



Clinical nutrition

# Changes in nutritional care after implementing national guidelines—a 10-year follow-up study

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## Abstract

**Background/objectives** In 2004, a survey conducted in Scandinavia documented insufficient knowledge in nutrition care among doctors and nurses. The survey also revealed a significant discrepancy in nutritional practice, where Norway ranked lowest, thus leading to several actions including elaboration of national guidelines. The aim of this study was to evaluate potential changes in nutritional practice, as well as assessing barriers to nutrition therapy, 10 years after the former study.

**Subjects/methods** In the first half of 2014, a total of 4000 doctors and nurses received a questionnaire, similar to the one used in 2004. The questions dealt with nutritional practice, routines, knowledge, barriers, and use of clinical dietitians (CDs) in the hospitals.

**Results** The response rate was 22%. Routines in nutritional practice were significantly improved. The level of knowledge among respondents were increased, but lack of knowledge and lack of assignment of responsibility were still important barriers. The patients' contradiction could be a barrier to the use of enteral nutrition. CDs are used in a small amount of patients, and wards with good nutritional routines have a better cooperation with CDs than wards with insufficient routines.

**Conclusions** Routines in clinical nutrition have improved from 2004 to 2014. Barriers in the daily practice among health care workers like lack of knowledge and lack of assignment of responsibility are still important, and health care professionals seem to let the patient himself or herself be a barrier to the use of enteral nutrition.

## Introduction

The number of hospitalized patients defined to be at nutritional risk or malnourished is high and varies between different patient [1] populations [2, 3] and type of screening

tool used [4]. The treatment of these conditions during hospitalization is often lacking, which means that the patients do not receive optimal treatment for their nutritional depletion or increased energy need [1, 5, 6]. This leads to increased length of hospital stay and costs and higher morbidity and mortality [7]. A search of the keyword “clinical nutrition” in PubMed leads to 13,121 articles during the period from 1994 to 2004 and 20,679 from 2004 to 2014, documenting that there is an increasing number of studies in the field of clinical nutrition during the last two decades. This indicates a growing interest in medical conditions, where clinical nutrition is an integrated part of the medical treatment. A prerequisite for the implementation of clinical nutrition in clinical practice is to recognize existing barriers and form a strategy to overcome these barriers [8].

A Danish study conducted in 1997 suggested that increased focus on education in nutrition, development of screening tools, and introduction of guidelines were needed to bridge the gap between the positive attitudes and the unsatisfactory clinical practice revealed [9]. In 2004, a follow-up study in Denmark documented positive changes in routines, but the main barriers against nutritional therapy

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remained the same [10]. This survey was simultaneously completed in Norway and Sweden, resulting in the first common Scandinavian study on attitudes and practice in nutritional therapy among doctors, nurses and clinical dietitians (CDs) [11, 12]. The study showed that health professions in Scandinavia agreed in that good nutritional care was important, but there were possibilities for improvements with regards to clinical practice, with Norway performing worst in this area [11]. The same study showed that the doctors and nurses with the best self-evaluated level of knowledge, rated basic nutritional routines as less difficult, compared to those with lowest self-evaluated level of knowledge [13]. It was also demonstrated that lack of knowledge was considered the most important barrier, followed by lack of interest and lack of assignment of responsibility [13]. Overall, doctors and nurses reported that nutrition care was important, but the routines in nutrition care failed to fulfill the criteria of the European Society for Clinical Nutrition and Metabolism (ESPEN) regarding good nutritional practice [11]. A new follow-up study in Denmark in 2012 indicated that the barriers acknowledged in 2004 still existed even though routines and clinical practice had improved [14].

Since the survey in 2004, different actions to improve nutrition care have been carried out in Norway. The present study is a questionnaire-based follow-up study among doctors and nurses in Norway, similar to the 2004 survey.

The aim of our study was to investigate changes in clinical practice in nutritional care in Norway 10 years after the first study and to map possible barriers to the process.

## Materials and methods

The questionnaire was distributed to 2000 doctors and 2000 nurses working in Norwegian hospitals. The answers were collected between January and July 2014. A reminder was sent to all by e-mail in March. The doctors were randomly selected from a database, covering the specialties internal medicine, medical gastroenterology, oncology, general surgery, gastrointestinal surgery, orthopedics, and intensive care/anesthesiology. The nurses were included by allocating a total of 2000 questionnaires to nurses working in the same wards as the selected doctors. The head nurses were instructed to answer one questionnaire by themselves and distribute additional questionnaires to the first nurses they met the same day. In May 2014, a letter with signature from the Norwegian Health Authorities was sent to all invited doctors in order to encourage them to respond. In addition, participation by answering an electronic version of the questionnaire was also offered in this letter.

In addition to demographic data, the questionnaire also covered the topics of nutritional practice, routines,

knowledge, barriers, and use of CDs. Twenty-two of the main questions were identical with the 2004 study [11, 13]. Thirteen of the original questions about attitudes from 2004 were removed because the main focus in this survey was to evaluate potential changes in clinical practice. Six questions about knowledge of “Norwegian national guidelines for prevention and treatment of malnutrition”, “National nutritional handbook”, and the leaflet “Good nutritional practice, assessment of nutritional risk”, all released in Norway after the previous survey, were added.

To analyze the use, attitudes, and knowledge about CDs among nurses and doctors, answers from respondents working in hospitals with no dietitians employed, were excluded from the analyses. The responses received were categorized according to whether the respondents reported good routines or inadequate routines in their wards.

Answers to 11 selected questions about current nutritional routines formed the basis for the categorization e.g., “Is it normal practice in your ward to measure the weight of the patients at admittance?” The alternate answers were as follows:

“Yes, in all patients” (ranked score 3)

“Yes, in some selected patients” (ranked score 2)

“Yes, in a few selected patients” (ranked score 1) and

“No” (ranked score 0).

The respondents with a total score of 0–21 were categorized as working in “wards with inadequate nutritional routines”, and those with a total score of 22–33 as working in “wards with good nutritional routines”.

An analysis of non-respondents was performed by sending three questions by e-mail to non-respondent doctors, regarding self-evaluated level of knowledge, interest, and relevance of their competence in treatment of undernourished patients. Answers were graded between 1 (lowest) and 10 (best).

## Statistics

SPSS was used for data analyses. Descriptive statistics were used to analyze the response rate and demographic data. For the statistical tests between two groups, the Chi-square test was used for nominal data and Mann–Whitney *U*-test for ordinal data. *P* values < 0.05 were considered significant.

## Results

### Demographic data

Of the total of 4000 questionnaires distributed, 893 (22%) were returned. Among these, 341 (17%) were returned from the doctors and 552 (28%) from the nurses (Table 1). In

Table 1, demographic data of the respondents from our study are compared with the equivalent study in 2004.

### Analysis of non-respondent doctors

A non-respondents analysis was performed among the doctors and was answered by 118 doctors. There was no significant difference in age between the respondents and the non-respondents (72% vs. 63% age  $\geq$  40 years) ( $p = 0.335$ ). Table 2 shows that the non-respondents expressed a lower level of knowledge regarding treatment of malnutrition ( $p < 0.001$ ), they were less interested in malnutrition ( $p < 0.001$ ), and considered it less relevant to have knowledge about the treatment of malnutrition than the respondents ( $p < 0.001$ ).

### Routines

As addressed in Fig. 1, the implementation of routines for screening, assessment, and documentation increased significantly during this 10-year period. However, only 12% reported that patients at nutritional risk have a nutrition plan recorded in the journal as a standard procedure in 2014.

### Knowledge

The level of self-evaluated knowledge of doctors and nurses was reported from 1 (lowest) to 10 (best). The number of respondents reported their level of knowledge to be  $\geq 6$  were 46% in 2004 compared to 57% in 2014 ( $p < 0.001$ ). This illustrates an increase in the level of self-evaluated knowledge.

**Table 1** Demographic data of doctors and nurses, 2004 and 2014

	2004 ( $n = 1469$ (%))	2014 ( $n = 893$ (%))
Respondent doctors	29	17
Respondent nurses	45	28
Male	34	30
Age $\geq 40$ years	46	53
University hospital	46	48

**Table 2** Analysis of self-rated level of knowledge, interest, and relevance among non-respondent doctors compared to respondent doctors, grading from 1 (lowest) to 10 (best)

	Non-respondents ( $n = 118$ )	Respondents ( $n = 341$ )	$p$ -Value
Knowledge about treatment of malnutrition	4.9 (1.6) <sup>a</sup>	5.6 (2.0)	< 0.001
Interest in treatment of malnutrition	5.5 (2.1)	6.3 (2.0)	< 0.001
Relevance of knowledge in treatment of malnutrition	6.8 (2.5)	8.1 (1.7)	< 0.001

<sup>a</sup>Results as mean (SD)

Additionally, significantly fewer respondents found it difficult to identify undernourished patients, assess energy needs, and develop a nutrition plan (Fig. 2).

### Barriers to nutrition care

Even if significantly less doctors and nurses answered that “lack of knowledge” and “lack of interest” exists in 2014 compared to 2004, these deficiencies are still the main barriers to sufficient nutritional therapy in this study. Furthermore, “lack of assignment of responsibility” is also an important barrier to nutrition care, but there was no significant difference between the two studies. There was an increase in the number of respondents reporting that “time-consuming” was a barrier to sufficient nutritional therapy ( $p < 0.002$ ; Table 3).

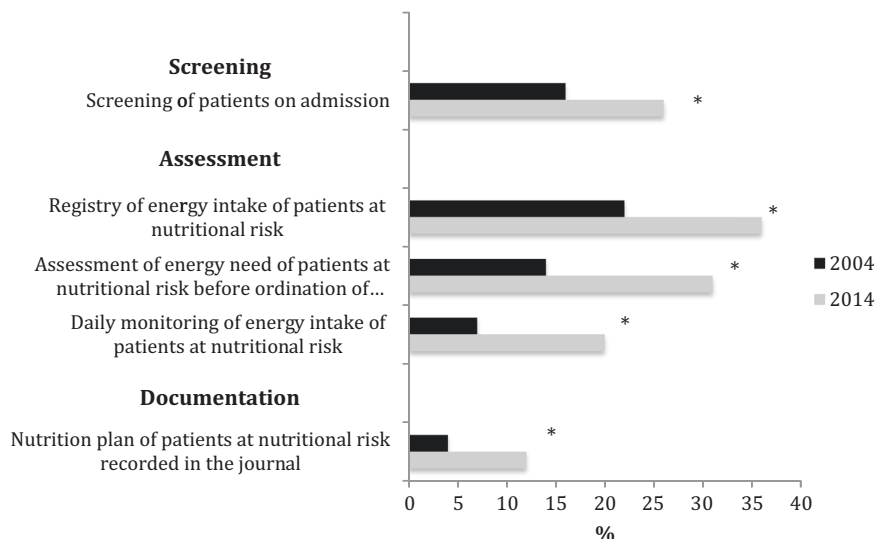
### Barriers to enteral nutrition

Twelve % agree that the placement of a naso gastric tube is a barrier to the use of enteral nutrition and 11% agree that to accomplish enteral nutritional treatment is so troublesome that it hamper the use of it. Despite this, 73% of the respondents report that the use of percutaneous endoscopic gastrostomy (PEG) ease the nutrition supply in patients. Furthermore, 46% report that the contradiction of the patient him or her self is a barrier to the use of enteral nutrition. Additionally, 50% report that parenteral nutrition is the chosen nutritional treatment in these patients. 43% agree that parenteral nutrition is easier for the staff to complete than enteral nutrition and 8% report that enteral nutrition is not prioritized because of lack of human resources. Only minor differences were observed between 2004 and 2014 (data not shown).

### Assignment of responsibility

Doctors and nurses both regard their own professional positions to be responsible for 4 out of 5 responsibility tasks in nutrition care (Table 4). CDs were ranked third in four responsibility tasks and second in responsibility for developing an individual nutrition plan of both doctors and nurses.

**Fig. 1** Nutrition routines of patients at nutritional risk as standard procedures on the ward, 2004 and 2014 (%). Percentage answered, “Yes, in all patients”. \* $p < 0.001$



### Involvement of CDs on the wards

In 2014, 81% of the respondents reported having CDs available in their hospital, compared to 72% in 2004 ( $p < 0.001$ ).

Despite this, 48% reported that CDs were involved with < 5% of the patients at their ward in 2014 compared to 53% in 2004. No difference was observed between the two investigations ( $p = 0.324$ ).

A higher amount of doctors and nurses working in wards with good nutritional practice reported that CDs were regularly involved in multidisciplinary meetings compared to doctors and nurses in wards with inadequate nutritional practice (92% vs. 81%,  $p < 0.007$ ). Both groups had a strong positive attitude toward CDs (98% good routines vs. 92% insufficient routines,  $p < 0.101$ ) and reported that CDs should be more involved, mostly by those with inadequate routines (77% good routines vs. 89% insufficient routines,  $p < 0.001$ ).

### Discussion

This study shows that routines in nutritional practice in Norwegian hospitals have improved significantly since the previous study in 2004. Nutritional screening on admission, assessment during the hospital stay, and documentation on nutritional plan in the journal were all more common practice in 2014 compared to 2004. However, lack of nutritional knowledge, lack of assignment of responsibility, and lack of interest among doctors and nurses still remains the most important barriers. Interestingly, this study demonstrates that the patient him or herself could be a barrier to the use of enteral nutrition and that parenteral

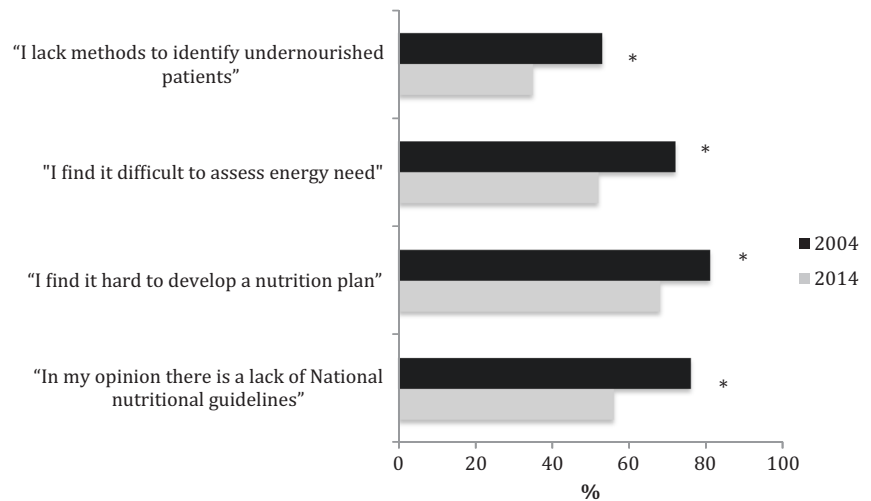
nutrition is a more executable treatment than enteral nutrition. We also found that CDs are used in a small amount of patients, and wards with good routines have a better cooperation with CDs than wards with insufficient routines.

### Limitations

The low response rate is the main limitation of this study. Because this is a follow-up study to that carried out in 2004, this consequently restricted how much we could simplify the questionnaire as an attempt to increase the response rate and simultaneously be able to compare the data. We managed to reduce the questionnaire from 10 to 6 pages. Similar surveys conducted among doctors in Europe during the past years have also revealed a trend toward a decreasing response rate [14, 15]. To increase the response rate in future studies, the length of the questionnaire should probably be further reduced. Electronically delivered questionnaire with an invitation letter sent by mail could also increase the response rate [16]. However, the present study reflects the perceptions of 893 doctors and nurses, and is the largest survey of its kind, conducted in Norwegian hospitals during the last 10 years. The results are of great importance in the process of improving nutrition care and evaluating the existing practice.

To take account of selection bias, we performed an analysis among non-respondents, which approved that doctors with most knowledge and interest in clinical nutrition answered the questionnaire. However, the analysis of non-respondents from 2004 showed the same; those who answered had more knowledge and were more interested in clinical nutrition. It means that for both 2004 and 2014, those who are more interested in nutrition answered, and we therefore assume that there has been an improvement in

**Fig. 2** Statements related to knowledge about screening, assessment, and guidelines among doctors and nurses, 2004 and 2014 (%). Columns show respondents who answered, “agree” or “predominantly agree”. \* $p < 0.001$



**Table 3** Barriers among doctors and nurses against sufficient enteral and parenteral nutrition on the ward, 2004 and 2014

Barriers <sup>a</sup>	2004 (%)	2014 (%)	<i>p</i> -Value
Lack of knowledge	67	57	< 0.001
Lack of assignment of responsibility	46	47	n.s.
Lack of interest	42	35	< 0.001
Lack of documentation	33	33	n.s.
Time-consuming	17	26	0.002

<sup>a</sup>Respondents were allowed to choose up to three barriers

nutritional practice in Norway in the last 10 years. In addition, following the former study, several initiatives in the field of nutrition have taken place in Norway and Norwegian hospitals. In 2005, the Norwegian Society of Clinical Nutrition and Metabolism was established. The health authorities have published the report “Measures when food intake is insufficient”, “White Paper nr 47, Coordination Reform [17]”, “National Guidelines in Preventing and Treatment of Malnutrition” [18], The mission document “Nutrition competence in the health- and care services” [19], “The National nutritional handbook” [20], “White Paper nr 10, Good quality- safe services”, and “The Regulatory documents of the Ministry of Health, 2013” between 2006 and 2013. The leaflet “Good nutritional practice, assessment of nutritional risk” was distributed for free to all interested Norwegian health professionals as a practical and easy to use tool.

The overestimation of positive or expected answers is another bias in questionnaire surveys. However, this bias also existed in 2004, and we therefore have confidence that the changes observed are real. In the case of increased knowledge, we would like to debate whether guidelines

**Table 4** Doctors and nurses view on how responsibility tasks in nutrition care are distributed among different health care professions

Nutrition care tasks	Nurses opinion (%)			Doctors opinion (%)		
	1st	2nd	3rd	1st	2nd	3rd
Assessing nutritional status	N	Dr	CD	Dr	N	CD
	85	64	20	80	61	19
Calculating daily energy intake	N	Dr	CD	N	Dr	CD
	76	21	19	50	40	25
Decision to carry out a dietary record	Dr	N	CD	Dr	N	CD
	71	66	20	87	32	13
Develop an individual nutrition plan	N	CD	Dr	Dr	CD	N
	56	37	36	52	36	21
Transfer nutrition plan to next level of care	N	Dr	CD	Dr	N	CD
	79	48	10	73	46	11

*N* nurses, *Dr* doctors, *CD* clinical dietitian

Percentage of respondents to questions to doctors and nurses; how is tasks and responsibility in nutrition care distributed among the wards doctors, nurses, or CDs?

No restriction in the number of selected health care professions in each nutrition care task. Alternate answers were “Nurses”, “Doctors”, “Clinical Dietitian”, “Nursing assistant”, and “Do not know”

Results of “Nursing assistant” and “Do not know”, is not showed

could ease the daily practice without improving the real level of knowledge, and if they just lead to the perception of a better knowledge. This study cannot conclude to this question. However, despite documented improvements in clinical practice there is still a way to go before we can conclude that nutritional care in Norway is satisfactory; in 2014 only 26% of the respondents reported that all patients were screened on admission. It is therefore of importance to evaluate the possible barriers to the optimal nutrition care.



## Barriers to sufficient enteral and parenteral nutrition

In this survey, lack of knowledge remains the most important barrier to sufficient nutritional therapy. This result is also well documented in previous studies, both in qualitative studies [21, 22] and in studies with closed questions [13, 14]. Both lack of knowledge and lack of interest were considered as important barriers among significantly fewer respondents in 2014 compared to 2004. The self-evaluated level of knowledge among the respondents was significantly increased. Additionally, significantly fewer respondents found it difficult to identify undernourished patients, assess energy need, and develop a nutrition plan in 2014 compared to 2004. These concrete tasks reflect the level of knowledge and support a trend toward improved knowledge. For an objective comparison to the subjective data obtained in this study, the consumption of sip feeds, enteral feeding, and parenteral feeding in the study period were analyzed. Norwegian statistics shows that the consumption of sip feeds have doubled from 2004 to 2014. In Norway, sip feeds are available as a reimbursable prescription for free to patients with defined medical diagnosis, and is therefore a low-threshold effort. It is important to note that it is not possible to judge whether these numbers represents an overspending. On the other hand, the use of enteral nutrition is unchanged and parenteral nutrition is increased by 30% in this 10-year period. Altogether, the statistics could represent increased focus and treatment, but maybe not in the optimal way. This can support our conclusion that routines are improved but still there is room for further improvements. Seventy-three percent of the respondents report that the use of PEG makes the enteral nutrition supply easier even though only twelve percent agree that to place a naso gastric tube is so troublesome that it hamper the use of it. Additionally, only 11% report that the use of enteral nutrition is so troublesome that it affects the use of it. 46% of the respondents report that the patients' contradiction could be a barrier to the use of enteral nutrition, and 50% agree that parenteral nutrition is the chosen nutritional treatment in these patients. To our knowledge, no studies have investigated the patients' perspective as a barrier to optimal nutrition care in the hospitalized setting. This study may suggest that patients' perception can be an important barrier to optimal nutrition therapy. Furthermore, it can be questioned whether patients have received basic information about treatment benefits and disadvantages regarding enteral and parenteral nutrition. Evidence shows that enteral nutrition improves patient outcomes and decreases the length of stay in intensive care unit by improving splanchnic blood flow, moderating the metabolic response, sustaining gut integrity, and preventing bacterial translocation from the gut to the bloodstream [23].

It may be discussed that whether the health professionals are aware of this and the importance of that information to be provided and how the patient's participation can influence the outcome of treatment. Significant time requirement was considered an important barrier among significantly more respondents in 2014 compared to 2004 and may be a result of the Coordination Reform [17], which have led to shorter hospital stays and earlier discharge to the community health care. Still, only 8% agree that enteral nutrition is not prioritized because of lack of human resources.

## Assignment of responsibility and use of CDs on the wards

Lack of assignment of responsibility was the second most important barrier and was unchanged in the study period. This survey found that doctors and nurses both pointed out their own profession as the one responsible for four out of five responsibility tasks in nutrition care, as in the study from 2004. This is also supported by two qualitative studies among nurses in Norwegian hospitals, where neglect in nutritional care among doctors [22] was one of the reasons why nurses believed that the nutritional therapy was the nurses' responsibility [21]. The different tasks in nutrition care do not have a defined responsibility, and each hospital is responsible to organize its own nutritional strategy, as stated in the National guidelines [18] and as suggested by the National handbook [20]. CDs have a specialized competence in individual assessment and treatment of malnourished patients. Individual nutritional therapy provided by a dietitian resulted in increased energy intake [24] and reduced length of stay [25]. Nevertheless, the CDs are ranked last in four out of five responsibility tasks in nutrition care. In Norway, CDs are not routinely employed on the wards, but perform supervision after referral. Significantly more responders had CDs available that the ward could involve in 2014 compared to 2004, but still about half of the responders report that CDs are involved in < 5% of the patients at their ward with no improvement between the two investigations. The documented prevalence of nutritional risk varies between 31% and 74% in different Norwegian wards included in this study [2], and demonstrates that many patients do not receive specialized assessment by dietitians. This may reflect lack of dietitians or an inefficient way of using their competence. In a cohort study in Canada, the current ad-hoc referral to CDs by physicians was concluded to be inefficient resulting in only half of the severe malnourished patients receiving consultation by a dietitian [26]. This study also show that CDs were reported to be more regularly involved in multidisciplinary meetings in wards with good nutritional practice compared to wards with insufficient nutritional practice.

## Conclusion

This study shows that routines in clinical practice in Norwegian hospitals have improved significantly since the previous study in 2004. Lack of knowledge remains the most important barrier to optimal nutrition care. The patients' contradiction to enteral nutrition can be an important barrier to this treatment in daily practice. Future studies should investigate barriers and enablers related to the use of enteral nutrition and how the competence of CDs could reach a higher amount of hospitalized malnourished patients.

## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no competing interests.

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