

How to improve satisfaction with hospital stay of severely injured patients

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Abstract

Background In the context of medical quality assurance, patient satisfaction with medical and organisational aspects of health care service is considered to be a relevant outcome of patient surveys after a stay in hospital. Within quality research, it is assumed that assessments of patient satisfaction represent a direct measure of the quality of health care received. Furthermore, there is evidence that satisfied patients demonstrate higher levels of compliance for the course of their treatment and that the probability of successful treatment completion thus considerably increases. The present analysis aims to identify determinants of satisfaction of seriously injured patients with regard to their acute hospitalisation.

Materials and methods One hundred twenty-one seriously injured survivors of work-related or traffic-related accidents treated in two hospitals in Cologne during the years 1996 to 2001 were sent a survey questionnaire. In addition to socio-demographic details, the survey covered the subjective evaluation of organisational and structural aspects of the acute hospitalisation and the psychosocial care provided by the medical staff.

Results Employing the “tailored design method”, a response rate of 74.4% ($n=90$) was obtained. Three highly significant factors influencing the satisfaction of seriously injured patients were identified by means of logistic regression: (1) patients’ perception of being involved in treatment, (2) patients’ feeling of being neglected by physicians and (3) patients’ perception of trust in physicians. **Conclusions** In the present study, the perceived quality of psychosocial care proved to have a significant effect on patients’ satisfaction with their hospital stay. Results of the current analysis thus indicate that psychosocial aspects of physician–patient interaction are of considerable importance in the medical care of seriously injured patients. Although this study is mainly based on subjective patient reported outcome, there is evidence that the subjective view of a patient is relevant in many aspects of medical treatment and outcome. These results already gave the motivation to develop a prospective interventional study with a training programme of communication skills to improve subjective and objective outcome parameters of severely injured patients.

Keywords Patient satisfaction · Severely injured patients · Psychosocial care · Quality assurance

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Introduction

Patient satisfaction regarding the subjective perception of medical care has become a pivotal outcome within quality management [1]. Knowledge concerning the satisfaction of patients with respect to their stay in hospital can supply valuable hints, which can help to uncover potential deficiencies in patient care [2, 3]. Patient satisfaction can be seen to represent a direct measure of the quality of care

received [4]. Moreover, it is well-known that satisfied patients show better compliance to their treatment [5–8]. But patient satisfaction not only constitutes a means for improving compliance but must further be understood as an indicator for quality in itself and an additional objective to be pursued in health care [9, 10]. The increasing political and economical pressure on hospitals to assess the quality of medical care will lead sooner or later to the establishment of patient satisfaction surveys as a common quality management tool [11, 12].

Methodological and theoretical deficits in measuring patient satisfaction

Over the course of the past few decades, various instruments have been developed for the measurement of satisfaction founded on diverse theoretical ‘satisfaction models’ [3, 13–15]. Many of these instruments fail to adequately meet the methodological requirements of reliability and validity [16, 17]. For example, Ross et al. were able to demonstrate that insufficient reliability poses a serious problem in the measurement of satisfaction [14]. Regarding the theoretical concept of “satisfaction”, dissension among researchers remains rife [18]. A wide variety of concepts of patient satisfaction have been developed based on various theoretical models [19]. *Social comparison theory* postulates that a patient is satisfied when he/she is doing equally as well or even better than other patients. In this model, it is primarily downward comparisons, which result in increased satisfaction. *Adaptation theory* assumes a connection between the current and past experiences of a patient. Within the framework of a past–present comparison, new experiences are evaluated on the basis of previous experiences and potentially adapted. The approach of *competence theory* focuses on the patient’s successful coping with external requirements for being responsible for his/her satisfaction. The *discrepancy model* describes satisfaction as a result of the difference between the subjective level of aspiration and perception of the current situation. This approach is also to be found in the concept of *customer satisfaction* originating from the business sector. Satisfaction or dissatisfaction in this model is the result of an individual process of comparison in which the consumer compares his/her expectations regarding particular provider services (target state) with those services actually provided (actual state). Beyond these models, studies exist which rather critically appraise the evidence supporting the discrepancy model when it comes to explain patient satisfaction [8, 15].

All in all it seems to be very important to get familiar with patients’ expectations concerning different dimensions of the hospital stay to be able to deal with them in an appropriate manner [7, 18, 20, 21]. In this analysis, we used the discrepancy model, which indicates that satisfaction is a

result of the difference between the subjective level of expectation and perception of the current situation.

Research question of the current investigation

Patient surveys have come to be viewed as an indispensable instrument of quality assurance in both inpatient and outpatient domains. In the framework of surveys, patients are given the opportunity to judge the strengths and weaknesses of the medical care provided and to articulate their subjective experiences and needs [22]. It is of particular relevance that hospital-specific and patient-specific factors will be detected, which not only increase the satisfaction of patients, but also influence dissatisfaction with regards to the hospital [23]. The aim of the current analysis is to identify those factors, which have an effect upon both the satisfaction and the dissatisfaction of seriously injured patients in terms of their acute stay in hospital. This aim is especially important considering that there have been to date few empirical studies investigating the determinants of satisfaction within this particular group of severely injured patients compared with for example oncological or psychiatric patients. Due to the fact that these patients mostly stay in hospital for an extended period of time, i.e. on average approximately 30 days [24] and also due to the frequently intensive medical and nursing care, it can be assumed that these patients are able to recall details of their treatment in hospital very well. This study focuses primarily on patients who were hurt by car, motorbike and work-related accidents and excludes victims of crime or suicidal attempts. Though it might be a difference in terms of satisfaction and psychological condition, whether a patient was hurt by crime or a traffic accident, there is yet no evidence that the satisfaction of patients hurt by cars is different from patients hurt by motorbike or work-related accidents.

Determinants of patient satisfaction

To date, the following determinants of patient satisfaction have been investigated in national and international studies:

Socio-demographic and socio-economic variables A relationship between patient’s *sex* and his/her total satisfaction with their stay in hospital has been shown in some studies [25, 26]. Results have demonstrated that women clearly set higher standards than men and hence prove more difficult to be pleased [27]. Evidence for the *age* of a patient as a possible determinant of satisfaction regarding a stay in hospital has been provided by numerous studies [28, 29] with older patients yielding generally higher satisfaction values than younger patients [17, 30, 31]. A solid partnership is evidently an important predictor of subjective

well-being and satisfaction, moreover, individuals with a partner have a statistically longer life expectancy [32–34]. Some studies have indicated that patients from low *social classes*, i.e. low level education and income [35] are more easily satisfied than individuals with higher socio-economic status [36–39].

Social desirability Social scientific explanations for frequently observed extremely high satisfaction ratings, sometimes reaching more than 80% [40, 41], include the phenomena of *social desirability*. Reduced demands during hospital stay, the tendency to excuse, together with feelings of gratitude can also lead to positively biased responses subsequent to discharge [42] and should therefore, where possible, be controlled for in satisfaction surveys.

Length of time since discharge and length of stay in hospital Most health-related events can be more objectively appraised given a certain *time since discharge* [42, 43]. This effect can in part be explained by decreasing social desirability and increasing objective distance to the hospitalisation [19]. An explanation for a possible relationship between *length of hospitalisation* and patient satisfaction includes the claim that shorter hospital stays provide less opportunity for problems to occur, which could lead to dissatisfaction [39].

Facilities and organisational characteristics of the hospital Due to the fact that patients are often not in a position to adequately assess the quality of medical–technical equipments and facilities, those *hospital facilities* generally referred to as hotel services frequently build the focus in patient surveys [19]. Such facilities are for example the quality of room furnishings, size of room, quality of meals and the possibility of watching television in patients’ rooms. Factors such as “room furnishings”, “food” and “drink” tended to have only little influence on patients’ satisfaction with regards to their hospital stay [44–46].

Quality of psychosocial care provided by medical staff There is evidence that the nature of interaction between patient and physician has a considerable impact on patient satisfaction [47, 48], compliance [49, 50] and treatment success [51, 52]. It is also well-known that informational deficits can result in lower compliance, subjectively worse mental states with increased stress susceptibility, higher complication rates and greater use of pain relief medication [53].

Active involvement of the patient in the treatment and decision process Numerous investigations have shown that the *active involvement of patients in the treatment and decision process* positively influences their convalescence and increases their satisfaction regarding the treatment

received [48, 54, 55]. The impact of patient involvement is recognised and embodied in the scientific concept referred to as “shared decision-making” [56, 57].

Subjective treatment success Donabedian [58] includes treatment success as a central outcome variable. Evidence of a relationship between patient satisfaction and subjective ratings of treatment success has been provided by some studies [59, 60].

Pain, physical and social limitation Independent of subjective ratings as to whether treatment has been successful or not, functional parameters such as *pain* and *physical limitation*, possibly connected to *social and familial consequences*, are also known to be significant determinants of patient satisfaction [61–63].

Materials and methods

Survey design

The current cross-sectional study is based on a questionnaire, which was sent by mail and therefore has a retrospective design. The survey was carried out in 2002 using the “tailored design method” developed by Dillman [64], which promises to increase significantly the rate of return.

Sample

Within a controlled, randomised and prospective study entitled “Quality of Life and the Effect of Psychotherapeutic Interventions on Rehabilitation Success of Patients with Traumatic Brain Injury and Multiple Trauma” (supported by a DFG grant no. PF-407-1/6), all patients receiving acute inpatient treatment between July 5, 1996 and July 31, 2001 were eligible for the study. Inclusion criteria were defined as follows: (1) seriously injured patients predominantly hurt by car, motorbike and work-related accidents with at least two injuries, which together reach a total degree of severity of AIS >6: e.g. AIS-Thorax=4 and AIS-Extremity=3 yields a total degree of severity of AIS=7, (2) patients aged between 18 and 75 years and (3) mentally orientated. Exclusion criteria were as follows: (1) too severe cranial injury (AIS >3 and coma >24 h), (2) attempted suicide, (3) victims of violent crimes, (4) previous mental disorder, (5) inadequate German language skills (subjective judgment of the psychotherapists) and (6) refusal to participate in the study.

The neuropsychological tests included a short form of Horn’s Performance Test System (Leistungsprüfsystem,

LPS-K) measuring intellectual performance [65]; Oswald and Roth's Number Connection Test (Zahlen-Verbindungs-Test, ZVT) measuring "cognitive speed performance" [66] and the Trailmaking Test (TMT), measuring the speed of cognitive processing and selective attention [67]. Patients with anomalous values were excluded from analysis.

In the course of the study, 298 seriously injured patients were screened. Of these, 127 failed to fulfil the inclusion criteria ("escape patients"). Forty-one patients were initially randomised and subsequently excluded at a later date ("dropout patients"). One hundred thirty patients were thus included in the randomised study and in turn constitute the sample of the present investigation. From the onset, the postal addresses for 9 of these 130 multiple injured patients could not be provided by the registration office, so that finally a total of 121 patients received the postal (Fig. 1).

Measurement instrument

The Cologne Patient Questionnaire (CPQ) was one of the questionnaires employed as a survey tool [68]. The questionnaire also included socio-demographic characteristics [69] and the German version of the SF-36 [70]. The CPQ was developed and validated in several research projects carried out by the Department of Medical Sociology of the Institute for Occupational and Social Medicine at the University of Cologne and is based on the theoretical concepts of "learning organisation" and "supportive care".

Data input and statistical analysis

Statistical analysis of the results was carried out using the statistical package SPSS (Version 10). To test for significant differences between satisfied and dissatisfied patients, the dependent variable was dichotomised by median split into two groups called "dissatisfied patients" and "satisfied patients".

In examining direct relationships between explanatory variables and the dichotomised dependent variable, dissatisfied and satisfied patients were first tested for significant differences in middle rankings with Mann–Whitney *U* test. In the case of dichotomous variables, such as for example "sex" and "partner", the chi-squared test was applied. Variables proving significant with a *p* value of ≤ 0.05 in this first stage of analysis were later included in logistic regression analyses to investigate the effect of significant independent variables when applied in various combinations. This two-step procedure in carrying out data analysis, i.e. initial use of univariate followed by multivariate analyses, represents a standard procedure in the field of medical statistics [71]. Variables with a proportion of missing values above 25% are excluded from analysis. None of the variables under investigation demonstrated inter-correlations >0.8 [72].

Dependent variable

Due to the customer model, satisfaction is a result of the combination of expectations and the subjective evaluation of a certain service or performance [73]. The dependent variable "satisfaction + expectations" is based on questions about (1) satisfaction (Cronbach's $\alpha=0.92$) and (2) fulfilment of expectations (Cronbach's $\alpha=0.88$) regarding the following 12 dimensions of care provision: (1) non-medical services, e.g. room furnishings and cleanliness, (2) organisation on ward, (3) psychosocial care provided by ward physicians, (4) psychosocial care provided by nursing staff on ward, (5) ward rounds, (6) medical treatment, (7) information, (8) pastoral care, (9) patient involvement, (10) involvement of the doctor who continues the treatment, (11) involvement of relatives and (12) discharge procedure. Answer categories were additionally presented visually using a five-point faces scale [74]. The dependent variable "satisfaction + expectations" was formed by adding the scores for satisfaction and expectations. The values for each answer category of satisfaction were as follows: "satisfied"=5, "somewhat satisfied"=4, "neither dissatisfied nor satisfied"=3, "somewhat dissatisfied"=2 and "dissatisfied"=1. The values for each answer category of expectations were as follows: "much better than expected"=+1, "better than expected"=+0.5, "as expected"=0, "worse than expected"=-0.5 and "much worse than expected"=-1.0. The sum score was performed by adding these scores for individual items and then dividing this sum by the number of items answered. This sum score (with values between 1.0 and 6.0) reflect the expectation-adjusted satisfaction of the patient concerning their acute hospital stay [73, 75] (Fig. 2).

The distribution of the dependent variable is shown in Fig. 3. The frequency of the variable shows a normal distribution, which was also tested by the Kolmogorov–Smirnov Test.

Independent variables

Information regarding *sex*, *age* and *relationship status* was extracted from the socio-demographic section of the survey instrument. The variable *social class* was computed on the basis of patients' statements concerning school education, occupational position and per capita household net income [76], also provided in the socio-demographic section of the survey.

The *total length of acute hospitalisation* (calculated in number of days) was determined by viewing patients' files. The period of time (in days) between discharge from the hospital and September 1, 2002 (reference date) constitutes the *length of time since hospital discharge*.

Injury severity was rated by means of the Abbreviated Injury Scale (AIS), defined and continuously updated by the

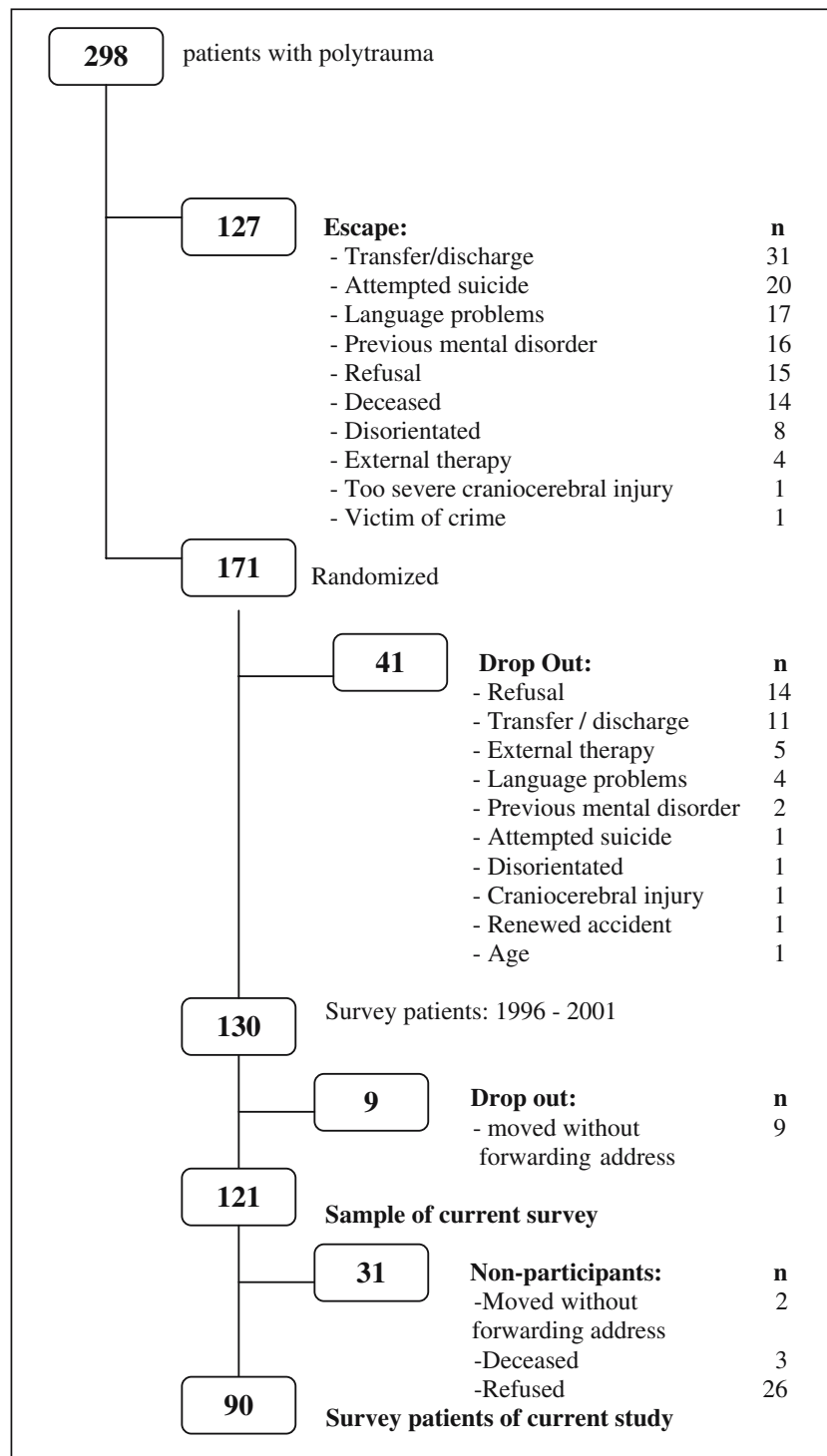
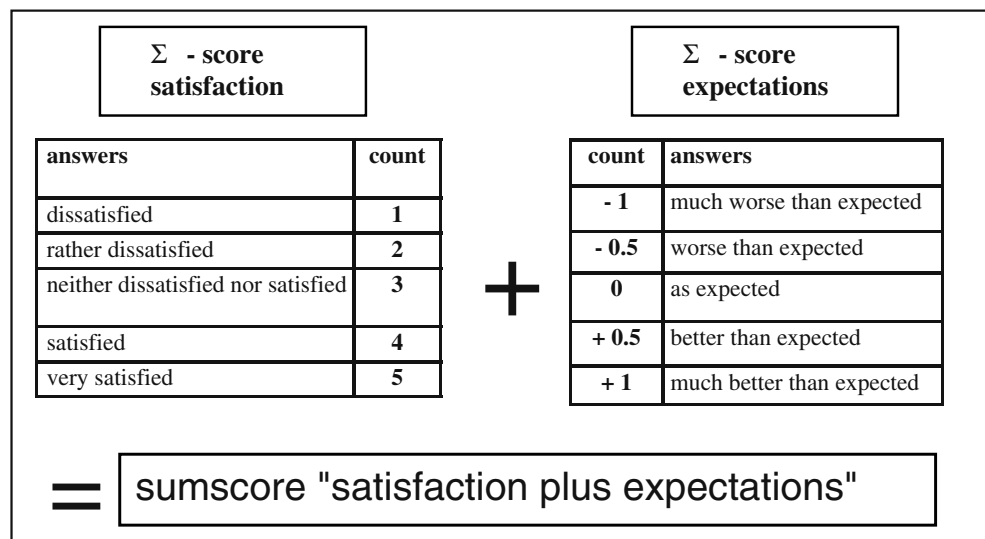


Fig. 1 Flow chart describing the progress of patients through randomised trial: reasons of escape, dropout and no participation and number of survey patients of the current study

“Association for the Advancement of Automotive Medicine” (AAAM) [77]. Values attained using this scale formed the basis for calculating the Injury Severity Score (ISS). For six regions of the body (head/neck, face, thorax, abdomen, extremities and soft tissues), the most severe injuries are coded with a score ranging between 1 and 6. For the

calculation of the ISS, scores for the three most seriously affected body regions are squared and then summated. An individual injury with 6 points automatically implies a maximum ISS of 75 points [78]. An ISS score ≥ 16 characterises a seriously injured patient (“major trauma”) and is linked with a prognosis of mortality of more than 10% [79].

Fig. 2 Calculation of dependent variable “satisfaction + expectations” by adding up scores of CPQ scale satisfaction and CPQ scale expectations for each patient on an individual level [73, 75]



To date, studies have shown that severe injuries to the extremities can especially pose a considerable strain for patients due to the fact that such injuries more often lead to permanent disability or restriction [80]. For this reason, the *AIS-extremities score* was included as a variable in the analysis in dichotomised form. An AIS score ≤ 2 was coded as no/minor injury to the extremities and an AIS score ≥ 3 as a serious injury to the extremities.

The SF-36 [70] is a non-illness-specific instrument measuring health-related quality of life. In the present analysis, questions relating to *physical functioning* (ten questions concerning the extent to which the present state of health impairs physical activity, such as walking, climbing stairs, etc.), *social functioning* (two questions concerning the extent to which physical health or emotional problems impair normal social activity) and *pain* (two questions concerning the degree of pain and extent to which pain influences normal work) were integrated from the SF-36 as independent variables.

The variable *gratitude* comprises three items taken from the CPQ survey module of the same name (Cronbach's $\alpha = .75$): (e.g. “you have to be grateful for the helpfulness shown in hospital”). Respondents were able to express their agreement with the statements presented on a four-point Likert scale (ranging from “do not agree at all” to “completely agree”). Each response was awarded a particular score (“do not agree at all”=1 point and “completely agree”=4 points) to facilitate the formation of a total score in subsequent analyses.

The physician/patient and nursing staff/patient interaction modules of the CPQ—“concerning contact with ward physicians” and “concerning contact with nursing staff on ward”—form the basis of the variables *psychosocial care provided by physicians* and *psychosocial care provided by nursing staff*. Scales of the two modules (devotion, trust, harassment, neglect, support) are identical both in terms of

formulation and the order of questions. They can thus be directly compared in the analysis phase. In both modules, patients are offered four response categories carrying scores ranging from 1 point (“do not agree at all”) to 4 points (“completely agree”). In interpreting the results, it is important to note that the scales “neglect” and “harassment” were recoded during statistical analysis, such that high scores reflect low level and low scores reflect high level

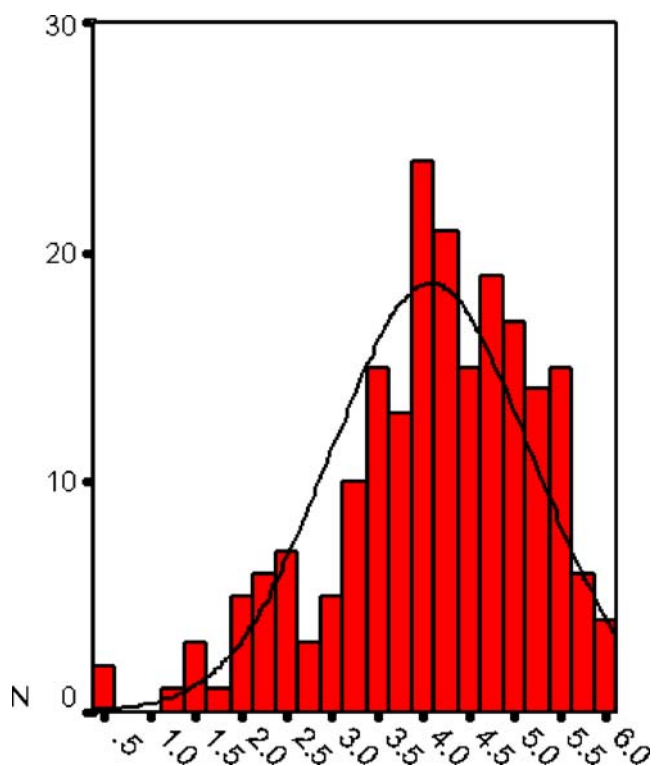


Fig. 3 Distribution of dependent variable “satisfaction + expectations” of study population (range from 0 “dissatisfied and much worse than expected” to 6 “very satisfied and much better than expected”; $n=90$ patients)

Table 1 Comparison of survey participants with dropout population in terms of socio-demographic and hospital stay related characteristics

	Survey participants ($n=90$)	Dropout population ($n=31$)
Males	67 (74.4%)	24 (77.4%)
Females	23 (25.6%)	7 (22.6%)
Age (years)	42.3 (12.9)	40.0 (12.7)
Injury severity score (ISS)	22.9 (9.5)	23.2 (10.0)
Length of time since discharge (months)	45.5 (18.5)	40.5 (12.5)
Length of stay in hospital (days)	51.6 (30.4)	57.6 (40.5)

Values are presented as the mean and SD in the case of continuous variables. *T* test or chi-squared test showed no significant differences.

agreement. The total score for “psychosocial care provided by physicians” is attained by first summing scores from the module “concerning contact with ward physicians” and subsequently dividing this sum by the number of items answered. The total score for the module “concerning contact with nursing staff on ward” is formed in the same way. The respective Cronbach’s alpha values for the various physician/nursing staff scales are provided in parentheses.

The CPQ scale *devotion* ($\alpha=0.87/0.88$) is designed to measure patients’ subjective perceptions regarding the devotion of medical–nursing staff. Empathy, the establishment of a trusting relationship and regular conversations, which also take place outside of ward rounds, lie at the centre of this scale (e.g. “Doctors/nursing staff carried out conversations with me in a very empathic manner”). The CPQ scale *trust* ($\alpha=0.91/0.94$) measures various aspects of a trusting relationship with the attending physicians or

Table 2 Name, label, response categories and descriptive statistics (number, mean, standard deviation, minimum, maximum) for all variables used in the analysis ($n=90$ severely injured patients)

Name	Label/responses	<i>N</i>	Mean	SD	Min	Max
Age	Age at time of survey (in years)	90	42	12.9	22	71
Social class	1=lower class, 2=lower–middle class, 3=middle class, 4=upper–middle class, 5=upper class	79	3.8	1.1	1	5
Length of time since discharge	Interval between discharge and survey (in years)	90	3.7	1.5	0.7	5.9
ISS	Injury severity	90	23.0	9.6	9	50
SF-36 PhysFu	Physical functioning	90	60.8	27.8	5	100
SF-36 Pain	Pain	90	57.6	26.9	12	100
SF-36 SoFu	Social functioning	90	75.3	25.6	12.5	100
Gratitude	Gratitude toward medical staff	90	2.7	0.6	1.3	4.0
Subjective rating of psychosocial care provided by physicians	CPQ modules “devotion”, “trust”, “harassment”, “neglect” and “support”	90	3.2	0.5	1.4	4.0
Subjective rating of psychosocial care provided by nursing staff	CPQ modules “devotion”, “trust”, “harassment”, “neglect” and “support”	90	3.1	0.6	1.1	4.0
Subjective rating of information behaviour of physicians	CPQ module informational uncertainty	90	1.7	0.6	1.0	4.0
Co-therapy	Total score for CPQ scale “co-therapy”	86	2.8	0.6	1.0	4.0
Subjective rating of quality of hospital structure	Total score for CPQ modules “basic infrastructure”, “cleanliness”, “room furnishings”, “organisational chaos”	83	2.8	0.3	2.0	3.9
Subjective rating of treatment success	Total score for CPQ module “subjective treatment success”	82	3.3	0.7	1.0	4.0
Satisfaction	CPQ index “satisfaction”	90	3.9	0.9	1.0	5.0
Expectations	CPQ index “fulfilment of expectations”	90	3.3	0.8	1.6	4.9
Sex	Male/female	90	M	67	F	23
Partnership	Without partner/with partner	90	Without	34	With	56
Extremities	AIS <3/AIS ≥3	90	<3	33	≥3	57
Psychotherapy	1=yes/2=no	90	Yes	47	No	43
				(52.2)		(47.8)

Table 3 Univariate comparison of potential predictors for belonging to the group of dissatisfied or to the group of satisfied patients using Mann–Whitney *U* test in terms of metric variables or chi-squared test in terms of dichotomous variables

	Dissatisfied patients (n=43)	Satisfied patients (n=47)	<i>p</i> value
Sex ^a —male	28 (41.8)	39 (58.2)	0.052
Sex ^a —female	15 (65.2)	08 (34.8)	
Without partner ^a	18 (52.9)	16 (47.1)	0.445
With partner ^a	25 (44.6)	31 (55.4)	
AIS extremities ^a <3	13 (39.4)	20 (60.6)	0.226
AIS extremities ^a ≥3	30 (52.6)	27 (47.4)	
Psychotherapy ^a —yes	19 (44.2)	24 (55.8)	0.541
Psychotherapy ^a —no	24 (51.1)	23 (48.9)	
Age	43.4	47.5	0.457
Social class	47.3	43.9	0.533
Length of stay	43.4	47.5	0.457
Time since discharge	50.4	41.0	0.088
Injury severity score (ISS)	38.2	52.1	0.011
SF-36 physical functioning	43.2	47.7	0.414
SF-36 pain	46.0	45.0	0.842
SF-36 social functioning	41.5	49.2	0.147
Gratitude	39.7	51.0	0.039
Psychosocial care provided by physicians	25.3	64.0	0.000
Psychosocial care provided by nursing staff	31.9	58.0	0.000
Information behaviour of physicians	59.2	33.0	0.000
Co-therapy	26.4	63.0	0.000
Quality of hospital structure	32.3	57.6	0.000
Subjective evaluation of treatment success	35.0	55.0	0.000

“Satisfied patients” were defined as those with an expectation-adjusted satisfaction score of four or above.

^aIn terms of the chi-squared test.

nursing staff, for example general trust and trust in the professional competence of medical staff (e.g. “I completely trusted my doctors/the nursing staff”). The CPQ scale *harassment* ($\alpha=0.91/0.93$) is designed to assess the “most extreme form of a straining relationship” [68] (e.g. “I had the feeling that the doctors/nursing staff personally disliked me”). The CPQ scale *neglect* ($\alpha=0.81/0.79$) is also a measure of straining relationships, though one which aims to cover the domain between neutral and extremely straining relationships (harassment) [68] (e.g. “The doctors/nursing staff had too little time for me”). The CPQ scale *support* ($\alpha=0.90/0.90$) measures patients’ subjective perceptions of the support provided by medical–nursing staff (e.g. “The doctors/nursing staff supported me in such a way that made it easier for me to deal with my illness”).

Table 4 Significant results of initial logistic regression with “satisfaction + expectations” as dependent variable (0=dissatisfied, 1=satisfied), model was controlled for ISS, gratitude, psychosocial care

	Co-efficient	Standard error	<i>p</i> value
Psychosocial care provided by physicians	4.61	1.30	0.000
Co-therapy	2.96	1.10	0.007
Constant	−22.86	4.86	0.000
Variance explained (Nagelkerke’s pseudo- R^2)	0.764		

The variable *information behaviour of physicians* is formed by summing the scores of the five items from the CPQ survey module “informational uncertainty” (Cronbach’s $\alpha=0.89$) (e.g. “Ward doctors left me in the dark by only giving vague information”). Respondents were given the opportunity to express their agreement with or rejection of the statements presented and in doing so, to take a stand on the (subjectively perceived) information behaviour of physicians. Each response category was measured with a score (1 to 4 points) in the context of survey evaluation. The higher the quality of physicians’ information behaviour as rated by patients, the higher the respective total score for the given variable.

The variable *co-therapy* (Cronbach’s $\alpha=0.80$) comprises four items (e.g. “The doctors wanted me to be actively

by nursing staff, information behaviour of physicians, quality of hospital structure and subjective evaluation of treatment success

Table 5 Comparison of predicted vs observed classification to satisfied or dissatisfied patient group and rates of correct assignment on the basis of initial logistic regression with “satisfaction + expectations” as dependent variable (0=dissatisfied, 1=satisfied)

Observed	Predicted		Correctly rated (in %)
	Satisfaction	Dissatisfaction	
Satisfaction	41	6	87.2
Dissatisfaction	7	36	83.7
Total percentage			85.6

involved in the treatment process”) and measures the degree of the activation of the patient to be actively involved in treatment. The four response categories provided (ranging from “do not agree at all” to “completely agree”) were transformed into scores (1 to 4 points) in the later phase of analysis. The more patients felt that they had been included in the therapy carried out by physicians, the higher the corresponding total score for this variable.

The CPQ survey module *subjective treatment success* forms the basis of the variable “subjective ratings of treatment success”. Respondents were able to express their agreement with or rejection of the statements presented on a four-point Likert scale, and in doing so, voice their subjective perceptions regarding treatment success. Summating the scores of this module and subsequently dividing this sum by two results in the total score for this variable. The CPQ survey module “subjective treatment success” (Cronbach’s $\alpha=0.91$) comprises the following items: (1) “I believe that the treatment, which was carried out has made an impact”, (2) “I feel better because of the treatment” and (3) “The treatment has increased my quality of life”.

The variable *structure* is based on the following four CPQ survey modules: “basic infrastructure” ($\alpha=0.70$, e.g. “Access to the television was...”), “cleanliness” ($\alpha=0.83$, e.g. “The cleanliness of the sanitary facilities was...”), “room furnishings” ($\alpha=0.84$, e.g. “the furnishment of my hospital room was...”) and “organisational chaos” ($\alpha=0.89$, e.g. “I had the impression that there were problems in the communication of arrangements between the ward and examination areas”). The evaluative questions were accompanied by Likert scales, which provided patients with five possible response categories, each of which was later measured with a score ranging

from 1 (“poor”) to 4 (good”). Items requiring an expression of agreement on behalf of the patient also provided five response categories, which were later assigned a score ranging from 4 (“do not agree at all”) to 1 (“completely agree”). The response category “cannot say” was in all cases coded as a missing value. Summating the individual scores and dividing this sum by the number of items answered results in the total score for “structure”.

A part of the patients of this study received a psychotherapeutic intervention performed by psychologists during the stay in hospital. The dichotomous variable *therapy* indicates whether a patient belongs in the group of therapies or not (therapy received: yes/no).

Results

Of 121 patients, which were sent a written questionnaire, 2 had moved to another house without leaving a forwarding address, 3 were deceased and 26 failed to return their survey resulting in a total of 90 surveys, which were returned and subjected to statistical evaluation. This corresponds to a rate of return of 74.4% with respect to the sample and 77.6% with respect to the adjusted sample. Statistical significant differences between the population of survey participants ($n=90$) and non-participants ($n=31$) were not found (Table 1).

Table 2 provides a descriptive summary of the relevant variables for the survey participants.

Patients rated the dependent variable “satisfaction + expectations” on average with a score of 4.0. The lowest score was 0.83 and the highest score 5.92 with a standard

Table 6 Significant results of second logistic regression with “satisfaction + expectations” as dependent variable (0=dissatisfied, 1=satisfied), model was controlled for devotion of physicians, support from physicians and harassment of physicians

	Co-efficient	Standard error	p value
Co-therapy	2.96	0.687	0.000
Neglect by physicians	2.02	0.702	0.004
Trust in physicians	1.782	0.674	0.008
Constant	-3.501	0.773	0.000
Variance explained (Nagelkerke’s pseudo- R^2)	0.694		

Table 7 Comparison of predicted vs observed classification to satisfied or dissatisfied patient group and rates of correct assignment on the basis of second logistic regression with “satisfaction + expectations” as dependent variable (0=dissatisfied, 1=satisfied)

Observed	Predicted		Correctly rated (in %)
	Satisfaction	Dissatisfaction	
Satisfaction	40	7	85.1
Dissatisfaction	8	35	81.4
Total percentage			83.3

deviation of 1.20. The cutoff point was set at the median with ≤ 4.0 and divides the total population of survey participants ($n=90$) into a group of “dissatisfied” ($n=43$) and “satisfied” ($n=47$) patients. The group of dissatisfied patients was assigned the value 1 and satisfied patients the value 0.

To investigate the direct relationships between the explanatory variables and the dependent variable, differences between “dissatisfied” and “satisfied” patients were tested for significance (Table 3).

In the course of analysis, two logistic regressions were applied to examine the effect of individual independent variables in various combinations. In the following, the results of these consecutive logistic regressions are presented. In the first model, variable selection was guided by the results of the previously performed univariate analysis, i.e. all variables with a p value ≤ 0.05 were included in the analysis. Consequently, the following eight explanatory variables were selected: “ISS” (injury severity), “gratitude”, “psychosocial care provided by physicians”, “psychosocial care provided by nursing staff”, “information behaviour of physicians”, “co-therapy”, “quality of hospital structure” and “subjective evaluation of treatment success”. The significant variables included in the model are listed in the order in which they were included in the regression equation. Results for the first logistic regression together with the accompanying classification model are presented in Tables 4 and 5.

The variables “psychosocial care provided by physicians” and “co-therapy” significantly contributed to the predictive power of this model. The model accounted for 76% of variance (Nagelkerke’s pseudo- R^2). In a second logistic regression, the variable “subjective rating of psychosocial care provided by physicians” was replaced by the five underlying physician/patient interaction modules (CPQ scales) “devotion of physicians”, “support from physicians”, “trust in physicians”, “neglect by physicians” and “harassment by physicians”. The aim was to ascertain which of the five aspects of physician/patient interaction has the greatest effect on patient satisfaction or dissatisfaction regarding their acute stay in hospital. Accordingly, the following six variables were included in the second logistic regression: “devotion of physicians”, “support from physicians”, “trust in physicians”, “neglect by physicians”,

“harassment by physicians” and “co-therapy”. Results of this second logistic regression together with the accompanying classification model are presented in Tables 6 and 7.

The variables “co-therapy”, “neglect by physicians” and “trust in physicians” significantly contributed to the predictive power of this model. The model accounted for 69% of variance (Nagelkerke’s pseudo- R^2), i.e. the three determinants identified explain approximately two thirds of the satisfaction of seriously injured patients regarding their hospital stay.

Discussion

The starting point of the current study was the question which patient-specific or hospital-specific factors affect the satisfaction of seriously injured patients. In the context of investigating the literature, it was initially possible to identify several determinants, which had proved significant in empirical research studies. The problems surrounding the reliability and validity of previous surveys of patient satisfaction were overcome by the application of a survey (CPQ) proving to fulfil these scientific quality criteria. It can furthermore be argued that due to the customer model, satisfaction is a result of the combination of expectations concerning a certain service or performance and satisfaction thereof. Thus, operationalising “satisfaction + expectations” by performing an additional index covering several relevant dimensions appears to be necessary. Using questions from the CPQ, the SF-36 and an additional socio-demographic questionnaire section, it was possible to cover all 18 conjectured determinants and subsequently include these in statistical analyses. The combined use of univariate and multivariate analyses finally led to the development of a model, which was able to identify three highly significant predictors of satisfaction in seriously injured patients. These predictors consisted of the patients’ perception of being involved in treatment, patients’ feeling of being neglected by physicians and patients’ perception of trust in physicians.

The subjective perception of the quality of psychosocial care provided by physicians was for the most part determined by the manner in which conversations were

held and the staff approached patients, and emotional and social aspects. The worse the surveyed patients felt that they had been psychosocially cared for, the greater the probability that they belonged to the group of dissatisfied patients. In particular those patients who felt that they had been neglected by their attending physicians and felt distrusting towards them were more frequently found in the dissatisfied group. A lack of time, information and willingness to listen to problems or contribute to solutions proved decisive. Evidence for the specific importance of psychosocial care on the part of medical staff has also been provided by other social–epidemiological and health care–epidemiological investigations. It has for example been shown that inter-personal contacts in the context of coping with illness have a considerably positive impact on successful recovery [52]. There is also empirical evidence that interactional relationships in hospitals have a verifiable affect on patients' compliance [49], health and satisfaction [47, 48, 50, 81–83]. Patient surveys investigating expectations on the physician and his/her treatment indicate that in addition to the professional qualification of the physician, most patients also consider the following three dimensions of medical practice to be of fundamental importance: (1) socio-emotional skills, for example being a good listener, demonstrating patience, having a friendly and empathic charisma; (2) adequate time for conversations and examinations and (3) extensive and comprehensible information concerning the causes and course of an illness, and the risks and chances of treatments [84]. Trust is an important aspect of a successful and satisfying physician–patient relationship. Confidence has extensive consequences for the quality of physician–patient relationship and further treatment process. Several studies have shown the negative effects of an insufficient relationship leading to a lack in compliance, worse subjective and objective evaluation of treatment outcome, increased consumption of drugs and decreased patient satisfaction. Thus, it becomes clear that medical support of severely injured patients requires not only professional surgical skills, but also a trustful physician–patient relationship, e.g. in terms of social support.

In many cases, a failure to fulfil these expectations results in dissatisfaction with the attending physician [30, 85]. In the present study, it was further demonstrated that seriously injured patients' subjective perception of being involved in the therapy had a significant effect on satisfaction with their acute hospital stay. Patients who had the impression that they were able to fundamentally influence treatment methods and therefore felt actively involved in the treatment were significantly more satisfied than patients receiving conventional care. This result also concurs with the findings of other studies, which show that patients who are incorporated as therapeutic partners develop higher self esteem, utilise the health care services

in a more sensible manner and generally reach better biomedical results at lower expenses (efficiency) [5, 7, 86, 87]. Moreover, there are numerous indications that patients who are actively involved in planning and carrying out their therapy, prove all in all more satisfied with the medical care received than those receiving traditional care [54, 55, 57, 88]. These findings are also embodied in the “shared decision-making model” [56], which foresees patients no longer simply comprehending the clinical recommendations of the physician, but additionally having the opportunity to decide between various appropriate treatment options. In summary, it is assumed that these procedures increase the legitimacy, acceptance and social tolerance of medical services [86].

The proportion of variance accounted for in this model amounts to 67%, i.e. approximately one third of patient satisfaction variance cannot be explained by the variables applied in this analysis. Future research should particularly include general health-related patient attitudes, such as control beliefs [89] or sense of coherence [90]. Furthermore, information relating to sex, age, experience and attitude of the physician, which could possibly contribute to explaining the remaining variance, is lacking in the present analysis. Further limitations of the study include the small number of cases and the extended period of time between acute hospitalisation and survey, which can lead to distortions in the form of selection bias or memory effects. A more extensive effect of length of time since discharge was statistically controlled for by including the corresponding variables. Besides incorporating a greater number of seriously injured patients and clinics, future studies should also include prospective interventions to check the internal validity of the presented results. In addition, attention should be paid to the length of time between treatment and survey; however, there are no standard recommendations regarding the optimal interval.

The current study also lacks data concerning the objective functional outcome and the degree of patients' disability (these are only partially operationalised by items targeting patients' self-reports of their subjective state of health) and regarding possible consequences in their social and societal environment (retirement, unemployment, financial loss, divorce or loss of partner).

Patient's evaluation of medical treatment outcomes are frequently viewed to be less important than outcomes measured objectively on the basis of medical parameters. But subjective assessments can become very real in their consequences: For instance, whether a patient is compliant to medical treatment or not depends very much on his view of medical treatment and outcome. This is what Thomas and Thomas already formulated in their theorem in 1928: “Very often it is the wide discrepancy between the situation as it seems to others and the situation as it seems

to the individual that brings about the overt behavior difficulty. If men define situations as real, they are it in their consequences” [91].

Moreover, it is conceivable that the personality structure of dissatisfied patients plays a central role (e.g. looking for someone to blame for one’s own fate). This should be taken into account in future studies, for example by integrating the health-related control beliefs [89] mentioned above. Of further interest is the question as to why the remaining explanatory factors described in the current investigation did not turn out to be relevant. Among other explanations, this result could be due to the nature of the present sample, which was relatively homogenous with respect to age, social status and injury severity, though not in terms of sex distribution.

Conclusions and practical implications

The satisfaction of seriously injured patients regarding their acute hospital stay is essentially determined by factors relating to communication between the attending physician and the patient [5, 47, 48, 92, 93]. The satisfaction promoting effects of a trustful physician–patient relationship should be used particularly with regards to severely injured patients. Their traumas often lead to durable physical and psychological disturbances, which have substantial influence on the vocational and social life of the patient. Above all, aspects such as the physician’s responsiveness to patients’ problems, a comprehensible explanation of both the diagnosis and treatment and the amount of time available for such encounters play a vital role. In the context of medical education and further training, well-founded instruction in and coaching of psychosocial skills, particularly focusing on the aspect of physician–patient interaction, could, also in the field of trauma surgery, aid to optimise patient care and increase patient satisfaction [94]. The findings of the current study also give cause to suspect that a future increase in documental and administrative workload within trauma surgical practice could lead to a reduction in the quality of psychosocial care provided and thus result in a decline in patient satisfaction.

The results already gave the motivation to develop a prospective interventional study with a training programme of communication skills for surgeons to improve subjective and objective outcome parameters of severely injured patients called “Advanced Trauma Psychosocial Support (ATPS)”.

References

1. Cleary PD (1998) Satisfaction may not suffice! *Int J Technol Assess Health Care* 14(1):35–37
2. Mirvis DM (1998) Patient satisfaction: can patients evaluate the quality of health care? *Tenn Med* 91:277–279
3. Urden LD (2002) Patient satisfaction measurement: current issues and implications. *Lippincotts Case Manag* 7:194–200
4. van Campen C, Sixma H, Friele RD, Kersters JJ, Peters L (1995) Quality of care and patient satisfaction: a review of measuring instruments. *Med Care Res Rev* 52(1):109–133
5. Brown JB, Boles M, Mullooly JP, Levinson W (1999) Effect of clinician communication skills training on patient satisfaction. A randomized, controlled trial. *Ann Intern Med* 7:822–829
6. Gross DA, Zyzanski SJ, Borawski EA, Cebul RD, Stange KC (1998) Patient satisfaction with time spent with their physician. *J Fam Pract* 47 (2):133–137
7. Rao J, Weinberger M, Kroenke K (2000) Visit-specific expectations and patient-centered outcomes: a literature review. *Arch Fam Med* 9:1148–1155
8. Williams B (1994) Patient satisfaction, a valid concept? *Soc Sci Med* 38:509–516
9. Eickstädt U, Mager G (2003) In: Lauterbach KW, Schrappe M (eds) *Gesundheitsökonomie, Qualitätsmanagement und Evidence-based Medicine*. Schattauer-Verlag, Stuttgart
10. Hall JA, Doman MC (1988) What patients like about their medical care and how often they are asked: a metaanalysis of the satisfaction literature. *Soc Sci Med* 27:935–939
11. Trojan A, Nickel S, Oppolzer A (1999) Qualität des Krankenhauses. Die Sicht der MitarbeiterInnen und PatientInnen im Vergleich. In: Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (eds) *Prävention arbeitsbedingter Gesundheitsgefahren und Erkrankungen in Pflegeberufen*. Wirtschaftsverlag NW, Berlin
12. Klotz T, Zumbe R, Velmans R, Engelmann U (1996) Die Bestimmung der Patientenzufriedenheit als Teil des Qualitätsmanagements im Krankenhaus. *Dtsch Med Wochenschr* 121:889–895
13. Carr-Hill R (1992) The measurement of patient satisfaction. *J Public Health Med* 14(3):236–249
14. Ross CK, Steward CA, Sinacore JM (1995) A comparative study of seven measures of patient satisfaction. *Med Care* 33(4):392–406
15. Sitzia J, Wood N (1997) Patient satisfaction: a review of issues and concepts. *Soc Sci Med* 45(12):1829–1843
16. Sitzia J (1999) How valid and reliable are patient satisfaction data? An analysis of 195 studies. *Int J Qual Health Care* 11:319–328
17. Dür W, Grossmann W, Schmied H (2000) Patientenzufriedenheit und Patientenerwartung im Krankenhaus-Statistische Analysen als Hilfsmittel im Benchmarking. In: Bullinger M, Siegrist J, Ravens-Sieberer U (eds) *Lebensqualitätsforschung aus medizinpsychologischer und-soziologischer Perspektive*. Hogrefe-Verlag, Göttingen
18. Thompson AG, Sunol R (1995) Expectations as determinants of patient satisfaction: concepts, theory and evidence. *Int J Qual Health Care* 7(2):127–141
19. Neugebauer B, Porst R, (2001) Patientenzufriedenheit. Ein Literaturbericht. ZUMA-Methodenbericht, ZUMA, Mannheim
20. Kravitz RL, Callahan EJ (1997) Assessing patients’ expectations in ambulatory medical practice. Does the measurement approach make a difference? *J Gen Intern Med* 12(1):67–72
21. Nettleman MD (1998) Patient satisfaction—what’s new? *Clin Perform Qual Health Care* 6(1):33–37
22. Trojan A, Satzinger W (2001) Bilanz: Was ist zu beachten, damit Patientenbefragungen die Patientenversorgung verbessern helfen? In: Satzinger W, Trojan A, Kellermann-Mühlhoff P (eds) *Patientenbefragungen in Krankenhäusern. Konzepte, Methoden, Erfahrungen*. Asgard-Verlag, Sankt Augustin
23. Raspe H, Voigt S, Herlyn K, Feldmeier U, Meier-Rebentisch K (1996) Patienten-Zufriedenheit in der medizinischen Rehabilitation—ein sinnvoller Outcome-Indikator? *Gesundheitswesen* 58: 372–378

24. Schwermann T, Grotz M, Blanke M, Ruchholtz S, Lefering R, Graf von der Schulenburg JM, Krettek C, Pape HC, AG-Polytrauma der DGU (2004) Evaluation der Kosten von polytraumatisierten Patienten insbesondere aus der Perspektive des Akutkrankenhauses. *Unfallchirurg* 107:563–574
25. Schmittiel J (2000) Effect of physician and patient gender concordance on patient satisfaction and preventive care practices. *J Gen Intern Med* 15(11):761–769
26. Hall JA, Irish JT, Roter DL, Ehrlich CM, Miller LH (1994) Satisfaction, gender, and communication in medical visits. *Med Care* 32(12):1216–1231
27. Ehnfors M, Smedby B (1993) Patient satisfaction surveys subsequent to hospital care: problems of sampling, non-response and other losses. *Qual Assur Health Care* 5(1):19–32
28. Vieder JN (2002) Physician–patient interaction: what do elders want? *J Am Osteopath Assoc* 102(2):73–78
29. Owens DJ, Batchelor C (1996) Patient satisfaction and the elderly. *Soc Sci Med* 42(11):1483–1491
30. Frederickson LG (1995) Exploring information-exchange in consultation: the patients' view of performance and outcomes. *Patient Educ Couns* 25:237–246
31. Olandt H, Krentz H (1998) Patient satisfaction—subjective quality assessment by patients and success factor for clinics. *Gesundheitswesen* 60(12):721–728
32. Stroebe W, Stroebe M (1994) Partnerschaft, Familie und Wohlbefinden. In: Abele A, Becker P (eds) *Wohlbefinden. Theorie-Empirie-Diagnostik*. 2. Aufl. Juventa-Verlag, Weinheim
33. Berkman LF, Syme SL (1979) Social networks, host resistance, and mortality: a nine-year follow-up study of Alameda County residents. *Am J Epidemiol* 109(2):186–204
34. Gärtner K (1990) Sterblichkeit nach dem Familienstand. *Z Bevölkwiss* 1:53–65
35. Carlson MJ, Blustein J, Fiorentino N, Prestianni F (2000) Socioeconomic status and dissatisfaction among HMO enrollees. *Med Care* 38(5):508–516
36. Hall JA, Dorman MC (1990) Patient sociodemographic characteristics as predictors of satisfaction with medical care: a meta-analysis. *Soc Sci Med* 30(7):811–818
37. Cleary PD, Edgman-Levitan S, Roberts M, Moloney TW, McMullan W, Walker JD, Delbanco TL (1991) Patients evaluate their hospital care: a national survey. *Health Aff* 10(4):254–267
38. Charles C, Gauld M, Chambers L, O'Brien B, Haynes RB (1994) How was your hospital stay? Patients' reports about their care in Canadian hospitals. *CMAJ* 150(11):1813–1822
39. Wüthrich-Schneider E (2000) Patientenzufriedenheit-Wie verstehen? *Schweiz Ärztzeitg* 81:1046–1048
40. Raspe H, Weber U, Voigt S, Kosinski A, Petras H (1997) Qualitätssicherung durch Patientenbefragungen in der medizinischen Rehabilitation: Wahrnehmungen und Bewertungen von Rehastrukturen und-prozessen (Rehabilitandenzufriedenheit“). *Rehabilitation* (Stuttg) 36:XXXI–XLII
41. Spießl H, Cording C, Klein HE (1997) Qualitätssicherung durch Patientenbefragungen. *ZaeFQ* 91:761–765
42. Blum K (1998) Patientenzufriedenheit bei ambulanten Operationen. Einflussfaktoren der Patientenzufriedenheit und Qualitätsmanagement im Krankenhaus. Juventa-Verlag, Weinheim
43. Geyer S (1999) Macht Unglück krank? Die Konsequenzen belastender Lebensereignisse. Juventa-Verlag, Weinheim
44. Baberg HT, Jager D, Bojara W, Lemke B, von Dryander S (2001) Expectations and satisfaction of patients during inpatient treatment. *Gesundheitswesen* 63(5):297–301
45. Cassier-Woidasky AK (1998) What do people expect from their hospital? Results of a visitor survey at open house in a general hospital. *Pflege* 11(5):248–254
46. Siegrist K, Schlebusch P, Trenckmann U (2002) Let us ask the consumer. *Psychiatr Prax* 29(4):201–206
47. Bertakis KD, Callahan EJ, Helms LJ, Azari R, Robbins JA (1998) Physician practice styles and patient outcomes: differences between family practice and general internal medicine. *Med Care* 36:879–891
48. Flocke A, Miller WL, Crabtree BF (2002) Relationships between physician practice style, patient satisfaction, and attributes of primary care. *J Fam Pract* 51:835–840
49. Stewart M (1984) What is a successful doctor–patient interview? A study of interactions and outcomes. *Soc Sci Med* 19:167–175
50. Fallowfield L, Jenkins V, Farewell V, Saul J, Duffy A, Eves R (2002) Efficacy of a cancer research UK communication skills training model for oncologists: a randomised controlled trial. *Lancet* 359(9307):650–656
51. Delbanco TL (1992) Enriching the doctor–patient relationship by inviting the patient's perspective. *Ann Intern Med* 116(5):414–418
52. Stewart M, Brown J, Donner A, McWhinney I, Oates J (2000) The impact of patient-centered care on outcomes. *J Fam Pract* 49:796–804
53. Siegrist J (2005) *Medizinische Soziologie*. Urban & Schwarzenberg, München
54. Lerman CE, Brody DS, Caputo GC, Smith DG (1990) Patients' perceived involvement in care scale: relationship to attitudes about illness and medical care. *J Gen Intern Med* 5:29–33
55. Mahler H, Kulik J (1990) Preferences for health care involvement, perceived control and surgical recovery: a prospective study. *Soc Sci Med* 31:743–751
56. Scheibler F, Janßen C, Pfaff H (2003) Shared decision making: ein Überblicksartikel über die internationale Forschungsliteratur. *Soz-Präventivmed* 48:11–23
57. Adams RJ, Smith BJ, Ruffin RE (2001) Impact of the physician's participatory style in asthma outcomes and patient satisfaction. *Ann Allergy Asthma Immunol* 86: 263–271
58. Donabedian A (2003) *An introduction to quality assurance in health care*. Oxford University Press, New York
59. Jackson JL, Chamberlin J, Kroenke K (2001) Predictors of patient satisfaction. *Soc Sci Med* 52(4):609–620
60. Jatulis DE, Budek NI, Legorreta AP (1997) Identifying predictors of satisfaction with access to medical care and quality of care. *Am J Med Qual* 12(1):11–18
61. Anderson JG, Wixson RL, Tsai D (1996) Functional outcome and patient satisfaction in total knee patients over the age 75. *J Arthroplast* 11(7):831–840
62. Jamison RN, Ross MJ, Hoopman P, Griffin F, Levy J, Daly M, Schaffer JL (1997) Assessment of postoperative pain management: patient satisfaction and perceived helpfulness. *Clin J Pain* 13(3):229–236
63. Robertsson O, Dunbar MJ (2001) Patient satisfaction compared with general health and disease-specific questionnaires in knee arthroplasty patients. *J Arthroplast* 16 (4):476–482
64. Dillman DA (2000) *Mail and internet surveys. The tailored design method*. Wiley, New York
65. Horn W (1983) *Leistungsprüfsystem LPS. Handanweisung für die Durchführung, Auswertung und Interpretation* (2. erweiterte und verbesserte Aufl.) Hogrefe-Verlag, Göttingen
66. Oswald WD, Roth E (1978) *Der Zahlenverbindungstest (ZVT)*. Handanweisung. Hogrefe-Verlag, Göttingen
67. Reitan RM (1958) Validity of the trailmaking test as an indication of organic brain damage. *Percept Mot Skills* 8:271–276
68. Pfaff H, Freise D, Mager G, Schrappe M (2003) *Der Kölner Patientenfragebogen (KPF): Entwicklung und Validierung eines Fragebogens zur Erfassung der Einbindung des Patienten als Kotherapeuten*. Asgard-Verlag, Sankt Augustin

69. Ahrens W, Bellach BM, Jöckel KH (1998) Messung soziodemographischer Merkmale in der Epidemiologie. RKI-Schrift 1/98, MMV Medizin-Verlag, München
70. Bullinger M, Kirchberger I (1998) SF-36 Fragebogen zum Gesundheitszustand. Handanweisung. Hogrefe-Verlag, Göttingen
71. Lefering R, Sauerland S (2004) Statistische Analysen. In: Neugebauer E, Mutschler W, Claes L (eds) Von der Idee zur Publikation. Thieme-Verlag, Stuttgart, pp 117–125
72. Katz MH (1999) Multivariable analysis: a practical guide for clinicians. Cambridge University Press, Cambridge
73. Janssen C, Ommen O, Pfaff H (2006) Combining patient satisfaction, fulfilment of expectations and importance—an integrative approach in quality assurance. *Eur J Public Health* 15 (Suppl 1):139–140
74. Kunin T (1955) The construction of a new type of attitude measure. *Pers Psychol* 8:65–77
75. Clausen G, Borchelt M, Janßen C, Loos S, Mull J, Pfaff H (2006) Unterstützende Versorgung und Zufriedenheit geriatrischer Patienten mit der stationären Behandlung—Ergebnisse einer systematischen Patientenbefragung. *Z Gerontol Geriatr* 39:48–56
76. Helmert U, Mielck A, Classen E (1993) Social inequalities in cardiovascular disease risk factors in East- and West-Germany. *Soc Sci Med* 35:1283–1292
77. AAAM (2006) Available online at: <http://www.carcrash.org/>. Cited November 15, 2006
78. Baker SP, O’Neill B, Haddon W Jr, Long WB (1974) The injury severity score: a method for describing patients with multiple injuries and evaluating emergency care. *J Trauma* 14(3):187–196
79. Kanz KG, Linsenmaier U, Pfeifer KJ, Mutschler W (2002) Standardisierte Bewertung von Unfallverletzten: Anforderungen an die bildgebende Diagnostik. *Radiologe* 42(7):515–521
80. Holbrook TL, Anderson JP, Sieber WJ, Browner D, Hoyt DB (1999) Outcome after major trauma: 12-month and 18-month follow-up results from Trauma Recovery Project. *J Trauma* 46:765–771
81. Callahan EJ, Stange KC, Bertakis KD, Zyzanski SJ, Azari R (2003) Does time use in outpatient residency training reflect community practice? *Fam Med* 35(6):423–427
82. Jenkinson C, Coulter A, Bruster S, Richards N, Chandola T (2002) Patients’ experiences and satisfaction with health care: results of a questionnaire study of specific aspects of care. *Qual Saf Health Care* 11(4):335–339
83. Williams S, Weinman J, Dale J (1998) Doctor–patient communication and patient satisfaction: a review. *Fam Pract* 15:480–492
84. Stötzner K (2001) Einbindung von Patienten und ihren Anliegen in die evidenzbasierte Medizin. *ZaeFQ* 95:131–136
85. Edgman-Levitan S, Cleary PD (1996) What information do consumers want and need? *Health Aff* 15(4):42–56
86. Künzi B (2002) Der Patient und die Qualität der ärztlichen Leistung. *Prim Care* 2:125–131
87. Lezzoni L (1994) Risk adjustment for measuring health care outcomes. Health Administration Press, Ann Arbor, Michigan
88. Kaplan SH, Greenfield S, Ware JE (1989) Assessing the effects of physician–patient interactions on the outcomes of chronic disease. *Med Care* 27:110–127
89. Wallston KA, Wallston BS, DeVellis R (1978) Development of the multidimensional health locus of control (MHLC) scales. *Health Educ Monogr* 6:160–170
90. Antonovsky A (1987) Unraveling the mystery of health: how people manage stress and stay well. Jossey-Bass, San Francisco
91. Thomas WI, Thomas DS (1928) The child in America: behavior problems and programs. Knopf, New York
92. Ommen O, Janßen C, Pfaff H (2006) Patientenzufriedenheit. In: Berth H, Balck F, Brähler E (eds) Medizinische Psychologie und Medizinische Soziologie von A bis Z. Göttingen, Hogrefe (im Druck)
93. Roter DL, Stewart M, Putnam SM, Lipkin M, Stiles W (1997) Communication patterns of primary care physicians. *JAMA* 277:350–356
94. Editorial (2004) The soft science of medicine. *Lancet* 363:1247