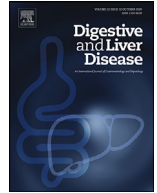




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Alimentary Tract

Therapeutic adherence in inflammatory bowel disease: User guide from a multidisciplinary modified Delphi consensus



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ABSTRACT

Background: Therapeutic non-adherence can significantly impair the quality of life of patients affected by inflammatory bowel disease (IBD), leading to worse treatment outcomes, more frequent hospitalizations, and increased healthcare expenses. Identifying and enhancing treatment adherence is a key goal in managing IBD.

Aim: To establish a consensus on the definition of therapeutic adherence, determination of risk factors, and identify patients with IBD at higher risk of non-adherence.

Methods: A modified Delphi method was employed to develop consensus statements. Initially, an extensive literature review was conducted on therapeutic adherence in patients affected by IBD, leading to the formulation of 13 statements. These statements were assessed and approved after two rounds of voting (level of agreement 1 to 9; cut-off ≥ 7 for approval).

Results: In the first voting round, all 13 statements achieved a mean score of ≥ 7 . During a subsequent plenary session, 12 of the 13 statements reached positive consensus, with final cumulative agreement ranging from 80 % to 100 %.

Conclusion: The 12 statements are intended to offer practical guidance to enhance therapeutic adherence in patients with IBD. Patients' profiles at higher risk of non-adherence need prompt recognition and implementation of appropriate strategies by dedicated physicians.

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1. Introduction

Inflammatory bowel disease (IBD), encompassing Crohn's disease (CD) and ulcerative colitis (UC), are chronic, immune-mediated condition characterized by alternating periods of flare-

ups and remission, with an often unpredictable progression [1–3]. Maintenance therapy is beneficial in reducing relapses, need for surgery, hospitalizations, and risk of developing colorectal cancer [4–7]. Additionally, active disease phases can severely impact the quality of life, which typically improves and returns to normal during remission [8,9].

Maintenance therapy may consist of daily oral medications (including 5-aminosalicylic acid [5-ASA], steroids, azathioprine, and 6-mercaptopurine), topical treatments (such as medicated enemas

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and suppositories), and advanced therapies (i.e., biologic therapies and small molecules that are typically administered as injection/infusion, or orally, respectively). Non-adherence rates in studies on patients with IBD range from 30–40 % with a maximum of around 60 % [10,11]. Adherence is affected by a variety of interconnected factors related to both patients and healthcare, including symptoms, type of treatment, route of administration, side effects, medication costs, healthcare beliefs, social factors, and cultural influences [12,13]. Some of these are more easily identifiable in a clinical context (i.e., psychiatric comorbidity, smoking, absence of caregiver), while behavioral or social aspects are not highlighted during clinical interviews [14].

Medication adherence is essential in providing high-quality care in patients with IBD and heavily impacts clinical outcomes and quality of life. According to the World Health Organization, adherence is defined as “the extent to which a person’s behavior – taking medication, following a diet, and/or executing lifestyle changes – corresponds with agreed recommendations from a health care provider” [15]. Conversely, nonadherence refers to any deviation from the prescribed treatment plan and can be assessed by the degree to which a patient’s actions differ from the agreed-upon therapeutic plan. Despite great efforts to standardize assessment of therapeutic adherence, and to increase it in patients with IBD, the definition of therapeutic adherence in the context of IBD is still debated. Many open issues remain on how clinicians should assess it and how to identify patients with IBD who are at risk for non-adherence. Our goal was to achieve consensus on the definition of therapeutic adherence, risk factors, and profile of patients with IBD at risk of non-adherence, as well as to establish clinically relevant indications to maximize therapeutic adherence. This updated recommendation serves to guide physicians on how to address and improve this unmet need in IBD.

2. Methods

The Delphi method is a structured approach for reaching expert consensus [16,17]. This research project utilized a modified Delphi method with a panel of expert gastroenterologists specializing in IBD to establish consensus on unresolved issues concerning therapeutic adherence in IBD.

The Steering Committee (SC) was composed of 10 members (Supplementary Table 1): 8 gastroenterologists (ADB, AA, FC, SD, MV, FC, PG, AO) with relevant expertise in managing IBD, one psychologist (DL) with expertise in chronicity management and therapeutic adherence, and one patient advocate (SL) who is a representative of the Italian Patients Association (AMICI Italia).

At the first meeting (November 2023), the SC drafted and validated a patient survey and established the basis for the systematic literature review. The outputs of these analyses, combined with the SC’s experience in clinical practice, formed the basis for the creation of the statements.

Next (May 2024), the SC met to analyze the key points of the literature review and the preliminary results of the patient survey. The clinicians worked individually using a shared folder to draft the statements, which were subsequently amended and revised. After receiving the final results of the patient survey, these drafts were further discussed and refined by SC members via a virtual meeting in July 2024. A total of 13 statements were generated. From August to September 2024, consensus on these statements was sought from the input of additional 33 Italian experts in IBD. The first round of voting was blinded and web based. A second and final virtual meeting was held in November 2024 between the SC and 33 voting experts. The statements that reached consensus were approved and included herein. The entire process is summarized in Fig. 1.

Further information on the methodology and details on the different phases can be found in the Supplementary Materials and Supplementary Figure 1.

2.1. Pre-Delphi research

2.1.1. Patient survey

The SC developed and validated a 37-question survey for patients with IBD, divided into three sections. The questionnaire was distributed via AMICI Italia’s official channels under the supervision of its director (SL) from February to June 2024. The responses were anonymized and analyzed by age group (years): Boomers (≥ 60 years), Gen X (44–59 years), Millennials (28–43 years), and Gen Z (18–27 years), to identify age-specific needs. An English translation of the survey is provided in Supplementary Table 2, and characteristics of the respondent are detailed in Supplementary Table 3.

2.1.2. Systematic and targeted reviews

An extensive literature review was conducted using the PubMed/MEDLINE, Embase, and Scopus databases up to September 2024 to identify evidence on definition and management of therapeutic adherence to conventional and biologic therapies for IBD. Information on the methodology can be found in the Supplementary Materials. The screening and selection process according to inclusion and exclusion criteria is shown in the PRISMA diagram in Supplementary Figure 2. The results of the patient survey and the literature review were summarized using descriptive statistics and analyzed qualitatively.

2.2. Modified Delphi process

The modified Delphi method, aimed at achieving consensus, involves identifying knowledge gaps and engaging participants with clinical and academic expertise.

2.2.1. Development and validation of statements

According to the evidence from patient survey and the systematic review, the SC developed 13 statements divided into 3 domains: (I) definition, extent and relevance of the problem; (II) high-risk categories and predictors of non-adherence; (III) strategies to improve adherence in IBD patients.

2.2.2. Statement validation: voting

The 33-member panel of gastroenterologists, from Italy, evaluated 13 statements over two rounds of voting. The first was conducted individually online, and the second during a live virtual meeting, where the first-round results were discussed, and statements were amended in real time as needed. The agreement was rated on a 9-point scale (1 = no agreement, 9 = complete agreement) with statements scoring ≥ 7 in the first and second rounds considered approved. Statements that did not achieve consensus after the 2nd voting round were rejected. The final list includes all statements that successfully met consensus.

3. Results

3.1. Current definitions in the literature

After deduplication and screening, 63 publications with 2231 IBD patients (56.8 % UC, 43.2 % CD) were included for qualitative analysis (Supplementary Figure 2). The main threshold adopted as an endpoint in the studies included to define adherence was ≥ 80 % and ranged from 20 % to 89.5 %. Therapeutic adherence was assessed through objective methods in most studies (~ 75 %, i.e., medication possession ratio, proportion of days covered), and in

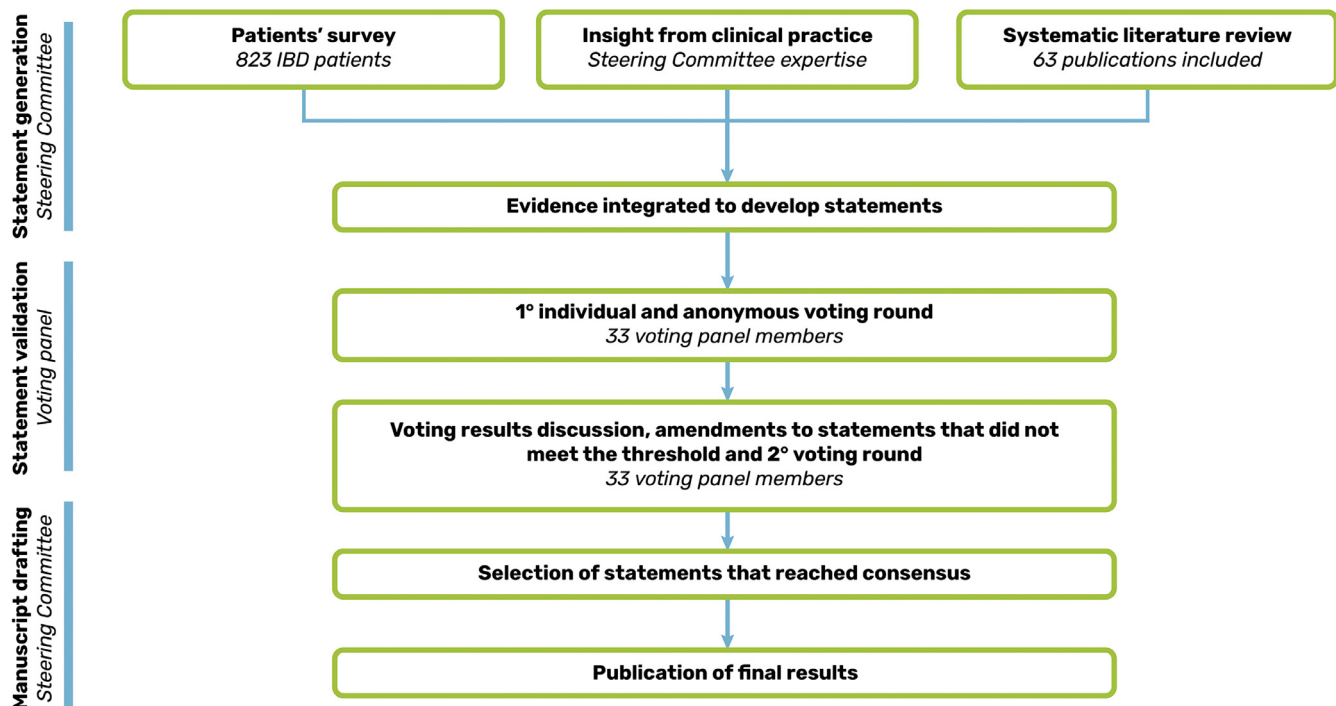


Fig. 1. Flowchart of the modified Delphi method process used for statement development and validation. Statements were generated based on a patient survey ($n = 823$), clinical practice insights, and a systematic literature review (63 publications). These statements underwent individual anonymous voting rounds by a panel of 33 experts, with discussions and revisions following the first round. Final consensus statements were selected and incorporated into the final publication.

the remaining through subjective measures (i.e., compliance questionnaire). Adherence to treatment consistently showed a significant association with a reduced risk of disease flare ($p < 0.001$) across studies. The wide range of adherence rates reported underscores the heterogeneity among studies and the absence of a standardized method to measure adherence. There was little published evidence about interventions that may improve adherence.

3.2. Patient survey

A total of 823 patients responded to the survey (response rate 74.8 % of the invited), 443 women (53.8 %) and 380 men (46.2 %). Supplementary Table 3 summarizes the characteristics of the respondents. The results of the survey are shown in Table 2. More than half of participants identified forgetfulness as the primary reason for not taking their therapy, over 22 % expressed concern about side effects, and one-fifth reported skipping their therapy during periods of clinical well-being. Among the main reasons for non-adherence, the complexity of the therapeutic regimen (too many medications and varying doses) was cited in 6 % of responses, particularly among Gen X respondents. Additionally, a lack of personal motivation and trust in the therapy was especially noted among Gen Z respondents. When asked which mode of administration best facilitated adherence, >75 % of all participants indicated an oral route. Notably, approximately 60 % of the respondents reported that once-daily oral administration would be highly beneficial in improving their therapeutic adherence. Among survey participants, approximately 30 % identified periodic consultations with their physician or nurse as their preferred support to improve adherence (this response was particularly popular among Boomers). Over 22 % indicated that reducing the number of drug administrations would enhance their adherence (a majority choice among Gen Z respondents). Finally, among Millennials and Gen Z respondents, there was a strong preference for support through apps or technological tools and activation of support groups. Three central issues, highlighted in the results of the survey, were selected and discussed by the board: (i) simplification of therapies

and their compatibility with daily life, (ii) motivation for treatment in the absence of symptoms, and (iii) acceptance of the disease in younger people.

3.3. Statements

All 13 statements attained a mean score of ≥ 7 in the first round of voting. However, following the discussion before the second round, one statement was removed (Supplementary Table 4). In the second round of voting, and after discussing possible improvements, the mean agreement improved for all statements, resulting in approval of 12 statements. Table 1 details the final approved statements and their mean level of agreement. The complete list of statements with the results of the first and second rounds of voting and the changes made are shown in Supplementary Table 4.

4. Discussion

4.1. Section 1: definition, extent, and relevance of the problem

4.1.1. Statement 1 [mean score: 8.3]

Non-adherence is defined as suboptimal medication use by patients; although there is no specific cut-off between adherence and non-adherence, taking 80 % of the medication can reasonably define an adherent patient.

In relation to this statement, the discussion and voting revealed a clear majority agreement. The 80 % cut-off is widely utilized in the cardiovascular field and other chronic diseases [18,19]. Specifically, for IBD, systematic reviews indicate that 80 % adherence to therapy is the most adopted threshold in studies investigating both conventional therapies and advanced therapies with parenteral administration [20–22].

4.1.2. Statement 2 [mean score: 8.4]

Medication adherence is shaped by patients' attitudes, lifestyles, engagement, and the involvement of healthcare providers and healthcare systems.

Table 1

Final consensus statements agreed on how to define and manage therapeutic adherence in patients with IBD.

Validated statements after the 2 ^o voting round (N = 33)		MEAN	SD
Section 1: definition, extent and relevance of the problem			
1	Non-adherence is defined as suboptimal medication use by patients; although there is no specific cut-off between adherence and non-adherence, taking 80 % of the medication can reasonably define an adherent patient.	8.3	0.5
2	Medication adherence is shaped by patients' attitudes, lifestyles, engagement, and the involvement of healthcare providers and healthcare systems.	8.4	0.7
3	Non-adherence is associated with an increased risk of IBD flares and progression, poorer quality of life, and increased healthcare utilization and costs.	8.6	0.5
4	Medication adherence is essential to maximize the effectiveness of both conventional and advanced therapies in patients with IBD.	8.6	0.7
Section 2: high-risk categories and predictors of non-adherence			
5	Among patients with IBD, the main factors of non-adherence include young age, male sex, single status, recent diagnosis of IBD, fear of side effects and/or a complex treatment regimen.	8.0	1.6
6	Additional risk factors for non-adherence in patients with IBD include relationship problems, sexual dysfunction, psychopathological comorbidities, educational level and high work complexity.	8.3	1.0
7	Among patients with IBD, those who are elderly and/or frail, not self-sufficient, on polypharmacy or without a caregiver are at particular risk of non-adherence.	8.4	0.9
8	In patients with IBD, simplified, patient-tailored and monitored treatment regimens are associated with higher adherence.	8.2	1.6
Section 3: strategies to improve adherence			
9	As promoting adherence is an integral part of treatment, we recommend that healthcare providers assess adherence during clinical follow-up and promote patient support.	8.4	1.6
10	Successful strategies to improve medication adherence in patients with IBD include educating, counseling and empowering patients to understand their treatment regimen, its necessity and benefits.	8.7	0.6
11	To promote adherence, clinicians should adapt their communication approach based on the patient's age and other characteristics.	8.5	0.6
12	Technological tools may be useful to maximize adherence in patients with IBD.	8.3	0.7

IBD: inflammatory bowel disease; SD: standard deviation.

Medication adherence is a multifaceted phenomenon that is influenced by a combination of patient-related factors and external elements. Medication-related concerns and beliefs have been extensively examined in relation to therapeutic adherence in IBD. Patients who exhibit ambivalence, skepticism, or indifference toward the necessity of a medication may demonstrate lower adherence to therapy [23]. Patients' perspectives on their condition and the treatments prescribed are crucial in shaping adherence. These include their understanding of the disease, beliefs about medication effectiveness and necessity, and concerns about side effects. Adherence behaviors are further influenced by lifestyle factors such as daily routines, dietary patterns, and comorbidities. Moreover, active involvement of patients in their healthcare, reflected in their participation in treatment decisions and commitment to self-management, serves as a key determinant of adherence. Medication accessibility, affordability, and healthcare delivery models (e.g., telemedicine, integrated care) significantly influence adherence. Systems that ensure continuity of care, minimize barriers, and offer support services like counseling or reminders are more effective in promoting adherence.

4.1.3. Statement 3 [mean score: 8.6]

Non-adherence is associated with an increased risk of IBD flares and progression, poorer quality of life, and increased healthcare utilization and costs.

Non-adherence to treatments prescribed for IBD is a significant factor in exacerbating disease outcomes [24–26]. Poor adherence to medication regimens significantly increases the risk of disease flare-ups, with non-adherence rates of 30–45 % in IBD patients linked to a 5-fold higher relapse risk. This leads to more frequent hospitalizations (up to 80 % higher in non-adherent patients), increased need for intensive treatments, and a higher likelihood of complications. Inadequate adherence also accelerates disease progression, as uncontrolled inflammation contributes to irreversible gastrointestinal damage. Moreover, it drives greater healthcare utilization, with non-adherent patients incurring up to 50 % higher medical costs due to increased outpatient visits, diagnostics, and hospital admissions. [27,28]. Thus, suboptimal adherence not only worsens clinical outcomes, but also places a considerable burden on healthcare systems.

4.1.4. Statement 4 [mean score: 8.6]

Medication adherence is essential to maximize the effectiveness of both conventional and advanced therapies in patients with IBD.

Adherence ensures that therapeutic drug concentrations are sustained, which is necessary for both the immediate control of symptoms and long-term prevention of disease progression. For conventional therapies, such as aminosalicylates, adherence reduces inflammation in the gastrointestinal tract and lowers the risk of flares [24,25]. Advanced therapies, such as biologics and small-molecule inhibitors, rely heavily on adherence to maintain therapeutic drug levels and avoid the development of anti-drug antibodies [29] that can neutralize the drug's effectiveness or accelerate its clearance, leading to secondary loss of response. Studies indicate that non-adherence rates to biologics in IBD range from 14 % to 45 %, with inadequate adherence associated with a 3- to 5-fold increased risk of treatment failure. Poor adherence can lead to sub-therapeutic drug levels, which in turn increases the likelihood of developing anti-drug antibodies, reported in 20–50 % of patients on biologics, significantly reducing drug efficacy [30]. Patients with detectable ADAs have up to a 70 % higher risk of secondary loss of response, often requiring dose escalation, treatment switching, or early discontinuation. Consistent administration of these agents is critical to suppress the inflammatory cascade and prolong remission.

4.2. Section 2: high-risk categories and predictors of non-adherence

4.2.1. Statement 5 [mean score: 8.0]

Among patients with IBD, the main factors of non-adherence include young age, male sex, single status, recent diagnosis of IBD, fear of side effects and/or a complex treatment regimen.

Non-adherence to prescribed therapies is influenced by a range of demographic, psychosocial, and treatment-related factors. Younger patients, particularly adolescents and young adults, often exhibit lower medication adherence due to several factors, including developmental challenges, limited understanding of the chronic nature of the disease, and a lack of health-related self-management skills. This age group may also experience difficulties in integrating long-term treatment into their lifestyle, often prioritizing immediate concerns like social activities or academic performance over the management of a chronic condition. Studies have shown that

Table 2
Results of patients' survey discussed to formulate the statements.

Question	n = 823 n (%)
What is the main cause that affects the worsening of your Quality of Life? (more answers possible)	
Physical symptoms/disorders of the disease	510 (62.0)
Dietary restrictions	125 (15.0)
Discomfort in social relationships and work activities	305 (37.0)
The need to always take the therapy	206 (25.0)
The disease does not worsen my quality of life	148 (18.0)
Other (specify)	0 (0.0)
What could help you improve your regular therapy adherence? (up to 3 answers possible)	
Periodic consultation with nurse/physician	228 (27.7)
Reducing the number of times a day you take the medication*	184 (22.4)
Detailed informational material about the drug and the disease	95 (11.5)
Apps or technological reminder tools	(24.8)
Support groups/communities of patients with similar conditions	139 (17.0)
More communication and clarification from the physician Changing the mode of administration	191 (23.3)
110 (13.4)	
Do you know the benefits of regular therapy adherence?	
Yes	740 (89.9)
No	10 (1.2)
Not sure	73 (8.9)
What is the main reason that leads/would lead you to not take therapy correctly and regularly?	
Fear of side effects	183 (22.2)
Because I have no symptoms, and I think I don't need it Forgetfulness	106 (12.9)
398 (48.4)	
Lack of personal motivation and confidence in the therapy	51 (6.2)
Complexity of the therapeutic regimen (too many drugs/doses)	44 (5.3)
Lack of clear information about the treatment	41 (5.0)
Do you think that the oral route promotes regular therapy adherence?	
Yes	625 (75.3)
No	198 (24.7)
Would it be useful if oral therapy could be taken only once a day?	
Very Useful	486 (58.9)
Quite Useful	256 (31.2)
Not Useful	81 (9.8)
What type of oral formulation would help facilitate your regular adherence?	
Tablet	338 (41.3)
Sachet	26 (3.0)
Capsule	50 (6.0)
Chewable tablet	44 (5.2)
The formulation does not affect my adherence	244 (29.5)
I do not take oral therapies	121 (14.7)
Do you find psychological support useful?	
Yes, I have already activated it	134 (16.3)
Yes, I would find it useful	401 (48.7)
No, I am not interested	288 (35.0)
How could the physician improve their communication and support you in regular therapy adherence? (select 3 options)	
Clear language	130 (15.7)
Dedicated time	117 (14.2)
Human relationship	149 (18.1)
Understanding ability	62 (7.5)
Asking direct questions	23 (2.7)
Continuity/presence of the same physician in follow-up visits	181 (22.1)
Possibility to easily reach the physician outside appointments	161 (19.7)

*in case of oral therapy.

male patients are generally less adherent to their prescribed treatment regimens compared to females [31,32]. This may be linked to sex-related differences in health behavior, where males may have a lower propensity for seeking healthcare support or may be less likely to engage in proactive health management. Additionally, men may be more likely to underreport symptoms or avoid treatment due to the perceived stigma of having a chronic illness. Being unmarried or living alone may reduce social support, which is a known facilitator of adherence [32,33]. The absence of such support may contribute to forgetfulness, lack of motivation, and difficulty managing the complex treatment regimens often required for IBD. Patients with newly diagnosed IBD may lack sufficient understanding of the disease and the importance of long-term adherence to treatment [29]. They may also struggle to cope with the psychological impact of diagnosis of a chronic illness, which can manifest as denial or resistance to treatment. Concerns about adverse effects, such as immunosuppression, risk of infection, and or-

gan toxicity, can lead to intentional non-adherence. Polypharmacy or regimens requiring frequent dosing, monitoring, or injections can overwhelm patients, leading to unintentional non-adherence [33]. For instance, oral medications requiring multiple daily doses (e.g., mesalamine) may be challenging for patients with demanding schedules.

4.2.2. Statement 6 [mean score: 8.3]

Additional risk factors for non-adherence in patients with IBD include relationship problems, sexual dysfunction, psychopathological comorbidities, educational level, and high work complexity.

Interpersonal conflicts and psychiatric conditions like anxiety, depression, and somatization, which are common in IBD patients, undermine adherence by causing emotional distress, reduced motivation, and lack of support in managing treatment regimens. Psychiatric conditions, including anxiety, depression, and somatization disorders, are prevalent among patients with IBD and are strongly

associated with non-adherence [34]. Depression reduces motivation, impairs cognition, and fosters negative health perceptions, thereby undermining adherence. Anxiety, fueled by concerns about disease or side effects, often leads to avoidance or inconsistent use of medication [35]. Limited education hampers understanding of treatment and its importance, while high-demand jobs with long hours or stress disrupt adherence and may trigger disease flares, further complicating management.

4.2.3. Statement 7 [mean score: 8.4]

Among patients with IBD, those who are elderly and/or frail, not self-sufficient, on polypharmacy, or without a caregiver are at particular risk of non-adherence.

Aging is associated with cognitive decline (e.g., mild cognitive impairment or early dementia as prevalent as 10–20 % in those over 65 years), reduced mobility, and physical frailty (characterized by sarcopenia and diminished functional reserves). These conditions compromise the ability to manage complex treatment regimens. Frailty, defined as a state of increased vulnerability due to decreased physiological reserves, exacerbates these challenges. Studies indicate that up to 40 % of elderly patients struggle with adherence to chronic disease management who can be 1.5–2 times more likely to be non-adherent, particularly in those with multiple comorbidities that are common in IBD, such as cardiovascular disease or diabetes. Rates of polypharmacy in patients with IBD can reach 40–50 % [36] and is associated with a 30–50 % higher risk of non-adherence due to treatment complexity and side effects [33,37]. Social isolation in patients with IBD and without caregivers increases depression, anxiety, and non-adherence, with higher rates of missed appointments and therapeutic non-adherence.

4.2.4. Statement 8 [mean score: 8.2]

In patients with IBD, simplified, patient-tailored and monitored treatment regimens are associated with higher adherence.

Simplified, patient-tailored, and actively monitored treatment regimens are associated with higher adherence due to several mechanisms. Complexity in treatment, such as multiple medications with varying dosing schedules, increases the cognitive and logistical burden on patients, particularly those with comorbidities or limited health literacy. Studies show that reducing the frequency of dosing (e.g., once-daily versus multiple times per day) can improve adherence by 20–40 %. Fixed-dose combination therapies and medications with extended-release formulations also reduce the risk of missed doses. Personalized care approaches, including shared decision-making, have been associated with a 30–50 % improvement in adherence to treatment in IBD.

4.3. Section 3: strategies to improve adherence

4.3.1. Statement 9 [mean score: 8.4]

As promoting adherence is an integral part of treatment, we recommend that healthcare providers assess adherence during clinical follow-up and promote patient support.

Regular assessment of adherence during follow-up visits ensures timely identification of non-adherence, enabling early interventions. Meta-analyses show that interventions combining education and behavioral support improve adherence rates by up to 40 %. Collaborative discussions about treatment options and tailoring regimens to align with patient preferences can reinforce adherence and lead to lower rates of hospitalization. Incorporating dietitians, mental health specialists, and pharmacists ensures comprehensive support. Patient associations foster a sense of community by connecting individuals with shared experiences; peer support can improve adherence by 15–30 %, since patients feel more understood and motivated [34].

4.3.2. Statement 10 [mean score: 8.7]

Successful strategies to improve medication adherence in patients with IBD include educating, counseling and empowering patients to understand their treatment regimen, its necessity and benefits.

When healthcare providers offer counseling that validates these concerns and provides coping strategies, patients feel supported and are more likely to continue with their prescribed therapies. Patients who receive psychological counseling as part of their IBD treatment plan have been shown to have up to 30 % higher adherence rates compared to those who do not receive such support. Additionally, these patients experience up to a 40 % reduction in disease flare-ups, as the counseling addresses psychological barriers to adherence such as stress, depression, and anxiety, which are common in IBD patients [38]. Empowerment improves a patient's confidence in their ability to manage their illness and treatment: when involved in decision-making about their treatment regimen, patients were 25–40 % more likely to adhere to prescribed therapies compared to those whose treatment decisions were solely made by healthcare providers. [38]. Patients engaged in shared decision-making have demonstrated improved quality of life and a 15–20 % reduction in hospitalization rates due to better disease control and more consistent treatment adherence [39].

4.3.3. Statement 11 [mean score: 8.5]

To promote adherence, clinicians should adapt their communication approach based on the patient's age and other characteristics.

Effective communication with younger patients requires age-appropriate language, visual aids, and involvement of caregivers or parents to ensure they understand their treatment regimens [40,41]. In case of elderly patients, clinicians should use clear, simple language and repeat key points to enhance understanding. Written instructions, large-print materials, and reminders may also be beneficial. Studies show that a patient-centered communication style, where patients are encouraged to ask questions and actively participate in their care, improves clinical outcomes significantly. Involving patients in decision-making enhances their sense of autonomy and investment in their care, which correlates with improved adherence [40,41]. Tailoring also accounts for comorbid conditions, minimizing the risk of polypharmacy and drug interactions. In this statement and throughout the last section of the statements we acknowledge the limitation of not having involved IBD nurses and colorectal surgeons in the development of the proposed items, which may have reduced the multidisciplinary scope of the findings. In Italy, IBD care is mainly delivered by gastroenterologists in specialized centers, with IBD nurses playing an emerging but not yet consistently integrated role. The IBD nurse plays a fundamental role in supporting patient education, monitoring, and continuity of care, all of which are essential for improving treatment adherence.

4.3.4. Statement 12 [mean score: 8.3]

Technological tools may be useful to maximize adherence in patients with IBD.

Active follow-up through in-person appointments, telemedicine, or digital health tools (e.g., apps that track symptoms and medication use) helps ensure adherence and allows early detection of non-compliance [42,43]. Mobile health apps are designed to provide patients with a user-friendly platform to track their symptoms, medication intake, and lifestyle habits [44]. These apps can also offer reminders for medication doses, scheduled appointments, and lifestyle modifications, which can significantly improve adherence [44]. Available evidence indicates that direct methods, such as measuring drug metabolite levels, provide objective measures of medication adherence. Nonetheless, self-report tools like the Visual Analogue Scale (VAS) and the Medication Adherence Report Scale (MARS) remain valuable [45,46], offering reliable and

practical alternatives for routine clinical use, with the potential to be integrated into patient-centered technological tools.

5. Conclusions

In essence, adherence to medication is not solely a matter of individual responsibility, but it is influenced by a variety of factors arising from the dynamic interaction between the patient, their environment, and the healthcare system.

To improve adherence in patients with IBD, there are a number of practical steps that healthcare professionals can take in their day-to-day care. First, simplify medication regimens to make them more manageable, such as using once-daily doses or long-acting formulations. This reduces cognitive load and makes it easier for patients to stay on track. Second, implementing caregiver support programs to help with reminders and provide emotional support, which can be particularly beneficial for patients struggling with complex treatments.

Clinicians should make adherence a part of every appointment and explain the consequences of non-adherence, involving patients in treatment decisions and empowering them to take responsibility for their own care. Finally, encourage open communication and provide practical solutions, such as educational resources or peer support. The limitations of this study include the absence of an IBD nurse in the authors' multidisciplinary team, the lack of specific data comparing adherence in different clinical scenarios, and the absence of inferential statistics on patient survey data. Finally, we acknowledge that our study did not specifically address adherence comparisons across different care settings, and that only limited evidence on this topic was identified and considered. Still, we are confident that our proposed framework will serve as a valuable guide for health professionals to enhance patient adherence to therapeutic plans and other aspects of care. By addressing barriers, incorporating adherence evaluations into standard care, and fostering a supportive environment, healthcare providers can significantly improve management of IBD, enhance therapeutic outcomes, and reduce associated healthcare burdens.

Author contributions

Guarantor of the article: corresponding author.

Author contributions: All authors conceived the subject of the paper, contributed to the critical interpretation and supervised the project. ADB performed literature research and wrote the manuscript. All the authors critically reviewed the content of the paper and approved the final version of the manuscript.

Data availability

The data supporting this article is available in its online supplementary material and upon request to the corresponding author.

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Declaration of competing interest

Silvio Danese reports consultancy fees from AbbVie, Alimentiv, Allergan, Amgen, Applied Molecular Transport, AstraZeneca, Athos Therapeutics, Biogen, Boehringer Ingelheim, Bristol Myers Squibb, Celgene, Celltrion, Dr Falk Pharma, Eli Lilly, Entera, Ferring Pharmaceuticals Inc., Gilead, Hospira, Inotrem, Janssen, Johnson & Johnson, Morphic, MSD, Mundipharma, Mylan, Pfizer, Roche, Sandoz, Sublimity Therapeutics, Takeda, Teladoc Health, TiGenix, UCB Inc.,

Vial, Vifor. Dr. Silvio Danese reports lecture fees from Abbvie, Amgen, Ferring Pharmaceuticals Inc., Gilead, Janssen, Mylan, Pfizer, Takeda

Flavio Caprioli served as consultant to Abbvie, MSD, Takeda, Janssen, Roche, Celgene, Bristol-Meyers Squibb, Galapagos, Gilead, Pfizer, Mundipharma, Biogen, Ferring, Eli-Lilly, Nestlè, Lionhealth, AlfaSigma, Dr Falk. He received lecture fees from Abbvie, Ferring, Takeda, Allergy Therapeutics, Janssen, Pfizer, Biogen, Sandoz, Tillotts Pharma, Vifor Pharma, AlfaSigma, and unrestricted research grants from Giuliani, Sofar, MSD, Takeda, Abbvie, Celltrion, Pfizer, Actial.

Arianna Dal Buono declares speaker's fees from AbbVie, Galapagos, Janssen, Eli Lilly, Ferring and Celltrion.

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David Lazzari has no conflict of interest to declare.

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Appendix

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Supplementary materials

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