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Is the length of stay in hospital correlated with patient satisfaction?

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Abstract

Objective. To investigate the correlation between length of stay (LOS) and patient satisfaction on the level of hospital wards. The underlying hypothesis is that good quality of care leads both to shorter LOS and to patients that are more satisfied.

Design. We used standardized LOS and standardized patient satisfaction data from seven specialisms: internal medicine, cardiology, pulmonology, neurology, general surgery, orthopaedic surgery and obstetrics and gynaecology in the period 2003–2010. All LOS data were derived from the National Medical Registration and patient satisfaction scores were measured by a questionnaire covering six aspects of care. The LOS data were standardized for the year of discharge, age, primary diagnosis and procedure. Patient satisfaction data were standardized for the year, age, education and health status.

Setting. One hundred and eighty-eight Dutch hospital wards.

Participants. The patient satisfaction data were gathered by questionnaires returned by 102 815 patients.

Intervention. None.

Main Outcome Measure. Pearson correlations and two-tailed significance. between standardized mean LOS and standardized mean patient satisfaction score.

Results. We found no correlation between LOS and patient satisfaction in six out of seven specialties. We only found significantly higher patient satisfaction scores in pulmonology for some specific items on hospitals wards with a shorter LOS. These items concerned the reception on the ward, the information provided by nurses on admission, the expertise of the nursing staff, the way information was transferred from one person to another and respect for patients' privacy such as in conversations, and during physical examinations.

Conclusions. We found no evidence that hospital wards with a relatively short mean LOS had higher, or lower, patient satisfaction than hospital wards with a relatively long LOS, with the exception of pulmonology.

Keywords: quality measurement, quality management, quality indicators, measurement of quality, patient satisfaction, measurement of quality, benchmarking, measurement of quality, case-mix or risk adjustment, measurement of quality, safety indicators, patient safety, adverse events, patient safety, hospital care, setting of care

Introduction

In the Netherlands, as in many other countries, hospitals have been reducing lengths of stay (LOS) for many years. This reduction reflects the introduction of new medical technologies as well as pressures for cost containment [1–3]. In the Netherlands the average LOS dropped by 5.6 days between 1990 and 2009 [4].

An abundance of literature shows large variations across hospitals in the specific LOS for procedures and diagnoses. After years of reducing average LOS, the case-mix adjusted variation in LOS is still substantial [1]. It seems that this remaining variation reflects the underlying processes in hospitals that cause these differences. Hospitals seem to vary in a variety of factors. For example in waiting times, in effective cooperation and communication between care professionals and in the availability and use, both of clinical pathways and standards [5, 6]. Moreover, the number and severity of adverse events could lead to variations in LOS between hospitals. Treating patients with unqualified staff, who may not

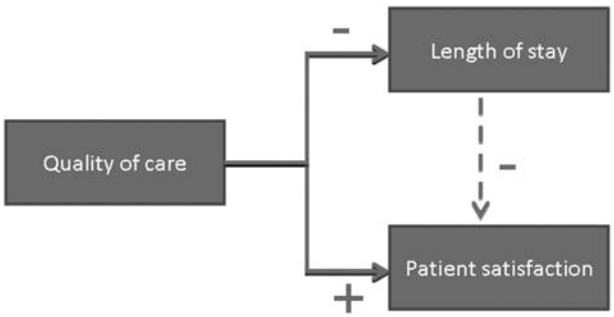

Figure 1 Model of the correlation between Quality of care, Length of stay and patient satisfaction. +, positive correlation. −, negative correlation.

adhere to guidelines, will result in more adverse events, which may lead to a significantly longer LOS [7–19]. So making the best use of the logistics of the care process such as examinations, treatment and communication will reduce waiting times and, as a consequence, the LOS [5, 20]. But, in addition, the prevention of adverse events will also lead to a shorter LOS. As a consequence, we expect a correlation between LOS and quality indicators.

Patient satisfaction is seen as an important indicator that embraces various aspects of the quality of care [21–31]. It is our hypothesis that differences across hospitals in the underlying processes as mentioned above can be identified by measuring differences in patient satisfaction. Good quality of care might lead both to shorter LOS and to patients that are more satisfied [32, 33]. Thus, we expect a negative correlation between LOS and patient satisfaction (see Fig. 1).

There is hardly any research on how patients in general appreciate the actual length of a hospital stay. Some studies have focused on the relationship between LOS and patient satisfaction for a specific diagnosis or treatment. These studies show that a reduced LOS does not adversely affect patient satisfaction [32, 34–37]. Carmel [38] found a significant correlation between patients with a long LOS and their satisfaction with surgical ward nurses. Rosenheck *et al.* also found a positive relationship between LOS and patient satisfaction among psychiatric patients [39]. Other studies showed no clear relationship between LOS and patient satisfaction [21, 40, 41].

There is a lack of research on the hospital ward level within health systems which share the same organizational context. Questions remain such as: 'Do hospital wards with a relatively short LOS have a higher patient satisfaction?' Therefore, the purpose of this paper is to investigate whether we can find evidence for this correlation in an extensive dataset gathered in Dutch hospitals.

Methods

Data

All LOS data were derived from the National Medical Registration (Landelijke Medische Registratie, LMR) which contains data on admissions in general and university hospitals in the Netherlands. This information includes medical data such as diagnoses and surgical procedures as well as data specific to patients, including age and hospital stay. The LMR diagnoses are classified by the ICD-9 CM and procedures by the Dutch Classification System of Procedures. We used the LOS data of 188 hospital wards for which both patient satisfaction data and LOS data were available. We used data from seven specialisms where a reduction in the LOS may have the largest impact on the national number of hospital days [1]. These specialisms are: internal medicine, cardiology, pulmonology, neurology, general surgery, orthopaedic surgery and obstetrics and gynaecology.

We used patient satisfaction data from 188 hospital wards gathered by an independent research organization, Kiwa Prismant, in the period 2003–2010 using the 'Core questionnaire for the assessment of Patient Satisfaction' (COPS) [42, 43]. The COPS is a short core questionnaire to measure patient satisfaction, based on the needs of clinical patients in university hospitals. The questionnaire was developed to compare satisfaction scores between hospitals, and to identify opportunities for improvements in the quality of care. The clinical COPS consists of six dimensions, each dimension is constructed by two, three or four questions: admission procedure (three items), nursing care (two items), medical care (two items), information (four items), autonomy (three items) and discharge and aftercare (three items). Factor analysis showed a good reliability of these dimensions (Cronbach's alpha ranging between 0.80 and 0.88).

Originally COPS was developed in university hospitals [44]. Since 2004, general hospitals too use the COPS as an instrument for measuring patient satisfaction. Most hospital wards participated several times with the COPS, but for this study each hospital ward is only taken into account once. We used the data from the clinical wards, day care data were excluded. See Appendix 1 for the exact content of the COPS.

Data preparation

The LOS and satisfaction scores were based on the actual, and the expected observations for a ward.

The LOS scores have been expressed in the quotients of the mean observed and mean expected LOS for all patients admitted onto the clinical ward in the same year as the year when the patient satisfaction was measured. A ratio >1 indicates that the mean observed LOS was higher than the mean expected LOS. Day care and clinical patients that could have been treated in day care were excluded. The mean expected LOS of the ward was based on expectations for every individual patient, taking into account the following characteristics of the patients:

(i) Year of discharge;
(ii) Age (divided into five classes: 0, 1–14, 15–44, 45–64, 65+ years);
(iii) The primary diagnosis that resulted in the admission, including about 1000 diagnoses classified by the ICD9 in three digits;

(iv) Procedures, classified by the Dutch Classification System of Procedures. The procedures considered depend on the diagnosis of the patient.

The expected LOS of an individual patient concerned the Dutch national mean LOS that was associated with these characteristics [45]. An exception was made for patients with an extreme LOS (100 hospital days or longer), and for patients who died in hospital. For the latter two groups the expected LOS was kept equal to the actual LOS and consequently the ratio of actual LOS to the expected LOS was always 1.

The satisfaction questionnaire contained 16 questions about six aspects of care, see Appendix 1. The answer categories for each question were on an asymmetrical 5-point Likert-type scale ranging from 'unsatisfied', 'somewhat satisfied', 'rather satisfied', 'quite satisfied' to 'very satisfied'.

To calculate the expected score we used all patient satisfaction data gathered by Kiwa Prismant from Dutch general and university hospital wards since 2003. This resulted in a database with 102 815 patients included in one of the seven specialisms mentioned above.

Each patient has an actual score on the sixteen questions of the questionnaire. The expected score per patient was based on the national mean patient satisfaction score and the characteristics that influence patient satisfaction scores [42]:

(i) Year: We used two-year periods, because the number of participating hospital wards would otherwise be too small for some specialisms: 2003–2004, 2005–2006, 2007–2008 and 2009–2010).
(ii) Age: We divided patients into five age groups: younger than 20, 20–39, 40–54, 55–59 and 60 years and older.
(iii) Education. We divided patients into five categories: none, lower, middle, higher and university.
(iv) Health status. We divided patients into five categories: bad, moderate, good, very good and excellent.

As a national mean patient satisfaction score per specialism we used all scores of all patients of all hospitals per 2-year period.

In order to standardize the patient satisfaction scores, we used the ratio of the observed patient satisfaction score and the expected score. A ratio >1 indicates a higher patient satisfaction score than expected. A ratio <1 indicates a lower patient satisfaction score than might be expected, based on the national mean. We calculated the mean standardized patient satisfaction score (per specialism) per hospital ward by adding all scores of all patients of this ward together, divided by the number of patients.

Eventually, this resulted per specialism in a standardized mean patient satisfaction score per ward on each of the 16 questions of the questionnaire.

Analysis

For all 188 hospital wards in this study, we calculated the Pearson correlations and the two-tailed significance between standardized mean LOS and standardized mean patient satisfaction score. Every hospital ward was counted only once and priority was given to the most recent data and the highest response rates.

Results

The LOS data had an overall standard deviation of the quotients of mean observed and mean expected LOS of 0.14. The standard deviation was largest in cardiology (0.16) and smallest in general surgery (0.11); see Table 1. On the 16 items of the COPS the patient satisfaction data had a mean standard deviation ranging from 0.03 to 0.05. The standard deviation was largest in the item is: transfer of information to external professionals in neurology (0.06) and smallest in the item information provided by nurse on admission in general surgery (0.02); see Table 2.

Table 3 shows the Pearson correlation and the two-tailed significance between the standardized mean LOS and the standardized mean patient satisfaction score, on each question of the Core Questionnaire and for each of the seven

Table 1 Median, minimum, maximum and standard deviations of the quotients of mean observed and mean expected LOS[a]

	Median	Minimum	Maximum	Standard deviation
Pulmonology (n=23)	0.93	0.82	1.22	0.12
Obstetrics and gynaecology (n=27)	1.00	0.76	1.26	0.12
Cardiology (n=25)	0.86	0.58	1.24	0.16
General surgery (n=30)	0.99	0.79	1.28	0.11
Internal medicine (n=28)	1.05	0.74	1.29	0.12
Neurology (n=27)	1.01	0.74	1.26	0.12
Orthopaedic surgery (n=28)	0.97	0.80	1.37	0.15
Overall	0.99	0.58	1.37	0.14

[a]The quotients are calculated by dividing the mean observed LOS by the mean expected LOS. Day care and clinical patients that could have been treated in day care were excluded. The mean expected LOS of the ward was based on expectations for every individual patient, taking into account the following characteristics of the patients: Year of discharge, age, primary diagnosis that resulted in the admission and procedure. The procedures considered depend on the diagnosis of the patient. The expected LOS of an individual patient concerned the Dutch national mean LOS that was associated with these characteristics. An exception was made for patients with an extreme LOS (100 hospital days or longer), and for patients who died in hospital. For the latter two groups the expected LOS was kept equal to the actual LOS.

Table 2. Median, minimum, maximum and standard deviations of the quotients of mean observed and mean expected patient satisfaction scores[a,b]

Admission		Nursing care		Medical care		Information		Information		Patient autonomy			Aftercare			
Reception	Information provided	Personal attention	Expertise	Personal attention	Expertise	Clarity by nurses	Clarity by doctors	Transferred	Rapidity	Self-sufficient	Participation in decisions	Privacy respected	Information further treatment	Information passed on	Procedure discharge	
Pulmonology (n=23)																
Median	0.994	0.991	0.998	0.994	0.995	0.999	0.998	1.000	0.990	1.005	0.997	0.997	0.999	1.000	1.002	1.002
Minimum	0.912	0.908	0.937	0.927	0.897	0.892	0.896	0.896	0.904	0.905	0.940	0.927	0.933	0.916	0.881	0.855
Maximum	1.063	1.062	1.072	1.071	1.060	1.072	1.087	1.049	1.060	1.084	1.040	1.043	1.071	1.093	1.071	1.046
Standard deviation	0.029	0.030	0.036	0.033	0.038	0.040	0.036	*0.034*	*0.032*	0.047	0.028	*0.031*	0.034	0.038	0.051	0.045
Obstetrics and gynaecology (n=27)																
Median	1.000	0.991	0.989	0.987	1.013	1.002	0.995	1.000	0.994	1.001	0.992	1.002	0.996	1.009	0.993	0.989
Minimum	0.934	0.917	0.920	0.928	0.882	0.925	0.930	0.866	0.876	0.872	0.939	0.907	0.924	0.897	0.899	0.900
Maximum	1.074	1.068	1.075	1.059	1.073	1.049	1.048	1.064	1.080	1.069	1.041	1.058	1.054	1.067	1.070	1.080
Standard deviation	0.035	0.032	0.041	0.033	0.046	0.033	0.036	0.043	0.047	0.049	*0.027*	0.040	0.038	0.045	0.044	0.044
Cardiology (n=25)																
Median	1.003	0.996	1.001	1.001	1.002	0.999	1.004	1.000	1.003	1.013	1.004	0.994	1.003	1.005	0.992	0.999
Minimum	0.951	0.934	0.923	0.931	0.879	0.907	0.883	0.847	0.877	0.848	0.912	0.867	0.922	0.809	0.879	0.811
Maximum	1.064	1.059	1.060	1.062	1.053	1.051	1.065	1.050	1.050	1.049	1.056	1.049	1.041	1.072	1.085	1.065
Standard deviation	*0.026*	0.031	*0.028*	0.031	*0.034*	*0.030*	0.036	0.037	0.037	0.041	0.027	0.035	*0.027*	0.047	*0.042*	0.046
General surgery (n=30)																
Median	1.000	1.003	0.991	0.987	1.001	0.994	0.987	0.997	0.988	0.997	0.997	1.005	0.997	0.986	0.999	0.990
Minimum	0.924	0.951	0.912	0.936	0.885	0.913	0.932	0.897	0.911	0.927	0.924	0.905	0.924	0.903	0.912	0.900
Maximum	1.048	1.041	1.081	1.095	1.062	1.060	1.068	1.068	1.065	1.084	1.038	1.051	1.041	1.080	1.069	1.096
Standard deviation	0.031	*0.023*	0.033	0.032	0.044	0.036	0.035	0.044	0.041	*0.038*	0.028	0.034	0.035	0.046	0.046	0.048
Internal medicine (n=28)																
Median	0.993	0.993	0.988	0.979	0.985	0.990	0.987	0.980	0.982	0.990	0.985	0.992	0.977	0.984	0.995	1.000
Minimum	0.915	0.901	0.876	0.901	0.890	0.897	0.861	0.902	0.867	0.888	0.917	0.837	0.922	0.834	0.853	1.072
Maximum	1.078	1.075	1.055	1.062	1.057	1.056	1.071	1.068	1.086	1.084	1.075	1.089	1.057	1.084	1.092	0.824
Standard deviation	0.035	**0.038**	**0.042**	0.034	0.043	0.041	**0.048**	0.044	**0.051**	0.051	**0.038**	**0.060**	0.034	**0.057**	0.058	**0.051**
Neurology (n=27)																
Median	1.001	1.002	0.996	0.998	1.003	1.006	1.005	0.994	0.996	1.011	0.994	0.999	1.010	1.005	1.003	1.009
Minimum	0.907	0.933	0.872	0.905	0.864	0.898	0.859	0.809	0.885	0.832	0.939	0.887	0.909	0.868	0.854	0.876
Maximum	1.051	1.061	1.077	1.063	1.062	1.061	1.058	1.094	1.091	1.120	1.070	1.088	1.071	1.137	1.118	1.103
Standard deviation	**0.038**	0.034	0.042	**0.035**	**0.048**	**0.041**	0.048	**0.053**	0.050	**0.060**	0.031	0.044	**0.041**	0.053	**0.062**	0.050
Orthopaedic surgery (n=28)																
Median	0.992	0.997	0.997	0.999	1.002	0.999	1.003	0.997	0.993	0.995	1.006	0.992	1.000	1.005	1.007	1.005
Minimum	0.938	0.941	0.918	0.937	0.893	0.936	0.933	0.911	0.911	0.897	0.913	0.934	0.930	0.919	0.866	0.902
Maximum	1.049	1.040	1.066	1.050	1.076	1.074	1.053	1.076	1.082	1.074	1.062	1.059	1.053	1.057	1.073	1.073
Standard deviation	0.027	0.025	0.033	*0.029*	0.047	0.035	*0.032*	0.043	0.042	0.039	0.032	0.034	0.029	*0.035*	0.045	*0.043*

Mean standard deviation per item	0.032	0.030	0.036	0.032	0.043	0.036	0.039	0.043	0.043	0.046	*0.030*	0.040	0.034	0.046	**0.050**	0.047

Italic, smallest standard deviation per item; bold, largest standard deviation per item.
[a]The quotients are calculated by dividing the observed patient satisfaction score by the expected patient satisfaction score. The expected score is based on the national mean score and on the patient characteristics age, education and health status. The mean standardized patient satisfaction score per specialism and per hospital ward was calculated by adding all scores of all patients in this ward together, divided by the number of patients. This resulted in a mean standardized score per specialism per ward on all items of the questionnaire.
[b]See appendix for the complete description of the 16 items mentioned above under the 6 dimensions.

medical wards (pulmonology, obstetrics and gynaecology, cardiology, general surgery, internal medicine, neurology and orthopaedic surgery).

For six out of seven specialisms no significant correlations at the 0.01 significance level were found. For these specialisms, we found no evidence that patients who stayed on wards with a relatively short mean LOS were less or more satisfied than patients who stayed on wards with a longer mean LOS.

Pulmonology is an exception. We observed 5 out of 16 items of patient satisfaction with significant correlations with LOS at the 0.01 significance level. On these five questions, patients were more satisfied on the wards with the shorter mean LOS. This concerned the satisfaction about the reception on the ward ($r^2 = -0.55$; P=0.006); the information provided by nurses on admission ($r^2 = -0.61$; $P = 0.002$); the expertise of the nursing staff ($r^2 = -0.54$; $P = 0.008$); the way information was transferred from one person to another ($r^2 = -0.58$; $P = 0.004$) and the respect for patients' privacy such as in conversations with doctors during physical examinations and during visiting times ($r^2 = -0.61$; $P = 0.002$).

Discussion

As stated in the Introduction, in the literature, good quality of care is often associated with shorter stays and shorter stays are not often associated with an adverse effect on patient satisfaction. For six out of seven specialisms we found no correlation between LOS and patient satisfaction, which means that we found no evidence that hospital wards with a relatively short mean LOS had higher, or lower, patient satisfaction than hospital wards with a relatively long LOS. The exception was pulmonology where we found significantly higher patient satisfaction scores for some specific items on hospitals wards with a shorter LOS.

The negative correlations for pulmonology are significant and should result in further research. Our findings concern the admission, the (transfer of) information, the expertise of the nursing staff and the privacy. Without pretending to be complete we found some suggestions in literature that might contain some explanations for the negative correlations between LOS and patient satisfaction at pulmonology wards.

Firstly, pulmonary diseases are characterized by the complexity of their care, indicated by a long hospital stay and the involvement of several health care professionals. Clear communication towards pulmonary patients could be difficult. This will influence their satisfaction.

Secondly, communication and information are essential for all wards. Patients who are well informed are more satisfied and are more willing to accommodate doctors' recommendations. In chronic respiratory diseases the emphasis on information is based on treatment, symptom relief, and the prevention of the progression of the illness. Information on the prognoses of the disease is important to patients, but this need is not always fulfilled for pulmonary patients [46].

Thirdly, patients with lung cancer—who form an important part of the pulmonary group—are less satisfied with the

Table 3 Correlations between standardized mean length of stay and standardized mean patient satisfaction score for the 16 questions of the Core Questionnaire[b]

	Admission		Nursing care		Medical care		Information				Patient autonomy			Aftercare		
	Reception	Information provided	Personal attention	Expertise	Personal attention	Expertise	Clarity by nurses	Clarity by doctors	Transferred	Rapidity	Self-sufficient	participation decisions	Privacy respected	Information further treatment	Information passed on	Procedure discharge
Pulmonology (n=23)																
Pearson Correlation[a]	**−0.55**	**−0.61**	*−0.50*	**−0.54**	*−0.43*	*−0.47*	*−0.52*	*−0.49*	**−0.58**	−0.39	−0.37	−0.36	**−0.61**	−0.30	*−0.46*	*−0.50*
Significance (two-tailed)	0.0060	0.0021	0.0160	0.0084	0.0383	0.0250	0.0104	0.0163	0.0039	0.0649	0.0853	0.0897	0.0021	0.1640	0.0270	0.0143
Obstetrics and gynaecology (n=27)																
Pearson Correlation[a]	−0.02	0.17	0.06	0.12	0.27	0.16	0.25	*0.39*	0.32	0.28	0.08	0.10	0.10	0.20	0.23	0.12
Significance (two-tailed)	0.9297	0.3905	0.7726	0.5347	0.1787	0.4157	0.1997	0.0418	0.1068	0.1589	0.6756	0.6059	0.6312	0.3200	0.2509	0.5632
Cardiology (n=25)																
Pearson Correlation[a]	0.11	−0.16	0.10	0.07	−0.07	−0.18	0.02	−0.09	0.02	0.14	0.20	0.01	0.02	0.29	*0.43*	0.33
Significance (two-tailed)	0.6131	0.4544	0.6380	0.7388	0.7274	0.3783	0.9261	0.6758	0.9108	0.5159	0.3327	0.9718	0.9208	0.1587	0.0306	0.1082
General surgery (n=30)																
Pearson Correlation[a]	−0.25	0.03	−0.25	−0.22	0.29	0.19	−0.13	0.20	−0.14	−0.06	−0.05	0.19	0.19	0.01	−0.14	−0.02
Significance (two-tailed)	0.1847	0.8584	0.1876	0.2385	0.1141	0.3129	0.4772	0.2896	0.4550	0.7616	0.7787	0.3152	0.3264	0.9408	0.4755	0.9221
Internal medicine (n=28)																
Pearson Correlation[a]	−0.17	−0.14	−0.21	−0.11	0.02	−0.02	−0.10	−0.05	−0.07	0.05	−0.04	−0.07	−0.12	−0.03	−0.08	−0.13
Significance (two-tailed)	0.3820	0.4656	0.2755	0.5933	0.9050	0.9232	0.6015	0.7899	0.7231	0.8107	0.8595	0.7408	0.5522	0.8681	0.6911	0.5036
Neurology (n=27)																
Pearson Correlation[a]	0.19	0.00	0.28	0.22	−0.07	−0.01	−0.10	−0.13	0.08	0.03	0.22	0.01	−0.05	0.12	0.17	0.11
Significance (two-tailed)	0.3385	0.9912	0.1556	0.2694	0.7317	0.9507	0.6256	0.5041	0.6967	0.8754	0.2686	0.9596	0.7931	0.5353	0.3945	0.5734
Orthopaedic surgery (n=28)																
Pearson Correlation[a]	0.06	−0.03	−0.09	−0.17	0.08	0.01	−0.23	−0.05	−0.03	−0.18	0.15	−0.11	0.24	0.06	0.18	0.09
Significance (two-tailed)	0.7508	0.8924	0.6367	0.3829	0.6884	0.9713	0.2338	0.8078	0.8612	0.3478	0.4550	0.5852	0.2194	0.7798	0.3666	0.6545

Italic, correlation is significant at the 0.05 level (two-tailed); bold, correlation is significant at the 0.01 level (two-tailed).

[a]The Pearson correlations were calculated between standardized mean LOS and standardized mean patient satisfaction score.

[b]See appendix for the complete description of the 16 items mentioned above under the 6 dimensions.

care received from physicians than other patients with cancer. They encounter more unfulfilled psychological and social needs compared to other cancer groups [47]

Fourthly, in pulmonary patients, psychiatric comorbidity is highly prevalent. It also plays a part in the development of functional deterioration and in determining poor medical outcomes. For example, delirium with cognitive disturbance is an acute psychopathological disturbance that usually improves considerably during the hospitalization [48]

As is common in literature we used patient satisfaction in this study as an indicator of the quality of care [21, 23]. Patient satisfaction and patient experiences have been used extensively in Dutch hospitals in the last decade for comparing hospitals' quality of care and for making quality improvements [43, 49–51]. We assumed that, in cases where the quality of care is better, patients know that the quality is better and as a result of this they will be more satisfied concerning the care they received. But two crucial questions need answering. Firstly, are patients really capable of distinguishing between good and inferior quality of care and, secondly, are the questions asked by the patient satisfaction questionnaire suitable to measure this? For patients with adverse outcomes, post-discharge, we know that they negatively influence patients' overall evaluation of the quality of their care [24]. However, we hesitate to suggest they are more negative simply because of the adverse outcome or whether this is also because of the lower quality of care, even if this did not result in an adverse outcome. Concerning the second question we doubt whether the patient satisfaction questionnaire really tackles the quality of care. It tackles the patients' possibly subjective perception of the quality of care. The questions in the questionnaire include more or less subjective topics like dignity, personal treatment and information given by the professionals. 'Objective' topics about the logistics and organization of care are not included in the questionnaire. Since patient satisfaction is influenced by patients' personal relationships with healthcare professionals such as doctors and nurses [25], a longer LOS might also influence the satisfaction in a positive way. A longer LOS allows for the development of more meaningful personal relationships.

Because we doubt whether the patient satisfaction questionnaire tackles the quality of care sufficiently, we suggest asking patients more directly how long they stayed in hospital and how they experienced their LOS. In future this could be done in the patient satisfaction questionnaire or in one of the Consumer Quality Indexes. This is in line with literature supporting the relationship between patient-centred care and clinical benefits such as the survival of acute myocardial infarction and lower patient mortality rates [26, 27]. Also better compliance, recovery and reduced admission and readmission rates are associated with patient-centred care [28]. Therefore, in the future, patient reports about their care should be accompanied by assessments of their clinical outcomes [26–28].

Limitations

We could not study the characteristics of the non-responders of the patient satisfaction surveys, because of their anonymity. Although the response rate was reasonable [29], it could be that only extremely satisfied, or dissatisfied patients returned the questionnaire. However, former research showed that the impact of a non-response bias on satisfaction questionnaires of hospitalized patients is relatively small [30, 31]. For LOS data there were no non-responders. Hospitals that participated in the LMR, participated with all their clinical patients.

In the Netherlands, patient satisfaction data have been gathered separately from information about LOS. Kiwa Prismant received the questionnaires anonymously and it was not possible to link the outcomes on the patient level to the LOS of the individual patient. Therefore, our analysis is carried out at the level of the ward. No conclusions can be drawn on the level of the individual patients. From this year, however, the satisfaction questionnaire has been extended to include a question about the LOS of the patient. In the future it will be possible to make a study of the relationship between the LOS and patient satisfaction on the patient level.

Conclusion

We found no evidence that hospital wards with a relatively short mean LOS had higher, or lower, patient satisfaction than hospital wards with a relatively long LOS, with the exception of pulmonology.

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Appendix 1

Patient Satisfaction Questionnaire

(i) Admission procedure:
   (a) How satisfied were you with the reception on the ward?
   (b) How satisfied were you with the information provided by nurses on admission?

(ii) Nursing care.
   (a) How satisfied were you with the personal attention of the nurses?
   (b) How satisfied were you with the expertise of the nursing staff?

(iii) Medical care:
   (a) How satisfied were you with the personal attention of the doctors?
   (b) How satisfied were you with the expertise of the doctors?

(iv) Information:
   (a) How satisfied were you with the clarity of information given by nurses?
   (b) How satisfied were you with the clarity of information given by doctors?
   (c) How satisfied were you with the way the information was transferred from one person to another?
   (d) How satisfied were you with the speed of the results of the diagnostic tests?

(v) Patient autonomy:
   (a) How satisfied were you with the degree of encouragement to be self-sufficient?
   (b) How satisfied were you with the degree to which you could participate in treatment decisions?
   (c) How satisfied were you with the privacy you were given such as in conversations with doctors during physical examinations and during visiting times?

(vi) Aftercare:
   (a) How satisfied were you with the information provided about further treatment?
   (b) How satisfied were you with the transfer of information to external professionals, such as your GP?
   (c) How satisfied were you with the discharge procedure?