

# The Economic Burden of Personality Disorders in Mental Health Care

Djøra I. Soeteman, M.S.; Leona Hakkaart-van Roijen, Ph.D.;  
Roel Verheul, Ph.D.; and Jan J. V. Busschbach, Ph.D.

Received April 16, 2007; accepted July 3, 2007. From the Viersprong Institute for Studies on Personality Disorders, Halsteren (Ms. Soeteman and Drs. Verheul and Busschbach); Department of Medical Psychology and Psychotherapy (Ms. Soeteman and Dr. Busschbach) and Institute for Medical Technology Assessment (Dr. Hakkaart-van Roijen), Erasmus Medical Center Rotterdam; and the Department of Clinical Psychology, University of Amsterdam (Dr. Verheul), the Netherlands.

The Study on the Cost-Effectiveness of Personality disorder Treatment (SCEPTRE) is being conducted with the participation of 6 mental health care institutes in the Netherlands: Center of Psychotherapy De Viersprong, Halsteren; Altrecht, Utrecht; Medical Center Zaandam; Center of Psychotherapy De Gelderse Roos, Luntenen; Westelijk Noord-Brabant Mental Health Care (GGZWNB), Bergen op Zoom; and Center of Psychotherapy Mentrum, Amsterdam.

The authors report no financial affiliations or other relationships relevant to the subject of this article.

Corresponding author and reprints: Djøra Soeteman, M.S., Viersprong Institute for Studies on Personality Disorders, P.O. Box 7, 4660 AA Halsteren, the Netherlands, +31 164 632200 (e-mail: [djora.soeteman@deviersprong.nl](mailto:djora.soeteman@deviersprong.nl)).

**Objective:** Some evidence suggests that personality disorders are associated with a high economic burden due to, for example, a high demand on psychiatric, health, and social care services. However, state-of-the-art cost studies for the broad range of personality disorder diagnoses are lacking. The present study examines the direct medical costs, as well as the indirect costs, of patients seeking mental health treatment with DSM-IV personality disorders.

**Method:** The 1740 subjects included in this study were recruited from March 2003 to March 2006 from 6 different mental health care institutes in the Netherlands specializing in the psychotherapeutic treatment of personality disorders. The direct and indirect costs were assessed using the Trimbos and Institute for Medical Technology Assessment Questionnaire on Costs Associated with Psychiatric Illness. Personality disorders were diagnosed using the Structured Interview for DSM-IV Personality.

**Results:** The mean total costs of the personality disorder group in the 12 months prior to treatment were €11,126 per patient. Two thirds (66.5%) of these costs consisted of direct medical costs, while the remaining costs were related to productivity losses. Borderline and obsessive-compulsive personality disorders were uniquely associated with increased mean total costs.

**Conclusions:** Treatment-seeking patients with personality disorders pose a high economic burden on society, a burden substantially higher than that found in, for instance, depression or generalized anxiety disorder. These high societal costs present a strong argument in favor of prioritizing effective personality disorder treatments in reimbursement decisions.

(*J Clin Psychiatry* 2008;69:259–265)

Hardly any research exists on the economic burden of personality disorders. This is remarkable as the presumed high societal costs of personality disorders are often used as an argument to justify the costs of expensive treatments (in general) for this patient group. Moreover, the economic burden of other mental conditions has already been extensively investigated, for example schizophrenia<sup>1–3</sup> and depression.<sup>4–6</sup>

The limited evidence available so far suggests that personality disorder patients are extensive users of psychiatric services and other mental health care resources.<sup>7,8</sup> Furthermore, there is evidence of a high demand on health, criminal, and social care services.<sup>9–11</sup> The study by Bender and colleagues<sup>7</sup> on the utilization of mental health treatment in 664 treatment-seeking patients found that patients with personality disorder (schizotypal, borderline, avoidant, and obsessive-compulsive) showed more extensive histories of psychiatric outpatient, inpatient, and psychopharmacologic treatment than the comparison group with major depressive disorder without personality disorder. Another study on the service usage of 24 patients with personality disorders calculated that the costs of psychiatric and prison services 1 year before treatment were £13,966 per patient.<sup>9</sup>

Other research suggests that—in addition to these health, criminal, and social care service costs—a strong relationship exists between reduced productivity (absence from and inefficiency at work) and mental disorders,

including personality disorders.<sup>12-14</sup> For instance, Lim et al.<sup>12</sup> studied lost productivity among full-time workers with mental disorders in a community sample of 4579 respondents. Although they found only depression to be significantly associated with more work loss days (number of days unable to perform usual activities), they also found that depression, generalized anxiety disorder, and personality disorder were significantly associated with more "cutback days" (i.e., the number of days on which usual activities were restricted). When the prevalence of these DSM-IV disorders in the Australian community was taken into account, the economic burden of personality disorders dominated over the burden of diagnoses of mood, anxiety, and substance use disorders.

A state-of-the-art economic assessment always includes 2 different types of costs: (1) direct costs related to actual expenditures for detecting and treating the medical problems, and (2) indirect costs associated with lost productivity related to health problems.<sup>15</sup> None of the studies presented above have combined these 2 aspects, so actually they are incomplete cost-of-illness studies. The only study that did include both direct and indirect costs was a study by Rendu and colleagues.<sup>16</sup> In a follow-up of 303 general practice attendees, this study found that people with personality disorders were nearly twice as costly to support (mean = £3094 per annum) as those without (mean = £1633 per annum). This study did not, however, distinguish between the various types of personality disorders.

In sum, the full economic burden of personality disorders has received little attention as compared to other mental illnesses. Moreover, state-of-the-art cost investigations for the broad range of specific DSM-IV personality disorders are lacking. The aim of the present cost-of-illness study was to calculate the direct (use of medical resources) and indirect (productivity losses because of absence from work and reduced efficiency at work) costs of treatment-seeking patients with different diagnoses of personality disorders in order to assess their economic burden on society. This economic burden may not be interpreted as the reduction in costs as a consequence of a new effective intervention, as the costs of the intervention are unknown. However, a cost-of-illness study may serve as a tool in designing a cost-effectiveness study, as it provides valuable information on which cost items should be included.

## METHOD

### Participants

Subjects were recruited from a consecutive series of admissions to 6 mental health care institutes in the Netherlands offering outpatient, day hospital, and/or inpatient psychotherapy for adult patients with personality pathology and/or personality disorders. As part of the standard

admission procedure, all applicants performed a routinely distributed assessment battery including self-report questionnaires in order to measure psychopathology, personality, functional impairments, and treatment history and a semistructured interview for diagnosing personality disorders. When the administration of the questionnaires forms part of the routinely administered clinical intake procedure and does not involve additional risks or load, informed consent is not mandatory under Dutch law. For this reason, informed consent was only asked if the patient participated in any further follow-up investigations. The current study design was approved by the Dutch medical ethics committee.

From March 2003 to March 2006, 2540 individuals were registered as admissions to the 6 mental health care institutes. Of these patients, 462 (18.2%) did not start and 272 (10.7%) did not complete the formal admission procedure. Of the remaining 1806 patients, 46 were excluded due to clear signs of unreliable data in the interview and/or questionnaires (2.3%) or due to serious intellectual impairment (0.3%). The questionnaire for estimating costs was missing for 20 patients, leaving 1740 patients for the current study sample, i.e., 96.3% of those who completed the formal assessment procedure.

Of these patients, 35.2% were male. The mean age was 33.9 years (SD = 9.9; range, 18–67 years). Regarding the marital status, 65.2% were unmarried, 22.1% were married, and 12.7% were divorced or widowed. No differences with respect to gender, age, and educational level were found between those admissions that were included as compared to those who were excluded from the sample.

### Instruments

The Trimbos and Institute for Medical Technology Assessment (iMTA) Questionnaire on Costs Associated with Psychiatric Illness (TiC-P) was used to collect data on direct and indirect costs.<sup>17</sup> The first part of the TiC-P consists of questions on (1) the number of visits to a general practitioner, psychiatrist, medical specialist (that is, medical professional working at a hospital), physiotherapist, and alternative health practitioner; (2) the day care/hospital lengths of stay; and (3) the use of medication in the 4 weeks prior to filling out the questionnaire. Bottom-up methodology was used to calculate the total direct medical costs; that is, the total number of medical visits (outpatient visits, hospital lengths of stay, use of medication, etc.) was multiplied by the 2003 unit prices of the corresponding health care services.<sup>18,19</sup> The reference unit prices of health care services for 2003 were adjusted to prices in 2005 by using the consumer price index.<sup>20</sup> The mean direct costs per 4 weeks were multiplied by 13 to calculate the annual costs.

The second part of the TiC-P includes a short form of the Health and Labor Questionnaire for collecting data on

productivity losses.<sup>21</sup> The short form of the Health and Labor Questionnaire consists of 3 modules that measure productivity losses: absence from work, reduced efficiency at work, and difficulties with job performance. The days of short-term absence from work and actual hours missed at work because of health-related problems were multiplied by the net income of the patient per day and per hour, respectively. The number of lost working days per patient was calculated, taking into account the number of days and hours of paid employment of the patient per week. The recall period for the short form of the Health and Labor Questionnaire is 2 weeks. Therefore, the mean indirect costs due to short-term absence were multiplied by 26 to calculate the annual costs. In order to assess long-term absence from work, patients who indicated to be absent from work longer than the preceding 2 weeks were asked when this period of absence started. To value long-term absence from work, we applied the friction-cost method. This method takes into account the economic circumstances that limit the losses of productivity to society, which is related to the fact that a formerly unemployed person may replace a person who becomes disabled.<sup>22</sup> The period needed to replace a worker (the so-called friction period) is estimated to be 5 months. Hence, the maximum indirect costs to society were confined to productivity losses during a period of 5 months.

Additionally, the TiC-P includes a list of 28 chronic medical disorders, e.g., rheumatic disease, diabetes, asthma, Parkinson's disease, migraine, cancer, and burnout/severe tension. The patients were requested to indicate which of the chronic medical disorders they had experienced in the past year.

Personality disorders were assessed using the Dutch version<sup>23</sup> of the Structured Interview for DSM-IV Personality.<sup>24</sup> This instrument includes the 11 formal DSM-IV Axis I diagnoses (e.g., schizoid personality disorder) including personality disorder mixed, the 2 DSM-IV appendix diagnoses (depressive and negativistic personality disorder), and, in addition, the DSM-III-R self-defeating personality disorder. Personality disorder mixed is diagnosed when at least 10 diagnostic criteria are present, but no specific personality disorder is present. Interviewers were master-level psychologists, who were trained thoroughly by one of the authors (RV), and who received monthly booster sessions to avoid drift from the interviewer guidelines. Interrater reliability, based on 30 videotaped interviews rated by 3 observer-raters, was good. Percentage agreement ranged from 84% (avoidant personality disorder) to 100% (schizoid personality disorder) (median = 95%). Intraclass correlation coefficients for the sum of DSM-IV personality disorder traits present (i.e., scores of 2 or 3) ranged from 0.60 (schizotypal personality disorder) through 0.92 (antisocial personality disorder) (median = 0.74).

## Statistical Analysis

Univariate regression analyses were performed in order to compare the costs of each personality disorder type versus the patients without personality disorder.

The majority of patients (54.9%) were diagnosed with at least 2 personality disorder diagnoses. For that reason, multiple regression main effect analyses were conducted, measuring the unique contribution of the different diagnoses on the costs. In the analysis, a ranked definition of the presence of a diagnosis was used: no traits, only traits but no diagnosis, and the diagnosis present. An additional variable was entered into the multiple regression models to account for possible interactions between diagnoses. Because the number of possible interactions between 14 independent variables becomes intractable, the interaction term is represented by a count of the diagnoses present. Age and gender variables are associated with health service use and were therefore entered into the regression models.<sup>25</sup>

Chronic medical disorders are expected to induce high costs due to elevated use of both mental and somatic health care and a high impact on productivity losses. Hence, an additional regression analysis was performed to control for medical disorders to ascertain the unique contribution on the variation in costs.

## RESULTS

### Study Participants

In the present sample of 1740 participants, depressive (31.8%), avoidant (28.3%), obsessive-compulsive (20.9%), and borderline (20.9%) personality disorders were the most frequently diagnosed disorders. Schizotypal (1.0%) and schizoid (1.1%) personality disorders were the least frequently diagnosed disorders (see Table 3). In 320 patients, no personality disorder could be diagnosed. As patients can be diagnosed with more than 1 diagnosis of personality disorder, the percentages will add up to more than 100%. The percentage of patients with a paying job was 53.7%. Of the patients without paying jobs, 68.1% indicated that they were unable to work because of health-related problems.

### Direct Medical Costs

Table 1 shows the mean direct medical costs per year differentiated by type of medical service incurred by the patient group with 1 or more personality disorders. The total mean direct medical costs per patient were €7398 per year. These costs are mainly composed of costs due to inpatient health care (33.1%) (e.g., admissions into general or psychiatric hospital) and outpatient mental health care (26.1%). In a multiple regression analysis, paranoid ( $p = .035$ ), borderline ( $p = .011$ ), and obsessive-compulsive ( $p = .028$ ) personality disorders were associated with increased direct medical costs.

**Table 1. Mean Direct Medical Costs per Year of Patients With Personality Disorder (N = 1420)**

Type of Service	Cost (2005 prices), €	Percentage of Total Direct Medical Costs	Subjects Using the Service, N (%)
General practitioner	223.49	3.0	630 (44.4)
Company doctor	89.85	1.2	357 (25.1)
Physiotherapist	108.26	1.5	169 (11.9)
Alternative health practitioner	165.80	2.2	155 (10.9)
Domestic help	115.50	1.6	25 (1.8)
Self-help group	69.52	0.9	42 (3.0)
Social worker	137.71	1.9	138 (9.7)
Substance abuse outpatient care	27.99	0.4	13 (0.9)
Ambulatory mental health care	1933.33	26.1	642 (45.2)
Psychiatric practice	705.70	9.5	443 (31.2)
Outpatient psychiatrist (general hospital)	289.31	3.9	208 (14.6)
Outpatient psychiatrist (psychiatric hospital)	561.81	7.6	75 (5.3)
Inpatient health care (total)	2451.54	33.1	58 (4.1)
Medical care	1001.54	13.5	27 (1.9)
Psychiatric care	1450.00	19.6	32 (2.3)
Medical specialist	110.70	1.5	143 (10.1)
Medication	407.33	5.5	945 (66.5)
Total	7397.85		

### Indirect Costs

Table 2 presents indirect cost data for the group of patients with at least 1 personality disorder and a paying job. The total mean indirect cost per patient with a paying job was €7088 per year. The total days lost because of absence from work or inefficiency at work was 47.6 per patient per year. In a multiple regression analysis, borderline ( $p = .047$ ) and obsessive-compulsive ( $p = .003$ ) personality disorders, age ( $p < .001$ ), and gender ( $p < .001$ ) were associated with increased indirect costs in patients with a paying job.

### Total Costs of Personality Disorders

The mean total cost in the 12 months prior to treatment in the total group of patients with personality disorder was €11,126 (range, €0 to €147,759) per patient. The mean direct medical cost was €7398 per year per person (66.5%), while a mean of €3728 per patient (both with and without a job) was due to indirect costs.

In Figure 1, the results of the univariate analyses for each of the 14 personality disorder types are displayed. The graph shows that the majority of the personality disorder types induce higher mean costs compared to the patients without personality disorder, although the difference was statistically significant only for borderline ( $p = .021$ ), histrionic ( $p = .050$ ), self-defeating ( $p = .021$ ), any personality disorder ( $p = .033$ ), and personality disorder mixed ( $p = .030$ ).

The main effects of the 14 personality disorder types, as studied in a multiple regression analysis, showed

**Table 2. Mean Indirect Costs per Year of Patients With a Paying Job and at Least 1 Personality Disorder Diagnosis (N = 743)**

Type of Indirect Cost	Days	Cost (2005 prices), €
Absence from work	27.7	6112.63
Reduced efficiency at work	19.9	959.88
Difficulties with nonpaying jobs	0.2	15.10
Total	47.8	7087.61

that borderline ( $p = .014$ ) and obsessive-compulsive ( $p = .003$ ) personality disorders had a unique contribution on the total costs. These results are summarized in Table 3. As patients can have more than 1 personality disorder, the sum of the number of patients in the different diagnostic groups is higher than the total number of patients included in this study. In the regression model also, the age variable, which is directly influencing the indirect costs, significantly predicted total costs ( $p = .030$ ). The total number of personality disorders diagnosed, representing an additional interaction effect, did not have an independent effect on the total costs. The maximum variance of total costs that was explained by these variables (age, gender, 14 diagnoses of personality disorders, number of diagnoses) in the regression model was 2.4%.

When studying the main effects of the chronic medical disorders in a multiple regression analysis, 3 out of 28 appeared significant, indicating that having that specific medical condition has a significant effect on the total costs in this sample. These medical conditions are kidney stones, burnout/severe tension, and injury by accident. Adjusting the original multiple regression model by entering these 3 variables showed that in addition to age ( $p = .047$ ), kidney stones ( $p < .001$ ), burnout/severe tension ( $p = .035$ ), and injury by accident ( $p = .006$ ), borderline ( $p = .026$ ) and obsessive-compulsive ( $p = .005$ ) personality disorders were significant predictors of the total costs. The proportion of explained variance of total costs in the regression model was 4.3%.

The cost data in the present study are nonnormally distributed, due to a majority of patients with roughly similar costs and only a small proportion of patients who induce very high costs. Cost data are typically found to be positively skewed. Log transformations are often used to solve the problems of the violation of assumptions (nonnormality and heteroscedasticity of the residuals) of multivariate linear regression analysis. Concordantly, we performed a log transformation on the dependent cost variable. The log-transformed model remains significant for borderline personality disorder ( $p = .007$ ), obsessive-compulsive personality disorder ( $p = .026$ ) and age ( $p = .003$ ). The R square, although higher compared to the nontransformed model, is still relatively small (3.1%). This indicates that the small R square in the nontransformed model was not due to the violation of the normality assumption.



Figure 1. Difference in Mean Total Costs (direct and indirect) of the Personality Disorder Types Compared to the Patients Without Personality Disorder

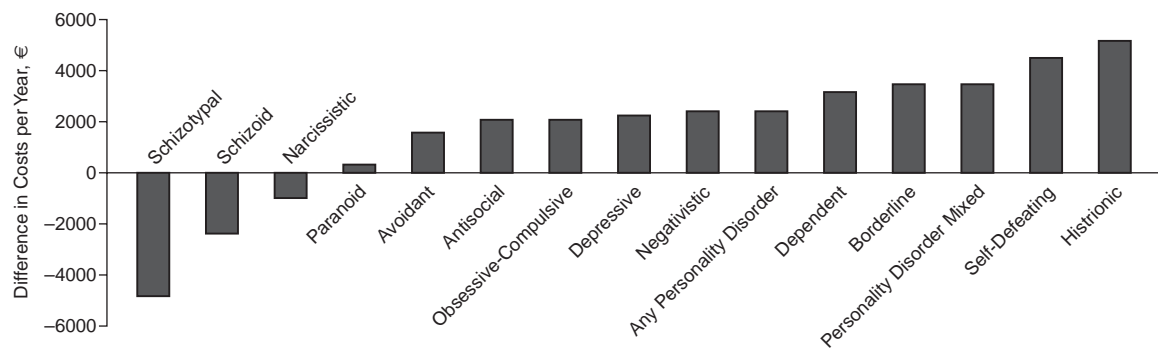


Table 3. Multivariate Predictors of Total Costs (direct and indirect) of Patients With Personality Disorders, €

Multivariate Predictor	N	$\beta^a$	SE	p Value
Constant <sup>b</sup>	NA	952.11	3370.02	.778
Gender	NA	-940.64	1015.59	.354
Age	NA	102.36	47.07	.030
Paranoid	106	-1111.98	680.19	.102
Schizoid	20	-381.70	687.58	.579
Schizotypal	17	-165.09	828.52	.842
Antisocial	36	-540.12	652.49	.408
Borderline	364	1962.27	794.93	.014
Histrionic	51	75.39	671.39	.911
Narcissistic	103	-1229.69	690.69	.075
Avoidant	492	-694.47	759.60	.361
Dependent	182	1231.22	716.84	.086
Obsessive-compulsive	363	2184.02	741.43	.003
Self-defeating	118	14.04	730.31	.985
Depressive	553	1735.30	1029.92	.092
Negativistic	64	-719.64	681.48	.291
Personality disorder mixed	262	839.92	1062.07	.429
Number of diagnoses	NA	18.24	394.59	.963

<sup>a</sup>For continuous variables (e.g., age), the coefficient indicates the increase or decrease in cost per unit increase in the covariate (e.g., per year of age). For categorical variables, the coefficient is the difference in cost between the specified group and the comparison group. For the diagnoses, 3 categories are specified: no traits; only traits, no diagnosis; and presence of the diagnosis. Adjusted  $R^2 = 0.024$ .

<sup>b</sup>Refers to the constant in the regression equation, also referred to as the intercept.

Abbreviation: NA = not applicable.

## DISCUSSION

In summary, treatment-seeking patients with personality disorders are accountable for high costs to society. The most relevant cost drivers were absence from work, inpatient health care, and outpatient mental health care. In this sample of 1740 adults, borderline and obsessive-compulsive personality disorders were uniquely associated with increased mean total costs. This conclusion holds even after controlling for chronic medical disorders. Compared to the patients without personality disorder,

mean total costs were consistently higher for borderline, histrionic, and self-defeating personality disorder, any personality disorder, and personality disorder mixed. Although not statistically significant, mean total costs were least in schizotypal and schizoid personality disorders as compared to the group without personality disorder. This finding can mainly be attributed to relatively low costs due to absence from work in both personality disorder groups. Additionally, in schizotypal personality disorder, the percentage of employment was considerably lower compared to the group without personality disorder.

We found that the amount of direct medical costs, and thus the usage or volumes of these medical services, is associated with some of the personality disorder types (paranoid, borderline, and obsessive-compulsive). This finding seems in part consistent with the study of Bender et al.<sup>7</sup> They also reported that patients with certain types of personality disorders received treatments more often than those with other personality disorders. Borderline personality disorder was found to receive greater amounts of psychosocial treatments (i.e., individual and group psychotherapy, day treatment, psychiatric hospitalization, and halfway house residence) than the other personality disorder groups (schizotypal, avoidant, and obsessive-compulsive). The differences in results between the 2 studies might be explained by the fact that the Bender study includes only 4 diagnoses of personality disorders and that the 4 personality disorder types could not be comorbid with each other.

The economic burden of personality disorders seems considerably higher than the burden of patients seeking mental health treatment for other mental disorders, such as depression and generalized anxiety disorder, and comparable to that in schizophrenia. (For reasons of comparison, all costs were converted to Euros by using the mean exchange rate for 2006 of 1€ = \$1.33 U.S. and 1€ = £0.68 U.K.) A systematic review of cost-of-illness studies of depression<sup>6</sup> found that the average annual costs per

case ranged from €752 to €1880 for direct costs and from €1654 to €3083 for indirect costs depending on international differences. In another review, the total costs (direct and indirect) of generalized anxiety disorder patients in ambulatory care (with comorbidity) were reported to be €3634 per year and patient.<sup>26</sup> In a study on service utilization in schizophrenic patients in contact with mental health services in 5 European countries, average direct costs were calculated of €7419 per annum and patient.<sup>3</sup>

In the current study the direct medical costs clearly exceed (66.5%) the indirect costs of productivity losses. In most literature on mental and chronic diseases, the opposite is observed: indirect costs constitute the major part of the total costs. This is because virtually all studies used the human capital approach.<sup>27</sup> The human capital approach has been criticized as calculating potential rather than actual productivity costs, leading to unrealistically high estimates of productivity costs.<sup>28</sup> By using the friction cost method as an alternative to the traditional human capital approach, we used the most conservative method in estimating costs of productivity losses. Moreover, we believe that the societal perspective or the actual loss for society is represented best in this friction cost method. In the case of long-term absence from work, the friction cost method limits costs to a friction period, the time needed to replace a worker, whereas the human capital approach estimates the indirect costs as the value of the productivity loss from the age of disablement of the person until the age of retirement or until the time the person has found an equivalent job. However, in our case no long-term follow-up data on personality disorder patients regaining employment are available. Therefore, when we used the human capital method in our study, we had to make the assumption that the productivity losses would last until the age of retirement. Research comparing the friction cost method with the human capital approach has shown a major influence of the methods used. For example, in a study on the productivity costs among patients with rheumatoid arthritis, researchers found that the productivity costs were 15 times higher when using the human capital approach instead of the friction cost method.<sup>29</sup> Furthermore, a comparison of the 2 methods for schizophrenia showed productivity costs that were even 69 times higher by using the human capital approach.<sup>30</sup>

The 1740 participants included in this study were recruited from 6 different mental health care institutes in the Netherlands specializing in the psychotherapeutic treatment of personality problems and disorders. The large number of patients and the different settings can be considered one of the strengths of this study, as these enhance the external validity of the results. On the other hand, we only sampled patients that were referred to psychotherapeutic treatments; therefore, the results may not be generalizable to all prevalent cases in the community.

Moreover, the patients in our sample can be considered treatment-seeking patients, i.e., they have the wish to receive treatment, as opposed to treatment-rejecting patients. This distinguishing feature of personality disorders mentioned in literature<sup>31</sup> may affect the outcome. For future research it would be interesting to study direct and indirect costs in both treatment-seeking and treatment-rejecting personality disorder patients, e.g., in forensic care or in the normal population.

Another limitation of our study is that no standardized diagnoses of comorbid Axis I disorders were available, e.g., mood disorders or substance use disorders. Note, however, that this limitation does not jeopardize the main finding of our study, which is that personality disorder patients who seek treatment pose a substantial economic burden on society. Among personality disorder patients admitting to a mental health care facility, it is difficult to find patients with “only” Axis II problems. Isolating the effects of the Axis I disorders would be the same as considering the economic burden of diabetes without the accompanying foot ulcers. The independent contribution of Axis I and Axis II pathology to costs parameters should be addressed in future research.

Despite evidence that prison service costs in personality disorders are high,<sup>9</sup> these costs were not included in the present study. This can be considered a limitation of the study as it leads to an underestimation of the direct cost calculations.

The recall periods for the use of medical services and short-term absence from work were 4 and 2 weeks, respectively. The annualization of these costs is based on the assumption that these 4 weeks (or 2 weeks) are representative for the rest of the year. In order to test this assumption, an additional form was administered on which patients had to indicate the amount of outpatient, day-hospital, or inpatient psychological treatment they had received in the year prior to filling out the form. The utilization of outpatient, day-hospital, and inpatient care indicated on this form was then compared against the TiC-P, with a recall period of 4 weeks. The data indicated that on a population level there was no significant difference between the costs as measured with a recall period of a year (€3440) compared to a recall period of 4 weeks (€3247). Concordantly, there is no reason to believe that the costs calculated in the present study were an over/underestimation, but on the contrary are a realistic representation of the actual costs generated by this population in the year prior to treatment.

Given the fact that the unit cost prices used in the present study were, at least to some extent, subject to uncertainty, one should consider testing the robustness of the results to changes in unit prices. We acknowledge that this study is based on the assumption of a certainty in the unit costs that may not be there. However, the expectation is that unit prices are not of much influence on the outcome, as they are constants.

Borderline personality disorder has traditionally attracted much scientific and clinical attention,<sup>32</sup> which also has affected the prominent research concerning the utilization of health care resources and productivity losses. Although in our study only borderline and obsessive-compulsive personality disorders were found to have a unique contribution on the costs, this result does not mean that the high societal costs of the other personality disorder types can be ignored. We thus argue that, from a health economic perspective, research should also focus on the other personality disorder types instead of primarily on borderline personality disorder.

It is important to emphasize that, although cost-of-illness studies such as this do provide valuable information for the policymaker, these findings do not provide any information on the effectiveness of available treatment programs. Therefore, in order to fully appreciate the value of a treatment program, health care policymakers should be informed with state-of-the-art cost-effectiveness analyses. Accordingly, the present cost-of-illness study is incorporated into a large cost-effectiveness study in which different sorts of psychotherapy treatments (outpatient, day-hospital, and/or inpatient psychotherapy) for personality disorders are being compared. Results of this cost-effectiveness data will become available in 2008.

In the mean time, our results provide evidence that the economic burden of personality disorders is high; higher than, for instance, that of depression and generalized anxiety disorder. These high societal costs, in combination with a low quality of life that was found in earlier research,<sup>33</sup> reflect the severity of illness and thus present a strong argument in favor of prioritizing effective personality disorder treatments in reimbursement decisions.

## REFERENCES

1. Knapp M, Kavanagh S. Economic outcomes and costs in the treatment of schizophrenia. *Clin Ther* 1997;19:128–138
2. Rice DP. The economic impact of schizophrenia. *J Clin Psychiatry* 1999;60(suppl 1):4–6
3. Rössler W, Salize HJ, Os van J, et al. Size of burden of schizophrenia and psychotic disorders. *Eur Neuropsychopharmacol* 2005;15:399–409
4. Berto P, D'Ilario D, Ruffo P, et al. Depression: cost-of-illness studies in the international literature, a review. *J Ment Health Policy Econ* 2000;3:3–10
5. Greenberg PE, Birnbaum HG. The economic burden of depression in the US: societal and patient perspectives. *Expert Opin Pharmacother* 2005;6:369–376
6. Luppá M, Heinrich S, Angermeyer MC, et al. Cost-of-illness studies of depression: a systematic review. *J Affect Disord* 2007;98:29–43
7. Bender DS, Dolan RT, Skodol AE, et al. Treatment utilization by patients with personality disorders. *Am J Psychiatry* 2001;158:295–302
8. Zanarini MC, Frankenburg FR, Khera GS, et al. Treatment histories of borderline inpatients. *Compr Psychiatry* 2001;42:144–150
9. Dolan BM, Warren FM, Menzies D, et al. Cost-offset following specialist treatment of severe personality disorders. *Psychiatr Bull* 1996;20:413–417
10. Bateman A, Fonagy P. Health service utilization costs for borderline personality disorder patients treated with psychoanalytically oriented partial hospitalization versus general psychiatric care. *Am J Psychiatry* 2003;160:169–171
11. Vaillant GE, Perry JC. Personality disorders. In: Kaplan HI, Sadok BJ, eds. *Comprehensive Textbook of Psychiatry*. 4th ed. Baltimore, Md: Williams & Wilkins; 1985
12. Lim D, Sanderson K, Andrews G. Lost productivity among full-time workers with mental disorders. *J Ment Health Policy Econ* 2000;3:139–146
13. Kessler RC, Frank RG. The impact of psychiatric disorders on work loss days. *Psychol Med* 1997;27:861–873
14. Stevenson J, Meares R. An outcome study of psychotherapy for patients with borderline personality disorder. *Am J Psychiatry* 1992;149:358–362
15. Krupnick JL, Pincus HA. The cost-effectiveness of psychotherapy: a plan for research. *Am J Psychiatry* 1992;149:1295–1305
16. Rendu A, Moran P, Patel A, et al. Economic impact of personality disorders in UK primary care attenders. *Br J Psychiatry* 2002;181:62–66
17. Hakkaart-van Roijen L. Manual Trimbos/iMTA Questionnaire for Costs Associated With Psychiatric Illness [in Dutch]. Rotterdam, the Netherlands: Institute for Medical Technology Assessment; 2002
18. Oostenbrink JB, Bouwmans CAM, Koopmanschap MA, et al. Manual for Cost Research: Methods and Unit-Prices for Economic Evaluations in Health Care [in Dutch]. Amstelveen, the Netherlands: The Health Care Insurance Board (CVZ); 2004. Updated version
19. The Health Care Insurance Board (CVZ). *Pharmaceutical Compass*. Amstelveen, the Netherlands: CVZ; 2005
20. Consumer Price Index. Central Bureau for Statistics [in Dutch] Web site. Available at: <http://statline.cbs.nl> Accessibility verified Sept 5, 2007
21. van Roijen L, Essink-Bot ML, Koopmanschap MA, et al. Labor and health status in economic evaluation of health care: the Health and Labor Questionnaire. *Int J Technol Assess Health Care* 1996;12:405–415
22. Koopmanschap MA, Rutten FF. A practical guide for calculating indirect costs of disease. *Pharmacoeconomics* 1996;10:460–466
23. De Jong CAJ, Derks FCH, Van Oel CJ, et al. Gestructureerd Interview voor de DSM-IV Persoonlijkheidsstoornissen (SIDP-IV). Sint Oedenrode, the Netherlands: Stichting Verslavingszorg Oost-Brabant; 1996
24. Pfohl B, Blum N, Zimmerman M. Structured Interview for DSM-IV Personality (SIDP-IV). Washington, DC: American Psychiatric Press; 1995
25. Gill D, Sharpe M. Frequent consulters in general practice: a systematic review of studies of prevalence, associations, and outcome. *J Psychosom Res* 1999;47:115–130
26. Hoffman DL, Dukes EM, Wittchen HU. Human and economic burden of generalized anxiety disorder [published online ahead of print Dec 4, 2006]. *Depress Anxiety*. doi: 10.1002/da.20257
27. Koopmanschap MA, Rutten FFH. Indirect costs in economic studies: confronting the confusion. *Pharmacoeconomics* 1993;4:446–454
28. Drummond MF. Cost of illness studies: a major headache? *Pharmacoeconomics* 1992;2:1–4
29. Verstappen SMM, Boonen A, Verkleij H, et al. Productivity costs among patients with rheumatoid arthritis: the influence of methods and sources to value loss of productivity. *Ann Rheum Dis* 2005;64:1754–1760
30. Goeree R, O'Brien BJ, Blackhouse G, et al. The valuation of productivity costs due to premature mortality: a comparison of the human capital and friction cost methods for schizophrenia. *Can J Psychiatry* 1999;44:455–463
31. Tyrer P, Mitchard S, Methuen C, et al. Treatment-rejecting and treatment-seeking personality disorders: Type R and Type S. *J Personal Disord* 2003;17:263–268
32. Blashfield RK, Intoccia V. Growth of the literature on the topic of personality disorders. *Am J Psychiatry* 2000;157:472–473
33. Soeteman DI, Verheul R, Busschbach JJV. The burden of disease in personality disorders: diagnosis-specific quality of life. *J Personal Disord*. In press