



UNIVERSITATEA
DE MEDICINĂ ȘI FARMACIE
VICTOR BABEȘ | TIMIȘOARA

Instrumente necesare nutriției de precizie și măsurării aportului nutrițional

DR. COSTELA LĂCRIMIOARA ȘERBAN

UNIVERSITATEA DE MEDICINĂ ȘI FARMACIE VICTOR BABEȘ TIMIȘOARA

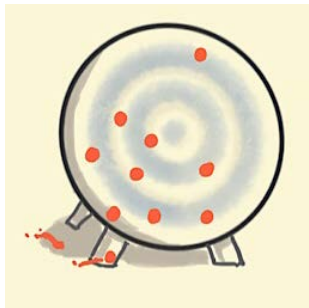
Instrumente??!!



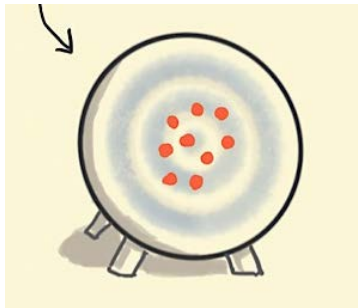
Acuratețe și precizie

Acuratețea e
legată de intenție

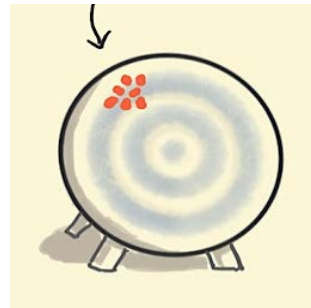
Precizia e legată
de performanța
individuală



Fără acuratețe
Fără precizie



Cu acuratețe
Fără precizie



Fără acuratețe
Cu precizie



Cu acuratețe
Cu precizie

Validare ??!!!

Instrumentul cântar

Măsoară ce trebuie/ne așteptăm să măsoare—
greutatea , similar cu alt cântar = VALIDITATE

Dacă îmi măsoar repetat greutatea, la interval scurt de
timp am aceeași greutate = REPLICABILITATE



Ce metode de estimare a aportului nutrițional se folosesc de obicei?

.....

Ancheta alimentară pe 24 ore

Jurnalul alimentar

Chestionarul de frecvență alimentară

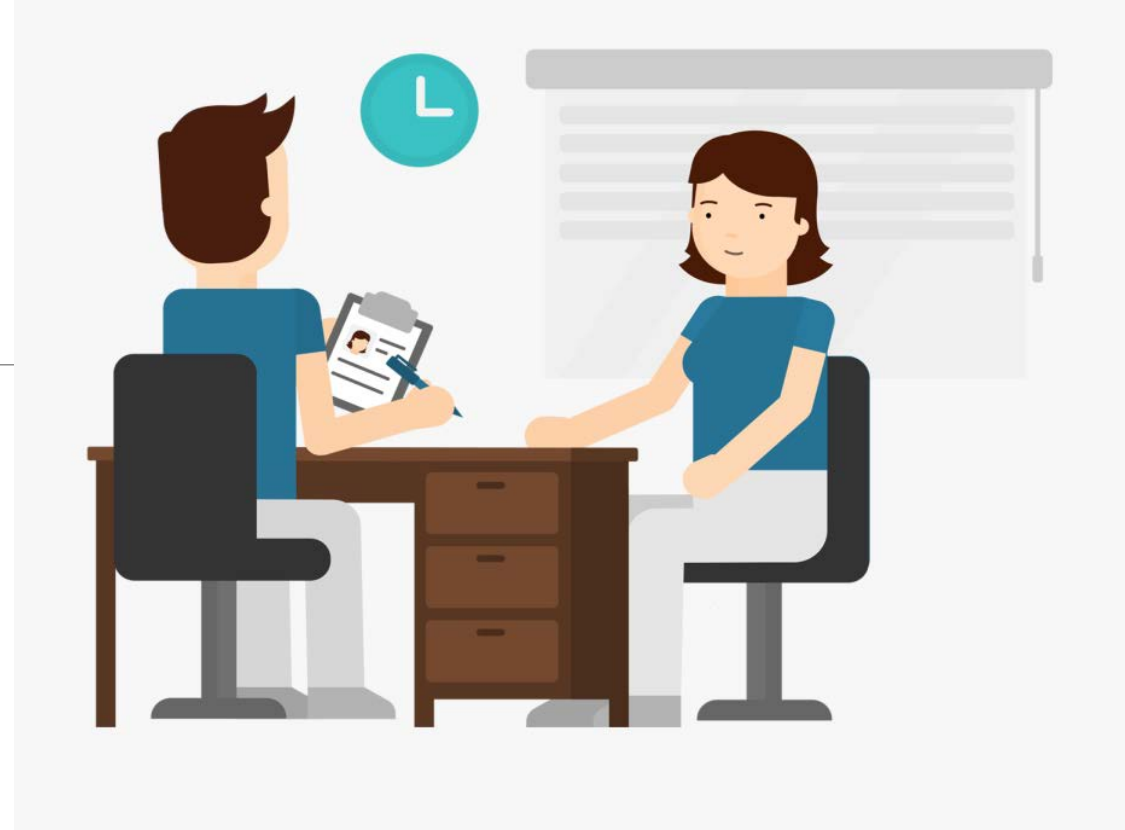
Metode

Ancheta alimentară

- interviu structurat
- durata 20-60 min
- aflarea alimentelor, băuturilor și suplimentelor alimentare consumate în ziua anterioară
- metoda 5 pass

AVANTAJE

- Se pot face estimări ale consumului alimentar zilnic
- Interviu se poate face chiar și telefonic
- poate fi folosit pentru a evalua eficacitatea unui studiu de intervenție pentru a schimba dieta



DEZAVANTAJE

- Se face doar de către personal cu experiență
- Pot fi intervievați doar anumite populații – bias de selecție
- Sunt necesare două sau mai multe recall-uri neconsecutive pentru a estima distribuțiile obișnuite ale aportului alimentar.

E ancheta alimentară o metoda validă?

➤ [J Am Diet Assoc.](#) 2004 Apr;104(4):595-603. doi: 10.1016/j.jada.2004.01.007.

Accuracy of dietary recall using the USDA five-step multiple-pass method in men: an observational validation study

[Joan M Conway](#) ¹, [Linda A Ingwersen](#), [Alanna J Moshfegh](#)

Affiliations + expand

PMID: 15054345 DOI: [10.1016/j.jada.2004.01.007](#)

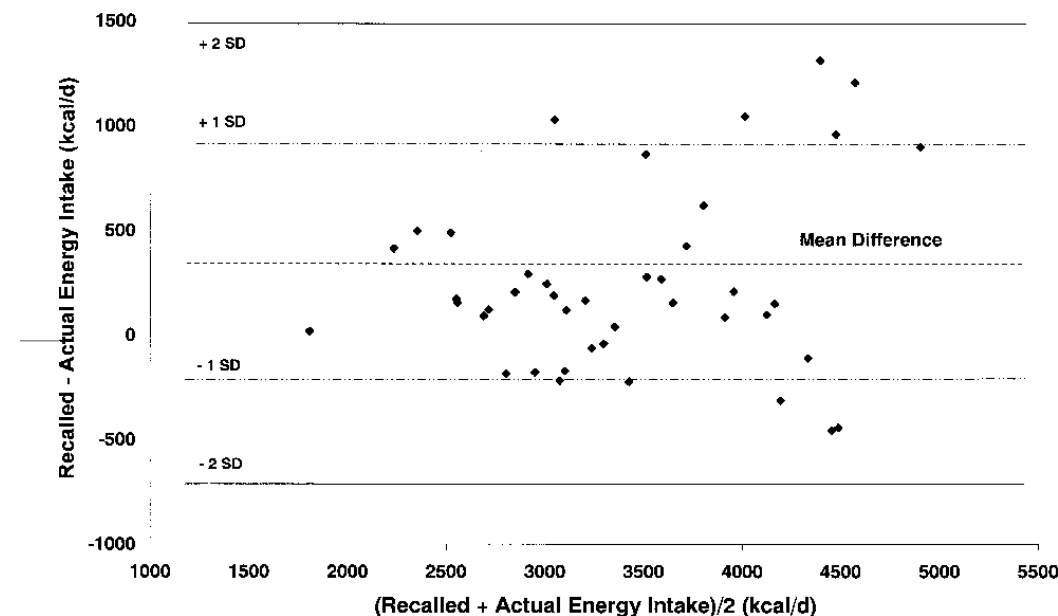
Actual and recalled energy, protein, carbohydrate, and fat intakes were determined by **direct observation** and by a 24-hour dietary recall, respectively. Dietary recall was determined via telephone administration of the USDA five-step multiple-pass method the following day.

Accuracy of dietary recall using the USDA five-step multiple-pass method in men: an observational validation study

Joan M Conway ¹, Linda A Ingwersen, Alanna J Moshfegh

Affiliations + expand

PMID: 15054345 DOI: 10.1016/j.jada.2004.01.007



	Actual Intake		Recalled Intake		Difference Between Actual and Recalled Intakes		
	$\bar{x} \pm \text{SEM}^a$	Range	$\bar{x} \pm \text{SEM}$	Range	$\Delta^b \bar{x} \pm \text{SEM}$ (<i>P</i> value)	Δ^c range	$\% \Delta \bar{x} \pm \text{SEM}$
Energy (kcal/d)	3,294 $\pm$ 111	1,797-4,707	3,541 $\pm$ 124	1,816-5,349	247 $\pm$ 67 (0.2)	-456-1,311	8.1 $\pm$ 0.6
Protein (g/d)	117 $\pm$ 4.6	71-186	126 $\pm$ 5.3	77-206	8.1 $\pm$ 3.0 (0.4)	-21-53	8.1 $\pm$ 0.7
Carbohydrate (g/d)	414 $\pm$ 16	226-818	449 $\pm$ 16	236-727	33.9 $\pm$ 8.6 (0.2)	-91-164	9.3 $\pm$ 0.6
Fat (g/d)	136 $\pm$ 7.3	50-252	146 $\pm$ 8	55-251	9.6 $\pm$ 3.3 (0.2)	-28-57	8.0 $\pm$ 0.6

^a $\bar{x} \pm \text{SEM}$ = mean $\pm$ standard error of the mean.

^b Δ = [Recalled intake - Actual intake] calculated on a per subject basis.

^cA negative value indicates an underestimation; a positive value indicates an overestimation.

E ancheta alimentară o metoda validă?



**Validati
recall: c
children**

Accurate measurement of energy in energy expenditure (TEE) measured recall (24 h MPR) method produces To extend this work, the current st 6 years). In both boys and girls, re $P=0.05$). On analysis of agreeme ($-2880, 2380$ kJ/d). EI was over- than in our previous study of pre- suggests that the 24 h MPR is inac

Diet records: Obesity: Child nut

Table 2. Bias and limits of agreement between total energy expenditure (TEE; kJ/d) and energy intake (EI; kJ/d) for both genders combined and separately*

	Bias (kJ/d)	Limit of agreement (kJ/d)	
		Upper	Lower
Both genders	-250	2380	-2880
Boys	-60	2750	-2870
Girls	-440	1970	-2860

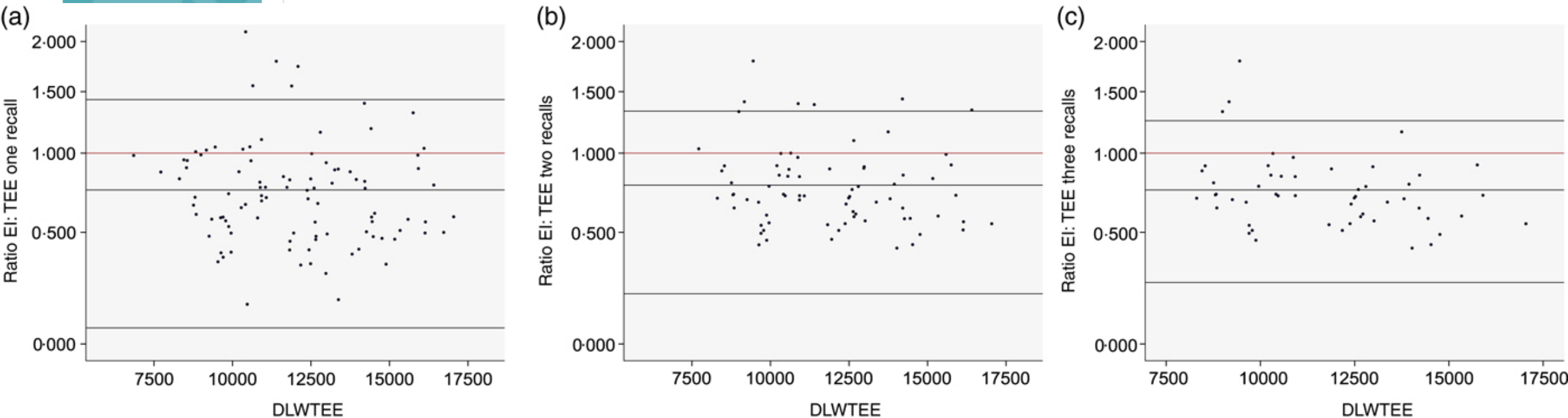
*Bias calculated as mean (TEE - EI); limits of agreement calculated as the bias +2sd (upper limit) and bias - 2sd (lower limit).

and girls (...).

E ancheta alimentară o metoda validă?



Validity and reliability of an online self-report 24-h dietary recall method (Intake24): a doubly labelled water study and repeated-measures analysis



E ancheta alimentară o metoda reproductibilă?



Validation of energy intake by 24-hour multiple pass recall: comparison with total energy expenditure in children aged 5–7 years

Published online by Cambridge University Press: 08 March 2007

Colette Montgomery, John J. Reilly, Diane M. Jackson, Louise A. Kelly, James Y. Paton and Stan Grant

Nutrient	Single recalls			Paired recalls		
	Reliability†			Reliability†		
	ICC	95 % CI		ICC	95 % CI	
Energy (kJ)	0·347	0·286,	0·409	0·516	0·428,	0·594
Fat (g)	0·339	0·279,	0·399	0·368	0·267,	0·461
Protein (g)	0·344	0·283,	0·406	0·539	0·454,	0·614
Carbohydrate (g)	0·364	0·303,	0·425	0·575	0·495,	0·646

Metode Jurnalul alimentar

JURNALUL MEU ALIMENTAR

DATA.....ZIUA 1

ORA	ALIMENTUL	SORTIMENTUL/INGREDIENTE/ DESCRIERE CONȚINUT	CANTITATEA

- auto-raportarea alimentelor consumate
- durează cel puțin 15 minute
- tradițional pe hârtie dar există și sisteme online de înregistrare, prin aplicație sau de documentare prin poze
- datele din jurnal pot fi utilizate pentru a evalua aportul alimentar total și/sau anumite aspecte ale dietei
- utilizate ca instrument de referință pentru a valida sau calibra estimări din alte instrumente de evaluare mai puțin detaliate, cum ar fi un chestionar de frecvență alimentară
- pot fi utilizate pentru a descrie aportul nutrițional al unei populații
- pot fi folosite pentru a examina relațiile dintre dietă și sănătate sau alte variabile, în care dieta este variabila independentă

Metode Jurnalul alimentar

JURNALUL MEU ALIMENTAR

DATA.....ZIUA 1

ORA	ALIMENTUL	SORTIMENTUL/INGREDIENTE/ DESCRIERE CONȚINUT	CANTITATEA

DEZAVANTAJE

- respondentul trebuie să aibă un grad de școlarizare
- produce reactivitate
- numărul de zile de jurnal depinde de întrebarea de cercetare
- Fiecare aliment și băutură raportată în jurnal necesită codificare și prelucrare a datelor
- scrierea de mână nelizibil, informațiile lipsă și raportarea inconsecventă de la individ la individ

E jurnalul alimentar o metoda validă?

➤ [Public Health Nutr.](#) 2006 Oct;9(7):934-41. doi: 10.1017/phn2005922.

Validation of an estimated food record

Anne Chinnock ¹

Affiliations + expand

PMID: 17010260 DOI: [10.1017/phn2005922](#)

Results: The EFR gave statistically significant lower average intake estimates for energy and 12 of the 22 nutrients examined. The correlation coefficients ranged from 0.68 (polyunsaturated fats) to 0.87 (calcium). The percentage of subjects classified into the same quartile ranged from 45.0% (polyunsaturated fats) to 68.3% (vitamin B12). For all nutrients except vitamin C, 0 or 1.7% were misclassified into extreme quartiles. For food group consumption, the EFR gave statistically significant lower estimates for six of the 17 groups and correlation coefficients ranged from 0.22 (fish) to 0.93 (beverages). Greater differences in estimates of mean energy and nutrient intakes were detected among subjects from rural areas, caused in part by a tendency to underestimate the amounts of rice and beans consumed.

E jurnalul alimentar o metoda validă?

[Nutrients](#). 2017 Mar; 9(3): 312.

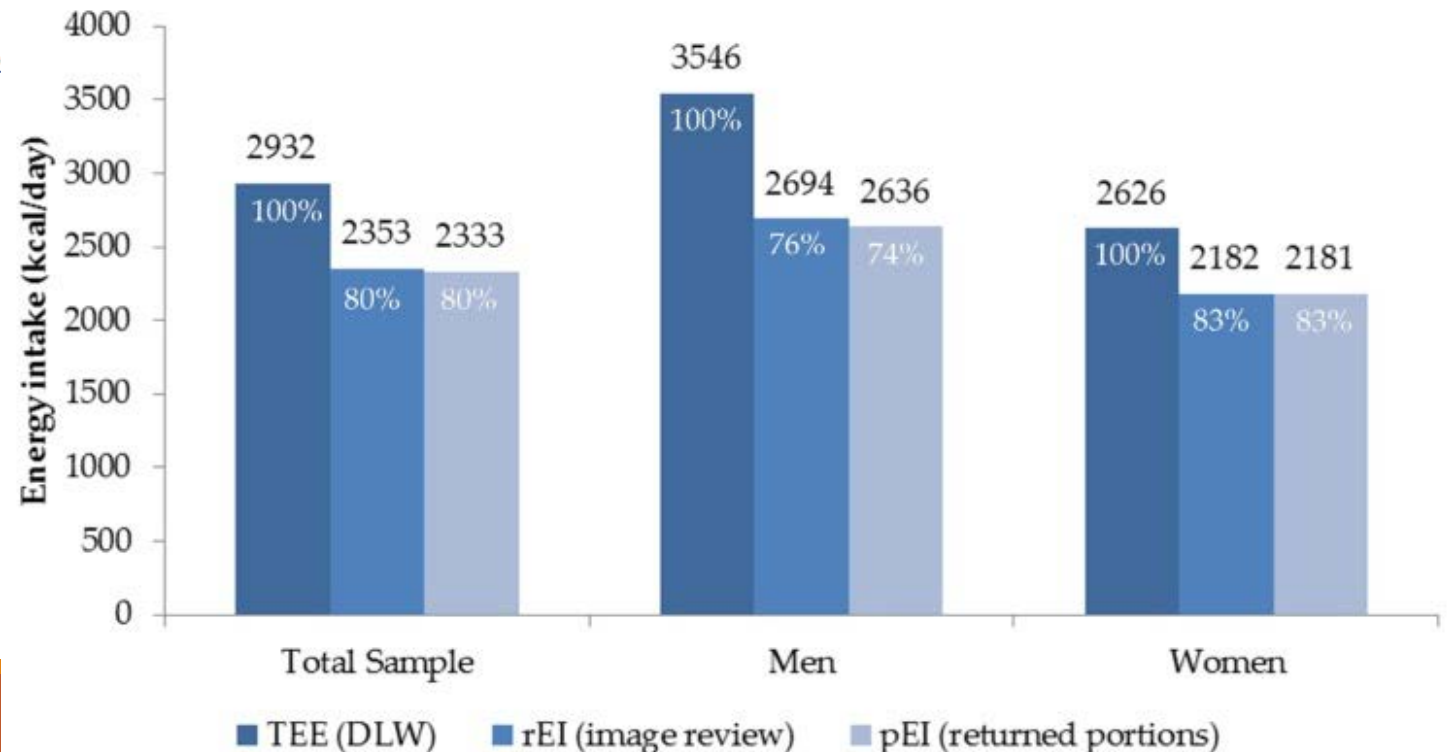
Published online 2017 Mar 22. doi: [10.3390/nu9030312](https://doi.org/10.3390/nu9030312)

PMCID: PMC5372975

PMID: [28327502](https://pubmed.ncbi.nlm.nih.gov/28327502/)

Reported Energy Intake Accuracy Compared to Doubly Labeled Water and Usability of the Mobile Food Record among Community Dwelling Adults

[Carol J. Boushey](#),^{1,*} [Melissa Spoden](#),² [Edward J. Delp](#),³ [Fengqing Zhu](#),³ [Marc B. Yurii B. Shvetsov](#),¹ [James P. DeLany](#),⁶ and [Deborah A. Kerr](#)⁷



Metode

Chestionarul de frecvență alimentară

- oferă informații despre consumul de alimente și băuturi interogate în perioada specificată.
- necesită de obicei 30 până la 60 de minute
- în funcție de amploarea elementelor interogate, datele pot fi utilizate pentru a evalua **aportul alimentar total și/sau anumite aspecte ale dietei**
- dacă datele sunt legate de o bază de date privind compoziția nutrienților, poate fi determinat aportul de nutrienți
- pot fi utilizate pentru a examina asocierile dintre dietă și starea de sănătate sau alte variabile

Metode

Chestionarul de frecvență alimentară

- sunt uneori folosite pentru a evalua eficacitatea intervențiilor de schimbare a dietei
- În funcție de amploarea elementelor interogate, datele pot fi utilizate pentru a evalua **aportul alimentar total și/sau anumite aspecte ale dietei.**
- Datele pot fi legate la o bază de date pentru a furniza informații despre aportul alimentar total.
- Conține eroare sistematică, care poate fi atenuată cel puțin parțial prin ajustare energetică
- Se bazează pe **memorie generică**, spre deosebire de ancheta de 24HR, care se bazează pe memorie **specifică** și înregistrarea alimentelor, care **nu se bazează pe memorie.**
- Necesită **capacitatea de a îndeplini sarcini de memorie și de mediere complexe din punct de vedere cognitiv**

Este chestionarul de frecvență alimentară o metodă validă?

Metode de validare

- **biomarkeri obiectivi de recuperare**

- *apa dublu marcată pentru energie,*
- azotul urinar pentru aportul de proteine,
- potasiul urinar pentru aportul de potasiu,
- sodiu urinar pentru aportul de sodiu,
- *și altele....*

- **alte instrumente de raportare:** anchetele de 24 de ore sau *jurnalul alimentar*

Using Intake Biomarkers to Evaluate the Extent of Dietary Misreporting in a Large Sample of Adults: The OPEN Study ^{FREE}

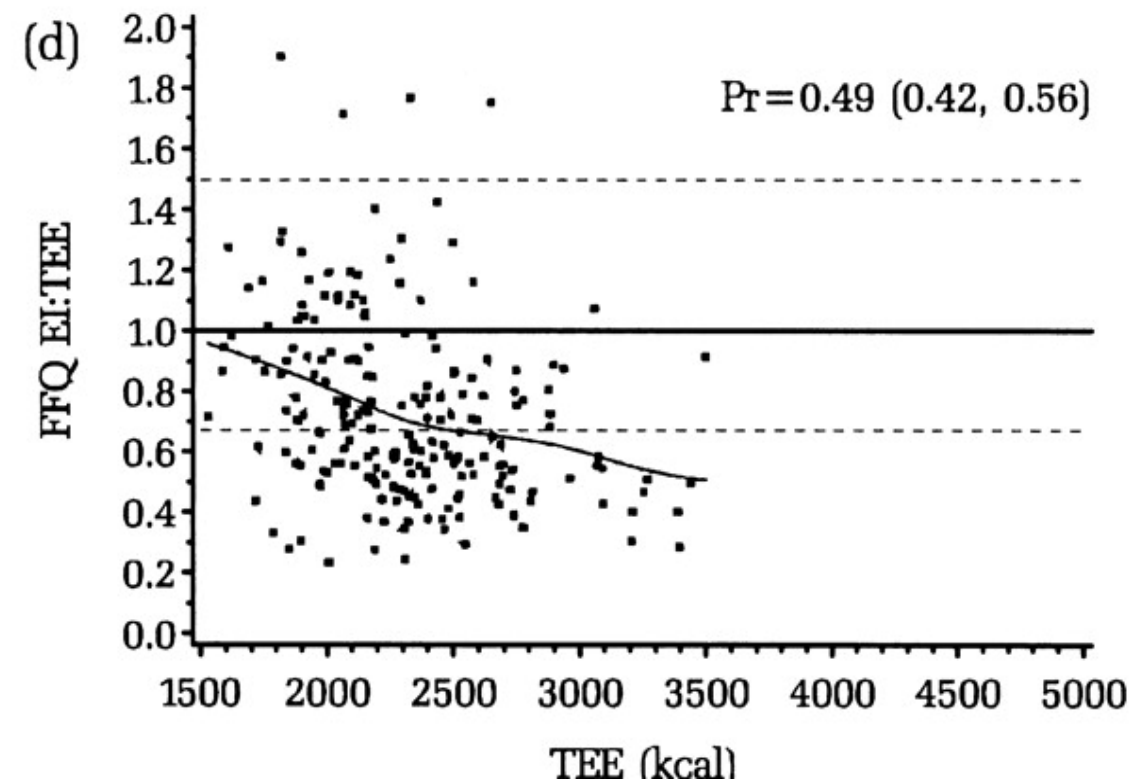
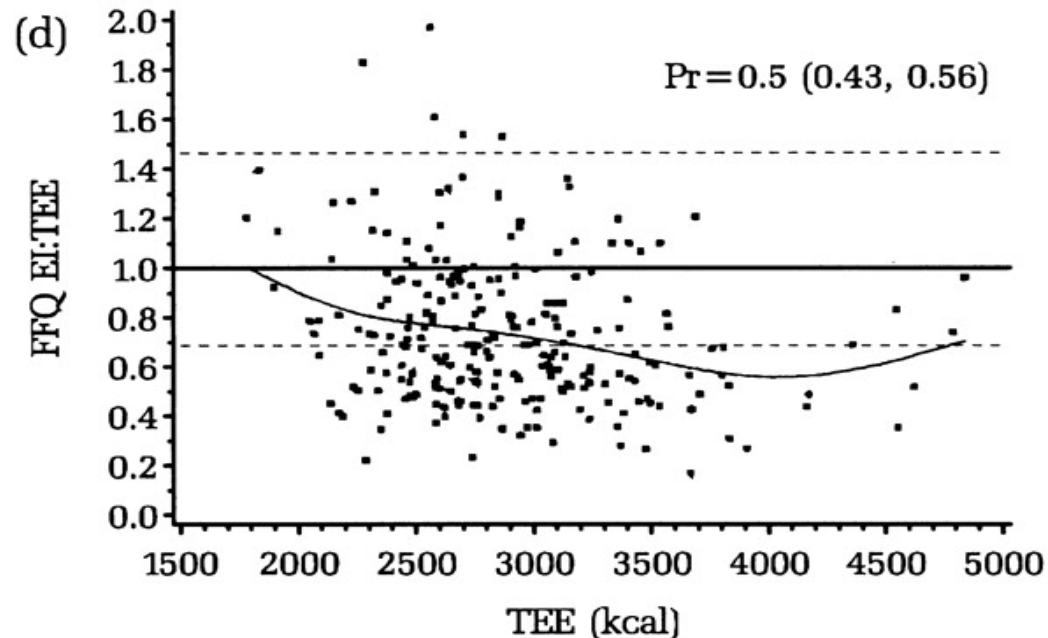
Amy F. Subar, Victor Kipnis, Richard P. Troiano, Douglas Midthune, Dale A. Schoeller, Sheila Bingham, Carolyn O. Sharbaugh, Jillian Trabulsi, Shirley Runswick, Rachel Ballard-Barbash ... [Show more](#)

American Journal of Epidemiology, Volume 158, Issue 1, 1 July 2003, Pages 1–13,
<https://doi.org/10.1093/aje/kwg092>

Published: 01 July 2003

Bărbați

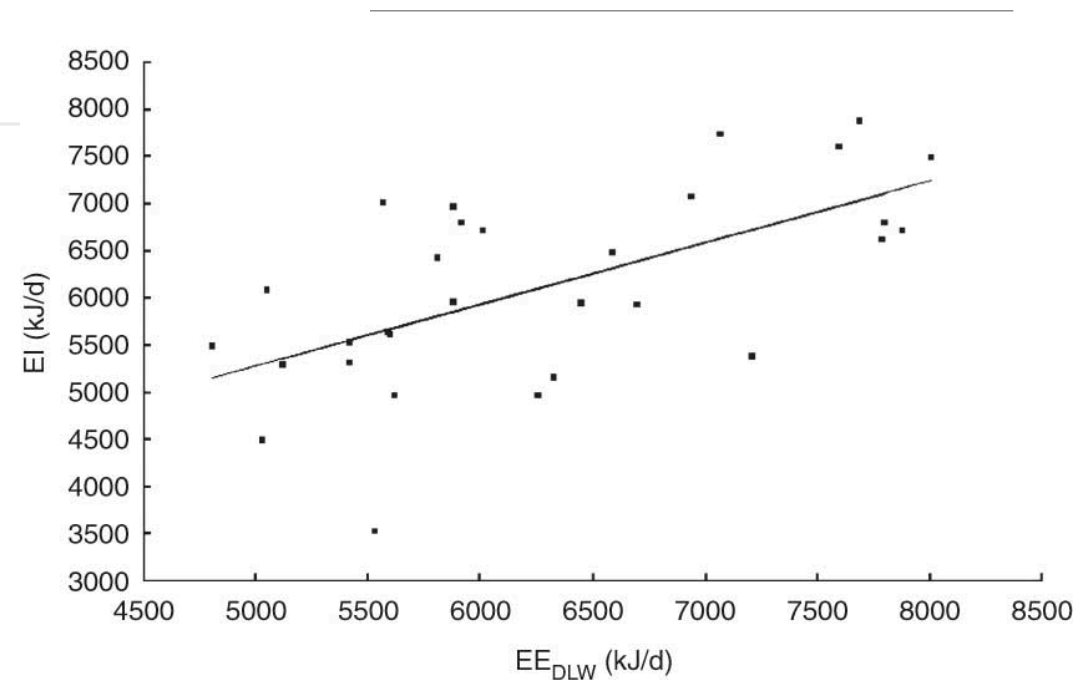
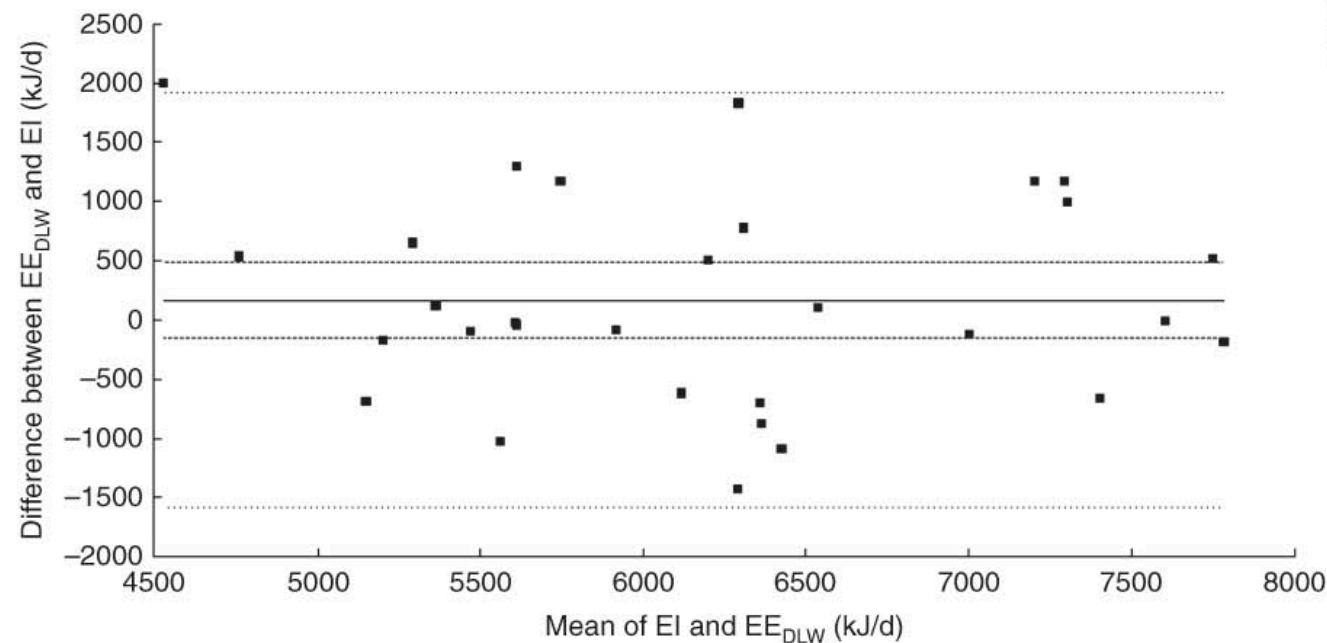
Femei



Validation of an FFQ and options for data processing using the doubly labelled water method in children

Published online by Cambridge University Press: 16 August 2010

Alice E Dutman, Annette Stafleu, Astrid Kruizinga, Henny AM Brants, Klaas R Westerterp, Cor Kistemaker, Wim JA Meuling and R Alexandra Goldbohm



Epidemiological assessment of diet: a comparison of a 7-day diary with a food frequency questionnaire using urinary markers of nitrogen, potassium and sodium FREE

NE Day, N McKeown, MY Wong, A Welch, S Bingham

International Journal of Epidemiology, Volume 30, Issue 2, April 2001, Pages 309–317,
<https://doi.org/10.1093/ije/30.2.309>

Published: 01 April 2001 **Article history** ▼

Table 6

Estimated correlation in the error of repeated measures on each measurement method. *R*: 7-day diary, *Q*: food frequency questionnaire

Error correlation:	N	K	Na
Between repeated of <i>R</i>	0.52	0.58	0.52
Between repeated of <i>Q</i>	0.45	0.56	0.51
Between repeated of <i>R</i> and <i>Q</i>	0.27	0.29	0.24

Published in final edited form as:

[Hypertension. 2014 Feb; 63\(2\): 238–244.](#)

Published online 2013 Nov 25. doi: [10.1161/HYPERTENSIONAHA.113.02218](https://doi.org/10.1161/HYPERTENSIONAHA.113.02218)

NIHMSID: NIHMS541932

PMID: [24277763](https://pubmed.ncbi.nlm.nih.gov/24277763/)

MEASUREMENT ERROR CORRECTED SODIUM AND POTASSIUM INTAKE ESTIMATION USING 24-HOUR URINARY EXCRETION

[Ying Huang](#),¹ [Linda Van Horn](#),² [Lesley F. Tinker](#),¹ [Marian L. Neuhouser](#),¹ [Laura Carbone](#),³
[Yasmin Mossavar-Rahmani](#),⁴ [Fridtjof Thomas](#),³ and [Ross L. Prentice](#)¹

Validare prin alte metode

Nutrition and Dietary Supplements

Dovepress

open access to scientific and medical research

 Open Access Full Text Article

ORIGINAL RESEARCH

Relative Validation of a Four Weeks Retrospective Food Frequency Questionnaire versus 7-Day Paper-Based Food Records in Estimating the Intake of Energy and Nutrients in Adults

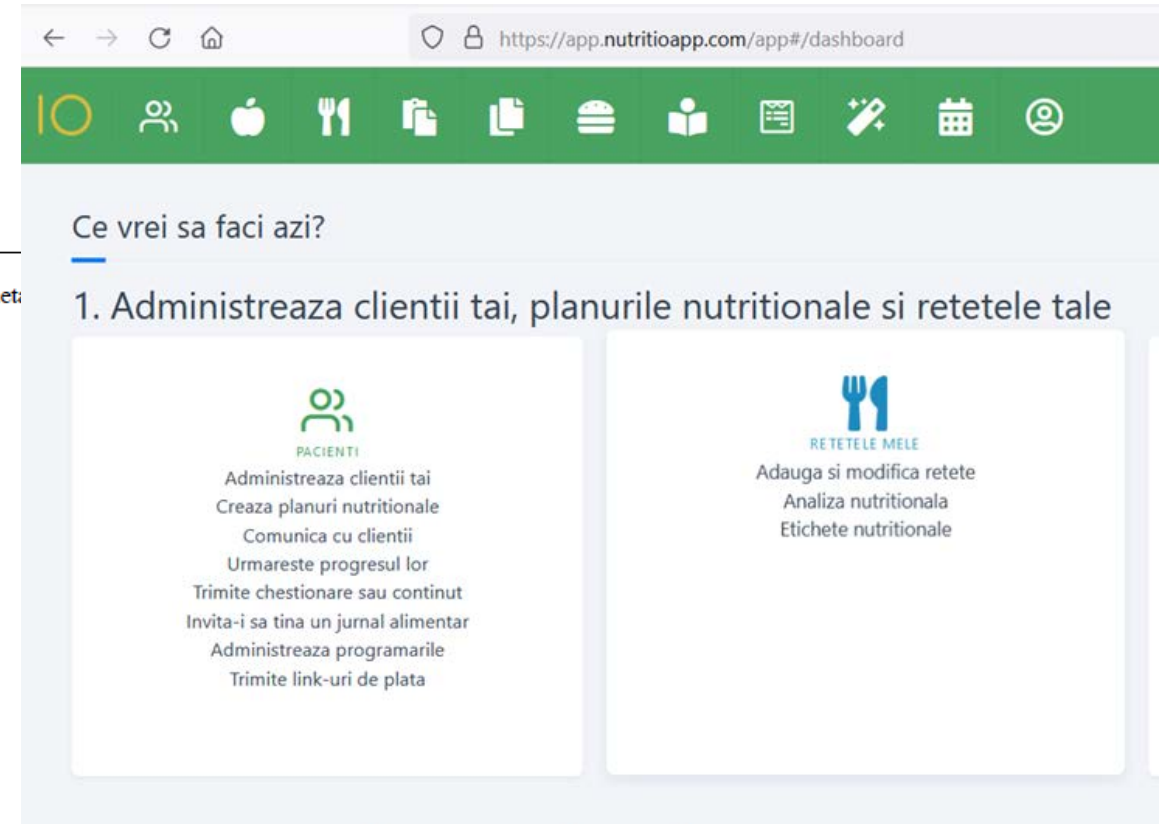
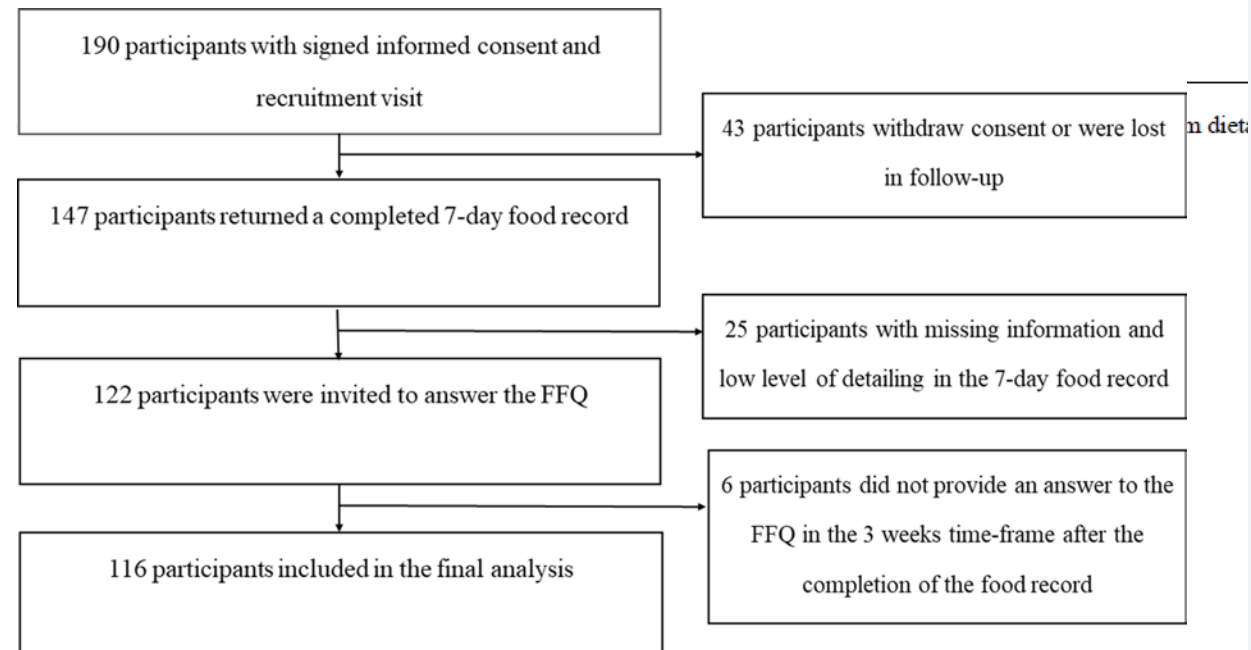
Costela Lacrimioara Serban¹
Ancuta Mioara Banu²
Sandra Putnoky³
Stefania Ioana Butica⁴
Mihai Dinu Niculescu⁵
Salomeia Putnoky⁶

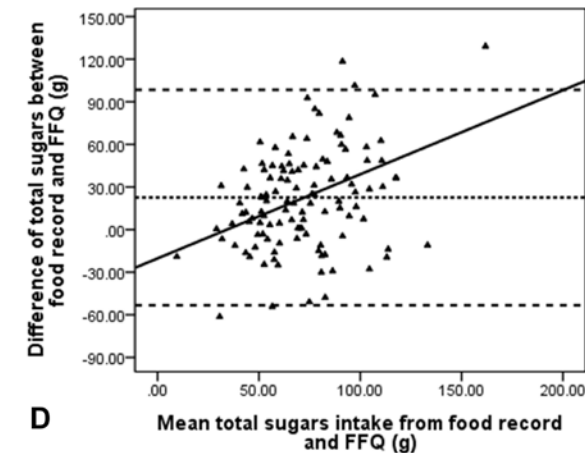
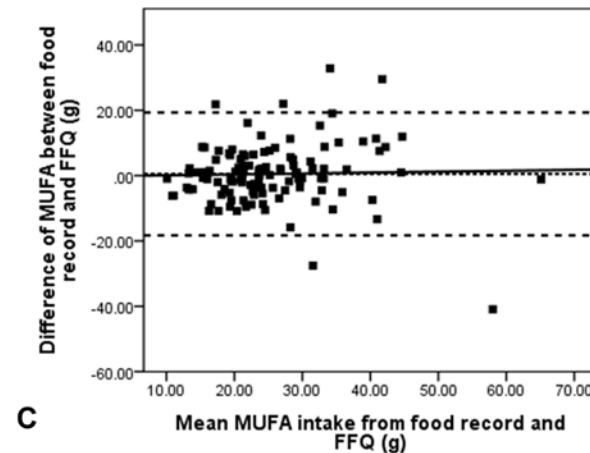
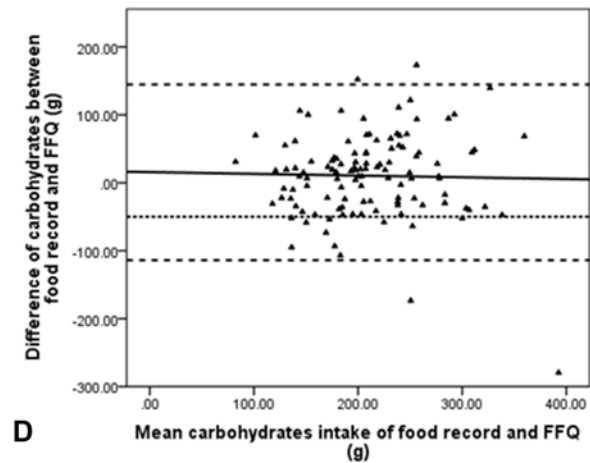
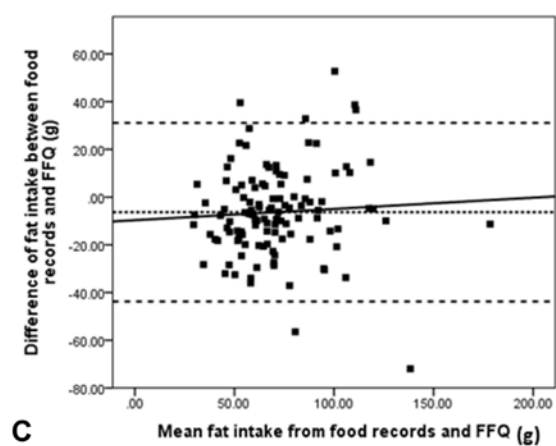
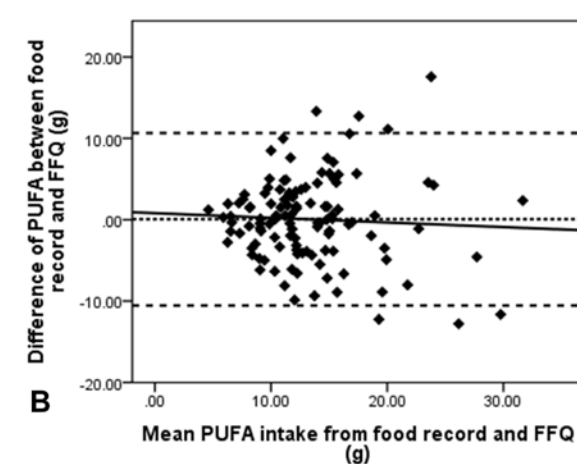
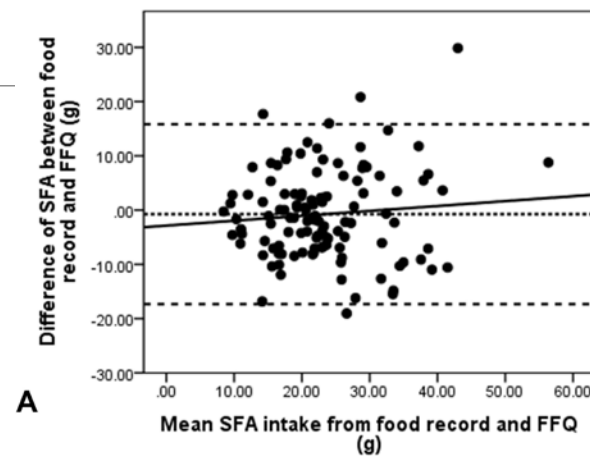
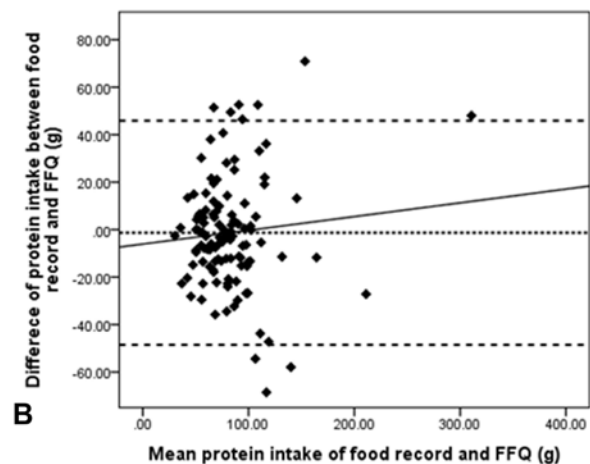
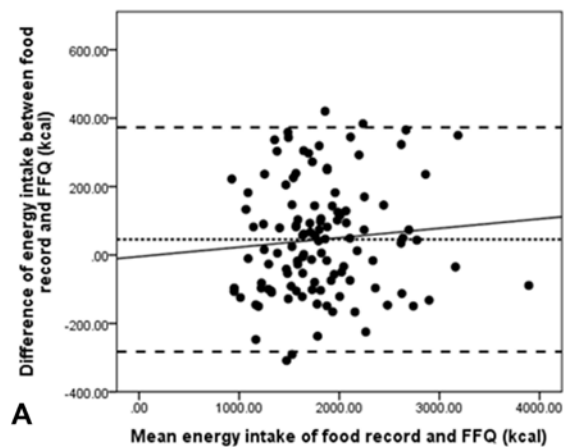
¹Department of Functional Sciences,
University of Medicine and Pharmacy

Purpose: This study assessed potential differences in estimating short-term dietary intake of energy and nutrients and food consumption, between 4-week food frequency questionnaires (FFQs) and 7-day food records in Romanian adults.

Patients and Methods: A total of 116 participants (age range 18–74 years, 31% males and 28.4% of participants being overweight and obese) were recruited. Estimates for energy and macro- and micronutrient intakes, and food group intakes were compared between the two methods using Wilcoxon-sign-rank test, correlation coefficients, Cohen's Kappa, Bland–Altman plots with 95% limits of agreement, and quartile classifications.

Relative Validation of a Four Weeks Retrospective Food Frequency Questionnaire versus 7-Day Paper-Based Food Records in Estimating the Intake of Energy and Nutrients in Adults





Utilizarea instrumentelor în cercetarea românească

Show/Hide Columns			
Study Title	Conditions	Interventions	Locations
Use of Nutrigenomic Models for the Personalized Treatment With Medical Foods in Obese People	- Obesity - Dyslipidemia	Dietary Supplement: Administration of supplements containing methyl-donors	- Clinica II Pediatrie Bega Timisoara, Timis, Romania - Spitalul Judetean Timisoara; Centrul de Diabet Timisoara, Timis, Romania

Study Design

[Study Type](#) ⓘ : Interventional (Clinical Trial)

[Estimated Enrollment](#) ⓘ : 600 participants

[Allocation](#): Randomized

[Intervention Model](#): Parallel Assignment

[Masking](#): Triple (Participant, Care Provider, Investigator)

[Primary Purpose](#): Supportive Care

[Official Title](#): Use of Nutrigenomic Models for the Personalized Treatment With Medical Foods in Obese People

[Study Start Date](#) ⓘ : September 2016

[Estimated Primary Completion Date](#) ⓘ : September 2019

[Estimated Study Completion Date](#) ⓘ : September 2019

Măsurarea aportului alim NUTRIGEN

Int J Environ Res Public Health. 2019 Aug 22;16(17):3036. doi: 10.3390/ijerph16173036.

Assessment of Nutritional Intakes in Individuals with Obesity under Medical Supervision. A Cross-Sectional Study

Costela Lăcrimioara Șerban¹, Alexandra Sima^{2 3}, Corina Marcela Hogeia⁴,
Adela Chiriță-Emandi^{5 6}, Iulia Teodora Perva^{5 6}, Adrian Vlad^{7 4}, Alin Albai^{7 4},
Georgiana Nicolae^{8 9}, Salomeia Putnoky¹⁰,
Maria Puiu^{5 6}

Affiliations + expand

PMID: 31443343 PMCID: [PMC6747404](#) DOI: [10.3390/ijerph16173036](#)

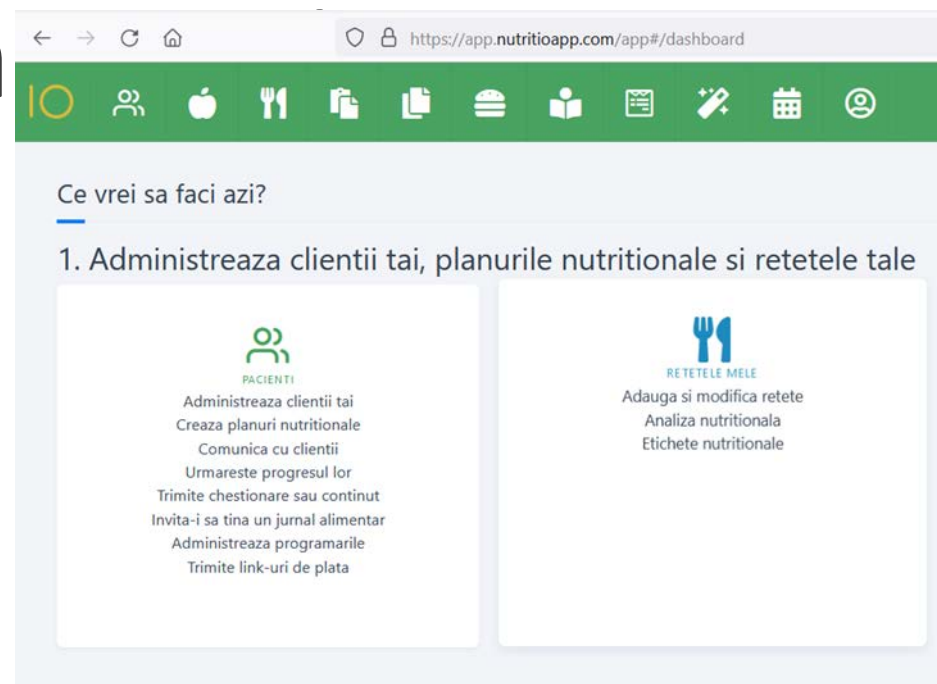


Table 2. Status of 24 h dietary recalls.

Number of Recalls	Patients with Recalls Numbers
4 × 24 h recalls	388 × 4 = 1552
3 × 24 h recalls	5 × 3 = 15
2 × 24 h recalls	4 × 2 = 8
1 × 24 h recalls	12 × 1 = 12
409 participants imputed in Nutritio app = 1587 recalls	

Table 5. Prevalence of reaching the recommended intake for proportion of energy derived from fat and carbohydrates by quartiles of energy intake *.

Categories			First Quartile	Second Quartile	Third Quartile	Fourth Quartile	<i>p</i> -Trend in Quartiles ***	Total
			<i>n</i> = 102	<i>n</i> = 103	<i>n</i> = 102	<i>n</i> = 102		<i>n</i> = 409
Energy derived from carbohydrates	Male	low	7 (36.8%)	25 (58.1%)	36 (65.5%)	51 (63.8%)	0.091	119 (60.4%)
		recommended	10 (52.6%)	17 (39.5%)	18 (32.7%)	28 (35.0%)		73 (37.1%)
		high	2 (10.5%)	1 (2.3%)	1 (1.8%)	1 (1.3%)		5 (2.5%)
	Female	low	23 (27.7%)	27 (45.0%)	27 (57.4%)	10 (45.5%)	0.002	87 (41.0%)
		recommended	51 (61.4%)	31 (51.7%)	19 (40.4%)	12 (54.5%)		113 (53.3%)
		high	9 (10.8%)	2 (3.3%)	1 (2.1%)	0 (0.0%)		12 (5.7%)
	Total	low	30 (29.4%)	52 (50.5%)	63 (61.8%)	61 (59.8%)	<0.001	206 (50.4%)
		recommended	61 (59.8%)	48 (46.6%)	37 (36.3%)	40 (39.2%)		186 (45.5%)
		high	11 (10.8%)	3 (2.9%)	2 (2.0%)	1 (1.0%)		17 (4.2%)
	Significance level **		0.515	0.193	0.414	0.139		<0.001
Energy derived from fat	Male	low	1 (5.3%)	0 (0.0%)	0(0.0%)	0 (0.0%)	0.074	1 (0.5%)
		recommended	8 (42.1%)	18 (41.9%)	20 (36.4%)	19 (23.8%)		65 (33.0%)
		high	10 (52.6%)	25 (58.1%)	35 (63.6%)	61 (76.3%)		131 (66.5%)
	Female	low	3 (3.6%)	0 (0.0%)	1 (2.1%)	0 (0.0%)	<0.001	4 (1.9%)
		recommended	55 (66.3%)	27 (45.0%)	20 (42.6%)	5 (22.7%)		107 (50.5%)
		high	25 (30.1%)	33 (55.0%)	26 (55.3%)	17 (77.3%)		101 (47.6%)
	Total	low	4 (3.9%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	<0.001	5 (1.2%)
		recommended	63 (61.8%)	45 (43.7%)	40 (39.2%)	24 (23.5%)		172 (42.1%)
		high	35 (34.3%)	58 (56.3%)	61 (59.8%)	78 (76.5%)		232 (56.7%)
	Significance level **		0.102	0.753	0.355	0.921		<0.001

Note * similar United States Department of Agriculture (USDA) and European Food Safety Authority (EFSA) reference range criteria: Total carbohydrates (E%): 45%–60% and Total fat (E%): 20%–35%. ** Mann-Whitney test, males versus females, per quartiles (unadjusted), and per total participants. *** Kruskal-Wallis test. Results in bold are statistically significant.

Utilizarea instrumentelor în cercetarea românească

Open Access

Article

Development and Validation of a LC–MS/MS-Based Assay for Quantification of Free and Total Omega 3 and 6 Fatty Acids from Human Plasma

All acceptance criteria were met. The calibration curves showed a very good correlation between concentration and response, R-squared for all calibrants was greater than 0.995, with no weighting method applied. All calibration curves were reproducible.

Accuracy was evaluated for four different concentrations for each standard. The RSD%s were all within the margin of $\pm 15\%$. The highest RSD (9.1%) was found at the lowest calibrant for LA, a value that had a large margin inside the Food and Drug Administration (FDA) guide's acceptance. Accuracy was also surveyed during each analytical run by inserting a quality control sample for every 10 samples, and allowance was set for the LabSolution software between 85% and 115%, as any deviation from this interval would invalidate the results. The RSD% for intra-assay and inter-assay precision test were also within the acceptable margin of 15%, demonstrating that the results are reproducible. The complete results for replicated analysis of standards (accuracy) and replicated analysis of samples (precision) are indicated in Table 3 and Table 4, respectively.

Development and Validation of a LC–MS/MS-Based Assay for Quantification of Free and Total Omega 3 and 6 Fatty Acids from Human Plasma

Table 4. The results for replicated analysis of samples (test precision). The sample was analysed 10 times in the same day (within-run precision) and 5 times in different days (between-run precision). The obtained concentrations were used to calculate the relative standard deviation (RSD%).

Compound		Intra-Assay RSD%	Inter-Assay RSD%
ALA	total	8.05	12.60
	free	7.81	13.10
ARA	total	1.92	6.50
	free	2.01	7.10
DHA	total	5.54	7.45
	free	5.20	7.70
EPA	total	3.00	8.10
	free	3.40	9.40
LA	total	2.89	6.05
	free	3.34	7.60

Legend: ALA— α -linolenic acid, ARA—arachidonic acid, DHA—docosahexaenoic acid, EPA—eicosapentaenoic acid, LA—linoleic acid.

The developed and validated method described offers a simplified extraction procedure without the need of derivatization, and a fast and reproducible LC-MS/MS quantification. It is suitable for quantifying *n*-3 and *n*-6 fatty acids in human plasma, in both free and total forms.

Utilizarea instrumentelor în cercetarea românească

Open Access Article

Single Nucleotide Polymorphisms in *PEMT* and *MTHFR* Genes are Associated with Omega 3 and 6 Fatty Acid Levels in the Red Blood Cells of Children with Obesity

by  Vlad Serafim ^{1,2,†},  Adela Chirita-Emandi ^{1,3,†} ,  Nicoleta Andreescu ^{1,3,*} ,  Diana-Andreea Tiugan ^{1,3},
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2.3. Food Intake

Food intake was evaluated using 5-pass 24 h dietary recalls as previously described [13]. Briefly, the recalls were administered four times to each participant if older than 13 years of age, or to both a parent and the child if the participant was younger. The declared amounts for each day investigated (foods and drinks) were converted to energy and macro- and micronutrient intakes using a web-application (Nutritio, Bucharest, Romania, <https://nutritioapp.com>) based on the U.S. Department of Agriculture (USDA) Food and Nutrient Database for Dietary Studies, with appropriate adaptations for local foods.

Single Nucleotide Polymorphisms in *PEMT* and *MTHFR* Genes are Associated with Omega 3 and 6 Fatty Acid Levels in the Red Blood Cells of Children with Obesity

Dependent Variable: LA in RBC					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	220014.263 ^a	8	27501.783	2.829	0.006
Intercept	142585.361	1	142585.361	14.665	0.000
Gender	86981.037	1	86981.037	8.946	0.003
rs1109859 in <i>PEMT</i> gene	64090.372	2	32045.186	3.296	0.040
rs4846052 in <i>MTHFR</i> gene	19491.620	2	9745.810	1.002	0.369
Hemoglobin	13805.541	1	13805.541	1.420	0.235
Hematocrit	29920.071	1	29920.071	3.077	0.081
LA intake	21692.633	1	21692.633	2.231	0.137
Error	1545925.144	159	9722.800		
Total	10938772.094	168			
Corrected Total	1765939.407	167			
a. <i>R</i> Squared = 0.125 (Adjusted <i>R</i> Squared = 0.081)					

Legend: DHA—docosahexaenoic acid, EPA—eicosapentaenoic acid, LA—linoleic acid, RBC—red blood cells, *MTHFR*—methylenetetrahydrofolate reductase, *PEMT*—phosphatidylethanolamine *N*-methyltransferase.

***CHDH-PNPLA3* Gene–Gene Interactions Predict Insulin Resistance in Children with Obesity**

[Adela Chirita-Emandi](#),^{#1,2,*} [Costela Lacrimioara Serban](#),^{#2,3,*} [Corina Paul](#),^{#4,5,*} [Nicoleta Andreescu](#),^{1,2}
[Iulian Velea](#),^{4,5} [Alexandra Mihailescu](#),¹ [Vlad Serafim](#),^{1,6} [Diana-Andreea Tiugan](#),¹ [Paul Tutac](#),¹ [Cristian Zimbru](#),^{1,7}
[Maria Puiu](#),^{1,2} and [Mihai Dinu Niculescu](#)^{1,8}

Participants and Samples

Two hundred children (95 males, 105 females) aged 7–18 years, with obesity defined using the World Health Organization 2007 reference, if more than +2 Standard Deviation (SD),¹⁵ were evaluated within the NutriGen Study protocol. The trial is registered at ClinicalTrials.gov, [NCT02837367](#). Clinical evaluation was performed in a paediatric hospital in Timisoara, Romania. Exclusion criteria were previously described elsewhere¹⁶ and included diagnosis of severe or medical history of severe acute immune disease.

Variables Mean $\pm$ SD		All Children			p value	p value Insulin
		Insulin Resistance			Boys vs	Resistance
		No	Yes	All	Girls	No vs Yes
		(n=60)	(n=93)	(n=153)		
Metabolic	ALA RBC ($\mu\text{mol/L}$)	1.4 $\pm$ 0.7	1.8 $\pm$ 1.2	1.7 $\pm$ 1.0	0.064 **	0.080 **
	DHA RBC ($\mu\text{mol/L}$)	170.2 $\pm$ 83.3	195.4 $\pm$ 130.5	185.7 $\pm$ 114.9	0.324 **	0.325 **
	LA RBC ($\mu\text{mol/L}$)	214.8 $\pm$ 97.5	240.3 $\pm$ 108.1	230.4 $\pm$ 104.5	0.136 **	0.168 **
	AR ARBC ($\mu\text{mol/L}$)	351.4 $\pm$ 138.1	397.3 $\pm$ 173.6	379.5 $\pm$ 161.9	0.236 **	0.323 **
	EPA RBC ($\mu\text{mol/L}$)	3.2 $\pm$ 2.0	3.9 $\pm$ 4.8	3.7 $\pm$ 3.9	0.085 **	0.234 **
Intake related	Percentage of energy intake from carbohydrates	46.9 $\pm$ 7.1	45.3 $\pm$ 7.2	45.9 $\pm$ 7.2	0.062 *	0.172 *
	Percentage of energy intake from fat	31.9 $\pm$ 6.6	33.0 $\pm$ 6.4	32.6 $\pm$ 6.5	0.496 *	0.291 *
	Fraction of energy intake from REE	0.67 $\pm$ 0.22	0.66 $\pm$ 0.23	0.66 $\pm$ 0.22	0.026 **	0.575 **

CHDH-PNPLA3 Gene-Gene Interactions

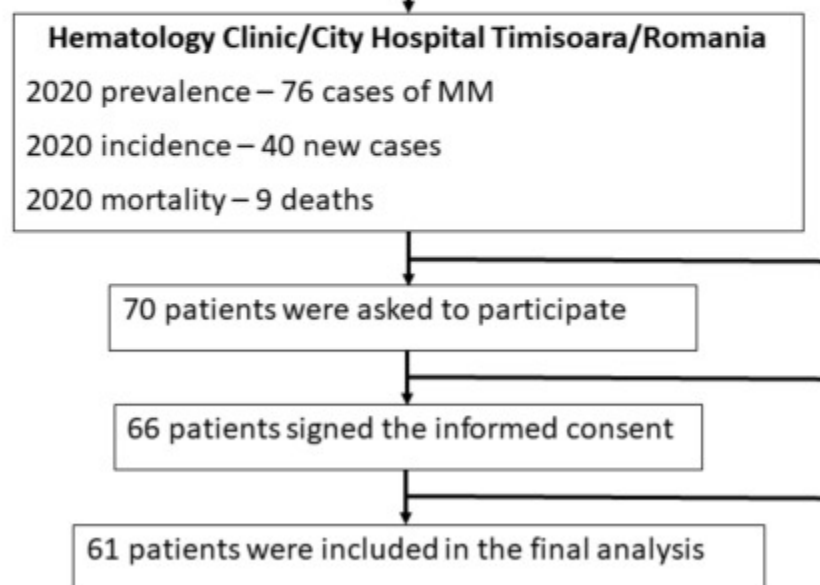
HOMA-IR mean +/- SD, n		rs12676 CHDH gene		
		AA	AC	CC
rs738409 PNPLA3 gene	CC	High risk 5.8 +/- 4.3 n=7	Low risk 3.9 +/- 2.1 n=31	High risk 4.1 +/- 2.6 n=41
	CG	High risk 6.5 +/- 3.1 n=4	High risk 6.8 +/- 4.8 n=11	Low risk 2.4 +/- 2.0 n=14
	GG	High risk 6.2 +/- 3.1 n=6	Low risk 3.9 +/- 2.6 n=22	High risk 5.7 +/- 4.3 n=17

High Carbohydrate Diet Is Associated with Severe Clinical Indicators, but Not with Nutrition Knowledge Score in Patients with Multiple Myeloma

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Affiliations + expand

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2.3. Nutritional Assessment

Dietary intake assessment was performed using a validated FFQ, consisting of 53 food items; it investigated food intake during the last 30 days [14,15]. For each item, the frequency and the usual amount of consumed food items were investigated. To give an estimate of the quantity of fat or added sugar, additional questions were asked in relation to some of the items. The intakes were converted to grams, in accordance with the guidelines of household scales [16]. Using a computer program specially created for this purpose, the energy and macronutrient intakes were calculated for each individual. Macronutrients were transformed into a percentage of contribution to total energy, and then the adequacy of intake was calculated as per the European Food and Safety Authority (EFSA) recommendations [17]. “Inadequate intake” had different meanings for different macronutrients: for proteins, “inadequate” meant lower than the recommended values; for fat, “inadequate” represented only the values above the upper recommended threshold; as for carbohydrates, the values were both lower and upper thresholds. The energy-adjusted values of intake were also computed for saturated fat, fibers and alcohol.

A low carbohydrate diet (LCD) score was computed using deciles of the percentage of macronutrients. For carbohydrates, the lowest decile received a score of 10, and the highest decile received a score of one. For fat and protein, the lowest decile received a score of one, and the highest received a score of 10. All individual macronutrient scores were added to obtain the LCD score, which ranged from a possible lowest score of 3 to a highest score of 30, with higher scores indicating higher adherence to a low carbohydrate diet [18,19]. The LCD score was transformed into tertiles and further used as a three-layer factor in statistical analysis.

Clinical and intake variables per tertile of LCD score.

Clinical and Intake Variables	Measure	Tertiles Of LCD Score			<i>p</i> -Values
		First (High Carb Diet) n1 = 21	Second (Medium Carb Diet) n2 = 18	Third (Low Carb Diet) n3 = 22	
Hemoglobin (g/dl)	Mean +/- SD **	8.1 +/- 1.7 ^a	9.8 +/- 2.2	8.0 +/- 2.0 ^a	0.010
Alkaline phosphatase (IU/L)	Mean +/- SD **	114.4 +/- 31.9	88.1 +/- 35.8	98.1 +/- 42.2	0.088
Erythrocyte sedimentation rate (mm/hr)	Mean +/- SD **	104.7 +/- 46.3	102.8 +/- 40.9	108.1 +/- 37.5	0.919
Serum calcium (mg/dL)	Mean +/- SD **	12.1 +/- 3.3	11.8 +/- 2.7	12.2 +/- 3.1	0.928
Uric acid (mg/dL)	Mean +/- SD **	7.7 +/- 1.8 ^a	5.9 +/- 2.2	6.3 +/- 1.7	0.006
Creatinine (mg/dL)	Mean +/- SD **	2.2 +/- 0.9	1.6 +/- 1.2	2.4 +/- 1.5	0.131
Blood urea nitrogen (mg/dL)	Mean +/- SD **	58.7 +/- 21.2	46.9 +/- 21.0	68.4 +/- 40.4	0.083
Albumin (g/L)	Mean +/- SD **	51.3 +/- 4.1 ^a	56.8 +/- 7.6	54.1 +/- 5.6	0.018
Total proteins (g/dL)	Mean +/- SD **	9.9 +/- 3.6 ^a	7.2 +/- 2.4	7.6 +/- 3.2	0.018
Beta-2 microglobulin (mg/dl)	Mean +/- SD **	10.7 +/- 4.0 ^a	5.9 +/- 3.4	8.8 +/- 4.5	0.002
C-reactive protein (mg/L)	Mean +/- SD **	20.3 +/- 17.7	12.0 +/- 9.7	18.3 +/- 13.5	0.179
Plasmocytes in bone marrow (%)	Mean +/- SD	67.5 +/- 18.5 ^a	44.4 +/- 23.5	58.2 +/- 22.7	0.006

High Carbohydrate Diet Is Associated with Severe Clinical Indicators, but Not with Nutrition Knowledge Score in Patients with Multiple Myeloma

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Epidemiology

Reliability and validity of a General Nutrition Knowledge Questionnaire for adults in a Romanian population

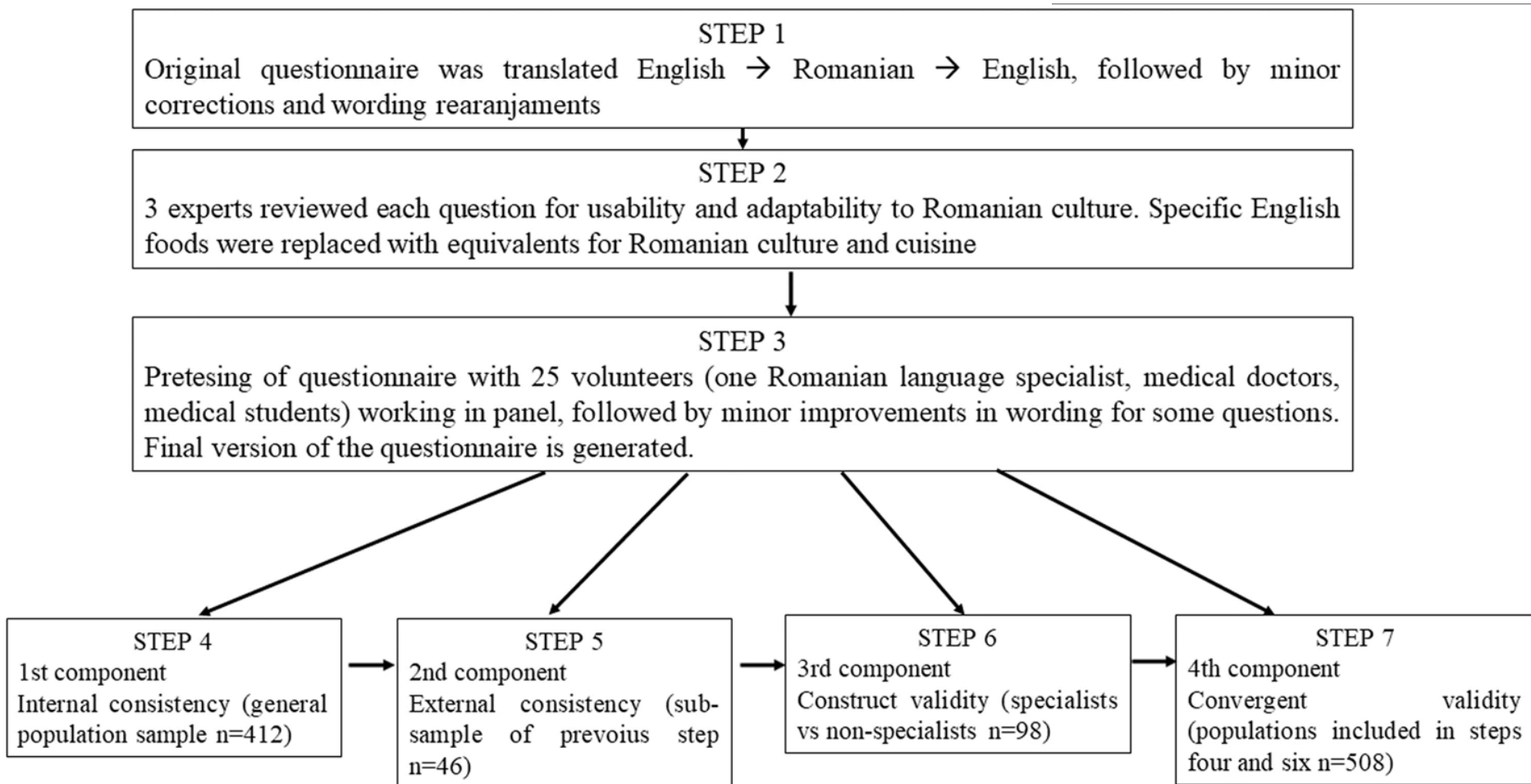
[Salomeia Putnoky](#), [Ancuța Mioara Banu](#) , [Lavinia Cristina Moleriu](#), [Sandra Putnoky](#), [Denis Mihai Șerban](#), [Mihai Dinu Niculescu](#) & [Costela Lăcrimioara Șerban](#)

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	Items in Romanian questionnaire (current study)	Romanian sample (current study) $n_1 = 412$	UK sample ($n = 168$) [10]	Australian sample ($n = 156$) [19]	Turkish sample ($n = 195$) [13]	Uganda sample ($n = 117$) [12]	UK sample ($n = 266$) [18]	Japanese sample ($n = 1182$) [11]
Overall	88	0.88	0.97	0.92	0.89	0.95	0.93	0.95
Section 1 Expert recommendations	18	0.53	0.70	0.53	0.47	0.56	0.70	0.78
Section 2 Food groups	36	0.82	0.95	0.88	0.88	0.85	0.86	0.94
Section 3 Healthy food choices	13	0.53	0.76	0.55	0.43	0.85	0.72	0.31
Section 4 Diet, disease and weight associations	21	0.72	0.94	0.73	0.81	0.91	0.77	0.81

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	Items in Romanian questionnaire (current study)	Romanian sample (current study) $n_2 = 46$	UK sample ($n = 168$) [10]	Australian sample ($n = 156$) [19]	Turkish sample ($n = 195$) [13]	Uganda sample ($n = 117$) [12]	UK sample ($n = 266$) [18]	Japanese sample ($n = 1182$) [11]
Overall	88	0.96	0.98	0.87	0.86	0.89	0.93	0.75
Section 1 Expert recommendations	18	0.94	0.80	0.37	0.56	0.80	0.70	0.67
Section 2 Food groups	36	0.96	0.94	0.85	0.85	0.77	0.86	0.67
Section 3 Healthy food choices	13	0.88	0.87	0.75	0.57	0.84	0.72	0.44
Section 4 Diet, disease, and weight associations	21	0.86	0.97	0.74	0.60	0.80	0.77	0.68

Type A scoring system: correct answer 1 point, else 0 points

Type B scoring system: correct answer 1 point, wrong answer –1 points and “I am not sure” option 0 points

Average

57.99/88 points

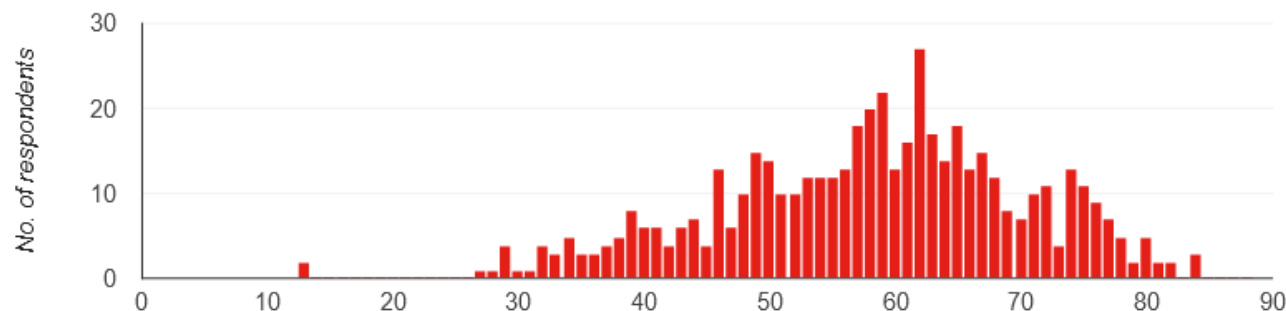
Median

59/88 points

Range

13-84 points

Total points distribution



Model		Unstandardized coefficients		Standardized coefficients	95.0% confidence interval for B	
		B	Std. error	Beta	Lower bound	Upper bound
1	(Constant)	28.880	1.439		26.053	31.707
	Gender (females)	–2.604	0.672	–0.170	–3.924	–1.283
	Education level (at least college)	–2.378	0.654	–0.167	–3.662	–1.093
	Studies in nutrition (yes)	–3.216	0.908	–0.154	–5.001	–1.431

Dependent variable: difference of two scoring system.

Independent variables: Gender, age categories, BMI categories, marital status, health perception, presence of children, level of education, and studies in nutrition.

$F(8499) = 7.95, p < 0.001$, adjusted R square = 0.099.

Vă mulțumesc!

