Internal consistency and test-retest reliability of general nutrition knowledge of head teachers and community extension workers in Uganda.

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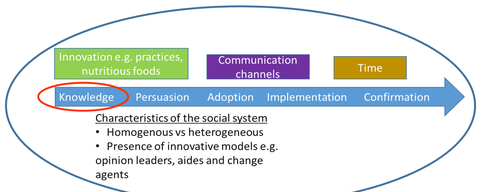
Abstract

The present study evaluated the internal consistency and test-retest reliability of a general nutrition knowledge questionnaire (GNKQ) among head teachers and community extension workers. The GNKQ had five domains (137 items): Expert recommendation (16), Food groups(67), Selecting food (10), Relationship of nutrition and disease (22) and Food fortification (22). Internal consistency was determined using Cronbach alpha (α) on a sample of 255 head teachers in Wakiso and Mukono districts and 80 community extension workers in Kiboga and Kyankwanzi districts. Test-retest reliability on scores was determined by intraclass correlation coefficient ($ICC_{2,1}$). *Head teachers*. The overall internal consistency was α = 0.92 on 94 items. All five domains had items that yielded data with acceptable internal consistency (α > 0.7). The test-retest reliability of two domains, Expert recommendation (ICC = 0.64) and Selecting food (ICC = 0.41) were not acceptable (ICC < 0.7). The remaining nutrition knowledge domains had acceptable test-retest reliability: Food groups (ICC = 0.9), Relationship of nutrition and disease (ICC = 0.91), and Food fortification (ICC = 0.95) i.e. 82 items in the three domains had acceptable internal consistency and test-retest reliability. *Community extension agents*. The questionnaire (85 items) had adequate internal consistency (α = 0.93) and test-retest reliability (ICC = 0.9). With exception of Selecting foods, other four nutrition knowledge domains had adequate internal consistencies (α > 0.7) and test-retest reliability (ICC > 0.7). The results show that the GNKQ can be used to evaluate reliable general nutrition knowledge data among head teachers and community extension workers. Future studies can use the questionnaire on other of adult groups to improve generalizability.

Introduction

- The Uganda Nutrition Action Plan has the following strategies:
  - Promotion of adequate feeding practices and behaviors including school children (6-12 years);
  - Increase availability, access, and consumption of diversified foods;
  - Strengthening of food and nutrition policies.
- Like in many countries, the above strategies are implemented in communities using a multi-sectoral approach.
- Head teachers and community extension workers are primary connections to new knowledge and practices in schools and communities.
- Modifying nutrition related behaviors starts with knowledge of nutrition content (scheme below). As such, training of head teachers and community extension workers starts with assessing their knowledge.



- Head teachers and Community extension agents in rural communities combine their basic knowledge with the new knowledge about the strategies described, to influence other members in the respective communities .

- Yet basic nutrition knowledge level of both head teachers and community extension agents is unknown. Validated tools to measure knowledge are limited.
- The studies on validation of tools among head teachers and community extension workers are important.

Research question

Can the general nutrition knowledge questionnaire (GNKQ) developed by Bukenya et al. 2017 collect reliable nutrition knowledge data from head teachers and community extension workers in Uganda?

Method

- The GNKQ comprised of five domains on nutrition knowledge, sources of nutrition knowledge, and demographic characteristics (Fig. 1).
- 255 head teachers in Mukono and Wakiso were recruited.
- 80 community extension agents working with various CGIAR centers including Bioversity International and government sector in Kiboga and Kyankwanzi districts, Uganda were selected.
- The questionnaire was administered twice in a span of two weeks.

Fig. 1. Components of the GNKQ

- Data were entered in SPSS-23. Obtained item difficulty (10-90%) and discrimination (<0.2) as basis for removal of items from final analysis.
- Internal consistency (using Cronbach Alpha in SPSS), test-retest reliability (Intraclass correlation coefficient) measured reliability.
- Paired *t*-test was used to determine differences between scores at time one and two.

Results: Demographics

Table 1: Characteristics of head teachers and extension agents

Characteristic		Head teachers % (N= 255)	Community extension agents % (N = 80)
Gender			
	Male	54.1	45
	Female	45.9	55
Age			
	18–24	1.6	13.8
	25–34	18.8	41.3
	35–44	32.5	25.0
	45–54	36.5	15.0
	55–64	9.8	3.8
	65–74	0.8	1.3
Education			
	Primary	2.4	18.8
	Ordinary Secondary school	2.0	31.5
	High School (A' level)	1.2	8.8
	Technical college	14.1	17.5
	Diploma	44.3	7.5
	Degree	32.2	16.3
	Post graduate degree	3.9	
Number of children			
	None	6.7	20.0
	1	5.9	15.0
	2	14.1	15.0
	3	18.4	12.5
	4	22.7	12.5
	≥5	32.2	25.0
Do you have any nutrition ralated qualification?			
	Yes		25
	No		75

Results for head teachers: Item discrimination, internal consistency and test-retest reliability

Table 2: Internal consistency and test-retest reliability of the items

Topic on General Nutrition (items before, after)	Internal Reliability (α)				Test-retest Reliability [1]*N = 136*
	Before		After		*After*
	Time 1 N= 255	*Time 2* N= 227	*Time 1* N =255	*Time 2* N= 227	$ICC_{1,2}$
Expert recommendations (16,10)	0.65	0.68	0.70	0.75	0.64
Food groups (67, 45)	0.81	0.86	0.86	0.89	0.90
Selecting food (10, 2)	0.19	0.34	0.80	0.83	0.41
Relationship of nutrition and disease (22, 15)	0.61	0.66	0.70	0.73	0.91
Food fortification (22, 22)	0.86	0.87	0.86	0.87	0.95
Total (137, 94)	0.87	0.91	0.89	0.92	0.97

[1]After removing items with poor item difficulty and discrimination from analysis. ONLY 136 head teachers who filled the questionnaire on second week (time two) are included. Intraclass correlation coefficient (ICC), using a two-way random model with an absolute agreement type, single measure), with 95% confidence interval (CI). Standard error (SE). *p < 0.05 for the mean differences.

- The internal consistency of the scores improved after deleting items with poor item difficulty and discrimination for all domains.
- The test-retest reliability of the scores was acceptable for most domains except *Expert recommendations* and *Selecting food.*

Results for community extension workers: Item discrimination, internal consistency and test-retest reliability

Table 3: Internal consistency and test-retest reliability of the items

Topic on general nutrition	*Internal consistency (α)*						*Test-retest reliability (ICC)*
	Before removing items			*After removing items*			*After*
	Items	*Time 1*	*Time 2*	*Items*	*Time 1*	*Time 2*	
Expert recommendations	16	0.69	0.68	10	0.73	0.72	0.84
Food groups	67	0.81	0.85	44	0.85	0.88	0.86
Selecting foods	10	0.24	0.26	0			
Relationship of nutrition and disease	22	0.63	0.63	9	0.77	0.70	0.86
Food fortification	22	0.90	0.88	22	0.90	0.88	0.78
Total	137	0.91	0.91	85	0.93	0.93	0.90

- The internal consistency items after deleting items with poor item difficulty and discrimination except the domain on "selecting food".
- There was improvement in the test-retest reliability of items except for items in sections *Selecting foods*.

Conclusions and future studies

- The GNKQ (Bukenya et al. 2017) is capable of collecting reliable data from different adult groups in Uganda.
- Administering the questionnaire to two different adult populations partly demonstrates external validity.
- The questionnaire should be applied to other adult groups in Uganda to improve generalizability and external validity to the general population.
- The reliability of the data on Expert Recommendations and Selection of Food was questionable. The items in these domains should be reviewed.
- Future studies will seek to use the questionnaire to study relationship of nutrition knowledge and other behavioral indicators and practices during dissemination of key nutrition messages.
- The questionnaire can facilitate the evaluation of impact of nutrition education intervention programs provided to head teachers and community extension agents by the government, development partners and private organizations such as PepsiCo.

References

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