

Prevalence and Risk Factors of Low Back Pain among Nurses in a Thai Public Hospital

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Objective: To determine the prevalence and risk factors causing low back pain in Thai nurses working in a public hospital.

Material and Method: A cross-sectional study was conducted among 265 Thai Hospital nurses between July and August 2008. A self-reported questionnaire was used to collect the data onsite. Risk factors including personal factors, working factors, job stress, health behavior, and work environment were measured. Data were analyzed by frequency distribution, mean, standard deviation, and logistic regression.

Results: The prevalent rate of low back pain based upon the nurses' report in the previous 12 months was 61.5%. Logistic regression analysis indicated that moving patients in bed without assistance and a lack of back muscle exercise were the significant risk factors causing low back pain among nurses ($p < 0.05$).

Conclusion: The prevalence of low back pain among Thai Hospital nurses was high. Further steps should be taken to prevent LBP by designing and implementing preventive factor-based interventions.

Keywords: Prevalence, Risk factors, Low back pain, Hospital nurses

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Nursing is a high risk low back pain (LBP) occupation. The prevalence of LBP among hospital nurses was reported in several countries. Its prevalence during the previous 12 months among hospital nurses in Western countries was 36.2%-57.9%, while in Asian countries, it was 36.8%-69.7%⁽¹⁻⁶⁾. This evidence indicates that the prevalence of LBP in Asian countries, including Thailand was comparatively high.

LBP affects nurses both at the individual and organizational levels. At the individual level, LBP impacts on nurses' health and ability to work. The impact on nurses' health includes suffering from LBP, back surgery, and then an inability to work⁽⁷⁾. At the organizational level, LBP impacts on the economic, the labor force, and the quality of care aspects of nursing work. The economic aspect consists of health care

costs, including compensation for injured nurses, loss of productivity, recruitment of new staff, training of replacement staff, and a reduction in staff morale^(8,9). The aspect of labor force comprises sick leave, staff turnover, reduction in staff retention rates, and staff shortages^(8,10). As for the quality of care, the impact of LBP on nurse turnover leads to the critical problem of nursing shortages that threaten or decrease the quality of nursing care associated with adverse patient outcomes^(2,11).

At present, several nursing organizations are working towards the aim of health promotion and disease prevention among nurses. The International Council of Nurses (ICN), a federation of 129 national nurses' associations representing millions of nurses in the world, has stressed the importance of establishing work environment which result in positive patient outcomes. The ICN recommends National Nursing Associations define national and local organizational policies that focus on injury prevention⁽¹²⁾. In Thailand,

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the policy of Hospital Accreditation (HA) partially focuses on improving the workplace environments of all certified hospitals⁽¹³⁾. However, the implementation of health promotion and disease prevention policies in Thai Hospitals is still at a low level of pre-implementation research.

It is important to identify the preventable risk factors of LBP in order to reduce the occurrence of LBP. Several studies have reported the risk factors of LBP in nurses. Significant risk factors reported among hospital personnel in Western countries include age, gender, smoking, working full-time, body mass index (BMI)⁽¹⁴⁾, number of years working in nursing, frequent and heavy lifting, type of nursing unit, perceived work stress and low social support^(2,15,16). In Asian countries, the risk factors of LBP reported among nursing personnel were the manual lifting and transferring of patients, perceived physical exertion, and psychological demand⁽¹⁷⁾. Although, LBP is a prevalent problem for Thai nurses, there has been very limited research regarding the prevalence of LBP and its associated risk factors conducted in Thailand. Wongthanakit et al⁽⁶⁾ conducted a study in Public Hospitals in the Bangkok vicinity where the size and nature of working conditions were different from those of other vicinities. The difference of ratio between nurses and patients and the number of lifting equipment may cause nurses working in rural hospitals to have different risk of LBP.

The purposes of this study were to determine the prevalence and risk factors causing LBP in Thai nurses working in a public hospital.

Material and Method

A cross-sectional study was conducted among nurses at Singburi hospital. This 301 bed public hospital was purposely selected because it had a target population of 312 nurses who had worked at the nursing department of the hospital for at least one year. Participation in the study was voluntary. All 312 nurses were invited to participate in the study and so questionnaires were distributed. Of these 312, a total of 265 nurses completed the survey, a response rate of 84.9%.

Data were collected using a self-reported questionnaire. The questionnaire was divided into six parts: personal factors (16 items), working factors (14 items), job stress (34 items) followed by the Nursing Stress Scale (NSS)⁽¹⁹⁾, low back pain (14 items), health behavior (16 items), and work environment (12 items). Risk factors of LBP including personal

factors, working factors, job stress, health behavior, and work environment were examined.

The Standardized Nordic Questionnaire (SNQ)⁽¹⁸⁾ was used to measure LBP in nurses. LBP reported by nurses was classified by a dichotomous outcome variable indicating both the presence or absence of LBP in the previous 12 months.

The validity of the questionnaire was examined by five experts. The reliability of the questionnaire on job stress and health behavior when tested by Cronbach's alpha were found to be 0.89 and 0.73, respectively. In addition, the reliability of the questionnaire on work environment when tested by Kuder-Richardson (KR-20) was 0.72.

This study was approved by the Ethics Committee on Human Research, Faculty of Public Health, Mahidol University (Ref. No. MUPH2008-109). Informed written consent was given by the participants. Questionnaires were administered in the hospital in the July and August 2008.

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 using the stepwise method was then applied to identify associations between LBP and possible associated risk factors, including personal factors, job stress, health behavior, and work environment. The level of statistical significance was set at 0.05.

Results

Characteristics of participants

The summary of participants' characteristics are presented in Table 1. The majority of the participants were registered nurses (90.9%) and female (96.6%). The participants' ages ranged from 25 to 59, with a mean age of 39.5. The BMI of the nurses ranged from 16.9 kg/m² to 36.2 kg/m², with a mean BMI of 23 kg/m². Number of years working in current unit of the participants ranged from 1 to 35 years. The mean years working in current unit was 9.7. Around a half of the nurses (55.1%) reported that they had been pregnant. Almost all participants (98.4%) had never smoked. The largest group of the nurses worked at the direct patient care unit (96.6%). More than a half of them (67.5%) had worked both day and night shifts. The majority of the participants (87.2%) had never experienced an accident or back trauma from work. Most of them (80.7%) had not experienced an operation by epidural or spinal block.

Table 1. Participants' characteristics (n = 265)

Variables	n (%)
Current work position	
Registered nurse	241 (90.9)
Technical nurse	22 (8.3)
Practical nurse	2 (0.8)
Gender	
Female	256 (96.6)
Male	9 (3.4)
Pregnancy	
Never been pregnant	112 (42.3)
Have been pregnant	146 (55.1)
During pregnancy	7 (2.6)
Smoking	
Never smoked	261 (98.4)
Ex-smoker	2 (0.8)
Smoker	2 (0.8)
Type of nursing unit	
Indirect patient care units	9 (3.4)
Direct patient care units	256 (96.6)
Working shift	
Only day shift (8.30 am-4.30 pm)	86 (32.5)
Both day shift and night shift	179 (67.5)
Have had an accident or back trauma from work	
No	231 (87.2)
Yes	34 (12.8)
Have had an operation by epidural or spinal block	
No	214 (80.7)
Yes	51 (19.3)
Age (years)	Mean 39.5 ± 8.70, Range 25.0-59.0
Body mass Index (kg/m ²)	Mean 23.0 ± 3.56, Range 16.9-36.2
Number of years working in current unit (year)	Mean 9.7 ± 7.87, Range 1.0-35.0

Prevalence and risk factors of low back pain in the previous 12 months

The prevalence of LBP in the previous 12 months was 61.5%. Of the 265 participants, 163 nurses reported having LBP and 102 nurses reported not having LBP in the previous 12 months. Table 2 presents the association between personal factors and LBP among nurses in the previous 12 months. None of the personal factors were found to be a risk factor causing LBP (Table 2).

In the present 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. Eight covariates including a) moving patients in bed without assistance (OR = 2.08; 95% CI = 1.24-3.49), b) moving patients in bed

without using lifting devices (OR = 1.77; 95% CI = 1.07-2.93), c) standing up continuously for more than 6 hours a day (OR = 1.57; 95% CI = 0.94-2.62), d) prolonged walking (OR = 2.70; 95% CI = 1.12-6.50), e) lack of back muscle exercise (OR = 3.25; 95% CI = 1.07-9.86), f) wearing high heeled shoes (OR = 1.86; 95% CI = 0.89-3.91), g) inadequacy of workspace for nursing care (OR = 1.98; 95% CI = 1.05-3.75), and h) job stress from lack of support (OR = 1.90; 95% CI = 0.88-4.11) were chosen in the initial logistic regression model. Table 3 shows the association between the eight associated risk factors and LBP among nurses in the previous 12 months-bivariate analysis.

In the performance of the multiple logistic regression analysis in this study all such variables were substituted with a dummy coding method. To find the best model, a forward stepwise method was used to determine the set of variables that best predicted the occurrence of LBP in the previous 12 months. Two of the eight 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 4 presents the final model in the logistic regression analysis. The most appropriate model consists of the moving patients in bed without assistance, and the lack of back muscle exercise factors. The overall accuracy of the logistic regression model was 64.3%. It was found that the nurses who moved patients in bed without assistance were twice as likely to get LBP than those who had never moved patients without assistance. Additionally, the finding also indicated that participants who had never performed back muscle exercises were 3.8 times more likely to get LBP than those who had performed back muscle exercises.

Discussion

Compared with the research findings from similar studies previously undertaken in public hospitals in Bangkok vicinity which revealed a 47.6%⁽⁶⁾ LBP level, the findings of this study reveal a somewhat higher prevalence of LBP. This difference may be due to the differences in the nature of nursing work. In this study, the data were collected from nurses in a medium sized hospital, whereas only nurses from small public hospitals were participants in the previous study by Wongthanakit et al⁽⁶⁾. Compared with other countries, the prevalence of LBP in this study is higher than levels measured during the same 12 months period in the United State of America (36.2%)⁽²⁾, China (56.0%)⁽⁵⁾, France (57.9%)⁽³⁾, Japan (59.0%)⁽⁴⁾, and Iran (59.6%)⁽²⁰⁾.

Table 2. The association between personal factors and LBP among nurses in the previous 12 months

Variables	Number (%) of LBP		p-value <i>x</i> ² -test	Odds ratio (95% CI)
	Yes	No		
Age (year)				
> 40 years	80 (60.2)	53 (39.8)	0.648	0.89 (0.54, 1.46)
≤ 40 years	83 (62.9)	49 (37.1)		1 ⁺
Gender				
Female	158 (62.0)	97 (38.0)	0.736 ^F	1.30 (0.34, 4.97)
Male	5 (55.6)	4 (44.4)		1 ⁺
BMI				
Underweight/normal	69 (62.2)	42 (37.8)	0.723	1.09 (0.66, 1.81)
Obesity 1-3	90 (60.0)	60 (40.0)		1 ⁺
Have had an accident or back trauma from work				
Yes	22 (64.7)	12 (35.3)	0.682	1.17 (0.55, 2.48)
No	141 (61.0)	90 (39.0)		1 ⁺
Have had an operation by epidural or spinal block				
Yes	33 (64.7)	18 (35.3)	0.585	1.19 (0.63, 2.25)
No	129 (60.6)	84 (39.4)		1 ⁺
Type of nursing unit				
Indirect patient care unit	159 (62.1)	97 (37.9)	0.312 ^F	2.05 (0.53, 7.81)
Direct patient care unit	4 (44.4)	5 (55.6)		1 ⁺

⁺ Reference category

^F Fisher's Exact test

However, the prevalence of LBP in this study is lower than that of Greece (75.0%)⁽¹⁾, and Turkey (77.1%)⁽¹⁶⁾.

As the results indicated, moving patients in bed without assistance was a high risk factor work practice. Unsafe manual handling included lifting, transferring, moving, turning, leaning, and pulling patients without assistance. Nurses were found to be at risk of getting low back pain while transferring patients without assistance. This is because when a nurse is burdened with the excess weight of a patient, her spine is forced into non-neutral postures and movements^(15, 21). At present, there is only a safe patient handling guideline for nurses in the operating room of the hospital. The guidelines do not cover all nursing units. The results of this study are consistent with the results of earlier studies by Smedley, Egger, Cooper, Coggon⁽²²⁾ and French et al⁽⁷⁾ which is moving patients in bed without assistance is an important associated risk factor of LBP in nurses. The findings from a Retsas and Pinikahana's study⁽²³⁾ also indicated that two-thirds (67.6%) of all injuries were related to direct patient care activities and one-third (32.4%) of all injuries were associated with the lifting, moving, and transferring of patients.

In addition, lack of exercise is an important associated risk factor of LBP among nurses. Lack of exercise produces inadequate flexibility and weak muscles in the back, pelvis, and thighs, causing an increase of LBP⁽²¹⁾. Exercises that stretch and strengthen the abdominal and spine muscles can help prevent back problems as such exercises increase ones flexibility. The findings from this research validate the findings of previous studies by Langerstrom, Hagberg, Wenemark, Hjelm, and the Moses Study Group⁽²⁴⁾ which found that LBP was related to low perceived physical fitness. A similar study by Vieira, Kumar, Coury, and Narayan⁽²⁵⁾ found that nurses who exercised regularly did not have LBP.

Personal factors and job stress were found not to be risk factors of LBP among nurses. This finding is consistent with the finding from Feng et al⁽¹⁷⁾ which found that personal factors, such as age, gender, and smoking were not significant risk factors for LBP among nursing staff. A possible explanation is that physical factors are a higher risk indicator for back injuries⁽¹⁵⁾ than psychological risk factors⁽²⁾.

Although, these study results provide significant information about the prevalence and risk

Table 3. The association between the eight factors and LBP among nurses in the previous 12 months-bivariate analysis

Variables	Number (%) of LBP		p-value χ^2 -test	Odds ratio (95% CI)
	Yes	No		
Moving adult patients in bed without assistance				
Ever	115 (68.0)	54 (32.0)	0.005*	2.08 (1.24, 3.49)
Never	48 (50.5)	47 (49.5)		
Moving adult patients in bed without using lifting devices				
Ever	102 (67.5)	49 (32.5)	0.025*	1.77 (1.07, 2.93)
Never	61 (54.0)	52 (46.0)		
Prolonged standing				
Ever	110 (65.5)	58 (34.5)	0.081*	1.57 (0.94, 2.62)
Never	53 (54.6)	44 (45.4)		
Prolonged walking				
Ever	153 (63.5)	88 (36.5)	0.022*	2.70 (1.12, 6.50)
Never	9 (39.1)	14 (60.9)		
Back muscle exercise				
Never	19 (82.6)	4 (17.4)	0.029*	3.25 (1.07, 9.86)
Ever	143 (59.3)	98 (40.7)		
Wearing high heeled shoes				
Ever	30 (73.2)	11 (26.8)	0.095*	1.87 (0.89, 3.91)
Never	133 (59.4)	91 (40.6)		
Work space for nursing care				
None/Inadequate	44 (73.3)	16 (26.7)	1.032*	1.99 (1.05, 3.75)
Adequate	119 (58.0)	86 (42.0)		
Job stress from lack of support				
A lot of stress	28 (73.7)	10 (26.3)	0.096*	1.91 (0.88, 4.11)
A little stress	135 (59.5)	92 (40.5)		

+ Reference category

* Significance with p-value < 0.10 (to be in a multiple logistic regression model)

Table 4. Logistic regression analysis - the final model

Factors	Coefficients (β)	SE	p-value	Adjusted OR	95% CI
Moving patients in bed without assistance	0.815	0.27	0.003*	2.26	1.33-3.83
Lack of back muscle exercise	1.356	0.58	0.019*	3.88	1.25-12.02
Constant	-0.134				

* Significance with p-value < 0.05

$R^2 = 7.3\%$, Adjusted $R^2 = 9.6\%$

factors of LBP in hospital nurses, the results are limited to the participants of one public hospital in Singburi, therefore, wide ranging generalization cannot be made. This is a cross-sectional study, thus, causal relationships between risk factors and LBP cannot be determined. On the other hand, this study can provide the basis for decisions about risk factors of LBP among nurses in follow-up studies. Recall bias

may occur when the participants are asked to report on events happening over a long period of time such as 12 months of experiencing LBP. In addition, lifestyle at home, which may affect the risk of developing LBP⁽²⁶⁾ was not included in the study.

Despite its limitations, this study points to the importance of assessing the risk factors which increase the prevalence of LBP in hospital nurses.

Findings from this study may be used by the hospital to both evaluate the risk of LBP among their nurses and to design interventions which reduce its prevalence.

In conclusion, the results demonstrated that the prevalence of LBP among Thai hospital nurses was high. This study confirmed that moving patients without assistance from other staff and a lack of back muscle exercise are the significant risk factors causing LBP in nurses. More active steps should be taken to prevent LBP in the nursing profession through the implementation of preventive factor-based interventions, such as training in patient lifts and transfers, as well as the provision of lifting team and handling guidelines, and the performing of back muscle exercises.

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อัตราความชุกและปัจจัยเสี่ยงของการปวดหลังส่วนล่างของพยาบาลในโรงพยาบาลของรัฐแห่งหนึ่ง

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วัตถุประสงค์: เพื่อศึกษาอัตราความชุกและปัจจัยเสี่ยงของการปวดหลังส่วนล่างของพยาบาลในโรงพยาบาลของรัฐ

วัสดุและวิธีการ: เป็นการสำรวจภาคตัดขวาง เก็บรวบรวมข้อมูลจากพยาบาลที่ปฏิบัติงานในโรงพยาบาลของรัฐแห่งหนึ่ง จำนวน 265 คน ระหว่างเดือนกรกฎาคม พ.ศ. 2551 ถึง เดือนสิงหาคม พ.ศ. 2551 โดยใช้แบบสอบถามแบบให้ตอบด้วยตนเอง ปัจจัยเสี่ยงที่ประเมินได้แก่ ปัจจัยส่วนบุคคล ปัจจัยการทำงาน ความเครียดในงานพฤติกรรมสุขภาพ และปัจจัยสิ่งแวดล้อมในการทำงาน วิเคราะห์ข้อมูลโดยใช้สถิติค่าความถี่ ร้อยละ และ logistic regression

ผลการศึกษา: อัตราความชุกของการปวดหลังส่วนล่างของพยาบาลในระยะ 12 เดือนที่ผ่านมา เป็นร้อยละ 61.5 ปัจจัยเสี่ยงของการปวดหลังส่วนล่างที่มีนัยสำคัญทางสถิติ ($p < 0.05$) คือ การเคลื่อนย้ายผู้ป่วยในเตียงโดยไม่มีผู้ช่วยยกหรือเคลื่อนย้าย และขาดการบริหารกล้ามเนื้อหลัง

สรุป: อัตราความชุกของการปวดหลังส่วนล่างของพยาบาลที่ปฏิบัติงานในโรงพยาบาลอยู่ในระดับสูง ขึ้นต่อไปควรมีการพัฒนาโปรแกรมการป้องกันการปวดหลังส่วนล่างสำหรับพยาบาลตามสาเหตุที่เกี่ยวข้องต่อไป
