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Medically Inappropriate Inpatient Care in West Germany

Rüdiger Klar[1], Udo Müller[2], Jürgen Schulte Mönting[1]

[1]Universität Freiburg, Institut für Medizinische Biometrie und Medizinische Informatik, Universität Freiburg
[2]Infratest Gesundheitsforschung, München

In the West German acute hospitals a rather high but unknown extent of medically unnecessary hospital utilization was assumed for many years. Especially in the elderly population of patients with often non insured nursing home care but insured acute hospital stay the appropriateness of the length of stay in the hospital was in doubt. So in 1987 the West German Government granted a study about the inappropriateness of hospitalization of elderly patients [1,2]. The study was continued for patients of all classes of age in the following years. The evaluations had to be seen in the framework of the 1988 legislation for the Health Reform Act (Gesundheitsreformgesetz) in the Federal Republic of Germany with a special background of: cost containment in inpatient care, planning of non hospital aftercare, estimations for a potential attendance allowance, assessment of quality of inpatient care, improving of ambulatory care.
Since it was the first time that such an investigation was carried out in Germany no data and methods were directly available. But the experiences of other countries and research groups, eg [3,4] in the field of inappropriate hospital use were very helpful.

Study Design
The objective of the study was the determination of the rate and structure of medically unnecessary hospitalization of patients in acute care hospitals. Usually a prospective design serves quite well the aims of such studies. But the negative impact on the discharge practice due to the knowledge about an ongoing inappropriateness study could not be avoided by blinding; everyone involved in the study can imply from the questions and items asked that he or she will be controlled in his or her discharge behavior and a more or less unintended distortion of the true rate of inappropriateness would be the result. Additionally the plainly recognizable hindrance of a previous prospective study about the reasons of inappropriate hospitalization [5] by some hospital associations spoke against the design. So we performed a retrospective approach.

Sample
Due to the lack of comprehensive hospital statistics and the availability of a special hospitalization survey «Diagnosis-Therapy-Index» (DTI) of Infratest Gesundheitsforschung we analysed the usefulness of this DTI for our purposes [6]. The DTI data base consists of a problem oriented yearly gathered random sample of medical records, proportionalized and weighted to represent all German acute hospital cases. For our studies the 1986 DTI data base delivered the data of 5577 inpatients (weighted: 5386.5 cases) with the following main items: admission and discharge date, kind and cause of admission, age, sex, type of discharge, insurance status, main diagnosis, additional diagnoses, duration and certainty of diagnosis, diagnosis oriented therapy including dosage of medication etc, therapy recommandation after discharge, severity of care, diagnostic tests and procedures etc. For every DTI case a special form of a problem oriented medical record with all relevant medical items for every day of stay is printed out. The quality of the DTI data was controlled by comparing the distribution of the main variables of the DTI data with those of the previous years as well by comparing the distribution of these variables with several other major medical centers. Because representative inpatient morbidity statistics are lacking in West Germany these controls were limited but none the less no important mistakes or deficiencies were found [6].

Rating Method
Measuring the appropriateness of hospitalization can be performed by using explicit criteria catalogs or implicit criteria in an expert rating [4,7]. Usually explicit criteria are preferred [4] but they must show high validity and reliability and they must be carefully applied preferredly by physicians in a standardized manner. Since there are no proven explicit criteria of appropriateness available in Germany and since a utilization review must be based on fundamentals of medical practice, not on cookbook like directives, our DTI data were structured and reviewed by 6 experienced physicians.
The problem was to find a valid rating method and reliably rating physicians who are well accepted by all relevant parties involved in the German health care system. That was why each of the two most extreme groups of this system, representatives of the insurance

organisations on one hand and of the hospital physicians on the other hand, were asked to nominate three expert physicians. These 6 physicians formed three pairs (2 internal and one surgical) and every pair consisted of one hospital and one insurance physician. The medical records were specialty oriented distributed to the three judging pairs. The rating was conducted by implicit criteria based on common West German diagnostic and therapeutical medical treatment practice regardless of the patients social conditions and the health care surrounding of the hospital. The inappropriateness was rated in medically unjustified days of care (and not in inappropriate admissions because of legal problems in admission habits: in some German states, a hospital physician may reject a patient's hospital admission, in other states every patient has to be admitted). In a pretest this rating method was trained, standardized and the reliability between the different nominations and specialties of the judging physicians was measured (rank correlation coefficients between 0.6 and 0.8). But this results of an independent rating represent only an insufficient reliability. A good quality of rating of inappropriateness could be achieved [1] in a consent rating within the pair for every medical case. In cases of disagreement the pair was advised to use the lower rate of inappropriateness. In this way a very high reliability could be achieved because for only 1.8% of the cases and 2.3% of the patient days no consent rating could be found.

Results

On the basis of the results and experiences of the pretest, the main study of rating the inappropriateness of 5577 inpatient cases was carried out.

The physician raters found an overall proportion of inappropriate patient days of 18.4% (95% confidence interval: 17.8%–19.0%), meaning 2.4 patient days out of 13 days of mean length of stay have been considered inappropriate for all West German inpatients, see first column in Figure 1. Forty-one percent of all patients (95% confidence interval: 39.3%–43.0%) spent at least one medically unnecessary day in the hospital. Figure 1 shows also a significant positive correlation between the patient's age and the length of stay but a small negative correlation between the inappropriateness rates in the last three classes of the patient's age.

Inappropriate use decreased significantly (chi square = 48, $p < 0.0001$) with increasing size of the hospital from 23.7% days of care in small hospitals with less than 200 beds to 11.4% in large hospitals with 600 and more beds as well as the length of stay decreased in a similiar way from 14.3 days in small to 10.9 days in large hospitals (see Table 1). The inappropriate days per patient in the last column of Table 1 varied in the same manner from 3.38 days out of 14.3 days of length of stay in small hospitals to 1.24 days in the large houses.

Tab. 1. Inappropriate days of care rated in a sample of 5343 inpatients with 69 386 days of care and the size of the hospital

size of hospital (beds)	days of care	length of stay (days)	in-appr. days	rate of inappr. days (%)	in-appr. days per pat.
< 200	12 871	14.3	3 051	23.7	3.38
200–399	23 359	13.3	4 576	19.6	2.61
400–599	18 493	13.7	3 484	18.8	2.59
≥ 600	14 663	10.9	1 669	11.4	1.24
over all	69 386	13.0	12 780	18.4	2.39

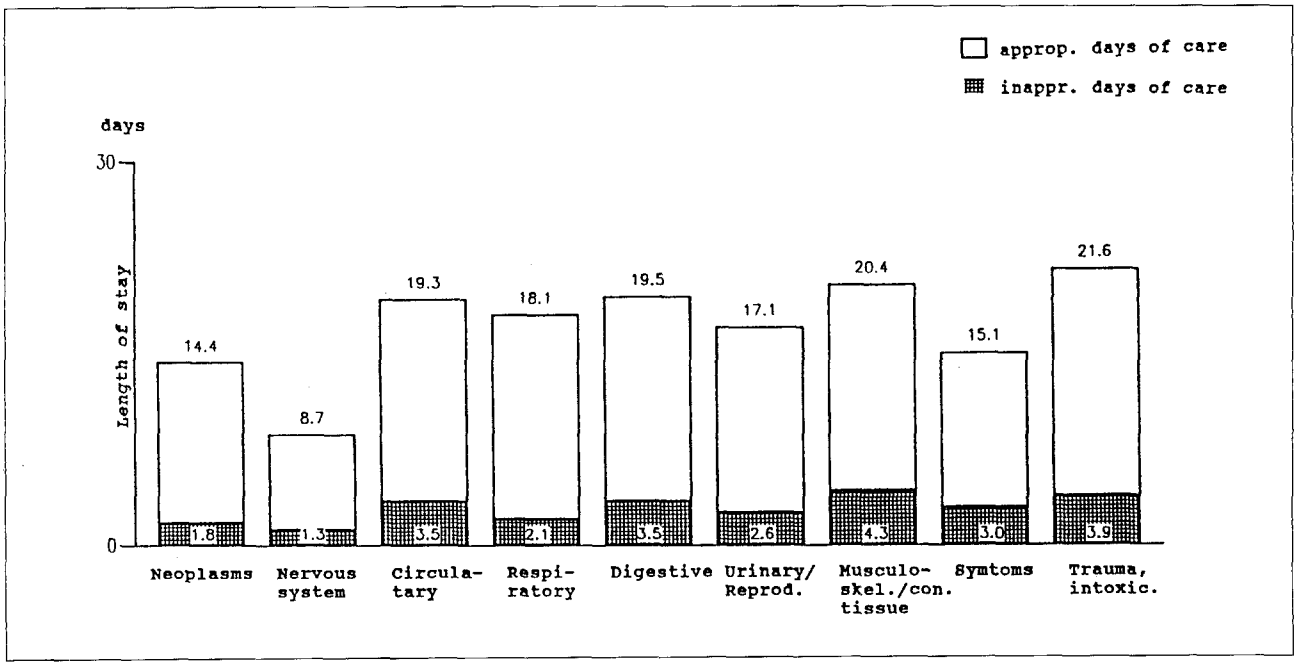

Fig. 1. Length of stay separated in appropriate and inappropriate days of care and depending on the patient's age

Overall male patients stay 0.7 days longer in the hospital than female patients but for both sexes the same amount of 2.4 inappropriate days was rated. But females aged 60 and over show with 3.3 inappropriate days of care significantly higher unnecessary utilization than elderly males with only 2.4 unnecessary days.

The rate of inappropriate patient days were in internal medicine 16.9%, in surgical specialties 25.3% and in other specialties 13.2% for patients of all classes of age. Only for the elderlies (60 and over) the inverse effect was found: the surgical patients had a higher rate of inappropriate days (18.2%) than the internal patients (16.6%).

Figure 2 represents the rates of inappropriate days of care for the younger patients and the elderlies (60 years and over) in the most frequently treated main diagnostic categories of the ICD-9. Low rates of inappropriateness were found for neoplasms and young patients with respiratory diseases and the highest rates for the younger patients with orthopedic diseases (37.7%) and injuries (29.3%). The main diagnostic category with the most days of care are the diseases of the circulatory system (18.1% of all beds are occupied by these patients) and they show a normal rate of inappropriate days of 18.3%. Within this category the cerebrovascular diseases (ICD-9 No 430–438) have the highest rate of inappropriateness (24.1%) and especially the older patients are suffering from these diseases. On the level of the three digit ICD-9 the highest rates of inappropriate days of care were found for younger patients treated for peripheral enthesopathies (ICD-9 No 726) with 56.5% and for unspecified disorders of back (ICD-9 No 724) with 42%.

Nearly every second inpatient was operated and the length of stay for operated patients was not significantly longer than for not operated. But for operated patients only 15.5% inappropriate days of care were rated in contrast to 21.3% for not surgically treated patients. The not operated patients show a continuing decrease in their rate of inappropriateness with increasing age (25.7% for the younger than 20 years to 19.3% to the older than 70).

About 10% of the inappropriate days of care occurred at the begin and 90% at the end of the patient's stay. Discharges to home show a rate of inappropriateness of 18.7% and to nursing homes or rehabilitation clinics of 24.8%.

Discussion

The first remark concerns the often doubted feasibility of the study. In spite of all different opinions and interests a consentaneous rating of inappropriateness between hospital and insurance expert physicians was possible and yields results consistent with other studies eg [3,4]. These similar studies carried out in the USA show a 12%–37% variability of inappropriate days of care compared to an overall rate of 18.4% in our study. The German council of public health experts [8] assumed an even higher proportion of inappropriate hospital use and the rating method underestimates this rate in case of a dissent. But of course in the opinion of other parties this rate is too high, the methods of the study are criticized and a prospective inspection of hospitals and inpatients was proposed [9]. But this approach was not feasible [5] and will not yield undistorted results as mentioned above.

In addition to the inappropriate days of care some US studies [4] regarded also the inappropriate admissions and readmissions which we could not analyze with our data material.

Like in our observation the US studies also did not show a significant influence of the inappropriateness

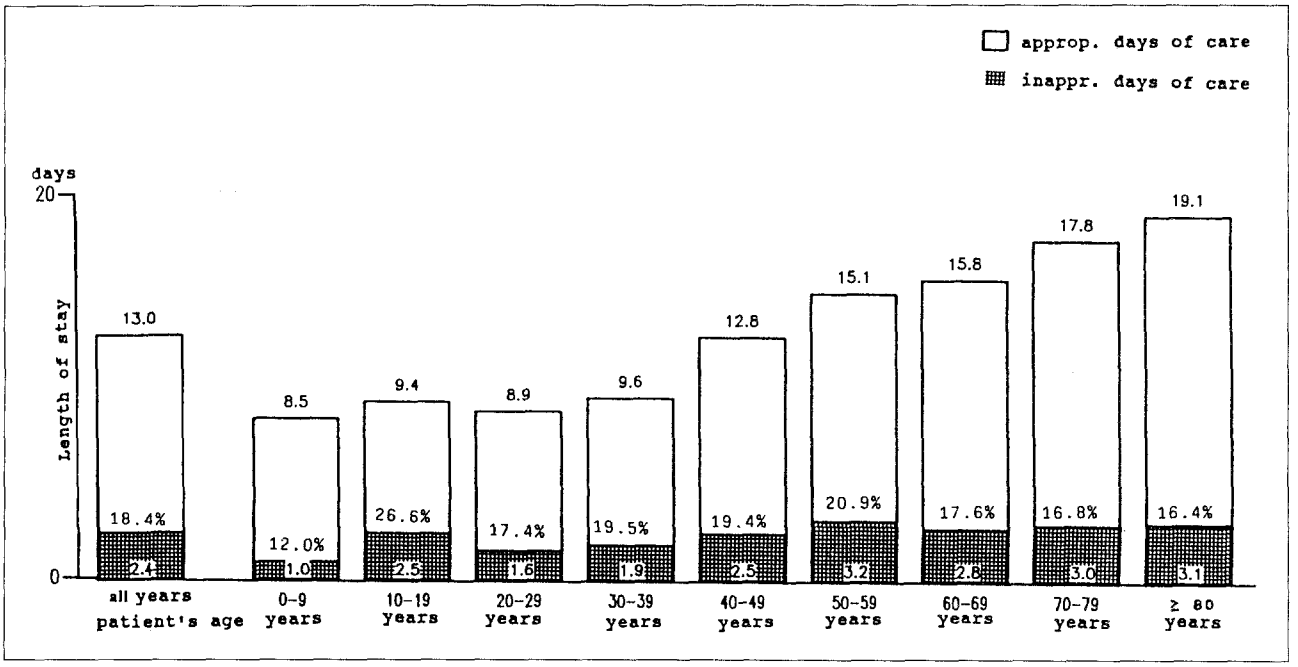

Fig. 2. Inappropriate and appropriate days of care for main diagnostic categories (ICD-9 classes)

rate by age or sex. The inverse influence of the size of the hospital on this rate is also well known in the USA [3]. Interestingly the very high rate of inappropriateness for young orthopedic patients found in our study compared to an US study [10] which shows the highest rate of medically inappropriate hospital use in the pediatric population of orthopedic services. In all classes of age the diseases and disorders of the musculoskeletal and connective tissue and trauma have relatively high rates in the US studies [3,4] as well as in our investigation.

Prorated to all 461 300 West German acute hospital beds and to a total of 144.5 million days of care, 85000 beds and 26.6 million days of care are affected by inappropriate use. Of course these «unnecessary» beds cannot be cancelled without comprehensive improvements in inpatient care and expecially in post-hospital-care (nursing-home-care, home-care etc). But the rate of 18.4% inappropriate days of care is so large that it is necessary to be considered in the discussion of the reform of the German health care system.

Summary

The extent of medically unnecessary hospital utilization in West German acute hospitals was measured by a representative study. A random sample of medical records was reviewed and assessed according to appropriateness by specially experienced physicians. This rating method was trained, standardized and evaluated. The study yields a mean length of stay of 13 days with 2.4 days (18.4%) of inappropriate use. Further analyses concern the influence of diagnoses, age, sex, hospital size etc. Prorated to all 461 300 West German acute hospital beds, 85 000 beds or 26.6 million patient days per year are affected by inappropriate use.

Résumé

Occupation inadéquate de lits d'hôpitaux en Allemagne Fédérale

Ce travail a pour objectif de mesurer le taux d'occupation de lits d'hôpitaux pour des raisons inadéquates en Allemagne Fédérale. Un échantillon aléatoire de dossiers hospitaliers a été évalué par 6 experts médecins pour étudier l'adéquation de l'hospitalisation. La méthode de validation a été standardisée et évaluée. Il a été montré que pour un séjour moyen de 13 jours, il y a 2,4 jours qui sont inadéquats, soit 18%. Pour un nombre total de lits de soins aigus de 461300, 85000 lits sont concernés, soit 26,6 millions de jours d'hospitalisation par année.

Zusammenfassung

Fehlbelegung in bundesdeutschen Akutkrankenhäusern

In einer repräsentativen Studie wurde das Ausmass von Fehlbelegungen als medizinisch unangebrachte Pflegetage in westdeutschen Akutkrankenhäusern gemessen. In einer randomisierten Stichprobe von Krankengeschichten wurden von sechs ärztlichen Sachverständigen die Fehlbelegungstage eingeschätzt. Dieses Beurteilungsverfahren wurde trainiert, standardisiert und in seiner Güte bewertet. Die anschliessend durchgeführte Hauptstudie zeigte bei einer mittleren Liegedauer von 13 Tagen 2,4 Fehlbelegungstage (18,4%). Die Struktur der Fehlbelegungen wurden bezüglich Diagnosen, Geschlecht, Alter, Krankenhausgrösse usw untersucht. Hochgerechnet auf alle 461 300 westdeutschen Akutkrankenhausbetten sind 85 000 Betten oder 26,6 Mio Pflegetage pro Jahr von dieser Fehlbelegung betroffen.

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Address for Correspondence:

Prof Dr Rüdiger Klar
Abteilung Medizinische Informatik
Universitätsklinikum Freiburg
Stefan-Meier-Strasse 26
D-7800 Freiburg i.Br.