**RESEARCH ARTICLE**

# Kidney Health Awareness Scale in Adolescents: Theoretical Form Development Study

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### ABSTRACT

**Objective:** This study was conducted to develop a theoretical form based on the Lawshe technique to evaluate the kidney health awareness levels of secondary school students in light of scientific and objective criteria.
**Material and Methods:** A question pool with 26 statements was created by reviewing the literature, and expert opinion (n:6) was taken to create a draft form. As a result of the expert evaluation, it was determined that six statements did not serve the purpose of the form and were removed from the study. The draft trial form with 20 statements was again submitted to expert evaluation (n:11). For construct validity and reliability, content validity criterion (CVC), content validity ratios (CVR), content validity index (CVI), Fleiss Cohen Kappa coefficient and Kendall's W goodness of fit values were calculated.
**Results:** The content validity ratio was calculated for each statement in the trial form, and it was determined that all items in the form except item 14 were above the lower limit of 0.64. The content validity index was calculated for 19 items by taking the arithmetic mean of the content validity ratios, and it was determined that it was 0.89. Results showed that the construct validity of the trial form was statistically significant, as the CVI value (0.89) was higher than the CVC value (0.64). For the reliability of the form, the inter-expert agreement was examined, the Fleiss Kappa coefficient was calculated, and a value of 0.652 was obtained.
**Conclusions:** As a result, this scale, whose validity and reliability are statistically accepted, can be used safely on secondary school students.
**Keywords:** Kidney Health, Adolescents, Awareness, Theoretical Form

## INTRODUCTION

Chronic Kidney Disease (CRD) is a global public health problem as its prevalence is increasing rapidly (1). Its prevalence is estimated to be 8 to 16% worldwide (2). The disease is projected to be the 5th most common cause of death worldwide by 2040 (1). In Turkey, the prevalence rate was reported to be 15.7% (3). As with most chronic diseases, kidney diseases are caused by modifiable risk factors such as blood pressure, proteinuria, obesity, unhealthy-sugary diet, excessive salt consumption, and prediabetes (4–7). Chronic kidney disease is a disease that can often be prevented or its progression delayed when detected early, but low awareness causes the disease to progress insidiously (8). However, results showed that people who are informed and aware will tend to adopt a healthy lifestyle that can reduce the risk of CRD (9).

Patients with kidney damage or low GFR often remain asymptomatic and show typical signs of kidney dysfunction only in more advanced stages (10). For this reason, early diagnosis of the disease is important. With the kidney disease prevention and control program at the national level, providing education to the whole society about the factors that are risk factors for kidney diseases with general prevention approaches such as healthy nutrition, salt reduction, adequate fluid intake, and special prevention approaches to identify patients in the risk group and prevent the development of kidney diseases and prevent the development of kidney diseases. It aims to increase awareness and early diagnosis (8). Chronic kidney disease is a global problem and therefore, education and awareness in this area during childhood can help children protect their kidney health both now and in the future (11). In addition, raising awareness during adolescence, when habits that will affect their future health and well-being develop, and adaptation to healthy living behaviors will probably be effective in maintaining the behavior permanently in the future (9).

When national and international studies are examined, there are few studies on kidney health awareness, and the level of knowledge about kidney health is questioned

with questionnaires (9,11–14). In this context, no specific measurement tool measuring kidney health and awareness was found in the literature. However, kidney disease has become a rapidly increasing epidemic (8).

Health professionals and other professionals have important responsibilities in evaluating children's behaviors toward kidney diseases and taking preventive measures to prevent the development of disease-causing factors. A user-friendly, up-to-date, valid, and reliable measurement tool is needed to raise awareness about kidney health in children. This study was planned to develop the Kidney Health Awareness Scale and to examine its psychometric properties in order to ensure reproducible measurement of behaviors affecting children's kidney health.

## MATERIALS AND METHODS

**Aim:** The aim of this study is to develop a kidney health awareness scale in order to evaluate the kidney health awareness levels of secondary school students in light of scientific criteria.

**Type of study:** This study is a methodological type of study. Measurement processes in behavioral sciences are carried out indirectly through scales. In the process of creating these scales, theory is taken as a starting point, and application is made. For this reason, measurement tools in scale development studies are prepared in theoretical form-experimental form, or hypothetical form only (15). In this study, the theoretical form development approach was adopted to develop the scale.

The development process of the kidney health awareness scale consisted of creating the question pool, obtaining expert opinion for the draft form, creating the trial form, obtaining expert opinion for the trial form, constructing validity (determining the content validity criterion, calculating the content validity ratios and determining the items according to the content validity indices, Kendall's W Fit Examination), reliability analysis (Fleiss' Kappa Reliability Coefficient) and obtaining the theoretical form.

**Creation of the item pool**: The literature was reviewed to create the item pool, and the statements that were thought to be related to the protection of kidney health were included. Then, these statements were brought together and organized, and a question pool consisting of 26 candidate statements was obtained.

**Obtaining expert opinion on the draft form:** The opinions of six expert academicians were taken about the statements in the draft form (26 items). The experts were asked to evaluate the statements and suggest corrections. Considering the feedback from the experts, it was concluded that six items were not related to the conceptual framework of the subject or were not suitable for the sample addressed by the scale, and it was decided to remove them from the form. Afterward, the draft form was reorganized to include 20 items.

**Obtaining expert opinion for the trial form:** Informative e-mails explaining the purpose of the study and inviting them to the study were sent to 11 academics experienced in the conceptual framework of the subject, and a few days later, they received the trial form. Responses were received from all of the experts contacted. Table 1 shows the descriptive information of the 11 experts.

**Table 1: Information on the experts**

| | | Title | | |
|---|---|---|---|---|
| Gender | Prof.Dr. | Ass.Prof.Dr | Dr. | Total |
| Female | 1 | 3 | 2 | 6 |
| Male | 1 | 2 | 2 | 5 |
| Total | 2 | 5 | 4 | 11 |

**Construct Validity:** For the construct validity of the scale, the content validity criterion was determined, and content validity ratios (KGO=CVR=Content Validity Ratio) and content validity index (KGİ=CVI= Content Validity Index) were calculated. In addition, Kendall's W goodness of fit test was applied, and the responses of six experts were analyzed for the comprehensibility, simplicity, and relationship validity of the items in the scale, and it was determined whether there was a statistical difference between the scale items and expert opinions.

**Calculation of the content validity criterion:** Since this study aimed to develop a theoretical form, a content validity criterion was used. Lawshe technique was utilized for this. The content validity criterion of the study was based on the evaluation of 11 experts who gave expert opinions on the trial form. In the literature, the recommended CVC value for 11 experts is .636 (16).

**Calculation of the content validity ratio:** Content validity ratios (CVRs) are obtained by subtracting 1 from the ratio of the number of experts expressing their "Necessary" opinion on any item to half of the total number of experts expressing their opinion on the item (CVR = (NG / (N / 2)) – 1). If the CVR values are negative or contain 0 values, such items are the items that are eliminated in the first place. Significance is tested with statistical criteria for items with positive CVR values (15).

**Calculation of the content validity index:** While the CVR is used in the acceptance or rejection of certain items, the CVI developed by Waltz and Bausell (17)is calculated for the entire test. In this case, the average of the CVR values of the items that are decided to be included in the scale is calculated, and the CVI value is obtained (18).

The fact that the CVI value obtained after the expert opinion is greater than the CVC value (CVI>CVC) indicates that the content validity of the construct obtained is statistically significant (18,19).

**Calculation of Kendall's W goodness of fit coefficient:** Kendall's coefficient of concordance is used to assess inter-rater agreement in ordinal scales. The value obtained is a measure of the compatibility between p raters evaluating n individuals. Kendall W=0 takes values between "no agreement" and Kendall W=1 "full agreement".

**Reliability:** Fleiss Kappa coefficient, which is one of the inter-rater reliability methods, was calculated to examine the reliability of the form. For this purpose, the form consisting of 20 statements scored between 1-5 was given to five raters for evaluation, and they were asked to evaluate it. The data obtained from the Kappa coefficient are interpreted as poor agreement if between .01-.20, acceptable agreement if .21-.40, moderate agreement if .41-.60, good agreement if .61-.80, and very good agreement if .81-1.00 (20).

## RESULTS

For the content validity of the kidney health awareness scale planned to be developed in this study, the data obtained from the experts were tested by determining the content validity rates, calculating the content validity index, and calculating inter-rater agreement (Table 2).

In line with the expert opinions, the CVR was calculated for each statement of the trial form. According to the Lawshe technique, in order for the findings obtained from the expert group of 11 people to be valid, the content validity criterion should take a minimum value of .636 at α=0.05 significance level (16).

In the calculations made as a result of the expert evaluations, it was seen that all items except item 14 scored higher than the content validity criterion of .64, which was recommended for 11 experts. Item 14 (When I notice swelling in my body (edema), elevated blood pressure, back pain, or decreased urine output, I report it to my family) received low scores from the experts and was removed from the study. The remaining 19 items in the trial form had sufficient content validity.

While the content validity ratio is calculated for each item in the scale, the content validity index is calculated for the entire form. The CVI was calculated by taking the average CVR of the 19 items that were decided to remain in the form. In theoretical form development studies, in order for the form to be statistically valid, the obtained CVI value should be greater than the CVC value (CVI>CVC). According to the findings obtained from this study, it was concluded that the content validity of the trial form was at a statistically significant level, as the CVI (0.89)>CVC (0.64).

Kendall's W goodness of fit test was used to determine whether there is a statistical difference between the items in the scale

**Table 2: CVR and CVI values of the trial form**

| Item No | STATEMENT | Appropriate | Must be corrected | Must be removed | CVR |
|---------|-----------|-------------|-------------------|-----------------|-----|
| M.1 | I try to maintain my ideal weight. | 10 | 1 | 0 | .82 |
| M.2 | I drink an average of 1.5-2 liters of water a day. | 11 | 0 | 0 | 1 |
| M.3 | I avoid adding extra salt to my meals. | 10 | 1 | 0 | .82 |
| M.4 | I urinate immediately when I need to. | 10 | 1 | 0 | .82 |
| M.5 | I avoid taking medication unless recommended by a physician. | 11 | 0 | 0 | 1 |
| M.6 | Physical activity for 45 minutes /1 hour at least 4 days a week (brisk walking, cycling, etc.). | 9 | 2 | 0 | .64 |
| M.7 | I avoid consuming fatty foods. | 11 | 0 | 0 | 1 |
| M.8 | I do not consume unhealthy foods (salami, sausage, hamburgers, etc.). | 11 | 0 | 0 | 1 |
| M.9 | I avoid being in smoking environments. | 11 | 0 | 0 | 1 |
| M.10 | I do not consume foods with high sugar content (chocolate, sweets, etc.). | 11 | 0 | 0 | 1 |
| M.11 | I consume dairy products (milk, buttermilk, cheese, yogurt, etc.) during the day. | 10 | 1 | 0 | .82 |
| M.12 | I make sure that my underwear is cotton. | 11 | 0 | 0 | 1 |
| M.13 | I do not consume sugary drinks (cola, soda, etc.). | 10 | 1 | 0 | .82 |
| M.14 | I let my family know when I notice swelling (oedema), high blood pressure, back pain or a decrease in my urine output. | 6 | 3 | 2 | .09 |
| M.15 | I pay attention to news/developments related to kidney health. | 11 | 0 | 0 | 1 |
| M.16 | I avoid unnecessary use of medication. | 11 | 0 | 0 | 1 |
| M.17 | I avoid smoking or drinking alcohol. | 9 | 2 | 0 | .64 |
| M.18 | I pay attention to my private area hygiene. | 10 | 1 | 0 | .82 |
| M.19 | I know the symptoms of urinary tract infection. | 10 | 1 | 0 | .82 |
| M.20 | I do research on my kidney health. | 10 | 1 | 0 | .82 |

Number of Experts: 11

Content Validity Criterion (CVC): 0.64

Content Validity Index (CVI): 0.89

and the expert opinions by analyzing the responses of the raters for comprehensibility, simplicity, and relationship validity. A Kendall's W coefficient greater than .05 is evidence that the statements are understood similarly by the raters and that there is an agreement (Table 3).

According to the Kendall's W fit analysis conducted to test the reliability of inter-expert agreement, it was determined that the form obtained had a good inter-expert agreement (n=5; df=18; Kendall's W=.051; $x^2$=6.320; p>.05).

### Reliability

The reliability of the obtained form was assessed by evaluating inter-rater reliability. For this purpose, the Fleiss Kappa statistic used for evaluations involving three or more raters was used. Since five raters were used in this study, the Fleiss Kappa value was calculated for five raters. According to the findings, the Fleiss' Kappa value of the form for five raters was calculated as .662 (Kappa=.652; p=.000) (Table 4).

value. In this study, the CVI value was determined as .89, and this value is greater than the calculated CVR value. Kendall's W coefficient of concordance was calculated to determine whether there was a statistically significant difference between the items in the questionnaire and expert opinions, and a value of p>.05 was obtained (16,23). This value was evaluated as there was no statistically significant difference between the expert evaluations for each statement. The obtained CVR, CVI, and Kendall's W goodness of fit coefficients provided evidence that the questionnaire is a structurally valid form.

Fleiss' Kappa coefficient was preferred for the reliability of the developed form (24). The trial form consisting of 19 questions with content and construct validity, in which each statement was scored between 1 and 5, was given to five raters (observers) and evaluated. The findings showed that the observers evaluated the statements in the trial form in a related manner in each score category. In addition, the calculated

**Table 3: Kendall's W analysis of concordance among experts**

| Item Number | Average Order | Item Number | Average Order | Item Number | Average Order | Item Number | Average Order |
|---|---|---|---|---|---|---|---|
| M1 | 10.57 | M6 | 10.41 | M11 | 9.35 | M16 | 10.41 |
| M2 | 11.00 | M7 | 11.00 | M12 | 11.00 | M17 | 11.00 |
| M3 | 90.41 | M8 | 11.00 | M13 | 10.41 | M18 | 10.88 |
| M4 | 9.52 | M9 | 11.00 | M14 | cancelled | M19 | 10.41 |
| M5 | 10.11 | M10 | 10.41 | M15 | 10.00 | M20 | 9.18 |

n=5; Kendall's W=.051; $X^2$=6.320; DF=18; P=.636

**Table 4: Fleiss cappa value**

| n | m | Point | Kappa | z | p | Fleiss' Kappa Kappa | z | p |
|---|---|---|---|---|---|---|---|---|
| | | 1 Point | .733 | 10.516 | .000 | | | |
| | | 2 Points | .781 | 9.732 | .000 | | | |
| 19 | 5 | 3 Points | .766 | 10.260 | .000 | .652 | 15.6 | .000 |
| | | 4 Points | .730 | 10.466 | .000 | | | |
| | | 5 Points | .460 | 6.223 | .000 | | | |

### CONCLUSION AND DISCUSSION

This study aimed to create a theoretical form based on the Lawshe technique to evaluate the kidney health awareness levels of secondary school students (21). The theoretical structure of the form was created based on expert opinion, and the content validity index, content validity ratio, and Kendall's W goodness of fit value were calculated for construct validity (22). According to the literature, the minimum recommended CVR value for 11 raters should be at least 0.64 at α=0.05 significance level, and the CVR value obtained for this study is above this limit value (20,21). Another necessary condition for construct validity is that the CVI value should be greater than the obtained CVR

Fleiss' Kappa coefficient was .652, and this value shows that the agreement level of the raters is at a good level.

As a result, this scale, whose validity and reliability are statistically accepted, can be used safely in secondary school students.

### Directive

The kidney health awareness scale is a measurement tool consisting of one dimension and 19 statements. All items in the scale are expressed positively, and there are no reverse-scored items. The scale is a four-point Likert scale, and the responses are "Never"=0, "Rarely"=1, "Sometimes"=3, and "Always"=3. Scoring of the scale is obtained by summing the scores of all items. The range of minimum and maximum points that can

be obtained from the scale is between 0 and 57. An increase in the score obtained from the scale means an increase in the level of kidney health awareness.

The scope of the kidney health awareness scale, which was developed in this study, and its validity and reliability were performed, is suitable for secondary school students, and validity studies needed to be carried out in order to be applied to other groups.

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