

# Assessment of Surgical Discharge Summaries and Evaluation of a New Quality Improvement Model

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**ABSTRACT:** **Background:** Discharge summaries after hospitalization provide the most reliable description and implications of the hospitalization. A concise discharge summary is crucial for maintaining continuity of care through the transition from inpatient to ambulatory care. Discharge summaries often lack information and are imprecise. Errors and insufficient recommendations regarding changes in the medical regimen may harm the patient's health and may result in readmission.

**Objectives:** To evaluate a quality improvement model and training program for writing postoperative discharge summaries for three surgical procedures.

**Methods:** Medical records and surgical discharge summaries were reviewed and scored. Essential points for communication between surgeons and family physicians were included in automated forms. Staff was briefed twice regarding required summary contents with an interim evaluation. Changes in quality were evaluated.

**Results:** Summaries from 61 cholecystectomies, 42 hernioplasties and 45 colectomies were reviewed. The average quality score of all discharge summaries increased from 72.1 to 78.3 after the first intervention ( $P < 0.0005$ ) to 81.0 following the second intervention. As the discharge summary's quality improved, its length decreased significantly.

**Conclusions:** Discharge summaries lack important information and are too long. Developing a model for discharge summaries and instructing surgical staff regarding their contents resulted in measurable improvement. Frequent interventions and supervision are needed to maintain the quality of the surgical discharge summary.

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**KEY WORDS:** elective surgery, hospital discharge summary, quality assessment, quality improvement, training and education

Numerous studies have shown that discharge summaries often lack information and are imprecise [8-14]. Errors and insufficient recommendations regarding changes in the medical regimen may harm the patient's health and may result in readmission [10,13,14]. On the other hand, discharge summaries can be too long and obscure or omit essential information. A thorough and concise discharge summary is crucial for maintaining continuity through the transition from inpatient to ambulatory care [1,2,5,15-18]. In addition, the document fulfills administrative and legal requirements and is an important source of information for future research [19,20].

Despite its importance, specific regulations or guidelines regarding the contents of a discharge summary are lacking [2,3,21-23]. The majority of discharge letters are written by interns who are less experienced and are burdened with a large workload [2,8,13]. Hospital-based training programs have been shown to improve the quality of discharge summaries [6,9,13,19]; and training that included follow-up and personal feedback proved to be more beneficial than theoretical training alone [2].

Studies have shown that the length of the discharge summary is inversely correlated to its quality [7], and when it is over two pages in length the quality decreases dramatically [22]. During the past decade, the length of discharge summaries has increased substantially. This can be attributed both to medical concerns, such as new examinations and audits, and to less professional circumstances, such as the propensity to avoid missing irrelevant details and the use of "cut and paste" algorithms. Clever extraction of data from the medical file is the key element in assembling a discharge summary of high quality [19].

The transition to computerized data management holds the potential for simplifying and improving the process of assembling the discharge summary, thereby improving its quality [10,16]. Nonetheless, in many hospitals, some of the information obtained during hospitalization is still handwritten and modified later into electronic format. The method whereby an electronic discharge summary is generated from handwritten material or a few computerized sources has proven to be inefficient and prone to mishandling [12,16,24,25]. The objective of the present study was to examine the quality of discharge summaries composed after hospitalizations in a surgical ward. Moreover, it aimed to evaluate a ward-based training program designed to improve

Discharge summaries provide the most reliable description of the events, consequences and implications of a hospitalization [1,2]. The hospital is only one element among many that share the responsibility for an individual's health [3-5] and it is common for discharged patients to need additional medical care [6,7].

the quality of these documents. The study used established and previously published methods but on a much larger scale.

**METHODS**

The study was conducted in two phases in our university-affiliated department of surgery. It focused on the discharge summaries of patients who had been hospitalized for three types of elective surgeries: cholecystectomy, inguinal or abdominal wall hernioplasty, or colectomy due to colorectal cancer. For cases that lacked essential information, such as the operative report, the discharge summary was excluded from the study.

A grading system for evaluating discharge summaries was created. The quality of the discharge summary was defined as the ratio between the number of details that it contained and the number of details that had been determined to be essential by a team of senior physicians, based on experience: 17 for cholecystectomy, 18 for hernioplasty and 25 for colectomy. The calculated percentage constituted the quality score of the discharge summary. The parameters required for each of the three surgeries are listed in Table 1.

The first phase of the study was retrospective and included the review of discharge summaries of all patients discharged from 1 January 2006 through 31 December 2006, after one of the three operations. The second phase of the study began with a 2 hour training session for all interns, attending and resident physicians concerning the required content of the discharge summaries based on the information that had been determined to be essential for each type of surgery (first intervention). After the training, a form was placed above every computer where the residents worked. After the training, we prospectively reviewed discharge summaries from 1 September 2007 to 31 August 2008. Midway through the prospective review period, the training session was repeated and followed by random reviews and feedback on discharge summaries by the senior attending doctors (second intervention).

All the discharge summaries written in both phases were reviewed and scored. The length of the hospitalization and the paragraph describing the hospitalization course were also collected. The contents of each discharge summary were reviewed and compared to the patients' complete medical record. After collecting all the data we conducted a blind comparison of the three research periods.

**STATISTICAL ANALYSIS**

The data were analyzed in two separate segments, the first consisted of data before and after the intervention, and the second consisted of data before and after the first intervention and after the second intervention. When analyzing the discharge summaries' quality scores, the differences within the first segment were calculated using *t*-tests, while the differences within the second segment were calculated using one-way ANOVA and post-hoc

**Table 1.** Discharge summary parameters required for each of the three surgeries evaluated

	Laparoscopic cholecystectomy	Hernioplasty	Colectomy due to colon cancer
Before surgery	<ul style="list-style-type: none"> <li>• Medical history</li> <li>• Medication regimen</li> <li>• Allergies</li> </ul>		
	<ul style="list-style-type: none"> <li>• Clear, evidence-based indication for surgery</li> <li>• Relevant preoperative imaging</li> <li>• Lab data (liver function)</li> </ul>	Hernia type and location	<ul style="list-style-type: none"> <li>• Results of full colonoscopy</li> <li>• Tumor pathology</li> <li>• Relevant preoperative imaging lab data (CEA)</li> <li>• Family history of colon cancer</li> </ul>
During surgery	<ul style="list-style-type: none"> <li>• Date of surgery</li> <li>• Type of anesthesia</li> <li>• Surgical approach</li> <li>• Abnormal findings (note if 'none')</li> <li>• Complications (note if 'none')</li> </ul>		
		Repair technique	<ul style="list-style-type: none"> <li>• Colectomy type (Lt./Rt./Hemi)</li> <li>• Anastomosis type and method</li> </ul>
Post-surgery	<ul style="list-style-type: none"> <li>• Postoperative course</li> <li>• Blood transfusion</li> </ul>		
			Bowel movement
Discharge instructions	<ul style="list-style-type: none"> <li>• Recommendation for rest</li> <li>• Change in medical regimen</li> <li>• New allergies, if discovered during hospitalization (note if 'none')</li> <li>• Reference to renewal of anticoagulant treatment if given previously</li> <li>• Additional treatment and follow-up, if needed</li> </ul>		
			<ul style="list-style-type: none"> <li>• Change of diet</li> <li>• Prophylactic anticoagulant treatment</li> </ul>
No. of parameters	17	18	25

CEA = carcinoembryonic antigen

comparison by Bonferroni. The correlation between the quality scores, the length of the paragraph describing the hospital course, and the overall length of the discharge summaries were measured by Pearson's correlation. Statistical significance level was defined as *P* < 0.05. The statistical analysis was prepared by SPSS.

**RESULTS**

A total of 323 discharge summaries were reviewed: 175 were written before the interventions and 148 after. Over 97% of the summaries were composed by interns. The mean quality score of the discharge summaries increased from 72.1% ± 15.8% before to 79.5% ± 13.0% after both interventions (*P* < 0.0005). In addition, the lowest score increased from 34.8% before the interventions to 47.8% after [Table 2]. Comparison of the mean quality score before, to the scores following the first and second interventions for all three operations, showed a progressive increase from 72.1% to 78.3% and to 81.0%, respectively (*P* < 0.0005). No statistical significance was found between the first and second interventions. The increase in the mean quality score within each of the three surgeries was similar. The score for the cholecystectomy discharge summaries increased from 79.3% ± 12.2% to 84.0% ± 10.0% following the two interventions (*P* = 0.017), while the scores for hernioplasty and colectomy increased

**Table 2.** Comparison of discharge summary quality scores among the three intervention periods

Surgical procedure	Study interval	N	Average score (± SD) (range)	P value (one-way ANOVA)
Cholecystectomy	Before intervention	77	79.3 ± 12.2 (46.2–100.0)	0.052
	After 1st intervention	36	83.4 ± 11.0 (58.3–100.0)	
	After 2nd intervention	25	84.8 ± 8.6 (64.3–100.0)	
Hernioplasty	Before intervention	50	78.6 ± 12.7 (45.5–100.0)	0.030 *time R≠P2
	After 1st intervention	22	84.3 ± 15.1 (50.0–100.0)	
	After 2nd intervention	20	86.9 ± 8.6 (66.7–100.0)	
Colectomy	Before intervention	48	53.9 ± 7.0 (34.8–73.9)	0.000 *time R≠P1≠P2
	After 1st intervention	23	64.6 ± 9.6 (47.8–78.3)	
	After 2nd intervention	22	71.3 ± 7.1 (58.3–86.4)	

\*Bonferroni post-hoc comparison

from 78.6% ± 12.7% to 85.5% ± 12.4% ( $P = 0.01$ ) and from 53.9% ± 7% to 67.9% ± 9.0%, respectively ( $P < 0.0005$ ). Table 2 shows the changes in quality scores for each procedure after the interventions. The mean quality scores increased after each interval.

The mean length of the discharge summaries (measured in number of pages) decreased throughout the three study periods for all three types of surgeries. However, there was an inverse correlation between the number of pages and the quality score in the hernioplasty and colectomy discharge summaries. This correlation was statistically significant only for colectomy discharge summaries [Table 3]. The length of the paragraph (in lines) that described the hospital course was directly correlated to the quality score in discharge summaries for all three surgeries. Nevertheless, this correlation was weak, reaching statistical significance only in cholecystectomy and colectomy discharge summaries.

## DISCUSSION

Discharge summaries are a critical link in the health care continuum, containing information that is relevant to ongoing patient

care and evaluation. The primary objective of the present study was to examine the quality of discharge summaries in a single surgical department in Israel, in light of the results of similar studies conducted worldwide [2,19,21-24]. The review and quality estimation methods in this study were based on recommendations from prior studies and the results of the retrospective portion of the study were comparable with those conducted previously [2,6-9]. Most of the discharge summaries were written by interns and their quality was initially rated as poor. Extracting information from the medical record is a key element in the quality of discharge summaries, and training and supervisory initiatives can compensate for the absence of a structured algorithm [19].

The present study investigated the effects of a structured algorithm and training for surgical residents and senior staff. Discharge summaries were reviewed before any intervention and after two types of interventions, training, and training combined with feedback. The mean quality score of the discharge summaries increased after the interventions. Accordingly, there was also a decrease in the standard deviation and an increase in the minimum quality scores among the discharge summaries, all of which point toward a more uniform and concise summary. It was also clearly shown that the lower the mean quality score of the summary before the intervention, the greater its improvement after the intervention.

When we analyzed the discharge summaries according to type of surgery, only the colectomy discharge summaries showed a significant improvement in quality scores after the first intervention, accompanied by additional significant improvement after the second intervention. The increase in the mean quality score was twice that of the other two groups of discharge summaries. This might be related to the larger number of parameters that were defined for colectomy discharge summaries, 25 compared to 17 for cholecystectomy and 18 for hernioplasty. As noted earlier, the low initial scores left room for more improvement.

While the increase in the mean quality score is consistent with previous estimations and evidence, it was surprising that the

**Table 3.** Correlations between the mean quality score, the length of the discharge summary (in pages), and the length of the hospitalization course description (in lines)

Procedure	Before intervention				After 1st intervention				After 2nd intervention				Pearson correlation	
	N	Score (%)	Pages	Lines	N	Score (%)	Pages	Lines	N	Score (%)	Pages	Lines	r	P
Cholecystectomy	77	79.3	3.5	5.4	36	83.4	3.3	6.8	25	84.8	3.3	6	r	0.22
													P	0.009
Hernioplasty	50	78.6	3.2	5.1	22	84.3	3	6.4	20	86.9	2.9	5.9	r	0.154
													P	0.143
Colectomy	48	53.9	4.7	7.9	23	64.6	4.5	8	22	71.3	3.3	7.6	r	0.208
													P	0.046

Score = mean quality score, pages = mean length of discharge summaries (pages)  
Lines = mean length of the paragraph describing hospitalization course (lines)

second intervention failed to provide further significant improvement in spite of the trend towards improved quality scores.

Our findings among surgical patients were consistent with previous studies that showed an inverse correlation between the length of the discharge summary and its quality for medical patients [23,25]. The mean length of the discharge summaries decreased concomitantly with the increase in quality scores. Although a definite trend was found for all operations, a significant inverse correlation between the length of the document and its quality was demonstrated only in discharge letters following colectomy.

The section in the discharge summary describing the course of hospitalization showed a direct correlation between its length and the quality of the discharge letter as a whole. This finding was not surprising since this section is the most descriptive part of the document and contains important information. However, previous studies revealed an inverse correlation, demonstrating that the length was related to an excess of unnecessary details [18,24]. We believe that our finding was additional proof of the training program's success.

It is important to emphasize that despite the progress evident in the study the results were still unsatisfactory. Training with supervision brought measurable improvement; however, even after both interventions the quality of the discharge summaries was not optimal. More frequent and in-depth training is needed to achieve the desired improvements.

In conclusion, the present study demonstrated that discharge summaries are generally of poor quality, lack essential information, and are too long. It was also shown that even minimal guidance and supervision at a departmental level led to a significant increase in their quality but still did not achieve optimal results. The results of this study may serve as a milestone in the effort to improve the quality of discharge summaries in surgical wards. However, additional work is needed to develop a model that would allow for the formulation of complete, reliable discharge summaries. Development of a well-organized concise form and repeated training led to improvement in quality of information provided in surgical discharge summaries.

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**“It’s not that I’m so smart, it’s just that I stay with problems longer”**

Albert Einstein (1879-1955), German-born theoretical physicist and philosopher of science, who developed the general theory of relativity. He received the 1921 Nobel Prize in Physics