Prevalence of Low Back Pain among Rice Farmers in a Rural Community in Thailand

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Objective: *To determine the prevalence of low back pain (LBP) among rice farmers in a rural community in Phitsanulok, Thailand.*

Material and Method: *A cross-sectional survey was conducted among 283 rice farmers in Wangnamkhu subdistrict, Muang district, Phitsanulok province, a rural community in Lower Northern Thailand. Face-to-face interviews with a structured closed-end questionnaire were performed to collect information on the presence of LBP in lifetime, within the last 12 months prior to and at the time of the present study.*

Results: *The lifetime, 1-year (12-month) and point prevalence rates of LBP were 77%, 56% and 49%, respectively. No relationship between age and LBP was found. However, women (61%) had significantly greater 1-year prevalence than men (51%). Ninety-five percent of LBP rice farmers were chronic (experiencing pain longer than 12 weeks) with a mean duration of 292 weeks (5.6 years).*

Conclusion: *The prevalence of LBP among Thai rice farmers is high. Further research should investigate risk factors among this group of the population to design appropriate preventive measures.*

Keywords: *Low back pain, Prevalence, Farmers*

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Many studies have shown that low back pain (LBP) is the most common musculoskeletal disorders among farmers[1-5]. In developed countries, the 1-year prevalence rate of LBP among farmers was 47% in Sweden[6], 23% in Finland[7], and 37% in the US[5]. However, in developing countries, the rate was much higher especially in South West Nigeria, 72%[8] and China, 64%[9]. The variation of prevalence might be due to the distinction of study populations or the relative presence of physical, psychosocial and individual risk factors of LBP[9].

While some prevalence data in farmers has become more available in many countries in different part of the world, the study of LBP prevalence in a Thai farmer population was rare. A few large studies found that the prevalence rate of LBP was 43% in the Thai general population[2] and 23% in the Thai rural population[3].

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In previous studies, the prevalence of LBP was obtained from heterogeneous groups of farmers that produced row crops and livestock production. Thus, the prevalence in specific or subgroup of farmers was less well known. Therefore, the purpose of the present study was to determine prevalence of LBP and to explore the nature and behavior of LBP in a more homogenous group of rice farmers, the largest group of the farming population in Thailand and South East Asia.

Material and Method

Participants

This was a community-based cross-sectional survey among Thai rice farmers in Wangnamkhu subdistrict, Muang district, Phitsanulok province in the Lower Northern Thailand. The rice farmers in Wangnamkhu subdistrict were chosen because they were quite homogeneous with regard to lifestyle, cultural norms, and farming type. They could grow two or three crops of rice per year. A stratified random sampling[10] was used according to a village where the farmers lived and gender. Three hundred thirty rice farmers were recruited by village health volunteers from

eight villages in Wangnamkhu subdistrict, which was about 60% of all the rice farmers from each village. The farmers were excluded from the present study if they were no longer active in farming, had LBP from other causes not related to farming, or had other health conditions that may interfere with the present study results such as renal failure, symptomatic heart disease, recent fracture, or recent large surgery.

Procedure

The present study was approved by the Ethical Committee on Research Involving Human Subjects, Naresuan University. The rice farmers who were eligible for the present study were interviewed using a structured closed-end questionnaire to collect information on demographic characteristics, experiencing LBP in their lifetime, within the 12-month period prior to the present study time and at the study time. In this present study, LBP was defined as 'any report of pain localized between the 12th rib and the lower glutei folds, with or without leg pain and lasting more than a day[11-13]. The rice farmers who experienced LBP at the present study time were asked about the nature of LBP *i.e.* area of pain, onset, duration, frequency, severity of LBP and behavior of LBP *i.e.* activities aggravating or alleviating pain. They were also required to answer "yes" or "no" to the 24 questions in a Thai version of the Roland-Morris disability questionnaire[14]. A total disability score was counted from the number of "yes" answers. Data collection process was conducted at Wangnamkhu primary care unit between August-September 2008.

Data analysis

Data was analyzed using the descriptive statistics (mean and standard deviation, range and frequency). Chi-square test was used to compare covariates between "yes" and "no" respondents for the LBP question and demographic variables with significant level of $p \leq 0.10$.

Results

Of the 330 rice farmers, 47 farmers were excluded from the present study. Of these, twenty-nine were no longer active in farming, eight had injured their low back from other causes, seven had recent fracture and recent large surgery, two had symptomatic heart disease, and one had renal failure. Finally, 283 rice farmers were included in the present study.

Demographic characteristics

Among 283 rice farmers, there were 138 males and 145 females. They were aged between 29 and 72 years with a mean age of 51.1 years. Of these samples, over two-thirds (70%) grew as often as three crops of rice per year. The average farming duration was 31 years with an average farm size of 13.9 acres or 34.7 rai (Table 1).

Prevalence of LBP

The lifetime, 12-month period, and point prevalence rates of LBP were 77.4%, 56.2%, and 49.1%, respectively (Table 2). Chi-square analysis revealed that women had a significantly higher prevalence rate than men (p value ≤ 0.10). No age difference on prevalence was found; however, the highest 12-month prevalence was found in the youngest group (66.7%)

Table 1. Demographic characteristics of participating rice farmers (n = 283)

Characteristics	Min	Max	Mean (SD)
Age (yr)	29.00	72.00	51.10 (8.81)
Weight (kg)	37.20	97.40	63.29 (10.59)
Height (m)	1.42	1.85	1.60 (0.08)
BMI (kg/m^2)	16.44	38.05	24.83 (3.92)
Duration of farming (yr)	1.00	55.00	31.04 (12.18)
Farm size (acres*)	0.00	60.00	13.89 (10.11)

* 1 acre ≈ 2.5 rai

Table 2. Prevalence of LBP in lifetime, within 12-month period and at the study time (point prevalence) by sex (n = 283)

Prevalence	Total, n (%)	Male, n (%)	Female, n (%)	p-value
Lifetime LBP	219 (77.39)	101 (46.12)	118 (53.88)	0.100*
Within 12 month period	159 (56.18)	70 (44.03)	89 (55.97)	0.071*
Point (at the study time)	139 (49.12)	60 (43.17)	79 (56.83)	0.064*

Test by Chi-square test
* Significance level at $p \leq 0.10$

Table 3. Prevalence of LBP within 12-month period by age and sex (n = 283)

Age	Male		Female		Total	
	n (% NLBP)	n (% LBP)	n (% NLBP)	n (% LBP)	n (% NLBP)	n (% LBP)
25-34	2 (33.33)	4 (66.67)	1 (33.33)	2 (66.67)	3 (33.33)	6 (66.67)
35-44	10 (58.82)	7 (41.18)	15 (35.71)	27 (64.29)	25 (42.37)	34 (57.63)
45-54	25 (49.02)	26 (50.98)	22 (36.67)	38 (63.33)	47 (42.34)	64 (57.66)
55-64	23 (48.94)	24 (51.06)	17 (47.22)	19 (52.78)	40 (48.19)	43 (51.81)
65 up	8 (47.06)	9 (52.94)	1 (25.00)	3 (75.00)	9 (42.86)	12 (57.14)
Total	68 (49.28)	70 (50.72)	56 (38.62)	89 (61.38)	124 (43.82)	159 (56.18)

with age range of 25-34 years, and the prevalence were slightly dropped after 35 years of age as presented in Table 3.

Nature of LBP

In 51.8% of the cases, LBP occurred from a single accident or injury such as slipping, lifting or carrying heavy things *e.g.* fertilizer bags while an accumulated injury from repeated activities was reported as a cause in 48.2% of LBP cases (Table 4). Almost 95% of the cases were considered chronic LBP (experiencing pain for longer than 12 weeks). Approximately 60% of the cases had pain localized in the low back and the rest (about 40%) experienced referred pain to the buttock, thigh, or lower leg. On the scale of 0 to 10, the majority of cases (80.6%) reported "mild pain" (pain score ranging between 0-4), "moderate pain" (ranging 4.1-7) by 14.2% and "severe pain" (ranging 7.1-10) by 5.2% of those with LBP. The pain score during one week prior to the time of the present study was averaged at 3.92.

On the scale of 0 to 24 for disability levels, only 3% of the cases experienced no disability, "low disability" (score = 1-6) by 66.4%, "moderate disability" (score = 7-12) by 17.2% and "high disability" (score = 13 or more) by 13.4% of those with LBP with a mean score of 5.78 on the Roland-Morris disability questionnaire. Only 16.7% of the cases experienced numbness or tingling in lower extremities. In addition, about 5.8% reported some weakness in the legs. About half of the LBP cases had stable condition and the progression of symptom was worse or better in one-fourth of the cases (Table 4).

Table 4. Nature of LBP among rice farmers

Nature of LBP	Number	Percent
Cause of LBP (n = 139)		
Repeated activities	67	48.20
Single accident/injury	72	51.80
Duration of symptom (n = 138)		
Equal or less than 12 weeks	7	5.07
More than 12 weeks	131	94.93
Area of LBP (n = 138)		
Back only	84	60.80
Back to buttock	14	10.14
Back to thigh	12	8.70
Back to lower leg	28	20.29
Intensity of pain (n = 134)		
Mild (VAS 0-4)	108	80.60
Moderate (VAS 4.1-7)	19	14.18
Severe (VAS 7.1-10)	7	5.22
Roland-Morris disability score (n = 134)		
No disability (score = 0)	4	2.99
Low (score = 1-6)	89	66.42
Moderate (score = 7-12)	23	17.16
High (score = 13 or more)	18	13.43
Numbness (n = 138)		
No	115	83.33
Yes	23	16.67
Weakness (n = 138)		
No	121	87.68
Yes	8	5.80
Not sure	9	6.52
Progression of symptom (n = 138)		
Better	37	26.81
Stable	66	47.83
Worse	35	25.36

Behaviors of LBP

The behavior of pain among the LBP rice farmers varied according to their postures and activities. Most rice farmers experienced increased LBP from slouched sitting (56.2%), forward bending (70.8%) and lifting (83.2%) and decreased LBP from straight sitting (41.6%) and back extension in standing (58.6%)

Table 5. Behaviors of LBP among rice farmers

Posture/activity	n	Better, n (%)	No effect, n (%)	Worse, n (%)
Supine	138	47 (34.06)	58 (42.03)	33 (23.91)
Side lying	137	47 (34.31)	64 (46.72)	26 (18.98)
Prone	108	40 (37.04)	46 (42.59)	22 (20.37)
Straight sitting	137	57 (41.61)	45 (32.85)	35 (25.55)
Slouched sitting	137	19 (13.87)	41 (29.93)	77 (56.20)
Standing	137	17 (12.41)	90 (65.69)	30 (21.90)
Walking	138	12 (8.70)	101 (73.19)	25 (18.12)
Forward bending	137	4 (2.92)	36 (26.28)	97 (70.80)
Back extension in standing	133	78 (58.56)	29 (21.80)	26 (19.55)
Lifting	137	0 (0.00)	23 (16.79)	114 (83.21)
Sit-to-stand	137	8 (5.84)	95 (69.34)	34 (24.82)
Coughing	137	0 (0.00)	119 (86.86)	18 (13.14)

as presented in Table 5. A few data was missing, but more missing data was presented in the prone position because many cases were not used to lying in prone position so that they could not describe their feeling.

Discussion

Prevalence of LBP

The lifetime, 12-month and point prevalence rates of LBP among rice farmers in the present study were 77.4%, 56.2% and 49.1%, respectively, which were much higher than the average prevalence reported in the general population in Western countries (60%, 34% and 18%)[15] and slightly higher than the average prevalence reported in African countries (62%, 50% and 32%)[16]. The 12-month prevalence rate among Thai rice farmers was higher than that of the Thai general population (43%)[2]. This is expected result because rice farmers are known as strenuous workers, so they may be more likely than general population to report LBP.

When compared with general farmers, the 12-month prevalence rate of LBP among Thai rice farmers (56.2%) derived from the present study was much higher than those among a combination of farmers reported in Western countries (23%-47%)[5-7], but less than those reported in peasant farmers in Nigeria (72.4%)[8] and rural China (64%)[9]. This could be explained that farmers in developing countries seemed to have poorer economic conditions and a lower level of education than those in the developed countries. In addition, the farming tools and equipment used in developing countries might require more physical exertion than those in developed countries.

In the present study, female rice farmers were more likely to develop LBP than males (Table 2). This finding was in accordance with the finding reported in Chinese farmers[9]. The higher prevalence rate in females might be due to poorer physical fitness. It was also possible that women had to carry out the housework in addition to farm activities, consequently had a higher risk to low back injury[9].

The present study did not find a relationship between age and LBP. However, the highest prevalence of LBP appeared in the youngest age ranged between 25-34 years, the prevalence had slightly decreased after the age of 35 years. The highest prevalence rate obtained in the youngest farmer compared with older farmer groups may be due to poorer farming skills. However, the interpretation of this finding should be cautious due to the small number of rice farmers in each age range, especially in the youngest age range because the majority of the younger generation prefers to engage in industrial work in urban cities instead of inheriting their parents' farm.

Nature of LBP

The result of the present study suggested that LBP onset among the study population could be both sudden and insidious with almost equal chance. Interestingly, about 95% of LBP participants were chronic cases with the mean duration of 292 weeks (5.6 years). The proportion of the chronic cases was much greater than those reported in previous studies conducted in developed countries[15,17,18]. It was possible that LBP cases in developed countries had workers' compensation and modified their work along with proper LBP management whilst Thai rice farmers

with LBP were self-employed and likely to continue regular duties in their farm because they could not afford to be off work. It was also questionable how rice farmers sought health care for their LBP.

According to pain and disability level, most LBP cases (80.6%) reported 'mild pain'. However, about 30% of the cases had moderate to severe disability on the Roland-Morris disability questionnaire (Table 4). This should be of great concern because many LBP rice farmers probably have poor knowledge on self-care and work modification, and could consequently risk further disability. The result suggested that health personnel in the primary level should pay attention to encourage preventive measures for LBP.

Behavior of LBP

The majority of participants with LBP reported that their low back got worse from slouched sitting, forward bending, and lifting and felt better from straight sitting and back extension in standing (Table 5). These LBP behaviors experienced by the rice farmers might indicate lumbar disc protrusion in the low back. If so, the result also suggested that the rice farmers should be encouraged to perform straight sitting while operating their ploughing vehicles and do back extension in standing more frequently while performing farming activities to alleviate LBP and perhaps prevent further injuries.

Clinical implication and future study

This was the first study of LBP among Thai rice farmers. Although the sample of the present study was limited in the rural community in the Lower Northern Thailand, the result sheds light the size of LBP among rice farmers, which are a very important population of Thailand. The majority of LBP rice farmers were chronic cases, which probably reflected poor health access within the present study population. It would be interesting to investigate how LBP rice farmers seek care. The result of the present study should provide substantial information to trigger policy makers or government as well as other stakeholders such as health sectors to address this LBP problem among rice farmers. Future study should expand the sample size to represent the entire rice-farming population in Thailand. Further risk factor analysis should be included in future research.

Conclusion

Prevalence of LBP is high among rice farmers in a rural community, Phitsanulok province, Thailand. Most of the LBP cases are chronic. Female farmers have significantly greater risk to LBP than males. However, further understanding of risk factors and health seeking behaviors for LBP among rice farmers is needed.

Potential conflicts of interest

None.

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ความชุกของการปวดหลังส่วนล่างในชาวนาปลูกข้าวในชุมชนชนบทประเทศไทย

ปนดา เตชทรัพย์อมร, ทวีศักดิ์ นพเกษร, ศุภสิทธิ์ พรรณารุโณทัย

วัตถุประสงค์*: เพื่อศึกษาความชุกของการปวดหลังส่วนล่าง ของชาวนาปลูกข้าว ในชุมชนชนบท จังหวัดพิษณุโลก ประเทศไทย*

วัสดุและวิธีการ*: เป็นการสำรวจแบบตัดขวางในชาวนาปลูกข้าว จำนวน 283 คน ในตำบลวังน้ำคู้ อำเภอเมือง จังหวัดพิษณุโลก ซึ่งเป็นชุมชนชนบทแห่งหนึ่งในเขตภาคเหนือตอนล่างของประเทศไทย การเก็บข้อมูลใช้วิธีการสัมภาษณ์ด้วยแบบสอบถามแบบมีโครงสร้างปลายปิดเกี่ยวกับการปวดหลังส่วนล่างในช่วงชีวิต ในช่วงระยะเวลา 1 ปีก่อนการศึกษา และ ณ ช่วงเวลาที่ศึกษา*

ผลการศึกษา*: พบว่าการปวดหลังในช่วงชีวิต ในช่วงระยะเวลา 1 ปีก่อนการศึกษา และ ณ ช่วงเวลาที่ศึกษา มีค่าเท่ากับ 77.39%, 56.18% และ 49.12% ตามลำดับ ไม่พบความสัมพันธ์ระหว่างอายุกับการปวดหลังส่วนล่าง แต่พบว่าผู้หญิงจะมีโอกาสปวดหลังมากกว่าผู้ชาย นอกจากนี้ยังพบว่า 95% ของชาวนาที่ปวดหลังเป็นการปวดเรื้อรัง (มีอาการปวดนานกว่า 12 สัปดาห์) ซึ่งมีค่าเฉลี่ยของระยะเวลาปวด เท่ากับ 292 สัปดาห์ (5.6 ปี)*

สรุป*: ชาวนาปลูกข้าวมีความชุกของการปวดหลังส่วนล่างสูง ควรทำการศึกษาปัจจัยเสี่ยง ในประชากรกลุ่มนี้เพิ่มเติม เพื่อที่จะสามารถออกแบบการป้องกันที่เหมาะสมต่อไป*