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ORIGINAL ARTICLE

Use of digital health tools in inflammatory bowel disease

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Abstract
Objective: To analyse the characteristics and use of digital health tools (DHT) in inflammatory bowel disease (IBD).
Methods: We performed a qualitative study based on a narrative literature review, a questionnaire and on the opinion of 3 expert gastroenterologists. Several searches were carried out until September 2022 through Medline to identify articles on the use of DHT in IBD by healthcare professionals. A structured questionnaire was designed to be answered by health professionals involved in the care of patients with IBD. The experts generated a set of recommendations.
Results: There are multiple DHT for IBD with different characteristics and contents. We received 29 questionnaires. Almost 50% of the participants were 41–50 years old, the majority were women (83%) and 90% were gastroenterologists. A total of 96% reported the use of several DHT, but 20% used them occasionally or infrequently. Web pages were found the most used (62%). DHT are mostly used to get information (80%), followed by clinical practice issues (70%) and educational purposes (62%). G-Educainflamatoria website is the best known and most used HDS (96% and 64%, respectively). The main barriers to the use of DHT in IBD were the lack of time (55%), doubts about the benefit of DHT (50%) and the excess of information (40%).
Conclusions: Healthcare professionals involved in the care of patients with to IBD frequently use DHT, although actions are needed to optimize their use and to guarantee their efficient and safe use.

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PALABRAS CLAVE
Herramientas digitales en salud;
Enfermedad inflamatoria intestinal;
App;
Opinión de expertos;
Encuesta;
Revisión narrativa

Uso de herramientas digitales en salud en enfermedad inflamatoria intestinal

Resumen
Objetivo: Analizar las características y el uso de herramientas digitales en salud (HDS) en la enfermedad inflamatoria intestinal (EII).
Métodos: Estudio cualitativo basado en una revisión narrativa de la literatura, un cuestionario y en la opinión de 3 gastroenterólogos expertos en la EII. Se realizó una búsqueda en Medline hasta septiembre de 2022 para identificar artículos sobre HDS relacionadas con la EII usadas por profesionales de la salud. Se diseñó un cuestionario estructurado para ser contestado por profesionales de la salud relacionados con el cuidado de pacientes con EII. En base a esto, se han generado recomendaciones sobre este tema.
Resultados: Existen múltiples HDS para la EII con distintas características y contenidos. Se recibieron 29 cuestionarios. Aproximadamente el 50% de los participantes tenían entre 41-50 años, la mayoría eran mujeres (83%) y el 90% gastroenterólogos. El 96% refería utilizar alguna HDS, el 20% hacía un uso puntual o poco frecuente, y las HDS más utilizadas eran las páginas web (62%). El motivo principal de uso es la obtención de información (80%), seguido de la práctica clínica (70%) y la educación (62%). La web G-Educainflamatoria es la HDS más conocida y usada (96 y 64%, respectivamente). Las principales barreras al uso de HDS en la EII eran la falta de tiempo (55%), las dudas de su beneficio (50%) y el exceso de información (40%).
Conclusiones: Los profesionales sanitarios dedicados a la EII utilizan con frecuencia HDS si bien se precisan acciones para optimizar el uso de HDS en la EII y garantizar un uso eficiente y seguro de las mismas.

Introduction

The World Health Organization (WHO) defines digital health as the field of knowledge and practice related to the development and use of digital technologies to improve health.[1] It is built on a multitude of different technological elements such as websites, blogs, mobile applications *(apps)*, social media, smart devices or artificial intelligence (AI), which overall we can call digital health tools (DHT).[2] Recently, AI-based tools like ChatGPT® (https://chat.openai.com) have emerged as one of the options with the greatest potential.[3] These technologies may be able to transform certain aspects of the healthcare system, including access to healthcare, daily clinical practice, the relationship with patients, the development of research, and the overall management of the healthcare system and its resources.[2] All of this has a very positive impact on patient care and prognosis.[2] However, DHT face numerous challenges such as privacy and security, cost and low levels of digital health literacy.[4]

The use of DHT here in Spain is now widespread. A national questionnaire involving 750 healthcare professionals revealed that 90% of healthcare professionals use some DHT, and 81% acknowledge that they can no longer do without DHT in their daily practice. Furthermore, 92% report currently trusting digitalisation compared to 41% before the SARS-CoV-2 pandemic.[5]

In inflammatory bowel disease (IBD), there are various DHT available and studies have analysed their characteristics from the patient's perspective and their impact on those patients.[6–8] However, little is known about the level of knowledge, skills and characteristics of current use of DHT by healthcare professionals (especially gastroenterologists) for the management of all aspects relating to comprehensive care for patients with IBD.[9,10]

Based on the above, we decided to carry out a project to identify which DHT are designed for use by healthcare professionals involved in the management of patients with IBD, and to find out how they are used.

Methods

We conducted a qualitative study based on a narrative review of the literature, a questionnaire and expert opinion. This study was carried out in full compliance with the principles established in the latest version of the Declaration of Helsinki regarding medical research in humans and in accordance with the applicable regulations on Good Clinical Practices. First, a group was set up of three gastroenterologists experts in the use of DHT in IBD (IR-L, BG and FMG) who defined the objectives and design of the literature review, as well as the project questionnaire. Given the large volume of articles published on DHT, the decision was made to focus the project on the most used ones, of which include websites, social media and *apps*. Other DHT such as telemedicine or other digital tools such as search engines (ClinicalKey® or UptoDate®) were then excluded.

Narrative review of the literature

A review was conducted in Medline using Pubmed's *Clinical Queries* tool and individual searches were performed with controlled language *(Mesh)* and free text terms until

September 2022. Terms such as *''inflammatory bowel disease''*, *''Crohn's disease''*, *''ulcerative colitis''* and *''digital technology''* were used. Searches were also performed using the main search engine. Our objective was to identify articles on the characteristics of DHT developed for use by healthcare professionals involved in the management of patients with IBD. Systematic literature reviews, as well as randomised clinical trials (RCT), uncontrolled clinical studies, and qualitative studies were selected. Two reviewers independently selected articles (first by title and abstract, then by reading the full articles) and collected data. Evidence and results tables were then generated. The quality of the studies was assessed using the 2011 Oxford scale.[11] At the same time, Google was used to explore websites related to IBD, both nationally and internationally, as well as other DHT suggested by the participants in this project.

Design, launch of the questionnaire and data collection

A structured, electronic questionnaire with 16 closed questions was designed (Appendix A, Supplementary material), to be answered by healthcare professionals involved in the management of patients with IBD over 18 years of age and resident in Spain. The questionnaire was sent via email on 3 April 2023 and closed on 17 May 2023. A reminder was included two weeks after the first email. The questionnaire was completed by healthcare professionals belonging to the Fundación Encuentros Médicos Quirúrgicos en EII [Medical Surgical Meetings in IBD Foundation], which had 298 members at the time the survey was sent out. The following variables were collected: 1) sociodemographic (age, gender, autonomous region in Spain); 2) relating to clinical practice (speciality/professional field, doctor in training or consultant, years of professional activity, level of care, mainly dedicated to IBD, work in an IBD unit; 3) relating to the use of DHT in IBD including use, frequency of use, reason for use (information, publication, *networking*, educational, for clinical practice, research, support for speciality and patients, others), level of knowledge and use of specific DHT in IBD, the most used DHT including *X* (formerly Twitter®), Instagram®, Facebook®, specific *apps* for IBD, blogs or consultation websites, podcasts, TikTok®, other(s), barriers and facilitators to the use of DHT.

Nominal group meeting

The experts discussed the results of the review and questionnaire and developed a series of recommendations on the use of DHT in IBD.

Statistical analysis

Data analysis was carried out using the Stata 12© statistical program (Stata Corporation, College Station, TX, EE, USA). A descriptive analysis of the data was performed. The categorical variables are described as frequencies and percentages.

Editing the final document

The results of the review, the questionnaire and the recommendations were summarised in a publication which was reviewed by all project participants.

Results

Narrative review of the literature

The different search strategies obtained a total of 312 articles, most of them (95%) related to the use of DHT by patients, and to a lesser extent by healthcare professionals (5%). Last of all, 13 articles of moderate quality were included, several of which are also scoping reviews.[2,6,7,12–21]

The studies focus on some type of specific DHT, mainly social media,[12,13] but also *apps*[7,15] or others such as websites.[2,6,14,16–21] Very few studies have examined the overall use of IBD-related DHT in the gastroenterology community and the impact these have on daily practice and health outcomes.

The reasons for use are very diverse. One of the studies included was a review that analysed these DHT in relation to social media.[12] This work shows that gastroenterologists use social media mainly for continuing medical education, clinical practice (for example, diagnostic or treatment strategies, management of non-medical clinical scenarios not included/discussed in the standard clinical practice guidelines, new treatments, patient education, patient care), *advocacy* (''activism'', ''corporatism'', support for/promotion of the disease, patients and healthcare professionals) and for *networking*.[12] This same article points out that the majority of gastroenterologists consider the impact produced by the use of social media to be positive.[12]

Other included reviews have shown (with a low level of evidence) that the use of DHT focused on improving the education and self-management of patients with IBD could reduce the number of visits and telephone calls to the gastroenterologist.[6,7,17]

In parallel with the literature review, several DHT in IBD were analysed both nationally and internationally. Tables 1–3 summarise the characteristics of the main websites, *apps* and social media available in relation to the disease. Regarding the websites and *apps* analysed (Tables 1 and 3), most of them have different related contents, including informative, educational and on clinical practice. Healthcare professionals are also the main audience in many of them and access is usually mixed, with one free area and another area restricted to members. The social media evaluated (Tables 2 and 3) have very similar characteristics, although the content tends to be more specific and they are generally open. It should be noted that in Spain there are also DHT related to IBD at the regional/local level (for example, websites of regional scientific societies).

Lastly, we would like to point out that we did try to investigate the possible financing of the DHT. Although some of them do mention financing, most of them do not, which does not necessarily mean they do not receive any.

Table 1 Characteristics of the main websites and *apps* on inflammatory bowel disease analysed.

Digital tool	Type	Developer	Scientifically valid	Main audience	Language	Access	Update
geteccu.org[a]	Website Website/*app*	GETECCU	Yes	Healthcare workers	Spa	Mixed (free and members area)	Yes
geteii.com[b]	Website	GETEII	Yes	Nursing staff	Spa	Mixed (free and members area)	Yes
educainflammatory.com[c]	Website	GETECCU	Yes	Patients, healthcare professionals	Spa	Mixed (free and members area)	Yes
aegastro.es[d]	Website	AEG	Yes	Healthcare workers	Spa	Mixed (free and members area)	Yes
SEPD[e]	Website	SEPD	Yes	Healthcare workers	Spa	Mixed (free and members area)	Yes
accuesp.com[f]	Website	ACCU España	Yes	Patients	Spa	Mixed (free and members area)	Yes
ecco-ibd.eu[g]	Website	ECCO	Yes	Healthcare workers	Eng	Mixed (free and members area)	Yes
UEG.eu[h]	Website	UEG	Yes	Healthcare workers	Eng	Mixed (free and members area)	Yes
gi.org[i]	Website	ACG	Yes	Healthcare workers	Eng	Mixed (free and members area)	Yes
Atomic IBD[j]	Website	Private	Yes	Healthcare workers	Eng	Free with free subscription option	Yes
ibd-eii.com[k]	Website	Private	Yes	Healthcare workers	Eng	Free with free subscription option	Yes
ECCO IBD[l]	*App* Android®, iOS®	ECCO	Yes	Healthcare workers	Eng	Mixed (free and members area)	Yes
GI guidelines *app*[m]	*App* Android®, iOS®	UEG	Yes	Healthcare workers	Eng	Free	Yes
IGIBD scores[n]	*App* Android®, iOS®	IG-IBD	Yes	Healthcare workers	Eng	Free	N/A
GEDIIB[o]	Android®, iOS®	Brazilian Organisation for CD and Colitis	Yes	Healthcare workers	Spa, Eng, Por	Open	N/A

Apps: mobile applications; EII: enfermedad inflamatoria intestinal [inflammatory bowel disease]; Eng: English; IBD: inflammatory bowel disease; N/A: not known; Por: Portuguese; Spa: Spanish.

[a] Grupo Español de Trabajo en Enfermedad de Crohn y Colitis Ulcerosa (GETECCU) [Spanish Working Group on Crohn's Disease and Ulcerative Colitis]; https://geteccu.org/.

[b] Grupo Enfermero de Trabajo en Enfermedad Inflamatoria Intestinal (GETEII) [Nursing Working Group on Inflammatory Bowel Disease]; http://geteccu.org/grupos-de-trabajo/geteii/que-es-geteii.

[c] G-Educainflamatoria; https://educainflamatoria.com/.

[d] Asociación Española de Gastroenterología (AEG) [Spanish Association of Gastroenterology]; https://www.aegastro.es/.

[e] Sociedad Española de Patología Digestiva (SEPD) [Spanish Society of Gastrointestinal Pathology]; https://www.sepd.es/inicio.

[f] Confederación de Asociaciones de Enfermos de Crohn y Colitis Ulcerosa de España (ACCU) [Confederation of Spanish Crohn's and Ulcerative Colitis Patient Associations]; http://www.accuesp.com/es/.

[g] European Crohn's and Colitis Organisation (ECCO); https://www.ecco-ibd.eu/.

[h] United European Gastroenterology (UEG); https://ueg.eu/.

[i] American College of Gastroenterology (ACG); https://gi.org/.

[j] Atomic IBD; https://charlielees.substack.com/.

[k] IBD-EII; https://ibd-eii.com/.

[l] ECCO IBD; https://play.google.com/store/apps/details?id=cc.conferences.eccosociety.

[m] GI Guidelines App: https://play.google.com/store/apps/details?id=eu.ueg.qualityofcare&hl=en&pli=1.

[n] Italian Group for the study of inflammatory bowel disease (IG-IBD); www.igibdscores.it/en/.

[o] Organização Brasileira de Doença de Crohn e Colite (GEDIIB); https://gediib.org.br/.

Table 2 Characteristics of the main social media in inflammatory bowel disease analysed.

Identity	Social network[a]	Main audience	Language	Followers[b]
GETECCU[c] @geteccu		Healthcare workers	Spa	X: 11,300
GETEII[d] @GETEII @geteii.enfermeria GETEII	X, I, F	Nursing staff	Spa	X: 2717 I: 1575 F: 1224
AEG[e] @aegastro	X, L, F	Healthcare workers	Spa	X: 18,091 L: 949 F: 1003
SEPD[f] @sepddigestiva SEPD Sociedad Española de Patología Digestiva [Spanish Society of Digestive Pathology]	X, L, F	Healthcare workers	Spa	X: 18,535 L: 3545 F: 3925
ACCU[g] @ACCU_Espana @accu_espana ACCU España	X, I, F	Patients, healthcare professionals	Spa	X: 8203 I: 8830 F: 18,000
ECCO[h] @Y_ECCO_IBD @D_ECCO_IBD	X	Healthcare workers	Eng	X: 1650
UEG[i] @my_ueg UEG — United European Gastroenterology	X, I, L, F	Healthcare workers	Eng	X: 14,813 I: 3778 L: 6923 F: 21,797
ACG[j] @AmCollegeGastro @amcollegegastro	X, I, L, F	Healthcare workers	Eng	X: 37,798 I: 7815 L: 12,183 F: 27,000
Duke GI Journal Club[k] @GIJournal	X	Healthcare workers	Eng	X: 3501
IBDJournalClub @IbdClub	X	Healthcare workers	Eng	X: 3353
#MondayNightIBD #MondayNightIBD	X, I	Healthcare workers	Eng Spa	X: 9245 I: 1227 F: 459
#Scoping Sundays @ScopingSundays	X, I	Healthcare workers	Eng	X: 10,914 I: 295
GI @GI	X	Healthcare workers	Eng	X: 926

Spa: Spanish; Eng: English.

[a] Social network; X®: formerly Twitter®; F: Facebook®; I: Instagram®; L: Linkedin®.

[b] Number of followers [Accessed 16 October 2023].

[c] Grupo Español de Trabajo en Enfermedad de Crohn y Colitis Ulcerosa (GETECCU) [Spanish Working Group on Crohn's Disease and Ulcerative Colitis]; https://geteccu.org/.

[d] Grupo Enfermero de Trabajo en Enfermedad Inflamatoria Intestinal (GETEII) [Nursing Working Group on Inflammatory Bowel Disease]; http://geteccu.org/grupos-de-trabajo/geteii/que-es-geteii.

[e] Asociación Española de Gastroenterología (AEG) [Spanish Association of Gastroenterology].

[f] Sociedad Española de Patología Digestiva (SEPD) [Spanish Society of Digestive Pathology].

[g] Confederación de Asociaciones de Enfermos de Crohn y Colitis Ulcerosa de España (ACCU) [Confederation of Spanish Crohn's and Ulcerative Colitis Patient Associations].

[h] European Crohn's and Colitis Organization (ECCO).

[i] United European Gastroenterology (UEG).

[j] American College of Gastroenterology (ACG).

[k] Duke GI Journal Club; https://sites.duke.edu/gijournalclub/.

Table 3 Type of content of health tools in inflammatory bowel disease.[a]

Websites and apps	Informative	Publicising	*Networking*	Educational	Clinical practice guidelines	Research	*Advocacy*
geteccu.org[b]	X	X	X	X	X	X	X
geteii.com[c]	X	X	X	X	X	X	X
educainflammatory.com[d]		X		X	X		
aegastro.es[e]	X	X	X	X	X	X	X
sepd.es[f]	X	X	X	X	X	X	X
accuesp.com[g]	X	X	X	X			X
ecco-ibd.eu[h]	X	X	X	X	X	X	X
UEG.eu[i]	X	X	X	X	X	X	X
gi.org[j]	X	X	X	X	X	X	X
Atomic IBD[k]	X	X	X	X	X		X
ibd-eii.com[l]	X	X	X	X	X		
ECCO IBD[m]	X	X	X	X	X	X	X
GI guidelines app[n]					X		
IGIBD scores[o]					X		
GEDIIB[p]					X		
Social media							
GETECCU[b]	X	X	X	X		X	X
GETEII[c]	X	X	X	X			X
AEG[e]	X	X	X	X			X
SEPD[f]	X	X	X		X		X
ACCU[g]	X	X	X	X			X
ECCO[h]			X	X		X	
UEG[i]	X	X	X		X		X
ACG[j]	X	X	X	X			X
Duke GI Journal Club[q]		X	X	X			
IBD Journal Club		X	X	X		X	
#Monday Night IBD	X	X	X	X	X		X
#Scoping sundays	X	X	X	X			
GI	X	X	X				X

IBD: inflammatory bowel disease; DHT: digital health tools.

[a] *Contents:* information (for example, to find out about courses, conferences, other news); Dissemination (for example, to give visibility to the disease, communicate results of studies, opinions); *Networking* (to learn, interact and/or collaborate with other healthcare professionals involved in the management of patients with inflammatory bowel disease); Educational (in the context of continuing education); clinical practice (for example, diagnostic or treatment strategies, management of clinical scenarios not included/discussed in the usual clinical practice guidelines, new treatments, patient education, patient care); Research (participation in projects or other activities related to research into inflammatory bowel disease); *Advocacy* support for speciality and patients (''activism'', ''corporatism'', rights, social aspects of the disease/promotion of the disease, patients and healthcare professionals involved in the care of these patients).

[b] Grupo Español de Trabajo en Enfermedad de Crohn y Colitis Ulcerosa (GETECCU) [Spanish Working Group on Crohn's Disease and Ulcerative Colitis]; https://geteccu.org/.

[c] Grupo Enfermero de Trabajo en Enfermedad Inflamatoria Intestinal (GETEII) [Nursing Working Group on Inflammatory Bowel Disease]; http://geteccu.org/grupos-de-trabajo/geteii/que-es-geteii.

[d] G-Educainflamatoria; https://educainflamatoria.com/.

[e] Asociación Española de Gastroenterología (AEG) [Spanish Association of Gastroenterology]; https://www.aegastro.es/.

[f] Sociedad Española de Patología Digestiva (SEPD) [Spanish Society of Gastrointestinal Pathology];https://www.sepd.es/inicio.

[g] Confederación de Asociaciones de Enfermos de Crohn y Colitis Ulcerosa de España (ACCU) [Confederation of Spanish Crohn's and Ulcerative Colitis Patient Associations]; http://www.accuesp.com/es/.

[h] European Crohn's and Colitis Organisation (ECCO); https://www.ecco-ibd.eu/.

[i] United European Gastroenterology (UEG); https://ueg.eu/.

[j] American College of Gastroenterology (ACG); https://gi.org/.

[k] Atomic IBD; https://charlielees.substack.com/.

[l] IBD-EII; https://ibd-eii.com/.

[m] ECCO IBD; https://play.google.com/store/apps/details?id=cc.conferences.eccosociety.

[n] GI Guidelines App: https://play.google.com/store/apps/details?id=eu.ueg.qualityofcare&hl=en&pli=1.

[o] Italian Group for the study of inflammatory bowel disease (IG-IBD); www.igibdscores.it/en/.

[p] Organização Brasileira de Doença de Crohn e Colite (GEDIIB); https://gediib.org.br/.

[q] Duke GI Journal Club; https://sites.duke.edu/gijournalclub/.

Questionnaire

We received 29 questionnaires (response rate of 10%) from all over Spain. The majority of the participants were female (83%), 45% were aged 41–50, 90% were gastroenterologists vs 10% surgeons, with all participants being consultants. Regarding their work experience, 45% had been active for 10–20 years, and 48% worked in a third-level hospital; 86% reported being mainly dedicated to IBD and 93% worked in an IBD Unit.

A total of 96% reported using some DHT in relation to IBD, 36% with a weekly frequency, 24% daily use and 20% occasionally or infrequently. We found that the main reason for use was to obtain information (80%), followed by clinical practice (70%) and education (62%), with websites being the most used tools (62%) (Table 4). More specifically, the website ''G-Educainflamatoria'' (educainflamatoria.com) is the most well-known and used DHT (96% and 64%), followed by the account @geteccu on the social medium X® (88% and 64%) respectively (Appendix table* 1 of the Supplementary material).

Among the reasons for not using or limited use of DHT in IBD, 55% of the participants state that they do not have enough time and 50% say there are too many tools and they are not sure how many they would have to use to obtain any benefit (Table 5). Lastly, it is worth highlighting that 92% consider that a way to improve these tools would be to have them endorsed by scientific societies or official bodies (Table 5).

Expert opinion

DHT have the potential to improve many areas related to the care of patients with IBD (Table 6). They can increase the knowledge and skills of healthcare professionals involved in the care of these patients, reduce their workload and the risk of errors, and also improve communication between doctors and patients, thus resulting in better quality of care. They also, for example, help give visibility to certain disorders and establish new relationships between healthcare professionals. DHT can contribute positively to research and to support for the speciality and patients. This is why many healthcare professionals use them, and it is expected that in the future they will become an essential part of day-to-day practice.

Despite the potential benefits of DHT in IBD, this new technological paradigm also brings new challenges for all those involved in the care of patients with IBD. Firstly, the arrival of DHT implies the need for healthcare professionals to acquire and develop certain knowledge, skills and attitudes regarding DHT (digital literacy and competence). This is why all healthcare professionals must become trained and start introducing changes into their daily practice. As in any other field, it is important to have the right disposition to be able to implement changes. An open, proactive, creative and innovative mindset and attitude among healthcare professionals can be a huge help. And, in terms of training, digital training programmes and strategies have been developed on websites and *apps* (based for example on videos, access to different websites with updated information, documents on medical procedures).[22] Tutorials and other support materials are also available.

Secondly, DHT in IBD have different usage characteristics and pursue different objectives. Therefore, taking into account the current large supply of DHT, it is necessary to look for those which adapt to the needs, skills and usage preferences of each healthcare professional at each moment. Due to the amount and diversity of information available, this often requires exploring the various DHT outside of working hours, thus requiring additional time to do so properly.

The results of our questionnaire have also raised doubts about the reliability and/or lack of applicability in clinical practice of DHT. At this point, experts recommend selecting those DHT endorsed by sources, such as scientific societies, which use the best available evidence and adapt their content to the different needs of healthcare professionals, including clinical practice. This is why the experts believe that scientific societies must adapt to new technologies and display all their resources through them. Tools such as ''G-Educainflamatoria'' are of note. This is an educational platform on IBD, created and updated by different healthcare professionals from the IBD units within the Grupo Español de Trabajo en Enfermedad de Crohn y Colitis Ulcerosa (GETECCU) [Spanish Working Group on Crohn's Disease and Ulcerative Colitis], to which doctors from different specialities, specialised nurses, psychologists, etc. have contributed. ''G-Educainflamatoria'' includes multidisciplinary information on different aspects related to IBD of special interest to patients and the healthcare professionals involved in their care. All of this can positively contribute to a better and greater use of DHT in IBD, especially relevant considering the time constraints.

Other issues to consider include privacy, security and legal aspects. Intensive work is currently underway to create different legal frameworks in the European Union to ensure the safe use of DHT, especially following the increasingly widespread use of AI. Meanwhile, experts recommend prioritising those that bear the seal of official societies or organisations, as well as the general recommendations given for the use of the Internet (Appendix table* 1 of the Supplementary material).

Discussion

The evolution of digital technology in society and in the productive sectors has raised the need for digital transformation in healthcare systems which can provide improvements in quality and efficiency.[6,7,17] Despite technological advances and the growing social demand to incorporate them into clinical practice, the degree of implementation in the healthcare sector is still low.

DHT plays a crucial role in providing unparalleled immediacy, facilitating rapid interactions and allowing real-time access from anywhere in the world and from almost any device. Its usefulness transcends geographical and temporal barriers, offering agile and dynamic platforms for the exchange of critical medical information.

In this project we have focused on the use, by healthcare professionals, of DHT (more specifically websites, *apps* or social media) related to IBD. We should point out first of

Table 4 Reasons for using digital health tools in inflammatory bowel disease.[a]

Tool	Information	Publication	*Networking*	Educational	Clinical practice guidelines	Research	*Advocacy*	Other
X®	15 (62.5%)	8 (33.3%)	6 (25%)	8 (33.3%)	11 (45.8%)	2 (8.3%)	6 (25%)	1 (4.2%)
Instagram®	5 (20.3%)	3 (12.5%)	0 (0%)	4 (16.7%)	3 (12.5%)	1 (4.2%)	2 (8.3%)	1 (4.2%)
Facebook®	2 (8.3%)	1 (4.2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
IBD-specific Apps	17 (70.8%)	2 (8.3%)	1 (4.2%)	13 (54.2%)	12 (50%)	6 (25%)	4 (16.7%)	2 (8.3%)
Blog or website consultation	17 (70.8%)	4 (16.7%)	4 (16.7%)	11 (45.8%)	15 (62.5%)	9 (39.6%)	3 (12.5%)	1 (4.2%)
Podcast	8 (33.3%)	6 (25%)	0 (0%)	6 (25%)	5 (20.3%)	1 (4.2%)	0 (0%)	1 (4.2%)
TikTok®	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (4.2%)

Apps: mobile apps; IBD: inflammatory bowel disease; X: formerly Twitter®.

[a] Reasons for use: Information (for example, to find out about courses, conferences, other news); Dissemination (for example, to give visibility to the disease, communicate results of studies, opinions); *Networking* (to learn, interact and/or collaborate with other healthcare professionals involved in the management of patients with inflammatory bowel disease); Educational (in the context of continuing education); Clinical Practice (for example, diagnostic or treatment strategies, management of clinical scenarios not included/discussed in the usual clinical practice guidelines, new treatments, patient education, patient care); Research (participation in projects or other activities related to research into inflammatory bowel disease); *Advocacy* Support for speciality and patients (''activism'', ''corporatism'', rights, social aspects of the disease/promotion of the disease, patients and healthcare professionals involved in the care of these patients).

Table 5 Barriers and facilitators for the use of digital health tools in inflammatory bowel disease.

	N (%)
Barriers	
Lack of time	11 (55%)
There are too many and I am not sure how many I would have to use to get any benefit	10 (50%)
Information overload	8 (40%)
Lack of knowledge	5 (25%)
I do not think they are better than the usual means (attendance at scientific meetings, textbooks, etc)	2 (10%)
They do not inspire confidence in me	1 (5%)
Language	1 (5%)
Facilitators	
That they are endorsed by scientific societies or official bodies	22 (92%)
That they are validated	12 (50%)
Better updating	6 (25%)
Greater privacy	2 (8.3%)
Lower level of complexity	2 (8.3%)

all that, although almost all healthcare professionals report using DHT, only a quarter do so frequently. This is partly explained by a lack of knowledge about and/or confidence in the tools, as reflected in the questionnaire. But it may also indirectly suggest a lack of skills in their use. It has been estimated that around 40% of Europeans lack basic digital skills.[4] This study also showed that the most common reasons for not using DHT were lack of time, overload of information and the complexity of the tools.[4] We also have to take into account our cultural context, in which scientific/academic interaction is also based on face-to-face interaction.

The DHT most commonly used in IBD are websites. These DHT have been available for many years and are fully integrated into the activity of the healthcare professionals. The main societies and organisations at least have a website where users can find a wide variety of contents. Other DHT such as social media are usually restricted to more specific content, which may explain why they are not used as much. Perhaps X® (formerly known as Twitter®) is the exception, as we found its use to be relatively widespread and it is versatile. Launched in 2006, not only was it one of the first social media to be created, it also enables fast and specific communication worldwide.

As far as the reasons for using DHT in IBD are concerned, in our questionnaire, the most common were searching for information (for example, courses, congresses, other news), for issues related to clinical practice and for continuing education. It is striking that they are not used as much for other activities such as research or *networking*, although this may be because not all healthcare professionals are involved in these fields, which, as we mentioned previously, many prefer to carry out face-to-face.

We should also highlight that the best known DHT in IBD most used by those who responded to the questionnaire is a digital tool from a scientific society (GETECCU) which guarantees the veracity and reliability of its contents. How-

Table 6 Expert reflections and recommendations for better use of DHT in IBD.

No.	*Related to efficient use of DHT*
1	Specific training in DHT (digital literacy and competence)
2	Open mindset and attitude towards DHT
3	Look for the one(s) that adapt to the needs, skills and usage preferences of each healthcare professional
4	Select DHT from more reliable sources such as scientific societies that use the best available evidence and adapt their content to the different needs of healthcare professionals, including clinical practice
No.	*Related to efficient use of DHT*
5	Use strong passwords (ideally also different ones) on accounts and applications
6	Use the privacy settings and review them regularly
7	Always keep the security systems of the devices you use, such as antivirus, up to date.
8	Report inappropriate content
9	Browse secure sites (https websites, digital certificate), especially the DHT of scientific societies or similar organisations
10	Use and download applications only from official sites
11	Disable wireless connections when not in use (wifi, Bluetooth)
12	Avoid connecting to public or unknown networks
13	Check the information offered on social media with recent evidence to confirm its veracity
14	Identify opinion leaders or people of world or national renown with experience and authority for obtaining information and checking opinions based on evidence
15	Indicate whether or not funding has been received, who is providing it, and, even if only briefly, describe what is being funded. Along with this, it should be easily consulted

IBD: inflammatory bowel disease: DHT: digital health tools.

ever, although as we have shown there is a wide variety of DHT in IBD with contents potentially of great interest to healthcare professionals, their use is not as widespread as one might perhaps expect. Lack of time, lack of confidence and the feeling that there are many options without a clear understanding of their benefits are the main barriers encountered, which indirectly, may also indicate that the level of knowledge and skills is not optimal. For this reason, the experts have proposed a series of recommendations, including those aimed at facilitating the use of DHT, such as specific courses, but also that the different DHT need to be assessed individually to select those that best adapt to the characteristics, technological skills and needs of the healthcare professional. Plus, when in doubt, or to begin this process, the DHT on IBD of the different national and international scientific organisations and societies need to guarantee that the content shown is reliable and safe.

Lastly, we need to mention a series of limitations in this project. Regarding the literature review, it was not systematic, which means that it cannot be guaranteed that we identified all articles related to the topic. However, search techniques typical of systematic reviews were used, so we would hope to have reviewed the most relevant literature for this work. The sample size and response rate achieved in the questionnaire were limited, and the average age of the participants may be relatively high and so not considered representative of the total population of interest, possibly reflecting some generational and cultural barriers to the use and type of use of DHT. Furthermore, all participants were specialist physicians, so these results may not apply to the majority of doctors on the Spanish resident doctor training programme (médico interno residente [MIR]) who, due to age and learning needs, may be making greater use of these media. All of this could also make it difficult to generalise the results. However, as we mentioned previously, around 40% of Europeans lack basic digital skills,[4] so it is only to be expected that these types of deficiencies would also apply to the general population of healthcare professionals involved in the management of IBD.

In summary, DHT have the potential to revolutionise the way patients with IBD are cared for, offering new avenues to improve patient care. Furthermore, the availability of more and better information for patients is expected to contribute to their active participation in their care and shared decision-making. In addition, DHT can significantly improve the activity of healthcare professionals and research outcomes. There are different DHT in IBD with very diverse characteristics and contents, which can be of great interest to healthcare professionals, but there are also multiple barriers that hinder their use. Therefore, further analysis, actions and strategies are needed to increase and improve the use of DHT in IBD.

Ethical considerations

This work did not include patients, so approval by an ethics committee was not required.

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Conflicts of interest

M. del Pilar Fortes, Ana Cábez, Kristy Sánchez and Daniel Arumí are employees of Pfizer (Spain). In the project they have collaborated on issues related to the execution of the project, which includes: the conception and structure of the article; the review of articles and data collection for the literature review; the transfer of the survey to SurveyMonkey®; and the review of the final document.

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Appendix A. Supplementary data

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