Digestive and Liver Disease 51 (2019) 43–46

Contents lists available at ScienceDirect

Digestive and Liver Disease

journal homepage: www.elsevier.com/locate/dld

Alimentary Tract

Hospital admission for digestive diseases: Gastroenterology units offer a more effective and efficient care

Antonio Balzano[a], Flavia Carle[b], Cristina Tamburini[c], Fabio Monica[d], Giuseppe Milazzo[a,e], Paolo Spolaore[a], Marco Galadini[b], Fulvio Basili[c], Luigi Ricciardiello[f], Elisabetta Buscarini[g,*], Gioacchino Leandro[a,h]

[a] AIGO, Italian Association of Hospital Gastroenterologists and Endoscopists, Roma, Italy
[b] Direzione Generale della programmazione sanitaria, Italian Health Ministry, Roma, Italy
[c] Direzione Generale della digitalizzazione, del sistema informativo sanitario e della statistica, Italian Health Ministry, Roma, Italy
[d] Department of Gastroenterology, Cattinara Hospital, Trieste, Italy
[e] Department of Medicine, Vittorio Emanuele III° Hospital, Salemi, Italy
[f] Department of Medical and Surgical Sciences, University of Bologna, Bologna, Italy
[g] Department of Gastroenterology, Maggiore Hospital, ASST Ospedale Maggiore, Crema, Italy
[h] Department of Gastroenterology, Scientific Institute for Digestive Disease "Saverio de Bellis" Hospital, Castellana Grotte, Italy

ARTICLE INFO

Article history:
Received 17 March 2018
Received in revised form 2 June 2018
Accepted 18 June 2018
Available online 28 June 2018

Keywords:
Bleeding
Digestive diseases
Hospital discharge record
Mortality

ABSTRACT

Background: Digestive diseases imply a substantial burden for health care systems. Effectiveness of specialized gastroenterology care has been demonstrated in a few real life surveys.
Aims: To perform an in-depth analysis of Hospital Discharge Records (HDRs) of patients admitted for digestive diseases (DDs) from all Italian regions over the years 2010–2014.
Methods: Data on National HDRs were provided by the Italian Health Ministry.
Results: During the years 2010–2014, a mean of 949,830 patients with DDs were admitted to hospital per year, representing 10.0% of all admissions in Italy. Only 7.4% of patients with DDs were admitted to Gastroenterology units due to the limited number of the specialty-focused beds (3.4/100,000 inhabitants). DDs urgent admissions in Gastroenterology units represented 33% of admissions. The mean length of stay was 8.1 days in Gastroenterology units, as opposed to 8.3 in other units. Mortality rate for DDs altogether, for urgent admissions, and for urgent admissions with bleeding were 2.2%, 1.7%, 2.2% in Gastroenterology units, and 3.1%, 3.9%, 3.5% in other units, respectively. DDs admissions were appropriate in 81.3% in Gastroenterology units as opposed to 66.6% in all other units.
Conclusions: Gastroenterology units offer a better specific care in terms of length of hospital stay and mortality even for patients admitted for emergent conditions.

1. Introduction

Digestive diseases (DDs) – including gastrointestinal, liver and pancreatic disorders – are highly prevalent in Europe with inherent mortality rate varying from 500,000 to 900,000 deaths per year and a significant impact on healthcare costs [1].

Appropriate planning of assistance to DDs, particularly in the era of health cost containment, not only requires epidemiological data on DDs but also data regarding the impact of specialized gastroenterological care on appropriateness and outcome of DDs. Unfortunately, data regarding burden of DDs, their impact on national health care systems (NHS), and outcome of specialized assistance have been evaluated only in few European countries so far [2–4].

In 2011, the impact of DDs on Italian health care system was assessed on the basis of analysis of nationwide data from Ministry of Health for the years 2003–2009 regarding the Hospital Discharge Records (HDRs) of Major Diagnostic Categories (MDCs) 6 and 7 [2]. One of the most critical results of this analysis was that DDs represent a great burden for hospital care, being the first or second cause of hospitalization yearly. Furthermore, in-hospital mortality for DDs admitted in emergency, as digestive hemorrhages, resulted significantly lower in Gastroenterology services than in other hospital departments [2].

* Corresponding author at: Gastroenterology Department, Maggiore Hospital, ASST Crema, Largo Dossena 2, 26013 Crema, Italy.
E-mail address: elisabetta.buscarini@asst-crema.it (E. Buscarini).

https://doi.org/10.1016/j.dld.2018.06.015
1590-8658/

Table 1
HDRs per year: all DDs, urgent DDs, urgent DDs with bleeding.

Year	All diseases HDRs[a]	All DDs[a]	%[b]	Urgent DDs[a]	Urgent bleeding DDs[a]
2010	10,396,714	1,046,028	10.0	234,018	51,682
2011	9,879,863 (−5.0%)	980,149 (−6.3%)	9.9	232,934 (−0.5%)	50,143 (−3.0%)
2012	9,384,071 (−5.0%)	938,915 (−4.2%)	10.0	235,533 (+1.1%)	48,705 (−2.9%)
2013	8,980,251 (−4.3%)	905,329 (−3.6%)	10.0	235,972 (+0.2%)	48,336 (−0.8%)
2014	8,680,679 (−3.3%)	878,729 (−2.9%)	10.1	238,147 (+0.9%)	47,285 (−2.2%)

[a] Percentage variation from previous year.
[b] (All DDs/All diseases HDRs) × 100.

2. Aim of the study

The 2011 analysis [2] showed a non-homogeneous data flow from Italian regions, whereas satisfactory homogeneity of data recording hospital discharge from all Italian regions has been reached over the past few years. Therefore, a further survey has been performed by the Italian Association of Hospital Gastroenterologists & Endoscopists (AIGO) in cooperation with the Ministry of Health to analyze HDRs concerning diagnosis related to DDs belonging to MDCs 6 and 7 from all 21 Italian regions for the years 2010–2014. The analysis aimed to evaluate the impact of DDs on NHS in terms of hospitalization and outcome of specialized care to DDs.

3. Materials and methods

HDRs from public or private NHS accredited hospitals from 21 Italian regions for the years 2010–2014 were analyzed.

HDRs were related to DDs from the diagnosis-related groups (DRGs) belonging to MDCs 6 and 7 [5]. The data source was the National HDRs record of the Italian Ministry of Health [6,7]; the analysis was performed on the basis of an agreement between AIGO and the General Directorate for Health Planning, the General Directorate for Health Information, Communication Technology and Statistics of Ministry of Health.

The analysis aimed to evaluate: (1) the number of HDRs and hospitalization rates for DDs according to hospital departments (with exclusion of long-term care departments), in different Italian regions per year, and according to either different emergent admission conditions (divided in two main categories: urgent, urgent with bleeding) or non emergent admission; (2) the length of stay for DDs by hospital departments, according to age ranges; and (3) in hospital mortality for DDs in different departments, by age groups, for either different emergent admission conditions (divided in two main categories: urgent, urgent with bleeding) or non emergent admission.

4. Results

The study analyzed 4,823,569 HDRs related to DDs ordinary, day hospital and emergency hospital admission.

4.1. DDs hospitalization

DDs revealed an average of 949,830 HDRs/year in the 5-year-period, and DDs represented the second cause of hospital admission in Italy in year 2014 after cardiovascular diseases [6]. DDs represented 10.0% of all hospital admissions and this percentage remained stable over the observation period (Table 1), with a similar trend in all Italian regions.

The standardized (for age) rate of hospitalization for DDs dropped from 17.3 admissions/1000 inhabitants in the year 2010 to 14.5 in the year 2014, parallel to what happened for the hospitalization for all diseases which dropped from 171.9 admissions/1000 inhabitants in the year 2010 to 142.8 in the year 2014.

Table 2
DDs discharge from different Units by age groups in the years 2010–2014 (average of values recorded in the years 2010–2014).

Unit type	Age groups (years)					
	0–17	18–44	45–74	75–84	85+	Overall
Gastroenterology	1.8	7.7	8.4	7.7	6.3	7.4
Surgery	7.5	64.5	56.6	45.6	36.3	49.8
Medicine	1.2	16.5	23.0	31.9	40.2	24.0
Pediatrics	68.2	0.1	0.0	0.0	0.0	5.1
Other Units	21.3	11.2	12.1	14.8	17.2	13.7
All Units but Gastroenterology	98.2	92.3	91.6	92.3	93.7	92.6

Table 3
Mean length of stay (days) for DDs with urgent admission with bleeding, by age groups and discharging units (average of values recorded in the years 2010–2014).

Unit type	Age groups (years)					Overall
	0–17	18–44	45–74	75–84	85+	
Gastroenterology	5.4	5.6	7.1	7.7	7.2	7.2
Other Units	3.9	5.6	7.5	9.0	9.0	8.0

DDs hospitalization occurred mainly in ordinary stay regimen (about 84%) and in 16% as day-stay admissions.

4.2. DDs discharge

The average of HDRs/year for the years 2010–2014 for ordinary admissions for DDs was 794,607, with 59,146 HDRs from Gastroenterology units and 735,461 from other specialties. The average percentage of DDs admitted in Gastroenterology units was 7.4% and 92.6% in all other units (Table 2).

Hospital beds in Gastroenterological units in Italy in the year 2014 were 2062, corresponding to 3.4 beds in Gastroenterology units/100,000 inhabitants.

4.3. Length of hospital stay for DDs

The mean length of stay for DDs during years 2010–2014 was 8.1 (C.I. 95% 8.1–8.1) days in Gastroenterology units, and 8.3 (C.I. 95% 8.3–8.3) in all other units (detailed list of hospital admissions, length of stay and averages in different units of different Italian regions, with relevant 95% CI, can be found in Supplementary Table). Table 3 reports the analysis of length of stay for urgent admission with bleeding by group of age in Gastroenterology units and in all other units.

4.4. Urgent hospital admission for DDs

Globally, urgent hospital admissions for DDs were 276,246 during years 2010–2014, while 19,554 in Gastroenterology units (7.1% of all urgent admissions for DDs). Bleeding occurred in a total of 47,371 patients, and 6340 (13.3%) of them were admitted in Gastroenterology units. Urgent admissions for DDs in Gastroenterology units represented 33% of all admissions in this specialty.

Table 4A
Number of deaths (with mortality rate in parenthesis) in patients admitted for DDs with urgent admission, by age groups, in Gastroenterology units and in other units[a] (average of values recorded in the years 2010–2014).

Unit type	Age groups (years)					Overall
	0–17	18–44	45–74	75–84	85+	
Gastroenterology	–	5 (0.3)	91 (1.4)	62 (2.0)	57 (3.8)	215 (1.7)
Other Units	2 (0.03)	67 (0.5)	1.338 (2.6)	1.493 (4.7)	1.797 (8.9)	4.696 (3.9)

[a] With exclusion of Intensive Care Units.

Table 4B
Number of deaths (with mortality rate in parenthesis) in patients admitted for DDs with urgent admission for GI bleeding, by age groups, in Gastroenterology units and in other units[a](average of values recorded in the years 2010–2014).

Unit type	Age groups (years)					Overall
	0–17	18–44	45–74	75–84	85+	
Gastroenterology	–	3 (0.6)	46 (1.6)	43 (2.3)	47 (4.6)	139 (2.2)
Other Units	1 (0.04)	17 (0.6)	331 (2.3)	441 (3.5)	588 (7.3)	1.378 (3.5)

[a] With exclusion of Intensive Care Units.

Table 5
Number (and percent) of ordinary admissions for DDs and related appropriateness according to Specialty (average of values recorded in the years 2010–2014).

Unit type	Admission appropriateness	
	Appropriate N (%)	Inappropriate N (%)
Gastroenterology	48,066 (81.3)	11,080 (18.7)
Surgery	273,791 (69.1)	122,254 (30.9)
Internal Medicine	136,482 (71.7)	53,819 (28.3)
Pediatry	21,560 (53.4)	18,767 (46.6)
Others	78,193 (71.8)	30,602 (28.2)
Overall	558,092 (70.2)	236,523 (29.8)

4.5. DDs related mortality

During years 2010–2014, DDs caused in-hospital mortality in 24,291 patients (3.1% of all DDs hospital admissions). Mortality rate in Gastroenterology units was 2.2% as opposed to 3.1% in other units altogether. Furthermore, in ordinary non-emergent admissions, a mortality rate of 2.4% was recorded in Gastroenterology units and 3.2% in other units. The differences between in-hospital mortality in Gastroenterology and in other specialties according to different urgent admission type (urgent and urgent with bleeding) and age groups are reported in Tables 4A and 4B

.

4.6. Appropriateness of hospital admission for DDs

During the quinquennium 2010–2014, the appropriate admissions for DDs in Gastroenterology units represented 81.3% compared to 66.6% in other Specialty units (Table 5).

The case-mix in Gastroenterology units is expressed by top ten DRGs reported in Table 6.

5. Discussion

The surveys of digestive health across Europe [1], Italy [2], France [3] and UK [4], have clearly shown the substantial impact of DDs on population health, in terms of either disease burden or chronicity and mortality.

As expected, DDs have also a great impact on the NHS. By combining the data reported in the present report with those previously published in the White Paper of Italian Gastroenterology [2], DDs have represented the first or second cause of hospitalization in the years between 1999 and 2014. Of note and not surprisingly, the epidemiological and health care burdens of DDs in Italy are similar to the burdens in other European countries [3,4].

During latest 10 years, the reduction of healthcare funding with a strong cost containment policy in Italy, as in other European countries, have led to a reduction in general hospital admission rate (−4.3% per year) and in hospital admission for DDs as well (−3.7% per year). Nevertheless, an average of 949,830 patients/per year affected by DDs were admitted to the hospital, representing 10% of all hospital admissions countrywide, and, hence, a substantial burden of disease which would imply accurate planning for an adequate assistance.

In present period of cost containment, gastroenterologists must demonstrate that they provide effective and efficient care.

The unique strength of the present report, based for the first time on data homogeneously collected by the Ministry of Health from all Italian regions, is to draw a complete countrywide and real-life description of hospital assistance to DDs, thus allowing either to confirm the epidemiological burden of DDs and to assess the impact of specialized gastroenterological assistance on care appropriateness and outcome of DDs.

Noteworthy, present analysis demonstrates that specialized assistance to DDs offered by Gastroenterology units is more efficient, appropriate, and effective than in other units; in fact, data on average length of stay, appropriateness of admissions and case-mix, and in-hospital mortality for DDs either with non-emergent or emergent presentation, perform better in Gastroenterology units than in non-specialized units.

However, the present report confirms a critical issue emerging from the analyses of the White Paper of Italian Gastroenterology [2]: only a small proportion, that is 7.4% of patients with DDs, is admitted to Gastroenterology units, with the rest of the patients being allocated to other non-specialized units (mainly Internal Medicine and Surgery).

As from present report, gastroenterological care for DDS is more effective and results in better outcomes. Accordingly, any effort should be made to allow a greater proportion of patients with DDS to receive specific, high quality care.

Considering that the Italian NHS aims for a figure of 3.7 beds/1000 and admissions for DDs correspond to 7.4% of all hospitalizations, a figure of 27/100,000 beds in Gastroenterology would to be expected. However, the present analysis provides a clearcut result: 3.4 beds/100,000, 10-fold lower than the expected, and with wide regional variations in available Gastroenterology beds from 0 to 8.4/100,000.

As widely demonstrated, an adequate workforce for Gastroenterology units is pivotal to warrant specialized assistance to DDs.

Table 6
Case-mix: first 10 DRGs, in ordinary admissions for DDs in Gastroenterology units (average of values recorded in the years 2010–2014).

DRG	N DRGs	% of all admissions
202-Cirrhosis and alcohol related hepatitis	7904	14.1
203-Malignant tumors, hepatobiliary and pancreas	5838	10.4
179-Inflammatory bowel diseases	4724	8.4
174-Digestive hemorrhage with complications	4252	7.6
183-Esofagitis, gastroenteritis, >17 yo without complications	4182	7.4
207-Biliary diseases with complications	3854	6.9
204-Pancreas diseases, except malign tumors	3825	6.8
208-Biliary diseases without complications	3222	5.7
205-Liver diseases except malign tumors, cirrhosis, alcohol hepatitis with complications	2179	3.9
182-Esofagitis, gastroenteritis, >17 yo with complications	2103	3.7

However, a previous analysis conducted on resources of the Italian NHS reported 1425 gastroenterologists working for NHS in 2012, a number largely inadequate to meet the needs of specialized care for DDs [8], notably in fact, in accordance to estimates made with the White Paper analyses, the activity of digestive endoscopy alone would require 1224 gastroenterologists [2]. The present inadequacy of both human and structural resources is therefore the logical explanation for the small proportion of patients with DDs treated in Gastroenterology units. On the other hand, the better efficiency and effectiveness of Gastroenterology units would justify the need to implement adequate and homogeneous distribution of gastroenterology facilities. Gastroenterology units offered a better specific care in terms of both hospital stay and mortality even for patients admitted for emergency conditions, who represented 33% of all admitted patients in Gastroenterology. However, it has to be underlined that DDS with urgent admission were admitted in Gastroenterology units only in 7.1% of 276,246 HDRs in the examined quinquennium. This means the great majority of patients suffering from DDs with urgent presentation (critically ill patients) were treated in non specialized units, with the inherent higher mortality rates shown by the present analysis. Of note, in-hospital DDs related mortality rates for urgent and urgent with bleeding admissions were lower in Gastroenterology units than in other Specialty units in all groups of age, and this difference was even greater in elderly patients, showing that better effectiveness of specialized units does not depend on different patient settings.

In conclusion, as demonstrated by the present study, the flow data to national governments, which are nowadays available in most European countries, provide a reliable description of assistance to DDs occurring countrywide, highlighting results of different DDs managements as well as the impact of specialized gastroenterological care on appropriateness and outcome of DDs.

Insofar, such data should represent the key reference to plan appropriate, efficient, effective care for DDs at a nationwide level, with adequate empowerment and resource allocation for specialized Gastroenterology facilities.

Conflict of interest
None declared.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.dld.2018.06.015

References

[1] Farthing M, Roberts SE, Samuel DG, Williams JG, Thorne K, Morrison-Rees S, et al. Survey of digestive health across Europe: final report. Part 1: the burden of gastrointestinal diseases and the organisation and delivery of gastroenterology services across Europe. United Eur Gastroenterol J 2014;2:539–43.
[2] Buscarini E, Conte D, Cannizzaro R, Bazzoli F, De Boni M, Delle Fave G, et al. White paper of Italian Gastroenterology: delivery of services for digestive diseases in Italy: weaknesses and strengths. Dig Liver Dis 2014;46:579–89.
[3] Le Livre Blanc de l'Hépato-Gastroentérologie, Société Nationale Française de Gastroenterologie (SNFGE), 2001.
[4] Williams JG, Roberts SE, Ali MF, Cheung WY, Cohen OR, Demery G, et al. Gastroenterology services in the UK. The burden of disease, and the organisation and delivery of services for gastrointestinal and liver disorders: a review of the evidence. Gut 2007;56(Suppl 1):1–113.
[5] International Classification of Disease, 9th revision, Clinical Modification. Italian version, 2007. Available at: http://www.salute.gov.it/imgs/C_17_pubblicazioni_2251_allegato.pdf.
[6] Ministero della salute. Banca dati SDO. Web site: http://www.salute.gov.it/.
[7] Ministero della salute. Rapporto annuale sull'attività di ricovero ospedaliero (Dati SDO 2014).
[8] Buscarini E, Carle F, Tamburini C, Balzano A, Milazzo G, Soncini M, et al. Hospital care services for digestive diseases in Italy: the first quantitative assessment. Dig Liver Dis 2014;46:652–7.