Original article

Systematic screening for undernutrition in hospitals: Predictive factors for success☆

Eva Leistra [a,b,*], Marian A.E. van Bokhorst-de van der Schueren [a,b], Marjolein Visser [a,c,d], Anja van der Hout [b], Jacqueline A.E. Langius [a,b], Hinke M. Kruizenga [a,b,c]

[a] Dutch Malnutrition Steering Group, Amsterdam, The Netherlands
[b] Department of Nutrition and Dietetics, Internal Medicine, VU University Medical Center, PO Box 7057, 1007 MB Amsterdam, The Netherlands
[c] Department of Health Sciences, Faculty of Earth and Life Sciences, VU University, Amsterdam, The Netherlands
[d] Department of Epidemiology and Biostatistics, EMGO Institute for Health and Care Research, VU University Medical Center, PO Box 7057, 1007 MB Amsterdam, The Netherlands

ARTICLE INFO

SUMMARY

Background & aims: Since 2007, systematic screening for undernutrition has become a performance indicator (PI) for hospitals within the National Benchmarks on Quality of Care of the Dutch Health Care Inspectorate (HCI). Its introduction was guided by a national implementation program. The aim of this study was to evaluate the screening results from 2007 to 2010 and to identify predictive factors for achieved screening results.
Methods: All 97 Dutch hospitals were obliged to report screening results to the HCI. An additional questionnaire was developed to determine hospital characteristics, including hospital type, size, participation in implementation program, screening tool used, use of electronic records, presence of hospital-wide or ward task forces, and protocol-defined referral. Multivariate linear regression analysis was used to identify predictive factors for the obtained screening results in 2010.
Results: The mean screening percentage increased from $51 \pm 28\%$ in 2007 ($n = 75$ hospitals, $n = 340,000$ patients) to $72 \pm 17\%$ in 2010 ($n = 97$; $n = 1,050,000$) ($p < 0.01$). Eighty-one hospitals returned the questionnaire. A higher screening percentage was associated with more clinical admissions (highest vs. lowest tertile: $\beta = 14.0$, 95% CI 3.9–20.5; $p < 0.01$; middle vs. lowest: $\beta = 7.3$, −0.8 to 15.6; $p = 0.05$), presence of protocol-defined referral to a dietician ($\beta = 10.5$, 2.9–18.0; $p < 0.01$), and use of the SNAQ screening tool (vs. MUST: $\beta = 9.1$, 1.7–16.6; $p = 0.02$).
Conclusion: Screening percentages have increased significantly since the introduction of the PI. Screening was more frequent in hospitals which have more patient admissions, protocol-defined referral to a dietician, and who use the SNAQ screening tool. This information may assist in improving Dutch screening rates and in implementation in other countries.

1. Introduction

Disease related undernutrition is a major problem in health care settings in Western Europe and other industrialized countries. The prevalence of undernutrition in hospitals is broadly described in the literature and ranges, depending on the definition used, from 10 to 60 percent.[1–10]

Undernutrition is found to be associated with reduced wound healing, increased complication rates, increased length of hospital stay, increased mortality, and increased health care costs.[2,6,11,12] Without screening, only half of the undernourished patients are recognized by medical and nursing staff,[13,14] which emphasizes the need for systematic screening.[15]

In 2007, through a collaboration between the Dutch Malnutrition Steering Group (DMG) and the Dutch Ministry of Health, Welfare and Sports, systematic screening for undernutrition in hospitalized patients was introduced as a performance indicator (PI) within the National Benchmarks on Quality of Care of the Dutch Health Care

Inspectorate (HCI). Its introduction was guided by a DMG national implementation program. Annually, hospitals are required to report on a variety of care processes to the Dutch Health Care Inspectorate. Results are used to create transparency on quality of care and to rate the performance of Dutch hospitals. The PI on undernutrition screening obliges hospitals to annually provide information on the percentage of patients screened for undernutrition at hospital admission and on prevalence of undernutrition at admission.

Our data are among the first on systematic screening of undernutrition. While many countries are working on implementation programs, nationwide mandatory nutritional screening is still rare. Moreover, little is known about factors influencing screening results. Therefore the aim of this study is to evaluate the screening results from 2007 to 2010 and to identify predictive factors for achieved undernutrition screening results.

2. Methods

2.1. Hospitals

All 97 Dutch hospitals (58 general, 28 teaching, 8 university and 3 specialized hospitals) were required to provide data on undernutrition screening to the HCI. Between 2006 and 2009, 57 hospitals participated in the implementation program of the Dutch Malnutrition Steering Group "Early recognition and optimal treatment of malnutrition in Dutch hospitals". In 4–6 multidisciplinary workshops, led by an implementation expert and a scientific expert different steps of implementation and maintenance of screening and treatment were discussed. Moreover, a structured, multidisciplinary implementation plan was developed, and hospitals had the opportunity to share ideas. Additionally, a downloadable toolkit was developed, including implementation strategies, information material for all hospital disciplines, tools, guidelines, literature, ready to use factsheets and presentations, process evaluation forms, tools for data analysis, etc.[1] The other 40 hospitals implemented screening without participation in this project, but had access to all the material.

2.2. Performance indicator on undernutrition screening

The performance indicator on undernutrition screening requires that all patients ≥ 18 years need to be screened within 24 h after admission. Screening should be performed with a validated screening tool; either SNAQ (Short Nutritional Assessment Questionnaire)[16] or MUST (Malnutrition Universal Screening Tool).[17] A SNAQ score of 2 points or a MUST score of 1 point is defined as moderate undernutrition, and a SNAQ score ≥ 3 points or MUST score ≥ 2 points is defined as severe undernutrition. Patients are excluded for screening if they are admitted for less than 24 h or admitted to the maternity ward.[18]

The performance indicator consists of four components: the number of patients admitted to the hospital (for at least 24 h) in the year of report, the number of patients screened at admission (within 24 h) to hospital, the number of patients that were moderately undernourished, and the number of patients that were severely undernourished. The percentage of patients screened, and the percentages of moderately and severely undernourished patients were calculated from these numbers.

Hospitals are responsible for collecting their own data, and for reporting on the four components of the performance indicator to the HCI. Hospitals are required to provide this information on all

(relevant) admissions in the year of report. Though, some hospitals provide only subsample information. Reasons for reporting subsample results are[1] screening is not implemented on all departments[2]; absence of electronic registration of undernutrition screening. Due to the time-consuming character of collecting screening information manually, these latter hospitals generally use four measurements throughout the year as a sample of all admissions, as the later introduced performance indicator on undernutrition treatment involves four measurements throughout the year as well,[18] or use the screening information collected in one or more months as a reflection of screening throughout the year.

Data on screening results from 2007 to 2010 were obtained directly from the Dutch Health Care Inspectorate.

2.3. Potential predictors

For this study, a questionnaire was developed to collect additional information about the hospitals. The questionnaire consisted of both closed and open ended questions, providing general hospital information and information on the implementation process. The questionnaire was tested in a pilot of 3 hospitals, including 2 general hospitals and 1 university hospital, after which minor adjustments were made. The final questionnaire was sent by email to all non-specialized hospitals, dieticians were asked to fill out and return the questionnaire. Eighty-one out of ninety-four hospitals (86%) responded to the additional questionnaire.

The following potential predictors of the obtained screening results of 2010 were investigated; hospital type (general, teaching, university, specialized), participation in the DMG implementation project (yes/no), used screening tool (SNAQ or MUST), screening information provided on all admissions or a subsample, protocol-defined referral to a dietician in case of undernutrition (yes/no), screening implemented in an electronic nursing record (yes/no), use of an electronic dietician record (yes/no), existence of a hospital-wide 'task force for undernutrition' (yes/no), presence of a 'task force for undernutrition' at each ward (yes/no), regular audit and feedback of screening results during the year (yes/no), target value recorded (yes/no), number of clinical admissions in 2010, number of clinical beds, number of clinical dieticians employed expressed in fulltime-equivalents (FTE) per 100 beds. The number of clinical admissions, clinical beds and FTE clinical dieticians per 100 beds were not normally distributed, and therefore divided into tertiles.

Specialized hospitals (n = 3; cancer, lung, and orthopedic) were excluded from prediction analyses, as these hospitals represent patient populations that are not comparable to the other hospitals and include mostly outpatient care.

2.4. Barriers and enablers

Within the questionnaire, two open ended questions were included on barriers and enablers for optimal screening. Dieticians were required to provide factors they believed were responsible for success or failure of screening in their hospital. Two researchers (EL, HK) scored the given answers into categories of enablers and barriers. Top 10 categories of enablers and barriers are presented. Moreover, dieticians were asked to rate the screening process in their own hospital on a 1–5 Likert scale. Scores were compared to achieved screening results.

2.5. Data analysis

Descriptive statistics were used to analyze the screening results of 2007–2010 and to summarize hospital characteristics. Means and standard deviations were calculated for continuous variables

---

[1] Dutch Malnutrition Steering Group: www.stuurgroepondervoeding.nl (Dutch)/ www.fightmalnutrition.eu (English).