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A diagnostic tool for family and marriage counseling with Muslim couples

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This study aimed to describe the development and psychometric properties of a questionnaire for Muslim couples and families based on how couples view and experience marital and family issues. A questionnaire was developed based on relevant literature and fine-tuned by a panel of experts. The questionnaire was administered to a sample of 1212 heterosexual Muslim individuals of 389 married couples aged 22–55 years old (overall mean age = 38.15 years, SD = 9.47; husbands' mean age = 38.25 years, SD = 9.23; wives' mean age = 38.06, SD = 9.70). The participants were divided into two subsamples for exploratory and confirmatory factor analysis and to draw Pearson correlations with the Dyadic Adjustment Scale (DAS) for validation procedures. The results indicate the strong statistical significance of a 22-item five-factor structure: structural attribute satisfaction, marital harmony, emotional and sexual harmony, spouse's family communication, and religious matters. The factors were interpreted theoretically and indicate a superior level of internal consistency. The validation process indicates that the questionnaire was appropriate for the targeted population. The validated tool is useful for the assessment of marital and family therapy with Muslim couples and families. The WIFAQ Questionnaire for Muslim Couples and Families (WQMCF) fills a critical gap in the market for a family health indicator that can be used in both local and national populations. In health care settings and organizations that provide services to families, the WQMCF may be an important screener of family and marriage counseling in Muslim couples. Individuals, communities, and nations can all benefit from a stronger understanding of the antecedents and outcomes of family health.

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Family therapy is a type of psychotherapy that focuses on family members' communication and conflict resolution. A psychologist, professional social worker, or licensed therapist typically provides family therapy. Unfortunately, the current clinical practices used by therapists may only provide a partial understanding of family or couples seeking therapy. This is because of the lack of valid and reliable instruments available to comprehensively depict the dynamics of the problem.

Similar to other modalities of science, family therapists need an accurate assessment tool for the evaluation of family and marital therapy (Doherty, 1985). Family therapists require a valid and reliable tool to determine the optimal prototype of treatment as well as to assess its effectiveness (West, 1988).

Sunderland et al. (2019) reported that the subjective nature and vast variety of symptoms associated with psychological disorders require the use of high-quality self-report measures to accurately recognize such experiences and facilitate diagnostic and intervention decision-making. The authors did, however, highlight numerous potential threats to measuring psychometric properties on the part of both respondents and the instrument, including faked good and bad response patterns, cross-cultural biases, a lack of insight, poor cognitive capacity, a lack of self-knowledge, and electronic administration as an alternative to paper-and-pencil instruments as well as measurement invariance across groups or cultures.

Springer et al. (2009) noted that a large portion of available measures are Western-made instruments that were initially developed and validated in the Western context and may lack validity with Muslim populations. Therefore, such measures may indicate this group's cognitive-mental conceptualization and psycho-emotional structure only and may have significant limitations when administered to Arabs or Muslims (Abi-Hashem, 2008). For instance, when administering the Family Cohesion Measure, Adaptability and Communication (FACES; Olson (1991)) to Muslim help-seekers, results indicate restrictive communication, entrapment, and role conflict, but such functions are not essentially impaired or abnormal in Muslim families (Daneshpour, 1998). In addition, measures of relationships that assess equivalence in joint decision-making, parental responsibilities, and household chores result in a misinterpretation of Muslim family dynamics (Springer et al. 2009).

There is a dearth of Arabic-validated measures for quantitative family and marriage counseling and of items peculiar to Arab Muslims' experiences, such as Islamic sharia rules and the degree to which the husband understands his wife's rights. The majority of psychological measures were developed and validated in non-Arab populations' cultures and do not consider factors such as a society's nature. Consequently, inaccurate results are obtained. The reported psychometric procedures do not guarantee acceptable levels of validity when translated directly into other languages and cultures, one of which is Arabic. Furthermore, most of these scales are outdated and thus not suitable for use in local communities. Hence, caution should be taken when interpreting their results. This is the case because the measures' norms are neither derived from local populations nor comprehensive or test for measurement invariance in both Arab and Western populations.

Arab and Muslim culture is complex in nature. In other words, men and women have distinct realms of influence, with males held accountable for the public sphere and women held accountable for the intimate sphere. There are considerable disparities in education and career prospects between men and women. In some Arab cultures, women are limited to caring and domestic roles (such as nursing, midwifery, gaining a degree, and educating children at home). Unfortunately, 60% of women continue to be illiterate in the region, and rules governing marriage, divorce, and inheritance tend to favor men (Al-Omari,

2008). It has been theorized that intrafamilial marriage is a beneficial approach for maximizing the security of couples, families, and communities. Moreover, Muslim men can have up to four wives as long as they are all equally treated, increasing lack of trust toward the Muslim male and increasing insecurity in Muslim women (Hamamy and Alwan, 2016). Muslim law tends to nullify the concept of divorce, but it is not prohibited, where the practice is commonplace. Getting divorced is more difficult for women than it is for men.

Generally, in some regions, such as the Arab region, there is a dearth of validated instruments using true scientific procedures for identifying couples with mental, emotional, or behavioral disorders that have been both clinically validated and culturally adapted. In such regions, the lack of culturally suitable mental health evaluation tools impedes screening patients for mental health diagnoses (Kaiser et al. 2019). Modest translation of diagnostic and therapeutic instruments, as they are frequently employed in practice as well as research, is unsatisfactory and results in erroneous and misinforming implications. Instead, methods of intensive clinical validation and cultural adaptation can ensure that evaluation instruments are locally reliable and valid (Kaiser et al. 2013). Furthermore, culturally adapted assessment instruments perform better in validation trials than instruments that have not been adjusted. The availability of culturally valid assessment tools with broad regional and linguistic applicability, which are required to detect individuals with common marital maladjustment and guide referral efforts at the community and primary health care levels, is one of the most significant facets of these reintroduced efforts to tackle Arab and Muslim mental health needs.

With all of this in mind, the current investigation aims to develop and validate a diagnostic tool for Muslim couples and families in the context of family therapy, considering the values of the Arab culture. The proposed tool will also help family counselors go beyond focusing only on the rights and duties between spouses or the negative aspects of past marital life, as it will focus on the future positive outlook of the marital relationship through understanding and awareness of the strengths and weakness of spouses, deploying them in the present and investing them in the future to increase feelings of marital happiness.

Method

Questionnaire development. The first step was to define constructs and content domains based on the previous literature; the second step was to produce and referee items, beginning with prewriting items—in Arabic—to chart all of the content of the conceptual characteristics. The conceptual characteristics and measuring items are displayed in Table 1. To ensure a strong connection between the items and features, two processes were conducted: assessment by family therapy experts and subsequent fine-tuning procedures.

First, three family therapy experts from the Family Consulting Center (WIFAQ) and Qatar University were provided with a set of 32 items developed for inspection to assess each domain's appropriateness. The experts' suggestions were incorporated with respect to their endorsement of the items' appropriateness in covering the anticipated conceptual content, and six items were removed as a result of the experts' suggestions. In addition, a think-aloud reflection process was used to develop the items and instrument with an opportunistic sample of ten couples with expected similar demographic characteristics (i.e., mean age, gender, ethnicity, education, and income) to the forthcoming participants. The research team reviewed the participants' comments, and these were assimilated when considered relevant. This stage was concluded with 38 five-point Likert scale items

Table 1 Conceptual characteristics and corresponding items.

Conceptual features	Items
Structural attribute satisfaction	WQMCF 18
	WQMCF 16
	WQMCF 14
	WQMCF 15
	WQMCF 17
Marital harmony	WQMCF 3
	WQMCF 2
	WQMCF 4
	WQMCF 5
Emotional and sexual harmony	WQMCF 1
	WQMCF 7
	WQMCF 10
	WQMCF 6
	WQMCF 8
Spouse’s family communication	WQMCF 9
	WQMCF 19
	WQMCF 21
	WQMCF 20
	WQMCF 22
Religious matters	WQMCF 12
	WQMCF 13

Table 2 Participant demographic information.

Demographics	N	Percentage
Spouses		
Husbands	604	49.8%
Wives	608	50.2%
Socioeconomic Status		
Low	311	25.7%
Middle	772	63.7%
High	129	10.6%
Level of Education		
Partial high school	105	8.7%
High school diploma	237	19.6%
Partial college	262	21.6%
Bachelor’s degree	433	35.7%
Master’s degree	162	13.4%
Doctorate degree	13	1.1%
Living situation		
Living with partner, no children	27	2.2%
Living with partner and children	1131	93.3%
Living with parents	54	4.5%

ranging from 1 = definitely not suitable to 5 = definitely suitable from the final version of the WIFAQ Questionnaire for Muslim Couples and Families (WQMCF).

Participants. A sample of 1325 heterosexual and monogamous Arab individuals was selected. All cases with missing values of more than 5% of missing data ($n = 113$) were omitted for each case regardless of couple status. The final sample comprised 1212 married couples aged between 22 and 55 years old (overall mean age = 38.15 years, $SD = 9.47$; husbands’ mean age = 38.25 years, $SD = 9.23$; wives’ mean age = 38.06, $SD = 9.70$).

Table 2 presents a full description of the sample demographics. The participants were recruited to the study by sending an invitation to existing WIFAQ clients and their relatives. The inclusion criteria included the following: participants had to be married for at least 2 years. Individuals range in age from 22 to 55 years old. At least a primary school education was required, and all participants spoke and read Arabic. For exclusion criteria, all participants had a history of substance addictions, mental illness, mental retardation, epilepsy, physical illness/any other comorbid psychiatric condition, such as multiple substance addictions, mental illness, mental retardation, epilepsy, or physical illness.

The sample was randomly divided into two subgroups for the validation analysis. The first sample, selected for the EFA, included 606 participants (303 couples), of which 48.84% were husbands (mean age = 37.69 years, $SD = 9.51$) and 51.16% were wives (mean age = 37.72 years, $SD = 9.24$). The second sample set was utilized for the confirmatory factor analysis (CFA) and consisted of 606 spouses (303 couples), 50.83% husbands (mean age = 38.71 years, $SD = 9.47$), and 49.17% wives (mean age = 38.44 years, $SD = 9.90$). Considering that the two subsamples were obtained via random sampling, characteristic features of participants thought to influence the results (e.g., age of participants) were considered and compared across these two cohorts to check that they were balanced. There were no differences between the two age cohorts in age, gender, marital status, income, or educational levels.

Instruments

The sociodemographic variables questionnaire. The Socio-demographic Variables Questionnaire (Q-SV-10; Toledano-Toledano

et al. 2019) is a ten-item questionnaire that assesses socio-demographic variables, including gender, age, education, the city of origin, religion, marital status, years married, the number of children, occupation and monthly household income. The Q-SV-10 was originally developed for caregivers of children.

The WQMCF is a 32-item scale developed to assess the future positive outlook of the marital relationship through understanding and awareness of the strengths and weaknesses of the spouses. The WIFAQ covers various aspects of marital and family dynamics, including structural attribute satisfaction, emotional and sexual harmony, communication within spouses’ family members, and religious affiliation. Participants are required to rate their responses on a 6-point Likert scale that ranges from 1 = always disagree to 6 = always agree. Reliability and validity outcomes are presented in the results section.

The dyadic adjustment scale (DAS-32; Spanier, 1976). The DAS is a 32-item instrument intended to measure couples’ relationship quality. The original version of the DAS includes items and subscales aimed at assessing intimacy, relationship satisfaction, affective expression, and related matters. In the Arabic version of the scale, participants are asked to rate their responses on a six-point Likert scale ranging from 1 = always disagree to 6 = always agree. In this study, the DAS showed a satisfactory level of reliability using Cronbach’s alpha ($\alpha:0.910$).

Procedure. The participants signed standard informed consent forms and completed debriefing forms; they completed the questionnaires in one session. The participants completed the testing session either at their homes or in a clinical setting. They completed the questionnaire in private without their spouses. They were informed that they had the right to withdraw at any point and that they were allowed to take a break whenever they needed to. The participants were assessed individually in suitable places; the assessment sessions lasted ~25–35 min. The participants started with the Q-SV-10, DAS, and WQMCF.

Ethics. All participants provided informed consent to participate. Ethical approval regarding this research was acquired from the Family Consulting Center Research Ethics and conformed with the Declaration of Helsinki ethical principles (Rickham, 1964).

Table 3 Loadings and item-total correlation (r) of items for each extracted factor.

Item	Loadings					R ²
	1	2	3	4	5	
WQMCF 14	0.84	0.19	0.14	0.12	0.13	0.84
WQMCF 15	0.84	0.15	0.16	0.11	0.10	0.82
WQMCF 16	0.81	0.15	0.14	0.12	0.13	0.81
WQMCF 18	0.76	0.18	0.07	0.19	0.04	0.78
WQMCF 17	0.75	0.19	0.08	0.20	0.09	0.79
WQMCF 3	0.16	0.82	0.18	0.08	0.14	0.82
WQMCF 4	0.16	0.79	0.16	0.09	0.12	0.78
WQMCF 5	0.15	0.76	0.17	0.07	0.17	0.77
WQMCF 2	0.22	0.73	0.18	0.07	0.12	0.75
WQMCF 1	0.17	0.70	0.18	0.09	0.13	0.71
WQMCF 8	0.13	0.17	0.78	0.21	0.14	0.75
WQMCF 7	0.12	0.18	0.72	0.13	0.14	0.70
WQMCF 10	0.08	0.13	0.64	0.20	0.16	0.65
WQMCF 9	0.07	0.18	0.64	0.14	0.16	0.63
WQMCF 6	0.13	0.17	0.63	0.08	0.17	0.63
WQMCF 19	0.08	0.10	0.14	0.78	0.11	0.50
WQMCF 20	0.10	0.13	0.11	0.69	0.11	0.48
WQMCF 21	0.18	0.03	0.25	0.49	0.01	0.57
WQMCF 22	0.19	0.03	0.10	0.40	-0.04	0.46
WQMCF 12	0.14	0.14	0.30	0.00	0.75	0.71
WQMCF 13	0.10	0.30	0.26	0.15	0.73	0.72
WQMCF 11	0.22	0.30	0.29	0.09	0.54	0.63
Eigenvalues	7.87	2.54	2.15	1.57	1.15	
Variance explained (%)	35.77	11.55	9.79	7.13	5.24	

Bold numbers show the factor that belongs to each variable. The total variance explained by the five factors is 69.48%. The maximum likelihood (ML) method with varimax rotation was used for EFA.

Statistical analysis. We conducted the statistical analysis using IBM SPSS Statistics for Windows, version 26 (IBM Corp., Armonk, N.Y., USA) and SMART-PLS software with the PLS algorithm method (Version 3.3, SmartPLS GmbH, Germany). First, exploratory factor analysis (EFA) was performed using the maximum probability procedure with varimax rotation for a subsample of 606 spouses. Second, CFA was performed using the maximum likelihood (ML) estimator considering an independent subsample of 606 subjects. Moreover, the measurement of invariance between husbands and wives was investigated to determine the extent to which the constructs were conceptualized similarly or differently between genders across both sample sets. Where gender differences were observed, these were examined to assess whether the disparities were due to actual gender differences or measurement error. Measurement invariance was performed across the whole cohort (Husbands: $N = 604$, $M_{age} = 38.25$, $SD = 9.23$, Wives: $N = 608$, $M_{age} = 38.06$, $SD = 9.70$).

Results

Results for WQMCF psychometric properties. Little’s missing completely at random test was conducted on the cases with <5% missing data that remained in the study ($n = 113$), and a significant result ($p < 0.02$) suggests that there was no link between the missing data of any observed or missing values (Tabachnick et al. 2007). There were no violations of normal distribution, indicated by skewness <3 and kurtosis <10 (Kline, 2005), for the two sample sets. No participants with <5% missing data were omitted from the study, and instead, the missing data were substituted using the expectation-maximization (EM) method.

Exploratory factor analysis. EFA was conducted after careful inspection of the assumptions. EFA was conducted by means of the

ML method of parameter estimation. Catell’s Scree Test inspection demonstrated a noticeable break between the fifth point and other points, indicating a solution of five factors. Potential overestimation of elements was avoided by using the eigenvalue criteria and therefore was deemed a correct option. The procedure was then replicated, imposing the answer to five factors using Varimax Rotation. Eight items were successively excluded (the process recurred following each exclusion) to improve the solution. Three more items were omitted despite vastly impacting two factors because of the lack of theoretical background for them. Therefore, an EFA with the ML procedure of the 22 items unresolved in the ultimate structure was continued. The final five-factor solution accounted for 69.48% of the common variances. According to Table 3, the first factor consisted of five items, with loadings ranging between 0.75 and 0.84, and displayed an eigenvalue of 7.87 and explained variance of 35.77%. The second factor explained 11.55% of the variance (eigenvalue = 2.54), with five items loading between 0.70 and 0.82. The third factor had five items with loadings between 0.63 and 0.78, with an eigenvalue of 2.15 and explained variance of 9.79%. The fourth factor consisted of four items with loadings of between 0.40 and 0.78 (eigenvalue = 1.57) and explained a variance of 7.13%. The final factor contained three items with loadings of between 0.54 and 0.75 (eigenvalue = 1.15) and explained variance of 5.24%.

According to the suggestion made by Tabachnick et al. (2007), using a limitation benchmark where all items must have factor loadings of at least 0.45, it is implied that they are suitable markers of the underlying variables. The Cronbach’s alpha analysis showed higher levels of internal consistency for Factors 1–5 with values of 0.91, 0.86, 0.73, 0.83 and 0.93, respectively (Table 4). This is considered to denote an excellent level of internal consistency (Nunnally and Bernstein, 1994).

Reliability analysis

Assessment of the measurement model. Cronbach’s alpha, composite reliability (CR), and factor loading were calculated using SmartPLS software version 3.3.6 (Ringle et al. 2015). The Cronbach’s coefficients for each factor exceeded the specified cutoff point of 0.70 (Cronbach, 1951; Nunnally, 1978). The coefficients were in the range of 0.778–0.867. The latent construct CR values ranged from 0.827 to 0.907. These findings bolster the measures’ internal consistency and reliability. In addition, the extracted average variance (AVE) ranged from 0.552 to 0.774. As a result, convergent validity is established (Fornell & Larcker, 1981). The assessment results of the measurement model are presented in Table 4.

As shown in Table 4, all of the correlations between the total score and each item are above 0.40, which means that all items remaining on the scale had a positive effect on the five factors in the course of developing a definitive measure of marital and family satisfaction (DeVellis, 2012).

We labeled the five factors as follows. Factor 1, structural attribute satisfaction, concerns satisfaction with the way a spouse organizes his or her own life and the resulting impact on his or her life. Factor 2, marital harmony, refers to “relationship happiness,” “conflict” and “closeness.” Factor 3, emotional and sexual harmony, refers to emotional and physical pleasure experienced in spouses’ sexual relationships, Factor 4, spouse’s family communication, covers the conception of spouses’ family roles in their marriage. Factor 5, religious matters, refers to religious beliefs about spouses’ rights and duties.

Validity. Since content validity was assessed during the item writing phase, it was important to conduct a discriminant and convergent analysis to assess construct validity. The next step was to verify concurrent validity to gain more insight into the underlying

Table 4 Assessment results of the measurement model.

Constructs and items	Loading	α	CR	AVE
<i>Structural attribute satisfaction</i>		0.907	0.931	0.73
My spouse understands my feelings.	0.856			
My spouse shows courtesy and respect to me.	0.853			
My spouse expresses his feelings after sexual relations.	0.839			
My spouse is honest with me.	0.829			
My spouse supports me.	0.824			
<i>Marital harmony</i>		0.858	0.898	0.639
We share our feelings with one another	0.845			
We are able to discuss things calmly	0.828			
We listen to each other	0.812			
We show our intimacy to each other	0.783			
We feel loved and accepted by one another	0.766			
<i>Emotional and sexual harmony</i>		0.729	0.831	0.552
There is a trust between us	0.794			
We show our feelings and desires for sexual pleasure.	0.778			
We use our need for sex as means of bargaining and putting pressure on each other	0.726			
I give my spouse the courtesy and respect that I wish to receive from him\her	0.725			
We communicate openly, honestly, and authentically with respect to our sexual relationship	0.719			
<i>Spouse's family communication</i>		0.827	0.895	0.741
My spouse considers my complaints to my family as interfering in our lives.	0.776			
We avoid our parents' interference in our privacy.	0.741			
My spouse considers my parents' advice to ruin our lives.	0.691			
My spouse considers my visits to my family to be the cause of our constant quarrels	0.638			
<i>Religious matters</i>		0.927	0.945	0.774
If I ask for sex, my spouse must respond immediately in obedience to God, even if he's not ready.	0.824			
Sometimes I fulfill my spouse's sexual needs just for God's sake	0.788			
I remain in my marriage because divorce is not preferable under Sharia law.	0.676			

Note: α Cronbach's alpha, CR composite reliability, AVE average variance extracted.

Table 5 Correlation between WQMCF factors and DAS subscales (n = 1112).

	Structural attribute satisfaction	Marital harmony	Emotional and sexual harmony	Spouse's family communication	Religious matters
Dyadic consensus	0.651	0.590	0.863	0.835	0.647
Dyadic satisfaction	0.661	0.558	0.641	0.662	0.723
Dyadic cohesion	0.760	0.629	0.677	0.740	0.657
Dyadic satisfaction	0.769	0.853	0.745	0.679	0.687

constructs and their nomological network. Discriminant and convergent validity are typical parts of CFA designed to ensure the observed variables' explained variances and correlations among the latent constructs. This involves a test of the internal validity of the hypothesized model. The concurrent validity criterion provides an external validation criterion as well as a correlation with other theoretically related variables (Hair et al. 2011; Kline, 2015).

The significant loadings were above the recommended cutoff of 0.50, and the amount of extracted variance for each component was between 0.72 and 0.91. The results for construct reliability and Cronbach's alpha coefficients indicate that all values were above the recommended cutoff criteria (0.70) (Gliem and Gliem, 2003). These findings imply that the WQMCF has good reliability as well as a five-factor structure.

To assess concurrent validity, the WQMCF components were correlated with the Dyadic Adjustment Scale (DAS) (Graham et al. 2006). The DAS is a well-established tool with well-documented psychometric properties, e.g., (Carey et al. 1993; Crane et al. 1991; Eddy et al. 1991). As given in Table 5, the results indicate that the correlations between the WQMCF factors and the four DSA subscales were stronger according to recommendations by Cohen et al. (2013). Consequently, we conclude that these strong correlations are an excellent indicator of the concurrent validity of the WQMCF.

Confirmatory factor analysis (CFA). To confirm the measurement theory, CFA was conducted using the ML estimator. CFA is a multivariate statistical method utilized to determine how well observed variables represent the number of underlying latent factors (Gallagher and Brown, 2013). As mentioned above, this model was applied to the second subsample of 606 participants. According to Hair et al. (2011), a standardized factor loading of >0.7 is suitable for CFA analysis. Therefore, to meet the criteria, items with standardized factor loadings of <0.7 were omitted (as in Table 6), and then the CFA procedure was conducted again. According to Table 7, the ranges of factor loadings for Factor 1 to Factor 5 were 0.86–0.91, 0.82–0.89, 0.77–0.86, 0.72–0.85, and 0.85–0.88, respectively.

The construct reliability values for each factor were examined to evaluate reliability suggested by Hair et al. (2011) to be >0.70. In the current study, the construct reliability values were as follows: Factor 1 (0.95), Factor 2 (0.93), Factor 3 (0.90), Factor 4 (0.84), and Factor 5 (0.90).

Moreover, we observed the average variance extracted (AVE) to evaluate convergent validity, which must exceed 0.5 (Fornell & Larcker, 1981). Convergent validity was measured for all factors through the values of AVE. In the current study, the AVE values for Factor 1 (0.77), Factor 2 (0.73), Factor 3 (0.64), Factor 4 (0.64), and Factor 5 (0.74) are above the minimum criterion value of 0.50.

Table 6 Standardized factor loadings, R^2 , variance extracted and reliability estimates for the hypothesized five-factor model (22 items).

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	R^2
WQMCF 14	0.91					0.82
WQMCF 15	0.89					0.80
WQMCF 16	0.88					0.77
WQMCF 18	0.86					0.73
WQMCF 17	0.87					0.75
WQMCF 3		0.89				0.79
WQMCF 4		0.86				0.74
WQMCF 5		0.86				0.73
WQMCF 2		0.84				0.71
WQMCF 1		0.82				0.67
WQMCF 8			0.86			0.74
WQMCF 7			0.82			0.68
WQMCF 10			0.78			0.61
WQMCF 9			0.77			0.59
WQMCF 6			0.77			0.59
WQMCF 19				0.81		0.65
WQMCF 20				0.78		0.60
WQMCF 21				0.75		0.56
WQMCF 22				0.63		0.39
WQMCF 12					0.86	0.73
WQMCF 13					0.88	0.78
WQMCF 11					0.85	0.71
Average variance extracted	0.77	0.73	0.64	0.55	0.74	
Construct reliability	0.95	0.93	0.90	0.83	0.90	
Cronbach's alpha	0.93	0.91	0.86	0.73	0.83	

Bold numbers show the factor that belongs to each variable.

Table 7 Standardized factor loadings, R^2 , variance extracted and reliability estimates for the hypothesized five-factor model (21 items).

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	R^2
WQMCF 14	0.91					0.82
WQMCF 15	0.89					0.80
WQMCF 16	0.88					0.77
WQMCF 18	0.86					0.73
WQMCF 17	0.87					0.75
WQMCF 3		0.89				0.79
WQMCF 4		0.86				0.74
WQMCF 5		0.86				0.73
WQMCF 2		0.84				0.71
WQMCF 1		0.82				0.67
WQMCF 8			0.86			0.74
WQMCF 7			0.82			0.68
WQMCF 10			0.78			0.61
WQMCF 9			0.77			0.59
WQMCF 6			0.77			0.59
WQMCF 19				0.85		0.72
WQMCF 20				0.83		0.68
WQMCF 21				0.72		0.51
WQMCF 12					0.86	0.73
WQMCF 13					0.88	0.78
WQMCF 11					0.85	0.71
Average variance extracted	0.77	0.73	0.64	0.64	0.74	
Construct reliability	0.95	0.93	0.90	0.84	0.90	
Cronbach's alpha	0.93	0.91	0.86	0.71	0.83	

Bold numbers show the factor that belongs to each variable.
We repeated the CFA again after removing Item 22 (the value of the standardizing factor loading was below 0.70).

Finally, the correlation between factors and the low inter-construct square correlation was examined to test multicollinearity. In this study, the range of correlation estimates is between 0.26 and 0.53, and the range of squared multiple correlations is between 0.07 and 0.28, as given in Table 8. These values indicate that the factors are independent, and there is no multicollinearity among the factors. Moreover, the analysis confirms the existence of discriminant validity since the AVE was calculated.

This analysis shows that according to Fornell and Larcker (1981) criteria, the discriminant analysis was confirmed since the constructs' AVE values are shown to be higher than the squared correlations with all of the other constructs in the model.

Discussion

The current study aims to assess and validate the structure and psychometric features of the WQMCF (Questionnaire for Muslim Couples and Families) for the assessment of marital and family therapy with Muslim couples and families considering the values of Arab culture. The proposed tool was also designed to help family therapists evaluate the rights and duties of spouses, the negative aspects of past marital life, and the future positive outlook of the marital relationship through understanding and awareness of the strengths and weaknesses of the spouses and deploying them in the present and investing them in the future to increase feelings of marital happiness. The WQMCF was applied to a sample of heterosexual and monogamous Muslim individuals in Qatar and Egypt. EFA and CFA results indicate that the WQMCF offers a five-factor model with satisfactory fit values,

including 1. structural attribute satisfaction, 2. marital harmony, 3. emotional and sexual harmony, 4. spouse's family communication, and 5. religious matters. The analyses reveal that the WQMCF tool provides an adequate level of internal consistency, construct reliability, and discriminant, convergent and concurrent validity. Finally, it was found that the WQMCF is a valid and reliable tool for evaluating marital and family therapy with Muslim couples and families (Fig. 1).

The study analysis indicates that the discriminant analysis was validated according to Fornell and Larcker (1981) criteria because the constructs' AVE values are demonstrated to be higher than the squared correlations with all of the other constructs in the model. The correlation estimates were between 0.26 and 0.53, and squared multiple correlations were between 0.07 and 0.28. These values suggest that the factors of the WQMCF are independent, with no multicollinearity among the tool factors, which confirms the presence of discrimination between tool groups. In line with this, Trinh and Phan (2020) found correlation values for Marital Satisfaction Scale subscales (emotional support, child-rearing, decision-making and financial management, cohesion, the division of responsibility, and housework) ranging between 0.21 and 0.47. Bayraktaroglu and Cakici (2017) found correlation values for the revised form of the DAS subscales of between 0.38 and 0.58 in a sample from North Cyprus. It is conceivable to infer that the research findings of Trinh and Phan (2020), Bayraktaroglu and Cakici (2017), and the current study have resemblances because Qatar, Egypt, and Northern Cyprus have similarities and Vietnamese cultures have collectivistic characteristics. In a study by Carver and Jones (1992), the correlation values for marital satisfaction subscales were found to be between -0.64 and 0.64, which may be because American culture has both collectivist and individualist characteristics. Simultaneous research to validate marital measures in different countries is necessary to develop a measurement tool devoid of cultural features.

Regarding convergent validity, the AVE was evaluated, which is expected to be higher than 0.5 (Fornell & Larcker, 1981). In the present study, the AVE values were 0.77 for Factor 1, 0.73 for Factor 2, 0.64 for Factor 3, 0.64 for Factor 4, and 0.74 for Factor 5. These values were between 0.72 and 0.91 in the study by Brkljačić et al. (2019), who worked on the validation of marital/relationship satisfaction. Overall, the values of convergent validity indicate that all within construct correlations are quite high and of almost

Table 8 Intercorrelations between WQMCF factors (n = 606).

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor1	-	0.17	0.11	0.11	0.13
Factor2	0.42	-	0.19	0.07	0.24
Factor3	0.33	0.43	-	0.07	0.28
Factor4	0.33	0.26	0.39	-	0.08
Factor5	0.37	0.49	0.53	0.28	-

Values below the diagonal are correlation estimates. Values above the diagonal are squared multiple correlations.

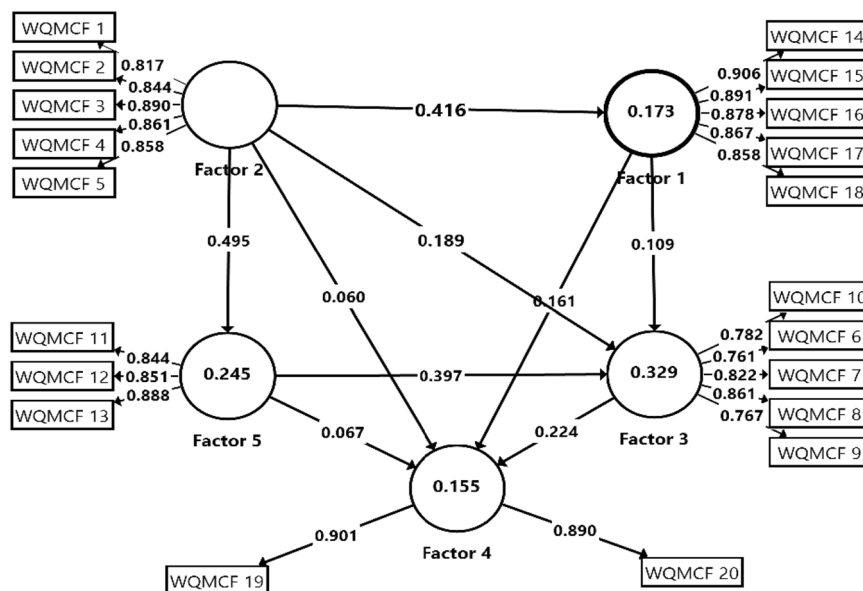


Fig. 1 Conceptual model of the five WQMCF factors. Confirmatory factor analysis and structural model of the diagnostic scale for Muslim couples and family.

identical magnitude. Since the cross-correlations among constructs are uniform and high, differentiation can be regarded as satisfactory (Fornell & Larcker, 1981). Thus, we can conclude that we would have to reject the model if these criteria were not met (Bagozzi & Yi, 2012). However, the findings regarding convergent validity show that the tool developed in this study is valid.

To evaluate concurrent validity, the WQMCF components were correlated with the DAS (Graham et al. 2006), which has well-documented psychometric properties (Carey et al. 1993; Crane et al. 1991; Eddy et al. 1991), to validate the tool by externally correlating with other theoretically related variables (Hair et al. 2011; Kline, 2015). The results show that the correlations between the WQMCF factors and the four DSA subscales were high (Cohen et al. (2013), ranging between 0.558 and 0.863. Inevitably, we can assume that the correlations between the WQMCF and the DSA are satisfactory, indicating the concurrent validity of the WQMCF. In line with the results of the present study, Trinh and Phan (2020) used the DAS of Spanier (1976) to assess the concurrent validity of the Marital Satisfaction Scale. As in this study, they found a positive correlation between these two measures (0.623).

Conversely, Bozoglan (2015) established a negative correlation between the SRSI and the DAS as expected when he examined Retired Spousal Intrusion Scale (SRSI) psychometric properties. This also indicates that the DAS is a valid and reliable tool for concurrent validity. This study is important in supporting the present study in terms of validity, as it was also conducted in a Middle East country.

Regarding the reliability of the WQMCF, Cronbach's alpha analysis demonstrated high levels of internal consistency for Factors 1 to 5 with values of 0.93, 0.91, 0.86, 0.73, and 0.83, respectively, indicating that all values were above the proposed criteria (0.70) (Giem and Giem, 2003). These values are regarded as denoting an excellent level of internal consistency (Nunnally, 1994). Cronbach's alpha values were measured at between 0.71 and 0.92 (Vishwas et al., 2017); 0.77 and 0.83 (Trinh & Phan, 2020); 0.73 and 0.95 (Canel, 2013); 0.75 and 0.83 (Fişiloğlu & Demir, 2000); 0.73 and 0.94 (Spanier, 1973) and 0.74 and 0.87 (Bayraktaroglu & Cakici, 2017) in studies focused on the validation of the marital satisfaction scale, measurement of marital quality and DAS. These Cronbach's alpha values are in line with the values computed in this study. Overall, the values obtained in the current study range from excellent to acceptable (George & Mallery, 2019).

Conclusion

To my knowledge, the current research is the first study to validate the Questionnaire for Muslim Couples and Families for the evaluation of marital satisfaction and harmony, emotional and sexual harmony, family communication, and religious matters with Muslim couples and families considering the values of Arab culture. The current report indicates that the WQMCF is a consistent and valid tool to assess marriage in Arab and Muslim contexts. This study's main strength lies in its application of EFA and CFA to two different samples. Accordingly, the cross-validation of two different samples for the WQMCF on couples who reside in Qatar and Egypt reinforces the strength of the current study.

Limitations and future implications. The current research has a number of limitations that can guide future work. First, because the data were gathered in a range of contexts, the study outcomes could be considered subjective. Various locations of data collection may have influenced the inclinations of the participants and the findings. Second, this study depended on the survey method only, and upcoming studies may use supplementary data

collection procedures such as face-to-face interviews to collect more robust and comprehensive data. Third, the study was built on a cross-sectional design. Although the two data samples had joint characteristics, the cross-sectional models cannot imply a causal relationship between the variables used in the study. After all, the participants were between 22 and 55 years old. To diversify the study sample, future studies should include participants from different age groups. A longitudinal model of interviewing similar couple groups over a long time might be implemented. In addition, forthcoming studies may test the WQMCF in various Arab countries. Therefore, the current study findings suggest that the WQMCF can be applied in confidence in future research in Arab countries for couples and families. Nevertheless, an additional assessment of the applicability of the WQMCF in Arab culture and other cultures is required to broaden the generalizability of the tool and propose more pragmatic support for its validity.

Despite the limitations mentioned above and the need for more in-depth research, this study sheds light on initial steps toward developing a valid, accurate, and comprehensive measure of family and marriage counseling with Muslim couples among a varied group of populations. The WIFAQ fills a critical gap in the market for a family health indicator that can be used in both local and national populations. In health care settings and organizations that provide services to families, the WQMCF may be an important screener of family and marriage counseling in Muslim couples. Individuals, communities, and nations can all benefit from a stronger understanding of the antecedents and outcomes of family health.

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References

- Abi-Hashem N (2008) Arab Americans: Understanding their challenges, needs, and struggles. In *Ethnocultural perspectives on disaster and trauma*. Springer, New York, NY p 115–173.
- Al-Omari J (2008) *Understanding the Arab culture: A practical cross-cultural guide to working in the Arab world*. Hachette UK.
- Bagozzi RP, Yi Y (2012) Specification, evaluation, and interpretation of structural equation models. *J Acad Mark Sci* 40(1):8–34
- Bayraktaroglu HT, Cakici ET (2017) Psychometric properties of revised form of the dyadic adjustment scale in a sample from North Cyprus. *Int J Educ Sci* 19(2-3):113–119
- Brkljačić T, Glavak Tkalić R, Lučić L, Sučić I, Kaliterna Lipovčan L (2019) A brief scale to measure marital/relationship satisfaction by domains: metrics, correlates, gender and marriage/relationship status differences. *Društvena istraživanja: časopis za opća društvena pitanja* 28(4):647–668
- Bozoglan B (2015) Spousal intrusion as a predictor of wives' marital satisfaction in their spouses' retirement. *Psychol Rep* 116(3):921–935
- Carey MP, Spector IP, Lantinga LJ, Krauss DJ (1993) Reliability of the dyadic adjustment scale. *Psychol Assessment* 5(2):238
- Carver MD, Jones WH (1992) The family satisfaction scale. *Social Behavior and Personality: an international journal* 20(2):71–83
- Canel AN (2013) The development of the marital satisfaction scale (MSS). *Educ Sci: Theory Pract* 13(1):97–117
- Cohen J, Cohen P, West SG, Aiken LS (2013) *Applied multiple regression/correlation analysis for the behavioral sciences*. Routledge, New York
- Crane DR, Busby DM, Larson JH (1991) A factor analysis of the Dyadic Adjustment Scale with distressed and nondistressed couples. *Am J Family Ther* 19(1):60–66
- Cronbach LJ (1951) Coefficient alpha and the internal structure of tests. *Psychometrika* 16(3):297–334
- Daneshpour M (1998) Muslim families and family therapy. *J Marital Family Ther* 24(3):355–368
- DeVellis R (2012) *Evaluate the items. Scale development: theory and applications*. 3rd ed. SAGE, Thousand Oaks, CA, p 104–110
- Doherty WJ (1985) Values and ethics in family therapy. *Counseling Values* 30(1):3–8

- Eddy JM, Heyman RE, Weiss RL (1991) An empirical evaluation of the Dyadic Adjustment Scale: Exploring the differences between marital” satisfaction” and” adjustment. *Behav Assess* 13(3):199–220
- Fişilöglü H, Demir A (2000) Applicability of the dyadic adjustment scale for measurement of marital quality with Turkish couples. *Eur J Psychol Assess* 16(3):313–328
- Fornell C, Larcker DF (1981) Evaluating structural equation models with unobservable variables and measurement error. *J Mark Res* 18(1):39–50
- Gallagher MW, & Brown TA (2013) Introduction to confirmatory factor analysis and structural equation modeling. In *Handbook of quantitative methods for educational research*. Brill Sense, p 287–314.
- Gliem J, Gliem R (2003) *Calculating, interpreting, and reporting Cronbach’s alpha reliability coefficient for Likert-type scales*. Presented at the Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education, The Ohio State University. Retrieved from <https://scholarworks.iupui.edu/bitstream/handle/1805/344/Gliem+&+Gliem.pdf?sequence=1>
- Graham JM, Liu YJ, Jeziorski JL (2006) The *dyadic* adjustment scale: a reliability generalization meta-analysis. *J Marriage Family* 68(3):701–717
- George D, Mallery P (2019) *IBM SPSS statistics 26 step by step: A simple guide and reference* (15 ed.). Routledge, New York.
- Hair JF, Ringle CM, Sarstedt M (2011) PLS-SEM: Indeed a silver bullet. *J Marketing Theory Pract* 19(2):139–152
- Hamamy H, Alwan S (2016) The sociodemographic and economic correlates of consanguineous marriages in highly consanguineous populations. In *Genomics and Society*. Elsevier, USA p 335–361.
- Kaiser BN, Kohrt BA, Keys HM, Khoury NM, Brewster A-RT (2013) Strategies for assessing mental health in Haiti: Local instrument development and transcultural translation. *Transcultural Psychiatry* 50(4):532–558
- Kaiser BN, Ticao C, Anojé C, Minto J, Boglosa J, Kohrt B (2019) Adapting culturally appropriate mental health screening tools for use among conflict-affected and other vulnerable adolescents in Nigeria. *Global Mental Health* 6:e10
- Kline RB (2005) *Methodology in the social sciences*. Guilford Publications. New York
- Kline RB (2015) *Principles and practice of structural equation modeling*. Guilford Publications. New York, NY
- Nunnally JC (1994) *Psychometric theory* 3E. Tata McGraw-hill education. New York, NY
- Nunnally JC, Bernstein IH (1994) The Assessment of Reliability. *Psychometric Theory* 3:248–292
- Nunnally JC (1978) *Psychometric theory* (2 ed.). McGraw-Hill
- Olson DH (1991) Commentary: three-dimensional (3-D) circumplex model and revised scoring of FACES III. *Fam Proc* 30(1):74–79
- Rickham P (1964) Human experimentation. Code of ethics of the world medical association. Declaration of Helsinki. *Br Med J* 2(5402):177–177
- Ringle CM, Wende S, Becker JM (2015) SmartPLS 3. SmartPLS GmbH, Boenningstedt. <http://www.smartpls.com>
- Spanier GB (1976) Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *J Marriage Fam* 1:15–28
- Springer P, Abbott D, Reisbig A (2009) Therapy with Muslim Couples and Families: Basic Guidelines for Effective Practice. *Fam J* 17:229–235
- Sunderland M, Batterham P, Calear A, Carragher N (2019) Self-Report Scales for Common Mental Disorders. In M. Sellbom (Ed), *The Cambridge Handbook of Clinical Assessment and Diagnosis*. Cambridge University Press, Cambridge p 263–277.
- Tabachnick BG, Fidell LS, Ullman JB (2007) *Using multivariate statistics*, Vol 5. Pearson, Boston, MA
- Toledano-Toledano F, Rodríguez-Rey R, Moral de la Rubia J, Luna D (2019) A Sociodemographic variables questionnaire (Q-SV) for research on family caregivers of children with chronic disease. *BMC Psychol* 7(1):1–10. 7
- Trinh L, Phan HT (2020) Preliminary development of the vietnamese marital satisfaction scale (MSS-VN): a pilot study using a Vietnamese intellectual sample. *Health Psychol Report* 8(1):83–96
- Vishwas HN, Reddy JS, Katravath PK, Kumar N, Posanpally PKB, Gattikoppula H (2017) Translation and validation of Telugu version of marital satisfaction scale (T-MSS). *Indian J Pharm Pract* 10(1):51–58
- West JD (1988) Marriage and family therapy assessment. *Counselor Educ Super* 28:169–180

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Competing interests

The authors declares no competing interests.

Ethical approval

This study was approved and reviewed by the Family Consulting Center Research Ethics and conformed with the Declaration of Helsinki ethical principles (Rickham, 1964).

Informed consent

A formal letter of request from the testing section of the Family Consulting Center in Doha, Qatar was supplied by the researchers prior to beginning data collection. Purposive sampling was used to choose the participants, and they were asked to determine their willingness to participate and provide data on the study’s topic. We briefed participants on the study’s overarching goals and purpose to ensure the validity and reliability of their responses.

Additional information

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