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Impact of Implementation of Additional Endoscopy List on Hospital Inpatient Length of Stay

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Abstract

Extended average length of stay (ALOS) leads to increased hospital expenditure. Prioritization of emergency endoscopies over routine elective procedures results in delay and adds on to patients' ALOS at tertiary hospitals. The gastroenterology department of Fiona Stanley Hospital aimed a service improvement project to shorten the ALOS of inpatients by implementing a new quarantined booking and procedural system allowing elective access to endoscopic procedures. An additional endoscopy list (quarantine list) was implemented with full participation of the stakeholders once a month for a 3-month trial period for inpatients by moving resources from a nearby satellite service. A comparison of the ALOS of patients before and after realizing the preceding intervention was carried out using the time and date information obtained from the theater management and the e-referral system of all routine inpatients with a valid e-referral for gastroscopy or colonoscopy. Upper gastrointestinal endoscopies comprised over two-thirds of the inpatient scopes performed. The ALOS and average time spent for referral improved by 1.09 and 1.97 days, respectively. The ALOS reduced by over 1 day, and improvement was noticed in the prereferral segment. Postreferral efficiency did not improve, and undertaking further analysis to determine the root causes for the continual delay is recommended.

Keywords: Average length of stay; Endoscopy; Service improvement; Additional endoscopy list.

1. INTRODUCTION

Revenue and expenditure are the two most important financial issues that influence the viability of any health care organization. Expenditure closely reflects the average length of stay (ALOS), which when increased above benchmarking criteria will drive inappropriate increased hospital expenditure. Furthermore, reducing LOS not only lowers expenditure but improves patient outcomes by minimizing hospital-acquired complications by 55% [1] and enabling patient recovery at home. A team of researchers from the United States has suggested health care planners to improve accessibility to endoscopy services to reduce patient mortality [2].

Fiona Stanley Hospital (FSH) is a large tertiary-care hospital in Western Australia. The gastroenterology department of FSH performs emergency and elective endoscopic procedures on resident inpatients. Emergency endoscopies are prioritized above more routine elective inpatient referrals, often resulting in the postponement and delay of routine procedures. Such postponements or delays are a common cause for dissatisfaction among clinicians, patients, and caregivers [3]. Patient dissatisfaction is highest among patients whose procedures were canceled following bowel preparation for colonoscopies [3].

To reduce the impact on ALOS related to procedural delays, a greater understanding of the factors limiting access to endoscopy facilities and improvements in scheduling is likely required. The aim of this study is to define the ALOS prior to and following introduction of a new quarantined booking and procedural system for inpatients requiring elective access to endoscopic procedures.

2. METHOD(S)

This project focused on improving the ALOS of inpatients referred electively for nonurgent endoscopic procedures during their admission at FSH. The project was conducted in three phases, specifically (1) preintervention phase, (2) intervention phase, and (3) postintervention phase. The project was carried out between August 1, 2019, and January 15, 2020.

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2.1. Background Work

To understand the patient flow, inward referral process, scheduling of appointments, and data access, the principal investigator conducted discussions with the head of the gastroenterology service, specialist endoscopists, endoscopy facility manager, endoscopy nurses, theater management systems staff, and appointment-booking nurses.

2.2. Preintervention Phase

The ALOS was determined for all inpatients who were referred for nonurgent endoscopic procedures for a period of 1 month prior to implementation of the intervention. This was sourced from data extracted from the theater management system (TMS) and electronic inpatient referral (e-referral) system. A database was compiled containing information of all the patients who were referred for nonurgent endoscopic procedures during the period from August 1, 2019, to August 31, 2019. Date and time of admission and discharge could be extracted from the TMS database. Referral time was obtained from the e-referral database. Inclusion criteria were a valid e-referral for gastroscopy or colonoscopy. Exclusion criteria were referrals for upper or lower gastrointestinal (GI) bleeding, foreign bodies, assessment of inflammatory bowel disease, or endoscopic retrograde cholangiopancreatography (ERCP) procedures. The ALOS and the average elapsed time from admission to referral and referral to discharge were calculated during this period of time.

2.3. Intervention Phase

Key stakeholder perspectives informed the design of a suitable intervention. All key stakeholders of the project agreed to establish an additional endoscopy list (quarantine list) on the first Monday of the month for a 3-month trial period for inpatients by relocating resources from an existing satellite service at Fremantle Hospital. Key stakeholders designed qualifying criteria to screen suitable inpatients to be included in the list.

2.4. Evaluation Phase

The ALOS and average elapsed time from admission to referral and referral to discharge were calculated for the period of intervention using TMS and e-referral data and were compared with the preintervention result. The ALOS timeline was divided into two periods: the prereferral and postreferral periods. This categorization was undertaken to better reflect standard clinical management in the given hospital system for patients being referred for inpatient endoscopy; the prereferral period reflects prioritization and referral decisions made by the treating clinical teams, while the postreferral period reflects organization of the procedure by the endoscopy service.

2.5. Method of Data Analysis

Data was collated from the TMS and e-referral systems. Time intervals for ALOS were calculated by subtracting time and date of discharge from that of admission and calculating the average using MS Excel formulas. Similarly, the average time for the referral and average time after the referral were calculated using MS Excel.

2.6. Privacy, Confidentiality, Ethical, and Administrative Considerations

The project did not involve any direct data collection from patients. All collected secondary data was stored in encrypted and password-protected systems. Ethical permission was obtained under GEKO 34691 from FSH.

3. RESULTS

Table 1 describes the distribution of upper and lower endoscopies performed during the study period in the study patients. More than two-thirds of pre- and postintervention endoscopies were upper GI endoscopies.

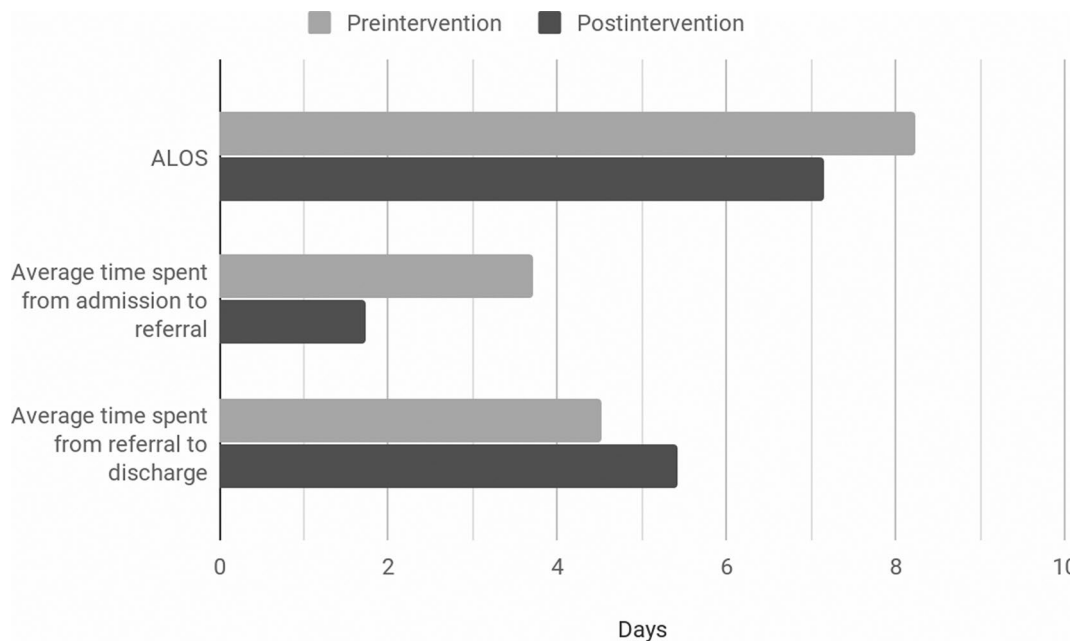
The ALOS has improved by over 1 day by adding an additional list per month (Table 2). Average time spent from admission to referral has been shortened by 1.97 days following the intervention. This is a reduction of over 50% of the time spent between admission and referral for the endoscopy procedure. However, the average time spent from endoscopy referral

Table 1: Distribution of upper and lower GI endoscopies during pre- and postintervention periods.

	Preintervention		Postintervention	
	Frequency	(%)	Frequency	(%)
Upper endoscopies	85	69.67	187	72.20
Lower endoscopies	37	30.33	72	27.80
Total	122	100	259	100

Table 2: Changes in ALOS and average time intervals between admission to referral and referral to discharge pre- and postintervention.

	Preintervention	Postintervention	Improvement Days	% Improvement
	Days	Days		
ALOS	8.24	7.15	1.09	13.22
Average time spent from admission to referral	3.71	1.74	1.97	53.01
Average time spent from referral to discharge	4.53	5.41	-0.88	-19.43

Figure 1: Changes in ALOS and average time intervals between admission to referral and referral to discharge pre- and postintervention.

to discharge has been increased by 0.88 days. Table 2 and Figure 1 describe the changes in the ALOS and average time intervals between admission to referral and referral to discharge.

4. DISCUSSION

Increased ALOS is a factor contributing to inefficiency, cost, and risk for hospital-admitted patients. This project was aimed at reducing the ALOS of patients referred for inpatient endoscopies by implementing an intervention that was agreeable to all stakeholders. The ALOS was compared before and after the implementation a quarantined additional endoscopy list for qualifying inpatients at FSH. The ALOS has improved by 1.09 days and average time spent from admission to the referral by 1.97 days as a result of the intervention.

Two-thirds of the nonurgent endoscopic procedures performed on existing inpatients in our study were upper GI endoscopies. Our results differ from patterns of endoscopy reported in a US-based study, which revealed that more than 50% of the endoscopic procedures performed were lower GI procedures, while about 30% were upper GI endoscopies [3]. The reason for the discrepancy likely reflects the inclusion of outpatient elective cases in the US-based study, whereas we only included inpatient referrals.

Borghans described 50 ways to reduce hospital LOS, and treating patients in a fast-track or accelerated care program has been listed as an intervention that can reduce ALOS of patients [4]. Several studies have shown that prompt endoscopy can result in a shorter LOS and fewer complications. Strate [5] reported a significantly short LOS in patients who underwent early colonoscopy.

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The present intervention has accelerated the patient accessibility to endoscopy by shortening the average time spent between referral and the procedure. Although the ALOS was improved by the intervention, it is evident that postreferral efficiency has not improved significantly. The reason for this is unclear, but it may be due, at least in part, to a single additional list per month influencing decision making in the intervening period. More research into this issue is required to understand the underlying cause. Overall, a great deal of coordination among teams is essential to reduce the ALOS of patients. This has been confirmed by Bjorkman *et al.* [6], who reported that the results of endoscopy must change subsequent patient care to impact resource utilization.

5. CONCLUSION

Short ALOS is a strong patient care outcome marker. The gastroenterology department of the FSH implemented an additional endoscopy list to shorten the ALOS of inpatients. The ALOS was reduced by more than 1 day, and the contribution was mostly from the prereferral segment of the patients' stay.

5.1. Recommendations

5.1.1. Implementing Two Additional Lists

It is likely that increasing the availability of the additional lists to twice a week could result in further improvements in the ALOS by influencing the management of patients in the interval between referral and procedure.

5.1.2. Further Studying of the Postreferral Period for Root Causes of Delay

The postreferral period should be process mapped and further studied to identify the root causes of the persistent delay.

5.1.3. Improving Coordinated Care

Clinical heads of the referring units should pay more attention to more coordinated approaches of care to improve collective decision making and reduce ALOS of referred patients after endoscopic investigations are performed.

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Author Contributions

Both authors contributed equally to this study.

Conflict of Interest

None.

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