Prevalence and Risk Factors of Low Back Pain among the University Staff

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Background: *Low back pain (LBP) is one of the most common musculoskeletal disorders in the population especially in working population. Many intrinsic and extrinsic factors have been evaluated for associated factor for LBP. Epidemiological researches have been provided information on the prevalence and risk factors of LBP in the workers. Little information has related individual and work-related factors to the prevalence of LBP among the university staff in Thailand.*
Aim: *The author aims to investigate the prevalence of LBP and explore risk factors of LBP among university staff in the government sector.*
Material and Method: *The self-administered questionnaires were distributed to 1,183 university staff on the list by official messenger. Data were collected over three months between October and December 2008. The questionnaire included low back pain information, demographic data, work-related characteristics, and habitual physical activity level. Data were analyzed using Chi-square and multivariate logistic regression techniques. The 6-month prevalence and associated risk factors were presented.*
Results: *Eight hundred and three staff returned the questionnaires (response rate of 67.9%). The past 6-month prevalence of self-reported LBP was 22.3% (95% CI: 19.4-25.2). The result of multivariate analysis showed that habitual physical activity level were found to be independent factors associated with the LBP (p-value = 0.048 by LRT) after adjusted for gender, nutritional level and work activity in a day. The physical activity as athletic level appeared to be the protective effect when compared to sedentary level (adjusted OR 0.43, 95% CI: 0.20-0.94).*
Conclusion: *Based on the results of the study, the physical activity as athletic level appears to be associated with the 6-month prevalence of LBP. Consequently, it is important that prevention programs take into account this risk factor in order to reduce the frequency of low back injuries in university staff and improve their work efficiency.*

Keywords: *Low back pain, Prevalence, University staff, Associated risk factors*

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Low back pain (LBP) is one of the most common musculoskeletal conditions in the general population. The burden of LBP are enormous in terms quality of life, productivity, and employee absenteeism, making this common condition the single largest contributor to musculoskeletal disability worldwide. LBP is defined as pain localized between the 12th rib and the inferior gluteal folds, with or without leg pain[1,2]. Diagnosis of LBP based on self reported questionnaire has been used to estimate the prevalence of LBP in epidemiological study of community setting[3]. Prevalence of LBP varied depending on definitions and study populations and also differs from countries to countries. The point prevalence, or the percentage of people experiencing LBP at a given moment in time, was reported between 21.5% and 57%[4-7]. One-year prevalence or LBP event in the past 12 months was reported between 37.8 and 61.3%[8-10]. The 6-month prevalence was reported between 40.8 and 42.6%[11,12], and the lifetime prevalence was reported between 61.6 and 70%[5,8]. In Thailand, few studies reported the LBP prevalence at 27.1-55.8%[13,14].

Several epidemiological studies have been performed in order to specify the role of individual and related factors as possible causes[8,10-12,15]. Other factors, including lifestyle, psychosocial profile, and

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work- related characteristics have been reported as risks of developing LBP.

Most of the epidemiological literature on risk factors for LBP has focused on specific occupational groups[5,6,8-10,16]. The university staff is an interesting population which comprised of different kind of works. Due to their work-related characteristics, sedentary life style and low physical activity they might have potential risk for LBP.

Aims

The author aims to investigate the prevalence of self-reported LBP and explore risk factors of LBP among university staff in the government sector.

Material and Method

A cross-sectional survey was conducted in Thammasat University (Rangsit Campus). The list of 1,183 of university staff was retrieved from Personnel Division of Thammasat University. Self-reported LBP, individual characteristics (age, weight, height, gender, marital status, level of education, current smoking status and alcohol consumption), work-related conditions (employment status, work categories, duration of employment and work hour per week) and habitual physical activity level were collected via the questionnaire. The questionnaire was distributed to Thammasat University staff on the list by official messenger between October and December 2008. This study was approved by Thammasat University Human Research Ethical Committee.

The study needs the sample size of 800 to achieve the expected prevalence of 35%[12] with the precision of the 95% confidence interval (CI) at $\pm$ 2%. The self-reported LBP questionnaire was modified from a standardization of back pain definitions[3]. The first screening questionnaire directed recipients to a picture of the back with containing a shaded area between the lowest rib and the gluteal fold, and asked, "Have you ever had an episode of low back (the area shown in picture) pain in the past 6 month? Please do not include pain occurring only during menstrual periods, pregnancy, or a feverish illness including flu". The following second question was "If you had pain, this was bad enough to limit your usual activities or change your daily routine for more than 1 day?". The respondents who answered "yes" to the second question were classified as having had 6-month prevalence of self-reported LBP.

The physical activity level was classified by the modified habitual physical activity questionnaire[17]. It composed of 16 items concerning the following five components; occupation, movements, sports, leisure time activities excluding sport, and sleeping habit. Each item could be calculated to scores of the indices of physical activity including; work index, sport index and Leisure-time index. Total score of three indices was divided into three activity levels including; sedentary (scores below 6), active (score 6-8) and athletic (scores above 8) level.

All data were coded and entered into Epidata software. Statistical analyses were conducted using STATA (Version 9.0). Frequency and percentage was used to describe qualitative data. Mean and standard deviation was used to describe quantitative data. The past 6-month prevalence of LBP stratified by demographic characteristics, work-related characteristics and Habitual Physical Activity levels were calculated including their 95% confidence interval (95% CI). Chi-square and Fischer' exact test were used to compare the characteristics between the LBP and non-LBP group. Multiple logistic regression was used to explore risk factors on the 6-month prevalence of LBP. Variables that were associated with the LBP at the level of 0.20 from univariate analysis were selected into the multiple logistic model. The final model included gender, nutritional level, work-activity in a day and habitual physical activity level. The Likelihood Ratio test (LRT) was used to test the parameter associated with the LBP by comparing the models with and without the referring parameter. All variable levels were coded so that the reference level (OR = 1) represented the hypothetical advantageous level concerning increased LBP. The Wald test was performed to test the significance of each level compared with the reference level on particular parameter. All tests were tested the significance level at 0.05.

Results

The questionnaires were returned by 803 university staff (response rate of 67.9%). The mean age was 36.9 (SD = 8.5) years. According to the self reported LBP by the questionnaire in this study, the 6-month prevalence of LBP was 22.3% (95% CI: 19.4-25.2). There were 554 female (70.8%) and 229 male (29.3%). There are 332 participants (42.7%) who were obese, body mass index (BMI) of more than 23 kg/m^2. Three hundred and forty six (43.9%) was graduated from Bachelor's degree. There were only 45 (5.7%) and 218 (27.8%) who are current smokers and alcohol consumers respectively. Most of responders worked as the supportive staff (67.6%) while 250 (32.4%) worked

as government officers. There were 482 (65.3%) work in sitting position during day. There was 609 (75.8%) who was classified as sedentary level according to habitual physical activity level.

The 6-month prevalence of LBP in this study is 22.3% (95% CI: 19.4-25.2). Table 1 presented the 6-month prevalence of LBP stratified by personal and work-related characteristics. The prevalence of LBP was 26.6% and 20.9% among male and female respectively. The prevalence of LBP was highest in the age group of

Table 1. The 6-month prevalence of self-reported LBP stratified by demographic and work-related characteristics among university staff (univariated analysis)

Factors	Total (n)	6-month prevalence			p-value*
		n	%	(95% CI)	
Age					0.552
< 30 years	185	36	19.5	(14.0, 25.9)	
31-40 years	326	73	22.4	(18.0, 27.3)	
> 40 years	235	56	23.8	(18.5, 29.8)	
Gender					0.086
Male	229	61	26.6	(21.0, 32.9)	
Female	554	116	20.9	(17.6, 24.6)	
Nutritional status					0.084
Non-obese (BMI $\leq$ 22.9 kg/m^2)	446	91	20.40	(16.8, 24.4)	
Obese (BMI > 23 kg/m^2)	332	86	25.90	(21.3, 31.0)	
Education level					0.274
Lower than Bachelor's degree	165	45	27.3	(20.6, 34.7)	
Bachelor's degree	346	73	21.1	(16.9, 25.8)	
Higher than Bachelor's degree	278	60	21.6	(16.9, 26.9)	
Marital status					0.378
Single	389	79	20.3	(16.4, 24.7)	
Married	367	90	24.5	(20.2, 29.3)	
Separated	30	7	23.3	(9.9, 42.3)	
Current smoking					0.295
No	741	163	22.0	(19.1, 25.2)	
Yes	45	13	28.9	(16.4, 44.3)	
Current alcohol consumption					0.251
No	566	121	21.4	(18.1, 25.0)	
Yes	218	55	25.2	(19.6, 31.5)	
Work category					0.901
Academic staff	172	38	22.1	(16.1, 29.0)	
Supportive staff	470	106	22.6	(18.9, 26.6)	
Employment status					0.865
Government officer	250	58	23.2	(18.1, 28.9)	
Other employments	521	117	22.6	(19.1, 26.5)	
Most activity at work in a day					0.056
Sitting	482	97	20.1	(16.6, 24.0)	
Standing/Walking	84	17	20.2	(12.3, 30.4)	
Awkward/Bending	120	35	29.2	(21.2, 38.2)	
Heavy physical work	52	16	32.7	(20.3, 47.1)	
Habitual Physical Activity level					0.168
Sedentary	609	136	22.3	(19.1, 25.9)	
Active	121	32	26.4	(18.8, 35.2)	
Athletic	73	11	15.1	(7.8, 25.4)	

*The p-values were based on the Fisher's Exact test.

more than 40 years (23.83%). The prevalence was highest as 26.4%, following by 22.3% and 15.1% in participants who had habitual physical activity as active level, sedentary level and athletic level respectively. Concerning the activity at work in a day, there is an increasing trend of the prevalence of LBP but not reach statistical significant level (p-value = 0.056 by Chi-square test for trend). The prevalence increases from 20.1%, following by 20.2%, 29.2% and 32.7% in participants who had the activity at work in a day as sitting, standing, awkward/bending and heavy physical work respectively.

By multiple logistic regression analysis, the habitual physical activity level was the only one independent risk that was significantly associated with the LBP (p-value = 0.048 by LRT) after adjusted for gender, nutritional level, activity at work in a day presented in Table 2. Concerning the habitual physical activity, the group of athletic level had significantly protective effect on the LBP with the odds ratio of 0.43 (95% CI: 0.20-0.94) compared to the sedentary level. Concerning the activity at work in a day, there was an increasing trend of having LBP but not reach statistical significant level (p-value = 0.118 by LRT). The magnitude of having LBP increased from odds ratio of 1.01, following by 1.63, and 1.92 in participants who had the activity at work in a day as standing, awkward/bending and heavy physical work compared to sitting respectively.

Discussion

This study was one of field study conducted in the community setting as the university environment in Thailand. The university staff composed of staff who had a mixed variety working styles whereas other studies were focus on particular types of work styles as office workers[8,18], nurse[15], hospital staff[10], or industrial worker[16]. The Thammasat University annual report (2006) showed that government officer, supportive officers, contributed to 47.7%, %, respectively[19]. The 6-month prevalence of self-reported LBP in this study was 22.3% (95% CI: 19.4-25.2), which was lower than the reports of prevalence of LBP from other studies[12,20]. This could be explained by different definition used in the studies[12,21,22] and different types of works among participants. However, selection bias may contribute in this study since the response rate is rather low as 67.9%. Only the Rangsit campus of Thammasat University was selected to survey in this study. Generalizability of the study result to the university environment is, therefore, limited by only one university setting and low response rate. For Thai survey, there have not been reported the prevalence of LBP in the university staff. However, there had been reported 27.17% of prevalence of LBP in the clothes factory worker[13] that higher than the prevalence in this study. It could be different because of the work style between studies; the factorial workers may have more work load than the university staff.

Table 2. Multivariate logistic regression analysis of risk factors of self-reported LBP among university staff (n = 803)

Factors	n	Crude OR	Adjusted OR	(95%CI)	p-value*
Gender					
Male	229	1.00	1.00	-	
Female	554	0.73	0.77	(0.52, 1.17)	0.226
Nutritional status					
Non-obese (BMI $\leq$ 22.9 kg/m^2)	446	1.00	1.00	-	
Obese (BMI > 23 kg/m^2)	332	1.36	1.19	(0.82, 1.73)	0.356
Most activity at work in a day					
Sitting	482	1.00	1.00	-	
Standing/Walking	84	1.01	0.97	(0.54, 1.74)	0.907
Awkward/Bending	120	1.63	1.56	(0.98, 2.48)	0.060
Heavy physical work	52	1.92	1.81	(0.94, 3.50)	0.078
Habitual Physical Activity level					
Sedentary	609	1.00	1.00	-	
Active	121	1.25	1.16	(0.72, 1.86)	0.550
Athletic	73	0.62	0.43	(0.20, 0.94)	0.036

*The p-values were based on the Wald Chi-squared test.

Most of epidemiological studies usually reported 12-month prevalence of LBP[8-12,18,23] but the result may affected by recalled bias. Therefore, the 6-month period prevalence of LBP was chosen in this study in order to reduce recalled bias.

According to multivariate analysis, habitual physical activity level was the only independent factor associated with the LBP (p-value = 0.048 by LRT) after adjusted for gender, nutritional level and activity at work in a day. People who had habitual physical activity as athletic level appeared to had protective effect compared to sedentary level with odds ratio of 0.43 (95% CI: 0.20-0.94). A review study showed that physical exercises in a LBP may prevent future recurrences or chronicity[2]. There was a strong evidence suggested that endurance training including running, swimming, cycling or aerobic training could prevent LBP[1].

However, the activity at work in a day was not significantly associated with LBP in multivariate analysis, people who had heavy physical work characteristic tended to associate with LBP compared to those who had sitting activity as most activity at work in a day with odds ratio of 1.81 (95% CI: 0.94-3.50). The sitting in this study was defined as working in sitting position more than 2 hours per day whereas the previous study[18], which reported the association of working in sitting position more than 8 hour per day and prevalence of LBP in the office workers in Thailand[18]. In sitting work posture, disc pressure at L3 is greater than standing position but this static loading and pressure is very low compared with that require to cause spinal damage. In contrast, LBP is more common in people with heavy physical work because there is much more axial load on vertebral disc[24]. This load may affect the narrowing disc space and degenerative change in the spine.

There was 25.9% of the 6-month prevalence among the obese (BMI > 23 kg/m^2) but not reached the statistical significant (p-value = 0.084). In this study we categorized the nutritional status into 2 groups according to the classification of appropriated body-mass index for Asian population by World Health Organization[25]. Leboeuf-Yde in 1999 reported the underweight (BMI < 20 kg/m^2) subjects consistently reported lower prevalence of low back pain (odds ratios = 1) than did those higher in weight[26]. In contrast to Spyropoulos in 2007 reported that there were the significant differences in their lifetime LBP prevalence ($p < 0.001$) between individuals with BMI $\geq$ 25 kg/m^2 (56.2%) and those with BMI $\geq$ 25 kg/m^2 (70.3%) in the office workers[8]. Moreover, Shiri in 2008 revealed the associations were statistically significant associated between LBP and BMI of 35.0 kg/m^2[27]. Notice that these studies used the different cut-of-point for BMI classification. It seems to be that people who have more BMI may have slightly more LBP trouble.

For further study for predicting LBP, more study size and more setting should be considered for precise evaluation. Moreover, psychological aspects will be considered for a risk factor.

Conclusion

A survey of the university staff was conducted to determine the situation of LBP and the potential risk factors of LBP. There was low 6-month prevalence of LBP in the university staff 22.3% (95% CI; 19.4, 25.2). Based on the results of the study, the physical activity as athletic level appears to have less LBP (OR = 0.43, 95% CI: 0.20-0.94). So we recommend the development of educational program including enhancing activity take into account this risk factor in order to reduce the frequency of low back injuries in university staff and improve their work efficiency. Future cohort study should be undertaken to evaluate the causality of LBP in the university staff.

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ความชุกและปัจจัยเสี่ยงของกลุ่มอาการปวดหลังส่วนล่างในบุคลากรมหาวิทยาลัย

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***ภูมิหลัง**: กลุ่มอาการปวดหลังส่วนล่างเป็นกลุ่มอาการผิดปกติทางระบบกระดูกและกล้ามเนื้อที่พบบ่อย โดยเฉพาะอย่างยิ่งในกลุ่มประชากรวัยทำงาน ปัจจัยเสี่ยงทั้งภายในและภายนอกได้รับการประเมินเพื่อหาความสัมพันธ์กับกลุ่มอาการปวดหลังส่วนล่างงานวิจัยเชิงระบาดวิทยานำมาซึ่งข้อมูลสำคัญเกี่ยวกับความชุก และปัจจัยที่เกี่ยวข้องกับกลุ่มอาการปวดหลังส่วนล่างในประชากรวัยทำงาน แต่มีจำนวนน้อยที่ศึกษากลุ่มอาการปวดหลังส่วนล่างในบุคลากรมหาวิทยาลัยในประเทศไทย*

***วัตถุประสงค์**: เพื่อศึกษาหาความชุกและปัจจัยเสี่ยงที่เกี่ยวข้องกับกลุ่มอาการปวดหลังส่วนล่างในบุคลากรมหาวิยาลัยภาครัฐแห่งหนึ่ง*

***วัสดุและวิธีการ**: แบบสอบถามแบบตอบด้วยตนเองถูกส่งไปยังบุคลากรจำนวน 1,183 ราย ผ่านทางงานสารบรรณของแต่ละหน่วยงาน ระยะเวลาในการเก็บข้อมูล 3 เดือน อยู่ระหว่างเดือนตุลาคมถึงธันวาคม พ.ศ. 2551 แบบสอบถามประกอบด้วยข้อมูลเกี่ยวกับอาการปวดหลัง, ข้อมูลส่วนตัว, ลักษณะการทำงาน และกิจกรรมที่ทำเป็นประจำทำการวิเคราะห์ทางสถิติด้วยวิธี multiple logistic regression รายงานผลการศึกษาเป็นจำนวนและร้อยละของความชุกของกลุ่มอาการปวดหลังส่วนล่างและปัจจัยเสี่ยงที่เกี่ยวข้องในช่วง 6 เดือนที่ผ่านมา*

***ผลการศึกษา**: ได้รับแบบสอบถามตอบกลับจำนวน 803 ฉบับ คิดเป็นร้อยละ 67.9 ความชุกของ กลุ่มอาการปวดหลังส่วนล่างในช่วง 6 เดือน เท่ากับร้อยละ 22.3 (ช่วงระดับความเชื่อมั่นที่ 95% ช่วง 19.4 ถึง 25.2) ผลจาก multiple logistic regression แสดงให้เห็นว่าระดับการทำกิจกรรมประจำมีความสัมพันธ์ต่อการเกิดกลุ่มอาการปวดหลังส่วนล่าง ($p = 0.048$) โดยการทำกิจกรรมระดับนักกีฬามีผลป้องกันการเกิดกลุ่มอาการปวดหลังส่วนล่าง เมื่อเทียบกับการทำกิจกรรมระดับที่ไม่ค่อยมีการเคลื่อนไหว (adjusted OR 0.43, ช่วงระดับความเชื่อมั่นที่ 95% ช่วง 0.20 ถึง 0.94)*

***สรุป**: การทำกิจกรรมประจำระดับนักกีฬามีเป็นปัจจัยสำคัญต่อเกิดกลุ่มอาการปวดหลังส่วนล่าง ดังนั้นควรให้ความสำคัญในการนำปัจจัยดังกล่าวมาวางแผนการป้องกันการเกิดกลุ่มอาการปวดหลังส่วนล่างในบุคลากรมหาวิทยาลัย และเพื่อเพิ่มประสิทธิภาพในการปฏิบัติหน้าที่*