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DIGITALIZATION AND TELEMEDICINE IN COLOPROCTOLOGY AS STEPS TOWARD THE FORMATION OF A MODERN SYSTEM OF SPECIALIZED CARE IN UZBEKISTAN

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Abstract. In the context of a shortage of specialized personnel and unequal access to coloproctological care in Uzbekistan, digitalization and telemedicine are emerging as critical directions for healthcare modernization. This narrative review explores the potential of digital technologies to improve accessibility, quality, and clinical effectiveness of specialized services. The study focuses on the pilot implementation experience at the Multidisciplinary Clinic of the Center for Professional Development of Medical Personnel, which introduced digital patient routing, automated diagnostics, histological-laboratory integration, and remote consultations. The findings reveal a reduction in diagnostic delays, increased treatment adherence, and higher patient satisfaction. The analysis supports the conclusion that digital tools serve a system-forming role and should be prioritized as a strategic axis of coloproctology reform in Uzbekistan.
Keywords: telemedicine, digital health, coloproctology, patient routing, specialized care, Uzbekistan, e-health

Introduction

Coloproctological diseases have a significant impact on public health, including the rising incidence of chronic inflammatory bowel diseases and colorectal cancer. International healthcare systems emphasize early diagnosis, a multidisciplinary approach, and the development of outpatient care models, including telemedicine and digital patient routing. The rapid advancement of digital technologies in medicine was particularly evident during the COVID-19 pandemic.

In Uzbekistan, despite the general trend toward healthcare reform, specialized coloproctological care has remained fragmented until recently. Most regions lack dedicated departments and trained specialists, leading to delayed diagnosis and limited access to care. Telemedicine and digitalization, although officially supported under national programs such as "Digital Health – 2030," are still being implemented in a limited manner and do not yet cover the field of coloproctology [9].

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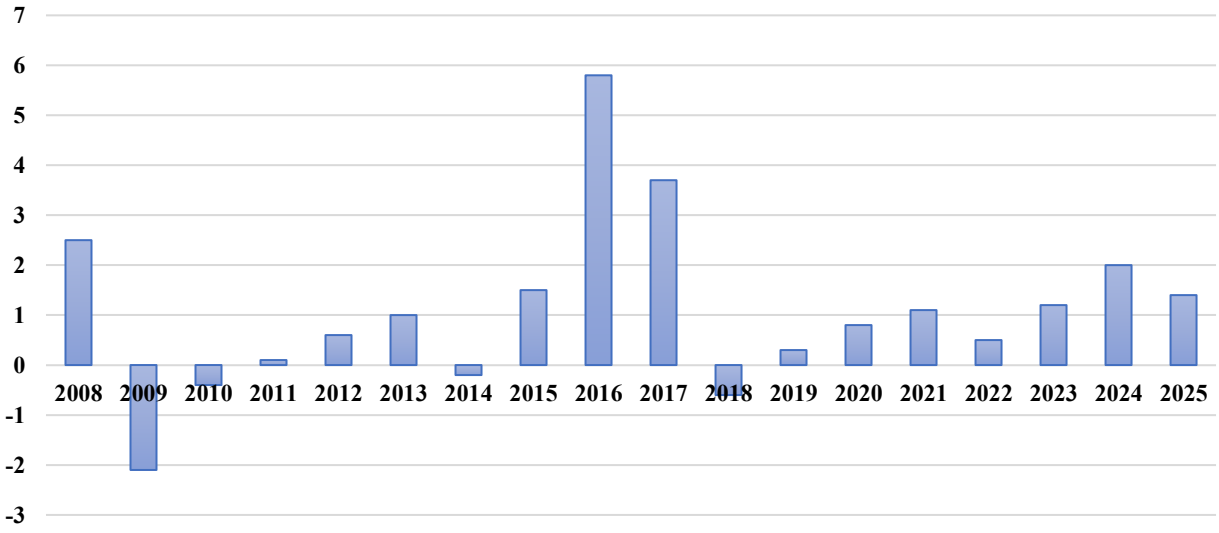

Figure 1. Dynamics of the increase in the number of patients with coloproctological pathology in Uzbekistan for the period 2008–2025

Uzbekistan is characterized by irregular patterns of seeking coloproctological care, reflecting both a lack of specialized infrastructure and the absence of established patient pathways (Fig. 1). This increases the burden on hospitals, prolongs diagnostic timelines, and underscores the relevance of introducing digital solutions to enhance system stability and predictability.

Against this background, the present study aims to analyze the potential of digital solutions and telemedicine technologies as tools for modernizing coloproctological care in Uzbekistan. The work is based on a comparison of international and national experiences, as well as the results of pilot projects introducing digital models in selected regions.

Methodology

This study was conducted in the format of a thematic review, with a focus on analyzing the current state of coloproctological care in Uzbekistan and assessing the potential for its digital transformation. The methodology is based on a comparative-analytical approach and includes the review of regulatory documents, human resource and infrastructure statistics, as well as program initiatives in the field of digital healthcare. The analysis covered not only quantitative indicators but also institutional mechanisms that determine the accessibility and organization of care.

The comparative analysis included models from countries with well-developed digital infrastructure - such as the United Kingdom, Japan, South Korea, Kazakhstan, and others. The comparison criteria covered the status of coloproctology in the healthcare system, the completeness of diagnostics, the presence of electronic registries and patient routing, and the degree of telemedicine integration [3–6]. Priority was given to solutions that have demonstrated reproducibility, resilience, and applicability in resource-constrained settings.

Results

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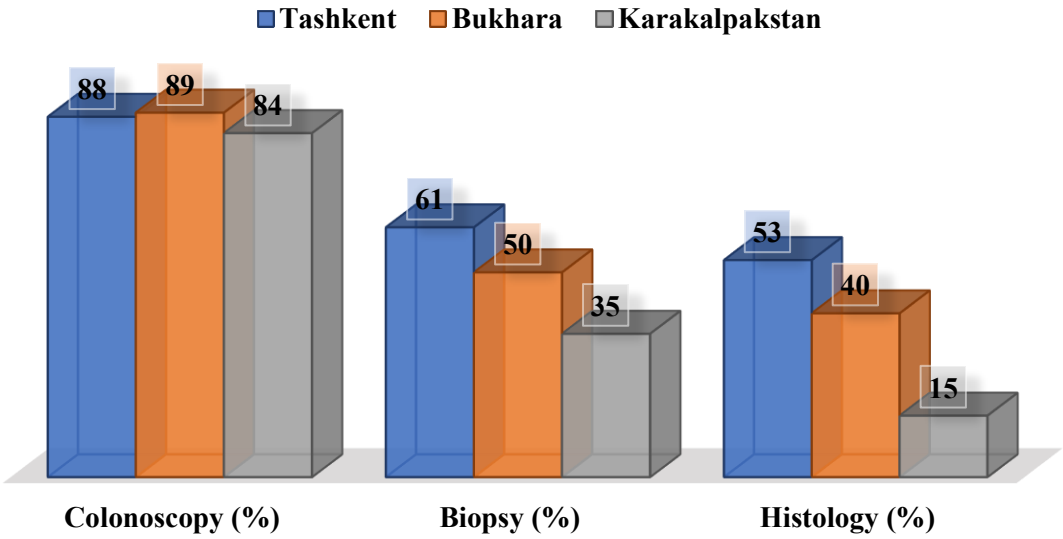
The implementation of digital solutions within the framework of the pilot project conducted at the Multidisciplinary Clinic of the Center for Professional Development of Medical Personnel significantly improved the efficiency of the diagnostic stage in coloproctological care. Prior to digitalization, patients had to wait 7 to 12 days for examination results: system fragmentation, manual data transfer, and lack of informational integration delayed the diagnostic process.

Figure 2. Comparative analysis of diagnostic coverage for ulcerative colitis in Tashkent, Bukhara, and Karakalpakstan (%)

The identified parameters of the diagnostic stage highlight the systemic vulnerability of the traditional model of coloproctological care (Figure 2). Even with a stable level of patient visits, the diagnostic process suffered from fragmentation, delays, and lack of coordination between



services. These findings underscore the need to transition from a disjointed structure to an integrated digital model that can reduce diagnostic delays, eliminate duplications, and enable more rational allocation of resources.

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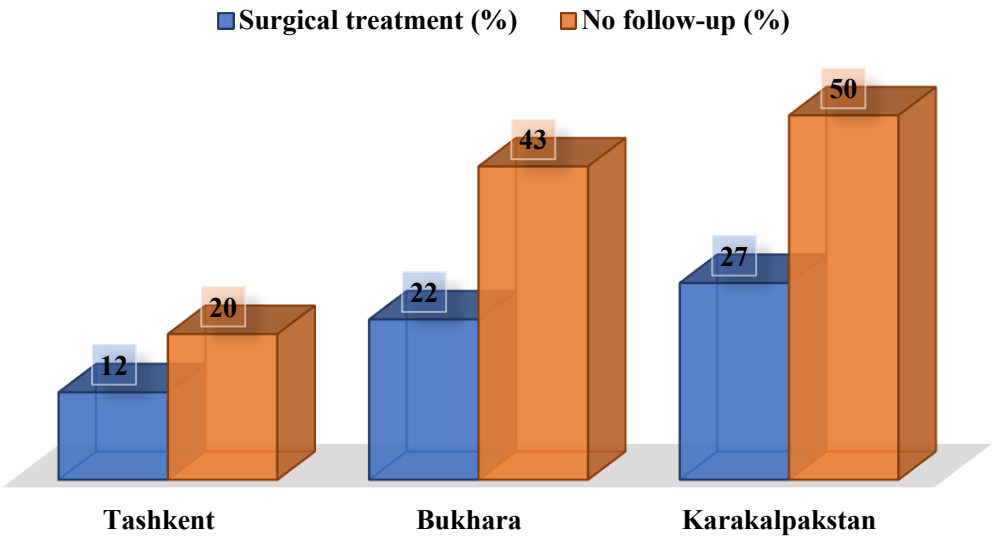

Figure 3. Frequency of surgical treatment and proportion of patients outside of dispensary observation by region (%)

The increasing share of remote consultations in the structure of care delivery illustrates a shift toward a hybrid model of medical services (Figure 3). Remote formats do not replace in-person care but allow for redistribution of workload, increased coverage, and better patient retention within the follow-up system. This is particularly significant for regions with a shortage of specialists: telemedicine has become a vital link between peripheral areas and the republican center, improving access to specialized coloproctological care.

Additionally, a patient identification system based on face ID was introduced, eliminating registration errors and ensuring personalized access to medical information. Electronic notifications and checkpoints within the system helped avoid missed examinations and improved the synchronicity of service coordination. Physicians gained real-time access to laboratory, endoscopic, and histological results, enabling faster diagnosis and timely treatment without unnecessary delays. This effect was confirmed by both specialists and patients, who reported improved predictability, speed, and transparency of medical procedures.

At the same time, the practice of telemedicine consultations was systematically expanded. Before the implementation of the project at the Multidisciplinary Clinic of the Center for Professional Development of Medical Personnel, remote interaction formats were virtually unused. The new model included both doctor-to-doctor (regular online case conferences between Multidisciplinary Clinic's specialists and regional doctors) and doctor-to-patient formats (including post-hospital follow-up, therapy adjustments, repeat consultations, and more). By the end of the pilot period, remote consultations accounted for 20–25% of all visits, especially in planned appointments and follow-up care. The electronic routing system, integrated with the schedule and the patient's individual electronic medical record, enabled prompt referrals for consultation or additional examinations, avoiding duplication of visits. Remote formats helped reduce unnecessary hospitalizations and mitigated staff shortages in remote regions.

These structural changes influenced patient perceptions of care quality. According to standardized surveys conducted at the Multidisciplinary Clinic, over 90% of patients rated their treatment positively. They especially appreciated: access to test results in electronic format,

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direct communication with physicians, transparency of examination routes, and automatic SMS and mobile reminders. The introduction of the “patient personal cabinet” increased patient awareness and led to greater adherence to treatment. Indirectly, this resulted in fewer self-initiated refusals of hospitalization and a higher proportion of patients completing rehabilitation.

In addition, significant clinical and organizational effects were recorded. Early detection and proper triage of patient referrals helped reduce the share of emergency hospitalizations by 15–20%. Colonoscopy coverage with biopsy approached the target of 90% (compared to less than 60% before the project). The average length of hospital stay decreased due to the widespread adoption of minimally invasive treatment methods and a shift to staged outpatient–inpatient care. This freed up bed-days, reduced the burden on medical staff, and increased the system's flexibility in a resource-constrained setting. Thus, the experience of the Multidisciplinary Clinic confirms that digitalization and telemedicine in coloproctology are not auxiliary but systemic tools for sustainable reform.

Discussion

The results obtained demonstrate that even under conditions of limited human and infrastructural resources, it is possible to significantly improve the effectiveness of specialized coloproctological care through the implementation of digital solutions. The key factor behind the success of the pilot project at the Multidisciplinary Clinic was not so much the technological equipment itself, but rather the institutionalized model of digital patient routing and clinical continuity, which was integrated into everyday practice.

One of the most significant outcomes was the reduction in diagnostic time. Literature emphasizes that delays in diagnosing colorectal pathologies are correlated with later-stage detection and poorer oncological outcomes. The creation of an end-to-end digital system covering laboratory, endoscopic, and morphological stages eliminated critical delays. Similar solutions were previously tested in cancer centers in the UK and Japan and demonstrated an increase in early-stage colorectal cancer detection.

The development of telemedicine formats helped partially compensate for the shortage of specialized personnel and expand the scope of outpatient follow-up. International experience (in particular, NHS Digital and DamuMed) [6] confirms that remote consultations in coloproctology are not only effective for postoperative follow-up but also play a key role in patient triage based on urgency and severity. In Uzbekistan, this format was systematically tested for the first time within a specialized service, representing a qualitative shift in practice.

The high level of patient satisfaction supports the hypothesis that digitalization should not be seen as a replacement for in-person care, but as a means to enhance the transparency, accessibility, and manageability of the treatment process. The introduction of a "patient personal cabinet," electronic reminders, and the possibility of online contact with a physician not only increases loyalty to the system but also ensures better adherence to therapeutic recommendations. Similar effects were previously recorded in studies on the implementation of telemedicine in the management of chronic inflammatory bowel diseases in Germany and South Korea [5].

Conclusion

The experience of implementing digital solutions and telemedicine tools as part of the pilot project at the Multidisciplinary Clinic demonstrates that even with limited resources, it is possible to establish a more effective and accessible system of specialized coloproctological care. The digitalization of patient routing, automation of diagnostics, electronic histology and

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laboratory modules, as well as the introduction of remote consultations, made it possible to reduce the time to diagnosis, increase treatment adherence, and lower administrative barriers in communication between patients and the healthcare system.

The results obtained highlight that digital tools are not auxiliary technologies but serve a system-forming function, setting new standards for clinical logistics, quality control, and patient-centered interaction. The achievements of the pilot project make it possible to view digital transformation as a key direction in the reform of coloproctological services in Uzbekistan-especially in the context of staff shortages and regional disparities in access to care. Scaling up such models requires institutional support, regulatory standardization, and the training of personnel capable of integrating digital practices into clinical decision-making.

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