The XXVIII[th] Annual Occupational Ergonomics and Safety Conference
Chicago, Illinois, USA
June 9-10, 2016

Chronic Low Back Pain among High School Teachers in The Central Region of Thailand

Chuliporn Sopajareeya[1], Sakonporn Sopajaree[2], Chompunut Sopajaree[3], and Gabriel Ibarra-Mejia[4]

[1]Boromrajonani College of Nursing, Sawan Pracharax-Nakhonsawan,
Nakhonsawan province, 60000, Thailand

[2]Wat Turk Racha School, Singburi,
Singburi province, 16000, Thailand

[3]School of Nursing, Mae Fah Luang University,
Chiangrai province, 57100, Thailand

[4] Department of Public Health Science, College of Health Sciences,
University of Texas at El Paso, USA

Corresponding author's e-mail: csopajareeya@gmail.com

Author Note: Dr. Chuliporn Sopajareeya works in the area of public health nursing and occupational health nursing. Assistant Prof. Dr. Chompunut Sopajaree works in the area of maternity nursing and women's health. Dr. Gabriel Ibarra-Mejia works in the area of environmental health at the Department of Public Health Science. Dr. Sakonporn Sopajaree is a director of Wat Turk Racha School, an elementary school.

Abstract: Although low back pain (LBP) is widely known as an important health problem among high school teachers, few epidemiological studies have investigated its prevalence in Thailand specifically. The objective of this study was to assess the prevalence of LBP and its risk factors among high school teachers. A cross-sectional study was conducted in five high schools in the central region of Thailand. Two-hundred- thirty-two respondents participated in the study. Information on demographic data, work characteristics and environment, work stress, health behavior factors, and LBP were collected. Data were analyzed by descriptive statistics and logistic regression.

Results revealed that 34.5% of high school teachers had chronic LBP in the past 12 months. Logistic regression analysis indicated that previous diseases related to LBP (OR=3.6; 95%CI=0.94-13.82), back injuries from work (OR=3.1; 95%CI=1.26-7.75), and obesity (OR=2.2; 95%CI=1.20-4.03) were the important risk factors of LBP. The findings are useful for designing LBP preventive strategies for high school teachers; such strategies should include management and treatment of LBP, body weight control, and physical exercise for the teachers.

Keywords: Chronic low back pain, High school teachers, Prevalence, Risk factors

1. Introduction

High school teacher occupation is at risk occupation to low back pain (LBP) in many countries including Thailand. The prevalence of LBP among high school teachers was reported in many countries. Its prevalence during the past 12 months among these teachers in Malaysia, Brazil, China, Ethiopia, Botswana, and Saudi Arabia was 40.4, 41.1, 45.6, 53.8, 55.7, and 63.8 (Cardoso, Ribeiro, Araujo, Carvalho, & Reis, 2009; Samad, Abdullah, Moin, Tamrin, & Hashim, 2010; Yue, Liu, & Li, 2012; Beyen, Mengestu, & Zele, 2013; Darwish & Al-Zuhair, 2013; Erick & Smith, 2014), while it was 76.0% among teachers and education personnel in Thailand)Thitilertdecha, Thongthiangdee, Kaewnoppakhun, & Laoittihi, 2012(. This evidence indicates that the prevalence of LBP in Thailand was more than that of the prevalence in Malaysia, Brazil, China, Ethiopia, Botswana, and Saudi Arabia.

ISBN: 97819384965-4-7

LBP has impacts on the living of high school teachers and education personnel, including decreased ability to work, increased direct and indirect cost, and educational system)Mohammadi, 2013; Abdulmonem, Hanan, Elaf, Haneen, & Jenan, 2014). From these impacts, it is very important to solve the LBP problem.

From literature reviews, risk factors of LBP among high school teachers and education personnel were from multi-factors including personal factors, health behavior factors, and work environment factors. Personal factors were age, number of years in teaching, obesity, previous diseases related to LBP, and having experience in an accident or back trauma from work. Health behavior factors included lifting heavy objects, awkward postures, prolonged sitting, and lack of exercise. Work environment factors were work stress, too high or low temperature in classrooms, inappropriate furniture in teachers' offices, and small workspace (Cardoso, Ribeiro, Araujo, Carvalho, & Reis, 2009; Samad, Abdullah, Moin, Tamrin, & Hashim, 2010; Korkmaz, Cavlak, & Telci, 2011; Yue, Liu, & Li, 2012; Beyen, Mengestu, & Zele, 2013; Darwish & Al-Zuhair, 2013; Erick & Smith, 2013; Abdulmonem, Hanan, Elaf, Haneen, & Jenan, 2014; Erick & Smith, 2014). These factors influence the occurring of LBP. Therefore, it is needed to determine risk factors of LBP among high school teachers.

Although low back pain is widely known as an important health problem among high school teachers, few epidemiological studies have investigated its prevalence in Thailand specifically. It is essential to assess the prevalence and risk factors of LBP in order to prevent the problem of LBP.

2. Objectives

The purpose of the study was to determine the prevalence and risk factors of LBP in the past 12 months among high school teachers in the central region of Thailand.

3. Ethical consideration

This study was approved by the Mae Fah Luang University Human Research Ethics Committee (Reference No. 75/2015). Informed written consent was given by the participants. Participation in the study was voluntary.

4. Materials and methods

A cross-sectional study was conducted among high school teachers from four high schools in Chinat, Singburi, Angthong, and Lopburi provinces in Thailand. The four high schools include Chinat Pittayakom School, Singburi School, Satree Angthong School, and Piboon Vittayalai. Questionnaires were administered to the sample, 252 high school teachers working at the schools for at least one year, in the schools during the July and August 2015. Of these 252, a total of 232 high school teachers completed the survey, a response rate of 92.1 %.

Data were collected using a self-administered questionnaire. The questionnaire was divided into five parts: demographic data (13 items), work characteristics and environment (11 items), work stress (30 items), health behavior factors (10 items), and low back pain (14 items). Risk factors of LBP including personal factors, work environment factors, work stress, and health behavior factors were examined. The questionnaire of Panumas Phunksachart (2013) was used to assess work stress among high school teachers. The Standardized Nordic Questionnaire (SNQ) (Kuorinka et al., 1987) was modified to assess the LBP in this study. LBP reported by high school teachers was classified by a dichotomous outcome variable indicating both the presence or absence of LBP in the past 12 months.

The validity of the questionnaire was examined by five experts including two nursing instructors who were expert in research methodology, two experts in the area of occupational health and safety, and one high school teacher. The reliability of the questionnaire on work stress when tested by Cronbach's alpha was 0.89. Moreover, the reliability of the questionnaire on health behavior factors and work environment factors when tested by Kuder-Richardson (KR-20) was 0.81 and 0.79, respectively.

Descriptive statistics were used to describe characteristics of the study participants and the study variables. Cross-tabulation procedures were conducted among bivariate variables to determine odds ratios (ORs) along with a 95% confidence interval (CIs). Logistic regression analysis was then applied to identify associations between LBP in the past 12 months and possible associated risk factors, including personal factors, work stress, work and environment factors, and health behavior factors. The level of statistical significance was set at 0.05.

5. Results

5.1 Characteristics of the participants

Three-fourth of the participants were female (78.4%). The participants' ages ranged from 24 to 60, with a mean age of 43.8 (S.D. = 11.97). The mean BMI of the high school teachers was 22.8 kg/m^2 (S.D. = 3.63). More than a half of them (69.0%) graduated in Bachelor's degree and also more than a half (60.3%) taught students in the secondary high school level. The teaching experience ranged from 1 to 38, with a mean year of 18.9 (S.D. = 12.39). Almost all (96.1%) of the subjects had never smoked cigarette. Most of the participants (94.4%) never had previous diseases related to LBP and most of them (87.9%) had never experienced in back trauma from work. Most of the participants (90.1%) had never experienced in an operation by epidural or spinal block. Almost all (97.0%) never attended on any LBP prevention training.

5.2 Prevalence of LBP in the past 12 months

The prevalence of LBP in the past 12 months was 34.5%. Of the 232 high school teachers, 80 high school teachers reported having LBP and 152 high school teachers reported no having LBP in the past 12 months (Figure 1).

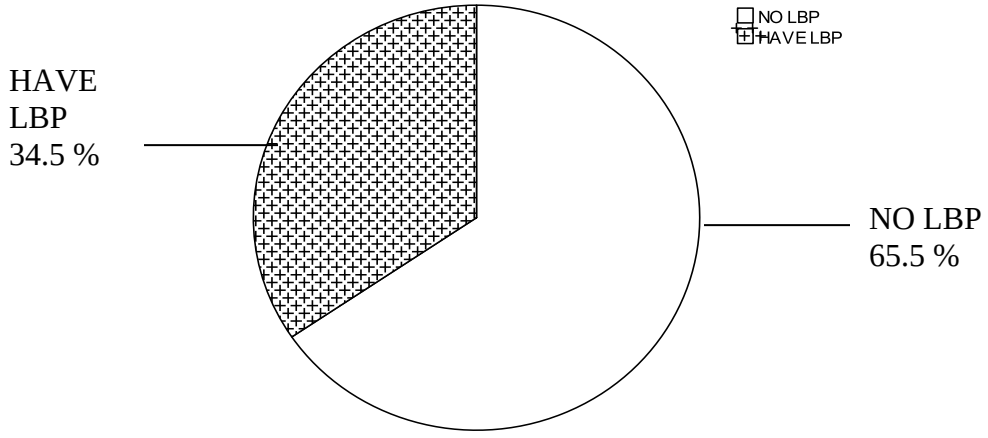

Figure 1. The Prevalence of LBP in the Past 12 Months

5.3 Risk factors of LBP in the past 12 months

In this study, any predictor variable whose bivariate test has a p- value of less than 0.10 should be considered as a candidate in a multiple logistic regression model. Twelve covariates including 1) obesity (OR= 1.9; 95%CI=1.11-3.33), 2) back injuries from work (OR= 3.4; 95%CI=1.53-7.81), 3) previous diseases related to LBP (OR= 4.6; 95%CI=1.39-15.74), 4) standing continuously for more than 6 hours a day (OR= 0.57; 95%CI=0.32-1.01), 5) work space (OR= 1.77; 95%CI=0.95-3.28), 6) stress from unclear responsible job (OR= 1.07; 95%CI=1.12-7.67), 7) stress from inadequacy of budget support (OR= 0.49; 95%CI=0.25-0.95), 8) stress from competitive work system (OR= 0.50; 95%CI=0.28-0.89), 9) stress from mistrust from bosses (OR= 0.51; 95%CI=0.29-0.89), 10) stress from unclear communication with co-workers (OR= 0.50; 95%CI=0.28-0.90), 11) stress from lack of freedom to work (OR= 0.54; 95%CI=0.31-0.94), and 12) stress from difficulty in lesson planning (OR= 0.40; 95%CI=0.22-0.71) were chosen in the initial logistic regression model. Table 1 shows the association between the twelve associated risk factors and LBP in the past 12 months-bivariate analysis.

Table 1. The Association between the Twelve Associated Risk Factors and LBP in the Past 12 Months —Bivariate Analysis

Variables	Number (%) of LBP	Number (%) of No LBP	p-value x^2-test	Odds Ratio (95% CI)
1. Obesity				
Overweight	44(42.7)	59(57.3)	.018*	1.92(1.11, 3.33)
Normal/lightweight	36(27.9)	93(72.1)		1+
2. Back injuries from work				
Ever	17(60.7)	11(39.3)	.002*	3.45(1.53, 7.81)
Never	63(30.9)	141(69.1)		1+
3. Previous diseases related to LBP				
Yes	9(69.2)	4(30.8)	.007*	4.69(1.39,15.74)
No	71(32.4)	148(67.6)		1+
4. Standing continuously for more than 6 hours a day				
Ever	48(30.4)	110(69.6)	.055*	0.57(0.32, 1.01)
Never	32(43.2)	42(56.8)		1+
5. Work space				
Inappropriate	25(44.6)	31(55.4)	.066*	1.77(0.95, 3.28)
Appropriate	55(31.3)	121(68.8)		1+
6. Stress from unclear responsible job				
Yes	53(29.6)	126(70.4)	.004*	1.07(1.12, 7.67)
No	27(50.9)	26(49.1)		1+
7. Stress from inadequacy of budget support				
Yes	58(31.2)	128(68.8)	.033*	0.49(0.25, 0.95)
No	22(47.8)	24(52.2)		1+
8. Stress from competitive work system				
Yes	48(29.6)	114(70.4)	.018*	0.50(0.28, 0.89)
No	32(45.7)	38(54.3)		1+
9. Stress from mistrust from bosses				
Yes	30(26.8)	82(73.2)	.017*	0.51(0.29, 0.89)
No	50(41.7)	70(58.3)		1+
10. Stress from unclear communication with co-workers				
Yes	47(29.6)	112(70.4)	.020*	0.50(0.28, 0.90)
No	33(45.2)	40(54.8)		1+
11. Stress from lack of freedom to work				
Yes	36(28.3)	91(71.7)	.031*	0.54(0.31, 0.94)
No	44(41.9)	61(58.1)		1+
12. Stress from difficulty in lesson planning				
Yes	43(27.6)	113(72.4)	.001*	0.40(0.22, 0.71)
No	37(48.7)	39(51.3)		1+

+ Reference category
* Significance with $a < .10$ (to be in a logistic regression model)

In the performance of the logistic regression analysis in this study all such variables were substituted with a dummy coding method. To find the best model, a backward stepwise method was used to determine the set of variables that best predicted the occurrence of LBP in the past 12 months. Three of the twelve variables were retained in the last additive model without interactive effects. An interactive effect model was determined and no interaction among independent variables was found. Table 2 presents the final model in the logistic regression analysis. The most appropriate model includes three factors of previous diseases related to LBP, back injuries from work, and obesity. The overall accuracy of the logistic

regression model was 70.7%. It was found that high school teachers who ever had previous diseases related to LBP were 3.6 times as likely to get LBP in the past 12 months than those who never had previous diseases related to LBP. Moreover, high school teachers who ever experienced back injuries from work were 3.1 times more likely to get LBP in the past 12 months than those who never experienced back injuries from work. The finding also indicated that high school teachers who had over body weight were 2.2 times as likely to get LBP in the past 12 months than those who had normal body weight.

Table 2. Logistic Regression Analysis –The Final Model

Factors	Coefficients ($\hat{\beta}$)	S.E.	p-value	Adjusted odds ratio	95% CI
1. Previous diseases related to LBP	1.283	0.68	.041*	3.6	0.94-13.82
2. Back injuries from work	1.143	0.46	.013*	3.1	1.26-7.75
3. Obesity	0.790	0.30	.010*	2.2	1.20-4.03
Constant	-0.056				

* Significance with p-value <0.05
R^2 =14.2%, Adjusted R^2 = 19.7 %

6. Discussion

6.1 Prevalence of LBP in the past 12 months

The study findings demonstrated that the prevalence of LBP in the past 12 months was 34.5%. One-third of the high school teachers had chronic LBP. This may be due to previous diseases related to LBP, back injuries from work, work stress, or obesity and these factors may influence the prevalence of LBP among them. Compared with the research findings from previous studies conducted among teachers and education personnel in four regions of Thailand which revealed a 70.6% (Thitilertdecha, Thongthiangdee, Kaewnoppakhun, & Laoittihi, 2012), the prevalence of LBP in this study is lower than that of the previous prevalence in the four regions. This could be due to the different participants in the study. In this study, the data were collected from high school teachers, whereas they were teachers and education personnel in the previous studies. Compared with other countries, the prevalence of LBP in this study is lower than that of the prevalence of LBP in the past 12 months in Malaysia (40.4%) (Samad, Abdullah, Moin, Tamrin, & Hashim, 2010), Brazil (41.1%) (Cardoso, Ribeiro, Araujo, Carvalho, & Reis, 2009), China (45.6%) (Yue, Liu, & Li, 2012), Ethiopia (53.8) (Beyen, Mengestu, & Zele, 2013), Botswana (55.7%) (Erick & Smith, 2014), Saudi Arabia (63.8%) (Darwish & Al-Zuhair, 2013), and Turkey (74.9%) (Durmus & Ilhanli, 2012). All prevalence data found in other countries tend to be higher than the finding in this study. This could be due to different kinds of definitions and questioning of LBP (Engels, van der Gulden, Senden, & van't Hof, 1996). Moreover, it may be due to different types of schools (governmental or private schools) and levels of schools (elementary or high schools) and the different types and levels of schools may cause different job characteristics and work environment. The data in this study were collected from teachers working in governmental schools and in the high school level. In other countries, the data were collected from teachers working in both governmental and private schools and in the elementary school level.

6.2 Risk factors of LBP in the past 12 months

As the results indicated, previous diseases related to LBP including chronic cough, skeletal defects, spine defects, scoliosis, or osteoporosis were important risk factors of LBP. This could be explained that these symptoms and defects lead to physical impairment and may also be antecedents to LBP (Landry, Sudha, Christopher, Yvonne, & Elham, 2008). This finding is consistent with the finding from Abdulmonem, Hanan, Elaf, Haneen, and Jenan (2014) that presence of chronic illness was associated with musculoskeletal pain. Also, the result of this study was supported by the result of Violante and colleagues (Violante, Fiori, Fiorentini, Risi, Garagnani, Bonfiglioli, & Mattioli, 2004) which found that scoliosis affected LBP.

In the recent study, back injuries from work including lifting heavy books, documents, and objects were also risk factors of LBP. When one is burdened with the excess weight of heavy objects, one's spine is forced into non-neutral postures and movements (Morewitz, 2006). The result of this study is consistent with the earlier studies by Thitilertdecha, Thongthiangdee, Kaewnoppakhun, and Laoittihi (2012) that back injuries or trauma were risk factors of LBP. The study by

Beyen, Mengestu, and Zele (2013) also indicated previous back injuries were significant risk factors of LBP among teachers. In a study by Erick and Smith (2014(, it was found that back injuries were risk factors associated with the occurring of LBP.

The findings of this study also demonstrated that overweight or obesity was a risk factor related to LBP (Karahan & Bayraktar, 2004; Thomas et al., 2006). Obesity increases weight on the spine and pressure on the disks (Morewitz, 2006). A large stomach pulls the spine forward and out of alignment and that increases the chances of back strain and fatigued abdominal muscles, which stimulate LBP. The result of this study is consistent with the findings from Abdulmonem, Hanan, Elaf, Haneen, and Jenan (2014) which found that obesity was a LBP risk factor.

7. Conclusion

This study indicated that the prevalence of LBP among high school teachers is at the medium level. The study confirmed that personal factors are the important risk factors of LBP among high school teachers.

8. Implications/ recommendation

The findings are useful for designing LBP preventive strategies for high school teachers; such strategies should include management and treatment of LBP, weight control, and physical exercise for the teachers.

9. Acknowledgements

The authors are very grateful to the directors of the Secondary Educational Service Area Office 5 and the directors of the four schools including Chinat Pittayakom School, Singburi School, Satree Angthong School, and Piboon Vittayalai for giving the necessary information and for their cooperation during the data collection. Also, the authors would like to thank all the high school teachers who participated in this study. Lastly, the authors would like to express appreciation to the Research Division of Praboromarajchanok Institute for Health Workforce Development, Thai Ministry of Public Health for financial support on the project.

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