Appetite assessment: simple appetite questionnaire predicts weight loss in community-dwelling adults and nursing home residents[1–3]

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ABSTRACT

Background: Anorexia-related weight loss can have devastating consequences on quality-of-life, morbidity, and mortality. Without a simple tool to evaluate appetite, health care providers often use inaccurate surrogates, such as measurement of energy consumption and nutritional risk, to reflect appetite.

Objective: We aimed to validate a simple tool for assessing appetite and predicting weight loss.

Design: This was a cross-sectional measurement study conducted on long-term care residents and community-dwelling adults. Construct validity of the 8-item Council on Nutrition appetite questionnaire (CNAQ) and its 4-item derivative, the simplified nutritional appetite questionnaire (SNAQ), were examined through correlation with a previously validated research tool: the appetite hunger and sensory perception questionnaire (AHSP). The length and complexity of the AHSP render it inefficient for clinical use. The sensitivity and specificity of the CNAQ and SNAQ to predict significant weight loss were calculated.

Results: Cronbach's alpha coefficients for the CNAQ were 0.47 (long-term care group) and 0.72 (community-dwelling group). In the long-term care group, the CNAQ correlated with the AHSP ($r = 0.60$, $P < 0.001$) and with the AHSP domains of taste ($r = 0.47$, $P < 0.0001$), hunger ($r = 0.51$, $P < 0.0001$), and smell ($r = 0.53$, $P < 0.0001$). The CNAQ showed sensitivities and specificities for 5% and 10% weight losses of 80.2 and 80.3 and 82.4 and 81.9, respectively. The SNAQ had sensitivities and specificities for 5% and 10% weight losses of 81.3 and 76.4 and 88.2 and 83.5, respectively.

Conclusions: The SNAQ and CNAQ are short, simple appetite assessment tools that predict weight loss in community-dwelling adults and long-term care residents. The SNAQ is a 4-item derivative of the CNAQ and thus is clinically more efficient. *Am J Clin Nutr* 2005;82:1074–81.

INTRODUCTION

Anorexia is common in patients of advanced age and can lead to drastic weight loss. Anorexia and weight loss also complicate diseases such as cancer, AIDS, and cardiac failure, regardless of age. Consequences of weight loss associated with anorexia can be devastating in all age groups and constitute a special problem in older adults (1–6). In the elderly, complications of anorexia-related weight loss include frailty, falls, hip fractures, compromised immunity, and pressure ulcers. Older adults with anorexia-associated weight loss are also more likely to die than their robust counterparts (7–14).

Most providers institute nutritional intervention only after weight loss has occurred (15, 16). However, early detection and treatment of anorexia may prevent weight loss, improve health outcomes, and reduce mortality. Currently, there is a dearth of simple, validated clinical tools that objectively quantify appetite in older adults at risk of weight loss. Nutritional risk assessment tools such as the Mini Nutritional Assessment tool (MNA), the short-form of the MNA (MNA-SF), the Seniors in the Community Risk Evaluation for Eating and Nutrition tool (SCREEN), and the Functional Assessment of Anorexia Cachexia Therapy (FAACT) questionnaire are used by several providers (17–20). However, most of these tools are lengthy and evaluate multiple interdependent nutritional domains. Few evaluate appetite as a distinct singular construct. Alternatively, some clinicians use food consumption as a surrogate index of appetite even though measurement of food consumption is frequently inaccurate (21). Furthermore, eating is subject to a variety of cultural, psychosocial, and environmental factors that confound the quantitative relation between appetite and food intake (22).

The purpose of the present study was to determine the reliability and validity of a short, simple appetite assessment tool developed by the Council for Nutritional Strategies in Long-Term Care in institutionalized and community-dwelling adults. We also sought to determine the clinical utility of this tool in the prediction of weight loss.

SUBJECTS AND METHODS

The study was approved by the Saint Louis University Institutional Review Board. All participants were fully informed about the study and gave written consent.

Council for Nutritional Strategies in Long-Term Care: development of an appetite assessment questionnaire

The Council for Nutritional Strategies in Long-Term Care is an expert panel of interdisciplinary thought leaders representing academia and the medical community that comprises geriatricians, nurse practitioners, dietitians, and pharmacists. The council was formed in May 1998 to examine major issues surrounding the diagnosis, prevention, and treatment of undernutrition in older adults and to identify evidence-based recommendations for the management of undernutrition in long-term care. Since its development, the council has formulated several protocol-driven recommendations based on existing literature to serve as a clinical guide for the management of anorexia, weight loss, and undernutrition in the long-term care setting (23). Where evidence-based data existed, these served as the basis for specific nutritional recommendations. In the absence of such evidence, a Delphi technique was used to obtain consensus among members. The Delphi technique is a recognized research method for arriving at a consensus by using iteration with controlled feedback from a panel of unbiased experts. Feedback usually assumes the form of a statistical group response, with or without comments provided by individual panel members (24).

Recognizing a lack of practical tools for objective evaluation of appetite in older adults, a working group was formed to develop a short and simple instrument for appetite assessment. This group comprised members of the council and a lead member of a research team that had previously developed and validated an assessment tool for the evaluation of appetite among community-dwelling elders in the Netherlands: the appetite, hunger and sensory perception questionnaire (AHSP) (25). The AHSP correlates with the MNA and with body weight in healthy, free-living Dutch elders.

Using the Delphi technique, the council's working group developed an 8-item questionnaire, hereafter referred to as the Council of Nutrition appetite questionnaire (CNAQ; **Appendix A**). In October 1999, the CNAQ received consensus approval by the Council. Four of the authors (M-MGW, DRT, LZR, and JEM) are members of the Council.

Study design and setting

Between April 2002 and December 2003, we conducted a prospective cohort study of 2 groups of subjects: residents of long-term care facilities (LTC group) and community-dwelling adults (CD group). Subjects in these 2 groups were studied to avoid the possibility of a confounding effect of the higher burden of disease in long-term care residents on appetite scores of community-dwelling subjects. The LTC group comprised 247 subjects older than 60 y recruited from 9 long-term care facilities in St Louis, MO, and the surrounding counties. All facilities are affiliated with the Geriatric Medicine Division of Saint Louis University Health Sciences Center. The CD group comprised 1100 subjects aged >20 y who were recruited from the St Louis metropolitan area.

In both groups, potential subjects were excluded if they had a diagnosis of major depression, mental retardation, dementia, or gastrointestinal disease. Subjects with a 30-item Yesavage geriatric depression score >11/30 or a Folstein's mini-mental status examination score <18 were also excluded (26, 27). Potential subjects were also excluded if they were consuming voluntarily restricted diets or were receiving enteral tube feeding or parenteral nutrition. Subjects were also excluded if they were acutely ill or had been hospitalized in the preceding 3 mo. For the purpose of this study, acute illness was operationally defined as the presence of unresolved, active, or worsening health symptoms that disrupted the subject's regular daily activities as a result of discomfort or distress. Subjects were not offered any incentives to participate in the study.

Materials

All subjects were asked to complete the CNAQ, which is an 8-item single-domain questionnaire. Responses are scored by using a 5-point (A to E), verbally labeled, Likert-type scale. The total CNAQ score is the sum of scores on the 8 items, with lower scores indicating deterioration in appetite. Possible scores range from 8 (worst) to 40 (best) (Appendix A).

To facilitate validation of the CNAQ, subjects were also asked to complete the AHSP. The AHSP is a validated, 29-item, multidomain appetite assessment tool that is scored with a 5-point (A to E) Likert-type scale with verbally labeled categories. Items on the AHSP are grouped into 3 domains: taste (14 items), smell (6 items), and hunger (9 items). The score for each domain is the sum of scores on the individual items, with lower scores indicating deterioration. The total AHSP score is the sum of scores on the 3 domains. Possible scores range from 29 (worst) to 145 (best) (25).

Procedure

Residents of 9 long-term care facilities in St Louis and the surrounding counties were approached by one of the investigators (M-MGW, SA, AB, or MRD) and asked to participate in the study. Community-dwelling adults were approached at health fairs within the St Louis metropolitan area and were recruited through flyers posted on the university campus and in surrounding neighborhoods. Older community-dwelling subjects (aged >60 y) were also approached in the Saint Louis University Health Sciences Geriatric Medicine ambulatory offices. Only older adults presenting for routine follow-up visits without signs or symptoms of acute illness were considered. Younger adults were not recruited from the ambulatory clinics to avoid creating a cohort of younger adults with a falsely elevated level of comorbidity compared with typical community-dwelling younger adults.

Subjects who agreed to participate in the study were asked to complete the CNAQ and the AHSP questionnaire. The CNAQ takes ≈3 min to complete. The AHSP questionnaire takes ≈10 min to complete. All subjects were weighed at the time of consent and again 6 mo later. All weights were obtained by using Tanita BF-350e digital scales (Tanita Corporation of America, Inc, Arlington Heights, IL). Subjects were weighed initially and subsequently wearing only a hospital gown by the same investigator using the same set of scales.

TABLE 1
Subject characteristics[1]

	Value
LTC group (n = 247)	
Age (y)	79.2 ± 9.0
Body weight (kg)	67.3 ± 12
BMI (kg/m²)	26.2 ± 6.4
Total CD group (n = 868)	
Age (y)	53.5 ± 20.2
Body weight (kg)	75.5 ± 18.7
BMI (kg/m²)	27.5 ± 6.0
Old CD group (>60–102 y; n = 352)	
Age (y)	73.8 ± 9.0
Body weight (kg)	74.2 ± 16.2
BMI (kg/m²)	27.6 ± 5.2
Young CD group (>20–60 y; n = 516)	
Age (y)	39.4 ± 12.0
Body weight (kg)	76.4 ± 19.6
BMI (kg/m²)	27.4 ± 6.5

[1] All values are $\bar{x}$ ± SD. LTC, long-term care; CD, community-dwelling.

Data analysis

In both cohorts, the internal consistency reliability of the CNAQ was estimated by using Cronbach's alpha coefficient, and the construct validity of the CNAQ was examined through its correlations with the AHSP by using Pearson's product-moment correlation coefficient analysis. In the CD cohort, reliability was also estimated as a function of subject age because of the larger number of subjects; the CNAQ was factor analyzed by using principal components analysis; multiple linear regression was used to predict the CNAQ from the 3 AHSP domains simultaneously; and sensitivity and specificity were calculated for the CNAQ as a function of its ability to predict 6-mo weight loss (5% and 10% decreases in body weight).

RESULTS

Long-term care group

Of 300 subjects approached, 247 agreed to participate (56 men and 191 women). The subject's characteristics are shown in **Table 1**. One hundred ninety-nine subjects (81%) self-identified themselves as white. Forty-eight subjects (19%) self-identified themselves as nonwhite.

The CNAQ reliability analysis indicated a Cronbach's alpha coefficient of 0.47. The reliability analysis also indicated that CNAQ questions 3, 5, 7, 8 were reliability reducers. Thus, questions 1, 2, 4, and 6 of the CNAQ were separated out to form a shorter tool, hereafter referred to as the simplified nutritional appetite questionnaire (SNAQ; **Appendix B**) The Cronbach's alpha coefficient for the SNAQ was 0.51.

Mean (±SD) CNAQ, SNAQ, and AHSPQ scores were as follows: 24.7 ± 3.9, 13.4 ± 3.2, and 72.3 ± 12.7. Analysis of construct validity showed that the CNAQ correlated moderately and significantly with the AHSP ($r = 0.60$, $P < 0.001$) and its domain scores (taste, $r = 0.47$, $P < 0.001$; hunger, $r = 0.51$, $P < 0.001$; smell, $r = 0.53$, $P < 0.001$).

Community-dwelling group

The flow of community-dwelling subjects is shown in **Figure 1**, and descriptive data are presented in Table 1. Eighty-two
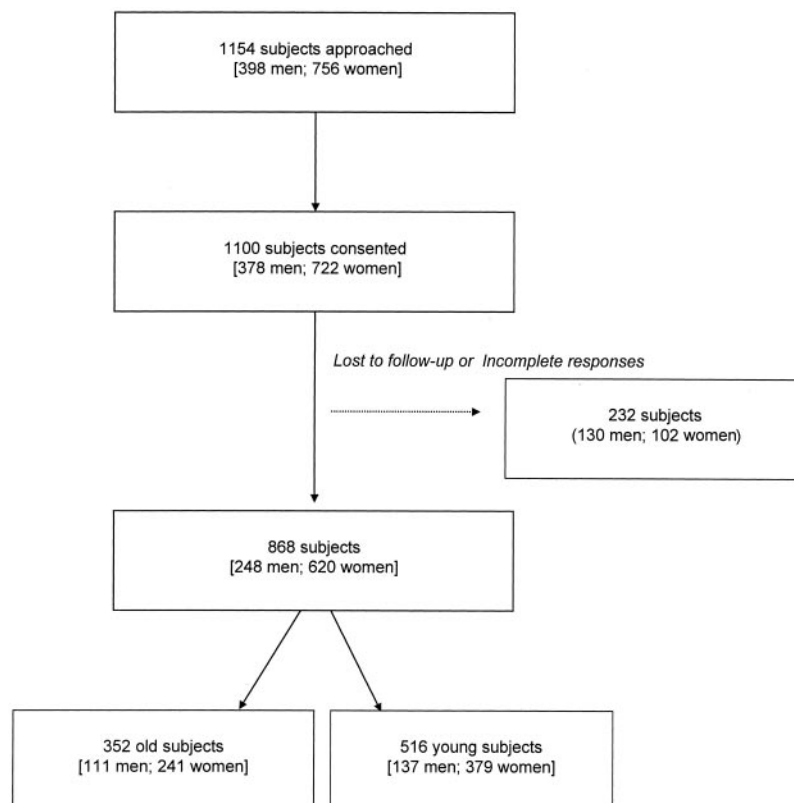
FIGURE 1. Flow of recruitment of community-dwelling subjects.

TABLE 2
Council on Nutrition appetite questionnaire factor analysis loadings for the community-dwelling (CD) population[1]

Question	Total CD population (n = 868)	Old CD subjects (>60–102 y) (n = 352)	Young CD subjects (>20–60 y) (n = 516)
1	0.80	0.82	0.78
2	0.68	0.73	0.64
3	0.49	0.40	0.52
4	0.79	0.82	0.75
5	0.43	0.45	0.38
6	0.60	0.62	0.58
7	0.42	0.47	0.47
8	0.40	0.42	0.37

[1] Principal components analysis.

TABLE 3
Reliabilities (Cronbach's alpha coefficient) for the Council on Nutrition appetite questionnaire (CNAQ) and the simplified nutritional appetite questionnaire (SNAQ) for the total sample and by age and sex in community-dwelling subjects

	CNAQ[1]	SNAQ[2]
Total sample (n = 868)	0.72	0.70
Old (>60–102 y; n = 352)	0.75	0.74
Young (>20–60 y; n = 516)	0.70	0.65
Female (n = 620)	0.75	0.76
Male (n = 248)	0.66	0.69
Old female (n = 241)	0.77	0.76
Young female (n = 379)	0.73	0.69
Old male (n = 111)	0.73	0.71
Young male (n = 137)	0.57	0.46

[1] 8-item questionnaire: questions 1–8.
[2] 4-item questionnaire: questions 1, 2, 4, and 6.

percent (n = 709) of the cohort self-identified themselves as white. One hundred fifty-nine subjects (18%) self-identified themselves as nonwhite.

Mean (±SD) CNAQ, SNAQ, and AHSPQ scores were as follows: for the total population, 26.9 ± 3.6, 15.1 ± 2.4, and 77.4 ± 11.8; for old subjects, 25.9 ± 3.7, 14.5 ± 2.6, and 74.65 ± 14.3; and for young subjects, 27.6 ± 3.1, 15.5 ± 2.2, and 79.3 ± 9.3. Thirty-seven older subjects (10 males and 27 females; 10.5% of the older population) lost >5% of their body weight. Weight loss exceeded 10% of baseline body weight in 28 older subjects (8 males, 20 females; 7.9% of the population). Fifty-three younger subjects (21 males, 32 females; 10.3% of the younger population) lost >5% of their baseline body weight. Weight loss exceeded 10% of baseline body weight in 22 younger subjects (10 males, 12 females; 4.3% of the population).

The results of the principal components analysis of the CNAQ for the total sample and by age are shown in **Table 2**. The loadings in Table 2 support the findings obtained in the LTC group (that questions 3, 5, 7, and 8 were reliability reducers) and thereby also confirm that the shorter 4-item tool comprising questions 1, 2, 4, and 6 (the SNAQ) was just as reliable as the original 8-item tool (the CNAQ) in the CD group. The reliability estimates for the CNAQ and the SNAQ for the total sample and as a function of age are shown in **Table 3**. The reliabilities are acceptable and consistent.

Multiple linear regression analysis indicated that 67% of the variance in the CNAQ could be explained by scores on 2 of the

3 AHSP domains: taste ($\beta = 0.65$, $P < 0.001$) and hunger ($\beta = 0.28$, $P < 0.001$). Similarly, 66% of the SNAQ variance could be explained by scores on the same 2 domains: taste ($\beta = 0.74$, $P < 0.001$) and hunger ($\beta = 0.16$, $P < 0.001$). Whereas the pattern of the beta coefficients was similar as a function of age, the scores on the AHSP domains could explain 72% of the CNAQ variance and 70% of the SNAQ variance in the older sample and 63% of the CNAQ variance and 61% of the SNAQ variance in the younger sample.

Sensitivity and specificity were estimated from the ability of the tools to predict involuntary weight loss in excess of 5% and 10% of baseline body weight over a 6-mo period. The optimal (maximizing) sensitivity and specificity values for the CNAQ and SNAQ and the corresponding cutoffs, both for the total sample and as a function of age, are shown in **Table 4**. Receiver operator characteristic curves for the CNAQ and SNAQ are shown in **Figure 2**.

DISCUSSION

The CNAQ and SNAQ are the first appetite-monitoring instruments, specifically validated for use among older adults in the United States, that have been shown to identify persons at risk of significant weight loss. Both tools are also valid for younger individuals. Our findings suggest that a CNAQ score <28 or a SNAQ score <14 may identify persons with anorexia at risk of

TABLE 4
Sensitivity (SN) and specificity (SP) for the Council on Nutrition appetite questionnaire (CNAQ) and the simplified nutritional appetite questionnaire (SNAQ) in predicting weight loss for the total sample and by age in community-dwelling subjects[1]

	Total population (n = 868)			Old subjects (>60 y) (n = 352)			Young subjects (20–60 y) (n = 516)		
	SN	SP	Cutoff	SN	SP	Cutoff	SN	SP	Cutoff
CNAQ									
5% weight loss	80.2	80.3	28.5	85.3	83.5	27.5	82.7	71.7	29.5
10% weight loss	82.4	81.9	27.5	83.3	68.4	28.5	90.9	85.2	27.5
SNAQ									
5% weight loss	81.3	76.4	14.5	81.6	84.6	13.5	79.2	79.4	14.5
10% weight loss	88.2	83.5	13.5	83.3	77.6	13.5	90.9	87.3	13.5

[1] SN = number of true-positive cases/(number of true-positives cases + number of false-negative cases); SP = number of true-negative cases/(number of true-negative cases + number of false-positive cases).
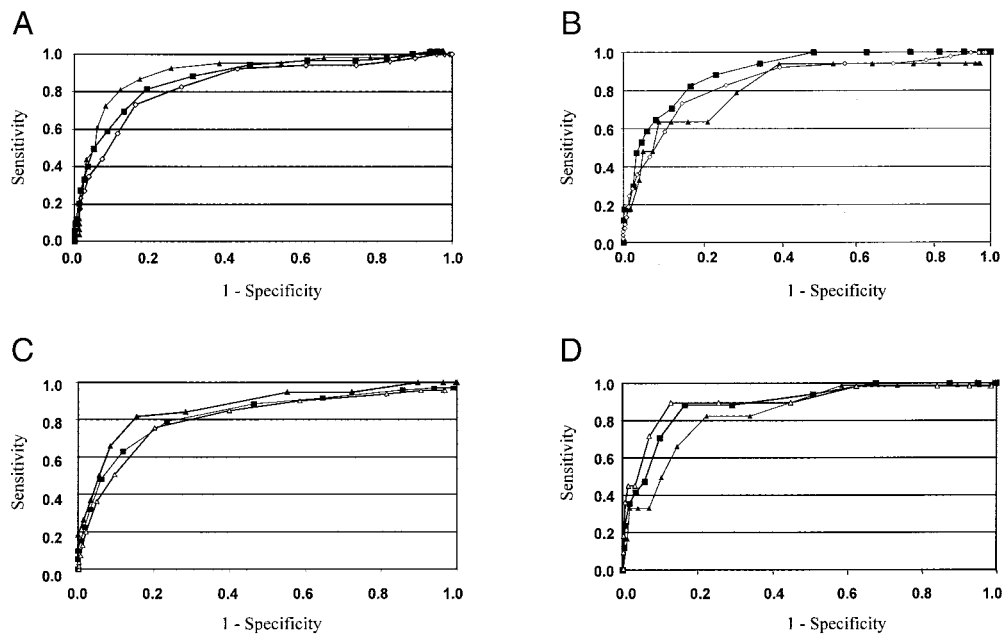
FIGURE 2. Receiver operator characteristic curves for the Council on Nutrition appetite questionnaire (CNAQ) and the simplified nutritional appetite questionnaire (SNAQ) in the total population (■), the old subjects (▲), and the young subjects (◇). (A) CNAQ, 5% weight loss over 6-mo period: total population area under the curve (AUC) = 0.86 ($P < 0.001$), old (>60 y) AUC = 0.90 ($P < 0.001$), young (20-60 y) AUC = 0.84 ($P < 0.001$). (B) CNAQ, 10% weight loss over 6-mo period: total population AUC = 0.90 ($P < 0.001$), old (>60 y) AUC = 0.86 ($P < 0.001$), young (20-60 y) AUC = 0.92 ($P < 0.001$). (C) SNAQ, 5% weight loss over 6-mo period: total population AUC = 0.85 ($P < 0.001$), old (>60 y) AUC = 0.87 ($P < 0.001$), young (20-60 y) AUC = 0.84 ($P < 0.001$). (D) SNAQ, 10% weight loss over 6-mo period: total population AUC = 0.89 ($P < 0.001$), old (>60 y) AUC = 0.85 ($P < 0.001$), young (20-60 y) AUC = 0.92 ($P < 0.001$).

significant weight loss; thus, the use of these tools can facilitate prompt nutritional intervention. The SNAQ is a shorter (4-item) derivative of the original 8-item CNAQ. Our data indicate that, in light of its brevity and comparable reliability, the SNAQ is the more efficient clinical tool.

Several assessment tools are available that evaluate appetite as just one of several domains. These include the Memorial Symptom Assessment Scale, which is used in patients with cancer; the Edmonton Symptom Assessment Tool, which is used in the context of palliative care; and the FAACT questionnaire, which is used to measure quality of life and other anorexia-related issues (17, 28, 29). These multidomain tools are useful in reflecting overall response to illness. However, the confounding effect of multiple interacting factors, such as functional status, chronic diseases, medication effects, and subjective estimates of well-being and quality of life, preclude objective interpretation of subjects' responses relating to any single domain. Current theories highlight the need for a purist approach to symptom analysis, advocating independent evaluation of discrete constructs, such as appetite (30). The Bristol-Myers Anorexia/Cachexia Recovery Instrument is a 9-item visual analogue instrument that does address appetite as a single domain. However, the main purpose of that tool is in the quantification of perception of benefit after intervention in patients with AIDS-related anorexia and wasting (31). Overall, our data show that the SNAQ is an efficient, reliable, and valid tool with appraisal parameters that focus on the singular construct of appetite with a view to preventing weight loss.

Weight loss is a highly reliable index of nutritional risk in older adults and is also a marker for increased morbidity and mortality (32, 33). Thus, the ability of the SNAQ to identify patients with anorexia who are at risk of subsequent weight loss makes it a valuable tool in the nutritional management of a variety of patients, including older adults. Effective nutritional management mandates early detection of nutritional disorders and early intervention. Incorporating the SNAQ into routine geriatric assessment will facilitate the identification of community-dwelling and institutionalized elders at risk of weight loss. The SNAQ may also be useful in assessing younger patients with a variety of chronic disorders associated with weight loss.

Enacted in 1987, the Omnibus Budget Reconciliation Act mandates that all long-term care facilities maintain acceptable parameters of nutritional status, one of which is body weight (34). In the absence of more reliable indexes of nutritional compromise, weight loss is frequently the sole variable used to evaluate the quality of nutritional management. Thus, although the Omnibus Budget Reconciliation Act legislation is widely acclaimed as a federal regulatory effort to maintain an acceptable standard of nutritional health, the paradoxical use of weight loss as a trigger renders this regulation ineffective as a preventive measure. Additionally, inconsistent reliability of weights obtained in long-term care facilities frequently results in delayed detection of weight loss. Use of the SNAQ in long-term care facilities will identify residents at risk of weight loss and facilitate prompt preemptive nutritional therapy.

Studies of the frail elderly show reduced comorbidity and improved function after nutritional intervention in a variety of clinical settings. Older community-dwelling adults and institutionalized elders with multiple chronic conditions causing disability show a significant increase in functional capacity after nutritional intervention (35). Approximately one-half of all older adults with hip fractures are undernourished during the postoperative period in subacute care and rehabilitation facilities (36).

In a meta-analysis of data from 943 patients (aged $\geq$65 y), Avenell and Handoll (37) concluded that early nutritional intervention facilitates successful rehabilitation and hastens recovery after hip fractures. Screening and detection of anorexia with use of the SNAQ may prevent undernutrition and weight loss in such patients.

Although our data support appetite assessment with use of the SNAQ in younger adults, test reliability is reduced in younger men. The reasons for this sex differential are unclear. However, other studies examining the interface between sex and nutritional indexes have also shown sex differences. Men have been shown to have lower concentrations of leptin and ghrelin. Leptin is a satiation-inducing peptide produced by adipocytes, and ghrelin is a hunger-inducing peptide produced by the gastric mucosa (38, 39). The small cohort of young male subjects in our study precludes objective comment in this area. Studies involving larger cohorts of young men are needed to further define sex effects in the area of appetite assessment.

Our study had other limitations. The narrow geographic location of our catchment area included a high proportion of inner-city subjects of lower socioeconomic status, which could have accounted for the relatively high prevalence of weight loss observed. Larger studies examining the predictive value of the SNAQ in cohorts of varying socioeconomic status are needed. Additionally, we used few demographic descriptors, which precluded analysis of the effect of socioeconomic variables such as income and marital status on clinical utility of the SNAQ. Analysis of the effect of ethnicity on the SNAQ was precluded by the overwhelming predominance of white subjects. Further studies examining the effect of such variables on the predictive value of the SNAQ will be helpful.

Anorexia is a fairly common symptom in many diseases. Age-related homeostatic compromise increases the likelihood of subsequent weight loss and death in older anorectic patients. Routine use of the SNAQ in nutritional assessment will facilitate the early identification of older adults at risk of anorexia-related weight loss. Aggressive intervention can then be instituted before the development of weight loss in such patients. In younger adults, use of the SNAQ may prevent weight loss in patients with chronic illnesses. Further research is ongoing to define the role of the SNAQ among specific cohorts of patients with chronic illness, malignant disease, Alzheimer disease, and AIDS.

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APPENDIX A

Council of Nutrition appetite questionnaire (CNAQ)

Name: _____ Sex (circle): Male Female

Age: _____ Weight: _____ Height: _____

Date: _____

Administration Instructions: Ask the subject to complete the questionnaire by circling the correct answers and then tally the results based upon the following numerical scale: a = 1, b = 2, c = 3, d = 4, e = 5. The sum of the scores for the individual items constitutes the CNAQ score. *CNAQ score ≤ 28 indicates significant risk of at least 5% weight loss within six months.*

1. My appetite is

a. very poor

b. poor

c. average

d. good

e. very good

2. When I eat

a. I feel full after eating only a few mouthfuls

b. I feel full after eating about a third of a meal

c. I feel full after eating over half a meal

d. I feel full after eating most of the meal

e. I hardly ever feel full

3. I feel hungry

a. rarely

b. occasionally

c. some of the time

d. most of the time

e. all of the time

4. Food tastes

a. very bad

b. bad

c. average

d. good

e. very good

5. Compared to when I was younger, food tastes

a. much worse

b. worse

c. just as good

d. better

e. much better

6. Normally I eat

a. less than one meal a day

b. one meal a day

c. two meals a day

d. three meals a day

e. more than three meals a day

7. I feel sick or nauseated when I eat

a. most times

b. often

c. sometimes

d. rarely

e. never

8. Most of the time my mood is

a. very sad

b. sad

c. neither sad nor happy

d. happy

e. very happy

APPENDIX B

Simplified nutritional appetite questionnaire (SNAQ)

Name: _____ Sex (circle): Male Female

Age: _____ Weight: _____ Height: _____

Date: _____

Administration Instructions: Ask the subject to complete the questionnaire by circling the correct answers and then tally the results based upon the following numerical scale: a = 1, b = 2, c = 3, d = 4, e = 5. The sum of the scores for the individual items constitutes the SNAQ score. *SNAQ score ≤ 14 indicates significant risk of at least 5% weight loss within six months.*

1. My appetite is

a. very poor

b. poor

c. average

d. good

e. very good

2. When I eat

a. I feel full after eating only a few mouthfuls

b. I feel full after eating about a third of a meal

c. I feel full after eating over half a meal

d. I feel full after eating most of the meal

e. I hardly ever feel full

3. Food tastes

a. very bad

b. bad

c. average

d. good

e. very good

4. Normally I eat

a. less than one meal a day

b. one meal a day

c. two meals a day

d. three meals a day

e. more than three meals a day