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QUALITY IMPROVEMENT

Endoscopic Scoring in Ulcerative Colitis: Evaluating Practice Patterns and Role of Educational Interventions

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Abstract

Aims/Background Endoscopic scoring systems are recommended internationally for assessing disease activity, response to therapy and mucosal healing. However, their real-world application remains inconsistent. This study aimed to evaluate the impact of an educational intervention on endoscopic scoring documentation and identify factors influencing its use.

Methods A retrospective observational study was conducted at four hospital sites in Greater Manchester, UK. Data from endoscopies performed on ulcerative colitis (UC) patients were compared before and after an educational intervention. Logistic regression was used to analyse factors affecting documentation rates.

Results Endoscopic score documentation increased from 39% (pre-intervention) to 46% (post-intervention) ($p = 0.162$). Nurse endoscopists had the highest documentation rates (83%), while surgeons had the lowest (8%). Attendance at educational sessions significantly increased documentation rates (29% vs. 74–80%, $p < 0.001$).

Conclusion Educational interventions modestly improved endoscopic scoring documentation. Further targeted training and standardised reporting templates are needed to enhance adherence and patient outcomes in UC management.

Key words: inflammatory bowel disease; ulcerative colitis; endoscopy; education; quality improvement

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Introduction

Ulcerative colitis (UC) is a chronic, relapsing-remitting immune-mediated inflammatory bowel disease (IBD), characterised by diffuse mucosal inflammation of the colon and symptoms such as altered stool frequency, rectal bleeding, and abdominal discomfort (Le Berre et al, 2023). It is now widely appreciated that clinical symptoms do not necessarily correlate with underlying mucosal inflammation (Baars et al, 2012; Gracie et al, 2016). Endoscopic mucosal healing is associated with improved long-term outcomes such as reduced relapse, hospitalisation, and the need for surgery (Shah et al, 2016). This underscores the critical role of endoscopic evaluation in achieving effective disease control recognised as a long-term target in the modern treat-to-target paradigm for IBD (Turner et al, 2021).

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Although faecal calprotectin and C-reactive protein (CRP) can provide indirect measures of mucosal inflammation in UC (Lamb et al, 2019), direct visualisation of the mucosa is essential for a comprehensive assessment, as these markers lack specificity (Brookes et al, 2018; Mosli et al, 2015; Turner et al, 2021; Vermeire et al, 2006). Colonoscopy remains the reference standard for assessing the extent and severity of mucosal inflammation (Lamb et al, 2019; Sturm et al, 2019). However, the interpretation of colonoscopic findings can vary significantly among practitioners (de Lange et al, 2004), potentially leading to inconsistent documentation of disease activity, discrepancies in patient management, and ultimately, impacting treatment decisions.

To address this variability, several endoscopic scoring systems have been developed, which have shown good interobserver coherence. The Mayo Endoscopic Score (MES) is the most widely used scoring system in UC (Limdi et al, 2020). Although not formally validated, the MES is a simple, four-point scale that grades inflammation based on the most severely affected bowel segment (Schroeder et al, 1987). The Ulcerative Colitis Endoscopic Index of Severity (UCEIS) is a recent and validated scoring system that assesses vascular pattern, bleeding, and erosions/ulcerations providing a more granular assessment of mucosal inflammation (Travis et al, 2012). The use of endoscopic scores provides uniformity and consistency with endoscopic reporting, allowing more precise monitoring of disease activity and response to therapy. This has led to international guidelines recommending the use of endoscopic scores in the management of UC (Dekker et al, 2022; Lamb et al, 2019; Sturm et al, 2019).

Despite the clear benefits of using endoscopic scoring systems, the uptake of these scores in real-world clinical practice remains limited (Lasa et al, 2024). Additionally, in many healthcare systems, endoscopic assessments are performed not only by gastroenterologists but also by surgeons, nurse endoscopists, and general physicians, adding potential for variance with endoscopic reporting when a scoring system is not used (Mazurek et al, 2022). This underpins the need for quality improvement seeking to improve utilisation of endoscopic scoring in practice.

We assessed the impact of an educational intervention on the real-world use of endoscopic scoring systems in a large tertiary IBD centre in Greater Manchester, UK. We also aimed to explore the factors that influence the use of endoscopic scores in a large UK hospital-based setting, with the goal of informing the development of targeted interventions to improve the quality and consistency of endoscopic reporting.

Methods

Study Design and Data Collection

We conducted a retrospective observational study, collecting data across four hospital sites at the Northern Care Alliance NHS Foundation Trust, Greater Manchester, UK. We initially collected baseline data from consecutive patients who underwent sigmoidoscopy or colonoscopy for assessment of an established diagnosis of UC, over a 6-month period (July 2020 to December 2020), which represents the

pre-intervention period. Following an educational intervention, which included training sessions and guidance posters, the same data were collected for a subsequent 6-month period (March 2021 to August 2021).

Data were collected using a Microsoft Excel spreadsheet (Office 365 Version 16.90.2, Microsoft, Redmond, WA, USA). The following data were captured: patient demographics, including age, procedure performed, disease phenotype, and admission status; endoscopist speciality; and documentation of an endoscopic scoring system (Mayo Endoscopic Score [MES] or Ulcerative Colitis Endoscopic Index of Severity [UCEIS]).

Eligibility Criteria

• Inclusion: All consecutive endoscopies on patients with an established diagnosis of UC (>3 months) who underwent sigmoidoscopy or colonoscopy for assessment or surveillance of UC during the specified study periods (July 2020 to December 2020 and March 2021 to August 2021). Being a retrospective study, patients included in the study should maintain complete clinical data.

• Exclusion: Incomplete procedures due to poor bowel preparation and patients who had undergone panprocto-colectomy for UC.

Intervention

The educational intervention consisted of virtual training sessions delivered to all endoscopists by an Advanced IBD Fellow (EL) and a Consultant Gastroenterologist (JKL) specialising in IBD. The sessions were conducted across two meetings between January 2021 and March 2021. Each training session of 45 minutes included a presentation emphasising the importance of endoscopic scoring, a detailed review of various scoring systems such as MES and UCEIS, and practical guidance on accurate scoring using images and videos from published literature (Schroeder et al, 1987; Travis et al, 2012). This was followed by a discussion addressing common pitfalls and challenges in endoscopic scoring. In addition, posters with guidance on correctly recording endoscopic scores for UC were displayed in the endoscopy rooms at all four hospital sites.

Statistical Analysis

The unit of analysis was ‘endoscopy’. Descriptive statistics were used to summarise endoscopies overall and stratified by pre- vs. post-training period. The n (%) of endoscopies, where an endoscopic score was used (primary outcome measure) was recorded in the pre- and post-training periods and grouped according to endoscopist speciality and outpatients versus inpatients. Logistic regression was used to investigate the association between the likelihood that the endoscopic score was recorded and the following four factors: training (pre- vs. post-intervention), speciality of the endoscopist (physician, nurse, or surgeon), type of patient (inpatient vs. outpatient), and procedure type (colonoscopy vs. sigmoidoscopy). These factors were chosen prior to analysis based on clinical importance. Exploratory analyses looked at the relationship between the speciality of the endoscopist, the number of sessions attended, and the recording of endoscopic scores. A Chi-squared test

Table 1. Endoscopy-related characteristics.

	Pre-intervention	Post-intervention	Overall
	N = 255	N = 241	N = 496
Age of patient			
Mean (range)	47 (16 to 88)	50 (17 to 85)	49 (16 to 88)
Speciality of endoscopist			
Nurse, n (%)	23 (9)	24 (10)	47 (10)
Physician, n (%)	190 (75)	193 (80)	383 (77)
Surgeon, n (%)	42 (16)	24 (10)	66 (13)
Type of patient			
Inpatient, n (%)	45 (18)	33 (14)	78 (16)
Outpatient, n (%)	210 (82)	208 (86)	418 (84)
Disease phenotype			
E1, n (%)	47 (18)	49 (20)	96 (19)
E2, n (%)	89 (35)	77 (32)	166 (33)
E3, n (%)	74 (29)	78 (33)	152 (31)
Not available, n (%)	45 (18)	37 (15)	82 (17)
Procedure			
Colonoscopy, n (%)	111 (44)	124 (51)	235 (47)
Sigmoidoscopy, n (%)	144 (56)	117 (49)	261 (53)

was used to compare endoscopic score recording by number of sessions attended by the endoscopist, for the post-training period. A *p*-value of less than 0.05 was considered statistically significant.

Results

A total of 255 eligible endoscopies were included from July 2020 to Dec 2020. The mean age of the patients was 47 years (range: 16–88 years). On the other hand, there were 241 eligible endoscopies in the post-intervention period, with the mean age of patients being 50 years (range 17–85 years). During the pre-intervention period, most procedures were performed by physician gastroenterologists (n = 190), followed by surgeons (n = 42). This trend continued in the post-intervention period, with physician gastroenterologists conducting most procedures (n = 193), while surgeons and nurses each performed 24 endoscopies. Endoscopy-related data are detailed in Table 1. Physicians performed 85% of inpatient endoscopies, with surgeons and nurse endoscopists contributing 5% and 10%, respectively. On the other hand, for outpatient procedures, physicians performed 75%, while surgeons accounted for 15%, and nurse endoscopists performed 9%. The MES was used in all reports with an endoscopic score in both the pre-intervention and post-intervention period, with one instance where both UCEIS and MES were recorded.

Factors Affecting the Use of Endoscopic Score

Prior to the intervention, endoscopic scores were documented in 99/255 reports, which increased to 111/241 reports after the intervention; however, this change was

not statistically significant using logistic regression ($p = 0.162$) (Table 2). Combining both pre-intervention and post-intervention data, nurse endoscopists were significantly more likely to record endoscopic scores than physicians, while surgeons were less likely to do so, $p < 0.001$ (Table 2). Inpatients were more likely to have their endoscopic score documented when compared to outpatients, $p < 0.001$ (Table 2). Interestingly the indication for endoscopy (IBD surveillance vs. IBD assessment) did not affect whether an endoscopic score was used, $p = 0.139$. Individual endoscopic score recordings pre- and post-intervention are outlined in Table 3.

Table 2. Logistic regression investigating factors associated with endoscopic score usage.

	Endoscopic score usage n (%)	Odds ratio (95% CI)	*p*-value
Training			
Pre (n = 255)	99 (39)	1.00	
Post (n = 241)	111 (46)	1.32 (0.89 to 1.96)	0.162
Speciality of endoscopist			
Physician (n = 383)	166 (43)	1.00	
Nurse (n = 47)	39 (83)	6.43 (2.89 to 14.30)	<0.001
Surgeon (n = 66)	5 (8)	0.12 (0.05 to 0.30)	<0.001
Indication			
IBD surveillance (n = 123)	45 (37)	1.00	
IBD assessment (n = 373)	165 (44)	1.41 (0.90 to 2.21)	0.139
Type of patient			
Inpatient (n = 78)	50 (64)	1.00	
Outpatient (n = 418)	160 (38)	0.35 (0.20 to 0.60)	<0.001

CI, confidence interval; IBD, inflammatory bowel disease.

Table 3. Endoscopic score usage by speciality of endoscopist.

Endoscopic score used	Nurse	Physician	Surgeon
Pre-intervention, n (%)	20 (87)	78 (41)	1 (2)
Post-intervention, n (%)	19 (79)	88 (46)	4 (17)
Overall, n (%)	39 (83)	166 (43)	5 (8)

Table 4. Attendance of endoscopist at training sessions by speciality for all endoscopies during the post-training period (N = 241).

	Nurse	Physician	Surgeon	Total
Number of sessions	N = 24	N = 193	N = 24	N = 241
None, n (%)	18 (75)	114 (59)	24 (100)	156 (65)
One, n (%)	3 (13)	36 (19)	0 (0)	39 (16)
Both, n (%)	3 (13)	43 (22)	0 (0)	46 (19)

Table 5. Endoscopic score usage by attendance of endoscopist at training sessions for all endoscopies during post-training period (N = 241).

	No sessions	One session	Both sessions	*p*-value*	Chi-squared statistic (χ^2)
	N = 156	N = 39	N = 46		
Mayo score used, n (%)	45 (29)	29 (74)	37 (80)	<0.001	53.05

*Chi-squared test.

Educational Intervention and Its Effect on Endoscopic Score Documentation

A significant proportion of endoscopy reports during the post-training period (65%) originated from endoscopists who did not participate in any virtual training sessions. Notably, out of 24 endoscopies conducted by a surgeon, none of these were conducted by a surgeon that had attended these educational sessions. Conversely, 41% of physician reports and 26% of nurse reports were completed by those who had attended at least one session (Table 4).

Following the educational intervention, there was evidence of a relationship between the number of training sessions attended by endoscopists and the frequency of endoscopic score documentation. Endoscopists who did not attend any sessions recorded endoscopic scores in only 29% of the endoscopies, while those who attended one or both sessions recorded scores in 74% and 80% of the endoscopies, respectively ($p < 0.001$) (Table 5).

Discussion

In this study evaluating the utilisation of endoscopic scoring systems in patients with UC we made some key observations. We identified factors influencing their utilisation, and the efficacy and limitations of educational interventions designed to promote the standardised assessment of endoscopic disease activity. Despite the recognised importance of mucosal healing and modern paradigms emphasising the use of standardising endoscopic scoring (Peyrin-Biroulet et al, 2015; Shah et al, 2016; Sturm et al, 2019), we found that the use of these scoring systems is inconsistent in clinical practice.

Endoscopic scores were documented in only 39% of reports before the educational intervention, which increased to 46% after the intervention, yielding an overall documentation rate of 42% (210/496). This remains suboptimal given the current clinical guidelines recommending the use of endoscopic scores to objectively assess and monitor mucosal healing, a key therapeutic target in the management of UC (Dekker et al, 2022; Sturm et al, 2019; Turner et al, 2021). Accurately translating the endoscopist's assessment of the disease is vital in making correct therapeutic decisions and avoiding repeat procedures.

In our study, endoscopic procedures were performed predominantly by physicians (77%), with surgeons and nurse endoscopists contributing 13% and 10% of the procedures, respectively. We noted significant variations in endoscopic documentation rates among surgeons, physicians, and nurse endoscopists, with nurses having the highest documentation rate (83%) and surgeons having the lowest (8%).

This aligns with findings from Lasa et al (2024), who reported that surgical endoscopists had significantly lower odds of documenting an endoscopic score in IBD cases [odds ratio (OR) (95% confidence interval (CI)): 0.06 (0.03–0.13)], while IBD focussed clinicians exhibited higher compliance [OR (95% CI): 2.38 (1.72–3.31)]. The higher documentation rate among nurse endoscopists [n = 39 (83%)] may reflect their specialised focus on specific endoscopic procedures. However, given their limited representation in the overall sample size, this finding should be interpreted with caution and limits the generalisability of this finding.

The MES was the most commonly used system, documented in 100% of cases where a score was recorded, while only one report included both the MES and UCEIS. Although MES is only partially validated, the overwhelming preference for the MES in our study likely reflects its simplicity and ease of use, allowing for rapid assessment and documentation. While the UCEIS offers a more granular evaluation, its complexity may hinder wider adoption, particularly in busy clinical settings. Increased awareness and targeted training on the benefits and application of UCEIS could encourage its uptake in the future (Limdi et al, 2020; Maaser et al, 2019; Sturm et al, 2019). Other studies, as well as modern clinical trials, have similarly observed this preference for MES over UCEIS (Gaidos et al, 2023; Lasa et al, 2024).

Although a few previous studies have assessed the impact of structured general endoscopy reporting, research in this area in the era of modern IBD management remains sparse (de Lange et al, 2003; Kuhn et al, 1991; Moorman et al, 1994). A recent study by Kader et al (2020) involving 900 endoscopies across multiple hospitals found that endoscopic score documentation improved from 44.4% at baseline to 77.7% after implementing an intervention bundle. In contrast, although we noted numerical improvement in endoscopic reporting, this improvement was not statistically significant improvement as ours was a pragmatic audit study and not powered a priori to demonstrate such a difference. Future prospective studies are needed, powered to demonstrate differences but we provide proof of principle, that an educational intervention improves documentation. Furthermore, we had low attendance from non-physician endoscopists. It also highlights the need for a structured approach with periodic training of existing and newer endoscopists to ensure comprehensive and standardised reporting. Future studies could explore alternative formats, such as in-person workshops, to encourage participation and enhance knowledge retention. This is particularly relevant with increasing demands on clinicians to meet service requirements which may hinder their ability to attend educational meetings. Notably, Kader et al (2020) included face-to-face educational sessions and subsequent modifications to the electronic reporting systems, which may have impacted the number of endoscopists they could reach out to and hence statistically significant differences. The Selecting Targets in Inflammatory Bowel Disease (STRIDE) consensus endorsed by the International Organisation for the Study of Inflammatory Bowel Disease sets goals and objectives for modern management of IBD and recommends the use of an index for reporting endoscopic appearances in UC (Peyrin-Biroulet et al, 2015; Turner et al, 2021).

The adoption of key performance indicators (KPIs) and minimum endoscopy reporting standards, similar to the Building Research in Inflammatory Bowel Disease Globally (BRIDGe) and European Society of Gastrointestinal Endoscopy (ESGE) quality improvement initiative for recommendations for IBD reporting needs consideration by national and international endoscopy and IBD societies for wider implementation and improvement of quality of care (Dekker et al, 2022; Devlin et al, 2016). Indeed, there is evidence that the introduction of KPIs and standardised quality measures have previously greatly enhanced the practice of lower gastrointestinal (GI) endoscopy (Rees et al, 2016).

Our observation, and the observations by Kader et al (2020), suggest that conducting IBD endoscopy on IBD specialist lists may improve the documentation of endoscopic scores. Whilst there is an argument that this may exacerbate existing pressures on healthcare systems, and increase procedure wait times, it could also be argued that such a strategy might in fact mitigate against the need for repeated procedures stemming from inadequate reporting, lead to better and more informed decision making with treatment optimisation or indeed even withdrawal with obvious benefits to patients and the healthcare system. Optimising care and quality to provide gold standard quality hardly needs justification and clinical services should work collaboratively to enable quality care delivery.

Factors Influencing Documentation

We observed that outpatients were less likely to have endoscopic scores documented than inpatients [OR (95% CI): 0.35 (0.20 to 0.60)]. Inpatient lower GI endoscopies were performed predominantly by physicians (85% in our study) with an interest in IBD, which likely influenced this finding and adds credence to the idea that listing patients appropriately may improve quality of endoscopic reporting and care.

When comparing the impact of our intervention on endoscopic documentation, we noted an overall improvement in endoscopic scoring, although statistical imprecision left it uncertain whether or not this improvement would translate to a future improvement. Notably, only 35% of the reports were completed by an endoscopist who attended one or two training sessions. Documentation of endoscopic scores, however, was significantly higher if the endoscopist had attended at least one training session, although we cannot interpret this relationship as causal, endoscopic scoring as part of colonoscopy training via national advisory bodies and societies, as well as creating minimum reporting standards and KPI's on endoscopy reporting for IBD should help raise standards (Lamb et al, 2019; Limdi et al, 2020; Sturm et al, 2019). Although there are no universally accepted IBD reporting standards, the BRIDGe group, has made recommendations for criteria that should be included in high-quality IBD reports (Devlin et al, 2016). Incorporating a reporting template encompassing universally, regionally or locally accepted parameters within the endoscopy software could guide endoscopists in documenting disease activity more accurately and consistently (Gaidos et al, 2023; Kader et al, 2020). Furthermore, it is plausible that the endoscopists who are more likely to document endoscopic scores attended the training session.

A key strength of our study is the large dataset, which included approximately 500 endoscopies over a 12-month period and involved a diverse group of clinicians, including nurse endoscopists, physicians, and surgeons from a large secondary and tertiary care cohort.

Our study has some limitations. We did not assess the accuracy of the documented endoscopic scores, which raises the possibility of interobserver variability and the potential for incorrect scoring. Previous studies have shown substantial interobserver variability in MES scoring, which could impact the reliability of reported outcomes (de Lange et al, 2004; Fernandes et al, 2018). Periodic training and the advent of artificial intelligence (AI) tools have potential to reduce interobserver variation and to improve standardization and consistency with endoscopic reporting (Bossuyt et al, 2020; Ozawa et al, 2019). AI integration would, however, require extensive training datasets, clinician trust and seamless work integration apart from economic and infrastructural feasibility (Limdi and Farraye, 2021; Nigam et al, 2021). Another limitation is the inability of our data capture tool to link data relating to endoscopies from the same individual endoscopist. Finally, this study focused solely on UC, and the findings may not be generalisable to Crohn's disease, where the existing endoscopic scoring systems tend to be more complex and less widely used (Gaidos et al, 2023; Lasa et al, 2024). It seems logical that similar processes should be implemented to ensure higher standards of endoscopic reporting in Crohn's disease as with UC. Further studies in this area are also urgently needed.

Conclusion

Endoscopic scoring systems provide objectivity, uniformity, and standardisation with reporting of mucosal appearances, augmenting clinical decision-making and ultimately having an impact on appropriate treatment targets and desirable patient outcomes. Real-world endoscopic reporting is limited by inconsistent use of standardised scoring systems, imprecision, and variance in reporting.

We noted an improvement in endoscopic score documentation following an educational intervention. Our findings highlight the need for more robust strategies to promote consistent use. Endoscopist specialism and the patient setting emerged as significant predictors of score documentation, indicating potential targets for focused interventions. Our findings offer valuable insights into real-world reporting practices. Future research should explore the development of AI-based tools to automate scoring and minimise interobserver variability. Additionally, the creation of comprehensive reporting templates and the establishment of minimum reporting standards could enhance adherence to quality reporting guidelines.

Key Points

- Despite the recognised importance of endoscopic scoring in UC management, its use in clinical practice remains inconsistent.
- A simple and inexpensive educational intervention resulted in an improvement in endoscopic score documentation, suggesting the need for more effective strategies to promote standardised assessment.
- Physician and nurse endoscopists demonstrated the highest adherence to endoscopic scoring, compared to non-IBD specialised endoscopists suggesting potential targets for tailored interventions.
- Future initiatives should focus on developing AI-based tools to automate scoring, creating comprehensive reporting templates, and establishing minimum reporting standards to enhance quality reporting and standardise UC care.

Availability of Data and Materials

All data included in this study are available at request by contacting the corresponding author.

Author Contributions

AJKK: Analysis and interpretation of data, writing: original draft, critical revisions and editing, final approval. SR: Data analysis, methodology review, data interpretation, critical revisions, final approval. EL: Study conception, data collection, critical revisions, final approval. JKL: Study conception, methodology, project supervision, critical revisions, curation of the manuscript, final approval. All authors agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethics Approval and Consent to Participate

As a quality improvement project, utilising anonymised, non-sensitive, routinely collected data with no patient intervention or associated risk, it did not meet the criteria for research, and, therefore, formal ethics approval was not required, as per NHS health research authority decision tool. This aligned with the principles of the Declaration of Helsinki (1975, as amended in 2013). The project was registered with the Trust Audit and Quality Improvement Department. Patient-related data were stored within the trust's secure network.

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Conflict of Interest

The authors declare no conflict of interest. Jimmy K. Limdi is serving as one of the Editorial Board members of this journal. We declare that Jimmy K. Limdi had no involvement in the review of this article and has no access to information regarding its review.

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