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Treatment course and its predictors in patients with somatoform disorders: A Routine Outcome Monitoring Study in secondary psychiatric care.

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ABSTRACT

Aim: Somatoform disorders are common and often chronic. It would be helpful to distinguish those patients who are likely to have a positive treatment course from those who are likely to follow a negative course. Such studies of different somatoform disorders are scarce, especially in secondary psychiatric care. This study examined the 6-month treatment course of psychological-, physical symptoms, functioning and its predictors in a naturalistic sample of secondary psychiatric care outpatients with somatoform disorders.

Method: The present study used Routine Outcome Monitoring (ROM) data of patients with somatoform disorders regarding their 6-month treatment course of psychological- and physical symptoms as well as functioning. The following patient groups were included: total group of somatoform disorders (N=435), and Undifferentiated Somatoform Disorder (N=242), Pain disorder (N=102), Body Dysmorphic Disorder (N=51), Hypochondriasis (N=40). Measures were: MINI (Mini-International Neuropsychiatric Interview Plus), BSI (Brief Symptom Inventory), MADRS (Montgomery-Åsberg Depression Rating Scale), BAS (Brief Anxiety Scale), SF-36 (Short Form Health Survey 36), and PSC (Physical Symptom Checklist).

Results: The study population generally showed high comorbidity, especially with anxiety- and mood disorders. The PSC total score, Body Dysmorphic Disorder, and Hypochondriasis were significant predictors for the treatment course of symptoms (BSI), while the PSC total score was the only significant predictor for the course of functioning (SF-36).

Conclusion: Secondary psychiatric care outpatients with somatoform disorders showed high comorbidity with anxiety- and mood disorders, and an unfavourable 6-month course of both symptoms and functioning. Clinical implications are discussed, such as additional treatment of comorbidity in somatoform disorders.

Keywords (max 6)
somatoform disorders, treatment course, undifferentiated somatoform disorder, pain disorder, body dysmorphic disorder, hypochondriasis

Key Practitioner Message (3-5 bullet points)

- Secondary psychiatric care outpatients with somatoform disorders had high comorbidity, especially with anxiety- and mood disorders.
- Additional treatment of this comorbidity is highly recommended.
- Patients with somatoform disorders also showed unfavourable six-month treatment outcome regarding both symptoms and functioning.
- The PSC total score, Body Dysmorphic Disorder, and Hypochondriasis were significant predictors for the course of symptoms, while the PSC total score was a significant predictor for the course of functioning.

1. INTRODUCTION

Individuals with somatoform disorders have physical symptoms for which no somatic cause is found. They experience real physical complaints, which are not consciously or deliberately imitated (DSM-IV; APA, 2000). Previous studies in somatoform disorders have found high comorbidity for anxiety and/or depression, which may increase the likelihood of patients holding psychological attributions (Rief et al., 2004; Frostholm et al., 2015). Diagnosis of somatoform disorders does not apply when the physical complaints can be explained by other psychiatric conditions or by the direct effect of a substance. In some cases, somatoform disorders are better understood as a maladaptive response to the physical symptoms, with or without a diagnosed somatic disease. This alternative understanding is reflected in the current DSM-5 (APA, 2013), where the term "somatoform disorders" has changed in "somatic symptom and related disorders".

Somatoform disorders are quite common, with an estimated prevalence of approximately 6% in the general population, 16% in primary care, and up to 52% in secondary care (van Hemert et al., 1993; Fink et al., 2004; de Waal et al., 2004; Baumeister & Härter, 2007; Wittchen et al., 2010; Creed et al., 2011; Steinbrecher et al., 2011; Houtveen et al., 2015a). Some authors assume an even higher prevalence for somatoform disorders as a result of changes in the DSM-5 in relation to the diagnostic threshold (Voigt et al., 2013). In secondary mental health care, somatoform disorders tend to be persistent and chronic, difficult to treat, and with high functional impairment (Dirkzwager & Verhaak, 2007; Steinbrecher & Hiller, 2011; Koelen et al., 2014; Houtveen et al., 2015a), resulting in high health care use, and high societal and economic costs (Sammet et al., 2007; Konnopka et al., 2012; Houtveen et al., 2015a). Research on the natural course of somatoform disorders in non-clinical populations showed fluctuation in the symptom picture (Lieb et al., 2002; Essau, 2007; Leikness et al., 2008). Medically insufficiently explained physical symptoms may be regarded as a continuum, ranging from mild and fleeting to chronic and debilitating symptoms (van Dessel et al., 2014). This is in line with the concept of "staging", which suggests that mental disorders may have dimensional representations (Ruhé et al., 2012; Wigman et al., 2013). According to the model of clinical staging, mental illness is progressing along stages or phases, ranging from acute to more chronic (McGorry et al., 2006). Patients with somatoform disorders in the acute stage are often treated in primary care by their General Practitioner (GP). In case of persistent psychopathology (a more chronic stage), these patients are referred by their GP to secondary care for specialised mental health treatment. In general, primary care studies found mixed results regarding course of recovery in somatoform disorders (Speckens et al., 1996; Kahn et al., 2003; Arnold et al., 2006; Steinbrecher & Hiller, 2011).

Treatment course and its prediction are important aspects of psychopathology that have been well characterized in several other psychiatric disorders (Coryell et al., 1996; Yonkers et al., 2003; Shea et al., 2004; Klein et al., 2008; Eisen et al., 2010, 2013; Hendriks et al., 2013; Phillips et al., 2013; Batelaan et al., 2014). Determining appropriate clinical responses based upon a likely course of somatoform disorders requires further research, especially in

secondary mental health care where these course studies are scarce. The few available course studies in this area were not, however, focused on the comparison between somatoform disorders but on a single somatoform disorder such as Hypochondriasis (e.g. Hiller et al., 2002) or Body Dysmorphic Disorder (e.g. Bjornsson et al., 2011; Phillips et al., 2005ab, 2013). Some possible predictors for treatment course of somatoform disorders were the following: physical functioning, functional disability, general health status, psychopathological symptoms, attributional style, personality traits, neuroticism, psychiatric history, age, gender, negative life events (Hiller et al., 2002; Steinbrecher & Hiller, 2011; Zonneveld et al., 2012; van Noorden et al., 2012; Voight et al., 2013; Bergander et al., 2013; Pedersen et al., 2016; Weiss et al., 2017). More knowledge on treatment course and its predictors in various somatoform disorders would help to distinguish those patients who are likely to have a more mild course from those who are likely to follow a severe course (McGorry et al., 2006; Gunn et al., 2013).

The present study examined the 6-month treatment course of different somatoform disorders (Undifferentiated Somatoform Disorder, Pain disorder, Body Dysmorphic Disorder, Hypochondriasis) in a naturalistic sample of psychiatric outpatients. We used Routine Outcome Monitoring (ROM) data of patients who were diagnosed according to the DSM-IV-R (APA, 2000) at the time of the data collection. As far as we know, this is the first study which assessed treatment course of both psychological- and physical symptoms as well as functioning for various somatoform disorders in secondary mental health care patients. Comparing somatoform disorders with each other could be important to see any differences in treatment course. For instance, it seems likely that more complicated somatoform disorders (e.g., Body Dysmorphic Disorder, Pain Disorder) show a more negative treatment course (Lieb et al., 2002. On the basis of the literature, we expected that patients with Body dysmorphic disorder and Pain disorder would exhibit the most negative treatment course (e.g. Lieb et al., 2002). We also expected that number and type of comorbid disorders, age and gender would predict a negative treatment course of somatoform disorders (e.g. Kroenke et al, 1994).

2. METHOD

2.1 Design

The treatment course of different somatoform disorders and its predictors were examined 6 months after baseline (6 months follow-up study; Anstey & Hofer, 2004). The study duration had to be limited to 6 months, because there were insufficient data for a longer follow-up.

2.2 Participants and procedure

The study population consisted of 435 secondary mental healthcare outpatients between 18 and 65 years with a somatoform disorder as primary diagnosis and possibly additional disorders (comorbidity). That is to say, patients of the 4 specific somatoform disorder groups (i.e., Undifferentiated Somatoform Disorder, Pain disorder, Body Dysmorphic Disorder, Hypochondriasis) had the registered somatoform disorder as primary diagnosis, no other somatoform disorder, and possibly a secondary diagnosis of comorbid depression and/or anxiety disorder (because somatoform disorder often goes along with this comorbidity; Frostholm et al., 2015). Diagnostic information was based on both the Mini-International Neuropsychiatric Interview Plus (MINI-Plus, see Measures: having a somatoform disorder) and clinical information (patients who were treated for somatoform disorder as primary diagnosis). Consequently, patients with primary depression/anxiety disorder and comorbid somatoform disorder were excluded. Additionally, three DSM-IV somatoform disorders (Somatization disorder, Conversion disorder, Somatoform disorder NOS) were excluded, because only a few of these disorders were present in the study population.

Data of participants came from a web-based Routine Outcome Monitoring (ROM) programme, in which patients were routinely assessed as part of the standard diagnostic procedure (van Noorden et al., 2010, 2012; de Beurs et al., 2011). Patients were referred for treatment to GGZ Rivierduinen Psychiatric Institute (service area of 1.1 million inhabitants). Executor of this study was the Department of Psychiatry of the Leiden University Medical Centre (LUMC).

Participants received standard mental health treatment (by psychiatrists and clinical psychologists or psychotherapists) according to the principle of stepped-care, based on (inter)national evidence-based treatment guidelines, and consisting of pharmacotherapy, psychotherapy (mostly CBT) or a combination of both (van Fenema, van der Wee, Giltay, den Hollander-Gijsman, & Zitman, 2012ab; Van Noorden, van Fenema, van der Wee, Zitman, & Giltay, 2012). Treatment was not assigned, controlled, or influenced by the research team.

The main objective of ROM is to improve clinical practice by interim monitoring and evaluation of treatment progress for the individual patient (Carlier et al., 2012a; 2017; van Noorden et al., 2012; Kendrick et al., 2016; Lambert, 2017). ROM measurements (duration 1-2 hours) can take place before (baseline), during and after treatment. ROM continues for as long as the patient is being treated. It consists of an extensive psychometric battery of instruments, both self-report and interviewer-based (de Beurs et al., 2011; for an overview of instruments see: http://www.lumc.nl/psychiatry/ROM-instruments). The present study focuses on baseline and 6-months assessments, because there were insufficient earlier or later data of our study population. All interviewer-based measurements were administered by an independent trained assessor (psychiatric research nurse or psychologist). Quality control and calibration among assessors ensured quality maintenance during data collection (de Beurs et al., 2011). All measurements were completed on touch-screen computers, to prevent

missing data. Patients with insufficient mastery of the Dutch language were ineligible (van Noorden et al., 2012). For more detailed information on the ROM procedure regarding this study see: de Beurs et al. (2011); van Noorden et al. (2010, 2012); de Klerk et al. (2011); Carlier et al. (2012ab, 2016).

2.3 Measures

For the purpose of this study, we focused on ROM-data collected with the following evidence-based instruments: MINI-Plus, Montgomery-Åsberg Depression Rating Scale (MADRS), Brief Anxiety Scale (BAS), Brief Symptom Inventory (BSI), Short Form Health Survey 36 *(*SF-36), Physical Symptom Checklist (PSC) (see below).

The choice of these measures was done according to the following criteria: a) besides psychopathology also functioning and physical complaints were measured; b) besides patient-reported measures also clinician-rated instruments were used. In addition, we have used data of generic questionnaires only (e.g., BSI for general psychopathology), because they are measured in all psychiatric disorders by default in ROM, resulting in the largest possible sample size. Consequently, we have not used data of disorder-specific questionnaires, because they were only measured in the specific disorder (e.g., BDI-II for depression, as indicated by the MINI-Plus), resulting in a much smaller sample size. Related to the focus of our study (treatment course), it was obvious to include patients with data on both measurement points of baseline and 6 months follow-up. In this context, it turned out that all disorder groups in our study had the required data, with the exception of Body dysmorphic disorder (BDD, see Table 3) in whom the PSC was not filled in on neither measurement moments (because of ROM procedure at the time). It was decided to include BDD without PSC-data, because they had all other instruments of this study available at both baseline and six-months follow-up.

Psychiatric diagnoses. DSM-IV diagnoses were assessed using the Dutch translation of the Mini-International Neuropsychiatric Interview Plus (*MINI-Plus*), an extended version of the original MINI (Sheehan et al., 1998; Van Vliet & De Beurs, 2007). It is a fully structured diagnostic interview that assesses DSM criteria for the main psychiatric disorders (current/life-time). The MINI is organized in diagnostic modules. Positive answers to screening questions are explored by further investigation of other diagnostic criteria. Excellent interrater and test-retest reliabilities of the MINI, and moderate validity of MINI versus CIDI and SCID-P have been reported (Lecrubier et al., 1997; Sheehan et al., 1998).

Psychopathology. Symptoms of psychopathology were measured with the observer rated *MADRS* and *BAS* (both part of the abbreviated Comprehensive Psychopathological Rating Scale, CPRS) and the self-rated BSI. The CPRS is an interviewer-based instrument, and its interrater reliability has appeared at least as good as that of the Present State Examination (Goekoop et al., 1991). For the present study, the Montgomery-Åsberg Depression Rating Scale (MADRS; Montgomery and Asberg, 1979) and Brief Anxiety Scale (BAS; Tyrer et al.,

1984) were chosen, because comorbidity of depression and/or anxiety is common in people with somatoform disorders. The MADRS and the BAS are observer rated scales used to measure the severity of depression and anxiety respectively. Both scales consist of 10 items that are scored on a seven point scale, ranging from 0 (none) to 6 (often). The sum of the item scores ranges from 0 to 60. Higher scores represent worse depression or anxiety.
The Brief Symptom Inventory (*BSI*) is a 53-item self-report instrument that assesses psychopathological symptoms in several domains. The BSI is an abbreviated version of the Symptom Checklist-90, designed for use in adults in the outpatient medical setting (Derogatis et al., 1973). The BSI demonstrates high concordance with clinician symptom assessment and strong test–retest and internal consistency reliabilities. It includes nine symptom subscales (somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism) and a total score. BSI scores range from 0 ("not-at-all") to 4 ("extremely"). The subscale and total scores are calculated as an average of the relevant items, with higher scores indicating more severe psychopathology (Derogatis et al., 1973; Derogatis & Melisaratos, 1983).

Functional health status. The self-report Short Form Health Survey 36 (*SF-36*), derived from the Rand Medical Outcome Study (Aaronson et al., 1998; Ware et al., 1993), measures functional health status and well-being, and can be used as a population-based assessment of quality of life. It has demonstrated high levels of reliability and validity (Karlsen et al., 2011). The SF-36 consists of 36 items divided into the following subscales: Physical Functioning, Social Functioning, Role limitations due to Physical health problems, Role limitations due to Emotional problems, Vitality, Bodily Pain, General Mental Health, and General Health Perceptions (General Health/total). The latter SF-36 subscale General Health is often considered as the total scale for functional health (Ware et al., 1993; Karlsen et al., 2011; Pedersen et al., 2016; Wortman et al., 2016; Schröder et al., 2012; Zonneveld et al., 2012). Subscale scores are calculated as the sum of the relevant items, ranging from 0 to 100. Lower scores correspond to a worse health state (which are inversely scored, so that higher scores imply a worse health state; Ware et al., 1993; see also statistical analyses).

Physical complaints. Participants completed the Physical Symptom Checklist (*PSC*; de Waal et al., 2005). This self-report questionnaire encompasses 55 physical symptoms covering most organ systems. The PSC was chosen because it is a self-report questionnaire regarding a wide spectrum of possible physical symptoms (not based solely on the DSM but broader than that), which are relevant to somatoform disorders but also to other psychiatric disorders. It is an evidence-based and license-free instrument (De Waal et al., 2005). The presence of symptoms is rated on a severity scale from 0 (none) to 3 (often) for the preceding week. A symptom is rated as present for the scores 2 and 3: "bothersome often or most of the time during the last week". Symptoms are grouped in five categories: autonomic (e.g. palpitations), general/neurological (e.g. headaches), musculoskeletal/pain (e.g. back pain), gastrointestinal (e.g. diarrhea), and warm/cold/urogenital (e.g. hot flushes, difficulty urinating) (de Waal et al., 2005).

2.4 Statistical analyses

First, all SF-36 subscales were inversely scored, so that higher scores imply a worse health state. In addition, all SF-36 subscales are transformed to a 100-points scale (range 0-100; Ware et al., 1993). Baseline characteristics of the research groups were compared with Chi-square test, ANOVA, and Kruskal-Wallis test. There were Post-Hoc comparisons done with Bonferroni adjustment to control for multiple testing (see Table 1)..

Second, for treatment course regarding psychological- and physical symptoms (BSI, BAS, MADRS, and PSC) and functioning (SF-36), we used paired t-test to compare baseline versus 6 months (see Tables 2 , 3 and 4).

Third, for the testing of predictors for treatment course, we used the total group of somatoform disorders, in order to keep sample size as large as possible. The four somatoform disorder groups were used as individual predictors. We used hierarchical multiple regression analysis to investigate predictors for the course of symptoms (BSI total, see Table 5) and predictors for the course of functioning (SF-36 Physical functioning, based on Zonneveld et al., 2012, see Table 6). The course of symptoms was determined by the difference score of the BSI total (BSI total at 6 months - BSI total at baseline). The course of functioning was determined by the difference score of the SF-36 Physical (SF-36 Physical at 6 months - SF-36 Physical at baseline; Zonneveld et al., 2012). Predictors were based on the relevant literature (e.g., Zonneveld et al., 2012) and their availability in our ROM database. The following control variables were taken into account for the course of symptoms in Table 5 (e.g., Zonneveld et al., 2012; Iezzoni, 2013; Grant et al., 2014; Ware et al., 1993; Karlsen et al., 2011): pretreatment BSI total, age, gender, marital status and employment status. In addition, the predictors that were taken into account for the course of symptoms included (e.g., Pedersen et al., 2016; Wortman et al., 2016; Schröder et al., 2012; Zonneveld et al., 2012): education, anxiety disorder, mood disorder, anxiety and mood disorder, total diagnoses, PSC total, BAS, MADRS, SF-36 physical functioning, SF-36 social functioning, SF-36 general health, and the four somatoform disorder groups (Undifferentiated somatoform disorder, Pain disorder, Body dysmorphic disorder, Hypochondriasis). The following control variables were taken into account for the course of functioning (Zonneveld et al., 2012): pretreatment SF-36 physical functioning, age, gender, marital status, employment status. In addition, the predictors that were taken into account for the course of functioning included: education, anxiety disorder, mood disorder, anxiety and mood disorder, total diagnoses, PSC total, BAS, MADRS, BSI total, and the four somatoform disorder groups (Undifferentiated somatoform disorder, Pain disorder, Body dysmorphic disorder, Hypochondriasis).

Statistical analysis was performed using IBM SPSS for Windows version 20.0. Significance was reached at $p < .01$ (e.g., Feise, 2002; Ranstam, 2016).

2.5 Ethical standards

The Medical Ethical Committee of the LUMC approved the general study protocol regarding ROM, in which ROM is considered integral to the treatment process (no written informed consent is institutionally required). A comprehensive protocol (titled "Psychiatric Academic Registration Leiden database", www.lumc.nl/psychiatry) was used, which safeguarded the anonymity of participants and ensured proper handling of the data. None of the participants objected to the anonymized use of their data for scientific purposes.

3 RESULTS

3.1 Baseline socio-demographic and clinical characteristics

Table 1 presents the baseline characteristics of the four prevalent somatoform disorders in this study: Undifferentiated Somatoform Disorder (n=242), Pain disorder (n=102), Body Dysmorphic Disorder (n=51), Hypochondriasis (n=40).
INSERT TABLE 1 HERE

The groups of somatoform disorders significantly differed in age ($F(4,8368)=51.87$, $p<.001$); number of comorbid disorders ($F(4,8368)=6471.97$, $p<.001$); BSI total ($F(5,64)=23.27$, $p<.001$); PSC total ($F(5,1287)=13.88$, $p<.001$); BAS ($F(5,2549)=144.19$, $p<.001$); MADRS ($F(5,2549)=103.28$, $p<.001$); and SF-36 total ($F(5,4568)=97.98$, $p<.001$). Gender ($X^2(4)=48.37$, $p<.001$), marital status ($X^2(8)=166.63$, $p<.001$), living situation ($X^2(20)=171.88$, $p<.001$), work situation ($X^2(24)=200.67$, $p<.001$), current training ($X^2(4)=23.04$, $p<.001$), education ($X^2(12)=50.37$, $p<.001$), ethnicity ($X^2(20)=110.50$, $p<.001$), and comorbid type of disorder ($X^2(12)=118.20$, $p<.001$), were all significantly different between the groups (see Table 1). For instance, Body Dysmorphic Disorder patients, compared to other somatoform disorder groups, were younger, more single, and with more co-morbidity. In addition, most sick leave was found for Undifferentiated Somatoform Disorder and Pain Disorder (see Table 1).

3.2 Baseline versus 6 month treatment course of psychological symptoms (BSI, BAS, MADRS), physical symptoms (PSC) and functioning (SF-36) for the somatoform disorder groups

These results are divided into three tables: table 2, table 3, and table 4.

Table 2 shows the 6 months treatment course of the total group of somatoform disorders and the Undifferentiated somatoform disorder group.

INSERT TABLE 2 HERE

For the total group of somatoform disorders, there was a significant but mostly small reduction at 6 months for most subscales, except for the insignificant PSC Gastro-intestinal and Warm/cold-urogenital subscales (see Table 2).

For the Undifferentiated somatoform disorder group, there was also a significant but mostly small reduction at 6 months for most subscales, except for the insignificant BSI Interpersonal sensitivity, Hostility, Phobic anxiety, and Paranoid ideation subscales; and the insignificant PSC Gastro-intestinal and Warm/cold-urogenital subscales (see Table 2).

Table 3 shows the 6 month treatment course of the Pain disorder and Body dysmorphic disorder.

INSERT TABLE 3 HERE

For Pain disorder, there was a significant reduction at 6 months only for the BSI Psychoticism subscale and for the SF-36 Physical functioning, Mental Health, Vitality subscales (see Table 3).

For Body dysmorphic disorder, most of the available scores (PSC not available) showed an insignificant reduction at 6 months. Only the following scores had a significant reduction at 6 months: the BSI Depression, Anxiety, Phobic anxiety, Psychoticism, and Total subscales; BAS; MADRS; and SF-36 Social functional, Mental health, Vitality subscales (see Table 3).

Finally, **Table 4** shows the 6 month treatment course of Hypochondriasis.

INSERT TABLE 4 HERE

Patients with Hypochondriasis exhibited almost no significant differences between baseline and 6 months. Only the PSC General/neurological subscale showed a small significant reduction at 6 months (see Table 4).

3.3 Predictors for the treatment course of symptoms (BSI total)

The course of the BSI total score was defined by the BSI total difference score (BSI total at 6 months – BSI total at baseline). For the total group of somatoform disorders (N=435), we found the following (not in table): the average BSI total difference score was -0.17, with a standard deviation of 0.03 (minimal difference score of -2.51, maximum difference score of 1.77).

Table 5 displays the results of the hierarchical multiple linear regression analysis for the BSI total difference score.

INSERT TABLE 5 HERE

When the effects of the pretreatment outcome BSI total score and socio-demographic variables were statistically controlled, we found the following three significant predictors for the course of the BSI difference score: PSC total score, Body Dysmorphic Disorder, and Hypochondriasis (explained variance by predictors: .160 or 16%). None of the sociodemographic variables nor comorbid disorders were significant predictors.

3.4 Predictors for the treatment course of functioning (SF-36 Physical)

The course of the SF-36 Physical functioning score was examined by means of the SF-36 Physical difference score (SF-36 Physical at 6 months – SF-36 Physical at baseline). The results for the SF-36 difference score for the total group of somatoform disorders (N=435) were as follows (not in table): the average SF-36 difference score was -0.86, with a standard deviation of 0.18 (minimal difference score of -13.00, maximum difference score of 13.01).

Table 6 displays the results of the hierarchical multiple linear regression analysis concerning the SF-36 Physical functioning difference score.

INSERT TABLE 6 HERE

When the effects of the pretreatment outcome SF-36 Physical functioning score and socio-demographic variables were statistically controlled, we found only one significant predictor for the course of the SF-36 difference score: PSC total score (explained variance: .078 or 7.8%). None of the sociodemographic variables, comorbid disorders, nor somatoform disorder groups were significant predictors.

4 DISCUSSION

The most common somatoform disorder in this study was Undifferentiated somatoform disorder, which corresponds to other studies (e.g. Arnold et al., 2007). Our results further showed that patients with somatoform disorders in secondary mental health care mostly consisted of female participants, middle aged, the majority married, reasonably educated, and with rather high sick leave. Most sick leave was found for Undifferentiated Somatoform Disorder and Pain Disorder. Compared to other somatoform disorder groups, our Body Dysmorphic Disorder patients were younger, more single, and had more co-morbidity. Our results are in line with the literature (Kuwabara et al., 2007; Leikness et al., 2008; Steinbrecher & Hiller, 2011; Grover et al., 2015). Most of our patients had comorbid disorders, especially the combination of anxiety- and mood disorders, which is also in line with other studies (de Waal et al., 2004; Lieb et al. 2002; Means-Christensen et al., 2008; Löwe et al., 2008; Hanel et al., 2009; Carlier et al., 2014; Grover et al., 2015; Jank et al., 2017). The clinical relevance of this comorbidity is considerable as it generally reflects more psychosocial disability and functional impairment, elevated risk for suicidality, more drop-out, and increased medical care utilization (Maier and Falkai, 1999; Ansseau et al., 2004; Barsky et al., 2005; Beesdo et al., 2010; De Reus et al, 2013; Carlier et al., 2014).

On the whole, we found an unfavourable 6-month treatment course of somatoform disorders with a predominantly modest decline of both symptoms and functioning. To illustrate, for the Total group of somatoform disorders, we found the following significant results on total scales (baseline versus 6 months, mean): BSI total: 1.19 versus 1.02; PSC total: 48.06 versus 43.68; BAS: 15.09 versus 12.59; MADRS: 16.60 versus 13.49; SF-36 General health/total: 55.30 versus 50.99 (Table 2). Somatoform disorders with a rather worse treatment course were Body dysmorphic disorder (only a few significant reductions on some total/subscale scores) and Pain disorder (only a few significant reductions on some subscales but not on total scales). The least positive treatment results were obtained for Hypochondriasis, with insignificant treatment results on all total/subscale scores, except for a significant modest improvement on the PSC General/neurological subscale. We eventually found that in particular Hypochondriasis and Body Dysmorphic Disorder were significant predictors for the course of symptoms. Which implies that our hypothesis concerning worse treatment course was confirmed for Hypochondriasis but not for Pain disorder.

Our modest treatment results for somatoform disorders are in line with studies in primary care (e.g., Steinbrecher & Hiller, 2011) and secondary care (e.g., Zonneveld et al., 2012; Deary et al, 2007), but in contrast with those that found somewhat better treatment results (e.g., Kroenke, 2007). Possible reasons for our modest treatment results are for instance: the limited follow-up period of 6 months, and/or the negative influence of characteristics that might have hampered successful treatment outcome (e.g., maladaptive personality traits, dysfunctional therapeutic alliance; Reuter et al., 2014).

Our results further showed that few variables could predict treatment course of somatoform disorders: the PSC total score, Body Dysmorphic Disorder, and Hypochondriasis were significant predictors for the course of the symptoms, while the PSC total score was the only significant predictor for the course of functioning. The literature on predictive factors for the course of somatoform disorders in secondary mental health care is scarce, but it mostly confirmed our results (e.g. Voigt et al., 2013). However, it must be mentioned here that we could analyse only a limited set of predictors, and it is very likely that there may also be other relevant course predictors (e.g., negative life events, functional disability, attributional style; Steinbrecher & Hiller, 2011).

The strength of the present study is that it is the first study to investigate the course of psychological- and physical symptoms as well as functioning for various somatoform disorders in secondary mental health care. We had a naturalistic real world patient sample and used both patient- and clinician-based ratings. Our study also had limitations such as the lack of disorder-specific instruments and no randomized control group. The observational nature of our data precludes conclusions regarding whether the changes found are the result of treatment, as these minor changes over time could well be due to regression to the mean or to natural fluctuations in severity over time. We had no detailed information about treatment. However, previous analyses regarding our ROM-procedure showed that treatment followed international guidelines and consisted of psychotherapy (mostly individual CBT), pharmacotherapy, or combined therapy (van der Lem et al., 2011; van Fenema et al., 2012ab; van Noorden et al., 2012). Our study was conducted using DSM-IV criteria and three DSM-IV somatoform disorders (Conversion disorder, Somatization disorder, Somatoform disorder NOS) could not be analysed, due to low prevalence. Unfortunately, the follow-up of this study was only 6 months. A longer follow-up might have led to more improvement, due to longer treatment. However, this need not necessarily be the case, as Phillips et al. (2005abc) have found that patients with Body dysmorphic disorder who received mental health treatment during 1 year were not more likely to remit than those who did not received treatment. Finally, our participants were all treatment-seeking, preventing generalization of our findings to non-treatment seeking individuals. Our sample is representative for patients with somatoform disorders being treated in the setting of Dutch secondary mental health care. Consequently, we cannot generalize our results to primary or tertiary care or to patients outside the Netherlands.

Our results indicated that most of the somatoform disorder patients had high comorbidity as well as high psychopathology and low functioning, which is in line with other studies (Claassen-van Dessel et al., 2016; Weiss et al., 2017). Further research on the course of symptoms is important. For instance, Houtveen et al. (2015b) found substantial fluctuations in bodily complaints and mood states in patients with severe chronic somatoform disorder. Future course studies should preferably assess larger samples, with follow-up data obtained prospectively, and more frequent interval ratings (Kleinstäuber et al., 2017). Finally, more outcome studies are needed on the long-term effectiveness of interventions for somatoform disorders in secondary mental health care. After all, the treatment of DSM-5 somatic symptoms disorders is still in its infancy (Sharma & Manjula, 2013) and chronic severe

somatoform disorders are often treatment-resistant (Houtveen et al., 2015a). In line with our results, more recent treatment studies concerning somatoform disorders have stressed the importance of an additional treatment focus on comorbidity (Kaplan, 2014). Examples of other recent treatment studies regarding somatoform disorders are: CBT enriched with emotion regulation strategies (Kleinstäuber et al., 2016), Group CBT (Yoshino et al., 2015), Mindfulness-based cognitive therapy (van Ravesteijn et al., 2014), and Intensive multidisciplinary treatment (Houtveen et al., 2015a).

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References

Aaronson, N.K., Muller, M., Cohen, P.D.A., Essink-Bot, M.L., Fekkes, M., Sanderman, R., … Verrips, E. (1998). Translation, validation, and norming of the Dutch language version of the SF-36 Health Survey in community and chronic disease populations. *Journal of Clinical Epidemiology,* 51, 1055–1068.

American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders, 4th edition (DSM-IV-TR).* Washington, DC: American Psychiatric Association.

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders, 5th edition (DSM-V-TR).* Washington, DC: American Psychiatric Association.

Ansseau, M., Dierick, M., Buntinkx, F., Cnockaert, P., Smedt de, J., Haute van den, M., Mijnsbrugge van der, D. (2004). High prevalence of mental disorders in primary care. *Journal of Affective Disorders,* 78, 49-55.

Anstey, K.J., Hofer, S.M. (2004). Longitudinal designs, methods and analysis in psychiatric research. *Australian and New Zealand Journal of Psychiatry,* 55, 737-744.

Arnold, I.A., Waal de, M.W.M., Eekhof, J.A.H., Hemert van, A.M. (2006). Somatoform disorder in primary care: Course and the need for cognitive behavioral treatment. *Psychosomatics,* 47, 498-503.

Arnold, I.A., Waal de, M.W.M., Eekhof, J.A.H., Spinhoven, .P, Assendelft, P., Hemert van, A.M. (2007). Unexplained physical symptoms and the association with depression and anxiety. *Huisarts en Wetenschap,* 50(13), 969-973. Dutch

Barsky, A.J., Orav, E.J., Bates, D.W. (2005). Somatization increases medical utilization and costs independent of psychiatric and medical comorbidity. *Archives of General Psychiatry,* 62(8), 903-910.

Batelaan, N.M., Rhebergen, D., Spinhoven, P., Balkom van, A.J., Penninx, B.W.J.H. (2014). Two-year course trajectories of anxiety disorders: do DSM classifications matter? *Journal of Clinical Psychiatry,* 75(9), 985-993.

Baumeister, H., Härter, M. (2007). Prevalence of mental disorders based on general population surveys. *Social Psychiatry and Psychiatric Epidemiology,* 42, 537-546.

Beesdo, K., Jacobi, F., Hoyer, J., Low, N.C.P., Höfler, M., Wittchen, H.U. (2010). Pain associated with specific anxiety and depressive disorders in a nationally representative population sample. *Social Psychiatry and Psychiatric Epidemiology,* 45, 89-104.

Bergander, B., Erdur, L., Kallenbach-Dermutz, B., Deter, H.C. (2013). Younger and older chronic somatoform pain patients in psycho-diagnostics, physician-patient relationship and treatment outcome. *Biopsychosocial Medicine,* 7(1), 4. doi: 10.1186/1751-0759-7-4.

Beurs de, E., Hollander-Gijsman den, M.E., Rood van, Y.R., Wee van der, N.J.A., Giltay, E.J., Noorden van, M.S., … Zitman, F.G. (2011). Routine Outcome Monitoring in the Netherlands: practical experiences with a web-based strategy for the assessment of treatment outcome in the clinical practice. *Clinical Psychology & Psychotherapy,* 18, 1-12.

Bjornsson, A.S., Dyck, I., Moitra, E., Stout, R.L., Weisberg, R.B., Keller, M.B., Phillips, K.A. (2011). The clinical course of body dysmorphic disorder in the Harvard/ Brown Anxiety Research Project (HARP). *Journal of Nervous and Mental Disease,* 199, 55-57.

Carlier, I.V.E., Meuldijk, D., Vliet van, I.M., Fenema van, E., Wee van der, N.J., Zitman, F.G. (2012a). Routine outcome monitoring and feedback on physical or mental health status: evidence and theory. *Journal of Evaluation in Clinical Practice,* 18(1), 104-110.

Carlier, I.V.E., Schulte-Maaren van, Y., Wardenaar, K., Giltay, E., Noorden van, M., Vergeer, P., Zitman, F.G. (2012b). Development and validation of the 48-item Symptom Questionnaire (SQ-48) in patients with depressive, anxiety and somatoform disorders. *Psychiatry Research,* 200(2-3), 904-910.

Carlier, I.V.E., Colijn, S., Rood van, Y.R., Streevelaar, M.F., Vliet van, I.M., Veen van, T. (2014). A comparative analysis of personality pathology profiles among patients with pure depressive-, pure anxiety-, and pure somatoform disorders. *Journal of Affective Disorders,* 168, 322-330.

Carlier, I.V.E., Hovens, J.G., Streevelaar, M.F., Rood van, Y.R., Veen van, T. (2016). Characteristics of suicidal outpatients with mood, anxiety and somatoform disorders: the role of childhood abuse and neglect. *International Journal of Social Psychiatry*, 62(4), 316-326.

Carlier, I.V., Kovács, V., van Noorden, M.S., van der Feltz-Cornelis, C., Mooij, N., Schulte-van Maaren, Y.W., van Hemert, A.M., Zitman, F.G., Giltay, E.J. (2017). Evaluating the Responsiveness to Therapeutic Change with Routine Outcome Monitoring: A Comparison of the Symptom Questionnaire-48 (SQ-48) with the Brief Symptom Inventory (BSI) and the Outcome Questionnaire-45 (OQ-45). *Clinical Psychology & Psychotherapy*, 24(1), 61-71.

Claassen-van Dessel N., Wouden van der, J.C., Dekker, J., Horst van der, H.E. (2016). Clinical value of DSM IV and DSM 5 criteria for diagnosing the most prevalent somatoform disorders in patients with medically unexplained physical symptoms. *Journal of Psychosomatic Research*, 82, 4-10.

Coryell, W., Leon, A., Winokur, G., Endicott, J., Keller, M., Akisal, H., Solomon, D. (1996). Importance of psychotic features to longterm course in major depressive disorder. *American Journal of Psychiatry,* 153, 483-489.

Creed, F., Henningsen, P., Fink, P. (2011). *Medically unexplained symptoms, somatization and bodily distress*. Cambridge, MA: Cambridge University Press.

Deary, V., Chalder, T., Sharpe, M. (2007). The cognitive behavioural model of medically unexplained symptoms: a theoretical and empirical review. *Clinical Psychology Review*, 27(7), 781-797.

Derogatis, L.R., Lipman, R.S., Covi L (1973). SCL-90: an outpatient psychiatric rating scale-preliminary report. *Psychopharmacology Bulletin,* 9(1), 13–28.

Derogatis, L.R., Melisaratos, N. (1983). The Brief Symptom Inventory: an introductory report. *Psychological Medicine* 13(3), 595-605.

Dessel van, N., Leone, S.S, Wouden van der, J.C., Dekker, J., Horst van der, H.E. (2014). The PROSPECTS study: Design of a prospective c.ohort study on prognosis and perpetuating factors of medically unexplained physical symptoms (MUPS). *Journal of Psychosomatic Research,* 76, 200-206.

Dirkzwager, A.J., Verhaak, P.F. (2007). Patient with persistent medically unexplained symptoms in general practice: characteristics and quality of care. *Family Practise Management,* 8, 33-43.

Eisen, J.L., Pinto, A..P, Mancebo, M.C., Dyck, I.R., Orlando, M.E., Rasmussen, S.A. (2010). A 2-year prospective follow-up study of the course of obsessive-compulsive disorder. *Journal of Clinical Psychiatry,* 71(8), 1033-1039.

Eisen, J.L., Sibrava, N.J., Boisseau, C.L., Mancebo, M.C., Stout, R.L., Pinto, A., Rasmussen, S.A. (2013). Five-year course of obsessive-compulsive disorder: predictors of remission and relapse. *Journal of Clinical Psychiatry,* 74(3), 233-239.

Essau, C.A. (2007). Course and outcome of somatoform disorders in non-referred adolescents. *Psychosomatics*, 48(6), 502-509.

Fenema van, E.M., Wee van der, N.J., Bauer, .M, Witte, C.J., Zitman, F.G. (2012a). Assessing adherence to guidelines for common mental disorders in routine clinical practice. *International Journal of Quality in Health Care*, 24(1), 72-79.

Fenema van, E.M., Wee van der, N.J., Giltay, E.J., Hollander-Gijsman den, M.E., Zitman, F.G. (2012b). Vitality predicts level of guideline-concordant care in routine treatment of mood, anxiety and somatoform disorders. *Journal of Evaluation in Clinical Practice*, 18(2), 441-448.

Feise, R. J. (2002). Do multiple outcome measures require p-value adjustment? *BMC Medical Research Methodology*, 2(1), 8, 1-4.

Fink, P., Hansen, M.S., Oxhøj, M. (2004). The prevalence of somatoform disorders among internal medical inpatients. *Journal of Psychosomatic Research,* 56, 413-418.

Frostholm, L., Ørnbøl, E., Fink, P.K. (2015). Physical symptom attributions: a defining characteristic of somatoform disorders? *General Hospital Psychiatry,* 37, 147-152.

Goekoop, J.G., Knoppert-Klein van der, E.A., Hoeksema, T., Klinkhamer, R.A., Gaalen van, H.A., Velde van der, E.A. (1991). The interrater reliability of a Dutch Version of the Comprehensive Psychopathological Rating Scale. *Acta Psychiatrica Scandinavica,* 83(3), 202-205.

Grant, N., Hotopf, M., Breen, G., Cleare, A., Grey, N., Hepgul, N., . . . Wingrove, J. (2014). Predicting outcome following psychological therapy in IAPT (PROMPT): a naturalistic project protocol. *BMC Psychiatry*, 14(1), 170, 1-8.

Grover, S., Aneja, J., Sharma, A., Malhotra, R., Varma, S., Basu, D., Avasthi, A. (2015). Do the various categories of somatoform disorders differ from each other in symptom profile and psychological correlates. *International Journal of Social Psychiatry,* 61(2), 148-156.

Gunn, J., Elliott, P., Densley, K., Middleton, A., Ambresin, G., Dowrick, C., … Griffiths, F. (2013). A trajectory-based approach to understand the factors associated with persistent depressive symptoms in primary care. *Journal of Affective Disorders,* 148, 338-346.

Hanel, G., Henningsen, P., Herzog, W., Sauer, N., Schaefert, R., Szecsenyi, J., Löwe, B. (2009). Depression, anxiety, and somatoform disorders: vague or distinct categories in primary care? Results from a large cross-sectional study. *Journal of Psychosomatic Research,* 67, 189-197.

Hemert van, A.M., Hengeveld, M.W., Bolk, J.H., Rooijmans, H.G., Vandenbroucke, J.P. (1993). Psychiatric disorders in relation to medical illness among patients of a general medical out-patient clinic. *Psychological Medicine,* 23(1), 167-173.

Hendriks, S.M., Spijker, J., Licht, C.M.M., Beekman, A.T.F., Penninx, B.W.J.H. (2013). Two-year course of anxiety disorders: different across disorders or dimensions? *Acta Psychiatrica Scandinavica,* 128, 212-221.

Hiller, W., Leibbrand, R., Rief, W., Fichter, M.M. (2002). Predictors of course and outcome in hypochondriasis after cognitive-behavioral treatment. *Psychotherapy and Psychosomatics,* 71(6), 318-325.

Houtveen, J.H., Broeckhuysen-Kloth van, S., Lintmeijer, L.L., Bühring, M.E.F., Geenen, R. (2015a). Intensive multidisciplinary treatment of severe somatoform disorder. *The Journal of Nervous and Mental Disease,* 203, 141-148.

Houtveen, J.H., Lipovsky, M.M., Kool, M., Sorbi, M., Bühring, M.E.F., Broeckhuysen-Kloth van, S. (2015b). The day-to-day concurrence of bodily complaints and affect in patients with severe somatoform disorder. *Scandinavian Journal of Psychology,* 56, 553-559.

Iezzoni, L. (Ed.) (2013). *Risk adjustment for health care outcomes* (4th ed.). Chicago, Ill.: Health Administration Press.

Jank, R., Liegl, G., Böckle, M., Vockner, B., Pieh, C. (2017). Häufigkeit somatoformer syndrome in der Allgemeinmedizin. *Zeitschrift für Psychosomatische Medizin und Psychotherapie*, 63(2), 202-212. German

Kahn, A.A., Khan, A., Harezlak, J., Tu, W., Kroenke, K. (2003). Somatic symptoms in primary care: etiology and outcome. *Psychosomatics,* 44, 471-478.

Kaplan, M.J. (2014). A psychodynamic perspective on treatment of patients with conversion and other somatoform disorders. *Psychodynamic Psychiatry,* 42(4), 593-615.

Karlsen, T.I., Tveitå, E.K., Natvig, G.K., Tonstad, S., Hjelmesæth, J. (2011).Validity of the SF-36 in patients with morbid obesity. *Obesity Facts,* 4(5), 346–351.

Kendrick, T., El-Gohary, M., Stuart, B., Gilbody, S., Churchill, R., Aiken, L., Bhattacharya, A., Gimson, A., Brütt, A.L., de Jong, K., Moore, M. (2016). Routine use of patient reported outcome measures (PROMs) for improving treatment of common mental health disorders in adults. *Cochrane Database Systematic Review*, July 13;7:CD011119. doi:10.1002/14651858.

Klein, D.N., Shankman, S.A., Rose, S. (2008). Dysthymic disorder and double depression: prediction of 10-year course trajectories and outcomes. *Journal of Psychiatric Research,* 42(5), 408-415.

Kleinstäuber, M., Gottschalk, J., Berking, M., Rau, J., Rief, W. (2016). Enriching Cognitive Behavior Therapy with Emotion Regulation Training for Patients with Multiple Medically Unexplained Symptoms (ENCERT): Design and implementation of a multicenter, randomized, active-controlled trial. *Contemporary Clinical Trials*, 47, 54-63.

Kleinstäuber, M., Lambert, M.J., Hiller, W. (2017). Early response in cognitive-behavior therapy for syndromes of medically unexplained symptoms. *BMC Psychiatry*, 17(1), 195. doi: 10.1186/s12888-017-1351-x.

Klerk de, S., Noorden van, M.S., Giezen van, A.E., Spinhoven, P., Hollander-Gijsman den, M.E., Giltay, E.J., … Zitman, F.G. (2011). Prevalence and correlates of lifetime deliberate self-harm and suicidal ideation in naturalistic outpatients: The Leiden Routine Outcome Monitoring study. *Journal of Affective Disorders,* 183, 257-264.

Koelen, J,A., Houtveen, J.H., Abbass, A., Luyten, P., Eurelings-Bontekoe, .E.H.M, Broeckhuysen-Kloth van, … Geenen, R. (2014). Effectiveness of psychotherapy for severe somatoform disorder: meta-analysis. *The British Journal of Psychiatry,* 204, 12-19.

Konnopka, A., Schaefert, R., Heinrich, S., Kaufmann, C., Luppa, M., Herzog, W., Knig, H. (2012). Economics of medically unexplained symptoms: A systematic review of the literature. *Psychotherapy and Psychosomatics,* 81, 265-275.

Kroenke, K., Spitzer, R.L., Williams, J.B., Linzer, M., Hahn, S.R., Gruy, F.V., Brody, D. (1994). Physical symptoms in primary care: predictors of psychiatric disorders and functional impairment. *Archives of Family Medicine,* 3(9), 774.

Kroenke, K. (2007). Efficacy of treatment for somatoform disorders: a review of randomized controlled trials. *Psychosomatic Medicine*, 69(9), 881-888.

Kuwabara, H., Otsuka, M., Shindo, M., Ono, S., Shioiri, T., Someya, T. (2007). Diagnostic classification and demographic features in 283 patients with somatoform disorder. *Psychiatry and Clinical Neurosciences,* 61, 283-289.

Lambert, M.J. (2017). Maximizing Psychotherapy Outcome beyond Evidence-Based Medicine. *Psychotherapy & Psychosomatics*, 86(2), 80-89.

Lecrubier, Y., Sheehan, D.V., Weiller, E., Amorim, P., Bonora, I., Sheehan, K.H., … Dunbar, G. (1997). The Mini International Neuropsychiatric Interview (MINI). A short diagnostic structured interview: reliability and validity according to the CIDI. *European Psychiatry,* 12(5), 224–231.

Lem van der, R., Wee van der, N.J., Veen van, T. Zitman, F.G. (2011). The generalizability of antidepressant efficacy trials to routine psychiatric outpatient practice. *Psychological Medicine*, 41, 1353-1363.

Leikness, K.A., Finset, M.H.A., Moum, T., Sandanger, I. (2008). Overlap, comorbidity, and stability of somatoform disorders and the use of current versus lifetime criteria. *Psychosomatics,* 49, 152-162.

Lieb, R., Zimmermann, P., Friis, R.H., Höfler, M., Tholen, S., Witchen, H.U. (2002). The natural course of DSM-IV somatoform disorders and syndromes among adolescents and you.ng adults: a prospective-longitudinal community study. *European Psychiatry,* 17(6), 212-231.

Löwe, B., Spitzer, R.L., Williams, J.B.W., Mussell, M., Schellberg, D., Kroenke, K. (2008). Depression, anxiety and somatization in primary care: syndrome overlap and functional impairment. *General Hospital Psychiatry,* 30, 191-199.

Maier, W., Falkai, P. (1999). The epidemiology of comorbidity between depression, anxiety disorders and somatic diseases. *International Clinical Psychopharmacology,* 14(2), 1-6.

McGorry, P.D., Hickie, I.B., Yung, A.R., Pantelis, C., Jackson, H.J. (2006). Clinical staging of psychiatric disorders: a heuristic framework for choosing earlier, safer and more effective interventions. *American Journal of Psychiatry,* 40(8), 616-622.

Means-Christensen, A.J., Roy-Byrne, P.P., Sherbourne, C.D., Craske, M.G., Stein, M.B. (2008). Relationships among pain, anxiety, and depression in primary care. *Depression and Anxiety,* 25, 593-600.

Montgomery, S.A., Asberg, M. (1979). A new depression scale designed to be sensitive to change. *British Journal of Psychiatry,* 134, 382-389.

Noorden van, M.S., Giltay, E.J., Hollander-Gijsman den, M.E., Wee van der, N.J., Veen van, T., Zitman, F.G. (2010). Gender differences in clinical characteristics in a naturalistic sample of depressive outpatients: the Leiden Routine Outcome Monitoring Study. *Journal of Affective Disorders*, 125(1-3), 116-123.

Noorden van, M.S., Fenema van, E.M., Wee van der, N.J., Rood van, Y.R., Carlier, I.V.E., Zitman, F.G., Giltay, E.J. (2012). Predicting outcomes of mood, anxiety and somatoform disorders: the Leiden routine outcome monitoring study. *Journal of Affective Disorders*, 142(1-3), 122-131.

Pedersen Frølund, H, Frostholm, L., Søndergaard Jensen, J., Ørnbøl, E., Schröder, A. (2016). Neuroticism and maladaptive coping in patients with functional somatic syndromes. *British Journal of Health Psychology*, 21(4), 917-936.

Phillips, K.A., Pagano, M.E., Menard, W., Fay, C., Stout, R.L. (2005a). Predictors of remission body dysmorphic disorder: A prospective study. *Journal of Nervous and Mental Disease,* 193(8), 564-567.

Phillips, K.A., Grant, J.E., Siniscalchi, J.M., Stout, R., Price, L.H. (2005b). A retrospective follow-up study of body dysmorphic disorder. *Comprehensive Psychiatry,* 46, 315-321.

Phillips, K.A., Menard, W., Fay, C., Weisberg, R. (2005c). Demographic characteristics, phenomenology, comorbidity, and family history in 200 individuals with body dysmorphic disorder. *Psychosomatics,* 46, 317-325.

Phillips, K.A., Menard, W., Quinn, E., Didie, E.R., Stout, R.L. (2013). A 4-year prospective observational follow-up study of course and predictors of course in body dysmorphic disorder. *Psychological Medicine,* 43,

Ranstam, J. (2016). Multiple P-values and Bonferroni correction. *Osteoarthritis Cartilage*, 24(5), 763-764.

Van Ravesteijn, H.J., Suijkerbuijk, Y.B., Langbroek, J.A., Muskens, E., Lucassen, P.L., van Weel, C., Wester, F., Speckens, A.E. (2014). Mindfulness-based cognitive therapy (MBCT) for patients with medically unexplained symptoms: process of change. *Journal of Psychosomatic Research,* 77(1), 27-33.

Reus de, R.J.M., Berg van den, J.F., Emmelkamp, P.M.G. (2013). Personality Diagnostic Questionnaire 4+ is not useful as a screener in clinical practice. *Clinical Psychology & Psychotherapy,* 20(1), 49-54.

Reuter, L., Bengel, J., Scheidt, C.E. (2014). Non-response to therapy in acute and rehabilitative psychosomatic inpatient care - a systematic review. *Zeitschrift Psychosomatik Medicine & Psychotherapie*, 60(2), 121-145. German

Rief, W., Nanke, A., Emmerich, J., Bender, A., Zech, T. (2004). Causal illness attributions in somatoform disorders: associations with comorbidity and illness behavior. *Journal of Psychosomatic Research,* 57(4), 367-371.

Ruhé, H.G., Rooijen van, G., Spijker, J., Peeters, F.P.M.L., Schene, A.H. (2012). Staging methods for treatment resistant depression. A systematic review. *Journal of Affective Disorders,* 137, 35-45.

Sammet, I., Bohn, T., Schrauth, M., Leibing, E. (2007). Was folgt der diagnose einer somatoformen störung? Eine empirische untersuchung zu befindlichkeit und inanspruchnahme medizinischer versorgung nach psychosomatischer konsiliaruntersuchung in einer Universitätsklinik. *Psychotherapie Psychosomatik Medizinische Psychology,* 57, 462-468. German

Schröder, A., Rehfeld, E., Ornbøl, E., Sharpe, M., Licht, R.W., Fink, P. (2012). Cognitive-behavioural group treatment for a range of functional somatic syndromes: randomised trial. *British Journal of Psychiatry*, 200(6), 499-507.

Sharma, M.P., Manjula, M. (2013). Behavioural and psychological management of somatic symptom disorders: an overview. *International Review of Psychiatry,* 25(1), 116-124.

Shea, M.T., Pagano, M.E., Morey, L.C., McGlashan, T.H., Grilo, C.M., Sanislow, C.A., … Zanarini, M.C. (2004). Associations in the course of personality disorders and axis I disorders over time. *Journal of Abnormal Psychology,* 113(4), 499-508.

Sheehan, D.V., Lecrubier, Y., Sheehan, K.H., Amorim, P., Janavs, J., Weiller, E., … Dunbar, G.C. (1998). The Mini-International Neuropsychiatric Interview (MINI): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry,* 59(20), 22-33.

Speckens, A.E., Hemert van, A.M., Bolk, J.H., Rooijmans, H.G.M., Hengeveld, M.W. (1996). Unexplained physical symptoms: outcome, utilization of medical care, and associated factors. *Psychological Medicine,* 26, 745-752.

Steinbrecher, N., Koerber, S., Frieser, D., Hiller,W. (2011). The prevalence of medically unexplained symptoms in primary care. *Psychosomatics,* 52, 263-271.

Steinbrecher, N., Hiller, W. (2011). Course and prediction of somatoform disorder and medically unexplained symptoms in primary care. *General Hospital Psychiatry,* 33, 318-326.

Tyrer, P., Owen, R.T., Cicchetti, D.V. (1984). The brief scale for anxiety – a subdivision of the Comprehensive Psychopathological Rating Scale. *Journal of Neurology Neurosurgery & Psychiatry,* 47(9), 970-975.

Vliet van, I.M., Beurs de, E. (2007). The MINI-International Neuropsychiatric Interview Plus. A brief structured diagnostic psychiatric interview for DSM-IV and ICD-10 psychiatric disorders. *Tijdschrift voor Psychiatrie* 49(6), 393-397. Dutch

Voigt, K., Wollburg, E., Weinmann, N., Herzog, A., Meyer, B., Langs, G., Lőwe, B. (2013). Predictive validity and clinical utility of DSM-5 somatic symptom disorder: prospective 1-year follow-up study. *Journal of Psychosomatic Research,* 75(4), 358-361.

Waal de, M.W.M., Arnold, I.A., Eekhof, J.A.H., Hemert van, A.M. (2004). Somatoform disorders in general practice: Prevalence, functional impairment and comorbidity with anxiety and depressive disorders. *British Journal of Psychiatry,* 184, 470-476.

Waal de, M.W.M., Arnold, I.A., Spinhoven, P., Eekhof, J.A.H., Hemert van, A.M. (2005), The reporting of specific physical symptoms for mental distress in general practice. *Journal of Psychosomatic Research,* 59(2), 89-95.

Ware, J.E., Snow, K.K., Kosinski, M., Gandek, B. (1993). *SF-36 Health Survey Manual and Interpretation Guide*. Boston: New England Medical Center, The Health Institute.

Weiss, F.D., Rief, W., Kleinstäuber, M. (2017). Health care utilization in outpatients with somatoform disorders: descriptives, interdiagnostic differences, and potential mediating factors. *General Hospital Psychiatry*, 44, 22-29.

Wigman, J.T.W., Os van, J., Thiery, E., Derom, C., Collip, D., Jacobs, N., Wichers, M. (2013). Psychiatric diagnosis revisited: Towards a system of staging and profiling combining nomothetic and idiographic parameters of momentary mental states. *PLoS One,* 8(3), 1-8.

Wittchen, H.U., Jacobi, F., Rehm, J., Gustavsson, A., Svensson, M., Jönsson, B., … Steinhausen, H.C. (2010). The size and burden of mental disorders and other disorders of the brain in Europe. *European Neuropsychopharmacology Journal,* 21, 655-679.

Wortman, M.S., Lucassen, P.L., van Ravesteijn, H.J., Bor, H., Assendelft, P.J., Lucas, C., Olde Hartman, T.C. (2016). Brief multimodal psychosomatic therapy in patients with medically unexplained symptoms: feasibility and treatment effects. *Family Practice*, 33(4), 346-353.

Yonkers, K.A., Bruce, S.E., Dyck van, I.R., Keller, M.B. (2003). Chronicity, relapse, and illness-course of panic disorder, social phobia, and generalized anxiety disorder: findings in men and women from 8 years of follow-up. *Depression and Anxiety,* 17, 173-179.

Yoshino, A, Okamoto, Y., Doi, M., Horikoshi, M., Oshita, K., Nakamura, R., Otsuru, N., Yoshimura, S., Tanaka, K., Takagaki, K., Jinnin, R., Yamashita, H., Kawamoto, M., Yamawaki, S. (2015). Effectiveness of group cognitive behavioral therapy for somatoform pain disorder patients in Japan: A preliminary non-case-control study. *Psychiatry and Clinical Neuroscience,* 69(12), 763-772.

Zonneveld, LN, van Rood, Y.R., Kooiman, C.G., Timman, R., van ’t Spijker, A., Busschbach, J.J. (2012). Predicting the outcome of a cognitive-behavioral group training for patients with unexplained physical symptoms: a one-year follow-up study. *BMC Public Health*. 12, 848, 1-10.

Table 1: Baseline socio-demographic and clinical characteristics for the total group and the four separate somatoform disorder groups

Patient characteristics	**TOTAL N=435**	Undifferentiated somatoform disorder N=242	Pain disorder N=102	Body dysmorphic disorder N=51	Hypochondriasis N=40	P-value
Age (mean, SD)	**40.49 (12.13)**	41.99 (12.0)[a]	41.23 (11.87)[a]	31.63 (10.16)[b]	38.89 (12.01) [a]	**.000**
Gender (%)						**.000**
Male	**29.4**	27.1	32.3	28.4	35.9	
Married or living together (%)						**.000**
Married	**53.5**	53.8	54.4	31.4	69.4	
Widow	**13.6**	13.8	18.6	7.1	11.3	
Not married	**32.8**	32.4	26.9	61.5	19.4	
Housing situation (%)						**.000**
Living alone	**22.7**	23.6	21.3	32.0	12.1	
With family	**13.8**	12.0	12.7	29.6	9.7	
With partner	**39.7**	38.8	38.2	27.9	55.9	
Employment status (%)						**.000**
Part time work	**18.3**	17.3	16.0	25.4	28.2	
Full time work	**12.7**	10.3	12.4	17.8	21.0	
Unemployed	**10.2**	9.2	10.1	18.3	6.5	
Sick leave	**36.0**	38.4	40.2	23.1	16.1	
Current education (%)						**.000**
No	**87.1**	86.6	91.7	81.1	86.3	
Yes	**12.9**	13.4	8.3	18.9	13.7	
Educational status (%)						**.000**
Primary school	**10.3**	9.8	11.2	7.7	12.1	
Lower education	**31.8**	34.5	34.9	20.1	22.6	
Middle education	**39.3**	37.9	37.3	47.9	43.5	
Higher education	**18.6**	17.8	16.6	24.3	21.8	
Ethnicity (%)						**.000**
Dutch	**89.2**	87.8	79.6	86.4	88.7	
Comorbidity number of disorders (%)						**.000**
0	**17.1**	21.9[a, b]	16.5[a]	8.2[a, b]	15.9 [b]	

1	**35.2**	31.9	38.6	25.7	33.8	
2	**23.9**	21.3	22.6	25.7	17.2	
3	**13.4**	13.8	15.0	16.9	15.2	
>3	**10.5**	11.2	7.3	23.5	18.0	
Comorbidity type of disorders (%)						**<.001**
Anxiety	**15.8**	16.4	14.0	19.1	30.3	
Mood	**24.7**	20.6	28.0	23.0	18.6	
Anxiety+Mood	**22.6**	22.1	23.8	35.5	21.4	
BSI total (mean, SD)	**1.19 (0.75)**	1.05 (0.71)[a]	1.21 (0.79)[b]	1.45 (0.75)[c]	1.24 (0.82)[a, b, c]	**.000**
PSC total (mean, SD)	**48.06 (20.82)**	49.10 (0.81)[a]	48.87 (1.31)[a, b]	24.50 (8.50)[a, b]	40.10 (2.17)[b]	**.000**
BAS (mean, SD)	**15.09 (6.50)**	14.00 (0.23)[a]	16.22 (0.32)[b]	13.71 (0.54)[a]	16.40 (0.62)[b]	**.000**
MADRS (mean, SD)	**16.60 (8.47)**	16.43 (0.32)[a, b]	18.53 (0.50)[c]	18.59 (0.77)[a, c]	13.97 (0.79)[b]	**.000**
SF-36 total (mean, SD)	**16.06 (3.90)**	16.80 (0.13)[a]	16.58 (0.20)[a]	13.94 (0.32)[b]	15.53 (0.34)[a]	**.000**

Note: Values in the same row with different superscript numbers are significantly different (Post-hoc comparison by Bonferroni test, P-value <0.01).
Significant P-values (p<.01) are printed in bold.
Patients of the somatoform disorder groups have the registered somatoform disorder and no other somatoform disorders.
Anxiety denotes comorbid anxiety disorders, Mood denotes comorbid mood disorders, Anxiety+Mood denotes comorbid anxiety and mood disorders.
BSI denotes the Brief Symptom Inventory, SF-36 denotes the Short-Form Health Survey 36, PSC denotes the Physical Symptom Checklist, MADRS denotes the Montgomery-Asberg depression Rating Scale, BAS denotes the Brief Anxiety Scale. BSI total-, PSC total-, BAS-, MADRS- and SF-36 total scores denote the baseline scores.

Table 2: Six-month treatment course of total group of somatoform disorders and Undifferentiated somatoform disorder

Patient characteristics	**Total som. disorder B N=435**	**Total som. disorders 6m N=435**	**t-value**	**p-value**	**Effect size (d)**	**Undifferentiated som. disorder B N=242**	**Undifferentiated som. disorder 6m N=242**	**t-value**	**p-value**	**Effect size (d)**
BSI (mean, SD)										
Somatization	1.14 (0.80)	0.99 (0.83)	4.200	**.000**	0.20	1.13 (0.77)	0.97 (0.79)	3.293	**.001**	.221
Obsessive compulsive	1.60 (0.94)	1.40 (0.94)	5.066	**.000**	0.24	1.54 (0.06)	1.35 (0.89)	3.808	**.000**	.256
Interpersonal sensitivity	1.30 (1.07)	1.16 (1.01)	3.234	**.001**	0.16	1.08 (0.97)	0.97 (0.90)	2.107	.036	.141
Depression	1.40 (1.06)	1.14 (0.99)	5.974	**.000**	0.29	1.27 (1.02)	1.01 (0.94)	4.603	**.000**	.309
Anxiety	1.33 (0.99)	1.11 (0.94)	4.193	**.000**	0.25	1.17 (0.95)	0.99 (0.88)	3.682	**.000**	.247
Hostility	0.79 (0.78)	0.68 (0.75)	3.343	**.001**	0.16	0.72 (0.74)	0.61 (0.69)	2.596	.010	.174
Phobic anxiety	0.97 (0.97)	0.84 (0.90)	3.599	**.001**	0.17	0.79 (0.91)	0.71 (0.74)	1.792	.075	.120
Paranoid ideation	0.98 (0.90)	0.87 (0.86)	3.019	**.003**	0.15	0.86 (0.86)	0.76 (0.83)	2.056	.041	.138
Psychoticism	1.05 (0.86)	0.84 (0.81)	6.294	**.000**	0.30	0.88 (0.77)	0.72 (0.74)	3.949	**.000**	.265
Total score	1.19 (0.75)	1.02 (0.75)	5.885	**.000**	0.28	1.07 (0.72)	0.91 (0.69)	4.392	**.000**	.295
PSC (mean, SD)										
Autonomic	8.31 (5.15)	7.23 (5.23)	4.101	**.000**	0.24	8.14 (5.13)	6.77 (4.97)	4.001	**.000**	.297
General/neurological	11.87 (4.47)	10.47 (5.04)	5.143	**.000**	0.30	12.26 (4.42)	10.78 (5.24)	4.001	**.000**	.297
Musculoskeletal/pain	11.88 (6.03)	10.91 (6.01)	3.375	**.001**	0.19	12.18 (6.36)	11.16 (6.12)	2.677	**.008**	.198
Gastro-intestinal	8.82 (5.85)	8.21 (6.05)	1.935	.054	0.11	8.83 (5.72)	8.07 (5.88)	1.945	.053	.144
Warm/cold-urogenital	5.63 (3.90)	5.28 (3.97)	1.828	.069	0.11	5.77 (4.03)	5.23 (4.10)	2.225	.027	.166
Total score	48.06 (20.82)	43.68 (22.48)	4.095	**.000**	0.24	48.73 (20.56)	43.68 (22.07)	3.660	**.000**	.274
BAS (mean, SD)	15.09 (6.50)	12.59 (6.53)	6.747	**.000**	0.36	14.24 (6.59)	12.63 (6.60)	3.313	**.002**	.250
MADRS (mean, SD)	16.60 (8.47)	13.49 (8.78)	6.658	**.000**	0.35	15.89 (8.48)	13.84 (8.46)	3.201	**.001**	.242
SF-36 (mean, SD)										
Physical functioning	38.62 (24.48)	33.60 (24.98)	4.928	**.000**	0.24	45.05 (22.53)	38.52 (24.10)	4.153	**.000**	.285
Social functioning	54.90 (26.43)	46.06 (26.70)	6.210	**.000**	0.30	56.78 (24.90)	47.08 (27.12)	4.991	**.000**	.341
Limitations physical	79.10 (33.03)	68.25 (28.62)	5.496	**.000**	0.27	87.38 (26.18)	74.42 (35.72)	4.916	**.000**	.336
Limitations emotional	65.79 (40.63)	59.05 (42.27)	2.987	**.003**	0.15	65.26 (42.28)	56.85 (43.00)	2.692	**.008**	.184
Mental Health	49.98 (20.73)	43.70 (20.74)	6.313	**.000**	0.31	45.68 (19.98)	40.21 (20.52)	4.507	**.000**	.308
Vitality	65.72 (18.19)	58.63 (19.70)	6.826	**.000**	0.33	67.92 (17.69)	60.16 (21.04)	5.156	**.000**	.352
Pain	50.08 (26.57)	44.68 (26.26)	4.384	**.000**	0.21	54.47 (24.44)	46.16 (25.32)	4.865	**.000**	.333
General Health	55.30 (19.51)	50.99 (20.22)	4.810	**.000**	0.24	57.80 (19.10)	52.08 (19.01)	4.739	**.000**	.324

Note: som. disorder denotes somatoform disorder, B denotes the baseline, 6m denotes after 6 months. Concerns patients with both baseline and 6 months data.
P-value denotes the paired t-test, and significant p-values ($p<.01$) are printed in bold.
BSI denotes the Brief Symptom Inventory, SF-36 denotes the Short-Form Health Survey 36, PSC denotes the Physical Symptom Checklist, MADRS denotes the Montgomery-Asberg depression Rating Scale, BAS denotes the Brief Anxiety Scale.
Difference scores denote the subtractions scores of the baseline level and after 6 months.

Table 3: Six-month treatment course of Pain disorder and Body dysmorphic disorder

Patient characteristics	**Pain disorder B N=102**	**Pain disorder 6m N=102**	**t-value**	**p-value**	**Effect size (d)**	**Body dysm. disorder B N=51**	**Body dysm. disorder 6m N=51**	**t-value**	**p-value**	**Effect size (d)**
BSI (mean, SD)										
Somatization	1.16 (0.74)	1.08 (0.77)	1.081	.282	.112	0.83 (0.78)	0.64 (0.89)	1.389	.172	.205
Obsessive compulsive	1.70 (0.93)	1.63 (0.94)	.874	.384	.090	1.84 (0.84)	1.49 (1.02)	2.392	.021	.353
Interpersonal sensitivity	1.36 (1.04)	1.30 (1.01)	.825	.412	.085	2.24 (1.04)	1.78 (1.05)	2.699	.010	.398
Depression	1.42 (1.02)	1.25 (0.94)	1.688	.095	.174	2.07 (1.02)	1.54 (1.19)	3.141	**.003**	.463
Anxiety	1.30 (0.93)	1.15 (0.89)	1.726	.088	.178	1.74 (0.96)	1.27 (1.05)	2.954	**.005**	.436
Hostility	0.88 (0.80)	0.80 (0.82)	1.133	.260	.117	0.91 (0.76)	0.80 (0.80)	.786	.446	.113
Phobic anxiety	1.00 (0.99)	0.90 (0.89)	1.415	.160	.147	1.62 (0.88)	1.13 (0.92)	3.182	**.003**	.469
Paranoid ideation	1.01 (0.86)	1.00 (0.88)	.130	.897	.013	1.31 (0.86)	1.03 (0.86)	2.048	.046	.302
Psychoticism	1.16 (0.94)	0.91 (0.79)	3.206	**.002**	.331	1.55 (0.82)	1.15 (0.95)	3.558	**.001**	.525
Total score	1.24 (0.73)	1.12 (0.72)	1.800	.075	.186	1.53 (0.86)	1.18 (0.82)	3.104	**.003**	.458
PSC (mean, SD)										
Autonomic	7.94 (4.60)	7.86 (5.46)	.178	.860	.021	-	-	-	-	
General/neurological	11.89 (4.06)	10.79 (4.87)	2.024	.047	.240	-	-	-	-	
Musculoskeletal/pain	12.34 (5.12)	11.73 (6.11)	1.039	.302	.123	-	-	-	-	
Gastro-intestinal	8.52 (5.94)	8.90 (6.54)	-.657	.513	-.078	-	-	-	-	
Warm/cold/urogenital	5.74 (3.84)	5.30 (3.38)	1.184	.240	.142	-	-	-	-	
Total score	47.95 (19.99)	45.91 (23.87)	1.006	.318	.119	-	-	-	-	
BAS (mean, SD)	16.72 (5.93)	13.02 (5.34)	4.400	0	.483	13.52 (5.73)	9.15 (5.44)	3.426	**.001**	.659
MADRS (mean, SD)	19.46 (8.20)	14.45 (9.15)	4.367	0	.479	18.04 (7.63)	12.15 (8.80)	3.788	**.002**	.729
SF-36 (mean, SD)										
Physical functioning	40.68 (23.90)	35.23 (22.68)	2.818	**.006**	.300	15.58 (15.93)	11.05 (14.25)	1.704	.096	.260
Social functioning	51.70 (24.43)	46.59 (22.24)	2.055	.043	.219	63.37 (29.55)	44.48 (31.38)	4.380	**.001**	.531
Limitations physical	80.11 (20.60)	73.01 (34.79)	1.579	.118	.168	65.12 (37.85)	46.51 (43.84)	2.531	.015	.386
Limitations emotional	70.08 (36.11)	64.02 (39.54)	1.330	.187	~~1~~.11~~2~~	75.19 (34.96)	65.12 (44.22)	1.253	.217	.191
Mental Health	53.73 (17.52)	47.23 (17.49)	3.103	**.003**	.331	64.00 (19.85)	47.81 (24.31)	4.116	**.000**	.628
Vitality	66.36 (16.45)	60.06 (17.18)	3.201	**.002**	.341	65.93 (18.56)	53.49 (20.34)	3.621	**.001**	.552
Pain	57.83 (22.36)	55.56 (21.51)	.851	.397	.091	17.31 (19.14)	18.35 (21.81)	-.342	.734	-.052
General Health	55.57 (17.36)	51.31 (20.14)	2.119	.037	.226	42.91 (20.82)	37.91 (22.50)	2.035	.048	.310

Note: B denotes the baseline, 6m denotes after 6 months. Concerns patients with both baseline and 6 months data.
P-value denotes the paired t-test, and significant p-values ($p<.01$) are printed in bold.
BSI denotes the Brief Symptom Inventory, SF-36 denotes the Short-Form Health Survey 36, PSC denotes the Physical Symptom Checklist, MADRS denotes the Montgomery-Asberg depression Rating Scale, BAS denotes the Brief Anxiety Scale.
Difference scores (Diff. scores) denote the subtractions scores of the baseline level and after 6 months.
Body dysm. disorder denotes Body Dysmorphic disorder.

Table 4: Six-month treatment course of Hypochondriasis

Patient characteristics	Hypochondriasis B N=40	Hypochondriasis 6m N=40	t-value	p-value	Effect size (d)
BSI (mean, SD)					
Somatization	1.08 (0.87)	1.00 (0.87)	.760	.425	.122
Obsessive compulsive	1.28 (1.04)	1.28 (1.04)	1.449	.156	.232
Interpersonal sensitivity	1.30 (1.14)	1.30 (1.14)	-.366	.717	-.059
Depression	1.23 (1.12)	1.23 (1.12)	.619	.539	.099
Anxiety	1.50 (1.09)	1.50 (1.09)	.369	.714	.059
Hostility	0.69 (0.89)	0.69 (0.89)	1.102	.277	.176
Phobic anxiety	1.06 (1.16)	1.06 (1.16)	.130	.897	.021
Paranoid ideation	0.95 (0.98)	0.95 (0.98)	.782	.439	.125
Psychoticism	1.02 (0.89)	1.02 (0.89)	.872	.388	.140
Total score	1.13 (0.88)	1.13 (0.88)	.747	.460	.120
PSC (mean, SD)					
Autonomic	8.78 (5.79)	7.19 (5.17)	.1662	.109	.320
General/neurological	10.26 (5.45)	8.00 (4.55)	3.351	**.002**	.645
Musculoskeletal/pain	9.33 (5.58)	8.30 (4.83)	1.012	.321	.195
Gastro-intestinal	8.37 (5.52)	5.93 (4.57)	2.539	.017	.489
Warm/cold/urogenital	5.11 (3.38)	5.04 (3.42)	.132	.896	.025
Total score	43.59 (22.56)	33.93 (19.53)	2.313	.029	.445
BAS (mean, SD)	14.79 (6.51)	13.74 (7.16)	.628	.369	.108
MADRS (mean, SD)	12.09 (7.34)	11.15 (9.51)	.911	.534	.156
SF-36 (mean, SD)					
Physical functioning	24.74 (25.31)	25.13 (27.23)	-.155	.878	-.025
Social functioning	42.95 (30.05)	40.06 (31.44)	.552	.584	.088
Limitations physical	49.34 (43.30)	40.79 (42.88)	1.447	.156	.235
Limitations emotional	48.72 (31.78)	49.57 (43.84)	-.108	.914	-.017
Mental Health	47.69 (22.95)	46.67 (21.57)	.283	.778	.045
Vitality	55.00 (20.10)	50.51 (17.76)	1.440	.158	.231
Pain	39.03 (25.35)	34.47 (25.22)	1.422	.163	.228
General Health	52.18 (21.54)	52.18 (20.06)	.000	1.00	.000

Note: B denotes the baseline, 6m denotes after 6 months. Concerns patients with both baseline and 6 months data.
P-value denotes the paired t-test, and significant p-values ($p<.01$) are printed in bold.
BSI denotes the Brief Symptom Inventory, SF-36 denotes the Short-Form Health Survey 36, PSC denotes the Physical Symptom Checklist, MADRS denotes the Montgomery-Asberg depression Rating Scale, BAS denotes the Brief Anxiety Scale.
Difference scores (Diff. scores) denote the subtractions scores of the baseline level and after 6 months.

Table 5: Hierarchical multiple regression analysis of the BSI total difference score (course predictors for symptoms; N=435)

	B	SE	B	R^2
Step 1				
Constant	-.221	.176		
Control Variables				
BSI total	-.348***	.042	-.436	
Age	.000	.003	.009	
dFemale	.008	.065	.007	
dWidow	.219	.210	.133	
dUnmarried	.093	.212	.072	
dWithout partner	-.001	.227	.000	
dParttime	.012	.084	.008	
dFulltime	-.100	.085	-.062	
Explained variance by control variables (R^2)				.198
Step 2				
Constant	-.162	.248		
Control Variables				
BSI total	-.654***	.060	-.818	
Age	-.003	.003	-.062	
dFemale	-.037	.063	-.031	
dWidow	.234	.201	.142	
dUnmarried	.106	.204	-.053	
dWithout partner	-.055	.216	-.026	
dParttime	.038	.081	.024	
dFulltime	-.091	.082	-.057	
Predictors				
dLower education	-.070	.107	-.060	
dMiddle education	-.127	.108	-.108	
dHigher education	-.179	.119	-.120	
dAnxiety	-.017	.100	-.011	
dMood	-.102	.087	-.077	
dAnxiety + Mood	.108	.111	.073	
Total diagnoses	.033	.033	.072	
PSC total	.008***	.002	.278	
BAS	-.005	.007	-.062	
SF-36 physical	.002	.002	.064	
SF-36 social	.000	.001	-.009	

SF-36 General Health	.000	.002	.016	
MADRS	.006	.006	.093	
Undiff. somaform disorder	.086	.113	.074	
Pain disorder	.166	.121	.122	
Body dysm. disorder	1.100*	.508	.107	
Hypochondrias	.453***	.135	.237	
Explained variance by predictors (ΔR^2)				.160

Note: the constant is the difference score of BSI total (subtraction of BSI total on baseline and BSI total after 6 months).
B denotes regression coefficient, SE denotes the standard deviation.
R^2 denotes the proportion of variance.
d (for example dFemale) denotes dummy. These variables are accounted for as dummy variables.
dAnxiety denotes comorbid anxiety disorder, dMood denotes comorbid mood disorder, dAnxiety+Mood denotes comorbid anxiety and mood disorder.
Total diagnoses denotes the total comorbid disorders present besides the somatoform disorder.
*p≤.05, **p≤.01, ***p≤.001

Table 6: Hierarchical multiple regression analysis of SF-36 Physical functioning difference score (course predictors for functioning; N=435)

	B	**SE**	**B**	**R^2**
Step 1				
Constant	-1.425	1.184		
Control Variables				
SF-36 physical	-.032***	.009	-.202	
Age	.046*	.022	.141	
dFemale	.014	.474	.002	
dWidow	1.719	1.500	.158	
dUnmarried	1.057	1.058	.124	
dWithout partner	-1.535	1.614	-.109	
dParttime	-1.189	.610	-.116	
dFulltime	-1.144	.617	-.107	
Explained variance by control variables (R^2)				.076
Step 2				
Constant	1.380	1.828		
Control Variables				
SF-36 physical	-.041***	.011	-.257	
Age	.026	.024	.081	
dFemale	-.313	.482	-.039	
dWidow	1.692	1.519	.156	
dUnmarried	.807	1.552	.095	
dWithout partner	-1.306	1.633	-.093	
dParttime	-1.088	.614	-.106	
dFulltime	-1.117	.623	-.105	
Predictors				
dLower education	-.415	.825	-.053	
dMiddle education	-1.259	.832	-.161	
dHigher education	-1.612	.897	-.165	
dAnxiety	-.249	.731	-.025	
dMood	-1.099	.651	-.126	
dAnxiety + Mood	-.312	.822	-.032	
Total diagnoses	-.078	.246	-.025	
PSC total	.049***	.013	.263	
BAS	-.076	.050	-.129	
MADRS	.035	.042	.079	
BSI total	-.745	.421	-.137	

Undiff. somatoform disorder	-1.371	.853	-.178	
Pain disorder	-.449	.921	-.049	
Body dysm. disorder	1.162	3.810	.017	
Hypochondriasis	.186	1.023	.015	
Explained variance by predictors (ΔR^2)				.078

Note: the constant is the difference score of SF-36 Physical functioning (subtraction of SF-36 Physical on baseline and SF-36 Physical after 6 months).
B denotes regression coefficient, SE denotes the standard deviation.
R^2 denotes the proportion of variance.
d (for example dFemale) denotes dummy. These variables are accounted for as dummy variables.
dAnxiety denotes comorbid anxiety disorder, dMood denotes comorbid mood disorder, dAnxiety+Mood denotes comorbid anxiety and mood disorder.
Total diagnoses denotes the total comorbid disorders present besides the somatoform disorder.
*p≤.05, **p≤.01, ***p≤.001