

# Assessment and Management of Appetite Loss in Older Adults: An ICFSR Task Force Report

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## Abstract

The Appetite loss in older people is an important unmet clinical need in geriatrics. The International Conference on Frailty and Sarcopenia Research (ICFSR) organized a Task Force on April 20<sup>th</sup> 2022, in Boston, to discuss issues related to appetite loss in older people, in particular, the assessment tools currently available, its evaluation in the primary care setting, and considerations about its management. There is a high heterogeneity in terms of the etiology of appetite loss in older people and a gold standard assessment tool for evaluating this condition is still absent. Although this may render difficult the management of poor appetite in clinical practice, validated assessment tools are currently available to facilitate early identification of appetite loss and support care decisions. As research on biomarkers of appetite loss progresses, assessment tools will soon be used jointly with biomarkers for more accurate diagnosis and prognosis. In addition, efforts to foster the development of drugs with a favorable risk/benefit ratio to combat poor appetite should be strengthened.

*Key words:* Appetite loss, anorexia of aging, nutritional status, older adults, intrinsic capacity, ICOPE.

## Introduction

Appetite loss is increasingly recognized as a significant clinical problem among older adults. Its high prevalence (1-4) and association with adverse health events (including weight loss and malnutrition, mood-related conditions, sarcopenia, and frailty (1, 5-9)), demonstrate the central role poor appetite may play in older adults' health. Although loss of appetite, alongside weight loss, is a flagship hallmark of malnutrition during aging, its assessment and management in clinical settings are not performed systematically in geriatric populations..

Recognizing appetite loss as a major unmet clinical need in older people, the International Conference on Frailty and Sarcopenia Research (ICFSR) organized the first Task Force

in September 2021 to raise awareness around this topic (10). Following up on this prior effort, the ICFSR Task Force met again on 20<sup>th</sup> April 2022 to debate appetite loss in older people, in particular, appetite assessment tools, its evaluation in the primary care setting, and considerations about its management. The present article reports on the main outputs from this ICFSR Task Force held in Boston in 2022.

## Appetite and aging: assessment tools

### *Self-reported tools of appetite*

Appetite in older adults can be assessed through subjective ratings. Given the subjective nature of lack of appetite as well as the multifactorial causes underlying the condition, appetite assessment presents some challenging issues. Several tools to screen for malnutrition in older people (i.e., Mini Nutritional Assessment (11), Birmingham Nutrition Risk Score (12), Malnutrition Screening Tool (13), Short Nutrition Assessment Questionnaire (14)) include appetite loss as a component, recognizing its importance as a determinant of malnutrition. However, these tools aim to identify malnutrition, and the loss of appetite may, therefore, remain unrecognized in individuals who present with this complaint in isolation. Several screening tools have been developed and validated to identify older people with poor appetite or at risk of developing it (Table 1).

Likert and visual analogue scales (VAS) are among the most commonly used tools to screen for appetite decline in older people. The Simplified Nutritional Assessment Questionnaire (SNAQ) (15), is a simple screening tool composed of 4 items. Each item is scored from 1 to 5 on a Likert scale. A score lower than 14 indicates an increased risk of weight loss (i.e., at least 5%) within six months. The SNAQ showed a good predictive ability for weight loss and undernutrition (15, 24). The SNAQ was developed as a short version of the Council of Nutrition Appetite Questionnaire (CNAQ), which consists of 8 items on

**Table 1.** Summary of the main available tools to assess appetite in older people

Appetite Assessment Screening Tool	Number of Items	Description/domains assessed	Population considered
Simplified Nutritional Assessment Questionnaire (SNAQ) (15)	4	Appetite	Older people
Council of Nutrition Appetite Questionnaire (CNAQ) (15)	8	Appetite and mood	Older people
Appetite, Hunger and Sensory Perception Questionnaire (AHSPQ) (16)	29	Energy and macronutrients intake, hunger sensation, appetite, taste and smell	Older people
Functional Assessment of Anorexia/Cachexia Therapy (FAACT) (17)	39	Quality of life and appetite	Cancer
FAACT anorexia/cachexia subscale (FAACT A/CS-12) (17)	12	Appetite, eating and general health	Cancer
Bristol-Myers Anorexia/Cachexia Recovery Instrument (BACRI) (18)	9	Treatment-related weight loss, appearance, appetite and well-being	HIV
Disease Related Appetite Questionnaire (DRAQ) (19)	12	Appetite, hunger and other eating-related issues	COPD
Eating Symptom Questionnaire (ESQ) (19)	13	Specific symptoms (i.e., nausea, pain, gastrointestinal abnormalities, oral problems, changes in taste or smell)	COPD
Appetite and Diet Assessment Tool (ADAT) (20)	44	Appetite, diet, weight loss, need for assistance	Renal failure
Hunger subscale of the Eating Inventory questionnaire (21)	14	Hunger	Eating disorders, obesity, older people
Novel Assessment of Nutrition and Ageing (NANA) (22)	6	Hunger, fullness and eating moments	Older people
Minimum Data Set (MDS) interRAI tools (23)	NA	Comprehensive Geriatric Assessment	Older people
Integrated Care for Older People (ICOPE) screening tool	NA	Comprehensive Geriatric Assessment – one question on appetite loss	Older people

a 5-point Likert scale, with lower scores indicating deterioration in appetite (15). In particular, possible CNAQ scores range from 8 (worst) to 40 (best). A total CNAQ score  $\leq 28$  indicates a significant risk of at least 5% weight loss within six months. Both the SNAQ and the CNAQ were derived from the Appetite, Hunger and Sensory Perception Questionnaire (AHSPQ) (16). The AHSPQ was developed for people aged 70 and older and includes 29 items focusing on the self-assessment of energy and macronutrients intake, hunger sensation, appetite, taste and smell. However, it is burdensome and time-consuming to complete in the clinical setting (25, 26). Hays and Roberts (27) suggested that the hunger subscale of the Eating Inventory questionnaire (21) may help identify older people at risk for anorexia of aging and unintentional weight loss. The hunger subscale includes 14 questions and has been reported to predict unintentional weight loss (28).

Brief instruments have been developed to reduce the burden that long and complex questionnaires may have on frail individuals. This is the case of the simplified anorexia questionnaire (29), which is constituted of only two items: the first item assesses the lack of appetite on a scale ranging from 0 to 10 and the second item evaluates the severity of lack of appetite during the past week. The simplified anorexia questionnaire showed a moderate correlation with the 12-item Functional Assessment of Anorexia/Cachexia Therapy (FAACT) anorexia/cachexia subscale (A/CS) (FAACT A/CS-12) when a single point in time was considered. However, this instrument lacked sensitivity over time and was poor in predicting survival in advanced cancer patients.

Instruments, such as the FAACT (17), have been developed to measure quality of life and appetite in disease-specific conditions (ie, cancer, HIV). The original version of the FAACT is composed of 39 items on a 5-point Likert scale. Given its length, the scoring system, and multidomain nature, the FAACT questionnaire is not easily implementable in the routine clinical practice (15). However, shorter versions, like

the FAACT A/CS-12, have been developed and validated (17, 30). Similarly, the Bristol-Myers Anorexia/Cachexia Recovery Instrument (BACRI) (18), a 9-item visual analogue instrument, was developed to assess treatment-related changes on anorexia/cachexia in HIV patients. However, its implementation out of the context of an interventional trial is challenging (17). Other tools to assess anorexia/appetite loss in specific patient populations include the Disease Related Appetite Questionnaire (DRAQ) and the Eating Symptom Questionnaire (ESQ), which have been developed for chronic obstructive pulmonary disease patients (19). The DRAQ is a 12-item questionnaire on a 5-level scale derived from the CNAQ; it evaluates appetite, hunger and other eating-related issues. The ESQ is constituted of 13 items on a 5-point Likert scale about symptoms such as nausea, pain, gastrointestinal tract abnormalities, oral problems, and changes in taste or smell in the past two weeks that could all be clearly related to the feelings of hunger and appetite. In addition, the ESQ includes an open item in which additional symptoms can be reported. The appetite and diet assessment tool (ADAT) was developed to evaluate appetite as well as other factors affecting dietary intake in hemodialysis patients (20). The ADAT is a 44-item, self-administered questionnaire regarding appetite, recent changes in dry weight, dietary compliance, need for assistance with food shopping and meal preparation, common food practices, and the patient's perceptions of food enjoyment and diet satisfaction.

In recent years, computerized instruments to measure appetite in the older population have been developed. Brown et al. (22), validated a 6-item computerized tool for measuring older adults' self-reported mood and appetite as part of the Novel Assessment of Nutrition and Ageing (NANA) toolkit. In particular, appetite was evaluated using six visual analogue scale items (ie, hunger, fullness, desire to eat, perception of amount they could eat, urge to eat, or preoccupation with thoughts of food), with a 11-point (ranging from 0 [not at all] to 10 [very]) Likert scale response. The implementation

of digital tools to assess even remotely appetite may be of great importance, especially in times of pandemic or for those individuals that cannot attend outpatient clinics. Furthermore, remote assessment of appetite would facilitate the implementation of repeated measurements, what would provide a more accurate picture of this symptom since repeated assessments would better capture fluctuations in appetite.

Landi et al. (31) suggested the use of comprehensive geriatric assessment tools like the Minimum Data Set (MDS) interRAI tools (23). In particular, the interRAI tools include a set of multidimensional geriatric instruments aimed at identifying clinical, psycho-social and environmental problems in older persons in order to implement a personalized intervention. Finally, appetite loss is also screened by single questions; such an approach has been recently operationalized in the screening tool used in the context of the World Health Organization (WHO) program of Integrated Care for Older People (ICOPE) for evaluating the vitality domain (screen for malnutrition) of intrinsic capacity (IC). Besides vitality, the ICOPE screening tool also explores for potential deficits in other functional domains: locomotion, cognition, vision, hearing, and psychology.

In sum, there are a multitude of assessment tools already available for evaluating loss of appetite in older people, without a consensual gold standard. The degree of scientific validation varies across tools; some only apply to specific clinical populations.

### ***Biomarkers for assessing appetite***

Appetite status can also be measured through the levels of specific biomarkers of satiation and satiety (32), but such laboratory markers are mainly used for research purposes; they are not easily implementable in the routine clinical practice. Ghrelin, the so-called “hunger hormone”, which is synthesized and released in the stomach, seems to act both in the short term (ie, meal initiation) and in the long term (ie, after weight loss) (32). However, ghrelin levels seem not to change during aging (33). Leptin has been related to long-term appetite and acts as a satiety signal (34). In particular, leptin regulates food ingestion in conditions of energy imbalance (32). Other peptides potentially involved in the pathophysiology of appetite loss include cholecystokinin (CCK) and glucagon-like peptide 1 (GLP-1), whose increased levels are associated with lower feelings of hunger and lower food intake, playing a role in meal termination (32,35). In addition, some reports have outlined the role of peptide YY (PYY) as a marker of satiety. Of note, augmented concentrations of PYY during the postprandial period have been observed in older people suggesting a role of this peptide in determining less desire for a second meal (31). Altered insulin regulation, which is frequently observed in older people, has been suggested to play a role in appetite probably through its effects on leptin and ghrelin regulation (31). However, given its involvement in several metabolic processes, insulin’s role as a satiety marker is less clear (32). More recently, the growth differentiation factor 15 (GDF15), a cytokine involved in stress-signaling in

several physiological processes (36), has been recognized as a putative appetite regulator (37), being associated to appetite-related adverse events (eg, anorexia, cachexia) in both animal (38,39) and human (40) investigations. Interestingly, GDF15 is related with increased chronological and biological age (41), mitochondrial dysfunction (42), and inflammatory status (43). This suggests GDF15 could play an important role in different aging-dependent processes, including poor appetite and food intake. Further investigations on the longitudinal associations of GDF15 and appetite loss during aging in different age-ranges are welcome.

Although biomarkers of poor appetite constitute a promising way for early risk stratification of future loss of appetite, its utility in clinical settings remains to be proven. Research advances rendering currently expensive techniques more accessible in the future, particularly in terms of unbiased investigations (eg, OMICS approach), may lead to important discoveries in this field in the coming years.

### **Appetite loss in primary care: the Toulouse implementation of the WHO ICOPE program**

The WHO ICOPE program represents an innovative healthcare pathway promoting functional ability and healthy aging, particularly in older adulthood. It is focused on the improvement/maintenance of optimal levels of IC, the composite of an individual’s physical and mental capacities, operationalized using six domains: locomotion, cognition, psychology, vision, hearing, and vitality (the domain most closely related to nutritional status) (44–46). The screening of the vitality domain is performed using questions on appetite loss and unintentional weight loss.

The ICOPE program has been implemented in the real-life healthcare system of the French, South West region Occitanie (Toulouse area), since January 2020 (47). More than 20,000 individuals have already been screened, in particular by primary care providers (48), using the ICOPE screening tool. All the data is collected and stored in a secured database (48). We describe below (Table 2) results of this ICOPE implementation experience using data abstracted at the end of February 2022, regarding individuals aged 60 years or older (mean age 76.7 years  $\pm$ 8.8; 62% women), assessed by healthcare professionals and with information on appetite loss.

Data from this ICOPE implementation experience showed that, among the 14,358 individuals with data on both appetite and weight loss, 1,995 subjects had appetite loss and 1,778 had weight loss. Only 43.2% (n=863) of those reporting to have appetite loss had a concomitant unintentional weight loss; this represents 48.5% of people with weight loss who also had appetite loss. Compared to those without this condition, people with appetite loss had an increased probability (p-value < 0.05 for all) of having positive screenings in all the other domains of IC, even when the cross-sectional binary logistic regressions were adjusted by age, sex, and body weight. Such cross-sectional associations were particularly robust for locomotion, cognition, and psychology; they remained significant even when disentangling the effects of appetite



loss from those of weight loss (ie, when comparing people with appetite loss without weight loss to people with none of those conditions). Similar adjusted cross-sectional associations of appetite loss were found among people (sample varying from 419 to 801 individuals according to the domain of IC) receiving an in-depth assessment of locomotion (short physical performance battery, SPPB (49)), psychology (Patient Health Questionnaire depression module, PHQ-9 (50)), cognition (Mini-Mental State Examination, MMSE (51)), and as expected nutritional status (Mini-nutritional assessment, MNA (11)). Furthermore, individuals with appetite loss, compared to those without appetite loss, had higher severity of frailty (Fried frailty phenotype (52)) and sarcopenia (SARC-F (53)), lower handgrip strength, and worst performance in basic and instrumental activities of daily living (sample size varying across measurements from 587 to 1,238 people).

**Table 2.** Positive screening for the domains of intrinsic capacity according to appetite loss status using the ICOPE screening tool<sup>†</sup> in older adults in the French region Occitanie – data abstracted on February 2022\*

Positive screening for intrinsic capacity domains	Appetite Loss <sup>‡</sup>	
	Appetite loss (n=2013)	No Appetite loss (n=12,393)
Cognition <sup>a</sup>	1437 (77%)	6475 (57%)
Locomotion <sup>b</sup>	1057 (58.5%)	3689 (33.5%)
Psychological <sup>c</sup>	1316 (70.2%)	3913 (34.3%)
Vision <sup>d</sup>	1340 (79.8%)	7717 (73%)
Hearing <sup>e</sup>	1133 (70.1%)	6008 (61.3%)
Vitality/Nutrition <sup>f</sup>	2013 (100%)	915 (6.4%)

\*Population varied due to missing data; <sup>‡</sup>Percentages reflect the prevalence of positive screenings in intrinsic capacity within the groups with and without appetite loss; <sup>†</sup>Operationalization of the ICOPE screening tool is described elsewhere(44). Operational definitions are summarized below (letters a to f): a. Cognition (n=13,255): wrong response to 3-word recall or orientation items; b. Locomotion (n=12,814): Unable to complete five chair rises in  $\leq 14$  seconds; c. Psychological (n=13,280): self-reporting to feel down, depressed or hopeless OR having little interest or pleasure in doing things in the past two weeks; d. Vision (n=12,253): self-reporting to have eyes problems (difficulties in seeing far, reading, eye diseases or currently under medical treatment (eg, diabetes, high blood pressure)); e. Hearing (n=11,411): Hearing impairment as measured through the whisper test; f. Vitality (n=14,406): screening for malnutrition based on self-report of any of unintentional weight loss and appetite loss

Among people without baseline positive screening for specific domains of IC, longitudinal (mean follow-up length of  $6.5 \pm 2.1$  months) binary logistic regressions adjusted by age, sex and body weight showed that having appetite loss at baseline was associated with the incidence of positive screenings (using the ICOPE screening tool) on cognition (n=1649; OR 1.83, 95% CI 1.20 – 2.80, p=0.005), locomotion (n=985; OR 1.62, 95% CI 1.00 – 2.61, p=0.05), and psychology (n=2527; OR 1.73, 95% CI 1.08 – 2.76, p=0.02). Appetite loss was associated with the incidence of weight loss (n=3515; OR 1.78, 95% CI 1.13 – 2.80, p=0.013).

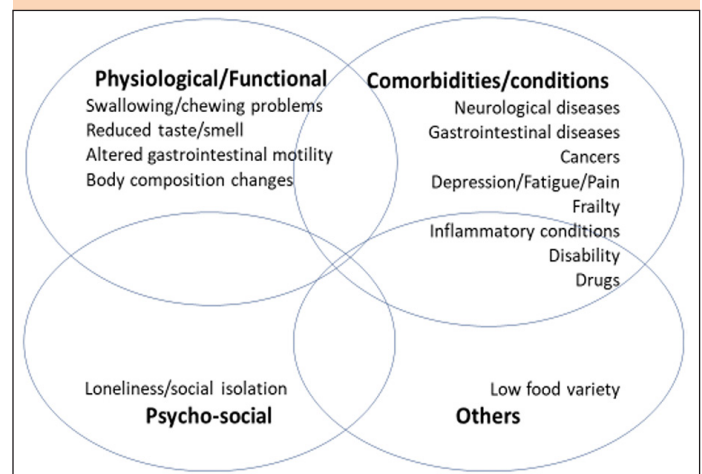
Regarding longitudinal data on appetite loss, 4,106 individuals assessed by care professionals provided this information at least twice,  $6.5 \pm 2.1$  months apart. Among the 459 individuals with appetite loss at baseline, 98 (21.4%) still had appetite loss at follow-up (persistent appetite loss),

whereas 361 (78.6%) no longer had this condition (appetite loss reversibility). In this short time, the incidence of appetite loss among the 3,647 individuals without this condition at baseline was only 4.6% (n=167).

## Appetite loss management: a few considerations

Since no drug therapies are approved for the indication of poor/loss of appetite currently, non-pharmacological approaches remain the frontline treatment for this condition. Given the multifactorial nature of loss of appetite during aging (see Figure 1 on the determinants of appetite loss adapted from De Souto Barreto et al. (10)), a multidimensional approach to this condition is recommended. In the same vein, multimodal intervention strategies may be needed according to the potential causes of poor appetite. Therefore, a comprehensive geriatric assessment and the consequent implementation of multi-domain interventions should be considered and prioritized.

**Figure 1.** Determinants of appetite loss



Appetite loss may represent a warning for future weight loss and malnutrition (54). It is associated with a myriad of adverse health events, even when other overt clinical signs (eg, weight loss) of malnutrition are absent. Among potential strategies to treat appetite loss and its consequences, we can cite flavor enhancements (eg, spices, herbs, masking bitter taste (27, 55)), food fortification, mineral/vitamins and oral nutritional supplements (31, 56), but also physical exercise (10). Modifications of food texture, palatability and presentation, increased dietary variety, use of finger foods, and the provision of feeding assistance may be helpful (31). Adapting the social environment (31, 57) related to food intake, such as the time dedicated to meals, surroundings quiet and calm, promoting conviviality and a positive atmosphere, and having well-lighted places may contribute to improving appetite in older adults.

Even though the multifactorial etiology of appetite loss impacts on the possibility to have a straightforward/unique drug indication, research on pharmacological interventions for treating this condition should be strengthened. Examples from modern medicine of pharmacologically treatable multidimensional symptomatology exist and can be illustrated by pain, for example. Like appetite loss, pain has several

determinants (eg, physiological, anatomical, psycho-social, comorbidities and chronic diseases) and this condition can be relieved by symptomatic treatments. Such an example should constitute a goal to be pursued by researchers in the field of appetite and anorexia of aging.

## Final considerations

Appetite loss in older people is a critical unmet clinical need in geriatrics. Unfortunately, the high heterogeneity in terms of the etiology of appetite loss in older people and the absence of a gold standard assessment tool for evaluating this symptom render its management in clinical practice difficult. Despite those pitfalls, validated assessment tools exist. These tools are mostly used for research purposes, with no appetite assessment tool systematically used in clinical practice currently. However, these instruments may already be used to identify appetite loss as early as possible, before more pronounced signs of malnutrition (eg, weight loss) arise. Given its simplicity, easiness-of-use, and robust associations with malnutrition, the SNAQ instrument may constitute a good assessment tool for implementation in clinical settings. For a broad, public health approach, single-item measurements, such as the vitality item operationalized in the WHO ICOPE program, should be prioritized to screening for possible appetite loss.

Future research on this area should focus on investigating the phenotyping of people with appetite loss more accurately since different clinical profiles (eg, appetite loss with/without: weight loss; depression; mobility impairment; cognitive decline) probably require different management strategies. Furthermore, efforts are needed for improving the understanding of the natural history of appetite loss (eg, longitudinal evolution according to age-ranges and sex, incidence, persistence, reversibility) in older people and the feasibility of using appetite assessment tools in different real-life clinical care settings. The implementation of a biorepository in those future studies would foster biased (eg, GDF15) and unbiased investigations on markers and targets of appetite loss during aging.

As research progresses, in the near future, such assessment tools will probably be used jointly with biomarkers of appetite loss for achieving a more accurate diagnosis. In parallel, the scientific community should support the efforts toward developing pharmacological approaches to combat poor appetite.

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