

A controlled treatment study of somatoform disorders including analysis of healthcare utilization and cost-effectiveness

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Abstract

Objective: The purpose of this prospective study was to evaluate the effects of cognitive-behavioral treatment (CBT) on mental health status and healthcare utilization in patients with somatoform disorders (SFD) of a specialized tertiary care center. **Methods:** According to DSM-IV interviews, 54 patients had somatization disorder (SD), 51 abridged somatization syndrome (SSI-8) and 67 other defined SFD. A clinical non-SFD comparison group consisted of 123 patients. Treatment effects were controlled against the waiting list. Cost calculations for the 2-year periods before and after treatment were based on medical and billing records from health insurance companies. **Results:** The SFD patients improved significantly with respect to physical symptom

distress, health anxieties, dysfunctional beliefs towards body and health, depression and psychosocial functioning. Their outpatient plus inpatient charges during the 2 years prior to treatment were about 2.2-fold higher than for average patients of the health system. At the 2-year follow-up, we found treatment-related cost offset of 382 € (–24.5%) for outpatient and 1098 € (–36.7%) for inpatient care. Indirect socioeconomic costs due to days lost from work decreased by 6702 € (–35.3%). Per patient savings of 32,174 € (–63.9%) were found in a subgroup of somatizing high-utilizers. **Conclusion:** The results encourage including treatment strategies to reduce somatoform illness behavior into clinical practice. © 2003 Elsevier Science Inc. All rights reserved.

Keywords: Somatoform disorders; Somatization; Cognitive-behavioral treatment; Healthcare utilization; Cost-effectiveness analysis

Introduction

Clinical researchers develop increasing interest in disorders associated with high utilization of the healthcare system and, as a consequence, inadequately high expenditures for medical services. Patients suffering from medically unexplained somatic symptoms have been identified as a crucial group. According to current diagnostic systems, such patients are diagnosed as somatoform disorders (SFD) whenever their physical symptoms cause personal distress or lead to clinically relevant psychosocial impairments [1–3]. Somatizing patients are frequently treated by general practitioners and internists but rarely by psychia-

trists or psychotherapists. Therefore, the costs of this group tend to be high for somatic treatments but low in the field of mental healthcare. Rost et al. [4] found that 91% of the annual healthcare charges of patients with somatization disorder (SD) were due to somatic treatment and only 9% to psychiatric and related services.

Despite the lack of organic pathology, patients with SFD tend to perceive themselves as sick and physically disabled [5,6]. Traditional medical treatments lead to little or no improvement [7]. As a consequence, patients are dissatisfied because they feel not having been helped and physicians are frustrated because they feel being ineffective [8,9]. Inadequately high medical costs result when patients visit physicians frequently, consult numerous specialists, demand costly diagnostic tests, insist on inpatient care and undergo operations without clear medical indication.

Exact cost calculations, however, have rarely been performed. Smith et al. [5] found that average charges of

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patients with SD were 14 times higher for outpatient treatments and over six times higher for hospital care than the average US per capita consumption. In a family practice study by deGruy et al. [10], office visits and monthly charges incurred by somatizing patients were about 50% greater than for matched control patients without somatization syndrome. Labott et al. [11] calculated that costs for somatizing patients of a pulmonary subspecialty clinic were comparable to those of asthmatic patients but 13 times higher than the average costs for patients of a health maintenance organization. Shaw and Creed [12] found a relationship between costs for medical investigations and physicians' awareness of psychosocial factors in patients with somatic symptoms due to psychiatric disorder. Median costs were only £10 when physicians recognized the probable role of psychiatric factors but £460 when the patients' complaints were considered as physical illness only.

Such health economical findings influence expectations about the goals of treatment. According to the *offset hypothesis* [13], it is assumed that broader interventions that take psychosocial factors into account reduce unnecessary costs in other areas of medical care. A few studies have indeed demonstrated that expenditures for somatizing patients were reduced by information letters sent to the physicians, training of general practitioners or brief psychotherapeutic group interventions [4,14–16]. The tendency to overutilize medical services can be explained from cognitive-behavioral models of SFD [17–19]. These suggest that bodily complaints may develop from various non-disease-related reasons, for example, increased attention on bodily processes, benign symptoms of temporary physiological dysfunction, autonomic arousal or correlates of intense emotion. When somatizing patients misinterpret their bodily sensations as signs of a serious disease, they tend to consult physicians but find it difficult to accept that no organic disease explaining their symptoms can be found. As a consequence, illness behavior with frequent medical consultations (“doctor-shopping”), checking behavior, inadequate use of medication and psychosocial impairments may develop.

Although the efficacy of cognitive-behavioral treatment (CBT) was demonstrated in several controlled studies for different populations of somatizing patients [15,20–22], little is known of how well these methods can be implemented into routine healthcare. This paper describes a controlled naturalistic study evaluating a new treatment approach in a German tertiary care facility. We applied CBT techniques that had proven successful in previously published international studies, mainly aiming at defocusing attention from the physical sensations and establishing adequate coping strategies. Objective data on healthcare expenditures were additionally collected as part of a large prospective nationwide cooperation project with various health insurance companies. We expected that not only symptomatology and treatment satisfaction of our patients

should improve but also reduced sick role behavior should lead to subsequent savings of healthcare costs. Although the German mental health treatment system is quite different from those available in most other countries because psychosomatic hospitals are more common and inpatient care is offered in addition to usual outpatient services, the present paper will focus on the specific psychopathological and socioeconomic effects of CBT.

The present study was guided by the following *major research questions*: (1) Does the treatment program improve the physical and mental health status of somatizing patients, e.g., symptom distress, hypochondriacal beliefs and anxieties, other psychopathology and psychosocial impairments? (2) Is the treatment superior to a no-treatment condition and are effects maintained over the subsequent 2-year period? (3) To what extent are SFDs associated with inadequately high healthcare costs and can successful treatment reduce such costs? (4) Does comorbidity with other than somatoform mental disorders play a crucial role for the course and outcome of the interventions?

Method

Sampling procedure, study population and design

Consecutive patients registered for inpatient treatment at the Roseneck Center for Behavioral Medicine were screened for medically unexplained somatic symptoms. These patients are usually referred by their general practitioners, psychiatrists or psychotherapists to receive initial or additional intense treatment, which includes CBT plus indicated psychiatric and other medical interventions. During the study period, we reviewed the letters from the referring clinicians, available medical records and the personal reports of all newly registered patients. Whenever there was any evidence for multiple or unclear physical symptoms, the treatment candidate received a set of screening questionnaires (see below) and was asked to complete and return it within 3 days. During this preselection phase, we excluded patients who were referred because of a primary eating disorder or chronic tinnitus, as specialized wards and treatment programs exist for these particular groups. Other exclusion criteria were schizophrenia and related disorders, primary substance dependence, psychoorganic disorder or clear organic disease.

If the initial screening confirmed the presence of physical symptoms and written informed consent to participate in the study was given, patients were included into our baseline sample. After admission, they received a thorough medical examination and a detailed face-to-face interview to determine the nature of their physical complaints and the presence of mental disorders. Questionnaires assessing psychopathology and associated clinical characteristics were completed at admission, shortly before discharge and once more 2 years later (follow-up).

The Center for Behavioral Medicine

The Roseneck Center of Behavioral Medicine in Prien (Germany) is a research-oriented inpatient unit affiliated with the Medical Faculty of the University of Munich. It is accessible to adult patients of all social and vocational levels. Public and private coverages are accepted. Indications for treatment are all mental and psychophysiological disorders except schizophrenia and related psychotic disorders, acute manic episodes and severe disorders due to psychoactive substances. Psychosomatic hospitals are part of the German mental healthcare system because it is expected that intense inpatient treatments help to avoid further chronicity and reduce unnecessary costs in the long term. They are typically chosen when patients suffer from combined physiological and psychological symptoms and whenever appropriate outpatient treatments are not available. The patients represent a high-risk group for multiple physical symptoms and SFD. Serious physical conditions that could explain the somatic symptoms are extremely rare. Although there is some evidence in the German literature that psychosomatic hospitals help to avoid chronicity and reduce unnecessary costs [23], no studies exist which define SFD as a circumscribed clinical group and use a SFD-specific cognitive-behavioral approach.

Description of the sample

Based on the sampling procedure described above, we recruited a total of 324 patients. Four were withdrawn from the final data analysis because they were not able or refused to fill out the questionnaires at admission, seven interrupted their treatment and left the hospital within the first 2 weeks, 17 revoked their initial consent and one patient was not further considered because serious organic diseases were detected (lumbar disc hernia, lumbar stenosis syndrome, severe hepatitis and intestine perforation). Thus, the study sample consisted of 295 patients of which 195 (66.1%) were female and 100 (33.9%) male. Their mean age was 45.7 years (S.D. = 11.1), with a range between 19 and 72 years. 58 (19.7%) of the patients were single, 197 (66.8%) married, 24 (8.1%) divorced, 13 (4.4%) widowed and three (1.0%) had other or unknown familial status. The educational and occupational characteristics of the sample are largely representative for the German population. 157 (53.2%) had previous school education of 9 years or less, 78 (26.4%) of at least 11 years, 54 (18.3%) of at least 13 years with or without additional university education and six (2.0%) had other or unknown educational status. 173 (58.6%) worked part- or full-time, 46 (15.6%) were jobless, 26 (8.8%) were house persons, 35 (11.9%) were retired and 15 (5.1%) had other or unknown occupational status. 136 patients (46.1%) had a history of hospitalization because of their major complaints and 158 (53.6%) had previous psychotherapy. 25 patients (8.5%) received sickness benefit payments from the state.

Diagnostic evaluation according to DSM-IV

We systematically evaluated somatoform and other mental disorders according to the DSM-IV criteria. Two clinical psychologists with sufficient clinical experience were trained to administer the Structured Clinical Interview, DSM-IV version (SCID) [24]. The first 10 patients per interviewer were diagnosed using the SCID. Afterwards, the equivalent International Diagnostic Checklists (IDCL) [25,26] were used to simplify the diagnostic procedure and to guarantee a high level of diagnostic quality. The IDCL are interview-guided checklists recommended by the World Health Organization for reliable and valid diagnoses. Their interrater test–retest reliability, if applied by trained raters, is as high as those for structured interviews. Somatic symptoms were coded as somatoform whenever organic diseases that could fully account for the complaints had been excluded by the physical examination and detailed reviews of the patients' medical records. Somatization symptoms were considered clinically relevant only if they were severe enough to cause the person to take medicine, see a physician or change her or his lifestyle.

Definition of the study groups

Based on the diagnostic results, patients were divided into two major groups:

SFD group

The criteria of a SFD according to DSM-IV were met by 172 patients (58.3%). Of them, 54 had SD, 51 abridged somatization syndrome (SSI-8) according to the SSI-8 criterion (see below), 48 pain disorder (presenting with pain as a primary complaint but not with multiple somatic symptoms), 5 conversion disorder (presenting with neurological symptoms) and 14 hypochondriacal disorder (presenting predominantly with inadequate anxiety and convictions of suffering from serious illness).

The above mentioned SSI-8 was diagnosed whenever patients reported eight or more unexplained somatic symptoms but failed to fulfil the criteria for SD, either because the symptoms had not developed before the age of 30 (as required by Criterion A of SD) or because they did not come from all four predefined organ systems (as required by Criterion B). We applied the SSI-8 (i.e., Somatic Symptom Index with a lifetime history of eight or more somatization symptoms), a term introduced by Escobar et al. [27,28] and evaluated by us [29] to define a broader group of somatizing patients, which is clinically and scientifically useful in addition to the narrow concept of SD. Although the SSI originally required only four symptoms for men and six symptoms for women (so-called SSI-4,6), we considered a minimum of eight symptoms as necessary for a clinically relevant condition. Escobar's SSI-4,6 was derived from the former DSM-III classification (where a different number of symptoms were defined for men and

women) and it tends to be overinclusive when applied to the current DSM-IV system.

Other mental disorders

The remaining 123 patients not diagnosed as SFD received other DSM-IV diagnoses, mostly for depressive or anxiety disorders. They served as a clinical comparison group.

The sociodemographic and diagnostic comorbidity profile of both groups can be seen from Table 1. There were no differences concerning sex, age, familial situation and educational status. The significantly higher number of somatization symptoms in the SFD group reflects the adequacy of our group definition. There was substantial comorbidity with other DSM-IV mental disorders, which is in line with earlier findings [30]. However, the comorbidity profiles of both groups were highly similar.

The waiting list condition

As described in the sampling procedure section, patients had first been evaluated at registration and again some weeks later at admission. We defined this pretreatment waiting period as a no-treatment control condition. Thus, our patients served as their own controls. Data were available from 262 patients whose mean waiting length was 135.0 days (S.D. = 86.0, range 15–459 days).

Outcome measures

The following scales were used to evaluate the treatment outcome and the effects at the follow-up study:

Screening for Somatoform Symptoms (SOMS)

The SOMS is a questionnaire including all bodily symptoms and criteria relevant for SFD according to the definitions of DSM-IV and ICD-10. There exist trait and state

versions relating to the past 2 years and the past 7 days, respectively. The trait version allows for a categorical classification, while the state version provides a more differentiated quantification of current distress associated with the complaints. Patients are instructed to report somatic symptoms that cause significant personal distress and for which doctors had not found a sufficient explanation. The SOMS includes 53 somatoform symptoms from the DSM-IV/ICD-10 lists plus 15 inclusion and exclusion criteria (such as duration of the disorder or frequency of doctor visits). Reliability and validity studies were carried out with good results [31]. In the present study, the patients received the trait version at the initial assessment (where one point is scored for each symptom reported) and the state versions at subsequent points of measurement (where each item is additionally rated on a four-point scale from 1 = *mild distress due to the symptom* to 4 = *severe distress*).

Whiteley Index (WI)

The WI is one of the most commonly used self-rating scales for hypochondriacal attitudes and behaviors. In the present study, we used the 14-item version with dichotomic answer categories (true–false). The German version was also validated and showed a factor structure comparable with the original English form [32,33].

Cognitions About Body and Health Questionnaire (CABAH)

We administered a newly developed instrument to assess dysfunctional attitudes and beliefs that were found typical for patients with SFD [34]. It consists of 31 statements that are rated on four-point scales (including completely right, mostly right, mostly wrong and completely wrong). The CABAH comprises the following scales: (1) *catastrophizing interpretation of bodily complaints* (e.g., “the most common reason for discomfort is a serious disease”), (2) *autonomic sensations* (e.g., “I often feel my heart beating because my circulatory system is very sensitive”), (3) *bodily weakness*

Table 1
Sociodemographic characteristics and comorbidity profiles

	SFD (<i>n</i> = 172)	Comparison group (<i>n</i> = 123)	Significance	
Female (%)	68.6	62.6	$\chi^2 = 1.15$	n.s.
Age (years)	46.2 (S.D. = 10.6)	44.9 (S.D. = 11.8)	<i>t</i> = 0.97	n.s.
Married (%)	66.3	67.5	$\chi^2 = 0.04$	n.s.
Divorced (%)	8.1	8.1	$\chi^2 = 0.00$	n.s.
School education 9 years or less (%)	52.9	53.7	$\chi^2 = 0.02$	n.s.
Number of somatization symptoms (from the DSM-IV list)	10.4 (S.D. = 4.3)	5.7 (S.D. = 2.8)	<i>t</i> = 11.2	<i>P</i> < .01
Major depression (with or without dysthymia) (%)	64.5	69.1	$\chi^2 = 0.67$	n.s.
Dysthymia (without major depression) (%)	8.1	3.3	$\chi^2 = 2.99$	n.s.
Panic disorder (with or without agoraphobia) (%)	22.1	19.5	$\chi^2 = 0.29$	n.s.
Generalized anxiety disorder (%)	11.0	7.3	$\chi^2 = 1.16$	n.s.
Agoraphobia (without panic disorder) (%)	12.8	17.1	$\chi^2 = 1.06$	n.s.
Social phobia (%)	27.9	30.1	$\chi^2 = 0.17$	n.s.
Specific phobia (%)	11.6	6.5	$\chi^2 = 2.19$	n.s.
Obsessive-compulsive disorder (%)	4.1	3.3	$\chi^2 = 0.13$	n.s.
Alcohol or drug dependence (%)	18.0	10.6	$\chi^2 = 3.14$	n.s.
Anorexia or bulimia nervosa (%)	1.2	0.8	$\chi^2 = 0.09$	n.s.

The comorbidity profiles refer to lifetime DSM-IV diagnoses; n.s. = not significant.

(e.g., “after physical exertion, I often have a feeling of being weak”), (4) *intolerance of bodily complaints* (e.g., “if something is wrong with my bodily sensations, it upsets me at once”) and (5) *health habits* (e.g., “I am always careful to live really healthily”). In our recent study [34], the internal consistency of the CABAH was .90 in a clinical sample of 493 inpatients and the first four scales showed good discrimination between SFD and non-SFD groups.

Beck Depression Inventory (BDI)

The well-validated German version of this questionnaire was used to assess the degree of depressive symptomatology.

Dysfunctional Analysis Questionnaire (DAQ)

The DAQ was used in previous studies to determine how disabled patients with SFD are if different forms of psychosocial functioning are considered [6,35]. The 45 items of the instrument split up into nine items related to impairments in each to the following areas: (1) *social* (e.g., “taking initiative in meeting people” or “feeling delighted on having guests”), (2) *vocational* (e.g., “completing work in time” or “opportunities for promotion at work”), (3) *personal* (e.g., “ability to control one’s anger” or “interest in sex”), (4) *familial* (e.g., “getting along with family members” or “spending time with spouse”) and (5) *cognitive* (e.g., “ability to remember names/faces of persons” or “concentration”). Each item is rated on a five-point scale, comparing the present level of functioning with that before the onset of the disorder. The DAQ was found to be of good internal reliability and validity [6].

Socioeconomic evaluation

Health system utilization costs were to be calculated for the 2-year period prior to our treatment and again for the 2-year period following discharge. We first performed a detailed semistructured interview with each patient to collect information on all areas of her or his medical care utilization. However, we intended to estimate utilization and charges from medical and billing records rather than merely from the patients’ memories. This strategy is accepted as a reasonable method for measuring utilization retrospectively over long periods [36]. We chose a 2-year period because it provides a better estimate of the patients’ use of services than the standard 6-month intervals, given the sometimes highly episodic nature of somatic symptoms [37].

Two hundred and thirty of our patients (78.0% of the total sample) permitted us by written agreement to contact their health insurance companies and apply for a detailed reconstruction of their individual expenditures. The providers were contacted multiple times by letters or by telephone until all essential and available medical and billing records were obtained. Almost all companies were very cooperative, but reconstruction turned out to be rather complex in many cases due to the organizational structure of the public German health system. This system does not

permit the individual-wise collection of medical data. Instead, expenditures are summarized separately for each hospital and for each physician running a private practice. Payments for dental treatments are recorded independently from other outpatient treatments. Medication costs had to be calculated by reviewing the prescriptions from numerous pharmacy stores in which the patient had bought her or his drugs. Due to these system-immanent problems and the high personal resources needed for the reconstruction work, the obtainable data for the different factors of the health system were limited. We received cost calculations for a total of 214 patients (93.0% of those who had given us permission to contact the health insurance company). Inpatient treatment charges were available for all 214 cases (100%), outpatient treatment charges for 150 cases (70.1%), outpatient dental treatment charges for 121 cases (56.5%), charges for prescribed medications for 81 cases (37.9%) and charges for other health-related services (e.g., transports, glasses, hearing aids and crutches) for 52 cases (24.3%). All cost calculations were converted from DM into € to enhance international comparability.

We also obtained data about disease-related work disability, which are continuously registered by the public health insurance companies for all members who are working in part- or full-time jobs. These data were the number of sick leave cases (i.e., how often, within the 2-year period, a patient presented a certificate of his doctor confirming that he or she was sick/unable to work) and the total number of days lost from work. These information were available in 125 cases for the 2 years before treatment and in 116 cases for the posttreatment period.

The treatment program

Because the nature of the patients’ symptoms and problems was not limited to the somatic complaints, they were treated within a broad interdisciplinary approach basing on the principles of CBT and behavioral medicine. All patients regularly received individual and group psychotherapy. The therapists of the SFD patients were instructed to lay special emphasis on emotions, cognitions and behaviors related to the somatoform symptomatology. The main therapeutic techniques used included identification and modification of dysfunctional perceptions and thoughts. Inadequate assumptions and misinterpretations were disputed and behavioral experiments were aimed at breaking the vicious circle of the physical symptoms and their consequences. Longer-range goals were to increase self-care, encourage physical activity, improve interpersonal and occupational functioning and lessen dependency on the medical care system. These methods were similar in content to those described by Warwick and Salkovskis [38] and Sharpe et al. [39]. We summarized these methods in a German treatment manual [40]. All clinicians that were involved in our study received concise treatment guidelines and a series of training sessions.

The SFD patients were also educated about the nature of their symptoms and possible psychophysiological mechanisms relevant for the development and maintenance of their complaints. Pure medical consultations and treatments were kept to a minimum to enhance the use of psychological coping skills. When appropriate, we performed systematic physical exercises with the patients in order to improve their bodily functioning and change their negative self-concept of being weak and disabled. Another treatment topic was the reduction of avoidance behaviors concerning the patients' physical, social and occupational functioning. Many patients also received assertiveness training, progressive relaxation and biofeedback sessions in which interactions between physical and mental processes were demonstrated.

Patients regularly received 15–20 h of treatment weekly. The overall number of treatment hours varied according to the length of the patients' stay in the hospital. The mean treatment period was 58.6 days (S.D. = 17.7, range 21–114) for the SFD and 52.2 days (S.D. = 14.9, range 15–84) for the non-SFD comparison group ($t = 2.98$, $P < .01$).

Posttreatment and follow-up assessments

A total of 283 patients (95.9%) completed the questionnaire set shortly before discharge. Two years after the end of the treatment, we attempted to recontact all 295 patients by telephone and 274 patients (92.9%) agreed to conduct another detailed interview and the questionnaire package was mailed to them. Of the 21 patients without obtainable follow-up data, 16 refused another diagnostic examination and 5 could not be contacted because their addresses had changed and were unknown. The questionnaires were returned by 245 patients.

During the interviews with the 274 follow-up patients, we reassessed their DSM-IV status (again using the SCID/IDCL as instruments) and healthcare utilization for the 2-year period since discharge. In addition, we contacted the health insurance companies for the second time in order to reconstruct the registered utilization costs for the posttreatment period. Based on the data obtained from the providers, pre–post comparisons were possible in 209 cases for inpatient treatments, in 135 cases for outpatient treatments, in 104 cases for dental treatments, in 45 cases for prescribed medications and in 28 cases for other expenditures. To obtain comparability of the pre- and posttreatment utilization costs from an economical perspective, all charges of the posttreatment period were corrected by an annual inflation rate of 2% plus an annual discounting rate of 3% [41].

Statistical methods

Analyses of variance and Student's t tests were used to compare group means and evaluate treatment effects. χ^2 analyses were used for categorical variables. We additionally computed effect sizes using d according to Cohen [42]

to describe the magnitude of change between two points of measurement. The significance level was conventionally set to .05. Because our cost data had very high standard deviations and skewed distributions, we additionally performed nonparametric tests. However, these results were highly similar to those of the parametric tests and will therefore not be additionally reported in this article.

Results

We will separately analyze the treatment effects and the group-related changes of the socioeconomical measures.

Comparability of the groups

Table 2 presents the pre-, post and follow-up results on all outcome variables. At the beginning of the treatment, the SFD group scored significantly higher in the SOMS than the group with other mental disorders, indicating that the somatizing patients suffered from a severe degree of distress due to their bodily complaints. The SFD patients also had higher scores for hypochondriasis (WI) and dysfunctional body-related cognitions (CABAH), whereas both groups did not differ with respect to depression (BDI) and psychosocial impairments (DAQ).

Treatment effects on the psychosocial outcome variables

Significant time effects were found on all variables for both treatment groups (Table 2). This was clearly in contrast with the waiting list where no changes were found except for a small improvement of the depression scores ($P < .01$, but effect size according to Cohen's d was only 0.10). Closer inspection by within-group t tests showed that both treatment groups reached highly significant pre–post improvements on all measures (all $P < .01$). However, these effects were not sufficiently stable during the follow-up period because the posttreatment scores of the SFD patients increased again in all scales except the CABAH ($P < .01$ for the SOMS and BDI, $P < .05$ for the WI and DAQ) and those of the other mental disorders group increased in all measures except the CABAH and the DAQ ($P < .01$ for the SOMS and BDI, $P < .05$ for the WI). Despite these deteriorations, the scores at the follow-up assessment were still below those before treatment. The largest pre–post effects were obtained for depressive symptomatology and psychosocial impairments. Effect sizes (d) were 0.86 for the BDI and 0.68 for the DAQ in the SFD group and even 1.03 (BDI) and 0.73 (DAQ) in the clinical comparison group. The corresponding values were 0.49 (SFD group) and 0.52 (comparison group) for the SOMS, and 0.58 (SFD group) and 0.49 (comparison group) for the WI. The treatment-related improvements reached in the CABAH were lower in magnitude (0.30 for the SFD and 0.35 for the comparison group) but more stable than all other measures in the follow-up period.

Table 2
Treatment evaluation

Measures ^a		Waiting list (<i>n</i> = 262)	SFD (<i>n</i> = 172)	Comparison group (<i>n</i> = 123)	Significance ^b		
SOMS ^c	Pre	–	36.3 (22.6)	25.7 (18.5)	Group	4.53	<i>P</i> < .01
	Post	–	26.2 (18.6)	16.8 (16.0)	Time	30.2	<i>P</i> < .01
	Follow-up	–	34.2 (26.8)	21.5 (18.7)	Interaction	0.87	n.s.
WI	Pre	6.4 (3.4)	7.1 (3.4)	5.1 (3.4)	Group	4.82	<i>P</i> < .01
	Post	6.3 (3.6)	5.1 (3.4)	3.5 (3.1)	Time	39.9	<i>P</i> < .01
	Follow-up	–	5.6 (3.7)	4.2 (3.7)	Interaction	1.06	n.s.
CABAH	Pre	40.0 (13.6)	40.9 (13.8)	36.2 (12.3)	Group	2.30	<i>P</i> < .05
	Post	39.5 (13.5)	36.7 (14.1)	31.5 (14.8)	Time	27.9	<i>P</i> < .01
	Follow-up	–	37.0 (15.5)	32.4 (13.1)	Interaction	0.13	n.s.
BDI	Pre	21.4 (10.6)	21.0 (10.9)	19.6 (10.2)	Group	1.40	n.s.
	Post	20.3 (10.7)	12.4 (9.2)	9.6 (9.2)	Time	103.6	<i>P</i> < .01
	Follow-up	–	16.0 (10.7)	12.7 (10.1)	Interaction	1.18	n.s.
DAQ	Pre	63.8 (13.8)	63.7 (13.9)	61.3 (15.0)	Group	1.76	n.s.
	Post	63.6 (14.5)	53.3 (16.6)	49.7 (16.6)	Time	54.2	<i>P</i> < .01
	Follow-up	–	56.5 (17.2)	50.8 (16.4)	Interaction	1.16	n.s.

Means and standard deviations (in brackets) are displayed.

^a Higher scores indicate lower functioning on all measures.

^b Group refers to results from two-tailed *t* tests comparing the pretreatment scores between both treatment groups. Time refers to *F* values from two-factorial MANOVA with repeated measures across the three points of assessment for both treatment groups. Interaction refers to *F* values from MANOVA Group × Treatment interactions. n.s. = not significant.

^c Waiting list scores are not available because the state version of the SOMS was not administered at registration.

Predictors of treatment outcome

We evaluated whether the obtained treatment effects were predictable by any of the sociodemographic or comorbidity variables. There were no significant effects due to age, sex and familial status on overall improvement during treatment as indicated by the DAQ (all *P* > .05), but patients with a lower educational level (≤ 9 years of school) improved better than those with better education (interaction *P* < .05). In addition, patients diagnosed as primary or additional major depression had larger treatment effects than patients without this diagnosis (*P* < .05), mainly due to a higher pretreatment level of depressive symptomatology (mean BDI admission scores 23.5 for the major depressive patients vs. 14.8 for non-major depression, *P* < .01). Patients suffering from a comorbid social phobia improved better on the DAQ (interaction *P* < .01) and those with a comorbid panic disorder improved better on both the BDI and DAQ (*P* < .05). These results were similar when only the SFD subgroup was analyzed. Other diagnoses of comorbidity had no significant relevance for treatment outcome.

Treatment effects of patients with pathological scores

The outcome analysis presented above may partly be biased because not all patients had pathological scores on each variable. For example, a subgroup of patients had no depressive disorder and therefore no pathological scores on the BDI before treatment. For this reason, analyzing means of the entire groups may underestimate true improvements of depressive symptomatology in patients whose BDI scores were clinically significant. Therefore, we conducted a secondary analysis considering only patients scoring ≥ 15 on the BDI or ≥ 60 on the DAQ at admission. Treatment effects

according to Cohen's *d* were then 1.20–1.51 for the BDI and 0.94–1.32 for the DAQ for the inpatient treatment period. These effects are large and of high clinical relevance.

Overall healthcare costs

Total mean health utilization costs, as recalculated by the health insurance companies, were as follows for the 2-year period preceding our treatment: outpatient treatments 1727 € (S.D. = 1873, range 0–15,921), inpatient treatments 2527 € (S.D. = 4951, range 0–35,698), outpatient dental treatments 396 € (S.D. = 670, range 0–3470), prescribed medications 566 € (S.D. = 765, range 8–4672) and other health-related services 513 € (S.D. = 624, range 0–3001). If the relative proportions of these different cost factors are estimated, about 30% of the total expenditures accounted for outpatient treatments, 44% for inpatient treatments, 7% for dental treatments, 10% for medicine and 9% for other health-related services. To appreciate the magnitude of these charges, we compared them with the average per capita expenditures published by German public health insurance companies. These were about 700 € for outpatient medical treatments, 1400 € for hospital care, 400 € for dental treatment, 500 € for medicine and 500 € for other health-related services. Thus, the costs produced by our sample before admission were roughly 2.5-fold higher for outpatient treatments, 1.8-fold higher for inpatient treatments, while quite similar for dental treatments, medicine and other health-related services, as compared to the average costs in the German healthcare system.

The presentation of cost data with means and standard deviations can mask skewed distributions and the significance of outliers. It can be seen from the standard deviations reported above that the variability of the costs was very high.

Table 3
Healthcare costs (given in €)

Cost factors	SFD	Comparison group	Subgroup: SD	Subgroup: SSI-8
Outpatient	1605 (1351)	1938 (2536)	2143 (1809)	1312 (979)
Inpatient	3019 (5755)	1736 (3143)	3251 (7216)	3186 (5651)
Dental	428 (696)	340 (625)	419 (784)	435 (541)
Medication	521 (606)	640 (975)	384 (350)	619 (755)
Other health-related costs	503 (651)	531 (590)	533 (681)	342 (286)

Means and standard deviations (in brackets) are displayed.

If combined total charges (outpatient plus inpatient costs as the most important cost factors) are considered and a categorical approach is taken, we found that 29.3% of the sample had low costs (<1000 €), 25.3% had average (1000–2500 €), 16.0% high (2500–5000 €) and 29.3% extraordinary costs (>5000 €). There were four patients with charges above 20,000 € and the highest was 38,006 €.

Costs of SFD patients

Table 3 shows how the costs split up into the diagnostic groups of our study. When the SFD and other mental

disorder groups were compared using one-tailed tests, we found that SFD patients had significantly higher inpatient ($P < .05$) but comparable outpatient costs ($P > .05$). The outpatient plus inpatient expenses for the SFD group were about 2.2-fold higher than the corresponding average charges reported from the German healthcare system (see above). Their costs for inpatient treatments were 2.16 times and for outpatient treatments 2.29 times higher. The calculations for the somatoform subgroups are additionally given in Table 3. As expected, SD patients had significantly higher outpatient costs than the SSI-8 group ($P < .05$), while the inpatient costs were similar ($P > .05$).

Comparison of costs before and after treatment

Changes of the 2-year healthcare costs from pre- to posttreatment are depicted in Fig. 1. The outpatient charges of the entire SFD group decreased by 24.5% from 1558 to 1176 €. A quite dramatic reduction of 44.7% (from 2220 to 1228 €) was observed for the SD patients, whereas those diagnosed as SSI-8 had a generally low pretreatment cost level, which remained nearly unchanged (1043 € before and 1118 € after treatment). Regarding inpatient charges, a substantial reduction was found for the entire SFD group

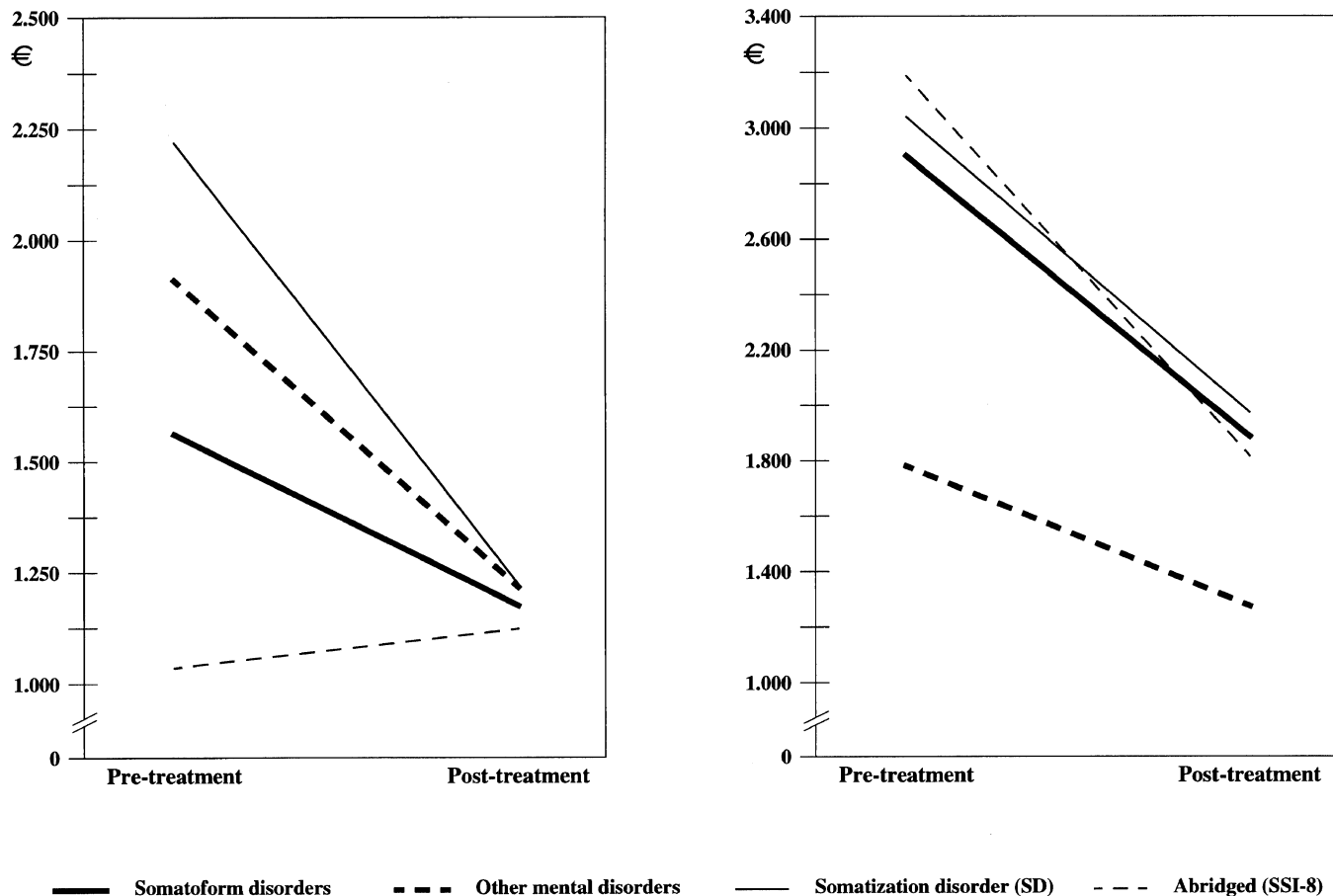


Fig. 1. Changes in outpatient (left) and inpatient (right) costs.

with savings of 1098 € (–36.7%, from 2990 to 1892 €) as well as for the SD (–35.3%) and SSI-8 subgroups (–43.0%). The inpatient charges of the non-SFD group also decreased by 497 € (–27.9%, from 1779 to 1282 €). Thus, a substantial overall reduction of healthcare expenses was found not only for SFD but also for patients with other mental disorders.

Indirect costs due to days lost from work

In addition to the direct costs for healthcare services, the number of days lost from work due to disorder-related disability is of socioeconomic relevance. According to the data obtained from the insurance companies, the number of days for which our patients had a medical certificate of not being able to work decreased significantly from 121.3 (S.D. = 158.3) in the pretreatment period to 89.2 (98.8) in the follow-up period ($P < .05$), which represents a 26.5% reduction. The number of registered sick leave cases decreased from 4.37 (S.D. = 3.22) to 3.27 (S.D. = 3.20) (–25.1%, $P < .01$). Looking separately at the diagnostic groups, SFD patients reduced their days off work from 126.6 to 91.0 days (–28.1%, $P > .05$) and the number of sick leave cases from 4.55 (S.D. = 3.42) to 3.62 (S.D. = 3.47) (–20.4%; $P < .05$), while the patients with other mental disorders had a reduction of days off work from 111.1 to 85.6 days (–23.0%, $P > .05$) and of sick leave cases from 4.03 (S.D. = 2.81) to 2.60 (S.D. = 2.51) (–35.5%; $P < .01$). It is assumed that one lost workday leads to indirect socioeconomic costs of about 150 € because of lost productivity, compensation payments of the health insurance companies and related factors. Therefore, the described reduction of days off work in our sample is equivalent to per patient savings of 6702 € (from 18,991 to 12,289 €, –35.3%, $P < .05$) in the SFD group and of 5105 € (from 16,666 to 11,561 €, –30.6%, $P > .05$) in the comparison group with other mental disorders.

Cost-effectiveness analysis

The socioeconomic data are summarized in Table 4 and contrasted against the costs of our inpatient treat-

ment program. Total per patient savings were 8182 € (–34.8%) for the SFD group and 6283 € (–30.9%) for the group with other mental disorders. Charges of the Roseneck Center were roughly 125 €/day including all treatment and hospital-related services. They were 800 € higher for the SFD than for the non-SFD patients because of different lengths of stay in the hospital (58.6 and 52.2 days, respectively). The savings for the SFD patients were 857 € higher than their treatment costs, whereas those of the comparison patients were 242 € lower. This is equivalent to cost/savings ratios of 1.12 and 0.96, respectively. It must be considered, however, that these relationships refer to a 2-year period and the ratios can be expected to further improve during the following years. Assuming linear trends, the costs of the Roseneck inpatient treatment are amortized after 21.5 months for the SFD group and after 24.9 months for the comparison group.

High-utilizer

Because not all patients had inadequately high healthcare costs during the pretreatment period, we separately analyzed those patients with high (2500–5000 €) or extraordinary (>5000 €) cost patterns for outpatient plus inpatient treatments. Of these 68 patients, 42 (61.8%) were classified as SFD and 26 (38.2%) belonged to the clinical comparison group. The SFD patients had a 33.1% cost reduction for outpatient treatments (from 2234 to 1494 €), 54.7% for inpatient treatments (from 7233 to 3274 €) and 67.2% for sick leave days-related costs (from 40,903 to 13,428 €), summing up to a total cost reduction of 63.9% (from 50,370 to 18,196 €). The corresponding values for the comparison group were a reduction of 39.6% for outpatient treatments (from 3175 to 1919 €), 65.2% for inpatient treatments (from 4093 to 1426 €) and 63.1% for sick leave days-related costs (from 35,190 to 12,974 €), summing up to a total cost reduction of 61.1% (from 42,458 to 16,319 €). These savings were clearly higher than the expenses for the inpatient treatment program, which were 7213 € for the SFD and 6525 € for the comparison patients. Thus, the costs/savings ratios for these high-utilizing patients were 1:4.5 and 1:4.0, respectively.

Relationship between psychological and cost measures

In a final step, we analyzed whether cost savings were explainable by clinical improvements between discharge and follow-up. Significant correlations were indeed found between total cost changes (inpatient plus outpatient) and corresponding changes of the SOMS ($r = .15$, $P < .05$), the WI ($r = .20$, $P < .05$) and the BDI ($r = .22$, $P < .01$) but not with changes of the CABAH (.04) and DAQ (.00). There was a comparable relationship between clinical improvements and changes in work disability days before and after treatment. The reduction of lost working days correlated significantly with changes of the SOMS ($r = .20$, $P < .01$),

Table 4
Cost-effectiveness analysis

Cost factors	SFD	Comparison group
Savings from outpatient treatments [€ (%)]	382 (–24.5)	681 (–35.7)
Savings from inpatient treatment [€ (%)]	1098 (–36.7)	497 (–27.9)
Savings from reduction of sick leave days [€ (%)]	6702 (–35.3)	5105 (–30.6)
Total savings (2 years) [€ (%)]	8182 (–34.8)	6283 (–30.9)
Mean costs of the inpatient treatment program (€)	7325	6525

All calculations refer to mean costs per treated patient and to a 2-year period.

the WI ($r = .27, P < .01$), the BDI ($r = .19, P < .05$) and the CABAH ($r = .27, P < .01$) but not with changes of the DAQ ($r = .11, P > .05$).

Discussion

This study was stimulated from the large regressive changes that are occurring, and will continue to occur, in the financing of the healthcare delivery systems in the Western societies. Expenses are exceeding both public and private healthcare budgets and the days of ever more resources seem to be over. Healthcare administrators have begun to analyze the costs and benefits of diagnostic tests and treatment components. Physicians, hospitals and other service providers, on the other side, must show that their methods are effective in improving the patients' conditions and economical in reducing unnecessary costs [43]. It seems increasingly important to improve the illness behavior of patients who frequently develop "doctor and hospital shopping" or occupational disability due to high symptom distress. One typical clinical group are patients with SFD. We evaluated a treatment program which takes into account the specific symptoms, psychosocial problems and therapeutic needs of these patients.

The results presented here show that our approach was clearly effective in reducing somatization, hypochondriacal fears, inadequate cognitions about body and health, depressive symptomatology and psychosocial impairment. Given the high comorbidity with other DSM-IV mental disorders, these improvements are of large clinical relevance. Although the effects were not fully maintained over the 2-year follow-up period, the clinical condition of the sample remained improved as compared with the pretreatment period. Somewhat surprisingly, comorbidity with other mental disorders was no negative predictor of outcome. Instead, patients with additional major depression, social phobia or panic disorder showed even better improvements than patients without these comorbid diagnoses. In all, this approach of a German hospital specialized in CBT for severely disabled SFD patients proved to be successful.

The second part of our study dealt with healthcare costs, which were objectively assessed from the records of the cooperating insurance companies. The charges of the SFD patients in the 2-year period before treatment were 2.29 times higher for outpatient and 2.16 times higher for inpatient treatments, as compared with the corresponding average per capita expenditures in Germany. Inpatient costs incurred by the SFD patients were almost twice as high as those found for the non-SFD group. The treatment-induced improvements were paralleled by cost offsets. In the 2-year follow-up period, the SFD patients had cost reductions of -24.5% for outpatient and -36.7% for inpatient treatments. If indirect socioeconomic costs from the number of days lost from work were additionally considered, we found that the total per patient savings were 8182 € (-34.8%)

for the SFD patients and 6283 € (-30.9%) for the non-SFD group. Contrasted against the costs for the inpatient treatment, the 2-year posttreatment net savings for the SFD patients were 857 €. This demonstrates the cost-effectiveness of the treatment program because it must be expected that the savings will continue to accumulate during the future years due to the usual chronic nature of SFD. The beneficial effects became even more apparent when only patients with patterns of high service utilization were analyzed. The 2-year cost savings for outpatient and inpatient care were -63.9% or 32,174 € per patient, which is about 15-fold more than the amount spent in the German health insurance system for average patients.

Offset effects due to the treatment of somatizing patients were also found by other researchers. In a randomized controlled clinical trial with 51 primary care physicians treating 56 somatizing patients, Smith et al. [36] observed that the annual medical costs decreased by 32.9% after the physicians had received information letters recommending a specific management approach. The same intervention with SD patients led to cost reductions around 50% [14]. A short-term group intervention with these patients resulted in 52% net savings in total annual healthcare charges [15]. Morris et al. [16] showed that a special training package delivered to general practitioners led to a subsequent 23% reduction of costs of referrals outside the primary care team in a group of over 100 patients with somatized mental disorder. Our research presented here is somewhat different from these studies because we treated chronic and highly comorbid inpatients, which are located more at the upper end concerning their level of severity and psychosocial impairment. It is unlikely that simply informing primary care physicians of a specific management approach de-emphasizing expensive investigations would be sufficient for this particular group. Although Smith et al. [14,36] observed cost reductions in their outpatient group after instructing the physicians, the symptoms and subjective complaints of the patients had not improved even at follow-up 18 months later.

The socioeconomic relevance of cost-related findings is high because SFD represent a large clinical group in many parts of the world. Lifetime prevalence rates from the Epidemiological Catchment Area Study (ECA) were below 0.01% for SD but 11.6% for the broader somatization syndrome [44]. A recent epidemiological survey among more than 3000 adolescents and young adults aged 14–24 years in Southern Germany found that 12.6% met the criteria of SFD according to DSM-IV and had high levels of psychiatric comorbidity and psychosocial impairment [45]. Two large international studies launched by the World Health Organization confirmed that somatization can be found in all cultures. Pain and neurological symptoms were most common, especially in Latin countries [46], and the number of disability days indicating social as well as occupational impairment were greater for somatizing patients as compared with other primary care patients [47].

As most research, our study has strengths and weaknesses. One advantage is that the diagnostic assessment was done consequently according to the international standard of DSM-IV. Second, we were able to reconstruct the costs from the billing records of the insurance companies rather than from simply interviewing patients about their utilization behavior. The cooperation with the companies was complex due to their difficult accounting system and our data might to some degree be considered “preliminary” because of the relatively large number of missing data for components such as dental treatments, medications and other health-related services. Nevertheless, when compared with the general per capita expenditures of the German health system, our data seem to represent a realistic estimate of costs unbiased from subjective report. To our knowledge, this is the largest study published until now in which outcome and cost changes of SFD were empirically and prospectively studied in a naturalistic setting. However, patients were not randomized to different or no-treatment conditions. Due to our situation as a regular treatment facility, randomization was not possible for ethical reasons but the usual waiting period before admission to the hospital was taken as a control condition. It is known from other studies that SFD tend to persist over long periods of time [48]. Therefore, the effects found by us are most likely to be caused by the interventions rather than representing spontaneous fluctuations or placebo effects. Our treatment results are in line with a number of randomized controlled studies, which already demonstrated the efficacy of CBT for SFD (e.g., Refs. [15,20–22]).

To summarize, the results of this study encourage the clinical use of treatment strategies taking SFD-related illness behavior into account. Although recommendations for primary care physicians exist for many years [14,16,49–52] and CBT techniques have repeatedly been described [38–40], these methods are still rarely transferred into usual clinical practice. Psychosomatic hospitals in Germany are only *one* possible setting where such treatments can be applied. Because psychosomatic hospitals are unusual in other countries, it seems necessary to evaluate whether substantial improvements of illness behavior and reductions of socioeconomic costs can also be gained from outpatient care. On the other hand, it seems plausible that the most severe and chronic cases may more effectively be treated during intense inpatient programs. We observed good acceptance of our treatment approach from these patients. One reason was the close interdisciplinary cooperation of physicians and clinical psychologists according to behavioral medicine principles. Patients could feel being taken serious because they received medical attention, while the concurrent psychological interventions aimed at changing inadequate illness beliefs and behaviors. Interdisciplinary approaches have also been proposed by a recent international conference on future perspectives of the management of SFD [53,54].

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