

Chapter 1

Introduction

1.1 Background

Low back pain disorder (LBP) is a health problem that directly impact on people, economic and social (Krismer & van Tulder, 2007; Staal, Rainville, Fritz, van Mechelen, & Pransky, 2005). The LBP has a variety of meanings. LBP is often referred the pain, a strained muscle or seizure of tissue restraining lower vertical rib 12 down to the gluteal fold that may have or have no symptoms or pain down the leg (Deyo, et al., 1998; Staal, et al., 2002), which causes symptoms such outstanding than 24 hours (de Vet, et al., 2002). However, there was arguement about the appropriate definition for research in epidemiology. In order to bring the study to be comparable, so Dionne and research team in 2008 established a questionnaire that was criticized by experts on the LBP definition. Questionnaires include a series of questions to the appropriate image used in the epidemiology of LBP (Dionne, et al., 2008).

In the industrial countries, LBP is an important health problems that are frequent about 70 percent of the population of working age. A systematic review found that the rate of LBP during the life time of repeated 85 %. The majority of Western countries, LBP is associated with the cost of medical care, lack of impotence in the works (van Tulder, Koes, & Bouter, 1995). A study of the Occupational Health Division, Department of Health surveyed problems abnormalities of muscle, bones and joints due to industrial action in over 300 offices in 48 provinces throughout Thailand. And interview workers to have pain and fatigue are part of the body as a total of 2,595 people showed that 78.5 percent of the study population had pain and fatigue, finding the LBP most of percentage 52.4. In the Replacement Fund Statistics from Network Compensation Fund, Social Security Office of Thailand in 2006 found that back and spinal problems around 7 per cent (5,390 persons from 204,257 persons) compared with other organs (*Social Security Statistics 2006: Statistics of Workmen's Compensation Fund (Covered by WCF)*, 2007).

There were many studies about the associated factors for LBP. Based on biopsychosocial model theory, risk factors that lead to musculoskeletal disorder should consider three areas: the physical, mental and social environment. The physical factors include personal factors and work-related factors (Waddell, 1998).

Trunk muscle performance is one of physical factors that including physical strength, durability, flexibility and stability of the spine. Past study reported that there was the association between the LBP and trunk muscle performance, however, still there are some scientific evidence arguments. Whether the strength of the trunk muscles causing LBP or not. Kujala surveyed self-reported LBP by mailing, the results found that no difference of the strength and durability of the back muscle among LBP and non-LBP participants in the study for 5-year follow-up period (Kujala, et al., 1996). In contrast to the research in 2008 found that the low durability of a back muscle violence increased the risk of LBP (Stroyer & Jensen, 2008). A study (Masset, Piette, & Malchaire, 1998) found the association between the incidence of LBP and trunk rotation and lateral flexion over than trunk flexion and extension. Lee (Lee, et al., 1999) found valuable extension/ flexion ratio in the volunteer group with self-reported LBP was less than the group without LBP. This showed that the balance between extensor and flexor muscle groups may affect the LBP (Lee, et al., 1999). Moreover, the measurement of trunk muscle strength by using Isokinetic BiodexTM Sytem-3 in 53 wrestling found that self-reported LBP from the questionnaire correlated with peak torque at test speeds at 120, 60 and 90 degrees per second respectively (Iwai, Nakazato, Irie, Fujimoto, & Nakajima, 2004).

Systematic review of the Hamberg-van Reenen in 2007 (Hamberg-van Reenen, Ariens, Blatter, van Mechelen, & Bongers, 2007) found that has been concluded the association between trunk muscle strength, the movement of the spine and LBP (Hamberg-van Reenen, et al., 2007). Due to each study was differed in evaluation techniques in trunk muscle strength and the movement of the spine. Majority of studies have been referred to LBP by assessing the self-reported LBP (Adams, Mannion, &

Dolan, 1999; Barnekow-Bergkvist, Hedberg, Janlert, & Jansson, 1998; Josephson, Hagberg, & Hjelm, 1996; Kujala, et al., 1996; Masset, et al., 1998; Rissanen, et al., 2002; Takala & Viikari-Juntura, 2000) and the definition of LBP was set differently. In addition, the evaluation of trunk muscle strength different methods such as the Isometric muscle strength test (Adams, et al., 1999; Alaranta, Luoto, Heliovaara, & Hurri, 1995), Isokinetic muscle strength test (Lee, et al., 1999; Masset, et al., 1998; Takala & Viikari-Juntura, 2000) and dynamic functional test (Rissanen, et al., 2002; Stevenson, Weber, Smith, Dumas, & Albert, 2001).

The stability of the spine caused by collaboration among 3 anatomy systems consists of back spine, trunk muscles and nervous system (Panjabi, 2003). The research found that coordination between the transversus abdominis and multifidus muscles is important for the stability of the spine (Hodges & Richardson, 1996; Storheim, Bo, Pederstad, & Jahnsen, 2002). Because these two muscle increases thoracolumbar fascia strength, which acts as a stability shield of the lumbar spine. A study showed that the work of transversus abdominis muscle is slower in patients with LBP (Hodges & Richardson, 1996). However, there have not found the prospective study of working muscles transversus abdominis and the multifidus muscle.

From these reasons, the researcher also found that no study for the incidence of LBP and find the association of LBP and trunk muscle performances in the Thai population. Therefore, the researcher is interesting for the incidence of LBP and evaluate the association of trunk muscle performance and the incidence of LBP for 6-month follow-up period among Thammasat University staff. (Rangsit Campus).

1.2 The objectives of the study

1.2.1 Main objective

To determine the 6-month prevalence and risk factors of LBP and measured the effect of trunk muscle performance on the 6-month incidence of LBP among Thammasat University staff at Rangsit Campus.

1.2.2 Secondary objectives

1.2.2.1 To evaluate the 6-month prevalence of LBP among Thammasat University staff at Rangsit Campus.

1.2.2.2 To identify the risk factors of the 6-month prevalence of LBP.

1.2.2.3 To evaluate the 6-month incidence of LBP among Thammasat University staff at Rangsit Campus.

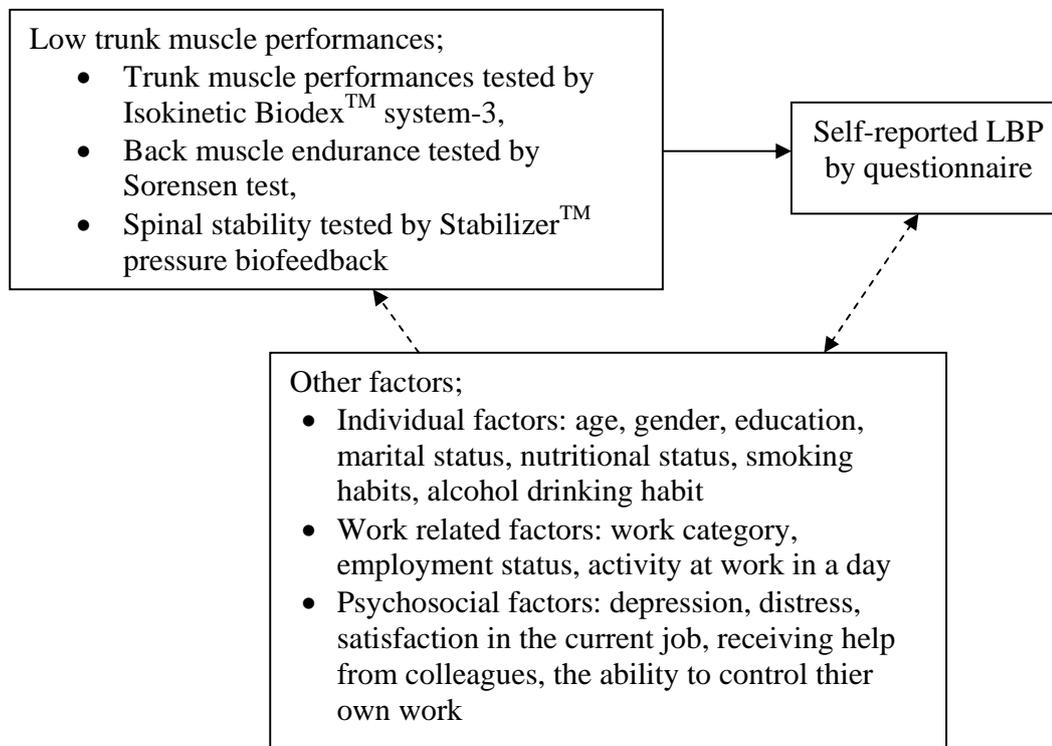
1.2.2.4 To identify the risk factors for the 6-month incidence of LBP.

1.2.2.5 To determine the association between the 6-month incidence of LBP and the trunk muscle performances including characteristics that measured by Isokinetic BiodexTM system 3; peak torque/ body weight, work/ body weight, average power, work first third; work last third, and extension/flexion ratio, trunk muscle endurance measured by time in seconds from the Sorensen test, and the level of spinal stability assessment by StabilizerTM pressure biofeedback.

1.3 Scope of the study

This study investigated the 6-month prevalence and associated risk factors of LBP and also measured the effect of trunk muscle performance on the 6-month incidence of LBP among Thammasat University staff both male and female aged between 18-45 years. The trunk muscle performances composed of muscle performance testing by Isokinetic BiodexTM System-3, Endurance of back muscle by Sorensen test, and stability test of the spine by using StabilizerTM pressure biofeedback.

1.4 Conceptual frame work



1.5 Definition of parameters

1.5.1 Low back pain

LBP refers to self-reported pain or discomfort in a lumbar area without leg pain and this pain was bad enough to limited usual activities or change daily routine life for more than 1 day in the past 6 month. LBP in this study was reported by the low back pain questionnaire which volunteer answered "ever" in the question number 1 and answered "yes" in the question number 2.

1.5.2 Habitual physical activity level

The habitual physical activity level was physical activities in term of usual time spent in various types of activities including work index and sport index and leisure-time index which measured by a self-administered questionnaire (Baecke, Burema, & Frijters, 1982). This questionnaire composed of 16 items and could categorized into 3 levels of

physical activities including; sedentary subject = scores below 6, active subject = scores 6 – 8, and athletic subject = scores above 8.

1.5.3 Trunk muscle performance testing by Isokinetic Biodex™ System-3

The trunk muscle performances that produced by Isokinetic Biodex™ System-3. The direction of test was in trunk flexion and extension. Total range of motion was 100 degrees.

1.5.5 Endurance of back muscle

Maximum period of assessment as shown by time in seconds by Sorensen test.

1.5.6 Stability of the spine

Highest level of spinal stability using the Stabilizer™ pressure biofeedback.

1.6 Eexpected result

This is a study of the problem of LBP in government officialpeople and the factors relevant to the cause of LBP. The result of this study could provide the information for preventive planning for the LBP in government departments. The healthy is fundamental to the national needs. There should be research on the issues behind the LBP of government personnel as well as learn risk factors that may cause the occurrence of LBP.

Table 1.1 Parameters of trunk muscle performances used in this study

Measurements	Parameters	Unit	Meaning
Trunk muscle performance on Isokinetic Biodex™ system-3	Peak torque / body weight	Percentage (%)	The single highest torque output produced by muscle contraction as the trunk moves through the range of motion divided by body weight.
	Work / body weight	Percentage (%)	Sum of all work (area under the torque versus time curve) performed in all the pre-selected test repetitions divided by body weight.
	Average power	Watt (Watts)	The total work performed during the given contraction, divided by the actual total movement time.
	Work first third	Joules	The sum of all work on the first part of torque versus time curve in all the pre-selected test repetitions.
	Work last third	Joules	The sum of all work on the last part of torque versus time curve in all the pre-selected test repetitions.
Balance of trunk muscles	Extension/ Flexion ratio	-	The ratio between peak torque of trunk extensors and trunk flexors.
Endurance of back muscle	Time from Sorensen test	Seconds	Maximum period of assessment by Sorensen test.
Stability of the spine	Highest level from Stabilization test	Level 1-6	Highest level of spinal stability using the Stabilizer™ pressure biofeedback