

Development and validation of a clinical competence test for dietitians regarding early chronic kidney disease



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Background

Chronic kidney disease (CKD) is a serious public health issue. Appropriate nutritional care may prevent CKD onset in patients at risk and slow progression in those at early stage. To improve care of patients with early CKD is mandatory to know the clinical competence (CC) of dietitians; however, no adequate tool to measure the latter issue has been published.

AIM: To develop and validate a test to evaluate dietitian's CC about nutritional care in patients with early CKD.

Methods

Descriptive cross-sectional validation study. The study consisted on 2 phases: 1) test development, and 2) validation. Figure 1 describes procedures divided in 7 steps.

Statistical analysis: χ^2 and Mann Whitney U tests as appropriate, p<0.05considered as significant. Cronbach's $\alpha \ge 0.70$ was considered as adequate for reliability assessment.

Figure 1. Procedures for development and validation of the test for CC of dietitians regarding early CKD

PHASE 1: TEST DEVELOPMEN

A group of experts in nutrition, psychometry, and early CKD was integrated

Nutrition (3) Pedagogy (1) Internal Medicine (1) Family Medicine (1) Nephrology (1)

Dietitian clinical competence and its indicators were defined

- CC was defined as the capability to integrate and apply the knowledge, skills and judgements to provide a safe and effective nutritional care in CKD; it was evaluated with the following indicators:
 - ✓ Identification of risk factors
 - Integration of diagnosis
 - ✓ Correct use of laboratory
 - **✓** Correct use of therapeutic resources

Test was constructed

- Four clinical cases from patients at risk or with early CKD in the primary health-care were selected
- Two-hundred sixty questions were generated for an initial test
- Answer options were True, False, Do not know
 - ✓ Correct answer receives: +1 mark
 - ✓ Incorrect answer receives: -1 mark
 - ✓ Do not know receives: 0 marks

Content validity was established

- Test was evaluated by external judges regarding legibility, relevance and content validity
- External judges were 4 dietitians specialized in Nephrology (different from those of the group of experts constructing the test)
- Inter-judge agreement >75% was considered as adequate.
 - ✓ From the original 260 questions, 21 were eliminated. Thus, 239 questions integrated a *preliminary* test



A pilot study was conducted

- To make sure that questions have internal consistency and discrimination capacity, the *preliminary* test was applied to 44 dietitians in a pilot study
- From these results, questions with an item/total correlation coefficient < 0.15 (internal consistency indicator) were removed; 100 items remained in the test
- The latter items were subsequently subjected to a discrimination index* < 0.15 to increase the discrimination capacity
- ✓ After this, the *final* test consisted on 92 questions
 - H-L

27% of Total

H: number of correct answers from top 27% of dietitians

L: number of correct answers from bottom 27% of dietititans

PHASE 2: TEST VALIDATION



Criterion validity was established

- The <u>final</u> test was applied to 86 dietitians
- As there is no gold standard to evaluate CC of dietitians regarding early CKD, the test was applied to different groups who were expected to score high or low on the basis of their training
- Groups selected were dietitians with previous CKD training (36%) and with no training (64%). It was expected that dietitians with previous training had the highest mean score, which differe significantly to demonstrate criterion validity

Reliability was evaluated

- Reliability was assessed by means of Cronbach's α.
 - ✓ As the Cronbach's α may be influenced by extension of the test and heterogeneity of the sample, it was established according to clinical case, CC indicator, and previous training of dietitians

Table 1. Characteristics of dietitians subjected to the final test, according to the previous CKD training status.

Characteristic	With training (n 23)	Without training (n 63)	<i>p</i> value
Female sex, %	94	81	0.38
Age, <i>yrs</i>	25 ± 2	27 ± 6	0.44
Academic degree, %			0.72
Bachelor of nutrition	69	77	
Postgraduate	31	23	
Time since school graduation, <i>yrs</i>	3.0 (1.2-7.0)	1.5 (1.0-4.5)	0.08
Nutrition counseling experience, <i>yrs</i>	2.0 (1.0-6.0)	0.7 (0-2.2)	0.005
Job institution, %			0.21
Government	50	38	
Private	31	15	
Other	19	46	
Professionals activities related to CKD, %	87	23	<0.0001
Self-perception of CC in CKD, %			<0.0001
Very low – Low	0	77	
Regular – High	100	23	
Training in other chronic diseases, %	94	15	<0.0001
CC: Clinical Competence			

CC: Clinical Competence **CKD: Chronic Kidney Disease**

Results

Number of questions and reliability Table (Cronbach's α) of preliminary and final tests, by clinical

Test Component	Preliminary Test		Final Test	
	N	α	N	α
Case 1	58	0.53	26	0.75
Case 2	64	0.52	23	0.70
Case 3	57	0.53	21	0.74
Case 4	60	0.52	22	0.69
TOTAL	239	0.83	92	0.91

Table 4. Reliability (Cronbach's α) of the final test, according to the test component and previous CKD training status (step 7)

Test Component	Whole sample (n 86)	With training (n 23)	Without training (n 63)
Case 1	0.67	0.81	0.53
Case 2	0.59	0.72	0.45
Case 3	0.69	0.79	054
Case 4	0.69	0.79	0.59
TOTAL	0.88	0.94	0.80

Table 3. Comparison of test scores according to the previous CKD training status (criterion validity, step 6)

Test component	With training (n 23)	Without training (n 63)	p value
Case 1 score	7 (-1 – 15)	3 (0 – 8)	0.035
Case 2 score	9 (4 – 13)	4 (0 – 7)	0.003
Case 3 score	10 (2 – 14)	2 (-1 – 5)	<0.0001
Case 4 score	13 (6 – 16)	6 (2 – 10)	0.001
TOTAL	37 (15 – 60)	14 (3 – 26)	0.003

Table 5. Reliability (Cronbach's α) of the final test, according to the CC indicators and previous CKD training status (step 7)

CC indicator	Whole sample (n 86)	With training (n 23)	Without training (n 63)
Identification of risk factors	0.39	0.52	0.20
Integration of diagnosis	0.59	0.70	0.53
Correct use of laboratory	0.64	0.75	0.57
Correct use of therapeutic resources	0.84	0.92	0.74

Conclusions

- A test to evaluate Dietitian CC about nutritional care in patients with early CKD was developed
- After eliminating questions by means of the item/total correlation and discrimination index, the internal consistency increased
- Dietitians with previous CKD training had higher test scores than those without training, supporting the criterion validity
- The test had higher reliability (considering both test components and CC indicators) in dietitians with previous CKD training versus those without training
 - The present test is a consistent and suitable instrument to identify dietitians with or without an adequate CC in nutritional care of early CKD patients; however, it is advisable to use the test in the complete version (no only parts of it)
 - The availability of a reliable test to measure Dietitian CC may help to improve care of patients with early CKD

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