

Original Article

## Factors Associated with Low Back Pain in Non-Professional Caregivers of Dependent Spinal Cord Lesion Patients

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### Abstract

**Background:** The number of spinal cord injury patients is rising every year. Caregivers play a role for taking care of these patients. The caregiver activities involving bending, twisting, frequent heavy lifting, awkward static posture, and psychological stress tend to result of low back pain.

**Objective:** To evaluate prevalence and factors associated with low back pain among non-professional caregivers of dependent spinal cord lesion patients.

**Methodology:** Participants included 96 non-professional caregivers of dependent spinal cord lesion survivors in rehabilitation clinic. Age, gender, body weight, neurological level, and Spinal Cord Independence Measure (SCIM) of patients and age, gender, BMI, low back pain history and Thai Modified Oswestry Disability Index were reported. All baseline characteristics and prevalence of low back pain was summarized in number percentage, mean and standard deviation. Association between risk factors and low back pain was analyzed by univariate analysis (significant p value < 0.05).

**Results:** The prevalence of low back pain among those caregivers was 64.6 percent. Low back pain associated factors were age less than 60 years, female, taking time more than 8 hours per day, history of smoking, and history of regular exercise.

**Conclusions:** Non-professional caregivers of dependent spinal cord lesion patients had a higher prevalence of low back pain which was associated with age, gender, caregiving duration, smoking, and history of regular exercise.

**Keywords:** Caregiver, Spinal cord lesion, Low back pain

### Background

In recent times, the life expectancy in disabled populations has increased (Thomas & Barnes, 2010). Spinal cord injury is common cause of physical disabilities. Dependent spinal cord lesion patients usually need some help from their caregivers for bed mobility, transfer and activity daily living (Bardak, Erhan & Gunduz, 2012).

The caregiver activities involving bending, twisting, frequent heavy lifting, awkward static posture and psychological stress tend to result of low back pain (LBP) (Yalcinkaya et al., 2010). In real life, most of caregivers are non-professional which lack the knowledge of back safety and lifting techniques (Tao & McRoy, 2015). These may be a leading cause of LBP.

Prevalence of LBP in general population was 12-42 percent (Andersson, 1999 & Freburger, 2009). For 90 percent of LBP, the symptom is benign and improved in 6 weeks, however, remainder of 10 percent did not recover and developed chronic LBP (Leboeuf-Yde, 2013). Moreover, the prevalence of low back pain among professional caregivers of spinal cord injured patients who were not family members (spouses, parents, children, other relatives, etc.) was 58 percent (Bardak, Erhan & Gunduz, 2012). Various risk factors of LBP such as female, obesity, smoking, family history of LBP, depression and history lack of exercise have been described in many researches (Ganesan, 2017 & Rossignol, Rozenberg & Leclerc, 2009). In addition, LBP is not only a common reason for lost workdays due to decline of functional and psychological performances (Stewart et al., 2003) but also the leading causes of high health care costs (Becker et al., 2010). Therefore, preventing and avoiding LBP in non-professional caregivers can prevent LBP progression. The associated modifiable and non-modifiable risk factors must be investigated.

To the best of our knowledge, there are no previous published researches of LBP in non-professional caregivers of dependent spinal cord lesion patients. The purpose of the present study was to evaluate the prevalence of LBP in caregivers of dependent spinal cord lesion patients and determine factors associated with LBP.

## Methodology

**Setting:** Rehabilitation outpatient unit and inpatient unit, Srinagarind hospital, Khon Kaen University, Thailand

**Study design:** A cross sectional study

**Participants:** The non-professional caregivers of patients with dependent SCI who were rehabilitated in our clinic during November 2014 to April 2015 were recruited to the study. Inclusion criteria were: age more than 18 years old; history of taking care spinal cord lesion patients more than 3 months; and give written informed consent. Exclusion criteria was history of spine's pathology and previous episodes of LBP. This study was approved by Khon Kaen University Ethics Committee in human research (HE 571376).

## Operational definitions:

- Low back pain: pain and discomfort, localized below the costal margin and above the inferior gluteal folds, with or without leg pain.
- Dependent spinal cord lesion patients: Spinal Cord Independence Measure (SCIM) score of SCI patients in one or the other items less than 2
- History of regular exercise: During 3 months former, exercise more than 30 minutes per day, at least 3 days per week

All of 96 participants completed a questionnaire. The first part of the questionnaire consisted of SCI patients' demographic characteristics. Data regarding age, gender, weight, neurological level, ASIA classification and Spinal Cord Independence Measure (SCIM) which was used to determine the level of functional independence. This scale consists of 3 major items. These items involve self-care (feeding, bathing, dressing and grooming), respiration-sphincter management (respiration, bowel-bladder management, use of toilet) and mobility (transfer to bed, ground and toilet tub). Each of these items is rated on a ordinal scale, with score less than 2 indicating dependence (Catz et al., 2006). The second part of the questionnaire consisted of non-professional caregivers of dependent spinal cord lesion patients' data informed about age, gender, BMI, occupation, history of regular exercise, history of smoking and duration of taking care their patients. Caregivers were interviewed whether they had LBP. The extent of LBP was assessed by using the Thai Modified Oswestry Disability Index which is one of the most commonly used scales for evaluating individuals with LBP. The scale consists of 10 items addressing how LBP affects the individuals' ability in activity of daily living. Each item is rated from 0 to 5 points, with higher values representing greater disability (Sakulsriprasert et al., 2006). Thai Modified Oswestry Disability Index was qualified with good internal consistency. The Cronbach's alpha of all items was 0.8107 that indicated a high reliability (Sanjaroensuttikul, 2007).

Primary outcome was prevalence of LBP in non-professional caregivers of dependent spinal cord

lesion patients. Secondary outcome was factors associated of LBP.

#### Statistical analysis:

Data from all participants were analyzed according to data being available. No imputation was implemented to missing data. All statistical tests will be two-sided with a significant level of 0.05. All statistical analysis were performed by using SPSS Version 17. All baseline characteristics and prevalence of LBP were summarized in number percentage, mean and standard deviation. Association between factors and LBP were analyzed by univariate analysis (significant p value < 0.05).

#### Result

The number of non- professional caregivers was 96 (69 females and 27 males; mean age 47 years). The average BMI was  $23.82 \pm 3.97$  kg/m<sup>2</sup>. Most of caregivers was taking care the patients more than 8 hours per day. The other of demographic characteristics of caregivers were shown in Table 1. According to baseline characteristics of dependent spinal cord injury patients, most of spinal cord injury patient was tetraplegia 52.1%. Average age 45 years and mean SCIM score was 45.36. (Table 2).

**Table 1: Baseline characteristic of caregiver**

Data	Number
<b>Gender, number(%)</b>	
female	69 (71.9)
<b>Age (years)</b>	
Mean±SD	47.83±13.00
<b>Weight (kg)</b>	
Mean±SD	60.34±10.61
<b>Height (cm)</b>	
Mean±SD	157.91±16.68
<b>BMI (kg/m<sup>2</sup>), number(%)</b>	
Normal	48 (50.0)
Overweight	18 (18.8)
Obesity	30 (31.3)
Mean±SD	23.82±3.97
<b>History of smoking, number (%)</b>	
yes	8 (8.3)
no	88 (91.7)
<b>History of regular exercise, number (%)</b>	
yes	45 (46.9)
no	51 (53.1)
<b>Take care duration (year)</b>	
Mean±SD	5.61±5.20
<b>Take care time per day (hr) number(%)</b>	
Less than 8 hr.	32 (33)
More than 8 hr.	64 (66)
Mean±SD	13.21±8.21

**Table 2: Baseline characteristics of dependent spinal cord injury patients**

Data	Number
<b>Sex, number (%)</b>	
Male	55 (57.3)
<b>Age (years)</b>	
Mean±SD	45.46±15.67
Min-max	7-80
<b>Weight (kg)</b>	
Mean±SD	56.94±10.52
<b>Neurological level, number (%)</b>	
Tetraplegia	50 (52.1)
Paraplegia	46 (47.9)
<b>AIS, number (%)</b>	
ASIA A	37 (38.5)
ASIA B	17 (17.7)
ASIA C	28 (29.2)
ASIA D	14 (14.6)
<b>SCIM scale (Mean±SD)</b>	
Self-Care	13.55±7.74
Respiration and sphincter Management	20.01±6.29
Mobility	11.69±8.02
Total	45.36±19.35

\* AIS = American Spinal Injury Association Impairment Scale \*\* ASIA = American Spinal Injury Association

\*\*\* SCIM = Spinal Cord Independence Measure

**Table 3: Association between factors and LBP**

Factors	Caregivers with LBP (N)	Caregivers without LBP (N)	P value
<b>Age(years)</b>			
< 60	44	31	.000*
≥ 60	18	3	
<b>Gender</b>			
Male	19	8	.020*
Female	43	26	
<b>BMI(kg/m<sup>2</sup>)</b>			
Normal	34	14	
Overweight	12	6	.074
Obesity	16	14	
<b>Take care time per day(hr)</b>			
< 8 hr	18	13	.000*
≥ 8 hr	44	21	
<b>History of smoking</b>			
yes	56	32	.000*
no	6	2	
<b>History of regular exercise</b>			
yes	34	11	.035 *
no	28	23	
<b>Neurological level</b>			
Tetraplegia	31	19	.368
Paraplegia	31	15	
<b>SCIM scale** (Self-Care)</b>			
0-10	23	12	.861
11-20	39	22	
<b>SCIM scale** (Respiration and sphincter)</b>			
0-20	36	23	.356
21-40	26	11	
<b>SCIM scale** (Management Mobility)</b>			
0-20	54	29	.517
21-40	8	5	
<b>SCIM scale** (Total)</b>			
0-50	25	17	.762
51-100	33	17	

\* p value < 0.05 \*\* SCIM = Spinal Cord Independence Measure

Prevalence of LBP in non-professional caregivers of dependent spinal cord lesion patients was 64.6%. Thai Modified Oswestry Disability Index was 25.94 which classified to moderate disability level. In addition, factors associated with LBP were age less than 60 years, female, taking time more than 8 hours per day, history of smoking, and history of regular exercise ( $P < 0.05$ ). (Table III).

### Discussion

In this study, we found a higher prevalence of LBP in caregivers of dependent spinal cord lesion patients compared to the previous study (Bardak, Erhan & Gunduz, 2012). Among the participants in this study, we recruited only non-professional caregivers which the most is their patients' relatives, whereas in the study of Bardak, Erhan & Gunduz was included only professional caregivers which usually know about the knowledge of correct back safety and proper lifting techniques (Tao & McRoy, 2015). The current study, the severity of LBP was classified by Thai Modified Oswestry Disability Index of LBP was moderate disability level which was characterized experiences more pain and difficulty with sitting, lifting and standing. Travel and social life was more difficult and may be disabled from work. Personal care, sexual activity and sleeping were not grossly affected and could be managed by conservative means. The severity of LBP in non-professional caregivers of dependent spinal cord lesion patients was similar to the caregivers of stroke patients (Yalcinkaya et al., 2010).

LBP was associated with modifiable (taking time more than 8 hours per day, history of regular exercise, and history of smoking) and non-modifiable factors (age less than 60 years, and female). In this study, cut off point of taking time was 8 hours per day because Thai labor law stipulated that the maximum number of working hours of employees in Thailand is 8 hours a day. This was attributed to caregiving that cause LBP having been carried out for a long period per day. Moreover, caregivers with history of regular exercise had LBP less than caregivers without history of regular exercise. It was accord with previous study which found that the primary health care clinics' caregivers with regular

exercise were significantly low prevalence of LBP (Bener, et al., 2014). Moreover, history of smoking had a significant effect on the presence of LBP which was similar to the study of Al-Obaidi, et al., 2004 which was mentioned that chronic nicotine usage causes the muscles to be malnourished or perhaps smokers have other negative lifestyles such as inactivity, being overweight, or alcohol drinking. LBP was more prevalent in female and age less than 60 years. Regarding to Kozinoga, et al., 2015, LBP is a massive problem in women with aged 45-60 years because they are going through perimenopausal and post-menopausal periods of life which is a result of slower production of sex hormones.

Nevertheless, there was no association between Spinal Cord Independence Measure (SCIM) and LBP which was different to other studies which found significant correlation between low functional score and LBP (Bardak, Erhan & Gun 2012; Yalcinkaya et al., 2010; Tong et al., 2003). It may be caused by different caregivers group and study designs.

Thereby, physicians who deal with dependent spinal cord lesion patients should recognize the occurrence of LBP in their caregivers in order to consider surveillance, early detection and improve the quality of holistic care. Physical therapy program for back safety techniques should be also trained for non-professional caregivers to prevent LBP.

### Conclusion

LBP common occurs in caregivers of dependent spinal cord lesion patients. The study identified that age, gender, caregiving duration, smoking, and history of regular exercise precipitated LBP. Identifying these factors at an early stage will prevent progression of LBP.

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