Pilot evaluation of indirect costs and the impact of bipolar disorder type I

Valutazione pilota dei costi indiretti e dell'impatto del disturbo bipolare di tipo I

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Summary

Objectives

Bipolar I disorder, a chronic disease characterised by alternating episodes of mania and depression, is often associated with severe comorbidities, both psychiatric and metabolic, which increase the cost of healthcare in these patients. The disease also has a significant social impact, because of difficulties due to work, family issues and interpersonal relationships. In addition to the direct health care costs (hospitalisation, pharmaceutical expenditure and outpatient visits), bipolar disorder is associated with considerable indirect costs due to absence for illness and early retirement. The objective of this multicentre study, a subanalysis of a prospective observational study, was to evaluate the indirect costs associated with bipolar I disorder in an Italian context.

Methods

An ad hoc questionnaire was administered to 265 patients with bipolar I disorder diagnosed according to DSM-IV criteria and referred to 39 medical centres: indirect costs were evaluated by calculating the days of work or study with lost or reduced production capacity in the previous 3 months. The estimation of the economic burden was obtained as a product of the number of days lost and the daily income individual patient. Since the income of the patients was expressed as brackets, quantification was carried out as the range between the minimum and maximum level of each income bracket.

Results

A total of 182 (54.9% women, 44.1% men), with a mean age of 50 years, responded to the questionnaire. Of these, 35.7% were employed and 27.5% retired, whereas the remaining 36.8% were unemployed (22.5%) and homemakers or students (14.3%). Overall, the sample declared a low-medium annual income: in fact, more than 80% of the patients earned less than € 25,000 a year. According to the responses to questionnaires, 24.2% of patients abandoned work for reasons related to bipolar disorder, 22% had reduced working hours, and 6.6% changed their job. On average, the working days lost per year per patient amounted to 93 days (median 60 days), whereas there were 66 working days with reduced productivity (median 44 days). Indirect costs for reasons related to the bipolar disorder for each patient were estimated to range from € 6009-11667, of which € 4600-8791 due to lost working days.

Conclusions

This study shows a strong and significant correlation between disease, work and economic aspects for patients suffering from bipolar I disorder. The disease appears to have a significant impact on indirect costs, deriving from loss of productivity, disability pensions and related benefits.

Key words

Bipolar I disorder • Health care costs • Cost of illness • Disability evaluation • Social problems

Introduction

Bipolar disorder type I is a chronic pathology characterised by the cycling of manic and depressive episodes [1 2]. The US National Comorbidity Survey Replication (NCS-R) estimated the prevalence, severity and comorbidities of mental disorders; epidemiologic data indicate that its prevalence is 1-2% [3], with similar prevalence of estimates in Europe [2 4 5]. The clinical episodes that characterise the disorder are generally interspaced with periods of return to normal emotional functioning. However, the risk of recurrence for individuals with the disorder is considered to be high [2 6]. The age with the highest frequency of onset of bipolar disorder type I is in late adolescence until an adult age [3 4 7].

Bipolar disorder type I is among the psychiatric disorders associated with the highest and most severe psychiatric comorbidities: 58% of cases are comorbid with alcohol abuse, 38% with substance abuse; in 56% and 65% of cases present with anxiety and personality disorders, respectively [7]. In addition, other comorbidities such as met-

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abolic disturbances and diabetes are also frequent [8]. Such comorbidities thus require treatment, which further impacts the direct costs of bipolar disorder; in a study from the US, it was reported that the annual healthcare costs of metabolic conditions in patients with bipolar disorder are twice that compared to a control group [9].

Bipolar disorder also has considerable impact on social dimensions: the symptoms of manic episodes, such as amplified self-esteem, risky behaviour, hypersexuality and difficulty in concentration, are often the cause of problems in the workplace, family (separation, divorce, etc.) and interpersonal relations. In the US, it also emerged that > 60% of patients are incapable of relations with children; 60%, in addition, have difficulties in maintaining intimate relationships or long-term friendships [10].

Moreover, while there is substantial economic impact associated with recovery for acute episodes, such costs also include pharmacotherapy, visits to GPs and both ambulatory visits and use of other healthcare services [11 12]. In a study in the UK, it was estimated that the annual costs to the NHS were around £200 million [9]. Of this, about 35% was associated with hospitalisation; the indirect, non-healthcare related costs were estimated to be £90 million. However, a Swedish study [13] indicated that the main costs of bipolar disorder were indirect costs related to sick leave and early retirement (about 75% of total expenses for patients with bipolar disorder). In an NDMDA study, 65% of interviewees declared to have changed work more frequently than colleagues; 41% were employed at the time of interview [10], and among these 30% were employed at a level below their qualifications, and received a relatively low salary. The majority (79%) also reported that although manic episodes were associated with an initial increase in productivity, in the longer term they had negative effects on the ability to work.

The objective of the present analysis is to evaluate the indirect costs associated with bipolar disorder type I in Italy, which was a secondary objective of a larger observational study whose primary aims were to observe potential intrinsic (socio-demographic characteristic and personality traits) and extrinsic (childhood trauma and psychosocial characteristics) factors predictive of remission after 12 weeks of treatment with antipsychotics and mood stabilisers.

Materials and methods

The present analysis is a subanalysis of an observational, prospective, longitudinal, non-interventional study on patients with a diagnosis of bipolar disorder type I who presented with manic episodes at baseline. The study duration was 3 months (during final statistical analysis and publication). The following data was collected for all participants in the study:

- indirect costs associated with the disorder using an ad hoc questionnaire (re-elaborated in the present analysis);
- demographic characteristics;
- characteristics of the on-going pathology;
- psychiatric history of the patient and family;
- psychiatric and medical comorbidities;
- main measures of the severity of the disorder (MADRS, YMRS, CGI-BD);
- measures of social, cognitive and psychological functioning (FAST);
- previous treatment for bipolar disorder;
- evaluation of personality traits (brief TEMPS- M);
- evaluation of childhood trauma (CTQ).

The enrolment period was from April 2012 to December 2012, with an observational period of 12 weeks (visits at baseline, week 1, week 3, week 8, week 12).

Control population

The study included male and female patients with an age ≥ 18 years who presented with manic episodes of bipolar disorder type I according to DSM-IV criteria. Patients could have been either hospitalised or in ambulatory care during the study. Inclusion criteria included:

- hospitalised and in acute manic phase at enrolment;
- experiencing manic episodes in the context of bipolar type I disorder on the basis of DSM-IV criteria;
- age ≥ 18 years;
- starting or switching (except for dose modification) therapy for mania with an oral antipsychotic and/or mood stabiliser in a hospital or ambulatory setting due to clinical conditions;
- signed informed consent form.

Exclusion criteria included:

- participation in an interventional study;
- inability to read or understand informed consent;
- pregnancy or nursing;
- relation or immediate family relationship with study staff.

Collection and analysis of data

For the quantification of indirect costs an ad hoc questionnaire was used (Table I). Indirect costs were estimated by calculating the daily costs of work/study lost or with reduced productive capacity on the basis of questionnaire data compiled by patients. The analysis considered the period relative to 3 months prior to compiling the questionnaire. The days included were then extended to the entire year and costs were then calculated relative to the annual salary indicated by patients. Questionnaires with unspecified annual income or days lost to work/study, and those relative to patients already in retirement were not included in the analysis. Cost estimations on a

TABLE I.
Questionnaire administered to patients for quantification of indirect costs. *Questionario somministrato ai pazienti per la quantificazione dei costi indiretti.*

Gross annual income (€)			
	0		
	< 10,000		
	10,000-24,999		
	25,000-39,999		
	40,000-59,999		
	> 60,000		
If presently or previously employed, which of the following apply due to your condition:			
	Had to leave the workplace		
	Change jobs		
	Develop new skills		
	Reduce working hours		
Age at onset of symptoms (age at appearance of first symptoms)			
Age at diagnosis			
Days of work (or study) lost due to your condition in the last 3 months			
Days of work with reduced productive capacity, even if still working, in the last 3 months			
By how much has your work capacity been reduced (e.g. 50% less than when I am functioning normally)			%
Days of work (study) lost to family/friends because of condition in last 3 months			
Number of visits for diagnosis and treatment of condition in the last 3 months			
What is the amount paid for healthcare expenses (€) in the last 3 months			
Average time (minutes) needed to get to place of medical visits (one way)			

daily basis were obtained by multiplying the number of days lost by the daily income of each individual patient. Since income was expressed in classes, two scenarios were considered. MIN COST was considered the lower extreme of each income class; MAX COST was considered as the upper extreme of each class.
For incomes < 10,000 €, the minimum amount was considered to be 5,000 €, while for incomes > 60,000 €, the maximum amount was set at 100,000 €. Regarding days with reduced productive capacity, the value used was obtained by the product of days with reduced capacity, percentage reduction (variable present in the questionnaire and indicated by the patient) and daily income for each the above-described scenarios.

Results

Characteristics of the patient cohort

The cohort was composed of 265 patients from 30 medical centres (SPDC, CSM/CM). A total of 182 patients compiled the questionnaire (54.9% women, 44.1% men). The mean age of the study population was 50 years, with an interquartile interval between 40 and 58 years. There were more females than males who were characterised by less variability in age distribution (Table II). At the time of first visit, 40.7% of the population was single/unmarried,

TABLE II.
Average age of the patients responding to gender. *Età media dei pazienti rispondenti per genere.*

	Total	Male	Female
Mean	49.5	50.4	48.9
Min	19	20	19
Q1	40	39	40
Median	49	49	50
Q3	58	60	58
Max	83	83	74
SD	14	15	12

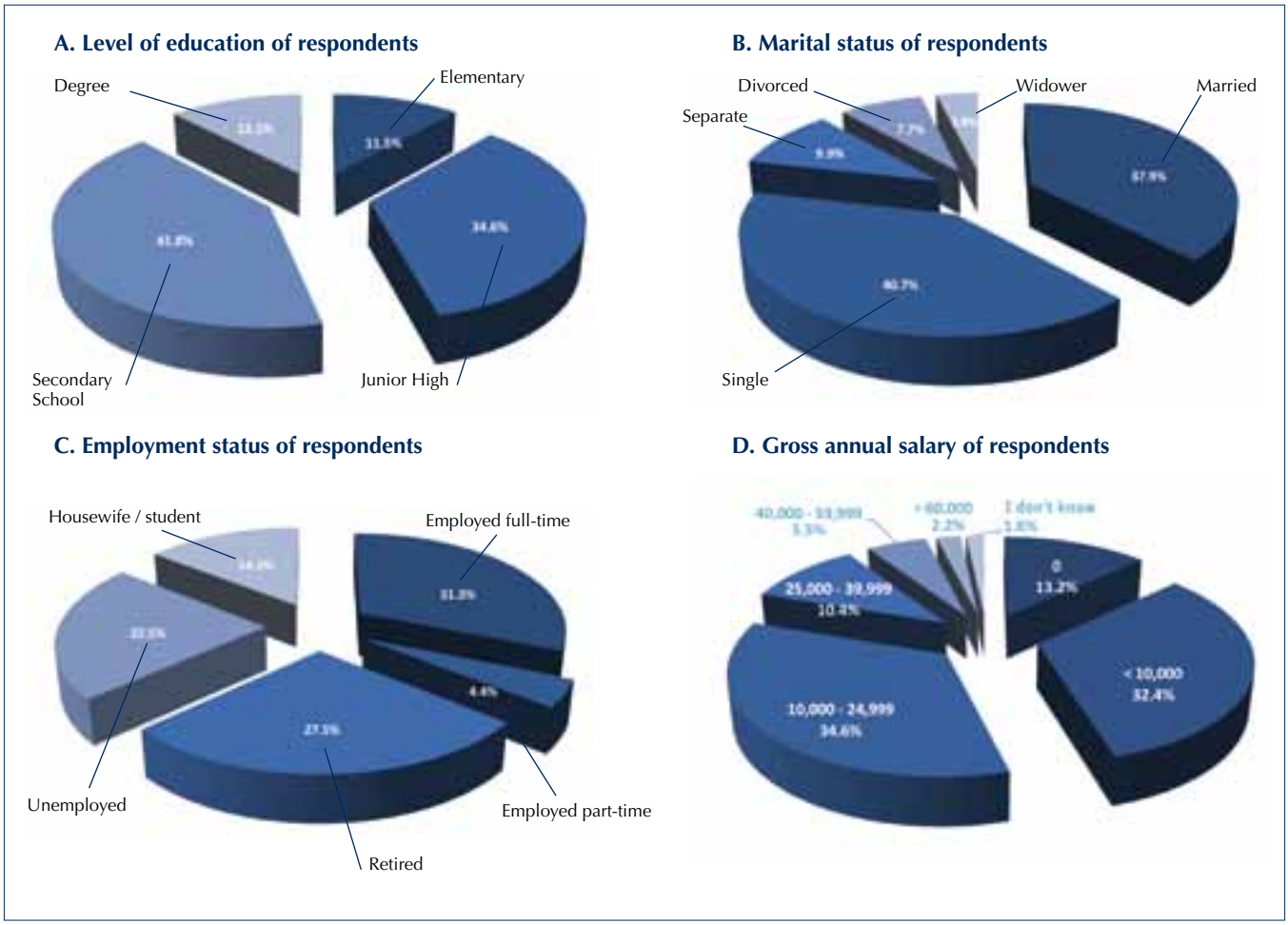

FIGURE 1.
Characteristics of the sample. *Caratteristiche del campione*.

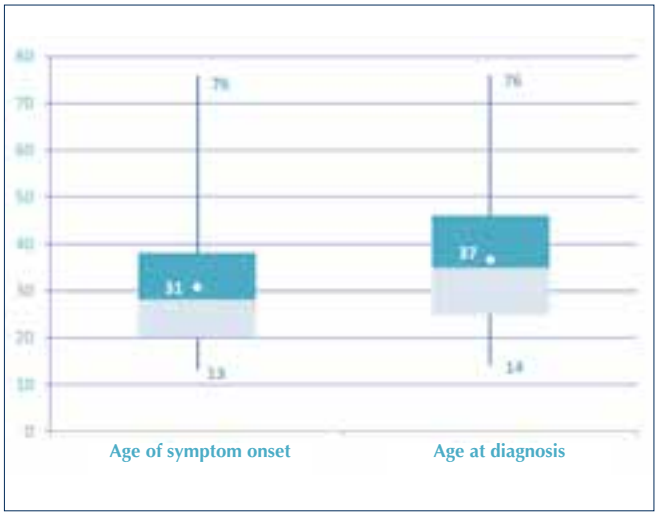

FIGURE 2.
Age at first symptoms and age at diagnosis in patients responding. *Età ai primi sintomi ed età alla diagnosi nei pazienti rispondenti*.

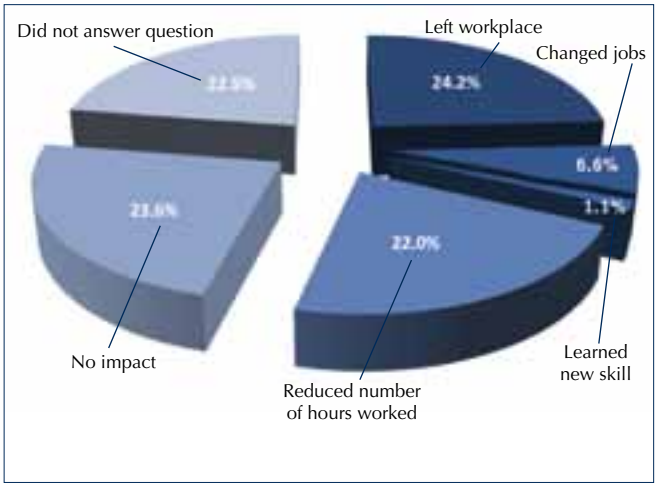

FIGURE 3.
Impact of the disease on employment for the responding patients. *Impatto della malattia sull'attività lavorativa per i pazienti rispondenti.*

37.9% married, 17.6% divorced/separated and the remaining 3.8% was widowed (Fig. 1A). The level of education achieved was high: 41.8% had completed high school, and 12.1% had obtained a college diploma (Fig. 1B).
A fundamental aspect, considering the objectives of the study, was employment status: 35.7% was employed (31.3% full-time, 4.4% part-time) and 27.5% was retired, while 36.8% of the sample consisted of patients who were unemployed (22.5) and housewives or students (14.3%) (Fig. 1C). The annual incomes reported by participants reflected the above-cited data: even if almost one-fourth of patients were unemployed, only 13.2% of these individuals declared that they did not receive any income in the past year, which would appear to correspond to housewives and students (14.3%). Thus, individuals who self-declared to be unemployed are likely receiving a pension or allowance for disability. Such reflections may have important implications for the indirect costs associated with bipolar disorder type I.
Individuals who declared an annual income < 10,000 € represented 32.4% of the total, which is close to the percentage of part-time workers and retirees. The middle class was considered to be those with an annual income from 10,000 € to 24,999 €, declared by 34.6% of respondents. Altogether, the majority of patients had a low-medium income: more than 80% of patients has an annual income < 25,000 € (Fig. 1D). This information is important for two reasons. On one hand, it allows for estimation of the indirect costs associated with absenteeism and presenteeism, and thus allows for determination of the economic costs of bipolar disorder. On the other, it also highlights the consequences of bipolar disorder. As already mentioned, in fact, one of the most frequent consequences of the disorder is the need to change jobs or completely leave the workplace.

Impact of bipolar disorder

For patients in this observational study, the first symptoms related to bipolar disorder appeared at a mean age of 31 years. The earliest signs of disease appeared at 13 years, but in 50% of patients enrolled the appearance of symptoms occurred within the age of 28 tears. On average, diagnosis was made within 6-7 years after the first appearance of symptoms. In fact, the mean age of diagnosis was 37 years (median 35 years; Fig. 2). Thus, in this patient cohort, the highest incidence is seen in working age individuals, which justifies further study on the consequences of the disorder on employment. According to our data, 24.2% of patients were forced to leave their employment for reasons linked to bipolar disorder, 22.0% had to reduce their working hours and 6.6% had to change jobs (Fig. 3).
Considering the responses according to employment status, 36.6% of the unemployed declared to have abandoned their work activity for reasons linked to their condition. Moreover, 7.3% had to change jobs, while 14.3% had to reduce the number of working hours. Thus, this would appear to confirm the hypothesis that the low level of income seen in the present cohort is mainly related to problems associated with bipolar disorder, and further demonstrate the strong impact that the disease has on the work activity of patients.
It can be concluded that 50% of part-time workers had to reduce the number of hours due to their condition, while the remaining 50% had to change jobs or even abandon the workplace (Table III). An estimate of the impact of disease on employment in terms of absenteeism and presenteeism can also been seen in the number of days lost to work in the last year and the number of work days with loss of productivity. On average, 93 days (median 60 days) were lost per patient, with an average of 66 days (median 44 days) with reduced productivity (Fig. 4). It should be noted however that these values were highly variable depending on the employment status of patients (full-time, part-time, unemployed); in addition, they may also be biased by the difficulty that patients may have in precisely remembering the number of days involved. In addition, since the estimate of an-

TABLE III.
Impact of the disease on the working condition for employment. *Impatto della malattia sull'attività lavorativa per condizione occupazionale.*

Status	Left work	Changed job	Learn new skill	Reduce hours	No change	NA
Employed (full-time)	19.3%	7.0%	1.8%	40.4%	28.1%	3.5%
Employed (part-time)	25.0%	25.0%	0.0%	50.0%	0.0%	0.0%
Retired	26.0%	6.0%	2.0%	8.0%	36.0%	22.0%
Unemployed	36.6%	7.3%	0.0%	14.6%	17.1%	24.4%
Housewife/student	11.5%	0.0%	0.0%	11.5%	7.7%	69.2%

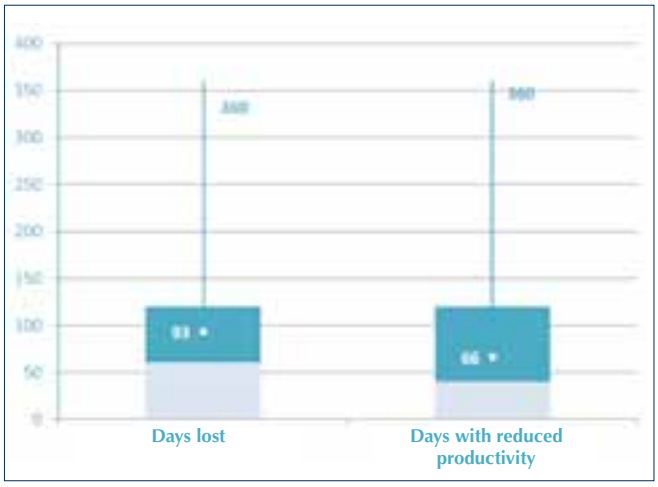

FIGURE 4.
Working days lost or reduced productivity for reasons related to bipolar disorder in responders. *Giornate di lavoro perse o con produttività ridotta per motivi legati al disturbo bipolare nei pazienti rispondenti.*

FIGURE 5.
Indirect costs due to lost work days with reduced productivity or for reasons related to bipolar disorder in responders. *Costi indiretti dovuti a giornate di lavoro perse o con produttività ridotta per motivi legati al disturbo bipolare nei pazienti rispondenti.*

nual days was obtained though responses relative to the last 3 months, these data could also be influenced by changes in employment status during the entire year. For example, at the time the questionnaire was compiled an individual who was unemployed would have declared to have lost 90 days in the last 3 months. In this case, the entire year would have been considered as lost, although in reality the precise time at which the patient left the workplace has not been defined.
As already mentioned, estimation of costs of days lost to work or with reduced capacity was based on annual incomes, considering the MIN COST and MAX COST. The indirect costs due to absenteeism and presenteeism due to bipolar disorder in 102 patients were € 613 million considering MIN COST, and € 1,191 million considering MAX COST. The costs per patient in the former were € 6,009, of which € 4,600 was due to days lost, and in the latter case were € 11,667, of which € 8,791 was due to days lost (Fig. 5).

Conclusions

The present study demonstrates the strict and significant correlation between disease, employment and economic aspects for patients affected by bipolar disorder type 1. The pathology also appears to have a relevant impact on indirect costs related to loss of productivity as well as disability pensions and subsistence benefits (Fig. 6). In 50% of patients, the first signs of disease appeared below the age of 28 years, or at the start of the average age of employment. In the vast majority of cases, there are significant repercussions on employment: about 40% of patients were forced to reduce the number of hours worked (the percentage increases to 50% for part-time workers, who presumably were once full-time workers), while 20% changed jobs and 25% abandoned the workplace. Patients affected by bipolar type I disorder had a strong tendency towards low income: 80% of interviewees declared an annual income less than € 25,000, and 45.6% had an annual income less than € 10,000. The consequences of bipolar disorder type I on employment, based on the number of job days lost or with reduced productivity, showed that there are substantial indirect costs associated with the disease. In particular, the average annual cost per patient was between € 6,009, calculated using the minimal annual income, and € 11,677, calculated using the maximum annual income declared.

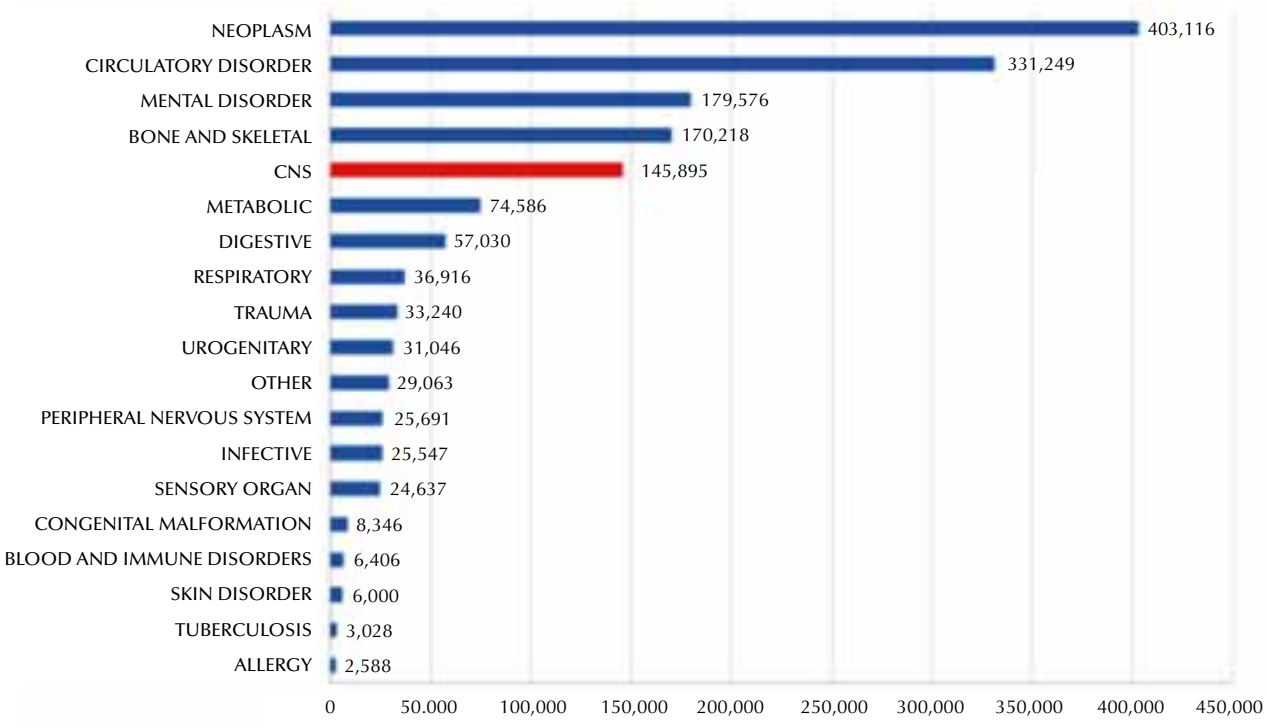

FIGURE 6.
Disability benefits paid out between 2001 and 2012. *Assegni di invalidità erogati tra il 2001 e il 2012.*

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