Reliability and Validity of the Reproductive Health Scale for Turkish Adolescents

Türk Adölesanları İçin Üreme Sağlığı Ölçeği'nin Geçerlik ve Güvenilirliği

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ABSTRACT Objective: This study was conducted to develop the Reproductive Health Scale (RHS) as a valid and reliable measure of adolescents' reproductive behavior. **Material and Methods:** Data were collected using self-report method from 320 students, aged between 17 - 30 years. Two questionnaires were used in this research: a socio-demographic data form and RHS, developed by the researchers. Kendall coefficient of concordance (W) was used for RHS' content analysis, and stability over time (test-retest reliability) and Pearson product moment correlation coefficient were used for its reliability analysis. In addition, internal consistency, Cronbach alpha calculation, Item to total score correlation technique, split-half and Spearman-Brown reliability coefficients were also calculated. **Results:** Exploratory principal components' analysis with varimax rotation yielded 34 items consisting of six factors: Partner selection, values in developing protective behavior, consultation, communication with sexual partner, confidence and protection from sexually transmitted diseases, accounting for 48.5% of the variance. Alpha reliability was 0.88; factor reliabilities ranged from 0.55 to 0.84. It was concluded that the adolescents who responded to the scale had more positive attitudes in reproductive health as their scores increased. **Conclusion:** The results of this study determined that this scale was highly reliable. It is suggested that the scale can be used in reproductive health studies carried out with adolescents and in their education in order to determine their statuses and also its validity and reliability analyses can be performed by applying it to different groups.

Key Words: Reproductive medicine; adolescent health services; attitude; reproducibility of results

ÖZET Amaç: Bu çalışma adolesanların üreme davranışı için geçerli ve güvenilir bir ölçü olarak üreme sağlığı ölçeğini (ÜSÖ) geliştirmek için yapıldı. **Gereç ve Yöntemler:** Veriler yaşları 17 ile 30 arasında olan 320 öğrenciden kişinin kendi beyanına dayalı rapor yöntemi ile toplandı. Bu araştırmada iki anket kullanıldı: Sosyo-demografik veri formu ve araştırmacılar tarafından geliştirilen ÜSÖ. ÜSÖ'nün içerik analizi için Kendall uyuşum katsayısı (W) ve güvenilirlik analizi için zaman içinde tutarlılık (test-tekrar test güvenilirliği) ve Pearson momentler çarpımı korelasyon katsayısı kullanıldı. Ayrıca iç tutarlılık, Cronbach alfa katsayısı, madde/toplam puan korelasyon tekniği, ikiye bölme (Split-half) ve Spearman-Brown güvenilirlik katsayıları da hesaplandı. **Bulgular:** Varimax rotasyonu ile eksploratuvar esas bileşen analizi varyansın %48.5'den sorumlu olan altı faktör içeren 34 madde sağladı: Eş seçimi, koruyucu davranış geliştirmedeki değerler, danışma, cinsel eşle iletişim, güven ve cinsel yolla bulaşan hastalıklardan korunma. Alfa güvenilirliği 0.88 idi, faktör güvenilirlikleri 0.55 ile 0.84 arasında değişti. Ölçeği yanıtlayan adolesanların puanları arttıkça üreme sağlığı ile ilgili daha olumlu tutumlara sahip oldukları sonucuna varıldı. **Sonuç:** Bu çalışmanın sonuçları bu ölçeğin güvenilirliğinin yüksek olduğunu saptadı. Ölçeğin adolesanlarda yapılan üreme sağlığı çalışmalarında ve eğitimlerinde durumlarını saptamak için kullanılabileceği ve ayrıca farklı gruplara uygulanarak geçerlilik ve güvenilirlik analizlerinin yapılabileceği düşünülmektedir.

Anahtar Kelimeler: Üreme tıbbı, adolesan sağlık hizmetleri, tutum, sonuçların tekrarlanabilirliği

Young people comprise 18.5% of the population of Turkey, a developing country, as well.[1,2] Their sexual lives and experiencing unsafe sex with inadequate information and without the development of preventive behaviors can be the cause for reproductive health problems. Studies conducted in our country show that young people have their first sexual relationships during their time at university, in particular.[3-5] The determination of young people's reproductive health attitudes can help in the development of educational programs appropriate for them. For this reason, there is a need for the development of a tool that can determine the thoughts and attitudes of students who have recently registered for university about reproductive health. The purpose of this study was to develop a valid and reliable tool, the "Reproductive Health Scale" (RHS), to determine the attitudes of young people about reproductive health.

There have been many studies conducted in many countries on the reproductive health of young people. In these programs a necessity for tools which can measure young people's reproductive health knowledge, behaviors and attitudes was reported.[6]

Attitudes about reproductive health form an individuals' system which facilitates adaptation to their environment as well as being important as a force which guide behaviors. The critical period for the formation of attitudes and beliefs has been accepted as the period between 12-30 years which includes the two periods of adolescence (12-21 years) and early adulthood (21-30 years). Attitudes are formed in adolescence and become crystallized or solidified during early adulthood.[7] For this reason these two periods of youth are important for the development of attitudes.

Young people are at increased risk because the education about reproductive health and sexual health are not at the desired level within the educational system or in the family, because it is considered a taboo topic, and because young people's lack of awareness of their bodies' growth causes them to put themselves at risk.[8] For this reason the use of newly developed tools with proven validity and reliability will be helpful in the development of reproductive health and sexual health

educational programs, in education provided in counseling centers, in research, to reach target groups. There are various tools which have been developed in different areas of reproductive health.[8-12] However there are no tools available to measure young people's attitudes about reproductive health in Turkish with established validity and reliability.

MATERIAL AND METHODS

As the consequence of this study, a tool with documented validity and reliability analyses that was appropriate for measuring the attitudes of Turkish university learners' about reproductive health had been developed.

The conclusion of factor analysis of the 34-item RHS was the determination of six subscales (factors) which explained 48.6% of the total variance. These six subscales of the scale measure young people's reproductive health attitudes about these factors are: partner selection, values in developing protective behaviors, communication with sexual partner, consultation, self confidence and relying on the other people, and protection from sexually transmitted diseases. Internal consistency reliability for the RHS was 0.88.

SAMPLE

The sample for this methodological research was university students between 17-30 years of age who were registered in the Foreign Language Department for the 2005-2006 school years. To determine the stability of the scale over time it was administered to this group for two times. In the first administration 820 students were reached, and after question forms that were not acceptable for analysis were abolished, the data from 668 students' question forms were evaluated. Four weeks after the first administration 320 participants were matched with the first administration and given the RHS question form to complete again.

INSTRUMENTS

Two forms were used for data collection in the research: a Socio-demographic Data Form and the RHS developed by the researchers.

Socio-demographic Data Form

Questions about the participants' age, gender, people they lived with, and economic status were asked. A total of 24 descriptive questions about reproductive health were also asked.

Reproductive Health Scale (RHS)

After a review of the literature, an item pool of 120 questions was created which was decreased to 83 items by the researchers when they were examined theoretically. The scale was pilot tested with 15 students from the research population who were not included in the participants and one item that the participants could not understand was removed from the scale. A total of 13 reversed or similar items were also removed from the scale. Following the 69-item scale's second administration, based on the results of factor analysis, the scale was put into its final form with 34 items (Figure 1).

In the evaluation of items on the 5-point Likert type scale from one to five, the items were marked as "I absolutely do not agree" (1), "I completely agree" (5). The lowest possible score was one and the highest was five for each item. The lowest possible total score was 34 and the highest was 170. As the score increased participants' positive reproductive health attitudes increased.

In the administration of the scale every dimension on the tool was evaluated separately, all subscales were added giving one combined score. The tool has four items for young people's attitudes about partner selection, twelve items for attitudes about values in developing protective behaviors, five items for attitudes about communication with sexual partner, five items for consultation behaviors to receive information about reproductive health, five items for attitudes towards self confidence and relying on the other people about reproductive health, and two items for attitudes towards protection from sexually transmitted diseases for a total of six subscales. On the scale a reverse scoring system was used. There are a total of 16 reverse and 18 direct items on the scale. The items with reverse scoring were, 12, 25, 27, 30, 33, 34, 42, 44, 60, 61, 65, 66, 69, 71, 76, 82 respectively.

PROCEDURES

Written permission to conduct the research was obtained from School of Health Research/Ethics Committee and Foreign Languages Department Director of the University. Students were informed about the tests and procedures before the study , thereafter volunteer students were enrolled in the study. After this stage RHS was developed by the researchers. The students who would be included in the study were randomized according to age and gender. After the pilot test and after expert opinion was received, the forms were given to the participants in the sample group. RHS was applied to the same population 4 weeks after the first application for establishing the Stability Over Time, and matched 320 were enrolled for statistical analysis. It took approximately 30 minutes to complete the self report forms, the RHS itself took approximately 10 minutes to complete.

The participants were asked to write a nickname and other descriptive information so they could be matched at the retest administration. After the second questionnaire all of the participants were given an informative brochure: "Safe Reproductive Health".

Keiser Meier Olkin (KMO) analysis was performed to determine the availability of the scale for the size of participants.

Then the validity-reliability analysis of the scale was conducted.

ANALYSIS

1. Validity Analyses

Content Validity of Reproductive Health Scale (RHS)

The scale's content validity was conducted by receiving the opinions of seven experts in the fields of Community Health, Community Health Nursing, Maternity Nursing, and Family Medicine. Kendall Coefficient of Concordance (W) was calculated to determine the degree of agreement of the expert opinions with each other.[13-15]

The results of expert review resulted in acceptance of all proposed RHS items with minor changes. Further editing for comprehension and
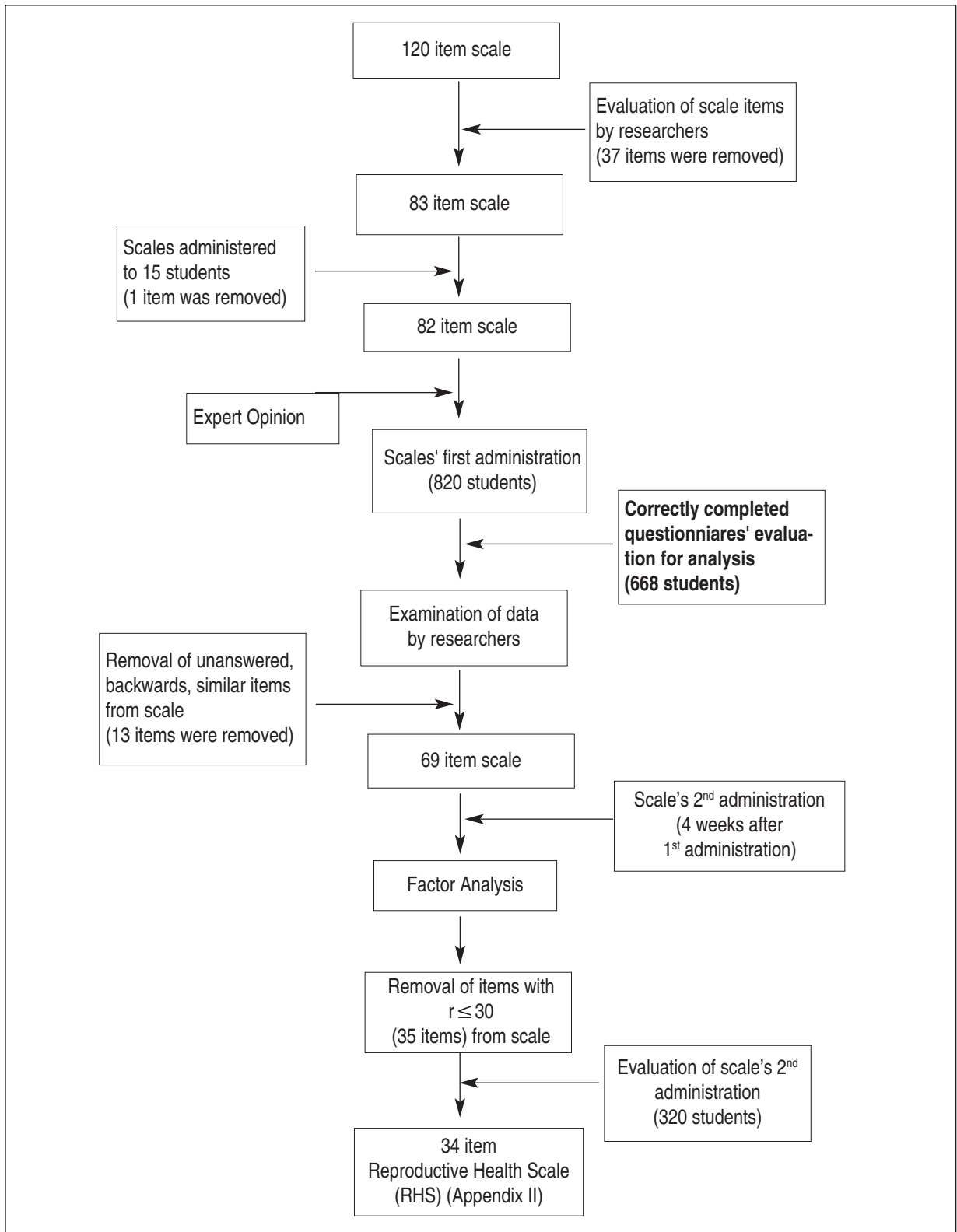
FIGURE 1: Flow Chart of the Steps in the Development of Reproductive Health Scale

contemporary terms was conducted based on recommendations from representatives of the target group.

Construct Validity (Convergent Validity/Similar Instruments Validity) factor analysis and correlation between previous study results and current study results were determined.

2. Reliability Analyses

Stability over Time (Test-Retest Reliability) was evaluated with the Pearson Product Moment Correlation Coefficient Technique.[13-16]

Internal consistency was analyzed using Cronbach alpha calculations, Item-total Score Correlation Technique, Split-half and Spearman-Brown reliability coefficients.[13-16]

RESULTS

DEMOGRAPHIC FEATURES

Of the subjects, 55.7% were male and 44.3% were female with mean age of 18.9 ± 1.6 years. It was determined that 71.3% of the participants had not received any education of any kind on subjects related to reproductive health. The sources for information about reproductive health for the 28.7% of the participants were books, internet or teachers. It was determined that 33.7% of the participants had sexual experience and 71.1% had used a condom during sexual intercourse.

REPRODUCTIVE HEALTH SCALE'S VALIDITY ANALYSES

In the evaluation of every item on the RHS for its practicality and understandability according to the expert opinion evaluation scores with Kendall W analysis it was determined that there was no statistical difference between the experts' scores (Kendall W: 0.142, p= 0.486, n= 7) and it was determined that there was concordance among the experts.

At the conclusion of the RHS factor analysis a total variance of 48.65% was found in the six subgroups (factors). The scale's total Cronbach alpha coefficient was 0.88. The subscales' Cronbach alpha coefficients were as the following respectively: Partner Selection 0.84, Values in Developing Protective Behaviors 0.79, Communication with Sexu-

al Partner 0.72, Consultation 0.63, Confidence 0.55, Protection from Sexually Transmitted Diseases 0.55 (Table 1).

To determine whether or not the RHS participants size was large enough to ensure confidence in the correlation and to determine adequacy of the data the Kaiser-Meyer-Olkin (KMO) test was conducted and the results were examined. In addition the distribution status of the population in the factor analysis was researched with the Bartlett test and a KMO value of 0.888, χ^2= 6851.91 was found with statistical significance (p=0.0001).

In the RHS factor analysis six subscales were separated. The lowest and highest item scores and values from the subscales are shown in Table 2. The subscales were renumbered and the scale was put into its final form.

REPRODUCTIVE HEALTH SCALE'S RELIABILITY ANALYSIS

The correlation coefficient between the RHS's two halves was 0.52, the Guttman Split-Half coefficient was 0.68, and Spearman-Brown coefficient was 0.69. The Cronbach alpha value was 0.84 for the first half (17 items); and 0.81 for the second half (17 items) (Table 3).

The correlation between the RHS subscales of the students who had recently started at the university is shown in Table 4. According to these data, in the comparison of the RHS total score with its own subscales the following results were obtained: Partner Selection r= 0.78, Values in Developing Protective Behaviors r= 0.49, Communication with Sexual Partner r =.56, Consultation r= 0.53, Confidence r= 0.51, Protection from STDs r= 0.42, and the results were found to be at a p= 0.01 level of significance (Table 4).

In the comparison of the RHS's first and second administration results with correlation analysis a statistically significant correlation was found between the first and second administrations (p<0.01) (Table 5).

DISCUSSION

The basic purpose in the first administration was to develop a tool. In the first phase after the prepa-

TABLE 1: Reproductive health scale (RHS) factor analysis.						
Items (Old no-new no)	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Item 30–1	0.822					
Item 34–2	0.800					
Item 12–3	0.729					
Item 33–4	0.603					
Item 66–5		0.651				
Item 60–6		0.641				
Item 61–7		0.607				
Item 65–8		0.585				
Item 71–9		0.505				
Item 27–10		0.437				
Item 44–11		0.410				
Item 82–12		0.396				
Item 76–13		0.379				
Item 69–14		0.341				
Item 25–15		0.333				
Item 42–16		0.317				
Item 41–17			0.765			
Item 43–18			0.631			
Item 53–19			0.627			
Item 72–20			0.419			
Item 22–21			0.390			
Item 75–22			0.163			
Item 73–23				0.748		
Item 26–24				0.653		
Item 58–25				0.511		
Item 54–26				0.429		
Item 14–27				0.139		
Item 67–28					0.623	
Item 64–29					0.515	
Item 59–30					0.457	
Item 29–31					0.354	
Item 01–31					0.257	
Item 56–33						0.586
Item 50–34						0.523
EIGENVALUES	7.240	3.277	1.864	1.769	1.257	1.137
EXPLAINED VARIANCE	21.294	9.638	5.482	5.203	3.696	3.345
Alpha (a) Coefficient	0.84	0.79	0.72	0.63	0.55	0.55
Scale Cronbach Alpha Coefficient	0.88					

ration of two to three times more items than the target number and after examining them, it was recommended a sufficient number of items to remain.[16] In a study by Sapin et al. an item pool of 118 questions was created which was later narrowed down to 71 and then to 55 according to the appropriateness of the items and following validity and reliability analyses, the number of items was decreased to 37.[17] Our RHS which supports this information was prepared by taking factors from the Turkish culture which may affect their attitudes towards reproductive health into consideration. The first format for the tool had 120 items which was decreased to 83 then used in a pilot test with 15 stu-

REPRODUCTIVE HEALTH SCALE (RHS)	
TABLE 2: Reproductive Health Scale (RHS)'s Split Half Test Reliability Analysis.	
Correlation Between Halves	0.52
Guttman Split-Half	0.68
Spearman-Brown	0.69
17 Item First Half Cronbach Alpha Value	0.84
17 Item Second Half Cronbach Alpha Value	0.81
Number of Items	34
N	668

According to by Oner (1997). it is emphasized that having an item that is 100% correct, in other words, very easy, or not answered by anyone, in other words, very difficult, does not participate in distinguishing individuals from one another, and for this reason they emphasized that these type of items should not be included in the test.[16] In accordance with the literature, following the first administration of RHS, 13 items were removed. In this stage the scale was decreased to 69 items.

The "r" value, which is accepted as the coefficient in reliability analysis to determine how sensitive the tool is and a value between 0 and 1 is obtained.[16] Forrest pointed out that a correlation coefficient of 0.30 determined appropriateness when developing attitude scales. In the light of this information, after the first administration of RHS 35 items with a r value below 0.30 were removed and the remaining 34 items were arranged into RHS's final format.

dents. At this phase the number of items on the tool had decreased to 82.

For development of Likert type tools, the items' adequacy is evaluated with superficial validity/appearance validity and practical validity studies.[14,18] It has been determined that the opinions of at least three to five experts were needed to determine the validity of a tool's theoretical forms.[19] The Kendall Coefficient of Concordance (W), showed that there was no statistically significant difference between their opinions (RHS- Kendall's W^a= 0.142. df= 81. p= 0.486, n=7).

In the examination of the expert group, it is recommended that for internal validity the items listed under "least appropriate" are needed to be removed from the tool or revised.[13] Based on the experts' opinions, there were no items on the RHS that needed to be removed, but some revisions were made in the remaining 82 items according to their recommendations.

In tool development studies, it has been determined that the participant size needed to be 400 in factor analysis for grouping items according to their level of linear relationship.[20] Comfrey and Lee classified participant sizes for tools as 50 is very weak, 100 is weak, 200 is indecisive, 300 is good, 500 is very good, and 1000 and above is ideal.[21] In tool administrations, participant size is recommended to be at least 300 for factor analysis or at least 5 participants for each item.[22] In this study the same 320 participants were taken for statistical analysis that could be matched for the first and se-

TABLE 3: Reproductive Health Scale (RHS)'s First Administration; Correlation Between Subscales.								
		Partner selection	Protect. Values	Communication	Consult'n	Confidences	STD Protection	Total
Partner selection	r	1						
Values in Developing Protective Behavior	r	0.464**	1					
Communication with Sexual Partner	r	0.125**	0.483**	1				
Consultation	r	0.195**	0.441**	0.566**	1			
Confidence	r	0.405**	0.373**	0.457**	0.395**	1		
Protection from STDs	r	0.057	0.283**	0.319**	0.345**	0.259**	1	
Total	r	0.625**	0.860**	0.690**	0.668**	0.670**	0.425**	1

* p<0.05   **p<0.01

TABLE 4: Correlation Between Reproductive Health Scale (RHS)'s First and Second Administration

1st and 2nd Administration Scale Subscales and Total Score*	Correlation (r)	p
Partner Selection	0.78	0.000
Values in Developing Protective Beh.	0.49	0.000
Communication with Sexual Partner	0.56	0.000
Consultation	0.53	0.000
Confidence	0.51	0.000
Protection from STDs	0.42	0.000
Scale Total Score	0.46	0.000

n= 320

cond administrations (number of scale items was 34).

Tavsancıl stated that to determine whether or not a participant size will provide trustworthy correlation and whether or not the data obtained from the participants is adequate for the KMO test, value which approaches 1 is excellent and values below 0.50 are unacceptable.[13] RHS's KMO value was found to be 0.89, χ^2=6851.91 and the analysis result was significant (p=0.0001). This result shows that the distribution was normal in the population for the participants' reliability and factor analysis, and at the same time, in support of the literature.

The higher the variance rates obtained as a result of factor analysis , stronger the tool's factor structure is.[14] As a result of the RHS factor analysis a total variance including the 6 subscales (factors) of 48.65% was found and this is considered to

be adequate according to the criteria determined for factor analysis (Table 1).

In Likert type scales calculation of the Cronbach alpha reliability coefficient has been determined to be the most acceptable method to test for internal consistency.[14] Tools which have a Cronbach alpha reliability 0.60-0.80 are considered to be adequate for use in research.[13,23] According to the factor analysis conducted with this study's data RHS's Cronbach alpha coefficient was found to be 0.88 which shows that this tool has a high level of reliability (Table 1).

As a result of the subscales' evaluation, it can be said that particularly "Partner Selection", "Values in Developing Protective Behaviors", and "Communication with Sexual Partner" received values higher than 0.70 (Table 1) and can be considered to be reliable. For the "Consultation", "Confidence", and "Protection from Sexually Transmitted Diseases" subscales, because this is the first attitude scale developed on this topic, the values are considered to be acceptable, however, it is recommended that future studies be conducted on the reliability of these subscales.

To obtain a tool's split half reliability coefficients it is necessary to administer the "Guttman Split-Half" and "Spearman-Brown reliability coefficient" reliability analyses.[15] RHS's split half correlation coefficient was found to be 0.52, the Guttman Split-Half coefficient 0.68, and the Spearman-Brown coefficient 0.69. The Cronbach alpha value was 0.84 for the first half (17 items) and 0.81 for the second half (17 items) (Table 2). These

TABLE 5: Lowest and Highest Scores from Reproductive Health Scale (RHS) Subscales.

Reproductive Health Scale Subscales	Item Numbers	Lowest-Highest Values	Cronbach Alpha Coefficient
Partner Selection	1*,2*,3*,4*	4–20	0.84
Values in Developing Protective Behavior	5*, 6*,7*,8* 9*,10*,11*, 12*, 13*, 14*, 15*, 16*	12–60	0.79
Communication with Sexual Partner	17, 18, 19, 20, 21, 22	6–30	0.72
Consultation	23, 24, 25, 26, 27	5–25	0.63
Confidence	28, 29, 30, 31, 32	5–25	0.55
Protection from Sexually Transmitted Diseases	33, 34	2–10	0.55
Total		34–170	0.88

*Reversed statements

findings support the reliability of the RHS developed by us.

As a correlation coefficient (r) approaches 1 the tool's reliability increases.[16] When every subscale of the scale and the scale's total score correlations were examined the study findings were found to be in parallel with the literature information. So it can be said that every subscale of the RHS is reliable. The Protection from STDs subscale (r= 0.42) appears to be low but this is probably a result of the low number of items in this subscale (Table 3).

The correlation analysis conducted on the administration of a scale to the same group of individuals at two separate times is measured with Pearson product moment correlation analysis and a low correlation is directly related to the time being too short or too long. It is recommended that a tool administration for test-retest correlation be at a two to six week interval.[13,23] Ross et al. reported that the first administration was conducted with a participant group of 108 individuals and the second administration 45 days later was conducted with 55 individuals.[24] In a validity and reliability study by Sener et al. the second administration to determine stability over time was after four weeks and the test-retest reliability for the original form of the tool which they were testing was found to be 0.82 and in their study it was found to be 0.84.[25,26] In this study the test-retest scale total score between the first and second administrations was found to be r= 0.46 and the relationship between the test and retest was found to be highly significant. As a result of analysis the correlations between each of the subscales' first and second ad-

ministrations were examined (Table 4). These results show that the tool has an adequate level of consistency over time.

CONCLUSION

As a result of analyses conducted on the 34-item RHS, which was developed by the researchers, a total Cronbach alpha coefficient of 0.88 was determined and it was established to be valid and reliable for Turkish young people.

In the evaluation of the tool's subscales "Partner Selection", "Values in Developing Protective Behaviors", and "Communication with Sexual Partner" scales had values greater than 0.70 and were determined to be reliable. However, it is still needed to perform further studies to determine the potential factors effecting limitations.

It was established that the lowest general score from the scale could be 34 and the highest 170. As the score from the scale increases a young person's attitudes towards reproductive health can be said to be more positive.

The RHS was administered to young people just beginning at a university in western Turkey. It is recommended to administer the scale to young people from different social groups and that it is supported by validity and reliability studies conducted on the tool with these different groups.

In addition, it is suggested that it would be beneficial for this scale to be used in studies and in education with young people to determine the status of their attitudes about reproductive health.

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