

Studi sperimentali

Hospitalization for anorexia nervosa in Italy

Ospedalizzazione per anoressia nervosa in Italia

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SUMMARY. Objective. This study provides: a) rates of hospitalization for anorexia nervosa (AN) in Italy in 2004-2005 period; b) an estimate of the incidence of moderate to severe hospitalized AN in the same period among persons aged 10-19 years. **Method.** 9863 hospital discharges of patients aged 10-59 years with a diagnosis of AN (ICD9CM code 307.1) were extrapolated from the Italian Hospital Discharges Database. Patients aged 10-19 years, first admitted in 2004-2005, never hospitalized for AN in 2001-2003, were assumed to be a reasonable proxy of incident cases. **Results.** Crude rate of AN associated hospitalization was 24.2 per 100,000 person-years among women and 1.6 per 100,000 person-years among men. Estimated incidence rate of AN was 22.8 per 100,000 among women compared with 2.0 per 100,000 among men in the 10-19 years age group. **Discussion.** This study provides, for the first time, nationwide incidence estimates of AN in Italy.

PAROLE CHIAVE: anorexia nervosa, incidence, hospitalization.

RIASSUNTO. Scopo. Questo studio rende disponibili: a) il tasso di ospedalizzazione per anoressia nervosa (AN) in Italia nel periodo 2004-2005; b) una stima dell'incidenza di AN da moderata a grave nelle persone di età compresa tra i 10 e i 19 anni nello stesso periodo di tempo. **Metodi.** Dall'archivio nazionale delle schede di dimissione ospedaliera sono state estrapolate 9863 schede di dimissione di pazienti di età compresa tra i 10 e i 59 anni con una diagnosi di AN (Codice ICD9CM 307.1). Si è considerato che i pazienti di età tra i 10 e i 19 anni, ricoverati per la prima volta nel periodo 2004-2005, e non ricoverati per AN tra il 2001 e il 2003, fornissero una misura accettabile dei casi incidenti. **Risultati.** Il tasso grezzo di ospedalizzazione per AN è pari a 24,2 per 100,000 anni-persona fra le donne e 1,6 per 100,000 anni-persona fra gli uomini. Il tasso di incidenza di AN stimato è pari a 22,8 per 100,000 fra le donne e 2,0 per 100,000 fra gli uomini nella fascia di età tra i 10 e i 19 anni. **Discussione.** Questo studio rende disponibile per la prima volta, a livello nazionale, una stima dell'incidenza di AN in Italia.

KEY WORDS: anoressia nervosa, incidenza, ospedalizzazione.

INTRODUCTION

Anorexia nervosa (AN) is a severe psychiatric disorder which often requires patient hospitalization and is associated with the highest risk of premature death among psychiatric disorders (1,2). The average prevalence of AN has been reported to be 0.3%. The peak age of onset is 15 to 19 years (3).

The standardized mortality ratio (SMR) has been estimated to be 6.2 (95% CI:5.5-7.0) in a recent large cohort retrospective study with a mean follow-up of 13.4 years (4).

Few studies have examined the incidence of AN and most of them are limited to cases detected in health care settings (3). Recent studies examined the incidence of AN in primary care in the UK and in the Netherlands (5,6). The overall incidence rate of AN has been reported to be 4.7 per 100,000 person years in the UK and 7.7 per 100,000 person years in the Netherlands. To date, the highest reported overall incidence rate was 8.3 per 100,000 person years in USA, during 1935-1989 (7).

The data on temporal incidence trends are conflicting, with some studies suggesting that the incidence is

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increasing (8-10) and other reporting stable rates (11). Two recent studies performed in Switzerland and the US, using identical methods, documented a global increase throughout the 20th century with a stable incidence in Switzerland since the 1970s and in the US since the 1990s (10,7).

National estimates of the epidemiology of AN in Italy are not available. In a local study, the lifetime prevalence of AN in a representative sample of young women aged 18-25 years was 2% (12). Another recent local study reported a lifetime prevalence of 0.4% in the general population (13). To date, in Italy, incidence and mortality rates of anorexia nervosa are unknown.

In this study we searched the Italian Hospital Discharges Database (IHDD) over a 5-year period (2001-2005) for hospitalizations in which AN was recorded as a diagnosis.

First, we aimed to provide rates of AN-associated hospitalization in Italy in 2004-05 and to describe the distribution of the hospitalizations both in day and inpatient setting by age, gender, geographical area of residence of patients, and treatment characteristics (e.g., length of stay).

The second and major aim was to estimate the nationwide incidence rate for AN in the same period among persons aged 10-19 years, that is the peak age of onset. In this age range, the rates of first hospitalization for AN over a 5-year period should closely approximate the overall incidence and is likely a reasonable estimate of the incidence of moderate to severe AN.

METHODS

Data source

Data were obtained from the Italian Hospital Discharges Database (IHDD). This database records all admissions in private and public hospitals both in day and inpatient setting. Data include demographic information (such as gender and date of birth), date of admission and discharge, diagnoses and procedures performed during the hospitalization, coded according to the International Classification of Diseases, ninth Revision, Clinical Modification (ICD- 9-CM).

For each admission, a primary diagnosis and up to five secondary diagnoses are determined at discharge by the treating physician who is also responsible of the diagnostic coding.

The IHDD is maintained by the Ministry of Health and covers all public and private general and day hospitals, and is thereby presumed to be representative of the population admitted to hospital care for whatever reason. Italy is a country with about 58 million inhabitants (14). Health care is provided to the entire population by the

National Health Service (NHS), which has a similar structure to the British NHS. All citizens have access to unlimited health care coverage through 'Local Health Units' (LHUs), each of which caters for a geographically defined catchment area. Access to health services is generally free of charge, as it is covered by general taxation, although some fees are charged for specific medical examinations. Not only does the NHS provide health care through the public health care system, it also generally covers access to private inpatient facilities, though not to outpatient private consultations.

Starting from 2001 a unique anonymous identification code (ID) was assigned to each patient, allowing the identification of multiple hospital stays referred to the same patient. Through a record linkage procedure, all the repeated admissions of the same patient can be linked.

A scientific agreement between the Ministry of Health and the Italian National Institute of Health (INIH) allows the Statistical Office of INIH to access the IHDD data for analysing them for public health research purposes. When the present study was performed the most recent data available were referred to the discharges occurred during the year 2005.

From the IHDD all the hospital discharges with a diagnosis of Anorexia Nervosa (ICD9CM code 307.1), either as primary diagnosis or co-morbidity, were extrapolated. In order to exclude unreliable diagnoses (e.g. erroneous use of 307.1 code for Anorexia due to organic conditions), hospital discharges referred to AN patients aged less than 10 years and 60 years and over were excluded. Moreover, patients with comorbid Schizophrenic disorders, Organic psychotic conditions or Affective disorders such as Major depressive disorder and Bipolar affective disorder (ICD 9-CM codes 290-299) that may present with anorexic symptoms were excluded, as in previously published studies (15). 6,1 % of patients were excluded based on this criterion (**Table 1**).

The analysis was performed for the most recent 2-year period for which data were available, i.e., 2004-2005. Annual average rates for 2004-2005 were computed using as denominator the mean number of Italian population at the beginning (January 1) and at the end (December 31) of the year 2005. The age and gender adjusted rates were computed using Italian population at 1991 census as standard population. All rates were per 100,000 inhabitants. Confidence intervals (95% CI) around rates were calculated assuming a Poisson distribution. Rates with no overlapping confidence intervals were considered significantly different.

Data were analysed with Microsoft Office Excel 2003 and SPSS, version 15.0 (16).

AN-associated Hospitalization

All hospitalizations of Italian 10-59 year old patients with a primary or a secondary diagnosis of AN and without comorbid psychiatric conditions possibly mimicking AN, during the period January 2004 to December 2005, were analyzed.

Tabella 1. Hospitalizations with a diagnosis of anorexia nervosa by associated diagnosis of psychosis, gender and age classes. Italy, years: 2004-2005

	Women										Overall	
	10-14 years		15-19 years		20-24 years		25-29 years		30-59 years		(10-59 years)	
	n	%	n	%	n	%	n	%	n	%	n	%
AN	653	92.4	2653	95.8	1824	97.2	1271	93.5	2845	91.2	9246	94.0
AN and Psychosis	54	7.6	115	4.2	53	2.8	89	6.5	276	8.8	587	6.0
Total	707	100.0	2768	100.0	1877	100.0	1360	100.0	3121	100.0	9833	100.0
	Men										Overall	
	10-14 years		15-19 years		20-24 years		25-29 years		30-59 years		(10-59 years)	
	n	%	n	%	n	%	n	%	n	%	n	%
AN	69	93.2	159	97.5	119	96.7	58	90.6	212	84.8	617	91.5
AN and Psychosis	5	6.8	4	2.5	4	3.3	6	9.4	38	15.5	578.5	8.5
Total	74	100.0	163	100.0	123	100.0	64	100.0	250	100.0	674	100.0

Annual average AN-associated hospitalization rates were computed by age and gender of patient, using as numerator the annual average number of selected hospitalizations. Annual average age adjusted rates of hospitalization (in inpatient and day hospital setting), mean and median age at hospitalization, median duration of inpatient hospitalization, were calculated by geographical macro areas of residence of patients: North West, North East, Centre, and South and Islands.

Differences by geographical areas of residence were tested with chi-square test for categorical variables, and by one-way Analysis of Variance (ANOVA) for continuous variables.

First hospitalization for AN

Patients aged 10-19 years with diagnosis of AN, first ever admitted in 2004-2005, and never hospitalized for AN in 2001-2003, were analyzed. These patients can be assumed to be a reasonable proxy of incident cases.

Annual average rates of first hospitalization for AN were computed (using as numerator the annual average number of first ever admitted patients) by gender, macro areas of residence of patient and for the age groups: 10-14, 15-19, and 10-19. The distribution of primary diagnosis was also reported by gender and age classes.

RESULTS

AN-associated Hospitalization

The IHDD includes data on 9863 hospitalizations for AN (as primary diagnosis or co-morbidity) in

2004-05 among patients aged 10-59 years (**Table 2**). Of the 9863 hospitalizations selected, 9246 (94%) occurred among women and 617 (6%) among men. The number of hospitalizations peaked among both women and men in the group aged 15-19 years (**Figure 1 and 2**).

During the study period, crude rate of AN-associated hospitalization was 24.2 per 100,000 person-years among women and 1.6 per 100,000 person-years among men (**Table 2**). There were differences between males and females in the hospitalizations rates at all age classes. Among women, age specific rates ranged from 9.9 to 95.7 per 100,000 person-years, while among men from 0.8 to 5.5 per 100,000 person-years.

Significantly different geographic patterns were seen among the overall hospitalization (**Table 3**). Considering both genders, rates of hospitalization ranged from 7.4 per 100,000 in Southern regions to 25.6 per 100,000 in the North-West. The significantly lower rate of hospitalization in the North-East compared to the North-West was mostly attributable to the lower rate of hospitalization in day hospital setting in the North-East compared to the North-West.

The mean age at hospitalization was about 25 years (median age: 22) with substantial geographical variation ($p < 0.0001$) except that between Centre Italy and South and Islands ($p = 0.55$) (**Table 3**). The highest average age was found in the North East and the lowest in the Centre.

The highest mean and median durations of hospital stay were observed in North-West and North East.

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Tabella 2. Anorexia nervosa: hospitalizations by age classes and gender. Italy, years 2004-2005

	Women		Men	
	n	rates per 100 000 (95% CI) ^o	n	rates per 100 000 (95% CI) ^o
10-14 years	1038	37.6 (35.3-39.9)	102	3.5 (2.8-4.2)
15-19 years	2689	95.7 (92.2-99.4)	164	5.5 (4.7-6.4)
20-24 years	1690	53.8 (51.3-56.4)	95	2.9 (2.3-3.5)
25-29 years	1290	33.3 (31.5-35.1)	59	1.5 (1.1-1.9)
30-59 years	2539	9.9 (9.5-10.3)	197	0.8 (0.7-0.9)
Overall (10-59 years)	9246	24.2 (23.7-24.7)	617	1.6 (1.5-1.7)
STD rate		29.7 (29.0-30.3)		1.8 (1.7-2.0)

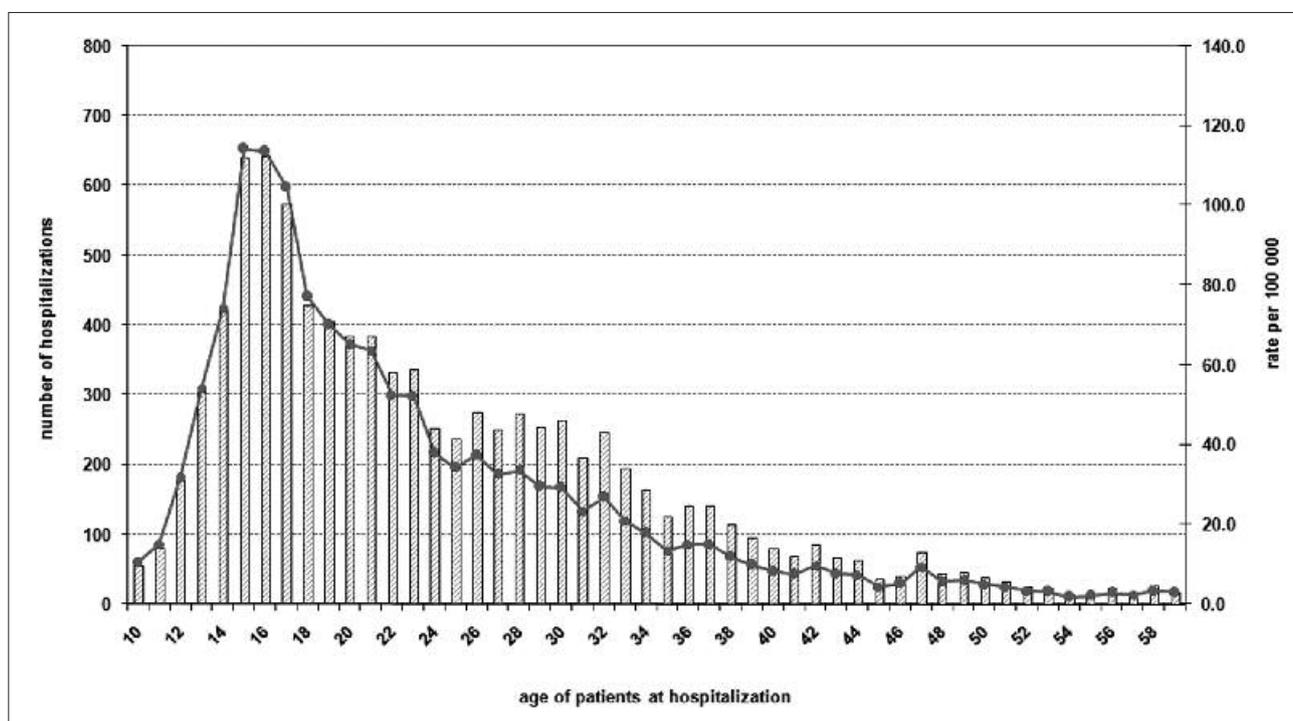


Figura 1. Anorexia nervosa: hospitalizations by age of patient. Total number of hospitalizations and annual average age specific rates. Women, Italy, years 2004-2005.

First hospitalization for AN

The IHDD includes data on 1391 AN patients aged 10-19 years first ever admitted in 2004-2005. Of these patients, 1271 (91%) were women and 120 (9%) were men (**Table 4**). The rate of first hospitalization was 22.8 per 100,000 among women compared with 2.0 per 100,000 among men. Among women aged 15-19 years the rate of first hospitalization was over two times

higher than among women aged 10-14 years (31.7 vs. 13.9).

Different geographic patterns were observed. Among women 10-14 years old, rates of first hospitalization in the North-West, North-East and Centre Italy (19.3, 18.9 and 18.8 per 100,000, respectively) were higher if compared to the South regions of Italy (7.1). In the 15-19 age class the highest incidence rate was found in the North West (55.2) followed by the Centre

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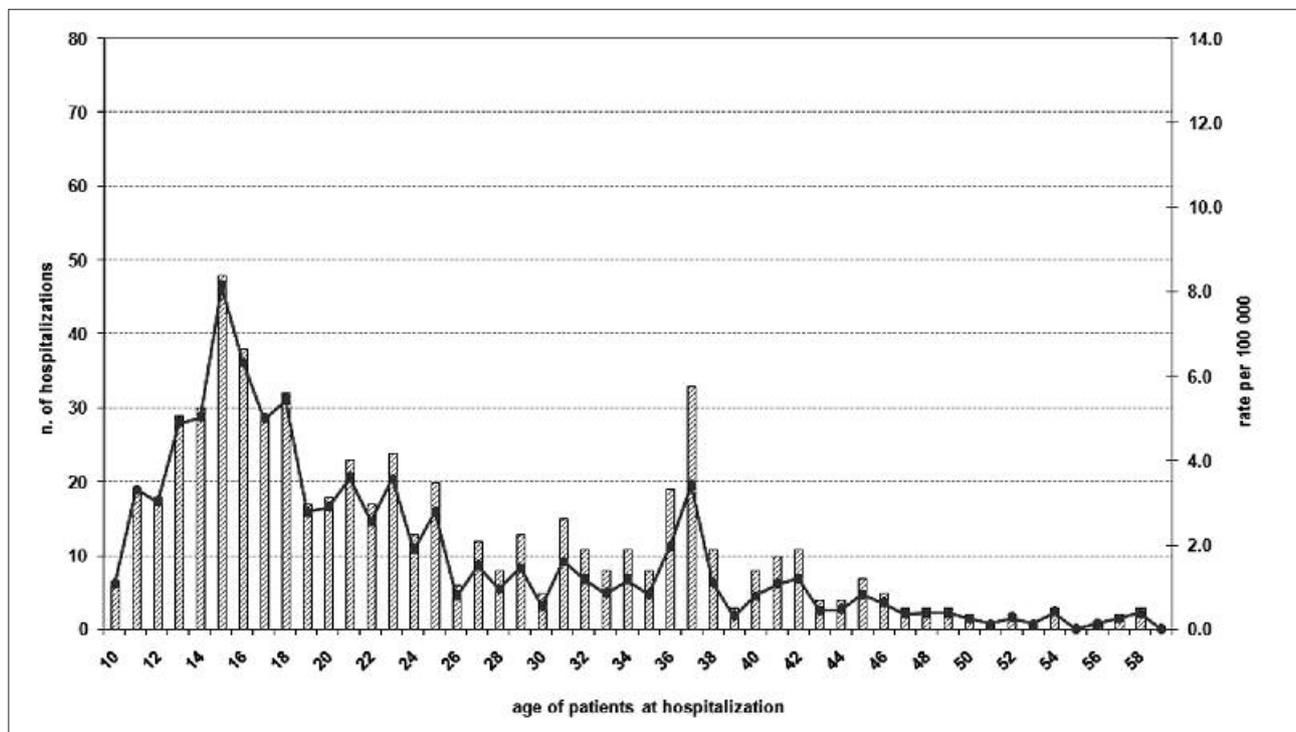


Figure 2. Anorexia nervosa: hospitalizations by age of patient. Total number of hospitalizations and annual average age specific rates. Men, Italy, years 2004-2005.

Tabella 3. Anorexia nervosa: indicators of hospitalization by geographical areas of residence of patients aged 10-59 years. Italy, years 2004-2005.

	North-West	North-East	Centre	South-Island	Italy(\$)
<i>n</i>	3922	1771	2257	1897	9863
<i>STD hospitalizations rate per 100 000 inhabitants (95%CI)</i>	25.6 (24.8-26.4)	15.8 (15.0-16.6)	20.01 (19.3-21.0)	7.4 (7.1-7.8)	15.5 (15.2-15.8)
<i>Mean age at hospitalization (95%CI)</i>	25.3 (25.0-25.6)	26.3 (25.8-26.8)	22.8 (22.4-23.2)	23.3 (22.9-23.7)	24.5 (24.3-24.7)
<i>Median age at hospitalization (95%CI)</i>	23 (22.5-23.5)	24 (23.4-24.6)	20 (19.5-20.5)	21 (20.6-21.4)	22 (21.7-22.3)
<i>% of inpatient admissions</i>	44.8%	65.4%	45.9%	53.1%	50.4%
<i>% of day hospital admissions</i>	55.2%	34.6%	54.1%	46.9%	49.6%
<i>STD inpatient admissions rate per 100 000 inhabitants (95%CI)</i>	10.9 (10.4-11.4)	10.0 (9.4-10.5)	8.8 (8.2-9.3)	3.9 (3.7-4.1)	7.5 (7.3-7.7)
<i>STD day-hospital admissions rate per 100 000 inhabitants (95%CI)</i>	14.7 (14.1-15.4)	5.8 (5.4-6.3)	11.3 (10.7-12.0)	3.5 (3.3-3.8)	7.9 (7.7-8.2)
<i>Mean duration of inpatient admissions (95%CI)</i>	29.8 (28.1-31.5)	28.6 (26.6-30.5)	20.0 (18.3-21.7)	17.1 (15.5-18.7)	24.9 (24.0-25.8)
<i>Median of inpatient admissions (95%CI)</i>	15 (14.0-16.0)	14 (12.7-15.3)	7 (6.2-7.8)	6 (5.3-6.7)	11 (10.4-11.6)
<i>% of men</i>	6.0	6.8	5.8	6.9	6.3

(\$) for 16 cases(15 women and 1 men) the region of residence was missing

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Tabella 4. Anorexia nervosa: first hospitalization among 10-19 years old, by geographical areas of residence of patients. Italy, years 2004-2005, Women and Men. Total number of cases and annual average rates per 100.000 inhabitants

	Women					
	10-14 years		15-19 years		10-19 years	
	n	Crude rate (95% CI)	n	Crude rate (95% CI)	n	Crude rate (95% CI)
North-West	121	19.3 (16.0-23.0)	343	55.2 (49.5-61.3)	464	37.1 (33.7-40.5)
North-East	86	18.9 (15.1-23.3)	147	33.2 (28.0-39.0)	233	25.9 (22.7-29.5)
Centre	91	18.8 (15.1-23.1)	210	42.8 (37.2-48.9)	301	30.9 (27.5-34.6)
South-Island	84	7.1 (5.6-8.7)	186	14.8 (12.8-17.1)	270	11.1 (9.8-12.5)
Italy (\$)	382	13.9 (12.5-15.3)	889	31.7 (29.6-33.7)	1271	22.8 (21.6-24.1)
	Men					
	10-14 years		15-19 years		10-19 years	
	n	Crude rate (95% CI)	n	Crude rate (95% CI)	n	Crude rate (95% CI)
North-West	17	2.5 (1.5-4.1)	20	3.0 (1.8-4.6)	37	2.8 (2.0-3.8)
North-East	8	1.7 (0.7-3.3)	9	1.9 (0.9-3.6)	17	1.8 (1.0-2.9)
Centre	16	3.1 (1.8-5.1)	22	4.3 (2.7-6.4)	38	3.7 (2.6-5.1)
South-Island	12	1.0 (0.5-1.7)	16	1.2 (0.7-2.0)	28	1.1 (0.7-1.6)
Italy	53	1.8 (1.4-2.4)	67	2.3 (1.7-2.9)	120	2.0 (1.7-2.4)

(\$) for 3 women the region of residence was missing

Tabella 5. Anorexia nervosa: first hospitalization among 10-19 years old by primary diagnosis. Italy, years 2004-2005, Women and Men. Percentage of cases

	Women			Men		
	10-14 years	15-19 years	Overall (15-19 years)	10-14 years	15-19 years	Overall (15-19 years)
AN	88.7	81.2	83.5	83.0	74.6	78.3
Somatic disease	6.8	14.2	12.0	11.3	22.4	17.5
Non psychotic mental disorder	2.1	2.5	2.4	5.7	1.5	3.3
Encounterig health services for other than diseases	2.4	1.9	2.0	0.0	1.5	0.8
Missing	0.0	0.2	0.2	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number of cases	382	889	1271	53	67	120

of Italy (42.8) while South and Island showed the lowest rate of first hospitalization (14.8).

Among men, Central Italy showed the highest rates (3.1 per 100,000 in the 10-14 age class and 4.3 per 100,000 in the 15-19 age class) while the South and Islands the lowest (1.0 per 100,000 for the 10-14 age class and 1.2 per 100,000 for the 15-19 age class).

The recorded primary diagnoses for patients aged 10-19 years are summarized in table 5. About 84% of women and 78% of men had AN as primary diagnosis. AN was more frequently reported as primary diagnosis among patients 10-14 years old than among patients 15-19 years old. For about 12% of women and 17% of men the principal diagnosis was somatic disease. The

diagnosis of non-psychotic mental disorder represented about 2% of principal diagnoses among women and 3% among men.

DISCUSSION

Our study provides, for the first time, nationwide estimates of hospitalized AN in Italy.

Our study reveals an estimate of incidence rate of first hospitalization for AN in women of 31.7 per 100,000 inhabitants in the 15-19 years age group. This is in contrast with previous reports based on cases detected in the health care system of 109 per 100,000 person-years in the Netherlands (11) and 73.9 per 100,000 person-years in USA (7). A possible explanation is that in our study the rate was based on hospitalized cases only, whereas both previously cited studies included medical records of all healthcare providers in the community services.

Moreover, compared to the US study (7) our study used more stringent criteria for the identification of AN diagnoses (only ICD9CM 307.1 was considered, excluding for example diagnosis of anorexia - ICD-CM:783.0, unspecified malnutrition - ICD9CM: 263, abnormal loss of weight -ICD9CM:783.2), whereas in the US study, records that mentioned diagnostic terms that could refer to non-detected cases were screened and included as probable as well as possible cases of AN. If only this "definite" AN cases are considered the USA study reports incidence rates of 36.5 per 100,000 among 15-19 years old women and 14.9 among women aged 10-14 years, which are quite similar to our estimates (31.7 for 15-19 year olds and 13.9 for 10-14 year olds); also for men 15-19 years old our estimates are consistent with those reported in the US study for "definite" AN (2.3 versus 2.6 per 100,000).

On the other hand, our findings are comparable with those reported in a recent study conducted with the same methodology (i.e. hospital cases registries) in Switzerland (10). In that study, a incidence rate of 19.7 per 100,000 among 12-25 years old women was reported, that is quite similar to our results of 22.8 among 10-19 years old women.

Because our results were based on cohorts ascertained through inpatient and day care settings, we missed patients with AN who had been treated in outpatient settings. Therefore, our population probably represents the AN group with the most severe and clear-cut anorexia nervosa (17). In fact, while some patients with AN may initially be managed in primary care, the great majority of severe cases are referred to hospitals services (18).

It was also observed that those detected in health care system represent only a minority of all the subjects with AN present in the general population (19). Hence in Italy the overall incidence rate of AN including less severe forms might be higher.

Large variations between geographical areas, even contiguous areas, were observed in hospitalizations rates for AN, and average length of stay among AN patients.

Factors that may account for this geographical variability include patient-related characteristics (e.g., socio-economic status, clinical severity) and health care system-related variables (e.g., health care structure or provision of hospital beds or treatment). Unfortunately, we could not test these hypothesis in this study.

Factors related to health care structure or provision of hospital beds may partially explain regional variation in hospital use. In Italy, AN inpatient care is delivered by medical as well as psychiatric facilities. These facilities also include 43 specialist eating disorders services with dedicated inpatients beds, also located in general hospitals. The majority of them, seventeen, are in the North-West. In the Center of Italy there are 12 of these specialist services, in South and Island 8, in the North-East 6 (20).

The higher number of specialist services as well as the improvement of quality of care in some regions may have improved detection of AN resulting in hospitalization at a time when the disorder was less advanced and before patients present serious physical or psychiatric complications and risks (21). However, in the North-West, the area with the highest number of specialist services, more lengthy hospitalizations were observed, which may mean that patients presented with a more severe clinical condition.

Another possible explanation of the observed geographical variability is that AN is more common among some regions and that the incidence rates of AN in some Italian areas (i.e., North West and Centre) may be higher than in other areas (i.e., North East and South and Islands) because of demographic or socio-cultural factors. The North West and the Centre have a higher degree of urbanization than the North-East and South and Islands. In particular, the North-West is the most industrialized area of our country. The link between degree of urbanization and a number of mental disorders is well established (22). Although recent studies have demonstrated that urban life is not a potential environmental risk factor for AN in some Western countries (11), other studies suggested that the degree of urbanization may have a significant impact on the prevalence on AN in Italy (12).

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The problem of eating disorders may appropriately be attributed to a combination of socioeconomic development and modern culture. The degree of morbid eating behavior may also depend upon the degree of exposure to modern emphasis on thinness and body ideals (23,24). Differently from the rest of the country that is similar in culture to other Western industrialized nations, the South of Italy still holds more traditional values in relation to the female role and attitudes towards femininity, family relations, and beauty. For example, in the South having a full rounded form is considered to be more attractive and a symbol of feminine nurturance than in other Italian areas.

We selected patients aged 10-19, according to their unique personal identification number, who appeared for the first time in the Italian national discharges database in 2004-05. We used a 4-5-year clearance period. Therefore, we do not know if these patients had already been hospitalized before 2001. However, given that the studied population is young and AN is uncommon in persons younger than 15 years (25), previous hospitalizations were not likely to have occurred. Undoubtedly, the best way to estimate incidence of illnesses is through data collected by population-based Registries but, in Italy, no AN registries has been set up. When there is not a Registry that collects standardized information, hospital morbidity data can be used to estimate the incidence of serious chronic diseases provided that patients with the condition are admitted to hospitals at least once. The estimate of incidence through an administrative data source, like hospital discharges data, requires the identification of "first time hospital admission" in order to exclude repeated admission to hospital; it is also common to consider a "clearance period" to overcome the problem of overestimation of incident cases (26-28), problem that arises from the erroneous inclusion of prevalent cases that have had previous hospital admissions prior to the study observation period. Moreover data routinely collected for administrative purposes are a very "low cost" source if they are compared to population based surveys, that could be very expensive to undertaken.

CONCLUSIONS

In conclusion, despite some limitations this study provided national rates of hospitalization for AN in Italy and rates of first hospitalization for AN among adolescents and very young adults, which is a reasonable proxy for the overall incidence of moderate to severe AN among Italian youngsters. Our findings are

consistent with those of previous studies performed in other industrialized countries with a similar methodology, and they corroborate the common opinion that AN in adolescence is a public health concern due to the high risk for suicide, the profound social consequences, and the frequent occurrence of severe medical complications as a result to starvation, malnutrition and purging. The low but discernible incidence among males points to the need for health professionals, particularly general practitioners, of being alert to the occurrence of this disorder in both sexes, as early referral to mental health services and multidisciplinary treatment teams is key to improve the prognosis of this disorder.

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