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Dieticians' practices in intensive care: a national survey

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Abstract

Background & Aims:

A real public health problem, namely, malnutrition in the hospital, also concerns intensive care patients. The diagnosis and prevention of malnutrition are major issues in the multidisciplinary management of patients hospitalized in the intensive care unit (ICU). To our knowledge, few data describe dietary management in French ICUs, and few international scientific publications mention professional practices or how dietitians are integrated in this type of specialized and technical sector. The objective of this study is to identify the practices of dietitians in the ICU at a national level.

Methods:

This study is based on the use of an electronic questionnaire distributed to registered dietitian nutritionists practising in intensive care.

Results:

A total of 185 dietitians participated in this survey, which allowed us to describe the practices of 174 ICUs. Among the respondents (n = 185), 95% were women with a median age of 37 [31; 52]. The respondents graduated a median of 14 years ago [8.5; 30] and have been practising in intensive care for 5 years [2; 10]. With a median number of 12 beds [10; 18] (n = 174), the ICU has a median of 0.1 [0.05; 0.25] (n = 185) full-time equivalent dietitians. The solicitation of the dietitian is variable in different ICUs. Nevertheless, information from dietitians is frequently sought. Dietary initiatives mainly concern acts relating to oral nutrition and enteral nutrition. A nutrition protocol was present in 38% of the ICUs (n = 174). The integration felt by dietitians in the service is heterogeneous. Statistical analysis reveals that a dietitian who spends more than 4 h a week in the ICU, has a nutrition protocol in his or her department and does not encounter any obstacles, such as the absence of a doctor's prescription, is more likely to be integrated into an ICU.

Conclusions:

This research work has made it possible to describe and make visible the role and involvement of dietitians working in ICUs in France and oversea departments and territories. Proposals to increase the involvement of dietitians in these sectors were reported at the end of this analysis.

Highlights

- Data on dietitians' practices in French ICUs are lacking.
- The study shows an important heterogeneity of practices.
- Results are discussed to help increase the integration dietitian in ICUs.

Key words

Nutrition therapy; intensive care unit; survey; professional practice, dietician nutritionist

INTRODUCTION

As a relatively young profession, dieticians in France were integrated the hospital environment in the 1950s. Under the tutelage of the care directorate, they is now considered full-fledged health members (1). When he or she belongs to a dietary service, the dietitian is usually assigned to one or more hospital care services, including the ICU.

After a review of the literature, we note that for ten years, several international studies have been published to describe the clinical practice and organization of dieticians in ICUs. Most studies have been conducted by dieticians, revealing a growing interest in this medical specialty (2–8). Thus, after validating a tool to measure the involvement of dieticians in ICUs, S Ferrie conducted a survey who highlighted large variations in dietary presence, practices and responsibilities in Australia and New Zealand (2) (3). R. Yandell demonstrated that with learning and training, she was able to safely and successfully place post-pyloric tube feeding (4). At that time, this act did not fall under the dietitian's decree of competence. In these two articles, the authors raise the issue of acts that may fall within the "expanded scope of practice" of the dietitian. This notion means that these acts are under his responsibility, and he would be able to prescribe and/or perform. In the United States, prescribing privileges have been extended to dietitians with clinical benefits for patients on enteral nutrition (5). Additionally, ICUs in the UK with strong dietary involvement are more likely to have protocols (6). In Canada, dieticians practising in ICUs also exhibit great variability in practices regarding the management of patients with severe sepsis (7).

In view of these recent publications, we can legitimately question the situation in France, which states that a single article presents a feedback experience (8). It should be kept in mind that the initial training of a dietitian differs from one country to another (2 years in France and Germany, bachelor's degree or master-level in Finland, Iceland and NZ) (9). These differences in training result in different acts and responsibilities. Nevertheless, the concept of the "extended field of

practice" that is developing in Australia finds its equivalence in France under the name of "advanced practices". To date, these practises do not concern French dietitians. Nevertheless, the High Authority of Health validated the first protocol of cooperation for dietitians, which allows "*the extension of the missions of the dietitian in the matter of malnutrition, enteral and parenteral nutrition in place of a doctor*"(10).

It was estimated that 5000 dietitians practised in hospitals according to the Automation of Lists directory (2018). How many dietitians practise in ICUs? How are they involved in this type of unit and what actions do they perform?

MATERIALS AND METHODS

Type of study

The aim of this study is to identify the current practices of dietitians working in intensive care services in France and to secondarily identify their specific skills that facilitate their integration.

This study used an electronic survey.

Population

To contact dietitians practising in intensive care, several professional networks were used. Establishments identified as having an ICU were listed, and the email addresses of care directorates were collected. Thus, the department of dietetics was contacted by email via their care directorate and asked to complete an electronic questionnaire. The French Association of Dietitians Nutritionists (AFDN) as well as scientific societies of nutrition (French-speaking Society of Clinical Nutrition and Metabolism, SFNCM formerly SFNEP) and intensive care (French Society Anaesthesia Resuscitation, SFAR and Society of Resuscitation of French Language, SRLF), were also asked to disseminate the electronic link to the questionnaire. The AFDN and the SFNEP posted an insert on their web page, whereas the resuscitation companies did not give an answer. In addition, the central management office of the Assistance Publique - Paris Hospitals (AP-HP), thanks to the dietitian manager working within it, also allowed us to solicit the hospital dietician executives throughout France.

The questionnaire was administered online from October 18 to November 18, 2016. The participants were informed in the introduction of the questionnaire that the study had been declared to the National Commission for Informatics and Freedoms (CNIL) and had obtained the approval of the ethics committee of the SFNEP.

The questionnaire

The questionnaire was based on the one validated and used in the study conducted in Australia and New Zealand by S. Ferrie and his collaborators (2). The questionnaire was translated into French by two people independently and then approved by a researcher holding the role of expert.

Additional questions on sociodemographic data, the activities performed on the initiative of the professional, the ancillary activities performed in the service, the presence of a nutrition protocol and the participation of the professional during his design were added to the 18 initial questions. Indeed, these different concepts did not appear in the initial questionnaire. However, C. Dupuy Richard, a dietician in intensive care, reported the importance of a certain number of these elements in its integration within the unit in an article (8). This was performed with the intention of moving towards a more complete interpretation of the results. The final questionnaire therefore included 37 questions, which is an acceptable number of questions for an electronic questionnaire with many closed-ended questions (27).

To optimize the time devoted to this research work and to reduce the costs related to human resources and data management, the electronic method was privileged in this study by the use of Lime Survey software (Hambourg / Germany). Once the questionnaire was created, it was previously assessed by two dietitians not practising in the ICU, as well as a doctor, and it was assessed for substance by a dietician who previously practised in the ICU but did not participate in the investigation.

In the case where two dietitians practised in the same ICU, only the response of the principal dietitian or “senior” dietitian was taken into account in the final analysis. The items studied to define the principal dietitian were the number of full-time equivalent (FTE) items, seniority in intensive care and the number of hours spent in the service. The answers of all the dietitians, regardless of the type of ICU in which he or she practices (adult or paediatric), were counted.

Similarly, when there were several ICUs in the same institution, all the answers were retained. Finally, in the situation where a dietitian was in charge of several ICUs, he or she was asked to complete the questionnaire considering the ICU with the most important dietary practices and then complete another questionnaire on the other (s) ICU(s).

Statistical analysis

The data are described as their frequencies and percentages for the categorical variables and as their medians (25th–75th percentile range) for the quantitative variables. The categorical variables were compared using a chi-square test or Fisher's exact test, as appropriate, and the quantitative variables were compared using Wilcoxon's ranked-sum test. We used stepwise logistic regression to estimate the odds ratios and 95% confidence intervals to determine the association between the selected factors and unfavourable outcomes. For model building, we introduced selected variables from univariate analysis with $p < 0.2$. All tests were two-sided, and the statistical significance was set at the $p=0.05$ level. The analyses were performed using R open source software 3.1.1 (available online at <http://www.R-project.org>).

RESULTS

According to a study conducted in 2012, there were an estimated 376 ICUs in France (11). In total, of the 496 questionnaires received, 191 were exploitable for the analysis (39%) because they included all the sociodemographic data of the participants and at least 80% of the questions were answered. Ten dietitian executives indicated by return of email that an ICU was present in their establishment but that no dietitian worked there; thus, they did not complete the questionnaire. The 3 responses corresponding to continuous care units were not retained for the final analysis. Fourteen other responses wherein several dieticians answered for the same ICU were also excluded. Thus, the number of responses corresponding to practices by the ICU was

174. Finally, 3 dietitians who worked at several ICUs completed several questionnaires. Part of the analysis will therefore be based on the 185 responses that reflect the point of view per professional (Figure 1).

Sociodemographic characteristics of dietitians

The responding dietitians were 95% female (n = 185) with a median age of 37 years [31; 52]. The respondents graduated an average of 14 years previously [8.5; 30] and have been performing in intensive care for 5 years [2; 10]. In total, 94% of the ICUs represented in this study (n = 174) are in public facilities and have a median of 12 beds [10; 18] with an estimated 0.1 [0.05; 0.25] a full-time equivalent dietitian (Tables 1 and 2).

Dietitian organization in ICUs (n = 174)

Patients were specifically assigned to dietitians in 71% of cases. It should be noted that 24% of the dietitians stated that all patients in the service are referred to them. The dietitian's solicitation of teams to discuss the nutritional management of patients was heterogeneous. Some dietitians claimed to be solicited daily (14% vs 16%) or weekly (13% vs 16%) by doctors and paramedics, whereas others reported that they are never consulted (28% vs. 30%). The dietitians estimated that they are consulted for an average of 10% of the patients within the service. Nevertheless, their advice is often almost always taken into account (73% and 76%), which in their opinion is explained by the recognition of their expertise and experience, as well as a relationship of trust established with caregivers.

Three out of four dietitians declared that there is a staff or visitor schedule in their ICU. Of these respondents, 21% of them participate in these schedules. They attend the ICU most of the time (21%) or at least once a week (57%). The respondents indicated that they speak frequently (53%) and sometimes systematically (7%). Dietary traceability in the patient's care file was

performed by 163 dietitians out of the 174 surveyed (94%), and dietary diagnoses were made according to the International Terminology of Dietetics and Nutrition (IDNT) by 53 of the respondents (30%).

Recommendations specific to the practice of nutrition in the intensive care are used by 112 out of the 174 respondents (64%) based on national recommendations (recommendations made by experts, etc.) and/or international recommendations emanating from learned societies of American and European nutrition (ASPEN and ESPEN, respectively). It should be noted that a service-specific nutrition protocol is present in 66 of the 174 ICUs represented in this survey (38%).

Scope of practices (n = 174)

In a routine nutrition assessment, 3 in 4 dietitians reported using anthropometric data and biological tests, calculating intakes, and estimating caloric and protein requirements. Collecting parameters or clinical signs was reported by 62% of assessments, and a physical examination or SGA (Subjectif Global Assessment) was reported by 8% of cases. The collection of weight and height are the most exploited anthropometric data, and these data are used to calculate BMI. Albumin, prealbumin and Protein C reactive are the most frequently used biological tests. The estimation of the contributions is performed mainly by records of ingesta. The calculation of energy requirements (excluding paediatrics and burns) by indirect calorimetry remains marginal (2%), and empirical formulas are more commonly used than the predictive equations. Finally, the average values of 30 kcal/kg/day and 1.5 g protein/kg/day are the most frequently cited (40% and 25% of dietitians, respectively).

In theory, the intervention of the dietitian comes under a medical prescription (12). In practice, the dietitian is solicited by various health professionals, and certain acts are performed independently. Among the acts performed autonomously by the dietitians surveyed, we found that the most common was the establishment of oral nutritional supplements (75%). The choice

of enteral nutrition product and flow rate (39%), the demand for biological tests (12%), micronutrient supplementation (6%) or even the choice of product and infusion rate of parenteral nutrition (5%) are also noted.

Involvement in ICU (n = 174)

Certain dietary acts are performed based on the own initiative of the professional (cf. tables 3 and 4). These actions are mainly related to nutritional assessment, oral intake or enteral nutrition, and these actions are less frequently related to parenteral nutrition or supplementation with minerals and trace elements. Finally, the involvement of dieticians in the care of patients also involves exchanges with dietician services upstream and downstream of the ICU to ensure the best continuity of nutritional care.

Beyond their direct clinical involvement with the patient, the dieticians reported participating in the operation and life of the service. For example, 70% of the dieticians reported participating in writing a nutrition protocol specific to their service when it did not exist. The dieticians reported contributing to the training of medical and paramedical teams (27% and 49%, respectively), to the management of stocks and supplies (36%) or to working groups within the department (21%). In total, 27% of the dieticians reported participating in social events, such as service parties. For others, getting involved in the ICU is the result of individual initiatives and a personal willingness to be present or visit beyond the perceived feeling that it is not part of the "habits of the service" or that their presence is not important (cited by 21% of dieticians who report involvement with staff).

In short, the dieticians reported very heterogeneous integration into the ICU with a median score of 5 [2; 7]. Here, 0 represents the feeling of not being integrated into the service, whereas

10 represents being completely integrated. Barriers to their involvement in the ICU were mentioned by 54% of respondents (n = 185) and are presented in Supplement I.

Dietician's involvement in the ICU

To evaluate dietician involvement in the ICU, we created a composite score based on two questions included in the questionnaire: estimating dietician solicitation and the impact of advice on therapeutic decisions (Supplement II). Two groups of dieticians were created, including a group with a high level of implication in the ICU (n=68) and a group with a low level of implication in the ICU (n=117). These 2 groups were compared, and the factors influencing ICU integration were identified using multivariate analysis (**Erreur ! Source du renvoi introuvable.**). The results of this multivariate analysis highlight the fact that dietician integration is linked to 3 major factors. The first factor is the number of hours dedicated to the ICU. When a dietician spends more than 4 hours in the ICU, this increases the chance of their integration (OR 4.31 [2.16; 8.85], $p < 0.001$). This first variable shows us the close relationship between the time that a dietician spends in the ICU and his or her ability to be integrated by the nurse and physician of this same unit. The two other factors that were identified were the presence of a defined nutrition protocol in the ICU (OR 3.19 [1.62; 6.42], $p < 0.001$) and the absence of obstacles, such as the lack of a written nutrition prescription (OR 2.15 [1.10; 4.23], $p < 0.001$).

DISCUSSION

This study is the first to focus on dietitians who practice in French ICUs. The responsiveness of the respondents and the high participation rate for a survey investigation (46.27%) seem to suggest a real interest of the profession for this medical specialty.

This study has highlighted significant heterogeneity in practices and involvement. The first element that was frequently noted was the presence of a dietitian in ICUs as a human resource. For some establishments, no dietitian works in the ICU; for others, there is a dietitian available that responds to requests. Finally, in the best of cases, a dietitian is dedicated specifically to the ICU. In article D. 712-110 of Decree n 2002-466 relative to the operation of intensive care, a dietitian is not included in the list of the team (13). According to the guidelines published in 2013 by the learned societies of intensive care, the recommendation R242 specifies that the ICU must be able to call upon a dietitian (14).

In the UK, the National Health Service's modernization agency recommends a dietetic allowance of 0.05 to 0.10 FTE per ICU bed (15). In 2016, dietitians working in 167 ICUs (72% of ICUs in the country) have reported an average allowance of 0.04 FTE dietitian per ICU bed, and 8% of ICUs lacked dietitian intervention (6). In Australia and NZ, recommendations are 0.02 to 0.10 FTE dietitian per bed. In 2009, dietitians practising in 182 ICUs (100% of ICUs in both countries) revealed that only 25% of ICUs had a formalized endowment of dietitians, with an average FTE per bed of 0.08 (min 0.01 - max 0.6). In terms of time spent in the service, this value corresponded to a median of 1.67 [0.94; 3.25] weekly hours per bed (3). Finally, a study performed in one ICU in Switzerland reported an allocation of 0.02 dietitian FTEs per bed (16). According to the results of our study, in France, there are currently 0.008 FTE dietitians per ICU bed or 0.16 weekly hours per bed. Several ways to influence clinical behaviour in case of immediate non-availability of the dietitian can be developed.

Involvement of a dietitian in the ongoing training of staff.

In our survey, a number of the respondents mentioned a lack of interest in nutrition by intensive care professionals; otherwise, they mentioned a lack of knowledge about the dietician profession. An environment that seems unfavourable to the development of multidisciplinary teamwork was also mentioned as a limitation by less well-integrated dieticians. Our study shows that the training activities performed by a dietician with the medical or paramedical staff are found significantly more frequently (respectively $p = 0.0005$ and $p = 0.0007$) in the group of integrated dieticians. Involving a dietician in the ongoing training of the intensive care staff is a relevant track to consider to make professionals aware of the importance of nutrition. This training would also be an opportunity for the dietitian to present his specific skills and define his role.

Associate the dietitian with the establishment of a nutrition protocol specific to the service.

In our survey, respondents mentioned low levels of multidisciplinary and occasionally difficult exchanges with intensive care professionals. A dietician who is summoned is not necessarily a dietician referent of the ICU. The respondents also mentioned the lack of initial training in nutrition for both medical teams and dietetic teams. In the latest expert recommendations, learned societies of intensive care and nutrition recommend instituting a formal multidisciplinary enteral nutrition strategy (Box 6.6 - weak agreement) (17). Establishing a nutrition protocol specific to the service makes it possible to master the recommendations of nutrition experts in intensive care to obtain a consensus of practices specific to the service and to define the role of each practice around this care in a pluriprofessional capacity. Our study reveals that the presence of a protocol increases the chances of a dietician being integrated in ICUs (OR 3.19 (95% CI [2.13, 8.7])). In the UK, the presence of a nutrition protocol based on English recommendations significantly increases the chances of having at least 0.05 dietitian FTE per bed (OR 2.4 (95% CI [1.1 - 5.6])) (6). A recent study demonstrated that the

implementation of such a tool facilitates the daily life of prescribers, particularly solicited during the COVID-19 pandemic (18). Finally, in terms of benefit to the patient, a cluster-randomized controlled trial found that ICUs that developed evidence-based nutrition recommendations and benefited from a multifaceted strategy of practice change were feeding earlier patients and more often achieved caloric goals (17). A single-centre study in Switzerland showed that the association between a nutrition protocol and the presence of a dietician referring to the ICU (60% FTE) provided a significant improvement in daily calorie delivery and therefore a significant reduction in the accumulated calorie deficit at 7 days (16). Similarly, combining a multimodal optimization strategy and multidisciplinary approaches, a nutritional protocol significantly improves the prescription of calories and increases protein intake (19).

Involvement of the dietitian in his own actions: the dietetic prescription protocol.

In our survey, we found that a large number of dietitians reported exchanging nutritional care with dietitians working in upstream services and downstream of the ICU. On the surface, these exchanges are not insignificant, and they help to ensure the continuity of nutritional care. Indeed, the temporality of intensive care management is not the same as that of nutritional care. Renutrition requires time. As a rehabilitation professional, the dietitian participates in the recovery of autonomy of the patient in collaboration with others therapists. The systematic reference of patients to a dietician is a track mentioned by S. Ferrie in his article. More recently, the author published an algorithm for the nutritional management of COVID-19 patients in ICUs, where dietitian intervention is essential (20). Our study reveals that the presence of formalized medical prescriptions favours dietitians' chances of being involved in services (OR 2.15 (95% CI [1.10, 4.23])). The systematic reference of patients to the dietitian or a "dietetic prescription protocol" could also be useful in rehabilitation. Studies have long demonstrated the impact of malnutrition on mortality, infections and length of stay (21–24). By ensuring the

fast and personalized care of the patient, dieticians improve the implementation of nutritional support and increases the clinical benefits (25). This track seems therefore quite interesting to consider and could result from the actions undertaken previously.

This study is the first study in France to inventory the role of dieticians in ICUs. One of the first limitations is that the survey-type investigation was exclusively based on declarative elements. We have adapted our conclusions accordingly. In addition, the answers reflect the opinions of dieticians. It would be interesting to conduct other studies to compare these responses with the point of view of other intensive care professional to obtain a more comprehensive view of practices in France.

By identifying the barriers to and levels of integration, this study is an anchor point to change practices. This study offers suggestions for ICU professionals about how dietitians could contribute to the optimization of the nutritional care of patients by providing added value. Additionally, our results offer the possibility of performing further comparative studies in the future.

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Conflict of interest

The authors state that they have no conflicts of interest in relation to the subject of the study. Elza Derouin declares having been invited by Nutricia, Fresinus and Nestlé (lunches). Ghislaine Picard claims to have been invited by Nutricia, Nestlé, Fresinus and Sanofi (lunches and conferences) and to have been a member of the SFNCM in 2017.

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Ethical approval

The study was approved by the SFNEP Ethics Committee (current SFNCM) by the voice of its president, Prof. JC Melchior, on October 16, 2016.

Patient consent

No patients were included in this study, so consent was not sought in this context. By completing the questionnaire, the participants agreed that their answer should be used.

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Supplement I Barriers to dietician involvement in intensive care

Barriers	Dietitians who mention barriers to their involvement Number of times cited (n =100)	Citations
Limited human resources	40	<p>“No dedicated time, no real diet dedicated, it is the available diet that goes there on medical prescription.”</p> <p>“The lack of time mainly.”</p> <p>“Non-daily presence.”</p>
Few dietetic medical prescriptions	29	<p>“The lack of dietetic medical prescription.”</p> <p>“The ICU is "autonomous.”</p>
Disinterest in nutrition	17	<p>“Some doctors who clearly express that the nutritional part concerning the patient is not a priority compared to other vital criteria (cardio, respiratory, infectious...).”</p> <p>“Practitioners' lack of interest in diet for patients in intensive care, staff as a result is little involved.”</p>
Lack of recognition of the profession of dietician/lack of recognition	13	<p>“The ignorance of the doctors of our formation and our knowledge.”</p> <p>“Profession of dietician (unknown) and too often related to hospitality.”</p> <p>“Skills of a dietician in intensive care are poorly identified.”</p> <p>“Caregivers have difficulty understanding the ‘role’ of a dietician and even more in this service.”</p>
Low multidisciplinary/difficult exchanges	11	<p>“No multidisciplinary staff, no teamwork.”</p> <p>“Discussions often sterile.”</p> <p>“The ICU is ‘closed’.”</p>
Insufficient training of professionals on nutrition in intensive care	10	<p>“Service of dietetic insufficiently trained to give strong recommendations.”</p> <p>“Training of the dietician applied to this type of service ‘on the job’, no real training at school.”</p> <p>“Poor nutritional knowledge perioperatively of doctors.”</p> <p>“Little training for interns on nutrition.”</p>

Supplement II Definition of the integration variable (n = 185)

	Dietician « well integrated » n = 68	Dietician “less integrated.” n = 117
Nurse and physician solicitation	Daily or weekly	Rarely or never
Dietician’s advice taken into account by nurse and physician	Always or frequently	Occasionally, rarely or never