Chapter 1

General Introduction
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Low back pain (LBP) is one of the most prevalent health problems in western societies. LBP is defined as pain or discomfort in the lumbar region, on one or both sides of the back, eventually radiating to the buttocks. LBP can be classified based on the duration of pain: acute LBP (ALBP): up to six weeks; sub-acute LBP (SLBP): between six weeks and three months; and chronic LBP (CLBP): over three months [11]. CLBP is one of the largest health related challenges in industrialized societies. CLBP has a large economic impact, mainly because of sickness absence and long-term disability [2,6,15,17].

Diagnosis of nonspecific LBP is made by exclusion of specific causes, identifiable through risk factors for serious pathology (red flags), and using diagnostic investigations [19]. The prognosis of ALBP is good, it is auto resolving in six weeks in most cases. In less than 10% of the cases ALBP will become chronic. Treatment of ALBP consists of reassuring the patient, providing information to remain as active as possible, and to avoid bed rest. The prognosis of CLBP is poor, as indicated by very low rate of resolution, even with treatment. In SLBP and CLBP, multidisciplinary pain rehabilitation is recommended, combining educational, cognitive behavioural and physical exercise treatments tailored to the individual needs. Aims of these rehabilitation programs are to reduce disability, and to improve functional capacity and participation [11]. In these treatment programs reduction of pain is not a primary goal.

The biopsychosocial model is applied worldwide to guide assessment and treatment of patients with CLBP [8,14,18,19]. According to this model, patient’s functioning is influenced by biomedical, psychological and social factors (Figure 1).

![Figure 1. The biopsychosocial model [19]](image)

Chronic pain may lead to disability, defined as ‘any restriction or lack of ability to perform an activity in the manner, or within the range considered normal for a human being.’ The
International Classification of Functioning, Disability and Health (ICF) has changed the emphasis from disability to activity and activity limitation.

![Diagram of the ICF model](image)

**Figure 2. The ICF model [20]**

In the ICF (Figure 2) components of health and health related components of well-being are defined. Disability is an umbrella term for impairments, activity limitations or participation restrictions. Functioning is an umbrella term encompassing all body functions, activities and participation [20]. Functional capacity is the patients’ capacity to execute work-related activities [1]. Chronic pain appears related to decreased activity and disability of patients with CLBP. Assessment of (dis)ability can be done by questionnaires, physical performance measures, assessment of work loss, or assessment of capacity for work [19]. Main goal of pain rehabilitation is to decrease disability and to regain functional capacity and participation. Knowledge of the relationship between factors within the biopsychosocial model and disability is important for optimal diagnosis and treatment of the patient with CLBP. Psychological factors such as distress, depression, anxiety and fear, self-efficacy, fear-avoidance beliefs, coping styles and cognitive factors generally are presumed to have more impact on back pain disability than biomedical or biomechanical factors [5,9,10,11,13,15,16].

Next to psychological factors, pain itself is also defined as a component of the biopsychosocial model. In the ICF pain is classified in the component body functions and defined as a sensation of unpleasant feeling indicating potential or actual damage to some body structure [20]. Damage to tissues such as muscles, discs and ligaments, may produce signals that lead to pain perception. A cascade of events in peripheral and central nerve system may lead to sensitization of pain modulating systems in the central nervous system. More insight in the mechanism of central sensitization is gained over the past decade [21]. Studies using positron emission tomography (PET) and functional MRI have contributed to the current understanding of cerebral pain networks, but a gap in knowledge still remains [4]. Sensitization may lead to
on-going of the perception of pain, even in the absence of actual tissue damage; the pain has become chronic [3,7,21]. The relationship between pain intensity and disability is indirect and complex. This complexity is, among others, suggested to be related to or mediated by psychological factors as distress, fear, coping style, and pain cognitions [13,18].

It was concluded that the relationships between factors within the biopsychosocial model and (dis)ability in patients with CLBP are complex, and the strength of these relationships is unclear. Yet it may be of great clinical importance to unravel these relations to reduce disability and optimize participation in patients with CLBP.

The main aim of this thesis was to gain a better understanding of determinants of disability and functional capacity in patients with CLBP. A determinant is any factor, whether event, characteristic, or other definable entity, that brings about change in a health condition or other defined characteristic [12]. Determinants are correlational and not necessarily causal, because correlation does not imply causation.

The main research questions in this thesis were:

1. What is the relationship between psychological distress and self-reported disability in patients with CLBP?
2. Are pain intensity and pain related fear related to functional capacity in patients with CLBP?
3. What is the relationship between psychological factors and performance-based and self-reported disability in patients with CLBP?
4. What is the relationship between psychosocial distress and self-reported disability in patients with CLBP and the role of pain intensity and patient characteristics in six Pain Rehabilitation Centers in the Netherlands?
5. Are psychological factors related to activity level in patients with chronic musculoskeletal pain?
6. What is the effect of analgesics on functional capacity and self-reported disability in patients with chronic low back pain?

**Outline of the thesis**

In the first part of the thesis (chapters 2-6) the focus lies on the relationship between psychological factors and self-reported disability and performance-based functional capacity in patients with CLBP.

In chapter 2 the relationship between pain intensity, and psychosocial distress and self-reported disability in patients with CLBP admitted for multidisciplinary pain rehabilitation treatment was assessed.

In chapter 3 the relationship between fear-avoidance beliefs and functional capacity, self-reported disability was studied.
In chapter 4 the relationship between a broad range of psychological factors and self-reported and functional capacity in patients with CLBP was focus of the study.
In chapter 5 the relationship between psychosocial distress and self-reported disability in six different Rehabilitation Centers in the Netherlands was studied, especially to analyze whether or not substantial differences between different populations exist.
In chapter 6 the relationship between psychological factors and activity level was studied in patients with chronic musculoskeletal pain. In this study activity level was measured with the RT3-accelerometer during one week.
In the last part of the thesis (chapter 7) the focus was on the relationship between pain reduction and functioning in patients with CLBP. A triple blinded Randomized Controlled Trial was conducted to assess the effect of analgesics in an experimental and control group on functional capacity and self-reported disability in patients with CLBP.
In chapter 8 the clinical implications and possible consequences in the treatment according to the bio-psychosocial model in multidisciplinary pain rehabilitation are discussed. In addition, consequences for future research are included.
Chapter 1

References