To stay or not to stay : the assessment of inappropriate hospital stay

Summary

Introduction

Every year a growing amount of knowledge, procedures and techniques to improve health care, based on careful scientific research becomes available. But since the resources in health care are limited, choices concerning the allocation of people, time, facilities, equipment and knowledge have to be made. The reduction of hospital beds increases the pressure to use the remaining beds as efficiently as possible. Inefficiency in this affects the quality of hospital care and impedes the logistical patient flow, resulting in delays in patient turnover and longer waiting lists and waiting times. The increasing demands in face of limited resources, puts hospitals under great pressure to improve the efficiency of internal operations, without sacrificing quality of care. Complex systems, like health care, are best organized first by their purposes. In the case of health care the definition of this purpose must be seen through the eyes of the informed patient: "They give me exactly the help I want (and need) exactly when I want (and need) it." Since there is evidence that within health care there is often an underuse, overuse or misuse of care, health care systems should be reinvented to foster innovation and improve the delivery of care, in order to reach optimal health care. This health care is: *Safe, Effective, Patient-centered, Timely, Efficient* and *Equitable*. Appropriate care not only concerns medical procedures, but also the setting in which that care is provided. Appropriate hospital care can be seen as the match between the patient's clinical characteristics, the services required for this care and the setting in which this care is provided. Reducing inappropriate hospital stay (IHS) can reduce costs and increase efficiency, while maintaining the quality of care. But consequently the question arises: "How to measure IHS?" and "What interventions to reduce IHS are needed?". Therefore, the central objective of this thesis was formulated as: "Is the patients' stay in an acute care hospital appropriate and how can it be measured in a valid and reliable way?"

Chapter 2

Two concepts of appropriateness have to be explained: appropriateness of care and the appropriateness of the setting in which that care is provided. The appropriateness of care is related to effectiveness and means that the expected benefits to a patient outweigh the expected harms to that patient. Hereby the procedure is labeled as "necessary" if it must -for reasons of ethics and medical necessity- be offered to the patient. The appropriateness of the setting in which care is provided is related to cost-effectiveness. This type of appropriateness is determined by whether the patient's clinical characteristics, and the services required for his or her care, match the setting in which the care is provided. When appropriateness of setting is considered, it is assumed that the services are appropriate and are provided in a technically correct way. An inappropriate setting (i.e. inappropriate hospital utilization) can be defined as utilization that is not suitable to the patient's medical need. There are two types of inappropriate utilization. Overutilization is care that is of no benefit to the patient or care that could be provided in a less costly setting. Underutilization is care that is not sufficient to meet the patient's medical need. Good health care should resonate with professional's values, but also convey a patient focus and brings in the idea of quality methods also reducing waste and increasing efficiency. A definition of quality, which many professionals have found to work best, is the three-dimensional definition of a patient, professional and management quality:

- Patient quality is what patients say they want
- Professional quality is what professionals think patients need (outcome and process)
- Management quality is using the fewest resources to give patients what they want and need, without waste, errors or delay and within policy and legal regulations

Two other concepts are important; cost containment and quality assurance. The most desirable situation is where quality improvement and cost containment meet, reducing quality waste. If quality improvement goes together with a rise in costs, the question remains if quality improvement can be justified by an increase in costs. So cost-benefit analyses are indicated But another important question remains: which degree of cost reduction does not yield an unacceptable loss of quality!?

Chapter 3

Several factors affect hospital stay. The patient's clinical condition is a very important factor, but not the only one. Several other factors affect (the length and appropriateness of) hospital stay. It is important to distinguish between demand factors (i.e. the need for care) and supply factors (i.e. the provision of the care). If supply factors predominate, methods of practice and managerial constraints to reduce length of might be indicated. Supply factors are closely related to the setting of care and consequently the appropriateness of care. Since this thesis focuses on the setting of care (supply factors), the demand factors are only discussed briefly in this chapter. Supply factors have influence on how long a patient stays in a hospital. Bed supply seems to have the strongest associations with hospital stay. Literature shows that if there are facilities, they will be used. This may lead to overuse and this overuse may lead to misuse as it may harm the patient. Therefore, the patient should only stay in the hospital as long (i.e. short) as medically required.

Chapter 4

A literature review was performed, focusing on the validity and reliability of the Appropriateness Evaluation Protocol (AEP) together with possibilities for intervention in order to use this tool to assess the necessity of hospital stay at the University Hospital of Maastricht. Also the first results of pilot studies with a Dutch version of the Adult-Medical AEP (days of stay) are reported here. Face, content, and convergent validity, and reliability (in terms of overall or specific agreement and by kappa) was assessed. Literature review revealed limitations in the AEP as a general and truly valid and reliable instrument for assessing the necessity of hospital stay. In applying a Dutch version, we encountered similar difficulties. Based on literature review and own findings, we concluded that the validity and reliability of the different versions of the AEP were at that time not yet up to standard. Regarding the results of the interventions thus far, we recommended additional improvements to both the instrument and the review conditions.

Chapter 5

The adult-medical AEP was modified into a valid and reliable instrument for use in the Dutch health care system. The IHS was assessed in a cross-sectional survey using a modified, Dutch version of the Appropriateness Evaluation Protocol (DAEP). The results showed that over 20 % of the hospital stay was inappropriate. Half of the inappropriate hospital stay (45.1%) was due to (internal) hospital procedures. The DAEP proved to be valid ($\kappa = 0.76$; 95% confidence interval (95% CI): 0.68 - 0.84), reliable ($\kappa = 0.84$; 95% CI: 0.75 - 0.93) and easy to use. A substantial proportion of hospital stay was found to be inappropriate, due to hospital procedures and the inability to refer patients to other care facilities or care providers. The DAEP can be used for monitoring the appropriate hospital stay and in detecting possible causes of inappropriate stay. Analysis of the causes of inappropriate hospital stay provided useful data for improvement actions.

Chapter 6

Extended day care (EDC) is a one-day admission spending one night in hospital. Many EDC patients do not need hospital care over night, so probably they could be transferred to a day surgery setting, resulting in decreased costs and increased efficiency. So, the appropriate length of extended day care (ALED) and a possible transfer to day surgery was assessed. ALED was defined as the time between the start of the surgical procedure and the final moment appropriate hospital care was provided. About 80% of the patients could possibly have been treated in day surgery. The other patients could not be transferred, because a prolonged ALED. With the implementation of new policies on admission to and discharge from the hospital and the use of altered types of operation room scheduling or patient logistics the transfer of most EDC patients to day surgery would be possible.

Chapter 7

Traditionally, venous thromboembolism was treated in a hospital setting. Nowadays, low molecular weight heparin preparations allow most deep venous thrombosis (DVT) patients to benefit from home therapy. Chapter 7 evaluates if the previous treatment of deep venous thrombosis in a hospital setting was appropriate in the context of modern opinion, using the DAEP. If so, the DAEP could be used to assess the appropriateness of the present hospital stay of other patient groups. So, a retrospective research of patients treated during 1995 - 1998 for DVT or pulmonary embolism (PE) (before implementation of ambulatory treatment) was conducted, assessing the appropriateness of the patient's stay using the DAEP. Only 27.1% of the treatment for DVT was found to be appropriate in a hospital setting and related to specific hospital care. The inappropriate stay was mostly related to delays in diagnostic and discharge procedures. Of the patients with PE, 50.2 % needed hospital stay. This proportion was statistically significantly higher than in DVT patients (p: < .001). The extent of the DVT was not related to the length of bed rest prescribed. The DAEP was able to identify inappropriate hospital stay in the past within DVT patient. Further exploration for the potential of the DAEP to identify patient groups who possibly could be treated at home is warranted.

Chapter 8

The reasons for IHS and possible predictors of IHS were identified and assessed. The reasons for IHS were analyzed in a cross-sectional survey at two surgical, one gynecologic and one obstetric ward. Results indicate that more than 20% of the hospital stay was inappropriate. The reasons for IHS were statistically significantly related to the patients' age, the availability of home care and specialism. In a predictive model, only the specialism proved to be a predictor of IHS. Most of the IHS occurred during the first days of hospital stay and the days before the patient's discharge. A substantial proportion of hospital stay was found to be inappropriate, due to hospital procedures and the inability to refer patients to other care facilities or care providers. Analysis of the causes of IHS provided useful data for improvement actions. Efficient use of hospital resources should be promoted by reducing the delay in interventions and discharge procedures.

Chapter 9

The reduction of hospital beds, the ageing of the population and the increased demand for hospital admissions requires the provision of the right care in the right setting. Since hospital stay should be as short and as appropriate as possible and previous studies showed a large proportion of the stay to be inappropriate, often related to delays in hospital procedures, the objective was to decrease IHS related to delays in diagnostic procedures and to hospital discharge within the department of Internal Medicine. Additionally, control charts were used to monitor the processes of hospital discharge and diagnostics and to differentiate between normal and abnormal variance. To reduce the delay in diagnostic procedures 'slots' (i.e. reserved time for diagnostic procedures) were set up. To reduce the delay in hospital discharge an 'admission & discharge team' was introduced. The IHS related to both delays in hospital discharge and diagnostic procedures decreased by 3.4%. However, only the actions to improve the process of hospital discharge were significantly successful. P-charts showed the variation of this process to remain within the control limits. The IHS related to the unavailability of other health care facilities increased by 6.1%. Specific hospital procedures have been improved. However, the impact of these improvement actions was undone by the increase of IHS caused by the unavailability of other health care facilities.

Chapter 10

Appropriate hospital stay should be: effective, efficient and tailored to the patients' needs. Within Obstetrics inappropriate hospital stay (IHS) consisted mostly of delays in hospital discharge. The specific goals of chapter 10 were: reducing IHS by fine-tuning the patient logistics; increasing the efficiency and providing a more comforting surrounding. New discharge policies using strict discharge criteria were implemented. Thereby, the mothers could leave the hospital in an earlier stage and use an external family accommodation, near the hospital. The total IHS decreased from 13.3 to 7.2 %. The delay in discharge procedures halved. P-charts showed a decreasing fluctuation in the IHS, indicating the current process to become more stable. A significant reduction of IHS by the implementation of innovative hospital discharge policies was found, indicating a higher efficiency and accessibility of hospital services.

Chapter 11: Lessons learned

The core business of health care is to provide the right care at the right time. Combining quality and efficiency should be the second core-business in health care, so that, given a certain budget, the best possible care is rendered. To do so, a systematic approach of planning, implementation, control and (re-)action is required. People may hold different views about inappropriate health care delivery, but as a matter of fact, health care that does not benefit the patient should be avoided. And the health care that is needed should not be provided in an inappropriate setting. An inappropriate setting means that care could be provided in an alternative setting (usually on an outpatient basis or at home) at a lower cost. However, the verb "could" should be emphasized; the required care may not be available in an alternative setting. In this, the patient's interest (and preferences) should prevail. But, the question remains if the aim should be a reduction of IHS per se (i.e. quality & efficiency improvement) or that a reduced IHS should be put against the means that are needed to reach the goals (i.e. cost - benefit analysis). The ultimate goal of a 'lean production' (zero IHS) may not always be the best option. Although we are able to detect, to classify and to improve IHS, there is still a long way to go to reach the level of minimal or 'zero IHS' on one hand a an optimal health care on the other hand as defined by the Institute of Medicine (*Safe, Effective, Patient-centered, Timely, Efficient & Equitable*). Even if we might never reach that level of IHS, it is important to bear this goal in mind. Only so, we can continuously improve the efficiency and ultimately the quality of health care services. But, the pros and cons have to be weighted. Therefore additional research is needed on the general implementation of measurement tools like the DAEP and research on how processes within a hospital can be improved. Here the use of statistical process control (SPC) can be helpful. But in order to perform time series analysis, continuous and frequent measurements of IHS have to be implemented. We proved the DAEP valid and reliable to assess the appropriateness of hospital stay, but since there are large differences in the proportion of IHS between countries, bench marking with these countries can be useful, in order to assess if the way of measuring IHS is the same, so the results can be compared. As final remark; Considering the strains on health care budgets, and although the proportion of IHS is low in relation to other countries, one quarter of inappropriate output within the Dutch health care is hardly affordable.