Delivery of oral nutrition supplement in hospital: Evaluation of professional practices in evaluation of nutritional status and representations of ONS by the caregivers and patients

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Introduction

Patient malnutrition is currently a major concern for hospitals. It is estimated that 30% of hospitalized patients on average suffer from malnutrition [1], and figures range from 20% up to 60% in geriatrics departments. Malnutrition is associated with patient mortality and morbidity [2], the length of hospital stays [3] and incurs health care costs 45 to 102 % higher than for a non-malnourished patient [4].Screening for malnutrition should be carried out systematically upon hospitalization in order to ensure that patients are managed in an adequate and appropriate manner. French National Authority for Health (HAS) has published diagnosis criteria in order to screen and take charge of malnutrition [5] (**tables 1a and b**). For screening, criteria used in France include BMI (Body mass Index), weight loss before hospital admission, albumin and prealbumin (these two values can be interpreted if the concentration of C-reactive Protein is below 15 mg/L), age and MNA for patients more than 70 years old (Mini Nutritional Assessment).

Table 1a : criteria to evoke the diagnosis of malnutrition from "simple" diagnostic tools (ANAES, 2003/ One criteria, among them, is necessary to classify the patients

Criteria giving rise to a moderate malnutrition diagnosis based on "simple" diagnostic tools		
	Age < 70	**Age ≥ 70**
Anthropometric measurements	BMI ≤ 17 kg/m²	BMI ≤ 20 kg/m²
	Weight loss ≥ 10% over a 6-month period Weight loss ≥ 5% over a 1-month period	
Biochemical measurements	Albumin < 30 g/L Prealbumin < 110 mg/L	
Index Calculation		MNA-SF ≤ 11
Criteria giving rise to a severe malnutrition diagnosis based on "simple" diagnostic tools		
	Age < 70	**Age ≥ 70**
Anthropometric measurements	Weight loss ≥ 15% over a 6-month period Weight loss ≥ 10% over a 1-month period	
Biochemical measurements	Albumin < 20 g/L	Albumin < 25 g/L
	Prealbumin < 50 mg/L	
Index Calculation		MNA-SF ≤ 11

Table 1b : Revised criteria to evoke the diagnosis of malnutrition from "simple" diagnostic tools in older patients (≥70 years old) (HAS 2007). One criteria, amoung them, is necessary to classify the patients

Moderate malnutrition	Severe malnutrition
• Weight loss: ≥ 5 % over a 1- month period, or ≥ 10 % over a 6-month period • BMI < 21 • Albumin < 35 g/l • MNA global < 17	• Weight loss: ≥10 % over a 1- month period or ≥ 15 % over a 6-month period • BMI < 18 • Albumin < 30 g/l

We used the criteria of ANAES (2003) (Agence nationale d'accréditation et d'évaluation en santé, part of HAS) and HAS 2007 for older patients (**≥ 70 years old)** in order to classify patients

in two groups: moderate malnutrition and severe malnutrition. These criteria are used to classify patients for their nutritional status, but also to declare this status to medical insurance in order to obtain refund for care given during hospital stay. ESPEN (European Society for Clinical Nutrition and Metabolism) criteria are not used in current care in France until now [6]**;** [7]. In order to conform to the hospital reality, we used the same assessment criteria as those used in the hospital in which the study was conducted (HAS/ANAES criteria): BMI (kg/m^2), percentage of weight loss before hospitalization, albumin (g/L), prealbumin (mg/L), and C-reactive protein (CRP) (mg/L), and MNA for patients older than 70. In practice, many doctors do not evaluate nutritional status of their patients whether because of a lack of time, faulty assumptions or hyper-specialized medical interests [8]. For example, in a study led by **Lennard-Jones et al.** [9] on 454 nurses and 319 junior doctors, two-thirds questioned patients about their food intake, and only 50 % asked about weight loss.

The aim of this study was to observe, during the in-hospital period of patients receiving ONS, the evaluation of the nutritional status of these patients and to highlight the different representations of ONS by the caregivers because these two things are correlated. Indeed, representations can have implications for practice and allow us to better understand the status of screening, management of undernutrition and the representations of ONS.

This study is part of a more comprehensive study on the prescription and monitoring of ONS consumption among hospitalized patients in this health facility. According to **Marine Fontas** [19], who is particularly interested in the nutritional management of patients with lung cancer: "*the disparity of nutritional management approaches observed in the literature can be observed…. We have seen changes from one department to another, going from preventive or therapeutic approaches to dietary disturbances to a purely therapeutic approach for weight loss, through the prescription of ONS*".

Patients and Methods

This research protocol is part of a larger study on the overall consumption and wasting of ONS at the Dijon University Hospital Center. This is why only patients who already have an ONS prescription were included whatever their nutritional status. This protocol has received a positive opinion from the committee for the protection of the population. All patients received an information note.

The data were collected in two departments at the Dijon University Hospital, belonging to the same pole with geographic proximity and same interest in nutritional problems from caregivers: digestive surgery and diabetes-endocrinology departments.

Patients. During 11 weeks, from January to march 2017, all the patients with a prescription for at least one ONS per day, no cognitive disorders, and hospitalized in the department for at least 4 days were included.

Study Design. The following data were retrieved from the medical records of our patients at study entry of hospital admission: age, BMI (kg/m²), percentage of weight loss before hospitalization, albumin (g/L), prealbumin (mg/L), and C-reactive protein (CRP) (mg/L), and MNA for patients older than 70 to determine the nutritional status of the patients in our study [5]. If the patients could not be classified with one of the simple criterion, other criteria were considered in order to determine nutritional status (i.e. Nutritional Risk Index (NRI) and Mini Nutritional Assessment long-form (MNA) for patients older than 70).

Changes in body weight were taken into account during hospitalization according to SFNCM (Société Française de Nutrition Clinique et Métabolisme) recommendations [10]. We also observed the implication of the team responsible for patient in the management of patient nutrition. Finally, post-hospitalization data was analyzed (prescription of ONS, follow-up for albumin levels, evaluation of malnutrition on the final patient report).

Questionnaires and semi-structured interviews: prescription, ONS follow-up, and feelings about ONS. Semi-structured interviews were also conducted with 11 medicine residents working in the two departments, and 11 nursing auxiliaries were asked to complete our questionnaire. The themes included: meal management, modalities for prescription, and attitude toward ONS **(appendices 1-2).** A semi-structured interview was also conducted with the 61 patients receiving ONS included in the study, to discuss their feelings and attitudes towards them (appendix 3). The average length of the interview was 10 minutes. All the interviews were transcribed and a thematic and qualitative analysis was conducted.

Statistical analyses.

A statistical analysis compared the averages obtained in the groups by Student's test (comparison between malnourished and no malnourished during hospitalization and post-hospitalization). The tests were performed bilaterally with a risk of the first species set at 5%. A $p < 0.05$ was considered significant.

Statistical analysis were conducted on XLSTAT, software version 2017.4, developed by ADDINSOFT France, operating system Windows 7 professional.

Results.

Study population. Sixty-one patients were included in the study (32 men and 29 women) ranging from 24 to 96 years old. Sixty percent of patients came from the endocrinology department and 40% from digestive surgery. The average age was 65.4 years ± 16 years and the average stay was 10 days ± 4 days. At their admission, 39.35% were defined as suffering from severe malnutrition, 21.31% were suffering from moderate malnutrition, and 39.34% were not malnourished. All these patients received ONS because of their nutritional status (severe or moderate malnutrition) or because of their low food consumption during their hospitalization.

Evaluation of nutritional status upon hospitalization. On admission, BMI was measured for 87% of patients. Albumin levels were tested in 98.6% of patients, prealbumin levels were tested in 87.7% of patients, and CRP was tested in 97% of patients. Concerning percentage of weight loss upon hospitalization, these data were not collected on patient file.

Nutritional evaluation of patients during hospitalization. Over the course of hospitalization, patients with moderate malnutrition had their weight checked less often than patients with severe malnutrition (38.46 % *vs* 80 %) ($p = 0.025$). Albumin levels were checked in 23.08 % of patients with moderate malnutrition, in 52% of patients with severe malnutrition and 25% of non-malnourished patients (severe malnutrition *vs* other groups, $p<0.02$). Prealbumin levels were checked more systematically in patients with severe malnutrition (56%) than in patients with moderate malnutrition (23%) and non-malnourished patients (16,7%) ($p<0.02$). CRP levels were checked in 54% of patients with moderate malnutrition, in 56% of patients with severe malnutrition and in 41.6% of non-malnourished patients (no significant differences between the three groups).

Representations around the status of ONS among caregivers and patients.

Medicine residents, nurse auxiliaries and patients were asked about their attitude and representations towards ONS.

The semi-executive interviews and questionnaires with caregivers conducted as part of our studies have enabled us to promote a heterogeneous discourse according to the parties

(medicine residents, nursing auxiliaries, patients). We have made a thematic and qualitative analysis in order to underline the main representations. (**Table 2**).

For medicine residents, ONS are mainly seen as medication. For nursing auxiliaries, ONS is not considered as medication but as nutritional supplement. They harbor the impression that ONS are only functional and useful if they are taken regularly. For patients, ONS are described as a medication for some and as a food or a supplement for others:

A lack of information about ONS is also mentioned by residents medicine: *"Honestly, we don't know much about ONS – what else is in there? Is it just protein and a bunch of calories? Why does it suppress the appetite?"*. We also questioned more precisely the nursing about their knowledge of the ONS. Globally, there is a real lack of knowledge on behalf of the nursing around the prescription and the observance of the ONS of patients. Besides, the prescriptions do not take into account the tastes and the preferences of the patients. The notions of cost and real efficiency are also little taken into account. The residents medicine have no knowledge concerning the modalities of costs and refund.

Table 2: Attitudes towards ONS and possible obstacles

Parties concerned	***Representations towards ONS***	***Obstacles***
medicine residents (responsible for prescribing ONS)	medication, but in conjunction with other care methods "Helpful when providing richer food is not enough to treat malnutrition"; "Improves nutritional status when there are not issues with malabsorption and swallowing"; "Used until malnutrition is gone and there is a return to an appropriate diet"; "I don't always explain when I prescribe a treatment. It depends what it is, but it is still a treatment".	Lack of knowledge
Nursing auxiliaries (responsible for delivering ONS)	Food, nutritional support	Not convinced of usefulness
Patients	Food, supplement , medication "My doctor gave them to me, so they are certainly beneficial"; "That dietary thing that they bring us at 3pm, I'm not used to it and after I'm not really hungry for my evening meal"; "It's a supplement, and so I'm categorical that it doesn't replace anything"; "It's to give us vitamins, to bring vitamins,	Not enough information, confusion about how ONS should be taken

	because we don't get enough exercise and vitamins and such".	

Post-hospitalization patient follow-up. We decided to observe the external prescriptions of all these patients having received ONS during their hospitalization. Nutritional follow-up was recorded after the hospital stay for 61.3% of patients with severe malnutrition; it is better than nutritional follow-up for moderate malnourished patients (31.3%) and for non-malnourished patients (68%)

Albumin levels were monitored post-hospitalization for 8.2% of patients with severe malnutrition, and for 2.2% of patients with no malnutrition. None patient with moderate malnutrition had albumin prescription for post-hospitalization. Finally, a follow-up prescription for ONS was provided 68.5% of patients with severe malnutrition, 43.8% of patients with moderate malnutrition and 57.1% of non malnourished patients.

No significant difference was found between the three groups for follow-up in the post-hospitalization period.

Discussion:

The aim of this study was to investigate, during the in-hospital period of patients receiving ONS, the evaluation of the nutritional status of these patients and . it was also about having a better understanding of the representations of the different stakeholders: medicine residents, nursing auxiliaries, patients.

The initial evaluation of nutritional status can be considered acceptable seeing as BMI was measured in 87 % of patients included in the study at admission. Laboratory testing at admission was also carried out almost systematically with rates of 98,6 % for albumin, 87.7% for prealbumin and 97 % for CRP. In a study by **Renoud-Grappin et al.** [11], including 50 patients who were hospitalized for a short stay or in follow-up care and rehabilitation, and whose mean age was 84 ± 8 years, BMI was calculated in 94 % of cases, and albumin and prealbumin in 100 % and 96 %, respectively. **Toze et al.** [12] studied the evaluation of nutritional status in 130 patients who were admitted to one of the geriatrics departments in the Mulhouse and Sud-Alsace region. They revealed that BMI was measured in 89.2 % of cases, whereas weight loss was only calculated in 8.1 % of cases during hospitalization. It was also

shown that albumin levels were among the most commonly used criteria, and that the MNA test was only used in 14.6% of cases. Our results were also similar to data exposed by **Hasselmann**[1], from Strasbourg University Hospitals. In their study, patient weight was recorded and BMI or change in weight calculated for only 28% of cases in the Strasbourg University Hospitals and 25% of cases in other university hospitals. Otherwise, **Henriksen et al.** [13] shown that data on weight or length were frequently missing in the patient records, and BMI could only be calculated in two-thirds of the patients in Norwegian hospitals.

Anthropomorphic and biological laboratory evaluation is essential for the precise evaluation of nutritional status, follow-up, diagnosis of possible complications, and the implementation of appropriate care ([14]; [5])**.**

The ESPEN criteria seem easier to use on a daily basis because they contain only anthropometric criteria and no biological criteria such as albumin, which seems to pose problems of interpretation [15]. At the end of this year, new French criteria for assessing the nutritional status of patients will be proposed.

Though the average length of hospital stays in our study was 10 days ± 4 days, albumin levels were tested two times or more in 52% of patients with severe malnutrition and 25 % of patients with no malnutrition. However, albumin half-life is 21 days, so regular testing has limited interest in the evaluation of nutritional status of patients in mid-length or short stays (Aussel, 2013). The methods used by health care teams to follow-up on malnutrition are not always optimal and can lead to increased spending.

Baron et al. [16] implemented an online system to collect diet-related advice in order to meet the criteria of HAS health care quality and safety indicators in screening for nutritional issues and to enhance the work of dieticians. This online file had improved coding for malnutrition which encouraged better practices for recording of diet-related patient data [17]. Finally, weight and BMI were recorded in 95.8% and 62.5% of patient files, respectively, versus 91.6% and 33.3% of files the year before.

The various representations of caregivers on ONS lead to confusion among patients. This study, in addition to a previous patient-centered study [18], raises the question of attitudes toward ONS. We investigated the attitudes of various different stakeholders: the medicine

[1] *Hasselmann M, Piran F, Séry V. 10 ans après les premières recommandations, qui dépiste la dénutrition dans les établissements de santé ? AFDN, 2009. Consulté le 8 novembre 2017, at http://www.afdn.org/fileadmin/pdf/0906-resumes-reims/090404-hasselmann-depistage_denutrition_en_etablissements_de_sante.pdf*

residents who prescribe the ONS, the nursing auxiliaries who administer them, and the patients who consume them. ONS have a special status – they are prescribed by doctors but managed by nursing auxiliaries – and the opinions expressed by the three parties revealed that ONS are seen partly as food, as supplement and as medication. This unstable image has an impact on the perceived importance of ONS, the effort dispensed to use them in the care of malnutrition (preventatively or therapeutically) and patient compliance and follow-up.

For medicine residents that we interviewed, the status of ONS is clear: it is a medicine. Nevertheless, medicine residents, who have a good understanding of malnutrition (e.g. causes, diagnosis, consequences), have a lack of specific knowledge about ONS (e.g. drug deliverance, compliance, post-hospitalization follow-up). The interviews as a whole underscored the lack of information and training regarding ONS, which would explain the gap between the HAS recommendations and the realities in the hospital context.

For nursing auxiliaries, ONS are first and foremost a food product which has the advantage of supplementing nutritional intake, but they are not perceived as a medication. ONS are not seen as 'medical', and the nursing auxiliaries we interviewed wonder about the utility of ONS prescription.

For patients, the situation seems even more complex. ONS are described as being somewhere between a medication, because it is prescribed, a food and a supplement. **Uijl et al.** [20] also showed the ambiguity of ONS status by patients. For 80% of them, the ONS was a food rather than a medicine. The varying attitudes displayed by medicine residents and nursing auxiliaries mean that patients receive mixed messaged. Overall, patients have an uncertain attitude toward ONS, which is corroborated by the lack of knowledge displayed by medicine residents.

The variability in the status of ONS has led to a complex situation. Today, there are a number of obstacles which must be removed in order to ensure better patient assessment and optimal follow-up. This must be done in view of the different stages of malnutrition **(Table 2)**. The led interviews and questionnaires allowed underlining the lack of knowledge and different representations relative to the status of the ONS. These differences lead an indistinctness as for the roles and the functions of the complementation, this one finding itself in the interface of the food and the medication. It seems then necessary that the medical profession have a holistic approach to think of the ONS in a global approach integrating the food habits of the patients, their tastes and their preferences to rethink the ONS prescription.

Each step, from the prescription to the consumption of ONS, has been rendered more difficult by vastly varying attitudes in the hospital setting. Norms, uses and perceptions differ according to whether the ONS is considered a medication, a food or a nutritional supplement.

Patients are exposed to many sources of information – from doctors, dietitians, or nursing auxiliaries – which result in an unclear message about ONS and the nutritional status of ONS. It is therefore necessary to align the various sources so that the information transmitted by the all clinicians including physicians can be properly understood by the patient, and so that patient compliance for ONS is satisfactory.

Conclusion:

This study reveals that initial evaluation of nutrition status upon arrival is satisfactory for our patients, but the follow-up during the hospital stay and post-hospitalization were not optimal and differed according to the severity of patient malnutrition. The varying attitudes towards ONS, conveyed by medicine residents, nursing auxiliaries and patients, reveal their ambiguous status. An interdisciplinary approach between doctors, medicine residents, dietitians, nurses and nursing auxiliaries is needed to align their practices in the care of malnutrition and the messages they transmit to the patient. Lastly, evaluation and nutritional follow-up need to become a central axis in global patient management.

Clarifying the status of ONS for the health care team will lead to optimal practices in prescription and nutritional follow-up, as well as improvements in compliance thanks to the delivery of better quality information to patients and general practitioners.

Currently, nutritional status is not recorded on the final patient file at an optimal rate seeing as only 64% of patients had any type of recorded indication. The lack of information in patient records leads to a lack of information available to the general practitioner when the patient is discharged from the hospital.

Limitations of the study. We did not evaluate the effect of ONS on biological and anthropometric parameters. It was not the aim of our study. Our aim was to photography habits of departments concerning nutritional status evaluation, and its follow-up, and also opinion about ONS. Furthermore, we did not voluntary evaluate the role of dieticians in this study. This specific evaluation is a part of an another work we led. One another significant limitation is the definition of malnutrition used in the study methods. We used the we used the

classification used in the hospital in which we conducted this study. But the classification criteria vary and the one used may not be the most common one.

Thanks: We would like to thank the Dijon University Hospital and in particular the staff of the digestive surgery and endocrinology departments. We would like to thank Marion Goguely and Corentin Jaillet for their help with data collection and we also thank Suzanne Rankin for translating the manuscript.

Conflicts of interest*:* None.

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Highlights:

- Initial nutritional evaluation of hospital patients upon arrival is optimal.
- Follow up during the hospital stay was not optimal for moderately malnourished patients.
- Post-hospitalization testing for albumin is rare, whereas ONS are regularly prescribed.
- Medicine residents see ONS as a medicine and nursing auxiliaries see it as a food.

Abstract:

Background: Nutritional evaluation and detection of malnutrition are based on criteria recommended by French health authorities. In practice, doctors do not always ensure strict implementation of the recommendations. The aim of this study is to evaluate professional practices in France regarding nutritional follow-up on arrival, during and after the hospitalization of inpatients who have oral nutritional supplements (ONS) prescribed and to discuss how ONS are seen by medical staff and patients.

Methods: A prospective study including patients consecutively admitted to digestive surgery and endocrinology units of the Dijon university hospital was conducted. Malnutrition risk at hospital admission was identified using anthropometric and biological criteria: Body Mass Index, percentage of weight loss, albumin, prealbumin, C-reactive protein and Mini Nutritional Assessment. Nutritional evaluation and monitoring of inpatients on arrival, during and after hospitalization was analyzed. Interviews were held with caregivers and patients to raise the question of their attitudes toward ONS.

Results: The sample was composed of 61 patients. At the beginning of hospitalization, nutritional evaluation of patients was satisfactory. Follow-up during hospitalization was not optimal and depends on the degree of malnutrition. Post-hospitalization testing for albumin was rare, whereas ONS were regularly prescribed. ONS was viewed differently by caregivers and inpatients, which makes the status of ONS ambiguous.

Conclusion: Our results show good evaluation of nutritional status of inpatients at the beginning of hospitalization but low follow-up during and after hospitalization. Representation of ONS differed between caregivers and patients leading to a confusion around them. Therefore, interdisciplinary work is necessary to encourage systematic assessment of nutritional status in patients and standardize the message regarding ONS.

Keywords: malnutrition, nutritional status, oral nutritional supplements, representation, hospitalization.

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