoL seemed less trustworthy as well (e.g. WHO) QoL, factor loadings <0.50, reliability coefficients 0.60 to 0.70.\textsuperscript{31} The problems in the measurement are often connected with clinical characteristics, i.e. functional status.\textsuperscript{32} However, the analysis suggested possible cultural and conceptual underpinnings. For example, components with the lowermost factor loadings on the subscale of Social domain demanded that individuals have talked about their problems regarding fertility, by asking questions such as “Are you content with the supports from your friends?” or “Does your family comprehend what you are experiencing?”. Numerous people with infertility are not open to discuss about their fertility problems. In-depth, multi-country analyses would aid the determination of the finest measure to deal with the problems, such as item rewording, item removal, usage of total scores, and drop subscale. It is possible that the subscales of core and treatment should be tested on their own and not included in the total score. It is because the core and treatment FertiQoL are more reliable than the overall number of individuals. Finally, despite its promising application, there are infrequent studies on FertiQoL’s factorial validity, and so is the measurement invariance test. Therefore, FertiQoL should be used conscientiously until further psychometric studies are done.\textsuperscript{15}

The validity of the data from the FertiQoL questionnaire Indonesian version also shows that all question items are considered valid with a sample size of more than 200, \textit{r} table 0.1341 and all question items (36 questions) have a calculated \textit{r} value>$r$ table (Table 2). The above-mentioned research demonstrated that fertility QoL could be analyzed through women, people with psychological vulnerability,
as well as people with infertility in longer period of time with a lower score of QoL. These findings are in line with former studies in infertile populations. A study by Verhaar et al in 2007, for example, proved that infertile patients are vulnerable to depression and anxiety.\(^{33}\) Meanwhile, Chachamovich et al in 2010 applied other measures and found that patients with infertility had a lower quality of life. Another gender analysis suggested that men from lower socio-economic backgrounds (i.e. having less education, being unemployed) could possibly be at greater risk of low QoL. Since numerous researches were cross-sectional, the causation continues to be debated.\(^{34}\) One literature review also gives reliable data that FertiQoL was able to be enhanced by aiming at the adaptable risk factors for poor FertiQoL, or, by improving the protective factors through interventions, i.e. a cognitive-behavioral intervention.\(^{35}\)

FertiQoL is proved useful in practice. As a result, the less prosperous QoL of several groups of patients (e.g. those with endometriosis, PCOS) could be better understood. Treatment QoL forecasted decisional conflict and regret as well as objectives in the perseverance of treatment, despite not being actual dropout.\(^{36,37}\) Likewise, pretreatment FertiQoL scores predicted successful live birth and pregnancy in certain groups.\(^{17}\) More studies are required to confirm these linkages as the prospective studies and confounder analyses propounded that such projection could appear as a result of a variety of QoL factors (e.g. longer duration of infertility, more attempts in treatment, obesity) which might also influence the outcomes of the treatment. In addition, FertiQoL could also be able to detect the aspects of treatment which might affect the improvement of patients’ QoL. One review implied that the patient-centered care had a relation to greater level of QoL, including the assistance from professional medical workers such as nurses and doctors in reinforcing the partner relationship.\(^{38}\)

This study's main limitation is that its design does not consist of comparing the psychiatric level of infertile people receiving treatment to those who do not, which could help clarify some of the challenges encountered by couples in receiving infertility treatment. Therefore, our results can be used in future studies as control scores for further comparisons. The relatively large and controlled sample size is one of the strengths of this study. This study also contributes to the literature as one of the rare studies that assessed the psychometric characteristics of the FertiQoL questionnaire in Indonesia. The internal consistency of FertiQoL’s online version in Indonesian reached sufficient levels in the current research for further studies.

**CONCLUSION**

The review proved FertiQoL as a valid tool to reliably measure the QoL of those with fertility problems, which holds potential in a variety of settings for research and practical purposes. While several conceptual and methodological challenges still exist, the problems have already been well-handled and studied. Future efforts with FertiQoL can strive for better understanding of potential problems in the measurements such as invariance of FertiQoL across samples, producing a valid population normative scores, expanding clinical applications (e.g. identifying clinically significant thresholds), and broadening the comprehension of reported associations with FertiQoL through further challenging research designs (i.e. prospective studies).

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**REFERENCES**

1. WHO. Infecundity, Infertility and Childlessness in Developing Countries: DHS Comparative Report No.9. WHO: 2004.
2. Jones I, Cooke I, Kempers R, Brinsden P, Saunders D. International Federation of Fertility Societies Surveillance 2010:preface. Fertility and Sterility. 2011;95(2):491.
3. Kementerian KRI. Data dan Info: Profil Kesehatan Indonesia, 2017. Available at: https://pusdatin.kemkes.go.id/folder/view/01/struktur-re-publikasi-data-pusat-data-dan-informasi.html. Accessed on 21 April 2021.
4. Vo TM, Tran Q, Le CV, Do TT, Le TM. Depression and associated factors among infertile women at Tu Du hospital, Vietnam: a cross-sectional study. JWH. 2019;11:343-51.
5. Quillan J, Torres SRA, Greil AL. Infertility and life satisfaction among women. J Family Issues. 2007;28(7):955-81.
6. Boivin J, Schmidt L. Infertility-related stress in men and women predicts treatment outcome 1 year later. Fertil Steril. 2005;83(6):1745-52.
7. Palomba S, Daolio J, Romeo S, Battaglia FA, Marci R, La Sala GB. Lifestyle and fertility: the influence of stress and quality of life on female fertility. Reprod Biol Endocrinol. 2018;16(1):113.
8. Agostini F, Monti F, Andrei F, Paterlini M, Palomba S, La SGB. Assisted reproductive technology treatments and quality of life: a longitudinal study among subfertile women and men. J Assist Reprod Genet. 2017;34(10):1307-15.
9. Maroufizadeh S, Ghaheri A, Amini P, Omani Samani R. Psychometric properties of the Fertility Quality of Life instrument in Iranian infertile women. IJFS. 2017;10(4).
10. Domar AD, Gross J, Rooney K, Boivin J. Exploratory randomized trial on the effect of a brief psychological intervention on emotions, quality of life, discontinuation, and pregnancy rates in in vitro fertilization patients. Fertility and Sterility. 2015;104(2):440-51.
11. Osapay G, Osapay K. A Stress and fertility. Orvosi Hetilap. 2015;156(35):1430-4.
12. Boivin J, Takefman J, Braverman A. The Fertility Quality of Life (FertiQoL) tool: development and general psychometric properties. Human Reproduction. 2011;26(8):2084-91.
13. Brysbaert M. How many participants do we have to include in properly powered experiments?: a tutorial of power analysis with reference tables. J Cognition. 2019;2(1):16.
14. Taber KS. The use of Cronbach’s alpha when developing and reporting research instruments in science education. Res Sci Educ. 2018;48(6):1273-96.
15. Koert E, Takefman J, Boivin J. Fertility quality of life tool: update on research and practice considerations. Hum Fertil. 2019;1-13.
16. Santulli P, Bourdon M, Pesse M, Gayet V, Marcellin L, Prunet C, Ziegler D, et al. Endometriosis-related infertility: assisted reproductive technology has no adverse impact on pain or quality-of-life scores. Fertil Steril. 2016;105(4):978-87.
17. Santoro N, Eisenberg E, Trussell JC, Craig LB, Gracia C, Huang H, et al. Fertility-related quality of life from two RCT cohorts with infertility: unexplained infertility and polycystic ovary syndrome. Hum Reprod. 2016;31(10):2268-95.
18. Cserepes RE, Korosi T, Bugan A. Characteristics of infertility specific quality of life in Hungarian couples. Orvosi Hetilap. 2014;155(20):783-8.
19. Sixty RE, Hamadnejh J, Rosner S, Strowitzki T, Ditzen B, Toth B, et al. Cross-cultural comparison of fertility specific quality of life in German, Hungarian and Jordanian couples attending a fertility center. Health Qual Life Outcomes. 2016;14:27.
20. Valsangkar S, Bodhare T, Bele S, Sai S. An evaluation of the effect of infertility on marital, sexual satisfaction indices and health-related quality of life in women. J Hum Reprod Sci. 2011;4(2):80-5.
21. Madero S, Gameiro S, García D, Cirera D, Vassena R, Rodríguez A. Quality of life, anxiety and depression of German, Italian and French couples undergoing cross-border oocyte donation in Spain. Hum Reprod. 2017;32(9):1862-70.
22. Donarelli Z, Lo CG, Gullo S, Salerno L, Marino A, Sammartano F, et al. The Fertility Quality of Life Questionnaire (FertiQoL) Relational subscale: psychometric properties and discriminant validity across gender. Hum Reprod. 2016;31(9):2061-71.
23. Chan CHY, Lau HPB, Tam MYJ, Ng EHY. A longitudinal study investigating the role of decisional conflicts and regret and short-term psychological adjustment after IVF treatment failure. Hum Reprod. 2016;31(12):2772-80.
24. Lo SS, Kok W. Sexual functioning and quality of life of Hong Kong Chinese women with infertility problem. Human Fertility. 2016;19(4):268-74.
25. Aarts JW, Huppelschoten AG, Empel IW, Boivin J, Verhaak CM, Kremer JA, et al. How patient-centred care relates to patients’ quality of life and distress: a study in 427 women experiencing infertility. Hum Reprod. 2012;27(2):488-95.
26. Holter H, Sandin BAK, Gejervall AL, Wikland M, Wilde LB, et al. Quality of care in an IVF programme from a patient’s perspective: development of a validated instrument. Hum Reprod. 2014;29(3):534-47.
27. Pedro J, Canavarro MC, Boivin J, Gameiro S. Positive experiences of patient-centred care are associated with intentions to comply with fertility treatment: findings from the validation of the Portuguese version of the PCQ-Infertility tool. Hum Reprod. 2013;28(9):2462-72.
28. Peterson RA. A meta-analysis of Cronbach’s coefficient alpha. J Consum Res. 1994;21(2):381.
29. Maroufizadeh S, Ghaheri A, Amini P, Omani Samani R. Psychometric properties of the Fertility Quality of Life instrument in infertile Iranian women. Int J Fertil Steril. 2017;10(4):371-9.
30. Kahyaoglu SH, Balkanli KP. Quality of life in women with infertility via the FertiQoL and the Hospital Anxiety and Depression Scales. Nurs Health Sci. 2015;17(1):84-9.
31. Skevington SM, Lotfy M, Connell KA. The World Health Organization’s WHOQOL-BREF quality of life assessment: psychometric properties and results of the international field trial. Qual Life Res. 2004;13(2):299-310.
32. Schuler M, Musekamp G, Bengel J, Nolte S, Osborne RH, Faller H. Measurement invariance across chronic conditions: a systematic review and an empirical investigation of the Health Education Impact Questionnaire (heiQTM). Health Qual Life Outcomes. 2014;12(1):56.
33. Verhaak CM, Smeenk JMJ, Evers AWM, Kremer JAM, Kraaimaat FW, et al. Women’s emotional adjustment to IVF: a systematic review of 25 years of research. Human Reproduction Update. 2007;13(1):27-36.
34. Chachamovich JR, Chachamovich E, Ezer H, Fleck MP, Knauth D, Passos EP. Investigating quality of life and health-related quality of life in infertility: a systematic review. J Psychosomatic Obstet Gynecol. 2010;31(2):101-10.
35. Domar AD, Gross J, Rooney K, Boivin J. Exploratory randomized trial on the effect of a brief psychological intervention on emotions, quality of life, discontinuation, and pregnancy rates in in vitro

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fertilization patients. Fertil Steril. 2015;104(2):440-51.
36. Huppelschoten AG, Van DAJCM, Verhaak CM, Smeenk JMJ, Kremer JAM, Nelen WLDM. Differences in quality of life and emotional status between infertile women and their partners. Hum Reprod. 2013;28(8):2168-76.
37. Gameiro S, Canavarro MC, Boivin J. Patient centred care in infertility health care: Direct and indirect associations with wellbeing during treatment. Patient Educ Couns. 2013;93(3):646-54.
38. Asazawa K. Effects of a partnership support program for couples undergoing fertility treatment. Jpn J Nurs Sci. 2015;12(4):354-66.

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