Universiteit Utrecht

Medical costs of somatoform inpatients

The relationship between symptomatic distress, presence of personality disorders, traumatic life experiences, and medical costs in a psychosomatic population at Eikenboom, centre for psychosomatic medicine.

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Preface & Acknowledgements

The present study is part of my graduation programme of the Master of Clinical and Health Psychology at the Utrecht University. By conducting my study at Eikenboom, centre for psychosomatic medicine, I was given the opportunity to examine the relation between symptomatic distress, personality disorders, trauma, and medical costs in a somatoform disorder population. By doing this research, I had the possibility to contribute to empirical studies which can have implications for treatment, particularly for Eikenboom, but also for general health care. The purpose of this study was to get acquainted with a population bearing diagnosis of somatoform disorder. Also, I wanted to expand my interest and knowledge within the field of somatoform disorders, and the influence of other psychopathologies in a clinical setting. During the period of my research, I have also been given the opportunity to experience clinical practice through implementing the Adult Attachment Interview and getting familiar with the Thematic Apperception Test.

My extensive gratitude goes to all who have helped and supported me during the past five months. Especially, I would like to thank my supervisor Prof. Dr. M.J.M. van Son from the Utrecht University for his constructive guiding and advice, and great support, and J.A. Koelen, MSc, from Eikenboom for his valuable ideas concerning the somatoform population. I would also sincerely like to thank all of those who work at Eikenboom, in particular F.A.F. Cornelissen, MSc, L. Prins, MSc, W. Reedijk, MSc, L. Veselka, MSc (clinical psychologist and psychotherapist), E.M. van der Werf, MSc, and D.B.S. van Westing, BSc, who have shown their support and shared their knowledge within the field of psychosomatic medicine.

Last, but certainly not least, I would like to take the opportunity to thank my friends and family for their love and support during this period. In particular, I would like to express my appreciation to Marlous van der Stadt, a fellow student and friend who conducted her research at Eikenboom during the same period and who has been a great support, through the good and the sometimes difficult times. There were several major challenges which we had to face during the process of conducting our studies, but these challenges have been overcome and I am very proud of the result I am hereby able to present[1].

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Abstract

Context: Somatoform disorders are an important determinant of medical care utilization, but their independent effect on utilization is difficult to determine because somatizing patients frequently have psychiatric and medical comorbidity.

Objective: The assessment of the extent of symptomatic distress; the overlap of somatoform disorder with personality disorders; the overlap of somatoform disorder with traumatic experiences; and the relation between symptomatic distress, personality disorders, trauma, and medical costs in a population with somatoform disorders.

Method: Patients (74 females, 25 males) of a tertiary referral clinic for psychosomatic medicine were surveyed with an interview and self-report questionnaires assessing symptomatic distress (SCL-90), personality disorder (SCID-II), trauma (VBE), and medical costs of the last four weeks before entering the clinic (TiC-P). A hypothesis testing research design was applied.

Results: Significant positive correlations were found between symptomatic distress and medical costs, and between physical trauma and medical costs. Non-significant positive relations were found between emotional trauma and medical costs, and sexual trauma and medical costs. Personality disorders were found not be positively correlated with medical costs.

Discussion/Conclusion: Regarding the results of the present study, one may conclude that evidence was found for the relationship between symptomatic distress, trauma, and medical costs in a psychosomatic population, supporting previous research. Overall, one may conclude that further research, taking the limitations of the present study into account, is necessary, as nearly all of the somatoform disorder patients in this study report -frequent- use of health care recourses with costs leading up to 3500 Euro's a month. Further research might enhance the understanding of somatoform disorders, causal factors, and medical costs, which then might have implications for treatment of somatoform disorders.

Keywords: somatoform disorder, psychosomatic, somatization, symptomatic distress, personality disorder, self-reported emotional-, physical-, and emotional trauma, medical costs, correlation, association.

1. Introduction

The term psychosomatic derives from the Greek *soma* for body; the somatoform disorders are a broad group of illnesses that have bodily signs and symptoms as a major component. Somatoform disorders encompass mind-body interactions in which the brain, in ways still not well understood, sends various signals that impinge on the patients' awareness, indicating a serious problem in the body. The central assumption that the mind is separated from the body, that there are some illnesses that are physical and others that are mental, requires re-examination. By maintaining the position that mind and body are separate and, furthermore, assuming that the significance of the mind in health and illness is limited to mental illness in a strict sense, it may have lead to a health care system that is insufficiently able to deal with the varied roles that the mind plays in so-called physical, including psychosomatic disorders, illness, leading to excessive use of the primary health care services and high medical costs.

1.1. Somatoform disorders, definition and epidemiology

The occurrence of physical symptoms suggesting physical disorder for which there are no demonstrable organic findings or known physiological mechanisms, and for which there is positive evidence that the symptoms are linked to psychological factors, has always been common in medical, as well as in psychiatric practice (Faravelli, Salvatori, Galassi, Aiazzi, Drei, & Carbas, 1997; Gill & Sharpe, 1999).

Over half of all primary and secondary health care visits are accounted for by somatic symptoms (Afari & Buchwald, 2003; Hiller & Fichter, 2004; Kroenke, 2003; Kroenke, 2007; Waldinger, Schulz, Barsky, & Ahern, 2006). Somatic symptoms are medically unexplained 30% to 60% of the time and if so, they are chronic or recurrent in 25% of the patients (Afari & Buchwald, 2003; Hiller & Fichter, 2004; Kroenke, 2003; Kroenke, 2007; Waldinger et al., 2006). Medically unexplained symptoms are common, frequently persistent, and are often associated with significant distress and disability sufficiently to be legitimately regarded as illness (Guo, Kuroki, & Koizumi, 2001; Mayou, Kirmayer, Simon, Kroenke, & Sharpe, 2005; Wessely, Nimnuan, & Sharpe, 1999). These medically unexplained symptoms are a major challenge to medicine due to their persistent form and the difficulty to prevent and manage them (Lipowski, 1988; Mayou et al., 2005). Because patients suffering from psychosomatic symptoms or disorders are likely to overuse the medical system, they have been identified as a crucial group in terms of health care use and medical costs (Hiller & Fichter, 2004). According to current diagnostic systems, such patients may be diagnosed as suffering from

somatoform disorders whenever their physical symptoms cause personal distress or lead to clinically relevant psychosocial impairments (American Psychiatric Association, 2000).

Between 22% and 58% of the patients in primary care fulfill the diagnostic criteria for a somatoform disorder (Barsky, Orav, & Bates, 2005; Fink, Sørensen, Engberg, Holm, & Munk-Jørgensen, 1999; Sharpe & Mayou, 2004; de Waal, Arnold, Eekhof, & van Hemert, 2004). A somatoform disorder is characterized by somatic symptoms that are unexplained by a general medical condition. To receive a diagnosis of somatoform disorder, it is required that the patient has undergone extensive medical investigation that excludes organic etiological factors that are capable of explaining the symptoms (Faravelli et al., 1997).

The diagnoses within the DSM category of somatoform disorders are somatization disorder, undifferentiated somatoform disorder, conversion disorder, pain disorder, hypochondriasis, body dysmorphic disorder, and somatoform disorder not otherwise specified (DSM-IV-TR: APA, 2000). The least severe of the somatoform disorders is the somatoform disorder NOS and the most severe is the somatization disorder (Fink et al., 1999). Somatization disorder is specifically characterized, according to DSM-IV-TR, by a combination of pain, gastrointestinal, sexual, and pseudoneurological symptoms (Kaplan & Sadock, 2003).

1.1.1. Somatoform disorders and somatization

As described before, somatoform disorders are characterized by clinically significant physical symptoms suggestive of, but not fully explained by a general medical condition (Chaturvedi, Desai, & Shaligram, 2006). Somatization refers to the presentation of a number of unexplained physical symptoms in several bodily systems. Somatization disorders represent the extreme end of a continuum of somatoform severity. Patients with somatization disorder report high levels of distress, of functional disability, and of health resource utilization. Many seem virtually resistant to psychological treatment, and the prognosis of the condition seems poor in many cases (Brown, Schrag, & Trimble, 2005). Barsky et al. (2005) reported that severely somatizing patients have comparable or greater impairment of physical function, worse mental health, and, importantly, poorer *perceived* general health than patients with many chronic medical illnesses. The way these patients perceive their own body and symptoms and the way these are evaluated seem important factors in the maintenance of the disorder (Spaans, Koelen & Bühring, 2009).

1.1.2. Etiopathogenesis

The course of somatoform disorders has been found to be mostly chronic, with an average duration of 19 years (Kaplan & Sadock, 2003). Most patients experience their first somatoform symptoms before the age of 15 (Essau, 2007). Symptoms that remain medically unexplained after initial evaluation are, apart from motivating a patient toward seeking treatment, carrying a higher risk of psychiatric comorbidity and the number of somatic symptoms is a powerful marker of psychological comorbidity (Kroenke, 2003). Apart from the diagnosis of somatoform disorders, many somatoform patients fulfill the criteria for the diagnosis of a personality disorder, which may also be a significant contributing factor to the maintenance of the somatoform disorder and the use of health care services (Kroenke, 2003).

Several predisposing, precipitating and perpetuating factors are understood to be involved in the etiopathogenesis of somatoform disorders. These factors are biological, social, and psychological and seem to take part in the development of somatoform disorder. The predisposing factors are related to childhood experiences of organically unexplained symptoms, parental ill health, and parental illness behaviour for bodily symptoms within the child. Personality factors, such as high action proneness and perfectionism (Luyten, Van Houdenhove, Cosyns, & Van den Broeck, 2006; Van Houdenhove, Bruyninckx, & Luyten, 2006), and traumatic life experiences are also related to predisposition, and influence the severity of the somatoform disorder.

The precipitating factors include organic illness, accidents, stressful life events, and psychosocial influences. The perpetuating factors are mainly related to behavioral and social influences on socio-cultural and psychosocial level (Henningsen, Zipfel, & Herzog, 2007). Thus, somatoform disorders may etiopathogenetically be best considered in a multifactorial model, considering the diversity of influencing factors, and this multifactorial model should be considered in treatment.

1.2. Symptomatic distress, personality disorders, trauma, and medical costs: an outline of characteristics and their interrelation with somatoform disorders

1.2.1. Somatoform disorders and symptomatic distress

Many patients who have somatoform disorders are apt to be seen in a general medical setting, using disproportionately large amounts of medical (but not mental) health services, and have elevated levels of role impairment (Barsky et al., 2005; Brown, Golding, Smith, 1990).

Previous research has shown an association between the severity of somatoform disorder and the severity of psychological distress/symptoms, i.e. the more severely ill a patient is, the more prone he or she is to experience psychological symptoms (Fink et al., 1999). Further, patient ratings of physical disability and health showed a strong association to use of primary care services (Hansen, Fink, Frydenberg, & Oxhøj, 2002). Physical rather than emotional symptoms are the predominant complaints in patients who seek care in the general medical setting (Kroenke et al., 1994). The specialties in medical care in which the most frequently reported unexplained symptoms have been found are: gastroenterology (irritable bowel syndrome, non-ulcer dyspepsia), gynaecology (premenstrual syndrome, chronic pelvic pain), rheumatology (fibromyalgia), cardiology (atypical or non-cardiac chest pain), respiratory medicine (hyperventilation syndrome), infectious diseases (chronic (postviral) fatigue syndrome), neurology (tension headache), dentistry (temporomandibular joint dysfunction, atypical facial pain), ear, nose, and throat (globus syndrome), and allergy (multiple chemical sensitivity) (Faravelli et al., 1997; Kroenke & Spitzer, 1998; Kroenke et al., 1994; Wessely et al., 1999).

Somatizers report more disability than nonsomatizers. This is particularly pronounced in the case of respondents with psychiatric diagnosis, and those older than 40 (Escobar, Golding, Hough, Karno, Burnam, & Wells, 1987).

Katon et al.'s (1990) work has shown an association between somatization and frequent consulting. Among 119 distressed high utilizers, grouped according to their number of medically unexplained physical symptoms, those with more somatic symptoms had significantly more current and past disability, psychiatric morbidity, and health care use. Their physicians also assessed them as having worse mental health, more tendencies to amplify somatic symptoms and to be more frustrating to treat (Katon, von Korff, Lin, Lipscomb, Russo, Wagner, & Polk, 1990). Karlsson et al. (1997) also found higher levels of distress among the somatizing subgroup of frequent consulters (Karlsson, Joukamaa, Lahti, Lehtinen, & Kokki-Saarinen, 1997). Patients rating themselves as severely physically disabled had 3.7 times increased odds for being high-users of inpatient admissions to nonpsychiatric departments, and 6.6 times increased odds for high use of insurance-paid health services (Hansen et al., 2002). Patients rating their current health as fair, poor, or very poor had a more than two times increase in odds for high use of insurance-paid health services, compared with patients rating their health as good or very good (Hansen et al., 2002).

Apart from the severity or duration of symptoms, specific concerns and expectations as well as psychological factors are important reasons why patients seek health care for their

somatic symptoms (Kroenke, 2003). On the other hand, high utilization of health care services may also be a predictor of psychological distress (Kroenke, 2003).

1.2.2. Somatoform disorders and personality disorders

Personality disorders are one of the most occurring psychiatric disorders (Soeteman, Verheul, & van Busschbach, 2008). According to the DSM-IV-TR (APA, 2000), the definition of a personality disorder is an enduring pattern of inner experience and behavior that deviates markedly from the expectations of the participant's culture. This pattern is manifested in two or more of the following areas: cognition, affectivity, interpersonal functioning, and impulse control, and is pervasive and stable over time. Apart from patient bounded burden of disease, the presence of personality disorders also has an economic burden on society, through criminality, productivity losses, and excessive health care utilization (Soeteman et al., 2008). The economic burden of personality disorders seems considerably higher than the burden of patients seeking mental health treatment for other mental disorders (Soeteman et al., 2008). Bender et al. (2001) reported that patients with certain types of personality disorders received treatments more often than those with other psychiatric disorders. Soeteman et al. (2008) found that, compared to patients without personality disorder, mean total costs were consistently higher for borderline, histrionic, obsessive-compulsive, and self-defeating personality disorder, and personality disorder mixed. Bender et al. (2001) also found that borderline and schizotypal personality disorder are associated with extensive use of mental health resources. The studies show that it is plausible that comorbidity with personality disorders may augment the chance that costs are higher than without personality disorders.

Researchers report that personality disorders are more common in somatoform disorder patients than in general medical patients (Leibbrand, Hiller, & Fichter, 1999; Noyes, Langbehn, Happel, Stout, Muller, & Longley, 2001; Rost, Akins, Brown, & Smith, 1992), although it has received little study. Half of the patients (Fishbain, Goldberg, Meagher, Steele, & Rosomoff, 1986) to two third of the patients with somatoform disorders meet criteria for an axis II personality disorder (Bass & Murphy, 1995). Certain personality disorders and somatoform disorders have been proven to be major characteristics of the difficult doctor-patient relationship. Hahn, Thompson, Wills, Stern, & Budner (1993) have postulated that difficult patients are characterized by two factors: medical uncertainty characterized by vague, complex, and ambiguous medical problems, and interpersonal difficulty associated with the patient's abrasive behavioral style. The difficult doctor-patient relationship has a vast impact on the outcome of care, patient satisfaction, provider morale and utilization (Hahn et al.,

1993). Difficult and frustrating patients have characteristics suggestive of very similar personality characteristics, including vague complaints, excessive demands, chronic complaining, lack of cooperation, lack of treatment response, and high utilization of services. Personality disorders were found overrepresented in such patients (Noyes et al., 2001). Bass & Murphy (1995) suggested that the reason for this comorbidity is that the attitudes, feelings and behaviour that constitute the somatoform disorders are manifestations of disorder or dysfunction in important domains of personality.

The most frequently reported personality disorders found in patients with somatoform disorders are antisocial, avoidant (Brown et al., 1990; Lilienfeld, van Valkenburg, Larntz, et al., 1986; Liskow, Othmer, Penick, et al., 1986; Liskow, Penick, Powell, et al., 1986; Rost et al., 1992) dependent (Rost et al., 1992), passive aggressive (Fishbain et al., 1986), histrionic (Fishbain et al., 1986), obsessive-compulsive (Fishbain et al., 1986; Noyes et al., 2001), borderline, paranoid, and self-defeating (Rost et al., 1992). Thus, particularly DSM-IV-TR (2000) cluster C seems overrepresented, but cluster B personality disorders are also quite common.

Theoretically, three models could explain the overlap between somatoform disorders and personality disorders: (1) primary somatization model (2) primary personality disorder model and (3) common etiology model (shared or partially shared etiology).

With regard to model 2, a possible interpretation is that personality disorders represent a predisposition to somatization and to somatoform disorders. Another possibility is that the personality disorders contribute to heightened bodily perception, increased self-absorption, the presentation of unexplained somatic symptoms and treatment-seeking behavior (Noyes et al., 2001).

The high prevalence of paranoid personality disorders in this group reflects the discomfort that many somatoform disorder patients have with their own feelings. Since paranoid personalities classically deal with this discomfort by attributing their fears to external causes, they may also see their own body as against them. It is plausible that this subgroup of patients has a greater frequency of doctor shopping, as they are more likely to see the doctor as an enemy instead of an ally (Rost et al., 1992).

The high prevalence of self-defeating personality disorder in somatoform disorder patients reflects a distorted self-image which prevents them from believing that they deserve anything good, including the possibility that they may be healthy rather than defective (Noyes et al., 2001; Rost et al., 1992).

The high prevalence of obsessive-compulsive disorder also sheds light on somatoform disorder patients' excessive symptoms in the absence of signs of disease. These patients may believe that it is only their hypervigilance that prevents them from becoming sick; thus, they amplify normal physiological variation into discomfort or illness (Rost et al., 1992). Patients with this disorder are concerned about maintaining control over their physical and mental functioning, and consequently, are threatened by unexplained symptoms. Also, such patients commonly engage in power struggles with physicians, and out of perceived inferiority, challenge their diagnosis and treatments (Noyes et al., 2001).

It is likely that personality disorders in general contribute to somatoform disorder patients' notorious reluctance to discuss psychological issues in their treatment, as clinicians have noted that many of these disorders are often associated with a lack of psychological mindedness (Rost et al., 1992). These patients often get stuck in what is referred to in the literature as the 'psychic equivalence mode', where an individual, in a serious frame of mind, expects the internal world in him- of herself and others to correspond to external reality, and subjective experience will often be distorted to match information coming from outside (Fonagy & Target, 1997). This is caused by a misrepresentation of the body which is believed to be leading to a deficit in mentalization; the ability to understand or deal with mental contents such as feelings, needs, fantasies, etc., in an integrated manner (Bühring & Spaans, 2006a).

To understand the relationship of personality disorders in somatoform disorder patients to frequency of help seeking and health care expenditures, research is needed. If particular personality disorders can be linked to poorer outcomes and excessive utilization, clinical interventions targeted to this special group of somatoform disorder patients can be designed and tested for their cost effectiveness (Rost et al., 1992).

As several studies have shown that that the prevalence of personality disorders in patients with somatoform disorders is high, and that both patients with somatoform disorders, as well as patients with personality disorders show excessive health care utilization and high medical costs (Noyes et al., 2001; Soetman et al., 2008), further investigation into this concept is desired.

1.2.3. Somatoform disorders and traumatic life experiences

Several studies found a positive relationship between various types of trauma and both psychological distress and mental disorders in general population samples, community samples, and clinical samples (Bailer, Witthöft, Bayerl, & Rist, 2007). Traumatic experiences

are aversive sensorimotor and highly affectively charged experiences (Näring & Nijenhuis, 2005), which are known to be associated with bodily symptoms (Sack, Lahmann, Jaeger, & Henningsen, 2007; Van der Hart, Nijenhuis, & Steele, 2006).

High rates of lifetime traumas have been found in the clinical groups of psychosomatic patients (Bailer et al., 2007). Many people with somatoform disorders are reportedly exposed to an early environment that is emotionally cold, harsh, and characterized by frequent criticism, insults, rejection, and physical punishment (Brown et al., 2005).

Numerous studies suggest that exposure to early adverse life experiences contribute to the development of somatoform illness in adulthood. In particular, histories of interpersonal childhood trauma (sexual abuse, physical abuse, emotional abuse, and neglect) have been linked with adults' reports of elevated levels of a wide range of symptoms for which there is no medical explanation (Brown et al., 2005; Sack et al., 2007; Waldinger, Schulz, Barsky, & Ahern, 2006), including chronic pain, headache, gynaecological complaints, gastrointestinal symptoms, musculoskeletal symptoms, and pseudoneurological symptoms (amnesia, paralysis, fainting, double vision) (Sack et al., 2007; Waldinger et al., 2006).

Somatoform disorder patients reported significantly greater childhood emotional abuse and more severe forms of physical abuse, relative to comparison subjects (Brown et al., 2005). Findings suggest that chronic emotional abuse might be the most important setting condition for the development of a somatoform disorder; although sexual abuse has also been particularly linked to a variety of somatic symptoms and functional somatic syndromes (Bailer et al., 2007). High sexual abuse rates have been found among patients with pseudoseizures, and somatization disorder, and in conversion disorder patients in general (Şar, Akyüz, Kundakçı, Kızıltan, Doğan, 2004).

Traumatized patients in general report a significantly higher number of somatoform symptoms and higher overall somatoform symptom severity as well as higher levels of psychological symptoms in general when compared with nontraumatized patients. These differences were even more marked for patients who reported having experienced sexual traumatizations as a child or in adulthood (Sack et al., 2007). Thus, a strong, graded relationship has been found between an increasing number of adverse (childhood) experiences and high levels of somatoform symptoms. Survivors of child abuse and emotional neglect are thought to be predisposed to concerns about bodily functioning and integrity later in life, due to intrusive or boundary violating behavior on the part of the caregiver or because basic physical or emotional needs were left unattended by caregivers (Waldinger et al., 2006).

Apart from abuse and neglect, serious illness or injury in childhood and exposure to illness of friends or family members is associated with hypochondriasis or somatization in adults. These life events may foster the development of dysfunctional beliefs, direct attention towards bodily symptoms of potential illnesses, and lead to enhanced symptom reports (Bailer et al., 2007).

With a high prevalence of lifetime traumatizations in populations with somatoform disorders on the one hand, high rates of somatoform symptoms in traumatized subjects have also been found. Hypothesised psychological or biological mechanisms for the link between trauma and somatoform symptoms involve altered perception of somatic sensory stimuli, vegetative dysregulation, and conversion or dissociation (Sack et al., 2007).

1.2.4. Somatoform disorders and medical costs

Epidemiologic research in community and clinical settings from Schmitz & Kruse (2002) and Soeteman, Hakkaart-van Roijen, Verheul, & Busschbach (2008), among others, reveal a strong association between mental disorders and increased utilization of health care services. Clinical studies from medical and surgical departments and from family practices have shown that patients with somatoform disorders in particular tend to use excessively more health care services than patients without these disorders (Barsky et al., 2005; Escobar et al., 1987; Fink et al., 1999; Gill & Sharpe, 1999; Hansen et al., 2002; Katon et al., 1990; Kroenke 2007; Smith, Monson, & Ray, 1986), costing the health care system and thus the whole society high amounts of money.

Several studies have reported that patients with somatoform disorders are frequently treated by general practitioners and internists but rarely by psychiatrists or psychotherapists (Barsky et al., 2005; Hansen et al., 2002; Hiller, Fichter, & Rief, 2003; Schmitz & Kruse, 2002; Sharpe, Bass, & Mayou, 1995; Rost, Kashner, & Smith, 1994). Therefore, the costs of this group tend to be high for somatic treatments but low in the field of mental healthcare (Hiller et al., 2003). This also implies that, due to the complex nature of somatoform disorders, these patients are often referred while unsuccessfully treated and that the costs thus continue to increase for these patients in the medical field. On account of these unsuccessfully (and seemingly redundant) treatments, patients suffer iatrogenic damage. For example, in a study by Hansen et al. (2002), somatoform disorder patients had more than six times increased odds for being high-users in terms of inpatient admissions, 4 ½ times increased odds for being high-users of insurance-paid services, and two to three times as many hospitalizations, major outpatient procedures, and emergency department visits per year as

those without somatoform disorders. They also averaged 1.5 times as many primary care visits and 1.7 times as many specialist visits as nonsomatizing patients (Barsky et al., 2005). A study conducted by Barksy et al. (2008) showed that mental health care was the only form of utilization that was not significantly elevated in the somatoform patients. Escobar et al. (1987) found that this finding accounts for both male and female somatizing patients, in which women with somatoform disorders report substantially higher utilization rates than their nonsomatizing counterparts. These findings shed light on why somatoform disorder patients cause ever increasing high medical costs. From these findings it follows that they cannot be treated solely by medical practitioners and that it is crucial that specialized treatments such as psychotherapy continue to be developed to stop these patients from circulating in general medicine practice.

The expenditures for patients with a somatoform disorder are estimated to be 20% of total medical expenditures, and 10% of all medical care is provided to patients with no serious organic disease (Barsky et al., 2005). Expenses exceed both public and private healthcare budgets (Hiller et al., 2003). There are several ways to explain the high burden of disease in terms of societal costs.

One possible explanation is sick role. Despite negative tests and therefore a lack of assessed organic pathology, patients with somatoform disorders tend to perceive their bodily sensations as signs of serious disease. Many of these patients continue to believe that their symptoms are caused by organic dysfunction or disease (Hiller & Fichter, 2004; Hiller, Rief, & Fichter, 1997). They therefore tend to visit additional physicians and specialists, demand further medical investigations and costly diagnostic tests, may insist on inpatient care, and undergo surgeries and treatments that are often not clearly medically indicated and which therefore lead to little or no improvement (Hiller et al., 2003; Hiller & Fichter, 2004; Sharpe et al., 1995). This pattern of behavior has been termed “inadequate illness behavior” when patients adopt a sick role despite the absence of medical disease (Hiller & Fichter, 2004). As a consequence, patients with high levels of medically unexplained symptoms, termed somatizing patients, have repeatedly been shown to have illness behavior with checking behavior, inadequate use of medication, development of psychosocial impairments (Hiller et al., 2003), and disproportionately elevated rates of medical health care utilization, including consultations, outpatient visits, hospitalizations, and total health care costs. Their utilization is particularly maladaptive and suboptimal because these patients tend to consult multiple physicians for the same problem (doctor shopping), use emergency services, and in addition tend not to keep scheduled appointments (Barsky et al., 2005).

Second, research suggests that, in addition to health and social services costs, a strong relationship exists between reduced productivity and mental disorders (Soeteman et al., 2008). A state-of-the-art economic assessment of medical costs should therefore always include two different types of costs: direct costs and indirect costs. Direct medical costs are the costs related to actual expenditures for the detection and treatment of the medical problems, offered by a broad range of both formal and informal health service providers. Indirect non-medical costs are associated with loss of productivity related to health problems. Three situations can be encountered here. First, people can be absent from paid work. Second, production losses also occur when people are ill but continue to work with reduced efficacy. And third, people may also be too ill to perform domestic tasks (Smit, Willemse, Koopmanschap, Onrust, Cuipers, & Beekman, 2006).

Moreover, according to "the offset hypothesis", it is assumed that broader interventions that take psychosocial factors into account reduce unnecessary utility and costs in other areas of medical care (Levant, House, May, & Smith, 2006; Mumford, Schlesinger, Glass, Patrick, & Cuerdon, 1984; Sturm, 2001). Specific interventions that target selected patients can reduce their medical costs and their use of primary health care (Sturm, 2001). Psychiatric consultation interventions among patients with somatoform disorder found substantial health improvements and reductions in the use of the general health care system and medical costs (Smith, Monson, & Ray, 1986; Strain et al., 1991; Sturm & Wells, 1995). Apart from the somatoform patients receiving better care for fewer expenses, this can lead to better accessibility and care for patients with medically explainable symptoms, whom then can benefit from better general health care. To be able to provide such care, research regarding treatments for somatoform disorders is necessary, which acquires money. To be able to improve both the general as well as the mental health care, it is important to be able to estimate the (direct and indirect) costs of patients with severe somatoform disorders.

1.3. The aim of the present study

As previously described, somatoform disorders, self-reported symptomatic distress, personality disorders and traumatic life experiences are all commonly associated with high levels of medical costs. However, the relation of these variables to medical costs in a population with somatoform disorders has not been studied before. The present cost-of-illness study firstly aims to determine the direct (use of medical resources) and indirect (productivity losses due to absence from work and reduced efficiency at work) costs of treatment-seeking patients with unexplained somatic complaints, in particular with a diagnosis of somatoform

disorder, leading to the question: “What are the costs associated with somatoform disorder?” In addition, this study aims to identify factors that may be associated with direct and indirect costs in somatoform disorders, in particular the level of self-reported symptomatic distress, the presence of personality disorders and having experienced (early) traumatic life events. This leads to the following question in this research: “What is the relationship between symptomatic distress, presence of personality disorders and traumatic life experiences in patients with somatoform disorders on the one hand, and medical costs on the other hand?”

Based upon previously described considerations, it is hypothesised that somatoform disorder is associated with high levels of costs, and that symptomatic distress, personality disorders and trauma are significantly positively related to medical costs in somatoform inpatients.

2. Method

2.1. Participants

The present study was conducted at Eikenboom, a specialized treatment- and rehabilitation centre for psychosomatic medicine in Zeist, the Netherlands. Eikenboom is a department of Altrecht, an institute for mental health care. Eikenboom is a tertiary referral clinic for patients with a combination of physical, psychological en social problems. Individuals are referred to Eikenboom from all throughout the Netherlands, by specialists, general practitioners, revalidation centres, hospitals, and other specialized centres with patients who experience complex psychosomatic problems and are frequently in need of immediate treatment (Bühring & Lether, 2000). The main aim is to revalidate patients and to best facilitate independence in physical, psychological en social domains (Spaans, 2006).

The participants in the present study were drawn from the population at Eikenboom, who enrolled between 2006 and 2008. Initially, 160 participants joined the standard screening procedure for admission in the clinic. All participants were diagnosed with a somatoform disorder and were selected for treatment. To be able to compare each participant on the factors included in this study (through several questionnaires for symptomatic distress, personality disorder, trauma, and medical costs), 103 participants remained due to missing questionnaires measuring one of these factors. After removal of outliers, the final sample (*N*= 99) consisted of 25 males and 74 females, with ages varying from 19 to 61. The descriptive statistics of the age of the males, females, and the total sample are shown in table 1.

Table 1. *Descriptive statistics of age and gender of the participants*

Gender	**Mean age in years**	**Standard deviation**	**Minumum age in years**	**Maximum age in years**
Male (n= 25)	44.84	10.46	23	61
Female (n= 74)	42.28	11.18	19	60
Total (N= 99)	42.93	11.01	19	61

The educational level of the participants ranged from primary level school to academic level. The frequencies are shown in table 2.

Table 2. *Education level of the participants*

Education	**Frequency**
Primary	2 (2.0 %)
< Intermediate	1 (1.0 %)
Intermediate	27 (27.3 %)
Qualified	42 (42.4 %)
Higher	27 (27.3 %)

All participants were diagnosed with a somatoform disorder according to the criteria of DSM-IV (APA, 2000). The frequencies are shown in table 3.

Table 3. *Frequencies of Axis-I Somatoform disorder diagnosis*

Disorder	**Frequency**
Somatization disorder	17 (17.2%)
Undifferentiated	34 (34.3%)
Conversion	18 (18.2%)
Pain	31 (31.3%)
Not otherwise specified	2 (2.0%)
Pain and conversion	2 (2.0%)

2.2. Procedure

Each potential patient at Eikenboom is expected to participate in an initial assessment, which contains a standard screening procedure, including interviews and questionnaires. The aim of the standard screening procedure is to form an indication of the participant's condition, for diagnostic and research purposes[2]. This procedure is supervised by one or two trained psychologists or psychology trainees. All participants receive complete instructions of the screening procedure, and are informed of its purpose. The screening procedure contains (in the following order): the Thematic Apperception Test (TAT; Murray, 1943), the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996), the Structured Clinical

[2]The fixed screening procedure fits the study which is part of a research programme under direction of Drs. Lucie Veselka (clinical psychologist and psychotherapist at Eikenboom), which is accepted by the Commission of Scientific Research of Altrecht.

Interviews for DSM-IV Axis I-II (SCID-I; First, Gibbon, Spitzer, & Williams, 1995; SCID-II; First, Gibbon, Spitzer, Williams, & Benjamin, 1997), the Dutch Short form of MMPI (Nederlandse verkorte MMPI; NVM; Luteijn & Kok, 1985), the Neuroticism Extraversion Openness - Personality Inventory Revised (NEO-PI-R; Hoekstra, Ormel, & De Fruyt, 1996), the Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986), the Body Image Questionnaire (BIV-20; Clement & Löwe, 1996), the Checklist Individual Strength (CIS-20-R; Vercoulen, Alberts, & Bleijenberg, 1999), the 36-item Short Form Health Survey (SF-36; Van der Zee & Sanderman, 1993), the Somatoform Dissociation Questionnaire (SDQ-20; Nijenhuis, Spinhoven, Van Dyck, Van der Hart, & Vanderlinden, 1996), and the Traumatic Experience questionnaire (Vragenlijst Belastende Ervaringen; VBE; Nijenhuis, Van der Hart, & Vanderlinden, 1999). During this screening process, a psychologist or psychology trainee remains present for supervision and instruction of the participants. Participants are allowed to ask questions about the questionnaires. Furthermore, participants are allowed to pause if they are hindered by concentration problems or physical complaints. After the standard screening procedure, all participants have the opportunity to make an appointment to get feedback on results of the screening procedure. To avoid outside influences (social desirability effects), personality questionnaires must be completed individually, within Eikenboom premises.

The screening is followed by the Standard Evaluation Project (STEP), which contains the Symptom Checklist 90 (SCL-90; Derogatis, 1973), the European Quality of Life Instrument (EQ-D5; Kind, 1996), and the Trimbos and Institute of Medical Technology Assessment Cost Questionnaire for Psychiatry (TiC-P; Hakkaart-van Roijen, Van Straten, Donker, & Tiemens, 2002). Supervision of the STEP-questionnaires is not mandatory, and completion is permitted outside the centre.

All participants signed a consent form for (anonymously) usage of the data from the interviews and questionnaires for research purposes.

2.3. Instruments included in this study

2.3.1. Symptom Check List (SCL)-90

The aim of the SCL-90 (Derogatis et al., 1973; Derogatis, 1983, in Simpson, Carlson, Beck, & Patten, 2002) is to explicate physical and psychological complaints with the purpose of usage for research, screening, or the evaluation of interventions. The SCL-90 is intended to measure symptom intensity on nine different subscales. The 90 items of the questionnaire are scored on a five-point Likert scale, indicating the rate of occurrence of the symptom during

the time reference**.** The SCL-90 consists of the following nine primary symptom dimensions: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The SCL-90 normally requires between 12 and 20 minutes to complete (Derogatis, 2000). The SCL-90 is a self report questionnaire and reliability and validity are satisfactory (Holi, 2003).

2.3.2. The Traumatic Experiences Questionnaire (Vragenlijst Belastende Ervaringen: VBE)

The Traumatic Experiences Questionnaire (TEC) (VBE; Nijenhuis, Van der Hart & Vanderlinden, 1999) was used in this study to establish the participant's traumatic experience(s). This questionnaire exists of 30 items which contains the following subscales: emotional abuse/neglect, sexual abuse and physical abuse. The raw scores of each item are classified into a five point scale, which indicates the subjective experience of the event as the participant retrospectively reports it (5 being most severe). The subscale scores can be measured as well as a total score. According to Nijenhuis, Van der Hart, & Kruger (2003) the reliability and validity of the VBE are satisfactory with regard to measuring traumatic life events.

2.3.3. Structural Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II)

Structured clinical interviews are currently the standard method of diagnosis in psychiatry studies. The SCID-II (First, Spitzer, Gibbon, Williams, & Benjamin, 1997) is designed to yield a reliable and valid DSM-IV personality disorder diagnosis. In the present study a Dutch version of the SCID-II was used to assess the Axis II disorder (Gestructureerd Klinisch Interview voor DSM-IV As-II Persoonlijkheidsstoornissen; Weertman, Arntz, & Kerkhofs, 1997). The interview contains 135 screening questions in order to determine which of the following 13 personality disorders is present or not. The personality disorders represented in the SCID-II are: avoidant, dependent, obsessive-compulsive, passive aggressive, depressive, paranoid, schizotypal, schizoid, histrionic, narcissistic, borderline, antisocial, and not otherwise specified (as established by the DSM-IV). The clinician who conducts the interview scores the patient on a three point scale, indicating the individual suitability in regard to the criterion (1 = "absent/incorrect", 2 = "uncertain", 3 = "present/correct" and ? = not sufficient information to score 1, 2, or 3). The SCID had been found to yield highly reliable and valid diagnosis for axis II disorders (Segal, Hersen, & Van Hasselt, 1994; Williams et al., 1992).

2.3.4. The Trimbos and Institute of Medical Technology Assessment Cost Questionnaire for Psychiatry (TiC-P)

The TiC-P (Hakkaart-van Roijen et al., 2002) obtains the use of health services. With this 29 items questionnaire participants register the number of general practice visits, sessions with psychiatrists, hospital days, etc. In addition, the number of work loss days (absenteeism from work) and the number of work cut-back days (reduced efficiency at work while feeling ill) are also measured with the TiC-P (Smit et al., 2006). Indirect non-medical costs are associated with loss of productivity related to health problems. Three situations can be encountered here. First, people can be absent from paid work. Second, production losses also occur when people are ill but continue to work with reduced efficacy. And third, people may also be too ill to perform domestic tasks (Smit et al., 2006). The TiC-P is based on the Dutch Manual for Costing in Economic Evaluation (Oostenbrink, Koopmanschap, & Rutten, 2002).

2.4. Data analysis

2.4.1. Aim

The present cost-of-illness study was conducted to explore the relationship between somatoform disorders and medical costs. The study firstly aims to determine the direct indirect costs of treatment-seeking patients with unexplained somatic complaints, in particular with a diagnosis of somatoform disorder. In addition, this study aims to identify factors that may be associated with direct and indirect costs in somatoform disorders, in particular the level of self-reported symptomatic distress, the presence of personality disorders and self-reported experiences of trauma.

Statistical analysis was conducted using the Statistical Package for the Social Sciences, version 16.0 (SPSS 16.0). Preliminary analyses were conducted to examine the dataset for errors and outliers. As previously described, errors due to missing data (questionnaires) have been found, and these cases have been excluded from the analysis. Errors due to wrongfully inserted data have not been found. To control for the outliers, the analysis has been conducted without outliers. Four participants were excluded from the dataset due to outliers, which lead to a total sample size of 99 participants.

Resulting from the aim of the present study, several research questions have been formulated, which shall be elaborated in paragraph 2.4.2. To answer the research questions, a hypothesis testing research design was conducted.

2.4.2. Statistical analysis

The main question of the present study is what the relationship is between symptomatic distress, the presence of personality disorders and traumatic life experiences in patients with somatoform disorders on the one hand and medical costs on the other hand. Based upon previously described considerations, it is hypothesised that symptomatic distress, personality disorders and trauma are significantly positively related to medical costs in somatoform inpatients. As in the present study it is presumed that symptomatic distress, personality disorders, and trauma are independently related to medical costs, and since the amount of participants differs per variable (symptomatic distress, N=99; personality disorders, N=99; trauma, n=55), it has been decided to analyze each variable separately in this study and also conduct an analysis to examine the relations *between* the variables. The main question leads to the research questions as described in table 4.

Table 4. *Overview of the research questions*

	Research question
1	What is the level of self-reported symptomatic distress in severe somatoform inpatients?
2	What is the prevalence of personality disorders in severe somatoform inpatients?
3	What is the prevalence of self-reported trauma in severe somatoform inpatients?
4	What are the costs associated with health care consumption in severe somatoform inpatients?
5	Are medical costs of somatoform inpatients significantly positively correlated with the level of self-reported symptomatic distress?
6	Are medical costs of somatoform inpatients associated with the presence (or absence) of personality disorders?
7	Are medical costs of somatoform inpatients associated with self-reported traumatic (emotional, physical, and sexual) life experiences?
8	Are the independent variables of this study (self-reported symptomatic distress, personality disorder, self-reported trauma) associated with each other?

The first four research questions were able to be answered through analysis of frequencies and descriptive analysis. The hypothesis testing design based upon the research questions is found in table 5. Preliminary analyses were performed to ensure no violation of the assumptions of linearity, homoscedasticity and normality. The graphs referring to these assumptions are

found in Appendix 1 (paragraph 2.1. and 2.2.). The graphs show that the independent variables do not violate the assumptions. However, the dependent variable of this study, medical costs, has no normal distribution. For this reason, nonparametric tests were conducted to test the hypotheses[3].

Table 5. *Hypothesis testing design*

	Hypothesis
1	Levels of self reported symptomatic distress in the area of somatoform disorders are positively related to levels of medical costs.
2	Patients with (a) personality disorder(s) show significantly higher medical costs than patients without a personality disorder.
3a	Patients with self-reported experiences of emotional trauma show higher medical costs than patients with no self-reported experiences of emotional trauma.
3b	Patients with self-reported experiences of physical trauma show higher medical costs than patients with no self-reported experiences of physical trauma.
3c	Patients with self-reported experiences of sexual trauma show higher medical costs than patients with no self-reported experiences of sexual trauma.
3d	The amount of self-reported experiences of different types of trauma is associated with medical costs. The more kinds of self-reported experiences of trauma, the higher the costs.
4a	Symptomatic distress, personality disorders, and traumatic experiences in somatoform disorder patients are together positively related with medical costs.
4b	Symptomatic distress is positively correlated with trauma.
4c	Symptomatic distress, personality disorder, and trauma do not show collinearity.

The fifth research question was examined with use of a nonparametric test of correlation, showing Spearman's Correlation (r_s) between the self-reported symptomatic distress level of patients diagnosed with a somatoform disorder and medical costs. The strength of correlation is indicated by the value of the correlation coefficient which varies between 1 and 0. The correlation has different directions in a linear relationship: either positive or negative. A perfect negative correlation would have a correlation of -1, and a perfect positive correlation would have a coefficient of +1. Correlation values of 0 to .2 are generally considered weak, .3

[3]Parametric tests were performed, but the dependent variable was too abnormally distributed to be able to perform these tests properly.

to .6 moderate, and .7 to 1 strong (Brace, Kemp, & Snelgar, 2006). The significance value will also be considered. In the present study, levels of self reported symptomatic distress in the area of somatoform disorders are presumed to be positively related to levels of medical costs (Hypothesis 1).

The sixth research question was examined with use of the Mann-Whitney test, the nonparametric equivalent of the independent *t*-test, which offers a comparison between independent groups. In this study, two groups were compared: somatoform disorder patients with a diagnosis of (a) personality disorder(s), and somatoform disorder patients with no diagnosis of a personality disorder. Patients with (a) personality disorder(s) are hypothesised to show significantly higher medical costs than patients without a personality disorder (Hypothesis 2).

The seventh research question was examined with use of the Mann-Whitney test and the Kruskal-Wallis One-Way between-subjects analysis, a nonparametric equivalent of the one-way between subjects analysis of variance (ANOVA). The Mann-Whitney test offers a comparison between the presence and absence of the three types of self-reported trauma (emotional, physical, and sexual) in medical costs. Patients with self-reported experiences of emotional trauma are expected to show higher medical costs than patients with no self-reported experiences of emotional trauma (Hypothesis 3a). Also, patients with self-reported experiences of physical trauma are expected to show higher medical costs than patients with no self-reported experiences of physical trauma (Hypothesis 3b). Finally, patients with self-reported experiences of sexual trauma are expected to show higher medical costs than patients with no self-reported experiences of sexual trauma (Hypothesis 3c). The Kruskal-Wallis test offers a comparison between the amount(s) of types of self-reported experiences of trauma (none, one, two, and three) in medical costs. The amount of self-reported experiences of different types of trauma is presumed to be associated with medical costs. The more kinds of self-reported experiences of trauma, the higher the costs (Hypothesis 3d). It was not possible to make a comparison between the presence and absence of self-reported traumatic experiences in general, considering that in the present study only three participants reported to have experienced no trauma.

In addition to answering the main question of the present study, the relationship between the independent variables within this study was examined. Symptomatic distress, personality disorders, and traumatic experiences in somatoform disorder patients are hypothesised to be positively related with medical costs (Hypothesis 4a), that symptomatic distress and trauma are positively correlated (Hypothesis 4b), but that the variables do not

show collinearity (Hypothesis 4c). This was examined with use of a nonparametric test of correlation showing Spearman's Correlation (r_s) (hypothesis 4a and 4b) and a regression analysis, which offers the collinearity statistics for the variables examined in this study (n=55).

The SPSS-Outputs of the analyses in this study are included in Appendix 1.

3. Results

3.1. Levels of symptomatic distress, prevalence of personality disorders, prevalence of trauma, and costs associated with health care consumption

Descriptive statistics of self-reported symptomatic distress. The extent of self-reported symptomatic distress of the somatoform inpatients in this study is measured by the symptom checklist (SCL-90). The minimum possible total score is 90 (90x1), and the maximum possible total score is 450 (90x5). The total score levels of self-reported symptomatic distress in the sample of the present study range from 92 to 384, with a mean score of 195.26 (*SD*= 66.32).

Descriptive statistics of personality disorders. The prevalence of personality disorders in severe somatoform inpatients is shown in table 6. Of the 99 patients who underwent the SCID-II interview, 32 were diagnosed with one or more personality disorder(s). The frequencies of the types of personality disorders are shown in table 7. The most frequently diagnosed personality disorders were obsessive-compulsive personality disorder (20.8%), borderline personality disorder (16.7%), personality disorder not otherwise specified (16.7%), and depressive personality disorder (12.5%).

Table 6. *Prevalence of personality disorders in severe somatoform inpatients (SCID-II)*

	Number of personality disorders in one patient	Frequency	Percentage
Absence	0	67	67.7
Presence		32	32.3
	1	22	22.2
	2	7	7.1
	3	1	1.0
	4	2	2.0
Total		99	100

Table 7. *Types of personality disorders found in somatoform inpatients*

Type	Frequency	Percentage
Paranoid	1	2.1
Schizotypal	2	4.2
Schizoid	2	4.2
Borderline	8	16.7
Narcissistic	3	6.3
Avoidant	3	6.3
Dependant	3	6.3
Obsessive-Compulsive	10	20.8
NOS	8	16.7
Depressive	6	12.5
Passive-Aggressive	2	4.2
Total	48	100
N	32	32.3

Descriptive statistics of self-reported trauma. The prevalence of self-reported traumatic experiences is shown in table 8. Of the 55 patients who completed the VBE, 52 (94.5%) reported having experienced trauma at some point in their lives. Of the 52 trauma-reporting patients, 17 participants (30.9%) reported having experienced one type of trauma, 21 participants (38.2%) reported having experienced two types of trauma, and 14 participants (25.5%) reported having experienced all three types of trauma.

Table 8. *Prevalence of self-reported trauma in severe somatoform inpatients (VBE)*

Self-reported Trauma	Type	Frequency	Percentage
Absence		3	5.5
Presence		52	94.5
	Emotional	40	72.7
	Physical	40	72.7
	Sexual	21	38.2

Descriptive statistics of medical costs. The costs associated with health care consumption of the somatoform inpatients in this study ranged, before removal of outliers, between €0,00 to €6700,00 for the four weeks before entering the screening programme, with a mean of €636,89 (*SD*= 1187.10). When outliers were removed, the standard deviation was still higher than the mean (*M*= 429.29, *SD*=560.67), and the costs ranged from €0,00 to €3500,00.

3.2. Hypothesis 1: Symptomatic distress and medical costs

The relationship between self-reported symptomatic distress, as measured by the Symptom Checklist 90 (SCL-90), and medical costs, as measured by the Trimbos and Institute of Medical Technology Assessment Cost Questionnaire for Psychiatry (TiC-P), was investigated using a nonparametric test of correlation, showing Spearman's r_s (Appendix A, paragraph 3).

As previously described, levels of self-reported symptomatic distress in the area of somatoform disorders are presumed to be positively related to levels of medical costs. Hypotheses 1 was confirmed; there was a significant positive correlation between self-reported symptomatic distress and medical costs (r_s = .221, N = 99, p < .05, two-tailed), with high levels of self-reported symptomatic distress associated with high levels of medical costs (figure 1).

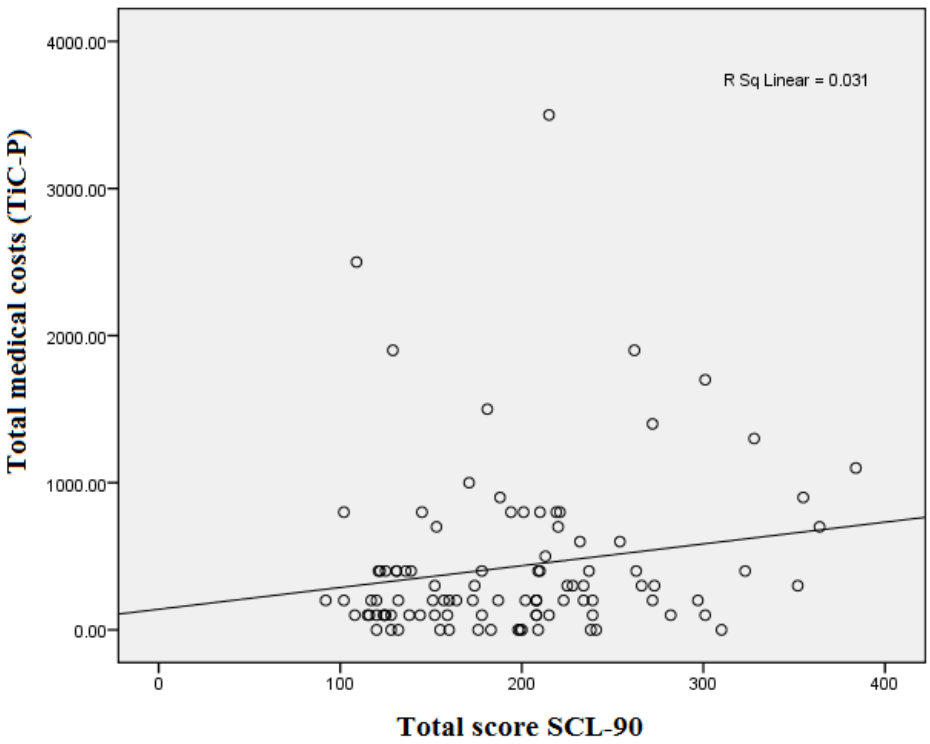

Figure 1. Scatter plot of the level of self-reported symptom distress associated with medical costs.

3.3. Hypothesis 2: Personality disorders and medical costs

A Mann-Whitney U test was conducted to explore the association between personality disorders, as diagnosed with use of the SCID-II interview, and medical costs, as measured by the TiC-P. The differences in medical costs between patients with and patients without a diagnosis of one or more personality disorder(s) were explored.

As previously described, patients with (a) personality disorder(s) are expected to show significantly higher medical costs than patients without a personality disorder. Hypothesis 2 could not be confirmed; the Mann-Whitney U test revealed no significant differences between patients with and patients without a diagnosis of (a) personality disorder(s) in medical costs (U = 1057.5, n_1 = 67, n_2 = 32, p = .91, two-tailed). An overview of the analysis is found in Appendix 1 (paragraph 4). An overview of the coefficients is found in table 9.

Table 9. *Test statistics between personality disorder(s) and medical costs*

	Medical costs
Mann-Whitney U	1057,500
Wilcoxon W	1585,500
Z	-0,110
Asymp. Sig. (2-tailed)	0,913

3.4. Hypothesis 3a – 3d: Trauma and medical costs

A Mann-Whitney test (Appendix 1, paragraph 5) and a Kruskal-Wallis test (Appendix 1, paragraph 6) were conducted to explore the association between self-reported experiences of trauma, as measured by the VBE, and medical costs, as measured by the TiC-P. The differences in medical costs between patients who reported having experienced trauma and patients who reported not having experienced some type of trauma and the amount of types of trauma experienced were examined.

As previously described, patients reporting experiences of emotional trauma are expected to be associated with higher medical costs than patients with no self-reported experiences of emotional trauma (Hypothesis 3a). Hypothesis 3a could not be confirmed; the Mann-Whitney U test revealed no significant differences between patients who reported having experienced emotional trauma and patients who reported not having experienced emotional trauma (U = 218.5, n_1 = 15, n_2 = 40, p = .12, two-tailed). An overview of the coefficients is found in table 10.

Table 10. *Test statistics between emotional trauma and medical costs*

	Medical costs
Mann-Whitney U	218,500
Wilcoxon W	338,500
Z	-1,561
Asymp. Sig. (2-tailed)	0,119

Hypothesis 3b stated that patients reporting experiences of physical trauma show higher medical costs than patients with no self-reported experiences of physical trauma. Hypothesis 3b was confirmed; the Mann-Whitney U test revealed that there were significant differences between patients who reported having experienced physical trauma and patients who reported not having experienced physical trauma ($U = 179.0$, $n_1 = 15$, $n_2 = 40$, $p < .05$, two-tailed). An overview of the coefficients is found in table 11.

Table 11. *Test statistics between physical trauma and medical costs*

	Medical costs
Mann-Whitney U	179,000
Wilcoxon W	299,000
Z	-2,317
Asymp. Sig. (2-tailed)	0,020

Finally, Hypothesis 3c stated that patients with self-reported experiences of sexual trauma are associated with higher medical costs than patients with no self-reported experiences of sexual trauma (Hypothesis 3c could not be confirmed; the Mann-Whitney U test revealed no significant differences between patients who reported having experienced sexual trauma and patients who reported not having experienced sexual trauma ($U = 320.5$, $n_1 = 34$, $n_2 = 21$, $p = .52$, two-tailed). An overview of the coefficients is found in table 12.

Table 12. *Test statistics between sexual trauma and medical costs*

	Medical costs
Mann-Whitney U	320,500
Wilcoxon W	915,500
Z	-,641
Asymp. Sig. (2-tailed)	,522

The Kruskal-Wallis test offers a comparison between the amount of types of self-reported experiences of trauma (none, one, two, three) in medical costs. As previously described, it is presumed that the amount of the self-reported experiences of different types of trauma is associated with medical costs. The more kinds of self-reported experiences of trauma, the higher the costs (Hypothesis 3d). Hypothesis 3d could not be confirmed; the Kruskal-Wallis test revealed no significant effect of the amount of types of trauma experiences reported for the second confidence rating (χ^2 (3, n=55) = 5,672, p = .129). An overview of the coefficients is found in table 13.

Table 13. *Test statistics between amount of types of self-reported traumas and medical costs*

	Medical costs
Chi-Square	5,672
df	3
Asymp. Sig. (2-tailed)	,129

3.5. Hypothesis 4a – 4c: Symptomatic distress, personality disorders, trauma, and medical costs

In addition to testing the main hypotheses of the present study, it was also hypothesised that symptomatic distress, personality disorders, and traumatic experiences in somatoform disorder patients are together positively related with medical costs, that symptomatic distress is positively correlated with trauma, but that the independent variables do not show collinearity. This was examined with use of a nonparametric test of correlation showing Spearman's Correlation (r_s) and a regression analysis, which offers the collinearity statistics for the variables examined in this study (n=55). The nonparametric test of Spearman's r_s

shows a significant correlation between medical costs and self-reported physical trauma (r_s = .315, n = 55, p < .05), amount of types of self-reported trauma (r_s = .312, n = 55, p < .05), and self-reported symptomatic distress (r_s = .221, n = 90, p < .05). There was no significant correlation between medical costs and personality disorder (r_s = -.011, n = 99, p = .913), self-reported emotional trauma (r_s = .212, n = 55, p = .12), and self-reported sexual trauma (r_s = .087, n = 55, p = .527). The results show that not all the variables are positively related to medical costs. For this reason, hypothesis 4a could not be confirmed. The test also shows that self-reported symptomatic distress is significantly positively correlated to self-reported emotional trauma (r_s = .279, n = 55, p < .05) and the amount of types of self-reported trauma (r_s = .307, n = 55, p < .05). However, these correlations are not strong enough to account for the same explained variance within medical costs, since the regression analysis does not show a tolerance less than 0.20 and/or a VIF (variance inflation factor) of 5 and above, which would indicate a multicollinearity problem (O'Brien, 2007). Therefore, hypothesis 4b was partially confirmed and hypothesis 4c could not be confirmed.

4. Discussion

4.1. Introduction

The present study was conducted to examine to what extent self-reported symptomatic distress, the presence of (a) personality disorder(s), self-reported emotional, physical, and sexual traumatic experiences, and medical costs of somatoform disorder patients are related. This study is the first to explore the relationship between these factors. The aim at this point is to conclude what the correlations, associations and the significances denote. This examination may contribute to the understanding of the relationship between symptomatic distress, the prevalence of personality disorders, the prevalence of trauma and medical costs in a specific group bearing diagnosis of somatoform disorder.

4.2. The severity of somatoform disorder in the population of the present study

The extent of self-reported symptomatic distress of the somatoform inpatients in this study varied between low total scores on the symptom checklist and high scores on the symptom checklist. 32.3 percent of the patients in this study were diagnosed with one or multiple personality disorders. This is in agreement with previous studies that personality disorders are common in somatoform disorder patients (Leibbrand et al., 1999; Noyes et al., 2001; Rost et al., 1992), although it is not in agreement with studies reporting that half of the patients (Fishbain et al., 1986) to two third of the patients with somatoform disorders meet criteria for a personality disorder (Bass & Murphy, 1995). The most frequently diagnosed personality disorders were obsessive-compulsive personality disorder, borderline personality disorder, personality disorder not otherwise specified, and depressive personality disorder, which was also found by Fishbain et al. (1986), Noyes et al. (2001), and Rost et al. (1992). Apart from three patients who reported not having experienced traumatic experiences, all of the other patients in the present study reported having experienced at least one traumatic experience. These results show that the patients within this study (and at Eikenboom) not only experience severe hindrance from their somatoform disorder, but also from the presence of personality disorder and experiences of trauma.

4.3. Hypothesis testing design

4.3.1. Correlation between self-reported symptomatic distress and medical costs in somatoform disorder patients

With regard to the research question whether medical costs of somatoform inpatients are significantly correlated with the level of self reported symptomatic distress, the correlation between the totalscore on the symptom checklist and medical costs was examined. It was hypothesised that the levels of self reported symptomatic distress in the area of somatoform disorders are positively related to levels of medical costs. This hypothesis was confirmed; there was a significant positive, although not strong, correlation between self-reported symptomatic distress and medical costs, with high levels of self-reported symptomatic distress associated with high levels of medical costs. The result of the present study is in concordance with previous studies of Hansen et al. (2002), Karlsson et al. (1997), and Katon et al. (1990), who found a strong association between patient ratings of physical disability and health showed and the use of primary care services. A possible explanation for why the correlation in this study was not strong is that the medical costs were not normally distributed and both patients with high and low levels of symptomatic distress show similar levels of medical costs, leading the correlation to conform to the face value of the costs. Another possible explanation is that this particular population of somatoform inpatients shows similarity in medical costs, as the gross of this population report to experience an average level of symptomatic distress. A third possible explanation is that the level of symptomatic distress is self-reported in this study. There might be discrepancy between the self-reported and actual experienced symptomatic distress; the individuals within this study may interpret their symptoms/physical disability in different ways, deny/under-report their distress (Harmatz & Shader, 1975) or exaggerate/over-report their distress (Langevin & Stancer, 1979), leading to differences in the way patients fill in the symptom checklist. Finally, other factors may have had an influence on the medical costs, except symptomatic distress. Not only the other examined factors in this study, but also the presence of physical illnesses or other psychological disorders such as depression and anxiety disorders, which are also associated with higher health costs (Simon, Ormel, VonKorff, & Barlow, 1995). However, although the correlation in this study was not strong, it does show a significant positive relation between the level of symptomatic distress and the amount of medical costs, which should be considered in both general and mental health care, to provide somatoform patients, especially

those with high levels of symptomatic distress, with appropriate treatment, preventing these patients from making high medical costs trough high use of health care services.

4.3.2. Association between personality disorder and medical costs in somatoform disorder patients

With regard to the research question if medical costs of somatoform inpatients are associated with the presence (or absence) of personality disorders, the association and significance of the association between personality disorders and medical costs were examined. It was hypothesised that patients with (a) personality disorder(s) show significantly higher medical costs than patients without a personality disorder. This hypothesis could not be confirmed; there were no significant differences in medical costs between patients with and patients without a diagnosis of (a) personality disorder(s). This is not in consensus with the majority of previous research, for instance by Bender et al. (2001) and Soeteman et al. (2008). Neither was the majority of the somatoform disorder patients within this study diagnosed with a personality disorder (32 with and 67 without personality disorder), in contrast with findings from studies by Bass & Murphy (1995) and Fishbain et al. (1986), among others. Again, a possible explanation for why the association was not significant is that the medical costs were not normally distributed and both patients with and without (a) personality disorder(s) show similar levels of medical costs. Barsky, Orav, and Bates (2005), reported that somatization increases medical utilization and costs, independent of psychiatric and medical comorbidity. Also, the number of participants with diagnosis of personality disorder was too small to be able to compare patients with one personality disorder with patients with more personality disorders, and to compare between the different types of personality disorder diagnosed within this population. Still, although the present study could not show the relationship between the comorbidity of personality disorder with medical costs of somatoform disorder patients, considering that the majority of previous studies did show this relationship, personality disorder is an important factor that should be taken into account regarding research of health care consumption and treatment of somatoform disorder patients.

4.3.3. Associations between self-reported experiences of trauma and medical costs in somatoform inpatients

With regard to the research question if medical costs of somatoform inpatients are associated with traumatic (emotional, physical, and sexual) life experiences, the associations and significances between medical costs and self-reported emotional, physical, and sexual

traumatic experiences were examined. It was hypothesised that, for every type of trauma, patients reporting experiences of trauma show higher levels of medical costs than patients with no self-reported experiences of that type of trauma. Two of the three hypotheses were not confirmed; there were no significant differences between patients who reported having experienced emotional trauma and patients who reported not having experienced emotional trauma, and neither were there significant differences between patients who reported having experienced sexual trauma and patients who reported not having experiences sexual trauma. The hypothesis stating that patients with self-reported experiences of physical trauma are associated with higher medical costs than patients with no self-reported experiences of physical trauma, was confirmed; there were significant differences between patients who reported having experienced physical trauma and patients who reported not having experienced physical trauma. It was also presumed that the amount of the self-reported experiences of different types of trauma is associated with medical costs; the more kinds of self-reported experiences of trauma, the higher the costs. However, there was no significant effect found and thus the hypothesis could not be confirmed. As described in the introduction, traumatic experiences have been associated with symptom severity (Bailer et al., 2007; Brown et al., 2005; Sack et al., 2007; Van der Hart et al., 2006; Waldinger et al., 2006), which was also found in the present study (described in the following paragraph), but the relationship between trauma and medical costs has not been studied before. This relationship was studied in the present study, and is a new given in the somatoform disorder literature. Explanations for the results within this study are difficult to find in the existing literature. Again, the not normal distribution of medical costs could have influenced the results. Also, there were only 55 participants in this study who completed the traumatic experiences questionnaires. This is a rather small sample for statistical analysis, which may have had influence on the outcomes of this study. A limited number of participants may result in inability of finding any significant results, even though association is empirically well validated (Miles & Shevlin, 2001). Therefore, the non-significant results should be interpreted with great care. Resting purely on the findings of this study, emotional and sexual experiences of self-reported trauma are not associated with medical costs, and physical experiences of self-reported are. Also, a possible explanation for the findings in this study is that the traumatic experiences are also self-reported. In this case too, participants might have different values and interpretations of experiences, have false or inaccurate memories and complete the questionnaire in different ways. Finally, another explanation might be that, as described previously, other factors may have influenced medical costs more than the experience of self-reported trauma. However,

since a significant association between physical trauma and medical costs was found, trauma remains a factor of interest regarding research and treatment.

4.3.4. Correlations between self-reported symptomatic distress, personality disorder, and self-reported experiences of trauma in somatoform inpatients

With regard to the research question whether the independent variables of this study (self-reported symptomatic distress, personality disorder, self-reported trauma) are associated with each other, the correlations and collinearity between these variables were examined. The hypothesis which stated that there is a positive relation between symptomatic distress and trauma was partially confirmed, since there was a significant correlation between symptomatic distress and self-reported emotional trauma and between symptomatic distress and the amount of types of self-reported trauma, which is in agreement with previous research by Bailer et al. (2007), Brown et al. (2005), Sack et al. (2007), Van der Hart et al. (2006), and Waldinger et al. (2006). However, the results also supported the hypothesis that these correlations are not strong enough to account for the same explained variance within medical costs (collinearity).

4.4. Limitations

Several limitations should be noted regarding the present study. The first limitation concerns the use of instruments in the present study. First, three out of four instruments were self-report instruments. As previously described, self-report questionnaires might endanger the validity and reliability, as participants might have different values and interpretations, under- or over-reporting's, have false or inaccurate memories or discrepancies between self-reported and actual symptoms/experiences, and therefore complete questionnaires in different ways.

Second, to examine the self-reported experiences of trauma, only subscales of the questionnaire (VBE) were used to indicate whether participants had experienced trauma, what type of trauma, and the amount of types of trauma. Information such as the age (childhood trauma or adulthood trauma) when the traumatic experience occurred and the intensity of the traumatic experience were not taken into account in this study. Consequently, the results concerning the participants within this study who were classified into the self-reported trauma types must be carefully interpreted.

A third limitation concerns the TiC-P instrument. The TiC-P only measures the medical costs of the four weeks before patients enroll in the Eikenboom (screening)programme. As described in the introduction, somatoform disorder patients tend to

doctor shop frequently for a long period before encountering mental health care. The assessment interval of four weeks before entering the programme of Eikenboom might give an inaccurate, incomplete and/or simplified perspective of the actual health care use and costs of these patients. This might be a possible explanation for why the participants show similarities in medical costs, and why these costs are not normally distributed. Differences might be found when a longer period of health care consumption is examined. Another limitation of the TiC-P is that it uses monthly incomes and workdays to indicate loss of income. However, most people reported quitting their jobs, for which they were not able to answer these particular questions. Therefore, some medical costs were computed with use of actual incomes, and others were computed with national information based on age and gender which might be incorrect. Also, the syntax used to compute medical costs is still being revised, and might need alterations as economic aspects (income, insurance, social security, health care) are under constant changes. Moreover, the syntax computes the total medical costs, without including the costs of medication use and without a division of the costs in subscales.

A fourth limitation concerns the use of only non-parametric tests. The non-parametric tests had to be used to enable examinations, in spite of not having a normally distributed dependent variable. Due to a not normally distributed dependent variable, it was not possible to examine the relation between all of the independent variables and medical costs in a multivariate analysis and/or multiple regression analysis. This has consequences for the analyses; the non-parametric tests do not make *any* assumptions regarding the population parameters, and could miss significant differences due to less sensitive test characteristics than parametric tests (Pallant, 2007). For example, it was not possible to make inferences of whether symptomatic distress is a moderator variable between the presence of personality disorder and traumatic experiences, and medical costs, which is a very interesting relationship to examine.

A final limitation concerns the specific sample within this study. After starting with a sample of 160, only 103 participants were useable since the other 59 participants did not complete the TiC-P questionnaire. Then, another four participants were removed due to extreme outliers. Of these 99 participants, the final sample, only 55 participants completed the VBE questionnaire. To prevent ending up with a sample of 55 participants, each variable was separately examined within this study. Examining every variable separately was also necessary as only non-parametric tests could be performed, so it was not detrimental for this study. However, the sample did count 55 participants for the examination between trauma and

medical costs, which is a rather small sample size. A small sample size, as previously described, might result in inability of finding any significant results even though association is empirically well validated (Miles & Shevlin, 2001). Also, as all the participants are patients from Eikenboom, a tertiary referral clinic for psychosomatic medicine, there were no control groups for non somatoform disorder patients and/or patients from primary and secondary care, and a larger amount of patients without experiences of trauma. The characteristics of the participants in the present study, a selected group, inhibit the generalization of the results to the whole somatoform disorder population, which makes this study an explorative study.

4.5. Recommendations for further research

As mentioned earlier, the present explorative study is the first to reveal the association between symptomatic distress, personality disorder, traumatic experiences and medical costs. This study has made an interesting new basis for further research. Still, the findings warrant further investigation into the effect of symptomatic distress, personality disorder, trauma and medical costs, seen the questions raised during the process of research and examination of the results.

The most important recommendations for future research are with regard to the sample and the methods of measurement used within the study. If the recourses and time are available, of which the latter was unfortunately not the case in the present study, it would be interesting to make sure there is a large sample size, with comparison (control) groups for every variable included in the study, and to examine the variables and participants over a longer period of time, preferably a period of at least one year. A larger sample size and comparison groups would make it possible to make profound comparisons, for example a comparison between having one personality disorder and multiple personality disorders, a comparison between the different types of personality disorders, and a comparison between the presence and absence of any type of trauma. If finding a comparison group of somatoform patients without traumatic experiences is not possible, it would be interesting to examine why so many somatoform disorder patients have experienced trauma. It would also be desirable to make sure all the variables are normally distributed, so that parametric tests are able to be performed and multivariate tests show more detailed (probably significant) and decisive results with regard to the research questions.

It would also be interesting to take other factors into account, factors of which previous research have shown the importance. Examples of interesting factors are other Axis-I disorders such as depression and anxiety disorders, the type of somatoform disorder, etc.

Another recommendation concerns the TiC-P. As mentioned earlier, it would be interesting to assess the costs of not only the last four weeks, but the costs of at least the last year. It would also be interesting to not examine the total costs, but subscales of the costs so comparisons could be made on different levels. This would probably require an adaptation of the syntax and further research regarding (the reliability and validity of) the TiC-P questionnaire itself.

Finally, it is highly recommended that research is also conducted in other settings in which somatoform patients are found, to be able to examine the whole somatoform population and from there make implications for improving general and mental health care.

5. Conclusion

The present study was conducted to examine the relationship between self-reported symptomatic distress, personality disorder, self-reported traumatic experiences, and medical costs, in a psychosomatic population. The aim of the study was to assess to what extent patients with a somatoform disorder experience symptomatic distress, have comorbid personality disorder(s), have experienced traumatic experiences and how these factors are related to medical costs. This relationship has not been examined before and by examining this, the extension of a somatoform disorder could possibly be uncovered and a contribution to more empirical evidence of the causal mechanisms of somatoform disorders was made, which could have implications for further research and treatment of somatoform disorders.

Considering the results of the present study, one may conclude that self-reported distress and self-reported trauma are positively interrelated with medical costs in somatoform disorders, but that somatoform disorder patients with (a) personality disorder(s) show little differences in medical costs from participants without a personality disorder. The results also show a difference between the type of self-reported trauma; patients with physical trauma differ in medical costs from patients with emotional and sexual trauma. A relationship was also found between self-reported symptomatic distress and self-reported trauma.

Overall, one may conclude that further research, taking the limitations of the present study into account, is necessary, as nearly all of the somatoform disorder patients in this study (85.9%) report -frequent- use of health care recourses with costs leading up to 3,500 Euro's (with outliers up to 6,700 Euro's) a month. Further research might enhance the understanding of somatoform disorders, causal factors, and medical costs, which then might have implications for (multidimensional) treatment of somaotoform disorders, especially for clients at Eikenboom.

6. References

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Appendix 1: SPSS Outputs

1. Descriptives & Frequencies

1.1. Descriptives

Descriptive Statistics Age, Gender, Education

	N	Minimum	Maximum	Mean	Std. Deviation
age	99	19	61	42,93	11,009
gender	99	1	2	1,75	,437
education	99	2	7	4,98	,979
Valid N (listwise)	99				

Descriptive statistics age/gender

gender	Mean	N	Std. Deviation	Minimum	Maximum
male	44,84	25	10,463	23	61
female	42,28	74	11,182	19	60
Total	42,93	99	11,009	19	61

Descriptive statistics SCL-90

	N	Minimum	Maximum	Mean	Std. Deviation
totalscore scl	99	92	384	195.26	66.324
Valid N (listwise)	99				

Descriptive Statistics Personality disorders (SCID-II)

	N	Minimum	Maximum	Mean	Std. Deviation
Amountpersdis	99	0	4	.47	.837
Valid N (listwise)	2				

Descriptive Statistics Trauma (VBE)

	N	Minimum	Maximum	Mean	Std. Deviation
Emotional	55	0	1	.73	.449
Physical	55	0	1	.73	.449
Sexual	55	0	1	.38	.490
TraumaticExperience	55	0	1	.95	.229
Trauma	55	0	3	1.84	.877
Valid N (listwise)	55				

Descriptive Statistics Medical costs (TiC-P) with outliers

	N	Minimum	Maximum	Mean	Std. Deviation
Medical costs total	103	.00	6700.00	636.8932	1187.10311
Valid N (listwise)	103				

Descriptive Statistics Medical costs (TiC-P) outliers removed

	N	Minimum	Maximum	Mean	Std. Deviation
Medical costs total	99	.00	3500.00	429.2929	560.65787
Valid N (listwise)	99				

1.2. Frequencies

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	25	25,3	25,3	25,3
	female	74	74,7	74,7	100,0
	Total	99	100,0	100,0	

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary	2	2,0	2,0	2,0
	< Intermediate	1	1,0	1,0	3,0
	Intermediate	27	27,3	27,3	30,3
	Qualified	42	42,4	42,4	72,7
	Higher	27	27,3	27,3	100,0
	Total	99	100,0	100,0	

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
	Primary	2	2,0	2,0	2,0
	< Intermediate	1	1,0	1,0	3,0
	Intermediate	27	27,3	27,3	30,3
	Qualified	42	42,4	42,4	72,7
	Higher	27	27,3	27,3	100,0

Somatization disorder

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	absent	82	82,8	82,8	82,8
	present	17	17,2	17,2	100,0
	Total	99	100,0	100,0	

Undifferentiated

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	absent	65	65,7	65,7	65,7
	present	34	34,3	34,3	100,0
	Total	99	100,0	100,0	

Conversion

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	absent	81	81,8	81,8	81,8
	present	18	18,2	18,2	100,0
	Total	99	100,0	100,0	

Pain

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	absent	68	68,7	68,7	68,7
	present	31	31,3	31,3	100,0
	Total	99	100,0	100,0	

Not otherwise specified

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	absent	97	98,0	98,0	98,0
	present	2	2,0	2,0	100,0
	Total	99	100,0	100,0	

Pain and Conversion

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	absent	97	98,0	98,0	98,0
	present	2	2,0	2,0	100,0
	Total	99	100,0	100,0	

Personality Disorders

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	absent	67	67.7	67.7	67.7
	present	32	32.3	32.3	100.0
	Total	99	100.0	100.0	

Amount of personality disorders

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	67	67.7	67.7	67.7
	1	22	22.2	22.2	89.9
	2	7	7.1	7.1	97.0
	3	1	1.0	1.0	98.0
	4	2	2.0	2.0	100.0
	Total	99	100.0	100.0	

Personality disorder 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	paranoid	1	1.0	3.1	3.1
	schizotypal	2	2.0	6.2	9.4
	schizoid	1	1.0	3.1	12.5
	borderline	3	3.0	9.4	21.9
	narcissistic	1	1.0	3.1	25.0
	avoidant	3	3.0	9.4	34.4
	dependent	2	2.0	6.2	40.6
	obsessive-compulsive	6	6.1	18.8	59.4
	NOS	8	8.1	25.0	84.4
	depressive	4	4.0	12.5	96.9
	Passive-agressive	1	1.0	3.1	100.0
	Total	32	32.3	100.0	
Total		99	100.0		

Personality disorder 2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	borderline	4	4.0	40.0	40.0
	narcissistic	2	2.0	20.0	60.0
	obsessive-compulsive	4	4.0	40.0	100.0
	Total	10	10.1	100.0	
Total		99	100.0		

Personality disorder 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	borderline	1	1.0	33.3	33.3
	depressive	1	1.0	33.3	66.7
	passive-agressive	1	1.0	33.3	100.0
	Total	3	3.0	100.0	
Total		99	100.0		

Personality disorder 4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	schizoid	1	1.0	50.0	50.0
	depressive	1	1.0	50.0	100.0
	Total	2	2.0	100.0	
Total		99	100.0		

TraumaticExperience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	absent	3	3.0	5.5	5.5
	present	52	52.5	94.5	100.0
	Total	55	55.6	100.0	

Amount of types of Trauma

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	3	3.0	5.5	5.5
	1	17	17.2	30.9	36.4
	2	21	21.2	38.2	74.5
	3	14	14.1	25.5	100.0
	Total	55	55.6	100.0	

Emotional trauma

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	absent	15	15.2	27.3	27.3
	present	40	40.4	72.7	100.0
	Total	55	55.6	100.0	

Physical trauma

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	absent	15	15.2	27.3	27.3
	present	40	40.4	72.7	100.0
	Total	55	55.6	100.0	

Sexual trauma

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	absent	34	34.3	61.8	61.8
	present	21	21.2	38.2	100.0
	Total	55	55.6	100.0	

Medical costs Total with outliers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	14	13.6	13.6	13.6
	100	19	18.4	18.4	32.0
	200	20	19.4	19.4	51.5
	300	8	7.8	7.8	59.2
	400	13	12.6	12.6	71.8
	500	1	1.0	1.0	72.8
	600	2	1.9	1.9	74.8
	700	3	2.9	2.9	77.7
	800	7	6.8	6.8	84.5
	900	2	1.9	1.9	86.4
	1000	1	1.0	1.0	87.4
	1100	1	1.0	1.0	88.3
	1300	1	1.0	1.0	89.3
	1400	1	1.0	1.0	90.3
	1500	1	1.0	1.0	91.3
	1700	1	1.0	1.0	92.2
	1900	2	1.9	1.9	94.2
	2500	1	1.0	1.0	95.1
	3500	1	1.0	1.0	96.1
	4900	2	1.9	1.9	98.1
	6600	1	1.0	1.0	99.0
	6700	1	1.0	1.0	100.0

Medical costs Total with outliers

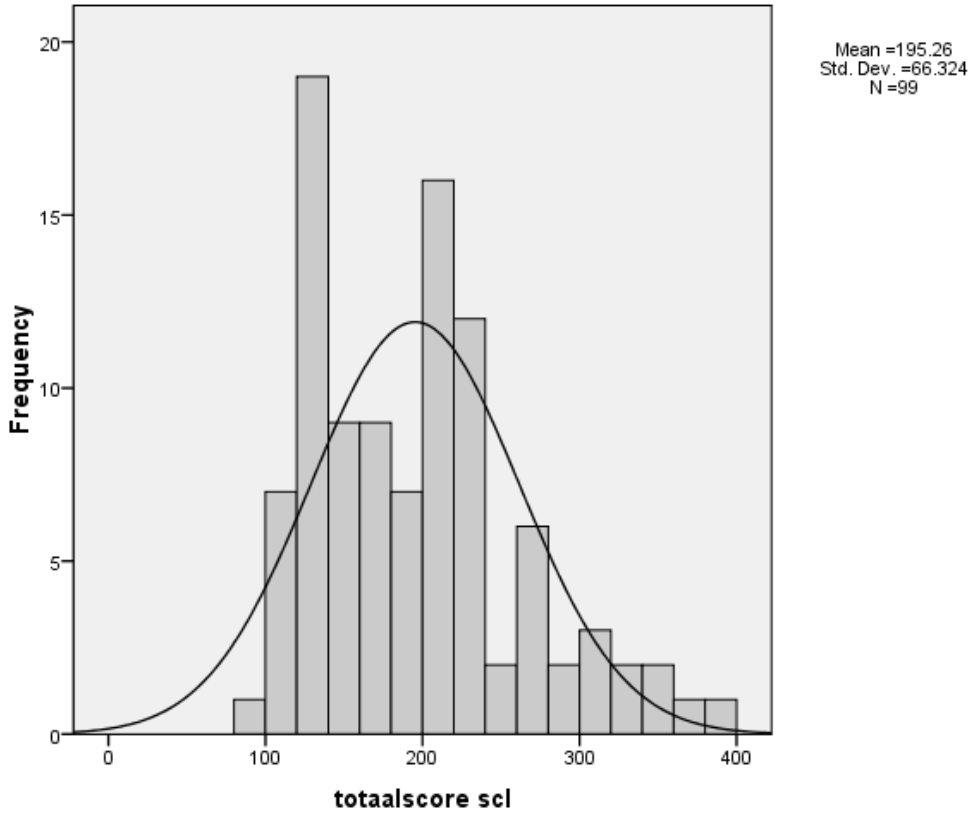
	Frequency	Percent	Valid Percent	Cumulative Percent
0	14	13.6	13.6	13.6
100	19	18.4	18.4	32.0
200	20	19.4	19.4	51.5
300	8	7.8	7.8	59.2
400	13	12.6	12.6	71.8
500	1	1.0	1.0	72.8
600	2	1.9	1.9	74.8
700	3	2.9	2.9	77.7
800	7	6.8	6.8	84.5
900	2	1.9	1.9	86.4
1000	1	1.0	1.0	87.4
1100	1	1.0	1.0	88.3
1300	1	1.0	1.0	89.3
1400	1	1.0	1.0	90.3
1500	1	1.0	1.0	91.3
1700	1	1.0	1.0	92.2
1900	2	1.9	1.9	94.2
2500	1	1.0	1.0	95.1
3500	1	1.0	1.0	96.1
4900	2	1.9	1.9	98.1
6600	1	1.0	1.0	99.0
6700	1	1.0	1.0	100.0
Total	103	100.0	100.0	

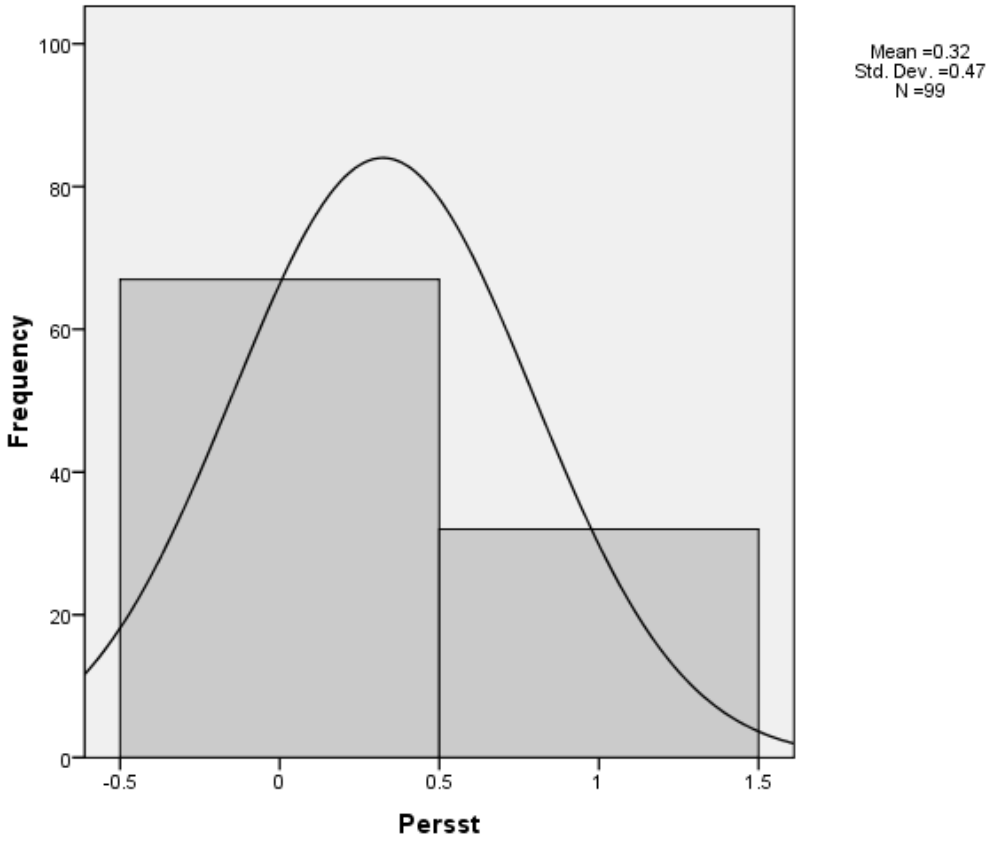
Medical costs Total with outliers removed

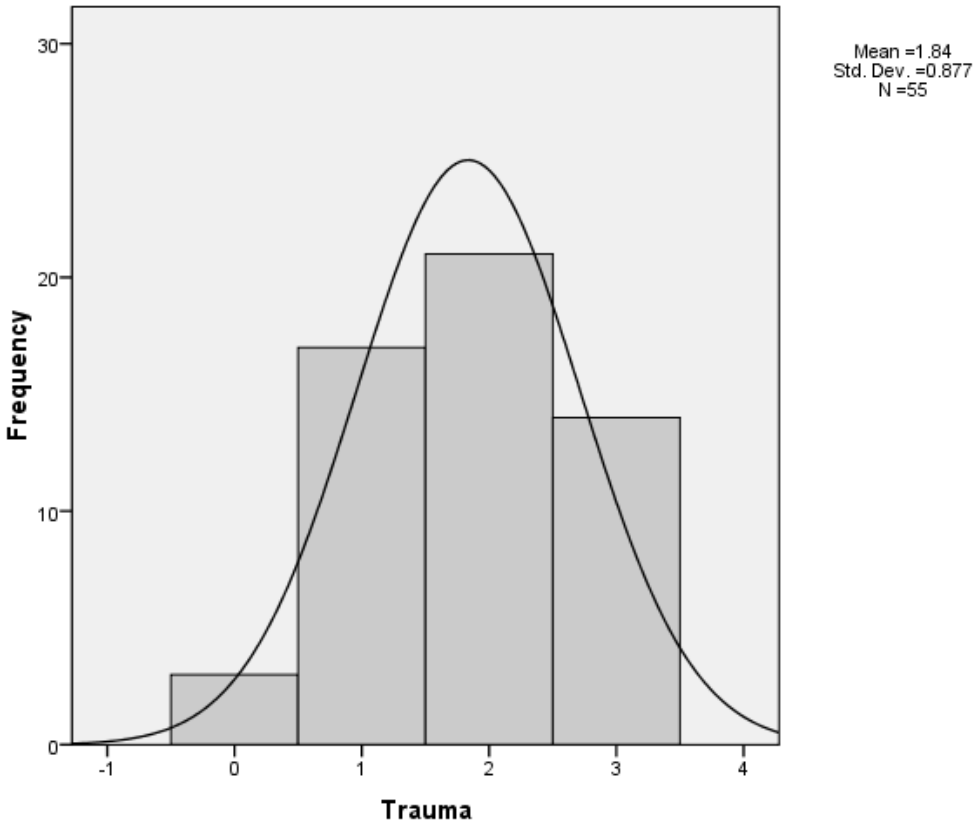
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	14	14.1	14.1	14.1
	100	19	19.2	19.2	33.3
	200	20	20.2	20.2	53.5
	300	8	8.1	8.1	61.6
	400	13	13.1	13.1	74.7
	500	1	1.0	1.0	75.8
	600	2	2.0	2.0	77.8
	700	3	3.0	3.0	80.8
	800	7	7.1	7.1	87.9
	900	2	2.0	2.0	89.9
	1000	1	1.0	1.0	90.9
	1100	1	1.0	1.0	91.9
	1300	1	1.0	1.0	92.9
	1400	1	1.0	1.0	93.9
	1500	1	1.0	1.0	94.9
	1700	1	1.0	1.0	96.0
	1900	2	2.0	2.0	98.0
	2500	1	1.0	1.0	99.0
	3500	1	1.0	1.0	100.0
	Total	99	100.0	100.0	

2. Assumptions with respect to normality & linearity

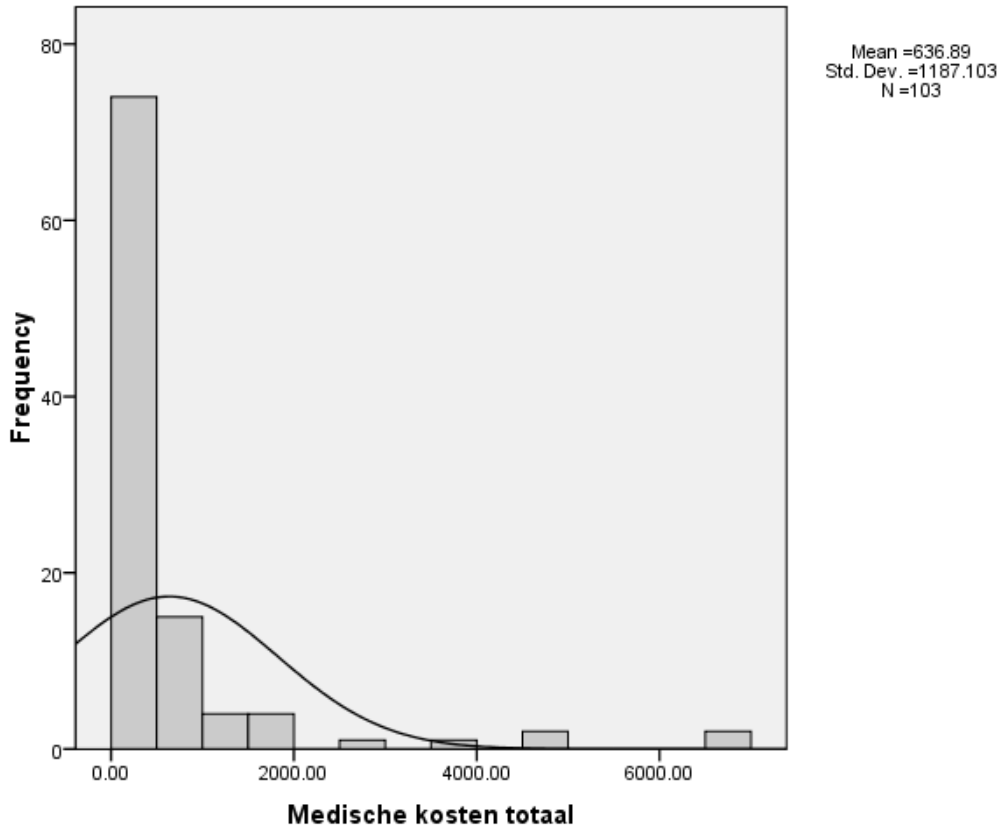
2.1. Histograms



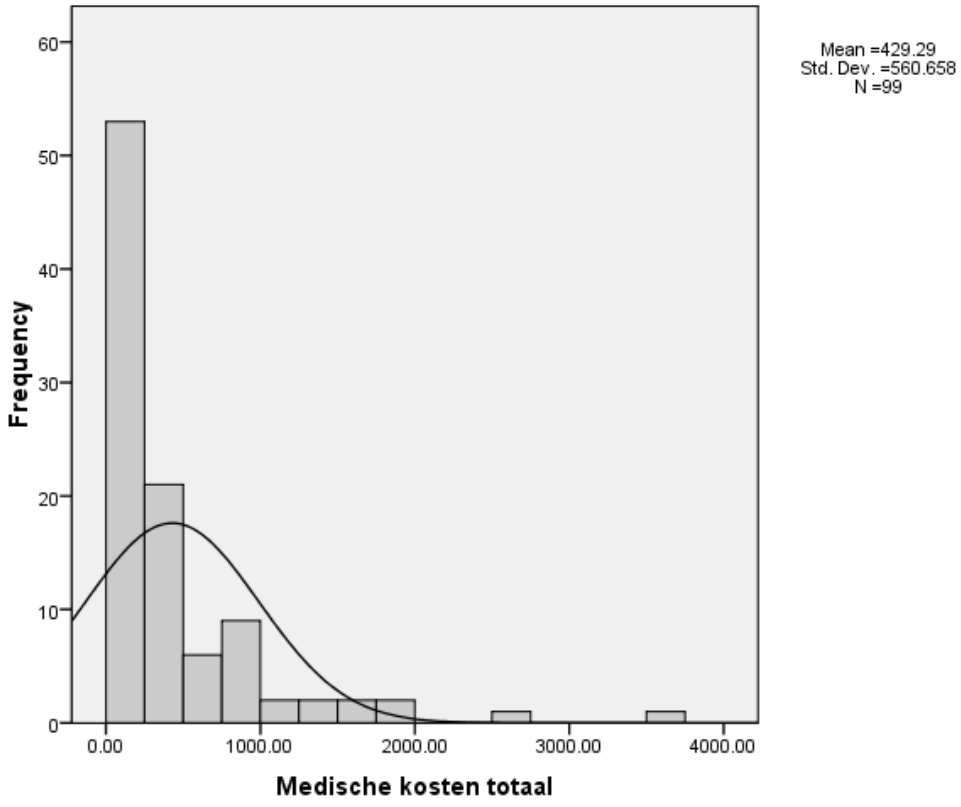

Mean =0.32
Std. Dev. =0.47
N =99
Frequency
100
80
60
40
20
0
-0.5
0
0.5
1
1.5
Persst


Mean =1.84
Std. Dev. =0.877
N =55
Frequency
30
20
10
0
-1
0
1
2
3
4
Trauma

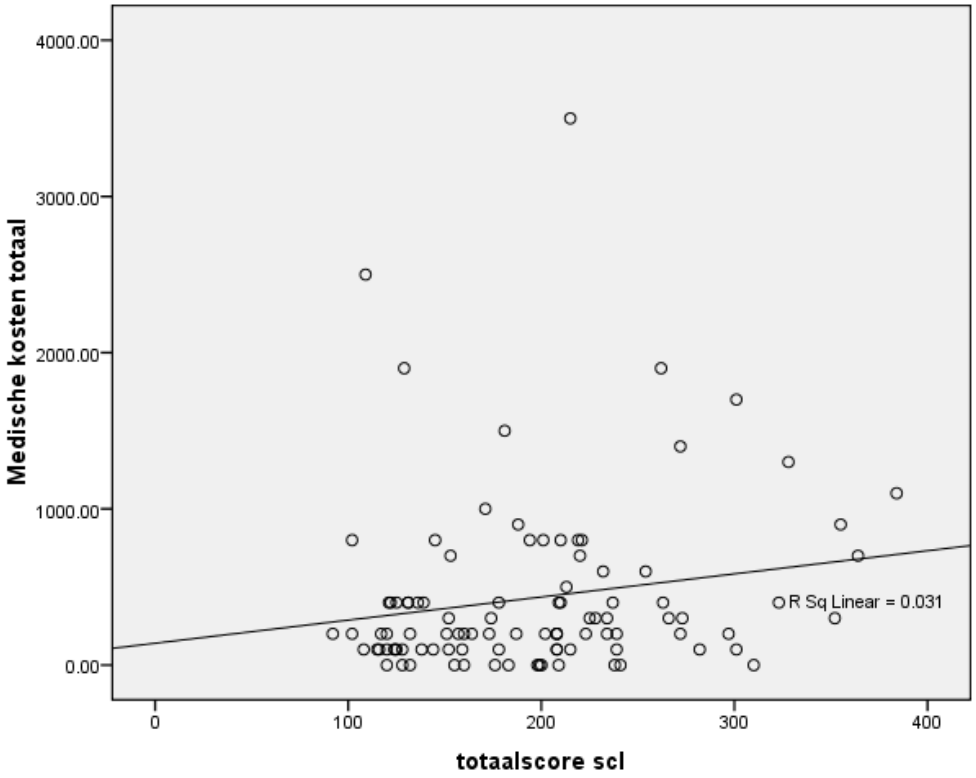
Before removal outliers

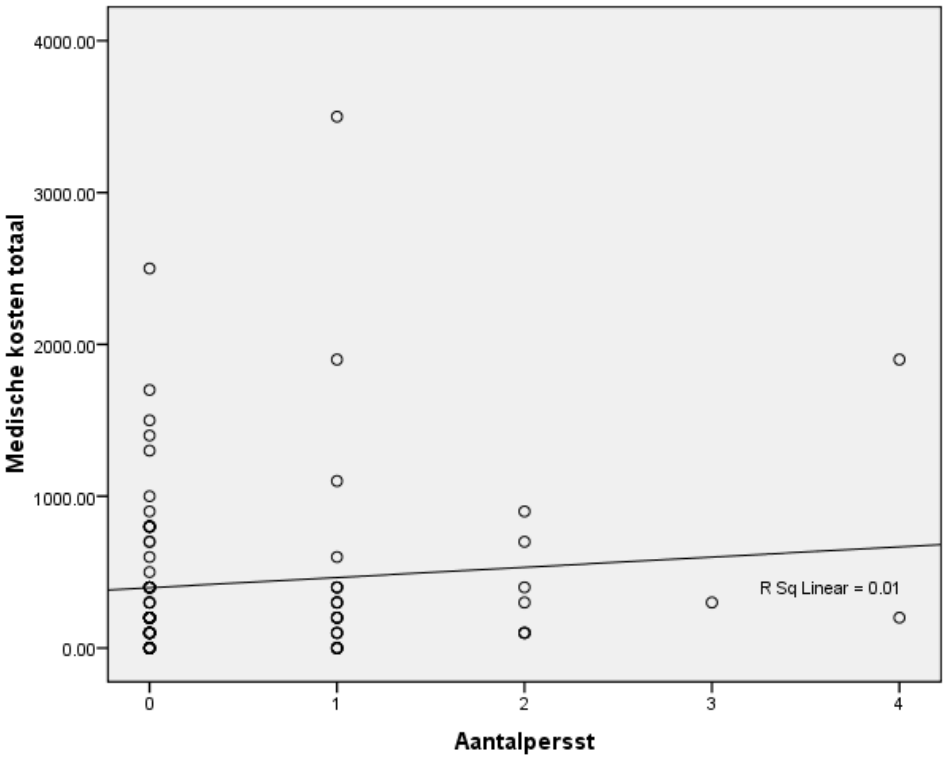


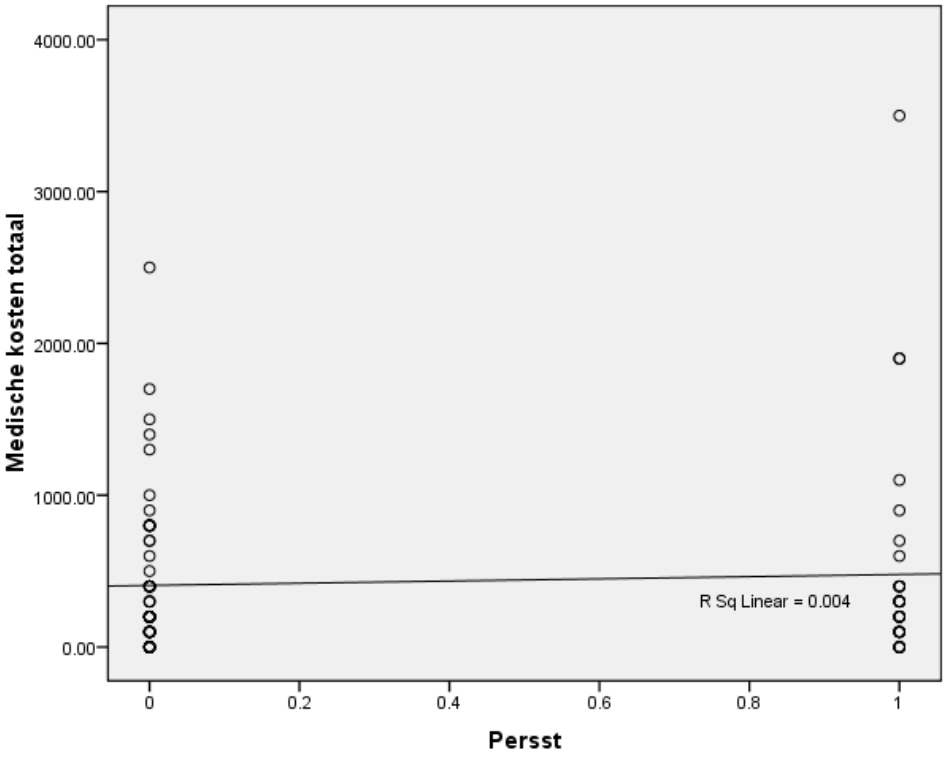
After removal extreme outliers

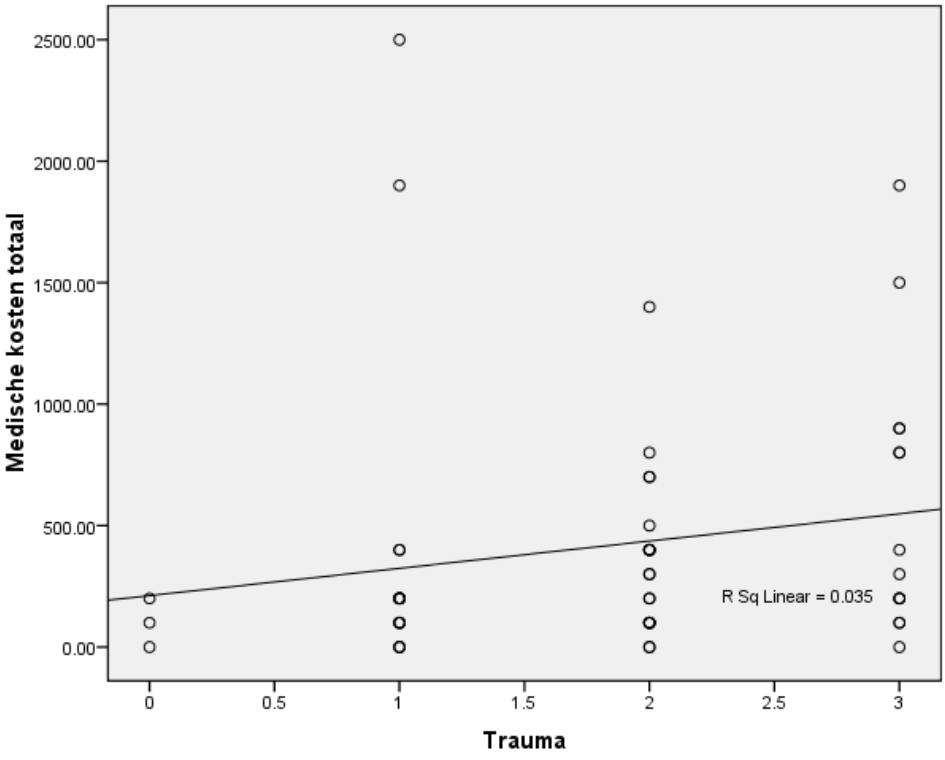


2.2. Scatterplots






Medische kosten totaal
4000.00
3000.00
2000.00
1000.00
0.00
R Sq Linear = 0.004
0
0.2
0.4
0.6
0.8
1
Persst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2000.00
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1000.00
500.00
0.00
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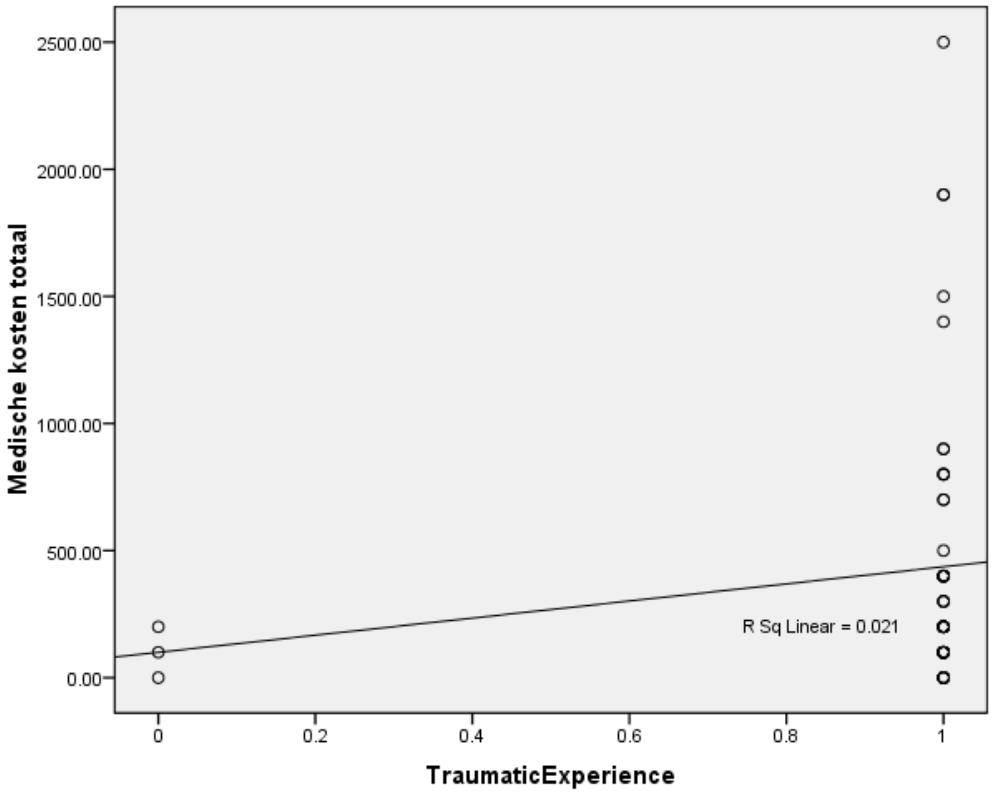
0
0.5
1
1.5
2
2.5
3
Trauma


Medische kosten totaal
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2000.00
1500.00
1000.00
500.00
0.00
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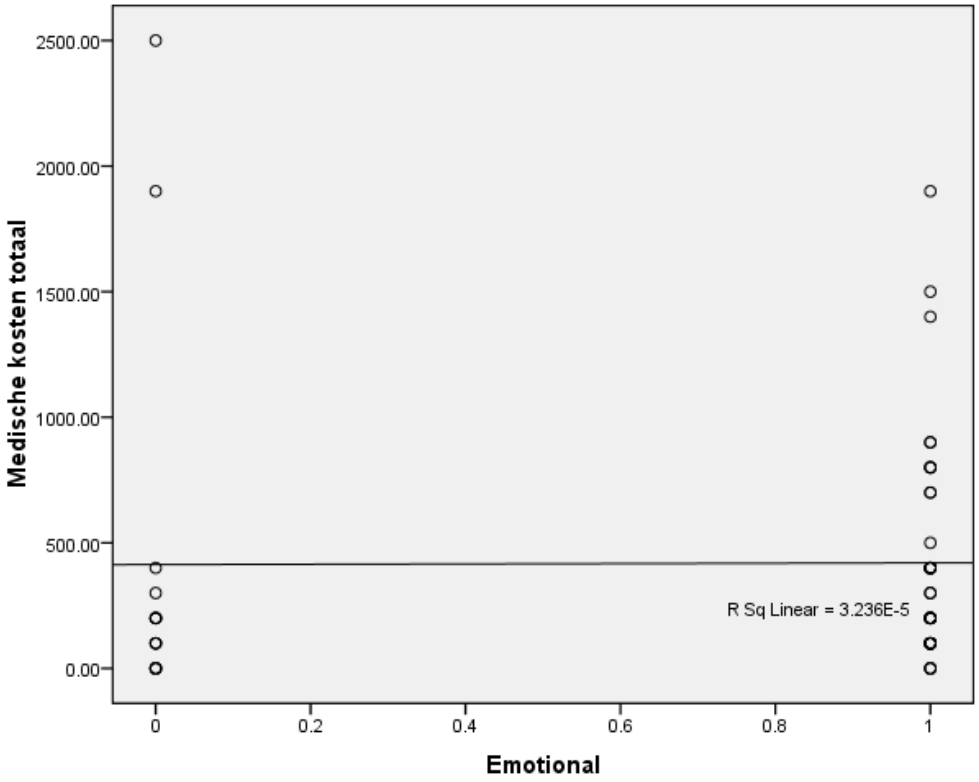
0.2
0.4
0.6
0.8
1
TraumaticExperience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1500.00
1000.00
500.00
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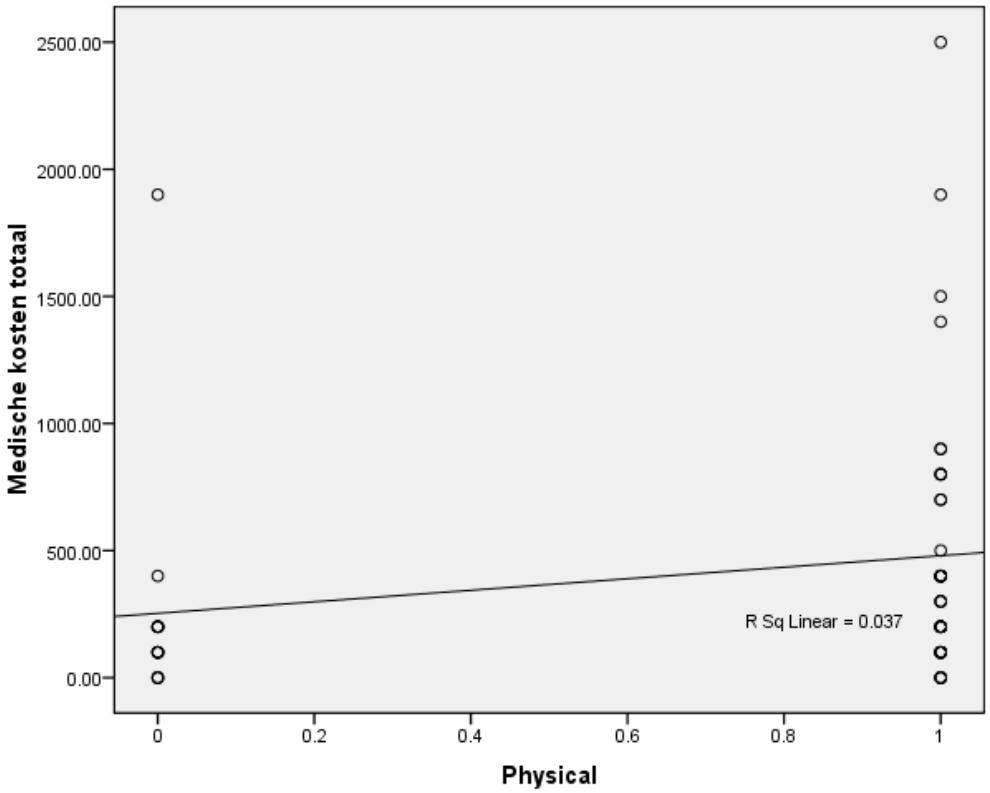
0.2
0.4
0.6
0.8
1
Emotional


Medische kosten totaal
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2000.00
1500.00
1000.00
500.00
0.00
R Sq Linear = 0.037
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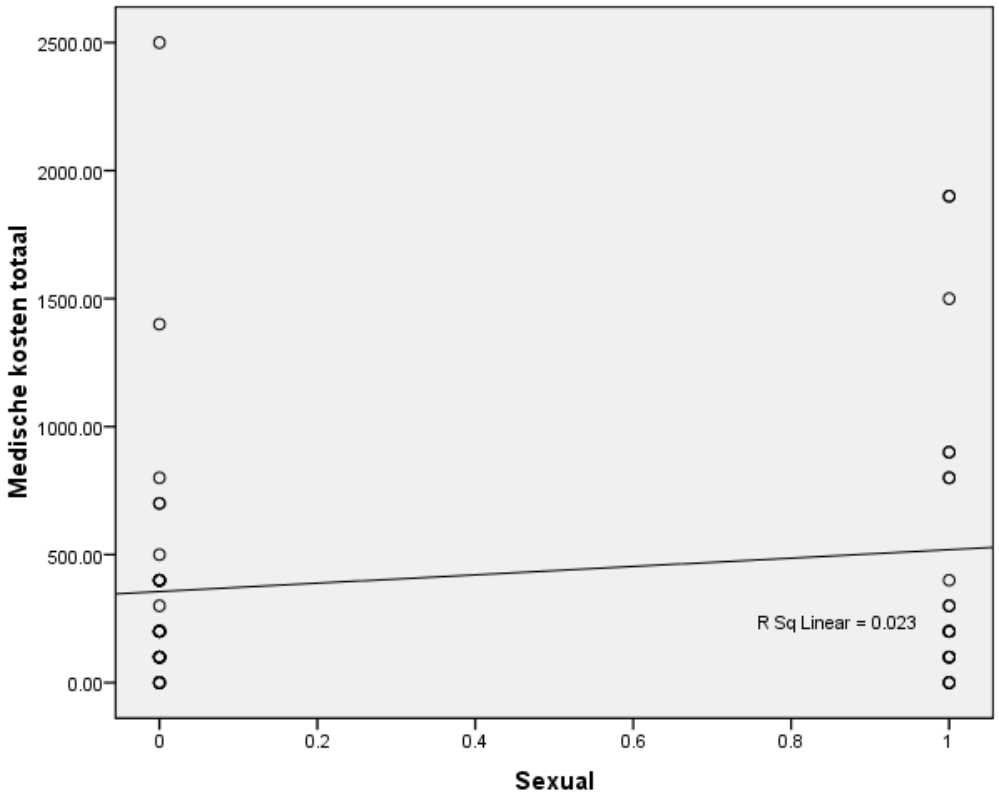
0.2
0.4
0.6
0.8
1
Physical


Medische kosten totaal
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2000.00
1500.00
1000.00
500.00
0.00
R Sq Linear = 0.023
0
0.2
0.4
0.6
0.8
1
Sexual

3. Spearman's r_s: nonparametric test of correlation (Self-reported symptomatic distress)

Correlations

			totalscore scl	Medical costs total
Spearman's rho	totalscore scl	Correlation Coefficient	1,000	,221*
		Sig. (2-tailed)	.	,028
		N	99	99
	Medical costs total	Correlation Coefficient	,221*	1,000
		Sig. (2-tailed)	,028	.
		N	99	99

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations

			totalscore scl	Medical costs total
Spearman's rho	totalscore scl	Correlation Coefficient	1,000	,221*
		Sig. (1-tailed)	.	,014
		N	99	99
	Medical costs total	Correlation Coefficient	,221*	1,000
		Sig. (1-tailed)	,014	.
		N	99	99

*. Correlation is significant at the 0.05 level (1-tailed).

4. Mann-Whitney test (Personality disorder)

Ranks

	PersDis	N	Mean Rank	Sum of Ranks
Medical costs total	absent	67	50,22	3364,50
	present	32	49,55	1585,50
	Total	99		

Test Statistics[a]

	Medical costs total
Mann-Whitney U	1057,500
Wilcoxon W	1585,500
Z	-,110
Asymp. Sig. (2-tailed)	,913

a. Grouping Variable: PersDis

5. Mann-Whitney test (Trauma)

Ranks

	Emotional	N	Mean Rank	Sum of Ranks
Medical costs total	absent	15	22,57	338,50
	present	40	30,04	1201,50
	Total	55		

Test Statistics[a]

	Medical costs total
Mann-Whitney U	218,500
Wilcoxon W	338,500
Z	-1,561
Asymp. Sig. (2-tailed)	,119

a. Grouping Variable: Emotional

Ranks

	Physical	N	Mean Rank	Sum of Ranks
Medical costs total	absent	15	19,93	299,00
	present	40	31,02	1241,00
	Total	55		

Test Statistics[a]

	Medical costs total
Mann-Whitney U	179,000
Wilcoxon W	299,000
Z	-2,317
Asymp. Sig. (2-tailed)	,020

a. Grouping Variable: Physical

Ranks

	Sexual	N	Mean Rank	Sum of Ranks
Medical costs total	absent	34	26,93	915,50
	present	21	29,74	624,50
	Total	55		

Test Statistics[a]

	Medical costs total
Mann-Whitney U	320,500
Wilcoxon W	915,500
Z	-,641
Asymp. Sig. (2-tailed)	,522

a. Grouping Variable: Sexual

6. Kruskal-Wallis test (Trauma)

Ranks

	Trauma	N	Mean Rank
Medical costs total	0	3	14,33
	1	17	23,79
	2	21	29,29
	3	14	34,11
	Total	55	

Test Statistics[a,b]

	Medical costs total
Chi-Square	5,672
df	3
Asymp. Sig.	,129

a. Kruskal Wallis Test

b. Grouping Variable: Trauma

7. Spearman's r_s: nonparametric test of correlation

Correlations

			Persdis	Emotional	Physical	Sexual	Trauma	Total score scl	Medical costs total
Spearman's rho	Persdis	Correlation Coefficient	1,000	-,107	,145	,230	,153	,181	-,011
		Sig. (2-tailed)	.	,437	,290	,092	,265	,072	,913
		N	99	55	55	55	55	99	99
	Emotional	Correlation Coefficient	-,107	1,000	,175	-,023	,578**	,279*	,212
		Sig. (2-tailed)	,437	.	,201	,868	,000	,039	,120
		N	55	55	55	55	55	55	55
	Physical	Correlation Coefficient	,145	,175	1,000	,145	,681**	,114	,315*
		Sig. (2-tailed)	,290	,201	.	,290	,000	,405	,019
		N	55	55	55	55	55	55	55
	Sexual	Correlation Coefficient	,230	-,023	,145	1,000	,624**	,230	,087
		Sig. (2-tailed)	,092	,868	,290	.	,000	,091	,527
		N	55	55	55	55	55	55	55
	Trauma	Correlation Coefficient	,153	,578**	,681**	,624**	1,000	,307*	,312*
		Sig. (2-tailed)	,265	,000	,000	,000	.	,023	,020
		N	55	55	55	55	55	55	55
	totalscore scl	Correlation Coefficient	,181	,279*	,114	,230	,307*	1,000	,221*
		Sig. (2-tailed)	,072	,039	,405	,091	,023	.	,028
		N	99	55	55	55	55	99	99
	Medical costs total	Correlation Coefficient	-,011	,212	,315*	,087	,312*	,221*	1,000
		Sig. (2-tailed)	,913	,120	,019	,527	,020	,028	.
		N	99	55	55	55	55	99	99

**. Correlation level is significant at the 0.01 level (2-tailed)

*. Correlation level is significant at the 0.05 level (2-tailed)

8. Regression analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-7,799	255,025		-,031	,976		
	totalscore scl	2,156	1,447	,231	1,490	,143	,765	1,308
	Emotional	-118,802	170,627	-,101	-,696	,490	,863	1,159
	Physical	229,177	164,474	,196	1,393	,170	,929	1,076
	Sexual	123,707	151,997	,115	,814	,420	,914	1,094
	Persdis	-199,919	163,827	-,186	-1,220	,228	,787	1,271

a. Dependent Variable: Medical costs total