



Nursing resources and responsibilities according to hospital organizational model for management of inflammatory bowel disease in Spain[☆]

Laura Marín^a, Antonio Torrejón^b, Lorena Oltra^c, Montserrat Seoane^d, Paloma Hernández-Sampelayo^e, María Isabel Vera^f, Francesc Casellas^b, Noelia Alfaro^g, Pablo Lázaro^{g,*}, Valle García-Sánchez^h

^a Digestive System Service, Germans Trias i Pujol University Hospital, Badalona, Barcelona, Spain

^b Digestive System Research Unit, Vall d'Hebron University Hospital, Ciberehd, Barcelona, Spain

^c Digestive System Service, Manises Hospital, Manises, Valencia, Spain

^d Digestive System Service, Santiago de Compostela University Hospital, Santiago de Compostela, Spain

^e Digestive System Service, Gregorio Marañón University Hospital, Madrid, Spain

^f Gastroenterology and Hepatology Department, Puerta de Hierro University Hospital, Majadahonda, Madrid, Spain

^g Advanced Techniques in Health Services Research (TAISS), Madrid, Spain

^h Digestive System Service, Reina Sofía University Hospital, Córdoba, Spain

Received 9 December 2010; received in revised form 7 January 2011; accepted 7 January 2011

KEYWORDS

Inflammatory bowel disease;
Nursing;
Resources;
Responsibilities;
Survey

Abstract

Background: Nurses play an important role in the multidisciplinary management of inflammatory bowel disease (IBD), but little is known about this role and the associated resources.

Objective: To improve knowledge of resource availability for health care activities and the different organizational models in managing IBD in Spain.

Methods: Cross-sectional study with data obtained by questionnaire directed at Spanish Gastroenterology Services (GS). Five GS models were identified according to whether they have: no specific service for IBD management (Model A); IBD outpatient office for physician consultations (Model B); general outpatient office for nurse consultations (Model C); both, Model B and Model C (Model D); and IBD Unit (Model E) when the hospital has a Comprehensive Care Unit for IBD with telephone helpline, computer, including a Model B. Available resources and

[☆] Sources of support: This work was funded through an unrestricted grant from Abbott Laboratories.

* Corresponding author at: Advanced Techniques in Health Services Research (TAISS), C/Cambrils 49, 28034 Madrid, Spain. Tel.: +34 91 7310380; fax: +34 91 7302893.

E-mail addresses: lauramarinsan@gmail.com (L. Marín), tonith@gmail.com (A. Torrejón), digestivosagunto@hotmail.com (L. Oltra), mseoanefarre@gmail.com (M. Seoane), palomasampelayo@gmail.com (P. Hernández-Sampelayo), isabel.veramendoza@gmail.com (M.I. Vera), fcasella@vhebron.net (F. Casellas), nalfaro@taiss.com (N. Alfaro), plazaro@taiss.com (P. Lázaro), vallegarciasanchez@gmail.com (V. García-Sánchez).

activities performed were compared according to GS model (chi-square test and test for linear trend).

Results: Responses were received from 107 GS: 33 Model A (31%), 38 Model B (36%), 4 Model C (4%), 16 Model D (15%) and 16 Model E (15%). The model in which nurses have the most resources and responsibilities is the Model E. The more complete the organizational model, the more frequent the availability of nursing resources (educational material, databases, office, and specialized software) and responsibilities (management of walk-in appointments, provision of emotional support, health education, follow-up of drug treatment and treatment adherence) ($p < 0.05$).

Conclusions: Nurses have more resources and responsibilities the more complete is the organizational model for IBD management. Development of these areas may improve patient outcomes.

© 2011 European Crohn's and Colitis Organisation. Published by Elsevier B.V. All rights reserved.

1. Introduction

Inflammatory bowel disease (IBD) comprises a group of intestinal diseases characterized by chronic inflammation of the digestive tract. The two most common types of IBD are ulcerative colitis (UC) and Crohn's disease (CD). IBD is important due to its prevalence, incidence and clinical consequences. The prevalence of IBD is about 205 cases per 100,000 inhabitants.¹ Its incidence has been increasing in recent years in the developed countries and is currently estimated to be around 9 cases per 100,000 population and year.²⁻⁴

IBD mainly affects young persons in their productive or formative years, thus it has a considerable impact on clinical outcomes, quality of life, and use of resources.⁵⁻⁷ Accordingly, treatment of IBD attempts to maximize remission time, minimize secondary effects, alleviate symptoms, resolve complications, and improve patients' quality of life.

IBD management requires a multidisciplinary approach involving physicians, nurses, dieticians and social workers, among others; this in turn requires knowledge and definition of the role of the different professionals involved. Aware of this multidisciplinary approach, some hospitals have established Comprehensive Care Units for IBD (CCU), which include health education in IBD, a responsibility generally assumed primarily by nurses, or other similar strategies related with nursing. Despite the importance of nurses, however, there are numerous gaps in our knowledge. For example, little is known about the impact of nursing activities on patient outcomes, as shown by the synthesis of the evidence by Hernández-Sampelayo et al.⁸ Another example is the lack of knowledge of the number of offices for nurse consultations in Spain for IBD management,^{9,10} as well as information about other resources and organizational models such as IBD outpatient offices for physician consultations. Accordingly, the objective of the present study was to improve the knowledge on resources availability for health care activities and on the different organizational models in managing IBD in Spain.

2. Materials and methods

This was a descriptive, cross-sectional, observational study. Data were obtained from a survey of Gastroenterology

Services (GS) in public hospitals and private hospitals contracted by the Social Security system in Spain. GS was defined as the service (e.g., reporting to the hospital medical director), section (e.g., reporting to the Internal Medicine Service), or unit (e.g., other) responsible for gastroenterology care in a hospital. The criteria for inclusion of a GS were that it: 1) met the definition of a GS; 2) was located in a public hospital or a private hospital contracted by the public sector; and 3) agreed to participate in the survey by answering the questionnaire.

A scientific committee was established to carry out the project, consisting of five nurses and three gastroenterologists who manage IBD, from seven Spanish hospitals. The centers that met the inclusion criteria were contacted to offer them the possibility to participate. The centers that agreed to participate had 4 weeks to answer the self-completed questionnaire used to collect the variables of interest. The questionnaire, developed by the scientific committee, included a description of the resources available to nursing staff and the nurses' activities in the management of IBD, with special attention to variables describing aspects related with structure and process. The variables included in the questionnaire were: a) hospital and GS (type of hospital, if it is a reference center for IBD, number of beds in the hospital and the service, existence of a day hospital for intravenous infusions, and research and training activities); b) human resources in the GS, such as number of physicians and nurses in the office and on the ward; c) GS activity (number of visits related with digestive disease in 2008, number of patients with IBD seen in the GS, and number of consultations for IBD in 2008); d) management of IBD (availability of outpatient office for nurse consultations, IBD outpatient office for physician consultations and CCU), availability of a telephone helpline and persons responsible for staffing it (only nurses, only physicians, or nurses and physicians); e) resources (office, computer, telephone, specialized software, databases, and educational material for patients); and f) frequency with which nursing staff assume responsibilities for patient care, such as control of disease activity indices, administration of quality of life questionnaires, patient follow-up in accordance with drug protocols, assessment of nutritional status, treatments, administration of medications, follow-up and compliance with non-biological treatments, training in self-medication, resolution or referral of walk-in visits, health education and emotional support (always/almost always vs. half of the time/sometimes/never).

Data entry was performed as the questionnaires were received, between June and September 2008. Telephone monitoring was conducted during the data entry process to correct potential errors of interpretation of the respondents. In this way, we tried to avoid under- or over-estimating the volume of work or available resources.

To study the resources available in each hospital and the organizational model for IBD management, a variable was created to classify the existing services for IBD treatment and their organization in each hospital, based on the availability of outpatient office for nurse consultations, IBD outpatient office for physician consultations and CCU. Five IBD organizational models were obtained: 1) No specific service for IBD management (Model A); 2) IBD outpatient office for physician consultations (Model B) (e.g., a specific time is allotted for the gastroenterologist to see IBD patients exclusively); 3) at least one general outpatient office for nurse consultations (Model C), in which IBD patients may also be seen; 4) Model D, when Model A and Model B are both available; and 5) IBD Unit (Model E), when the hospital specified on the questionnaire that it had a CCU, has Model B, with or without nursing staff, and availability of computer, and telephone helpline.

A descriptive analysis was made of the nursing resources devoted to IBD management (e.g., offices, computer infrastructure) and of the activities carried out by nursing staff. The association between hospital characteristics and the available nursing for IBD management was determined in a bivariate analysis. Comparison of means or analysis of variance (ANOVA) was used for continuous variables and the chi square test and test for linear trend for categorical variables. Statistical significance was established at $p \leq 0.05$. The calculations were made with the software program SPSS® 15.0.

3. Results

Questionnaires were received from 107 GS belonging to 13 of Spain's 17 autonomous communities (regions), which represent 90.6% of the population of Spain in 2009.¹¹ The most frequently represented autonomous communities were Catalonia (25%), Madrid (16%), Valencia (14%) and Andalusia (11%) (Table 1). Of all the participating centers, 102 GS (95%), belong to the public sector while 5 (5%) are in private hospitals contracted by the Social Security system, 87 (83%) conduct training for nursing staff, 57 (54%) have training for the specialty (Medical Interns and Residents (MIR) system), and 48 (46%) are reference hospitals for IBD.

The mean number of beds in the participating hospitals is 500 [standard deviation (SD): 355] and the mean number of GS beds is 20 (SD: 15.2). The GS staff is composed of a mean of 9 physicians (SD: 5.3), one outpatient nurse (SD: 1.5), and 8 ward nurses (SD: 7.4). Almost all the centers, 103 of 107 (96%), have a day hospital for intravenous infusions. Of the 93 centers with information about coordination of the day hospital, in 43 centers it is coordinated by physicians (46%), in 35 (38%) by nurses, in 10 (11%) by either physicians or nurses, and in 5 centers (5%) the day hospital is coordinated by other types of professionals. Seventy-six GS (71%) operate a telephone helpline for patients. The helpline is staffed by a physician in 41 centers (54%), by either a physician or nurse in 26 (34%), and by only a nurse in 9 (12%).

Table 1 Geographic distribution of the sample of respondents.

Autonomous community	Number of GS	%
Catalonia	27	25.2
Madrid	17	15.9
Valencia	15	14.0
Andalusia	12	11.2
Castilla La-Mancha	8	7.5
Castilla and Leon	7	6.5
Balearic Islands	5	4.7
Galicia	4	3.7
Basque Country	3	2.8
Murcia	3	2.8
Extremadura	3	2.8
Asturias	2	1.9
Cantabria	1	0.9
Total	107	100.0

GS: Gastroenterology Service.

With regard to the organizational models, 33 (31%) GS have Model A, 38 (36%) Model B, 4 (4%) Model C, 16 (15%) Model D, and 16 (15%) Model E. It is notable that, overall, 62 (58%) GS have Model B and 30 (29%) have Model C. The mean number of visits for digestive diseases per GS in 2008 was 8884 (SD: 6853), the mean number of patients with IBD was 406 (SD: 359), and the mean number of IBD consultations was 1233 (SD: 1070). In general, these figures increase with increasing complexity of the organizational model (Table 2). The proportion of visits for IBD with respect to all digestive diseases averaged 16% (SD: 16.1%), and the mean number of IBD visits per patient in one year was 3 (SD: 1.6).

Eleven (69%) of the Model D and 12 (75%) of the Model E, belong to GS that are reference centers for IBD. In 28 (74%) of the GS with Model B and in 13 (81%) with Model E, MIR training is provided (Table 3). With respect to the services offered, 13 of the centers (39%) without specific organizational models for IBD do not operate a telephone helpline, and in the centers that do offer this service, it is not staffed by nurses. It is only in the Model E that the proportion of GS in which the telephone helpline is staffed by nurses (N=6, 38%) outnumbers those staffed by physicians (N=2, 13%) (Table 3).

Of the infrastructure devoted to IBD management available to nurses, 54% of centers have a telephone, 50% a computer, 23% an individual office, and 22% have specialized software programs in IBD (Table 4). The organizational model with the most available resources for nursing staff is the Model E, followed by the Model D. For all the resources studied, there is a significant increasing trend in nursing resources with greater number of services devoted to IBD management in the organizational model.

The patient care activities significantly associated with the organizational model are: emotional support, health education, management of walk-in appointments, drug follow-up in accordance with protocols, follow-up and adherence to non-biological treatments, assessment of nutritional status, and use of quality of life scales. As in the case of resources, nurses assume significantly more tasks as more services are devoted to the management of IBD (Table 5).

Table 2 Patient workload, according to the organizational model of the Gastroenterology Service (year 2008).

Patient workload	Organizational model	N	Mean	Standard deviation	Minimum	Maximum
Number of outpatient consultations by patients treated for digestive disease ($p < 0.01$) ^a	Model A	29	5617	3409	72	12,033
	Model B	27	11,129	8085	1400	34,000
	Model C	2	6340	7834	800	11,880
	Model D	11	12,391	8102	2500	22,924
	Model E	10	8948	6025	200	18,000
	Total	79	8884	6853	72	34,000
Number of patients with IBD treated in the GS ($p < 0.001$) ^a	Model A	32	161	128	15	500
	Model B	34	452	300	30	1000
	Model C	3	193	225	30	450
	Model D	15	545	342	150	1029
	Model E	16	703	498	137	1873
	Total	100	406	359	15	1873
Number of outpatient consultations by patients treated for IBD ($p < 0.05$) ^a	Model A	28	646	692	10	3000
	Model B	33	1533	1000	96	3500
	Model C	3	460	480	80	1000
	Model D	14	1505	1157	250	3960
	Model E	11	1692	1418	270	4500
	Total	89	1233	1070	10	4500

Model A: no specific service for IBD management; Model B: inflammatory bowel disease outpatient office for physician consultations; Model C: outpatient office for nurse consultations; Model D: includes both Model B and C; Model E: inflammatory bowel disease unit.

^a ANOVA. Percentages are calculated on the number of valid cases.

4. Discussion

An important result of this study was the finding that one-third of the GS do not have any specific service for the management of IBD, while 36% have a Model B, 4% Model C, 15% Model D, and another 15% a Model E. The importance of the nurse's role in IBD patient care, as well as the availability of resources, increases as services like Model C, Model D and Model E are developed for IBD management and treatment – although less so in the case of Model B. The complexity of the organizational models and their resources are also associated with heavier patient workload.

Some studies show the importance of developing patient care models that integrate nursing staff and provide them with resources and responsibilities, given the high rates of recurrence and chronicity of IBD. Patients with IBD require care that is holistic, dynamic, rapid and flexible.^{9,12} It is postulated that coordination and integration of the different levels of care favor the guarantee of sound, appropriate and high-quality health care.¹³ The organizational models for patient care studied aim toward multidisciplinary care which integrates the nursing staff,¹⁴ granting them a central and dynamic role. Nurses are key personnel who constitute a valuable link between specialist and primary care, giving the patient easier access to other health professionals.¹⁵ Nurses' professional characteristics facilitate more direct care, within a comprehensive process that improves the continuity of patient care.

The main objectives of health care workers in IBD are promoting continued care focused on patient needs, strengthening self-care, offering education, counseling and emotional support, among other aspects important to patients.¹⁵ In centers where nurses participate in caring for patients with IBD, they play an essential role. Their primary

activities should focus on strengthening self-care by training patients in self-medication, and providing emotional support and health education.¹⁵ Some studies suggest that patients themselves positively assess the nurse's role in managing their disease, and that they highlight the caring and empathy with which they are treated.¹⁶

Our findings suggest that the way to improve nursing care, in terms of structure and process, and make it more accessible to the patient is to devote specific infrastructure such as Model B, Model C or Model E to the management of IBD, depending on the patient workload. Within these specific organizational models for IBD, nurses should have certain basic resources such as a telephone, computer, office, educational material for patients, databases, and specialized software programs that facilitate direct and continuous care. However, as the systematic review of Hernández-Sampelayo et al.⁸ states, the association of structure and process with patient outcomes, is not yet supported by enough scientific evidence and, consequently, the effect of nursing care on the outcomes of IBD patients should be further investigated.

Different studies highlight the importance of nurse-operated telephone helplines, because they considerably improve the quality of care and patient satisfaction, and increase remission.^{15,17,18} However, our study detected deficiencies like the lack of a direct telephone in one-third of the hospitals. A telephone helpline is offered in three of four hospitals, and is staffed by only nurses in one of 10 centers. This nursing activity has a positive impact on hospital management, reducing hospital visits, length of stay and costs, and makes it possible to free up time of the specialist, improve communication within the team, and reduce the time it takes to detect side effects.¹⁹ Some studies recommend that nurses should operate the

Table 3 Hospital characteristics according to resources assigned for IBD management.

		Hospital resources									
		Model A		Model B		Model C		Model D		Model E	
		N	%	N	%	N	%	N	%	N	%
Sector	Public	31	93.9	36	94.7	3	75.0	16	100.0	16	100.0
	Private	2	6.1	2	5.3	1	25.0	–	–	–	–
	Total	33	100.0	38	100.0	4	100.0	16	100.0	16	100.0
Nurse training	Yes	22	68.8	32	84.2	4	100.0	14	87.5	15	100.0
	No	10	31.3	6	15.8	–	–	2	12.5	–	–
	Total	32	100.0	38	100.0	4	100.0	16	100.0	15	100.0
Specialist training in Gastroenterology (p<0.001)	Yes	4	12.9	28	73.7	2	50.0	10	62.5	13	81.3
	No	27	87.1	10	26.3	2	50.0	6	37.5	3	18.8
	Total	31	100.0	38	100.0	4	100.0	16	100.0	16	100.0
Reference hospital in IBD (p<0.001)	Yes	5	15.6	19	52.8	1	25.0	11	68.8	12	75.0
	No	27	84.4	17	47.2	3	75.0	5	31.3	4	25.0
	Total	32	100.0	36	100.0	4	100.0	16	100.0	16	100.0
Is telephone helpline provided? (p<0.05)	Yes	20	60.6	24	63.2	4	100.0	12	80.0	16	100.0
	No	13	39.4	14	36.8	–	–	3	20.0	–	–
	Total	33	100.0	38	100.0	4	100.0	15	100.0	16	100.0
Who staffs it? (p<0.001)	Nurse	–	–	1	4.2	–	–	2	16.7	6	37.5
	Physician	14	70.0	19	79.2	–	–	6	50.0	2	12.5
	Either one	6	30.0	4	16.7	4	100.0	4	33.3	8	50.0
	Total	20	100.0	24	100.0	4	100.0	12	100.0	16	100.0
Is there a day hospital for intravenous infusions?	Yes	32	97.0	36	94.7	4	100.0	15	93.8	16	100.0
	No	1	3.0	2	5.3	–	–	1	6.3	–	–
	Total	33	100.0	38	100.0	4	100.0	16	100.0	16	100.0
Who coordinates the day hospital?	Nurse	14	48.3	9	30.0	2	50.0	4	26.7	6	40.0
	Physician	13	44.8	14	46.7	2	50.0	9	60.0	5	33.3
	Either one	–	–	5	16.7	–	–	2	13.3	3	20.0
	Other	2	6.9	2	6.7	–	–	–	–	1	6.7
	Total	29	100.0	30	100.0	4	100.0	15	100.0	15	100.0
Does the hospital have outpatient office for nurse consultations? (p<0.001)	Yes	–	–	–	–	4	100.0	16	100.0	10	66.7
	No	33	100.0	37	100.0	–	–	–	–	5	33.3
	Total	33	100.0	37	100.0	4	100.0	16	100.0	15	100.0

Model A: no specific service for IBD management; Model B: inflammatory bowel disease outpatient office for physician consultations; Model C: outpatient office for nurse consultations; Model D: includes both Model B and C; Model E: inflammatory bowel disease unit.

Table 4 Nursing resources assigned to IBD according to the organizational model of the Gastroenterology Service.

Resource	Organizational model of the Gastroenterology Service											
	Model A (n=33)		Model B (n=38)		Model C (n=4)		Model D (n=16)		Model E (n=16)		Total (n=107)	
	N	%	N	%	N	%	N	%	N	%	N	%
Telephone	14	56.0	16	55.2	3	75.0	9	69.2	16	100	58	54.2
Computer	10	41.7	16	55.2	2	50.0	9	75	16	100	53	49.5
Educational material for patients	7	30.4	10	34.5	3	75.0	9	69.2	15	93.8	44	41.1
Databases	2	9.1	8	28.6	0	0.0	5	38.5	15	93.8	30	28
Individual office	4	16.7	3	10.3	1	25.0	6	42.9	11	68.8	25	23.4
Specialized software	1	4.3	7	24.1	0	0.0	4	30.8	11	68.8	23	21.5

Percentages are calculated for the number of valid cases.

The percentage differences between organizational models are statistically significant (p<0.05) for all items in the tests for linear trend and chi-square tests.

Model A: no specific service for IBD management; Model B: inflammatory bowel disease outpatient office for physician consultations; Model C: outpatient office for nurse consultations; Model D: includes both Model B and C; Model E: inflammatory bowel disease unit.

Table 5 Patient care activity of nursing staff in the management of IBD according to the organizational model of the Gastroenterology Service.

Patient care activity	Organizational model of the Gastroenterology Service										Statistical association			
	Model A (n=33)		Model B (n=38)		Only ONC (n=4)		Model D (n=16)		Model E (n=16)		Total (n=107)		Chi square test	Test for linear trend
	N	%	N	%	N	%	N	%	N	%	N	%		
Training in self-administration of medications	12	63	9	41	3	100	9	60	14	88	47	63	NS	NS
Administration of medications	13	65	7	30	2	67	7	50	13	81	42	55	NS	NS
Emotional support	9	47	5	23	3	100	8	53	16	100	41	55	p<0.001	p<0.001
Health education	7	39	7	30	3	100	6	40	14	88	37	49	p<0.01	p<0.01
Management of walk-in appointments	4	22	5	22	2	67	8	53	16	100	35	47	p<0.001	p<0.001
Patient follow-up according to drug protocols	3	17	3	14	2	100	5	33	12	80	25	35	p<0.001	p<0.001
Follow-up/adherence to non-biological treatments	4	22	3	14	2	67	1	7	12	75	22	30	p<0.001	p<0.001
Treatments (wounds, ostomies)	7	39	5	23	2	100	2	13	5	31	21	29	NS	NS
Assessment of nutritional status	2	11	2	9	1	50	3	20	9	56	17	23	p<0.05	p<0.001
Assessment of disease activity index	2	11	2	9	0	0	1	7	6	40	11	15	NS	NS
Quality of life scales	3	17	0	0	0	0	0	0	6	43	9	13	p<0.01	NS

Percentages are calculated on the number of valid cases.

Model A: no specific service for IBD management; Model B: inflammatory bowel disease outpatient office for physician consultations; Model C: outpatient office for nurse consultations; Model D: includes both Model B and C; Model E: inflammatory bowel disease unit.

telephone helpline because this allows patients better and easier access to health professionals.¹⁸

Besides the lack of a telephone, other shortcomings were found, such as lack of computer, educational material, databases, individual office or specialized software programs, which could be detrimental to the quality of care. These deficiencies limit patient care responsibilities that other investigations assign to nurses. Adequate resources should be provided to carry out these responsibilities since, as shown in previous studies, they offer positive results with regard to cost reduction and patient satisfaction.^{18,19}

According to our findings, the importance of the nurse's role is associated with the existence of Model C or Model E, and in lesser measure with the existence of Model B. The lack of association between Model B and nurses' activities may be due to the fact that four of every ten Model B have no nursing staff; in these cases the patient receives care only from the physician specialist in IBD, a situation that limits comprehensive patient care. Thus, to strengthen the role of nurses in caring for IBD patients, it would be desirable to facilitate the creation of Model C or to provide the Model B with a nurse, when to establish a Model E is not possible. Nursing staff makes it possible to strengthen patient-centered care within the Model E and focus on self-care. For this purpose, nursing staff should more often assume responsibilities like resolving and referring programmed and walk-in consultations, and providing emotional support, health education, and continuous follow-up of patients in accordance with drug protocols.¹²

As services devoted to IBD increases, nurses have more resources and assume more responsibilities. The centers with the most resources are those that have a Model C and Model E. In turn, nurses are specifically responsible for managing unprogrammed consultations and providing emotional support and health education, aspects, which according to other studies may improve patient outcomes.^{17,20} Services that have Model C, Model D or Model E are more likely to have a telephone helpline, which relieves the physician's workload and provides better and more direct care when patients need it.¹⁹

The present study is not without limitations. One such limitation could stem from the possible lack of representativeness of the sample of GS, since it was not selected by randomized sampling. This was a convenient sample, in which some selection bias may have occurred. However, the wide representation of different geographic areas and the diversity of hospital characteristics suggest that the impact of this bias would have a negligible effect on the estimates obtained.

Another limitation may be related with the definition of GS. For example, some hospitals with an Internal Medicine Service that does not have a Gastroenterology section could have resources to treat IBD. We believe the probability of this is small, given the structure of public hospitals in Spain, but to the extent that it occurs, the resources detected may have been underestimated.

Despite these possible limitations, this study shows the need to strengthen the role of nurses to improve the quality of care of patients with IBD and, in turn, to optimize resources, given the trend toward a reduced number of visits that was observed in the Model E. The creation of Model C appears to be particularly important.

Nurses should be integrated within an organizational model that provides resources facilitating comprehensive, patient-centered care. Continued research is also needed to establish conceptual and operational definitions of patient care models for the management of IBD.

In conclusion, this study shows that nursing staff in centers with Model C and Model E have significantly more infrastructure and assume more patient care responsibilities than in centers lacking these services. It would be useful to produce scientific evidence on the relation between different ways of organizing patient care by nurses and outcomes in patients with IBD. This can be done through studies that establish the association of different types of organization of nursing care with patients' outcomes and, in an era of limited resources, the efficiency (e.g., cost/effectiveness analysis) of each organizational model.

Acknowledgements

The authors acknowledge Abbott Laboratories for the funding of the study. Abbott Laboratories has not participated in any part of the study.

Contribution of each author: LM participated in the design of the study, provided significant advice along the study, and contributed to data interpretation; MS participated in the design of the study, provided significant advice along the study, and contributed to data interpretation; LO participated in the design of the study, provided significant advice along the study, and contributed to data interpretation; AT participated in the design of the study, provided significant advice along the study, and contributed to data interpretation; PHS participated in the design of the study, provided significant advice along the study, and contributed to data interpretation; MIV participated in the design of the study, provided significant advice along the study, and contributed to data interpretation; FC participated in the design of the study, provided significant advice along the study, and contributed to data interpretation; VG participated in the design of the study, provided significant advice along the study, and contributed to data interpretation; NA participated in the design of the study, designed the data analysis contributed to data analysis and interpretation, and drafted the manuscript; PL participated in the design of the study, designed the data analysis, contributed to data analysis and interpretation, and drafted the manuscript.

All authors read and approved the final manuscript.

References

1. Saro C, Riestra S, Milla A, Sánchez R, Lacort M, Argüelles G, et al. Incidencia y prevalencia en enfermedad inflamatoria intestinal crónica. Estudio asturiano en cinco áreas (EIICEA). España. *An Med Interna (Madrid)* 2003;20(1):9–17 Ene.
2. Nerich V, Monnet E, Etienne A, Louafi S, Ramée C, Rican S, et al. Geographical variations of inflammatory bowel disease in France: a study based on national health insurance data. *Inflamm Bowel Dis* 2006;12(3):218–26.
3. Vind I, Riis L, Jess T, Knudsen E, Pedersen N, Elkjaer M, et al. Increasing incidences of inflammatory bowel disease and decreasing surgery rates in Copenhagen City and County, 2003–2005: a population-based study from the Danish Crohn colitis database. *Am J Gastroenterol* 2006;101(6):1274–82.
4. Saro C, de la Coba C, Lacort M, González A, Álvarez A, Pérez-Pariente JM, et al. Changes in incidence of inflammatory bowel disease during the last 15 years: a hospitalitaion al prospective Population-Based Study from Gijón (Spain) (1992–2006). *Gut* 2007;39(Suppl 1):A 129.
5. Casellas F, López-Vivancos J, Casado A, Malagelada JR. Factors affecting health related quality of life of patients with inflammatory bowel disease. *Qual Life Res* 2002;11(8):775–81.
6. Casellas F, Arenas JI, Baudet JS, Fàbregas S, García N, Gelabert J, et al. Impairment of health-related quality of life in patients with inflammatory bowel disease: a Spanish multicenter study. *Inflamm Bowel Dis* 2005;11(5):488–96.
7. Vidal A, Gómez-Gil E, Sans M, Portella MJ, Salameo M, Piqué JM, et al. Health-related quality of life in inflammatory bowel disease patients: the role of psychopathology and personality. *Inflamm Bowel Dis* 2008;14(7):977–83.
8. Hernández-Sampelayo P, Seoane M, Oltra L, Marín L, Torrejón A, Vera MI, et al. Contribution of nurses to the quality of care in management of inflammatory bowel disease: a synthesis of the evidence. *J Crohn's Colitis* 2010;4(6):611–22.
9. Fontanet G, Casellas F, Malagelada JR. La Unidad de Atención Crohn-Colitis: 3 años de actividad. *Gac Sanit* 2004;18(6):483–5.
10. Consulta de Enfermería pionera en Galicia. Enfermería avanza, 6 de julio de 2007. Accedida el 29 de octubre de 2008. Disponible en:<http://enfeps.blogspot.com/2007/07/consulta-de-enfermera-pionera-en.html>.
11. The National Statistics Institute. [Instituto Nacional de Estadística]. Population at 1st January 2009. Accessed March 18, 2010, at:http://www.ine.es/en/ine/eline_en.htm.
12. Torrejón A, Masachs M, Borrueal N, Castells I, Castillejo N, Malagelada JR, et al. Aplicación de un modelo de asistencia continuada en la enfermedad inflamatoria intestinal: la Unidad de Atención Crohn-Colitis. *Gastroenterol Hepatol* 2009;32(2):77–82.
13. Humet C. Reflexiones sobre la Calidad Asistencial en el cambio de siglo. *Rev Calidad Asistencial* 2001;16(1):5–7.
14. Gray J. Improving standards of care for colitis and Crohn's disease. UK: NACC Patient Focus Groups. December 2004–January 2005.
15. Younge L, Norton C. Contribution of specialist nurses in managing patients with IBD. *Br J Nurs* 2007;16(4):208–12.
16. Belling R, Woods L, McLaren S. Stakeholder perceptions of specialist inflammatory bowel disease nurses' role and personal attributes. *Int J Nurs Pract* 2008;14(1):67–73.
17. Nightingale AJ, Middleton W, Middleton SJ, Hunter JO. Evaluation of the effectiveness of a specialist nurse in the management of inflammatory bowel disease (IBD). *Eur J Gastroenterol Hepatol* 2000;12(9):967–73.
18. Woods L, Belling R, McLaren S. A Systematic Review of the Effectiveness of Inflammatory Bowel Disease Specialist Nurses; August 2006. Final Report. UK: NACC.
19. Pearson C. A nurse-led IBD service in a district general hospital. *Gastrointestinal Nurs* 2005;3(1):33–9.
20. Cónsul M, Soldevilla M. La enfermedad inflamatoria intestinal: reflexiones sobre los cuidados de enfermería a partir de un caso. *Nursing* 2004;22(3):58–64.