

## ORIGINAL ARTICLE

# Language and Cross-cultural Influences in the Psychometric Evaluation of the Malaysian FertiQoL

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## ABSTRACT

**Introduction:** FertiQoL questionnaire was developed and validated in 2011. It has been widely used and translated into many languages to measure QoL among infertile individuals. The use of translated psychometric tools is often subjected to cross-cultural variations. The objective of this study is to assess the psychometric properties of the Malaysian FertiQoL. **Methods:** A study was conducted among attendees of a public infertility clinic. Demographic details were collected and respondents answered the Malaysian FertiQoL. The questionnaire consists of 34 items. Factor analysis and internal consistency were analysed using SPSS v24. **Results:** Data from 175 respondents were analysed. Mean age is 32.1 ±3.8 SD with 56.6% female and 43.4% male. KMO index were 0.826 and significant Bartlett's test for sphericity. For Treatment domain, factor loadings for items T2 and T5 were < 0.32 but for all other items were acceptable between 0.32 – 0.80 with no cross loadings and Cronbach alpha for environment (0.717) and tolerability (0.660). For Core items, Q4, Q6 and Q14 loaded onto different domains and Q19 had poor factor loading. All other items were acceptable. Cronbach alpha for specific domains were emotional (0.788) mind-body (0.829), relational (0.639) and social (0.666). Cronbach alpha for emotional, relational, social improved to 0.857, 0.643 and 0.732 if Q4, Q6 and Q14 were omitted respectively. **Conclusion:** The study identified six items that affected the psychometric validity of the questionnaire and maybe explained by language or cross-cultural reasons. However, the Malaysian FertiQoL can still be useful to measure QoL in those with infertility.

**Keywords:** FertiQoL, Infertility, Psychometric, Language, Cross-Cultural

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impacts may have a long or short-term effect on life satisfaction but it is evident that the diagnosis of infertility, treatment process, and acceptance has shown to have a major cause of loss in QoL (12-16).

## INTRODUCTION

Infertility extends beyond not having children but is related to a situation where a desired outcome, i.e. 'having a child', is not achieved (1,2). Ample studies have shown that infertility is closely related to distress, anxiety, depression and reduced quality of life (QoL) (3-8) and that modern infertility treatment also add to these problems because of their lengthy process, complexities and stressfulness (1,4). Infertility affects both men and women psychologically and emotionally, although they may respond differently (9-11). These psychological

There are numerous studies looking at the impact of infertility on QoL from various parts of the world but it is important to consider the differences surrounding culture and belief systems in determining such impact and its implications for treatment and counselling for a specific population (13,17-19). Often, the impact of infertility on QoL is influenced by social and cultural factors such as the society's view on infertility and the availability of psychosocial support (2,18). Furthermore, the use of psychometric instrument to measure QoL is often, subjected to the local language interpretation and cross-cultural variations (20).

Local Malaysian studies on infertility have so far focused on psychological effect, sexual relationships and coping styles (21-23). There is a need to measure the QoL in infertile individuals using an existing tool and to assess the applicability of the tool within each local population. The FertiQoL questionnaire is a self-reported tool that was developed in 2011 by experts from the European Society of Human Reproduction and Embryology (ESHRE) and the American Society of Reproductive Medicine (ASRM) and has been recognized as a specific assessment tool to measure QoL in all people experiencing fertility problems (24). It has been used widely including in many Asian countries (25-28). To date, the FertiQoL questionnaire has been translated by the original authors into 45 different languages including the Malaysian language and is freely available and downloadable from the FertiQoL website (24, 29). The objective of this study is to assess the psychometric properties of Malaysian FertiQoL.

## MATERIALS AND METHODS

### Study type and data collection

This was a cross-sectional study to assess the psychometric properties of the Malaysian FertiQoL. Data collection was conducted at a public infertility clinic for a period of six months from 1st February 2017 until 1st August 2017. All patients attending the clinic on data collection days were approached after they had registered at the counter and whilst sitting at the waiting area. A study information sheet and verbal explanation were given to the patients and they were invited to participate in the study. Inclusion criteria were adult men and women aged > 21 years old diagnosed with primary or secondary infertility. Exclusion criteria included those who were non-citizens or non-permanent resident or unable to read or write in the Malaysian language. Those who fulfilled the inclusion and exclusion criteria and agreed to participate signed a consent form and given a questionnaire to answer. The researcher was available on site for any questions or feedback from the respondents but was not allowed to aid the respondents or influence their responses.

### Sample size

The sample size calculation was based on sample to variable ratio (SVR), denoted as N:p ratio, where N refers to the number of respondents and p refers to the number of items studied. Guidelines recommends N:p ratio from 3:1 to 20:1 (30). This study used the N:p ratio of 5:1. (30). Therefore, based on the 34-items psychometric tool, the minimum sample size is 170 respondents. With an attrition rate of 10%, data collection required a minimum of 187 respondents.

### The psychometric assessment tool

The questionnaire included sociodemographic and background information of the respondents and the Malaysian FertiQoL questionnaire. The original FertiQoL

questionnaire was developed based on the WHO quality of life (QoL) working group that identified five aspects in QoL, which included emotional wellbeing, social functioning, physical health, patient environment, and personal beliefs (31). The FertiQoL questionnaire has the core component and treatment component. The core component consists of 24 items and categorized into four domains which are emotional, social, cognitive/physical (Mind-body) and relationship domains. The treatment component is optional and has two domains, which are environment and tolerability. The original authors conducted the translation and content validation process (29) and the Malaysian FertiQoL is available on the website <http://sites.cardiff.ac.uk/fertiqol/download/>. However, the study on psychometric properties of the Malaysian FertiQoL has yet to be conducted and this is analysed in this study.

### Statistical analysis

Data entry and analysis were performed using IBM SPSS version 24. Assessment of sampling adequacy and data appropriateness was conducted using Kaiser-Meyer-Olkin (KMO) and the Bartlett's Test of Sphericity. The KMO index was reported in a range of 0 to 1, with value of > 0.5 considered as suitable for factor analysis. Bartlett's Test of Sphericity with a p-value <0.05 is considered significant and suitable to proceed with factor analysis. Factor analysis was conducted on the 34-items Malaysian FertiQoL using Principal Axis Factoring (PAF). The reliability of the questionnaire was assessed using Cronbach alpha coefficient as a measure of internal consistency. The PAF was chosen due to the fixed six domains of the original psychometric tool and to assess the goodness of the fit of the items to the original domains. The factors were obliquely rotated using promax rotation in order to establish the underlying dimension and to provide construct validity. Cronbach's Alpha of > 0.7 was regarded as acceptable. Factor loadings were considered adequate if it was > 0.32.

### Ethics approval

Ethical approval was obtained from the University Ethics Committee with reference 600-RMI (5/1/6) and written permission was obtained from the original FertiQoL developers.

## RESULTS

The total number of data collected was from 197 respondents and 22 were excluded due to incomplete or missing data. Therefore, the number of data analysed was from 175 respondents and this fulfilled the N:p ratio of 5:1 (sample size 170). The mean age of respondents were 32.1 ±3.8 SD with 56.6% female and 43.4% male.

Table I shows the socio-demographic details of the respondents that include gender, race, education level, salary scale, smoking status and previous children. There

**Table I: Socio-demographic details of respondents**

Characteristics	Variables	Number (percentage %)
Gender	Men	76 (43.4)
	Women	99 (56.6)
Race	Malay	134 (76.6)
	Chinese	21 (12.9)
	Indian	15 (8.6)
	Bumiputera	5 (2.9)
Education level	Secondary school	36 (20.6)
	Certificate / Diploma	54 (30.9)
	Degree	67 (38.3)
	Masters / PhD	18 (10.3)
Salary scale*	≤ 3000	86 (50.6)
	3001 - 5000	56 (32.9)
	5001 – 10,000	25 (14.7)
	>10,000	3 (1.8)
	10,000 – 20,000	5 (2.9)
	> 20,000	
Smoking status*	Yes	38 (21.8)
	No	136 (78.2)
Previous children	Yes	16 (9.1)
	No	159 (90.9)

\*represents missing data

were more women compared to men respondents. The majority were degree holders; however, the majority earned less than RM3000 and considered as low-income earners. The majority were non-smokers and never had any children before.

The correlation matrix identified that many items were > 0.3 and this indicated that the factor analysis was appropriate. The KMO measures of sampling adequacy was 0.826 which is well above the recommended threshold of > 0.5 and the Bartlett’s Test of Sphericity reached statistical significance 0.0001 (<0.05) indicating the inter-item correlations were sufficiently large to proceed with factor analysis. The scree plot identified the possibility of eight components with total eigenvalues > 1. The total eigenvalues for the first component is 94% and total variance > 60% was reached at component 7 (62%). The total variance for component 6 was 58% and although it did not achieve the target of > 60% however, in order to maintain the original domains, the number of factors for analysis was fixed at 6. The factor correlation matrix identified no multicollinearity within domains and all component correlations matrix were < 0.80. The strongest correlation was 0.487 between emotional and mind-body domain.

Table II highlights the results following factor analysis (PAF) for all items within the core and treatment domains. The table is arranged according to the original domains. In general, factor analysis supported the four-factor model of core domains and two-factor model for

**Table II: Factor loading on Malaysian FertiQoL items for the six domains**

	Component					
	1	2	3	4	5	6
	Emo-tional	Mind/body	Rela-tion	Social	Envi-ronment	Tol-erabil-ity
Q4R Able to cope*	X			(.398) <sup>a</sup>		
Q7 Jealousy and resentment	.572	(.572)a				
Q8 Grief, not able have child	.645	(.645)a.				
Q9 Hope and despair	.664	(.645)a				
Q16 Sad and depress	.707	(.752)a				
Q23 Angry	.791					
Q1 Attention and concentration	(.531)a	.707				
Q2 Move ahead life goals	(.434)a	.792				
Q3 Drained or worn out	(.506)a	.796				
Q12 Interfere obligations		.565				
Q18 Bothered fatigue		.567				
Q24 Pain and discomfort		.474				
Q6 Satisfied sexual relationship*			X	(.715)a		
Q11R Partner affectionate			.686			
Q15R Strengthen commitment			.600			
Q19 Negative impact relationship*	(.737)a		.208			
Q20 Difficult talk partner	(.641)a		.352			
Q21 Content relationship			.653			
Q5 Support friends				.604		
Q10 Socially isolated				.481		
Q13 Uncomfortable social				.418		
Q14R Family understand*			(.514)a	X		
Q17 Inferior to others				.420		
Q22 Pressure society				.346		
T2 Medical services available*					.235	
T5 Staff understand*					.308	
T7 Quality services					.837	
Rate treatment					.818	
Quality information					.820	
Staff interaction with you					.732	
Negative affect mood						.459
Complicated procedure						.634
Bothered treatment on daily						.653
Physical side effect						.551

Extraction Method: Principal Axis Factoring  
 Rotation Method: Promax with Kaiser Normalization.  
 X = no factor loading on the original domain  
 (a) = cross-loading  
 Threshold accepted > 0.32  
 R = questions that are reversed coded

treatment domains. Four items within the core domains did not load onto the intended components. Q4 and Q6 loaded onto social domain instead of the original emotional and relational domain respectively. Q14 loaded onto relational domain instead of its original social domain and Q19 poorly loaded onto relational domain and cross-loaded onto emotional domain. There were also overlaps between emotional and mind-body domain. Two items, T2 and T5 poorly loaded onto the environment domain and needed to be removed.

Table III shows the Cronbach alpha for FertiQoL total and domains with overall Cronbach alpha > 0.7 suggesting high reliability. The relational, social, and tolerability domains are < 0.7 but improve when Q6, Q14, T2 and T5 are omitted.

**Table III: Cronbach alpha for Malaysian FertiQoL questionnaire core and treatment domains and improvements if specific questions were omitted**

Sections	Domains	Cronbach Alpha	Omission	Cronbach Alpha after omission
FertiQoL	Total	0.894		
Core	Total	0.888		
	Emotional	0.788	Q4	0.857
	Mind-body	0.829		
	Relational	0.639	Q6	0.643
	Social	0.666	Q14	0.732
Treatment	Total	0.701	T2 or T5	0.712
	Environmental	0.717	T2	0.760
	Tolerability	0.660		

## DISCUSSION

The Malaysian FertiQoL is a useful tool in measuring QoL among those who are infertile. The overall questionnaire is reliability (Cronbach alpha > 0.7). However, the study found that within individual core domains, the reliability of relational domain was lowest compared to mind-body, social and emotional. This result is similar to the Indonesian FertiQoL (28) where the relational domain is lower than other domains (< 0.7). This is important because both languages originated from the same linguistic root known as ‘Nusantara language’ and share similar culture and tradition that may produce similar responses towards the items within the domain.

The study found that Q4, Q6, and Q14 in the core component did not load onto its original domain and Q19 was poorly loaded onto its original domain. There were also overlap between emotional and mind-body domains which included Q1, Q2, Q3, Q7, Q8, Q9 and Q16. This overlapping between emotional and mind-body domain was reported and discussed in the Dutch FertiQoL study (16) and it was suggested that emotions, mood, distress and QoL were not separate domains and that physical functioning is often related to QoL (16).

Exploring item Q4 “Do you feel able to cope with your fertility problems?” and this was translated into “Adakah anda berasa anda mampu menghadapi masalah kemandulan anda”. This question did not load onto its original emotional domain but loaded onto the social domain (0.398). The Cronbach alpha would be higher if this question was removed from the emotional domain. It is therefore, suggested that Q4 is removed from the Malaysian FertiQoL. However, we may also need to explore the term ‘cope’ because referring to the Oxford dictionary English-Malay, there is no direct translated word for ‘cope’ in Malay and the word used, ‘mampu menghadapi’ means ‘able to face’. The respondents may translate this as a social coping rather than an emotional coping. Also, language or semantic expert review could be considered and to include clinical views on such discrepancies such as Q4, perhaps if the word ‘kemandulan’ was replaced by the word ‘kesuburan’, the item would have loaded differently.

The study found that if Q6 was removed, the reliability of the relational domain improved. Q6 is “Are you satisfied with your sexual relationship even though you have fertility problems”. This question also affected the reliability of the Indonesian study (28) and perhaps this is due to the shared language and cultural beliefs. In the Taiwanese study (26), the reliability was not affected by Q4 or Q6 but was instead, affected by Q11 and Q13. It is reasonable to conclude that these discrepancies are unlikely due to the construct of these items but rather is affected by language as well as cultural understanding of the items. This is because translation of a questionnaire is not simply about translating the literal meaning of the original source language (SL) to the target language (TL) but equally important, is the linguistic meaning and how the questionnaire can accommodate cross-cultural differences (32, 33). Further language and semantic expert analysis is needed to decipher these discrepancies.

Q14 is “Do you feel that your family can understand what you are going through?” The removal of Q14 improves reliability of the social domain and although originally, this item is within the social domain but it loads highly within the relational domain. This suggests the discrepancy within cross-cultural translation between two-target populations (34). This could be due to the cultural view of family as part or extension of the marriage relationship rather than a social relationship. On the other hand, Q19 is ‘have fertility problems had a negative impact on your relationship with your partner’ was found to be poorly loaded onto its original relational domain and cross-loaded onto emotional domain. Although this was a relationship matter however, the response was perceived as an emotional one. This discrepancy suggested that these above-mentioned items were more suitably placed in other domains and perhaps, cross-cultural translation needed to be explored.

As for the overlapping between the emotional and mind-body domain, if we explore the cross-cultural variations in the linguistics and interpretation of the items between the source and target populations. It is noticed that often the items in the Malaysian FertiQoL begin with the phrase 'Adakah anda rasa' (Do you feel) such as in Q4 and Q14. The word 'rasa' (feel) may relate to both, emotional or physical feelings for example, 'rasa sakit' is to feel pain whereas 'rasa marah' is to feel angry. Therefore, it is likely to fall within the same domain. As mentioned, this was also reported in the Dutch FertiQoL study (16). These language and cross-cultural variations may influence the respondents' responses and can affect the analysis of the psychometric properties of the questionnaire. Also, If we look at Q7, although it loads onto the emotional domain as intended but it also cross-loads onto the mind-body domain similar to Q8 and Q9. The original English sentence for Q7 is "*Do your fertility problems cause feelings of jealousy and resentment?*" In forward translation, the noun 'jealousy' and 'resentment' used in the English version may correspond to several synonyms with subtle differences in meaning and cultural connotations (33). For example, from the source language of the original questionnaire in English, the word 'jealousy' can be translated into the target language as 'cemburu' or 'iri hati', both having similar meaning but used in different cultural context. The word 'resentment' was translated to 'dengki'. Although in the translation process, the target language (dengki) fulfils a literal meaning to the source language (resentment) however, in the cultural context, this particular word has a negative connotation and is associated to ill-feeling and a wish for similar suffering in others. Therefore, using this word may provoke a negative response towards the question by respondents as they may feel the resentment but may not wish infertility upon others.

Studies have shown that cognitive and reasoning styles are different across cultures and may affect the way questions are viewed and answered (32-35). These cross-cultural differences can lead to different interpretation of the questions, affecting the responses and may even affect the importance of one domain over another within different cultures (22, 34-35). It is known that the impact of infertility on QoL from various parts of the world is influenced by differences surrounding culture and belief systems and has its implications for treatment and counselling for a specific population (13, 17-19). Therefore, it is expected that any psychometric tool measuring QoL in infertile individuals would more or less be affected by the local culture and societal influence. For further analysis, it is suggested that a confirmatory study is conducted by confirmatory factor analysis given that the original authors fix the domains and items.

## CONCLUSION

The Malaysian FertiQoL is an important and useful tool in measuring QoL in all infertile individuals. Generally, the questionnaire is reliable (Cronbach alpha > 0.7) but the study identified problems with four items in core domain and two items in treatment domain that affected the psychometric validity of the questionnaire. Therefore, researchers need to be careful in its interpretation as there may be language or cross-cultural variations in understanding and response to particular items. A focus group discussion or qualitative study based on these specific areas of discrepancies may reveal the cultural influences on QoL among infertile individuals.

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