Original Article

Development and psychometric evaluation of the contraceptive attitude questionnaire

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Abstract

Context: Individual attitudes are a factor that affects the use of contraceptive methods. It is known that positive or negative attitudes affect the use of contraceptives.

Aims: This study aimed to develop an intelligible tool which can measure attitudes toward contraceptive methods that the healthcare personnel in Turkey can easily apply.

Setting and Design: This study is a methodological research. A simple random sampling method was used. The sampling of the study was made up of 300 women and men aged 15 and over who were referred to the two family healthcare centers. An information form and the final primary version of Contraceptive Attitude Scale consisting of 35 attitude items were used for data collection.

Materials and Methods: This study was conducted in two phases. Developing the items of the contraceptive attitude questionnaire (CAQ) was conducted in Phase I using the deductive method. In phase 2, the psychometric properties of the questionnaire were evaluated.

Statistical Analysis Used: Content validity ratio, content validity index, Kaiser-Meyer-Olkin coefficient, Bartlett's test of Sphericity, Pearson Product-Moment Correlation Coefficient, and Cronbach's alpha reliability coefficient were used. Furthermore, fit indices were calculated (Root Mean Square Error of Approximation [RMSEA], normed fit index [NFI], comparative fit index [CFI] non-NFI [NNFI], adjusted goodness of fit index [AGFI], goodness of fit index [GFI]).

Results: After the exploratory factor analyses, it was determined that the 25 items in the questionnaire were grouped under three factors. The internal consistency coefficient was found to be 0.90, 0.89, 0.84, and 0.77 for CAQ, Factor 1, 2, and 3, respectively. In the confirmatory factor analyses, it was determined that the Chi-square value of CAQ was significant and that the data were sufficient for the model ($\chi^2 = 1080.90$, $df = 272$, $\chi^2/df = 3.97$, $P = 0.000$). Of the fit indices in CFA, the following values were found: RMSEA = 0.059, NFI = 0.95, NNFI = 0.97, CFI = 0.98, AGFI = 0.73, and GFI = 0.78.

Conclusion: The CAQ was determined to be a valid and reliable measurement tool in Turkey. The questionnaire is suitable for use to protect and improve the reproductive health of women and men as it determines attitudes toward the use of contraceptive methods.

Keywords: Attitude, Contraception, Psychometrics, Reliability, Reproductive health, Validity

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INTRODUCTION

The use of contraceptive methods means that all individuals can control the number of children that they have, freely decide on the time interval between pregnancies, and use the method that they want for this purpose.[1] Having information about contraceptive methods is highly important when deciding whether to use a specific method and selecting the method to be used. While the prevalence of using contraceptive methods in married women aged between 15 and 49 was 73.0% in (Turkey Demographic and Health Survey [TDHS] 2008, it was 73.5% in TDHS in 2013). However, it is known that approximately one-third of the method users selected traditional methods. In TDHS 2008, the family planning needs of 8.0% of already married women in Turkey were unmet; this figure decreased to 6.0% in TDHS 2013. According to this information, it can be said that the use of contraceptive methods increased, but that it has still not reached the desired level.[2,3]

There are a number of factors that affect individuals' use of contraceptive methods. Some of these factors include pregnancy, birth, the number of living children and abortions, age, education, employment status, duration of the marriage, place of residence, the reliability of the method, expectations of society, false beliefs, and individual and familial attitudes. [4-6] In addition, another factor that affects the use of contraceptive methods is reported to be individual attitudes.[4] It is known that positive or negative attitudes affect the use of contraceptives. However, almost all of the individuals in our country have information about contraceptive methods. It is thought that the reason for the use of a method not being at the desired level is the negative attitudes of the individuals toward them.[5,7] In the study of Ayaz and Efe, it was stated that the characteristics such as educational level, number of pregnancies, desire to have children in the future, and knowing and using any contraceptive methods affect the attitude toward contraceptive methods.[7]

Healthcare personnel should determine the attitudes of individuals against contraceptive methods, make up for the incomplete information, and correct misinformation. Revealing the attitudes that affect the use of contraceptive methods of individuals is an important factor that will contribute to the planning of contraceptive method services. To do this, there is a need for high quality and various measurement tools with different items developed through administration on different samplings. It is thought that the contraceptive attitude questionnaire (CAQ), which still needs to be developed, will help individuals to plan and implement their services and evaluate the outcomes by getting to know the group to be served and will contribute to the field.

Therefore, this study aimed to develop an intelligible tool which can measure attitudes toward contraceptive methods that the healthcare personnel in Turkey can easily apply.

Research questions:
1. Is this questionnaire valid in Turkish society?
2. Is this questionnaire reliable in Turkish society?

MATERIALS AND METHODS

This study is a methodological research which was conducted in the following two phases:

Phase I: The development of CAQ
Phase I was conducted in the following a step:

Step I: Developing the attitude items
When the developing the items of CAQ was used the deductive method. While writing the items related to the attitude questionnaire, a literature review about attitudes and attitude measurement was conducted. In addition, the theoretical structure related to attitude (aspects of attitude: Cognitive, affective, behavioral, etc., the severity and intensity of attitude, etc.) and the issues that are appropriate to this theoretical structure (expression, content, severity of the attitude phrases, etc.,) were taken into account.[5,8-10] Thus, a pool of items was created by the research team. A primary version of CAQ was developed by using 46 attitude items in the pool which were determined to be appropriate. Items were scored on a five-point Likert scale as follows: "totally disagree" (1), "disagree" (2), "neither disagree nor agree" (3), "agree" (4), and "totally agree" (5).

Phase II: Psychometric evaluation
Psychometric properties of CAQ were assessed in the following three steps:

Step I: Content validity assessment
Qualitative content validity assessment
For qualitative content validity assessment, eleven experts (five professors, three associate professors, and three assistant professors), who are experts in the field of obstetrics and gynecology nursing were requested to comment on the comprehensibility, grammar, wording, scoring, adequacy, clarity, and simplicity of the CAQ items. Then, the items were revised based on their comments. After qualitative content validity assessment, 10 questions were modified and two questions were deleted.

Quantitative content validity assessment
For quantitative content validity, 11 experts were asked to give their opinion about the necessity of the questions

in terms of "it is necessary" and "it is helpful but not necessary," and "it is not necessary" and content validity ratio (CVR) for all questions was calculated.

For determining content validity index (CVI), the terms "not related (1 point)," "somehow related (point 2)," "related (point 3)," and "strongly related (point 4)" were used. The CVR score more than 0.70 was preserved in the final version of the CAQ. In addition, it is calculated the CVI for the whole instrument, considering a value >0.80.[11] Questions with score <0.80 also omitted. In the qualitative content validity assessment of the CAQ, eight questions were deleted.

After the qualitative and quantitative validity assessment, the primary version of CAQ was included 36 items.

Pilot study
To determine the intelligibility of the attitude items reorganized after the expert opinions were obtained, the questionnaire was piloted to 6 people (3 men and 3 women). A 5-point scaling system ranging from was used to respond to the items. Of the 36 items in total, one was identified as "unintelligible" by the women and men. This was discussed by the researchers and the item was removed from the primary version of CAQ. As a result, the final primary version of CAQ consisting of 35 attitude items was obtained for implementation.

Step II: Construct validity assessment
Exploratory factor analysis (EFA) was applied for the construct validity of CAQ. In this phase, the Kaiser-Meyer-Olkin (KMO) coefficient was calculated and the Bartlett's test of Sphericity was conducted to determine whether the data were suitable for the analysis of basic components. The varimax rotation technique was used to obtain the factors. The factors emerging as a result were named and interpreted. In order to determine the number of factors, the scree plot test method created based on the eigenvalues of factors was used.[12] The graph was obtained by combining the points that arise as a result of matching the factors with the eigenvalues. The factor with high acceleration and sharp drops in the graph gives the number of factors.

Confirmatory factor analysis (CFA) was conducted to determine the relationship between the variables and the factors, to test whether the relationship between the factors identified by the EFA was adequate, and determine whether the model was sufficient to define the factors.

Participants
The universe of the study consisted of men and women referred to the two family healthcare centers in Ankara.

The number of samples was determined according to the two rules used in scale development. First, some experts recommend a sample size of 200–300, which is necessary for factor analysis. Other researchers have graded sample sizes as poor ($n = 100$), fair ($n = 200$), good ($n = 300$), very good ($n = 500$), and excellent ($n = 1000$ or more)[13] Second, the number of people included was expected to be 5–10 times the number of items assessed.[14] Hence, the sampling of the study was made up of 300 literate women and men aged 15 and over who were referred to the two family healthcare centers, agreed to participate in the study, and had no communication problems between January 2017 and August 2017. Simple random sampling method was used. Participation's characteristics are shown in Table 1.

Investigation
An information form and CAQ were used for data collection. The information form was developed based on the related literature and consisted of nine items that questioned the socio-demographic characteristics of women and men and the use of contraceptive methods.[5,8]

Participants were asked to fill in the information form and the primary version of CAQ by themselves. Fifteen minutes were given for this all participants.

Step III: Reliability analyses
To test the reliability of the CAQ, the test re-test analysis and the internal consistency analysis were conducted. In order to perform the test-retest analysis of the CAQ, the test was re-administered to 30 participants under the same conditions at the highest level after an interval of 15 days. The test-retest reliability of the questionnaire was analyzed using the Pearson Product-Moment Correlation Coefficient. When the internal consistency analysis was conducted, Cronbach's alpha reliability coefficient was used.

Statistics
The data obtained by the administration of CAQ to the participants were analyzed on LISREL 8.80 and SPSS 20.0 software packages (Computer Program, International Business Machines, New York, USA), and the questionnaire tested whether it was a valid and reliable tool. The level of significance was defined as $P < 0.05$ in this study.

Ethical considerations
At the outset, written approval of the related institutions and ethical approval of the Ethics Committee (77082166-604.01.02-08.12.2016) were obtained. In addition, the women and men were informed about the purpose of the study and the data collection tools, and their written informed consent was obtained.

Table 1: Some of the descriptive characteristics of the participants (*n*=300)

Characteristics	Mean±SD
Age	30.73±7.56
Age groups, *n* (%)	
18-25	68 (22.7)
26-33	140 (46.7)
34-41	54 (18.0)
≥42	38 (12.6)
Sex, *n* (%)	
Female	170 (56.7)
Male	130 (43.3)
Marital status, *n* (%)	
Married	160 (53.3)
Single	140 (46.7)
Educational level, *n* (%)	
Primary school	37 (12.3)
Secondary school	67 (22.3)
High school	138 (46.0)
Bachelor's and postgraduate	58 (19.4)
Working status, *n* (%)	
Employed	221 (73.7)
Unemployed	79 (26.3)
Perceived income level	
Incomes lower than their expenses, *n* (%)	64 (21.3)
Incomes as equal to their expenses	166 (55.4)
Incomes more than their expenses	70 (23.3)
Status of chronic disease, *n* (%)	
Yes	30 (10.0)
No	270 (90.0)
Status of using contraceptive methods, *n* (%)	
Yes	117 (39.0)
No	183 (61.0)
Type of contraceptive methods (*n*=117), *n* (%)	
Condom	68 (58.1)
Coitus interaptus	34 (29.0)
Intra uterine device	9 (7.7)
Oral contraceptives	5 (4.2)
Tube ligation	1 (1.0)

SD: Standard deviation

RESULTS

Results of construct validity assessment
Exploratory factor analyses
The questionnaire was determined to be suitable for EFA since the KMO coefficient, which was found to be 0.92, and the Barttlet's test of Sphericity value ($\chi^2 = 5074.626$, df = 595, $P = 0.000$) were statistically significant.

The varimax vertical rotation technique was applied to determine the independent dimensions of the questionnaire and the factor load values were examined. Items loading more than one factor and with a difference of <0.10 between these values were excluded from the analysis and the EFA was repeated. As a result, 10 items were excluded from the questionnaire. It was determined that the 25 items in the questionnaire were grouped under three factors. The factor load values of 25 items in the questionnaire ranged between 0.342 and 0.802 [Table 2]. The factors in the questionnaire explain 50.17% of the total variance [Table 2].

The first factor consisted of 10 items (1, 3, 4, 6, 7, 8, 10, 11, 19, and 26), and the factor load values varied between 0.503 and 0.785. The factor explained 31.359% of the total variance, and the factor eigenvalue was determined to be 7.840.

The item-factor load values in the second factor varied between 0.342 and 0.802. The second factor consisted of nine items (5, 12, 23, 25, 28, 30, 31, 32, and 34). The eigenvalue of the second factor was 3.046 and explained 12.183% of the total variance.

The item-factor load values of the third factor ranged from 0.600 to 0.678. The third factor consisted of six items (9, 13, 15, 16, 20, and 22), and the factor explained 6.634% of the total variance. The eigenvalue of the third factor was determined as 1.658.

Scree plot also confirmed that CAQ included three factors with eigenvalues >1 [Figure 1].

After the EFA, the final version of CAQ included 25 items. The lowest and highest scores that can be obtained from the CAQ range between 25 and 125. In the CAQ, 15 of the 25 items (5, 9, 12, 13, 15, 16, 20, 22, 23, 25, 28, 30, 31, 32, and 34) were the reverse items. The low scores from the CAQ show negative attitudes toward the use of contraceptive methods, while high scores indicate positive attitudes.

Confirmatory factor analyses
In order to confirm the 25-item 3-factor structure of CAQ found as a result of the EFA, CFA of the Lisrel 8.80 Structural Equation Software was conducted. As a result of CFA, it was determined that the Chi-square value of CAQ was significant and that the data were sufficient for the model ($\chi^2 = 1080.90$, df = 272, $\chi^2/df = 3.97$, $P = 0.000$). Of the fit indices in CFA, the following values were found: Root Mean Square Error of Approximation (RMSEA) =0.059, normed fit index (NFI) =0.95, non-NFI (NNFI) =0.97, comparative fit index (CFI) =0.98, adjusted goodness of fit index (AGFI) =0.73, and goodness of fit index (GFI) =0.78.

Results of reliability analyses
The internal consistency coefficient was found to be 0.90, 0.89, 0.84, and 0.77 for CAQ, Factor 1, Factor 2, and Factor 3, respectively [Table 3].

As shown in Table 4, the correlations between the scores obtained from CAQ and the scores of the factors ranged between 0.38 and 0.81 [Table 4]. In addition, the correlation

Table 2: Contraceptive attitude questionnaire item-factor load values by factors

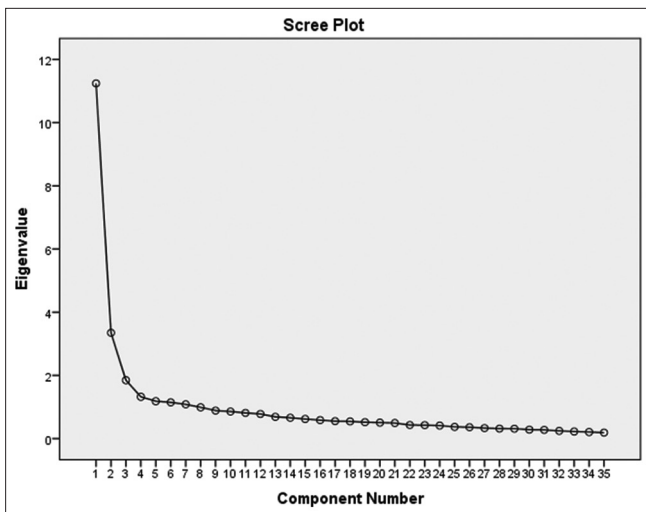|	Item number	Items	Factor 1	Factor 2	Factor 3
Effects on family economy and sexual life	M1	I think using contraceptives is beneficial for public health	0.658		
	M3	I think using contraceptives affects the family economy positively	0.694		
	M4	I think families using contraceptives will provide better opportunities for their children economically	0.708		
	M6	A man's use of contraceptive methods is one of the indicators that he values the health of his wife	0.785		
	M7	I think the sexual life of a couple who use contraceptive methods will be fulfilled	0.728		
	M8	I think using contraception will strengthen the emotional ties between couples	0.777		
	M10	I think that men should take responsibility for using contraceptive methods	0.599		
	M11	I think using contraceptive methods will positively affect women's health	0.732		
	M19	I think couples who use contraceptive methods are responsible parents	0.718		
	M26	I think that the sexual life of a woman using contraceptive methods will be positively affected	0.503		
Effects on the moral values of the society	M5	I think having information about contraceptive methods will make the age of starting sexual activity fall		0.390	
	M12	Only married couples should be able to access contraceptive methods		0.669	
	M23	I think it is inconvenient for single individuals to reach contraceptive methods easily		0.736	
	M25	I think it's the male's duty to use a contraceptive method		0.342	
	M28	Information on contraceptive methods should only be provided to married couples		0.651	
	M30	I think it is inconvenient to use contraceptive methods before having a child		0.573	
	M31	I think easy access to contraceptive methods would encourage sexuality		0.753	
	M32	I think the young people's easy access to contraceptive methods will cause the sexual intercourse to begin at an early age		0.802	
	M34	I think unmarried individuals' having information about contraceptive methods will adversely affect the moral values of the society		0.698	
Effects on men and religion	M9	I think using a contraceptive method will cause infertility in men			0.627
	M13	I think the use of contraceptive methods will negatively affect the trust between couples			0.637
	M15	Talking with my wife about contraceptive methods embarrasses me			0.627
	M16	I think it is unnecessary to use contraceptive methods			0.600
	M20	I think the sexual life of a man who uses contraceptive method will be adversely affected			0.604
	M22	I think using contraceptive methods is inappropriate for Islam			0.678
Eigenvalues			7.840	3.046	1.658
Explained variance			31.359	12.183	6.634

Figure 1: The scree plot of the factor structure of CAQ in factor analysis

coefficients were found to be significant at 0.001 level. The fact that the correlations were significant indicated that these three factors were the CAQ components.

In order to determine the internal consistency of the CAQ, the test was re-administered to 30 participants after an interval of 15 days. The overall test-retest reliability was found to be 0.77, 0.83, 0.64, and 0.70 for CAQ, Factor 1, Factor 2, and Factor 3, respectively.

DISCUSSION

Attitude questionnaires were prepared according to the needs of people living in a country. There are family planning-related questionnaires in the literature.[5,8,15-19] but the only family planning attitude questionnaire used in Turkey is the one developed by Örsal and Kubilay.[5] It is thought that the development of a new measurement tool that determines the attitudes of individuals toward contraceptive methods and tests its validity and reliability will make a significant contribution to the literature. "Reliability" and "validity" are prerequisites for developing a questionnaire.

Discussion of validity analyses

The validity of a measurement tool refers to its ability to measure a variable to be measured. The factor analysis is conducted to determine the construct validity of the questionnaire.[20] The KMO coefficient and the Bartlett's test of Sphericity are important because they show that the sampling is large enough and the data are suitable for factor analysis. The KMO coefficient and the Bartlett's test of Sphericity result measure the suitability of the data for factor analysis.[21] KMO coefficient should be above 0.60, and the approximation of the value to 1 indicates that the data are appropriate for factor analysis. In our study,

Table 3: Internal consistency coefficients of contraceptive attitude questionnaire and factors (Cronbach's alpha)

CAQ and factors	Number of items	Cronbach's alpha
1. Factor	10	0.89
2. Factor	9	0.84
3. Factor	6	0.77
CAQ	25	0.90

CAQ: Contraceptive attitude questionnaire

Table 4: Correlations between contraceptive attitude questionnaire and factors*

Factors	CAQ	1. Factor	2. Factor
1. Factor	0.81**	-	
2. Factor	0.75**	0.38**	-
3. Factor	0.77**	0.49**	0.52**

*Pearson correlation test statistics were used, **P<0.01.
CAQ: Contraceptive attitude questionnaire

KMO coefficient was found to be 0.92. The Bartlett's test of Sphericity value of the data was determined to be $\chi^2 = 5074.626$, df = 595, $P = 0.000$. According to these values, it was determined that EFA could be conducted on the 35-item final primary version of CAQ. Thus, the data were determined to be suitable for EFA.

In order to test the construct validity, some criteria were sought to determine the items to be included in the questionnaire in the EFA. The eigenvalues of the items should be at least 1 and the factor loads of the items should be at least 0.30. In addition, all items must be gathered under one factor and the difference for the items loading the two factors should be at least 0.10.[21] In our study, it was found that some items had a negative effect on factor loads and the explained variance; therefore, these items were excluded from the questionnaire. As a result of this analysis, the questionnaire consisted of 25 items and was made up of three factors. The factors were as follows: "Effects on Family Economy and Sexual Life (eigenvalue: 7.840, percentage of the total variance: 31.359, Cronbach's alpha = 0.89);" "Effects on the moral values of the society (eigenvalue: 3.046, percentage of the total variance: 12.183, Cronbach's alpha = 0.84);" and "Effects on men and religion (eigenvalue: 1.658, percentage of the total variance: 6.634, Cronbach's alpha = 0.77)." The 3-factor structure determined by eigenvalues > 1 explained 50.17% of the total variance. Factor load values of the remaining 25 items in the questionnaire were observed to range between 0.342 and 0.802.

CFA is used to determine whether there is a significant relationship between factors, which factors are correlated, whether factors are independent of each other, and whether the factors are sufficient to define the model.[22] If χ^2/df value is 5 or less, it indicates that the model has

an acceptable fit.[23,24] Given that the proportion of χ^2/df belonging to CAQ was 3.97, it can be said that the model had an acceptable fit. To determine whether the model built by confirmatory factor analysis fitted the data, fit indices were taken into consideration (Root-Mean-Square Error of Approximation = RMSEA, goodness of fit index = GFI, adjusted goodness of fit index = AGFI, comparative fit index = CFI, non-normed fit index = NNFI). It can be said that the closer the value of goodness of fit indices to 1 is, the fitter the model to the data is. For the goodness of fit indices, values ranging between 0.90 and 0.95 are acceptable, while values over 0.95 show a high fit.[25,26] In our study, the fit indices of CAQ were found to be NFI = 0.95, NNFI = 0.97, AGFI = 0.73, CFI = 0.98 and GFI = 0.78. It was determined that the fit indices of CAQ were found to be 0.95 and over, except for AGFI and GFI. Considering these fit indices, it can be said that the model had a good fit. For the model to be significant, the *RMSEA* value should be 0.05 or less. Values below 0.05 for the *RMSEA*, which is one of the fit indices, indicate good fit, and values below 0.08 indicate an acceptable fit.[22,27] In our study, the CAQ's *RMSEA* value was found to be 0.059; thus, it can be said that the structure of the questionnaire had an acceptable fit. Based on these results, it can be said that the questionnaire is valid and reliable.

Discussion of reliability analyses

Reliability is the capacity of a measuring tool to make a consistent and steady measurement.[28,29] A reliable test or questionnaire should give similar results when used repeatedly under similar conditions. In our study, the reliability of the CAQ in our study was achieved by item analysis, internal consistency analysis, and test-retest analysis.

The Cronbach's α coefficient is a weighted standard change average found by calculating the proportion of the total variance of the items in the questionnaire to the general variance.[30] The reliability criteria for assessing the internal consistency of the Likert-type questionnaire are known as the Cronbach's alpha coefficient. The Cronbach's alpha coefficient is a measure of the internal consistency and homogeneity of the items in the questionnaire. The Cronbach's alpha value of a Likert-type questionnaire is expected to be as close to 1 as possible. Coefficients below 0.40 indicate that the questionnaire is not "reliable," coefficients between 0.40 and 0.59 show that the questionnaire has a low reliability, values varying between 0.60 and 0.79 indicate that the questionnaire is reliable, and coefficient values ranging from 0.80-1.00 show that the questionnaire has a high reliability.[21,31] A high Cronbach's alpha is considered to be a sign of the high correlation

between items. In our study, the Cronbach's alpha value was found to be 0.90, which indicated that the questionnaire is highly consistent.

An item analysis was conducted to determine the contribution of the items to the total score of the questionnaire and find the extent to which the items were related to the whole questionnaire. The item-total correlation explains the relationship between the scores obtained from the items and the total score of the test. There are different opinions about what the lowest correlation limit should be. The value of r = 0.25 should be considered as the lowest limit.[21] Correlations between the scores obtained from CAQ and factors ranged between 0.38 and 0.81, and the correlation coefficients were found to be significant at 0.001. The fact that the correlations were significant indicated that these three factors were the components of CAQ.

Test-retest reliability is when a measurement tool is re-administered to people in the same group but does not show any changes over time and yields consistent results. Test-retest technique is the most commonly used and recommended reliability indicator. The time interval between test-retest has been reported to be a minimum of 2 weeks and a maximum of 4 weeks.[20] This period should be short enough to remember the test and long enough not to forget it. In this study, the primary version of CAQ of the test was re-administered to 30 participants on a 15-day interval to determine the test-retest reliability of the questionnaire. According to the Pearson Product Moment Correlation Coefficient, the test-retest correlation coefficient of CAQ was found to be 0.77. This coefficient indicated the consistency of invariance of the CAQ over time.

CONCLUSION

The CAQ was determined to be a valid and reliable measurement tool in Turkey. The questionnaire is suitable for use to protect and improve the reproductive health of women and men as it determines attitudes toward the use of contraceptive methods. Therefore, the questionnaire has been determined to be a measurement tool that can be used in future studies related to this topic. It is thought that studies that will use this questionnaire in different groups will contribute to the subject matter. It is recommended that the questionnaire be used in different groups.

Study limitations
The results of this study are limited to the sampling group, so cannot be generalized to the whole of society.

The study data were collected based on self-reporting by the individuals, and the information provided by the participants was assumed to be correct.

Conflicts of interest
The authors declared that there is no conflict of interest.

Authors' contributions
* Study conception and design: All authors
* Data collection: All authors
* Data analysis and interpretation: MUA, SPA
* Drafting of the article: MUA, SPA.

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