

Barriers to enteral nutrition on ICUs in Austria¹

Recommendations for clinical practice from a qualitative study

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Abstract

Background and Objective: 38% of critically ill patients on intensive care units are malnourished with 69% experiencing a nutritional decline in hospital. The objective was to identify barriers on Austrian intensive care units that prevent adequate enteral nutrition and to give recommendations for improvement.

Method: In a small qualitative study five semi-structured interviews with healthcare professionals from 4 different Styrian hospitals were conducted and cross-referenced with current scientific literature. Interviewees came from 4 different hospital-systems and 3 professions (2 registered dietitians, 1 registered nurse, 2 medical doctors) to obtain a broad insight into the topic.

Results: There seems to be no standard in hospitals and each institution handles enteral nutrition differently. The healthcare professionals considered nutrition important and appeared to be aware of some of the barriers identified. Educational and organizational barriers were common.

Conclusion: Changes in organizational practices, such as routine malnutrition screenings, automated tracking of nutrition therapy, individualized nutrition support, and the demand for better educating the professionals were only a few of the recommendations for improvement. Additional research is recommended.

Keywords: malnutrition, barriers, enteral nutrition, ICU – intensive care unit, recommendations, nutritional medicine, dietetics, nutrition therapy

Introduction

Adequate nutrition, parenteral and/or enteral nutrition (EN) is a challenge on most intensive care units (ICU). For enteral nutrition just 59% (site average range, 20.5%–94.4%) of the prescribed energy and 60.3% (site average range, 18.6%–152.5%) for protein is delivered to the patient, resulting in underfeeding and malnutrition [1]. 38% of critically ill patients are either moderately or severely malnourished with 69% of patients experiencing a nutritional decline during their hospitalization [2]. This is associated with prolonged hospitalizations, higher infection rates and increased morbidity and mortality [3].

Malnutrition and muscle wasting are common problems on ICUs. This is because of the effects of catabolic hormones, an imbalance between intake and requirements, and a loss of lean body mass due to physical immobilization. Loss of lean body mass is associated with prolonged hospital stay and interferes with quality of life and functional capacity [3]. Enteral nutrition is the nutrition of choice if the oral uptake is insufficient [2].

Multiple barriers exist that hinder adequate administration of EN. There are multiple reasons for delaying and/or interrupting EN. Some of these delays or interruptions are unavoidable (e.g. patient related factors, such as interruptions due to high gastric volumes [4], acute abdomen [1], and nursing care measures [4]); but some can be avoided or minimized (e.g. prolonged interruption before procedures [5], non-evidence-based orders and practice [6], lack of malnutrition screenings [3] and late start in feeding [4]). Since there is little data on practices and barriers for EN on Austrian ICUs this paper aimed, through a small qualitative research study, to

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identify specific barriers to Austrian ICUs and to highlight a few recommendations for improvement.

Research questions

- What are the specific barriers on Austrian ICUs preventing adequate nutritional support in patients receiving solely enteral nutrition?
- What can be done to prevent or minimize them?

Methods and Materials

A literature search was performed using databases such as PubMed, Science Direct, Wiley Online Library, ResearchGate, Google Scholar as well as personal experiences. Reference lists and related articles were also searched for additional studies. Studies included either descriptions of current practices of EN on intensive care units, evidence-based recommendations, or recommendations for improvement.

To obtain insight into the barriers specific to Austrian hospitals, a qualitative data collection through five semi-structured interviews was selected. Interviewees were recruited from four different hospitals and health systems in Austria through purposive sampling and came from different professions (registered dietitians [RD], registered nurse [RN], medical doctor [MD]) to obtain a broad view into the topic and to highlight recommendations for improvement from different perspectives. The sessions were facilitated by an interview guide and an interview protocol. The protocol helped to improve the study process while the guide helped asking the right questions in the right order and supplied the researcher with appropriate probing questions. The topics explored were broad and intended to help the participants describe and discuss their experiences in as little or as much detail as they wanted. Topics included participants' knowledge about nutritional guidelines, educational background, current practices on the ICU, and attitude towards dietitians on the ICU. The interview guide was slightly adjusted for each profession since they spoke from different perspectives and roles. The main questions, however, remained the same.

In total, five interviews were conducted from March to May 2020 with participants working in four different Styrian hospitals. One critical care doctor on a resident level with experience in critical care and EN from a primary care hospital with > 1,000 beds, one attending ICU MD from a primary care hospital with < 500 beds, one critical care RN from a private primary care hospital with > 500 but < 1,000 beds, and two RDs with critical care experience from two different hospitals with < 500 beds were interviewed. The interviews lasted between 25 and 60 minutes.

Results

Several interconnected themes were identified, some related specifically to education and patient care measures, while others highlighted organizational, personal, or ethical barriers. The answers were sorted, coded and categorized according to the topics in ♦ Table 1.

Perceived or actual barriers (♦ Table 1) and recommendations for improvement (♦ Overview 1) were different for each hospital and even for HCPs working at the same hospital.

Discussion

With the aim of identifying reasons for underfeeding through EN on the ICU in the critically ill on Austrian ICUs and highlighting recommendations for improvement (Overview 1), this small study is one of only a few. It presents well that there are multiple reasons and that professionals have excellent ideas on how to remedy them. It reflects to a certain extent what is occurring on the ICUs in Austria today. Health care professionals [HCP] are taking care of critically ill patients to the best of their capabilities and are aware of limitations of the current system.

As they are not always on the ICU, MD's are often not aware of the nutritional status of the patient, nor of feeding delays and interruptions. Also, malnutrition screenings are not done on every patient. This barrier was recognized by multiple HCP and recommendations were given. This was also described by Stewart [4]. The current gold standard for calculating the patient's individual need is the use of indirect calorimetry [7]. An automated documentation system could help with communicating discrepancies to all clinicians and could flag high-risk patients. This system would need to document the patient's values (height, weight, vital signs, laboratory parameters), recommended nutritional therapy (enteral and parenteral) and amounts, actual nutrition received and calculate the discrepancies automatically. Ultimately it should raise an "alarm" if they are outside of the tolerated range. It could also be argued that improved communication between HCPs, as well as regular nutrition team rounds, could easily minimize that barrier.

Special EN formulas (e.g. with/without fiber, high energy, high/low protein, MCT, soy) are



Organizational barriers	Personal barriers	Ethical barriers
<ul style="list-style-type: none"> • bed scales not available • RDs not active on all ICUs • no access to computer systems • no automated tracking of nutrients and actual volumes infused • discrepancies target volume not calculated into the next days administration rate • no common standards in the participating hospitals • lack of special formulas • MDs are not aware when target rate is achieved • interruption times only documented if >1h • MDs are not aware of interruption times and reasons 	<ul style="list-style-type: none"> • non-evidence-based practices • rapport-driven: Collaboration between professional requires trust – hard to build • EN is considered an MD domain • RD seen as a threat to the professional standing of MDs and RNs 	<ul style="list-style-type: none"> • nutrition holds varying degrees of importance to healthcare professionals • hesitation to reinsert feeding tube based on patient comfort • deliberate underfeeding to increase sense of hunger • territorial thinking vs. collaboration

Tab. 1: **Barriers to enteral nutrition on Austrian ICUs**

EN = enteral nutrition; ICU = Intensive Care Unit; MD = medical doctors; NPO (nil per os): In an ICU setting NPO includes all enteral feeding methods [author's note]; RD = registered dietitian

not always readily available and can delay the administration of the ideal clinically indicated EN by days. This could be remedied by a streamlined ordering system and more frequent deliveries through the central stores administration.

Discrepancies in actual vs. target volumes or kcal/day are often not compensated for. Usually the EN is discontinued after 18 hours, regardless of the actual volume infused. This could easily be minimized if the target is calculated in kcal and protein intake vs. volume in ml and the RN can adjust the administration rate accordingly to the patient's status [7]. This goes hand in hand with the recommendation of an individualized approach where the nutrition therapy is calculated individually to the patient's needs and status and not a one-size-fits-all approach [8]. Only one interviewed HCP stated that the 18 hours administration time is not set in stone and can be overdrawn, if necessary, to administer the target volume. One interviewed HCP reported that the discrepancy is calculated into the new administration rate the following day if the patient's condition allows for it. This was also recommended by Kim et al. [5]. Lichtenberg et al. [11] calculated higher infusion rates based on a 20-hour infusion schedule but administered the volume still over 24 hours at the higher rate. This was to compensate for missed feedings. This resulted in significant increases in both target feedings ($\pm 10\%$ of goal) and overfeeding ($\geq 110\%$ of goal), indicating a need for further research. The lack of bed scales on the ICU to measure the patient's weight complicates this further.

EN is still considered an MD domain and all HCPs confirmed that the MD has the final, and often only, say. The benefit of an RD as part of the nutrition team was recognized by 4 out of 5 HCPs but deemed expendable in one interview. Having an RD on the nutrition team, if one has actually been implemented already, was seen as a threat to the professional standing of the MD and RNs in two interviews and therefore looked at cautiously.

Overall, nutrition was considered important by all interviewees, even though room for improvement was also recognized. One HCP estimated that EN is initially more important for the MDs since they must consider and prescribe it, but that it lessens in importance over time. RNs initially have multiple tasks to complete at once and EN is just one task out of many and therefore of lesser importance in the first hours to days. There can be significant delays in EN when there are patency issues with the feeding tube as HCPs might be hesitant to reinsert the feeding tube to not further upset the patient. Feeding delays due to patency issues has been well documented in the literature [4].

There is also the practice of deliberately underfeeding the patient through EN if he or she is also allowed an oral diet as not to quell their sense of hunger. This practice might make it hard to track the actual calories consumed and leaves the patient at risk for prolonged malnutrition.

Even though there are clear recommendations on EN [9], calculation standards vary among hospitals. The same patient might receive a different calorie and protein amount depending on the facility administering care.

Interruptions due to nursing care procedures are a non-predictable reason for underfeeding. Some nurses document interruptions diligently while others only document them after at least 1 hour of interruption. This is in stark



Routine care measures	Educational barriers	Patient-driven barriers
<ul style="list-style-type: none"> • no standard for pausing EN due to care measures. This varies between healthcare professionals • only estimated volumes documented vs. actual amounts • NPO times often causes stop of EN even though target has not been achieved 	<ul style="list-style-type: none"> • MDs have no formal training on medical nutrition therapy • RNs only formal training in critical care course • RDs formal training only recently with university degree • inability to measure clinical outcome decreases interest for the subject in providers • unexperienced healthcare professionals learn outdated practices from their peers • prolonged NPO times • lack of inhouse training • medical nutrition is not a priority in clinical education programs • SOPs (standard operating procedures) not readily available and seldomly used 	<ul style="list-style-type: none"> • clinical reasons (e.g. risk of aspiration, high gastric residual volumes, sepsis) • clogged feeding tube • NPO times before procedures and tests • prolonged NPO times • problems with reinsertion of feeding tube

Tab. 1 continued: **Barriers to enteral nutrition on Austrian ICUs**

Overview 1: Recommendations for improvement

- formal training for all healthcare professionals in nutritional therapy and frequent refreshers
- routine malnutrition screenings
- automated computer systems tracking input, target rates, interruptions with their reasons, and discrepancies and automatic reporting to the providers
- individualized nutrition therapy
- interdisciplinary collaboration, RDs as part of the ICU nutrition team
- SOPs and guidelines readily available and easy to use
- ability to order and frequent delivery of special EN formulas through pharmacy and central stores
- ICU equipment such as bed scales and indirect calorimetry devices
- calculations of EN in kcal/d and g protein/d vs. ml/d

contrast to Kim et al. who gives a time frame of 15 minutes after which interruptions are reported [5]. Some interviewed HCPs turn the EN off for nursing care measures while others leave it running. Since only some of the technical systems in the hospitals included in this study track actual amounts administered it cannot clearly be said if and how much delays accumulate throughout the day. This should be looked at individually in future studies. It is highly likely that those interruptions of a few minutes for every nursing care measure accumulate to long delays in EN that, so far, go unnoticed and/or unaccounted for. None of the interviewees had formal training in EN. Personal interest and post-graduation classes were used to fill these gaps.

The notion of “the young learn from the old” holds especially true in the MDs and RNs. RDs now get formal training in their bachelor program and through the Association of Dietitians post-graduation. Standard operating procedures [SOP] are in place but usually only for the standard surgical patient. The need for numerous and more detailed SOPs was recognized and is in line with the recommendations by the ESPEN group for ICU nutrition guidelines [10].

One interviewed HCP recognized that their surgical patients are often malnourished for up to a week before they get flagged in their system for malnutrition. Since these patients fast before the procedure, are NPO just prior to surgery and might be NPO or with minimal oral intake after surgery, they lack nutrition for quite a while. So far this goes unaddressed at that facility. Problems with feeding tube insertion might further extend that fasting time. As nutrition therapy outcomes are not immediately visible, they are hard to grasp and to appreciate for the ICU HCPs. This might lead to a decrease in perception of its importance. This could be minimized by formal training, frequent refreshers, communication between HCPs and an awareness of long-term benefits of nutritional therapy.

The subject matter of this survey proved to be emotionally charged and potential participants were hesitant to share their experiences and therefore made it difficult to recruit from



all over Austria. The interviewees ultimately came solely from Styria. Therefore, this paper can only give an insight into the topic but not a conclusive list of barriers in Austria and/or all strategies for improvement. As time and resource limitations prohibited a larger sample size saturation was not achieved. Data saturation in a qualitative survey is the point at which data collection can be completed because the information provided is repetitive. Since this paper is a single student bachelor thesis and all steps were done by the author the risk for bias, over-analyzing and distortion of results is high.

Conclusion

This research has shown that there are multiple barriers to EN on Austrian ICUs. There seems to be no common standard between hospitals and each institution handles EN differently. HCP are aware of barriers, e.g. lack of formal education, and malnutrition screenings and have excellent ideas for improvement. Future studies should continue to assess the multidisciplinary management of EN to enhance study generalizability and even more importantly, to optimize patient care. Further investigations into personal practices and knowledge as well as use/non-use of guidelines need to be conducted. As parenteral nutrition is a common and useful option to adequately feed patients on the ICU it can easily be used to solely or supplementally cover the patient's needs when EN cannot.

Conflict of Interest

The authors declare no conflict of interest.

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