Abstract. [Purpose] The aim of this study was to examine the prevalence of knee pain in older farmers and to identify the associated factors, including the demographic variables, behaviours and physical activity/exercise levels. [Participants and Methods] A cross-sectional survey was conducted among a total of 285 systematically randomized farmers who were 60 years and older. [Results] The results of this study showed that the overall prevalence of knee pain in this population was 54.04% (n=154) based on a self-reported standardized Nordic Musculoskeletal Questionnaire. The highest prevalence of knee pain was 23.9% [95% confidence interval (CI): 17.75 to 30.05%] for two periods of time (within the past 7 days and over past 12 months). The intolerable physical activity risk factors that were significantly associated with knee pain included prolonged walking, standing and side sitting (odds ratio=2.39%, 95% CI: 1.06 to 5.39%). [Conclusion] The results of this study suggested that a high prevalence of knee pain in these older farmers may be particularly associated with sustaining a weight-bearing position.

Key words: Older farmers, Knee osteoarthritis, Prevalence

INTRODUCTION

Knee osteoarthritis (KOA) is a common condition in the older population. It is caused by the lack or loss of the articular cartilage of the knee, which progresses with age until the surrounding bone exhibits related damage. The symptoms of KOA include joint pain, stiffness, limited motion and deformity, leading to disability. The prevalence of painful disabling KOA in individuals over 55 years old is 10%, of whom one-quarter are severely disabled5. However, the number of individuals affected by symptomatic KOA is likely to increase due to the obesity epidemic and the aging of the population6. Unfortunately, there is a remarkable paucity of information regarding the differing KOA occurrences across racial groups and geographic regions. The prevalence that has been reported depend largely on the selected population, study design and criteria used. Therefore, the aim of this study was to examine the KOA prevalence in older rural farmers, and to identify the associated factors, including their demographic variables, behaviours and physical activity/exercise levels.

PARTICIPANTS AND METHODS

This cross-sectional survey was conducted among Thai farmers aged 60 years and older who were living in a rural area of the Khon Kaen Province in Thailand. This study was approved by the Ethics Committee for Human Research at Khon...
Kaan University. A total of 285 older individuals in five subdistricts were systematically randomized by their home addresses. After the researcher explained the study aims and procedures so that the participants thoroughly understood them, informed consent was provided by each of the participants.

The questionnaire used in this study contained two parts. The first part consisted of the Thai version of the standardized Nordic Musculoskeletal Questionnaire, which was used to analyse each participant’s musculoskeletal symptoms over three time periods: during the past 7 days, from 12 months ago until 7 days ago and over 12 months ago. The second part contained questions about their demographic variables (gender, age, weight, height, marital status, smoking behaviour, alcohol consumption, occupation, work pattern and exercise). The participants without knee pain did not have to answer the second part of the questionnaire. For those participants who had poor eyesight and/or were unable to read or understand the questions, the researcher’s assistant read the questions aloud and filled in the answers for the participant. After they completed the questionnaire, the musculoskeletal symptoms of the participants were assessed using the Thai version of the standardized Nordic Musculoskeletal Questionnaire for screening participants with knee pain. All of the participants with knee pain were classified according to the 1986 American College of Rheumatology criteria for screening participants with KOA.

The baseline characteristics and daily physical activities were shown by the number of participants and the percentage. The knee pain data was presented by the prevalence (%) and the 95% confidence interval (CI). The correlations between the musculoskeletal symptoms and the participants’ demographic and physical activity factors were described using the odds ratio (OR) calculated from a logistic regression analysis. A p value <0.05 was used as the statistical significance criterion.

RESULTS

The participants’ demographic variables and physical activity levels are shown in Table 1. Most of the participants never smoked or drank alcohol, and the occupations or activities that required physical activity included mild to moderate loads. Most of the daily physical activities included walking (25.0%, n=165), standing (20.9%, n=138) and side sitting (16.5%, n=109). Most of the participants exercised more than 3 days each week (57.54%, n=164).

The overall knee pain prevalence was 54.04% (n=154 of 285), shown in Table 2. Moreover, the knee pain prevalence for the past 7 days and over 12 months ago were the same 23.9% (95% CI: 17.75 to 30.05), while the knee pain prevalence from 12 months through 7 days ago was 6.3% (95% CI: 2.80 to 9.80). There were more women (68.83%, n=106 of 154) than men (31.17%, n=48 of 154) in the knee pain prevalence (Table 3). Other joint pain were also surveyed including the prevalent of neck (16.14%, n=46), shoulder (58.25%, n=166), elbow (16.49%, n=47), hand (35.09%, n=107), upper back (6.32%, n=18) and lower back (49.12%, n=140), hip (37.54%, n=107), ankle and foot (37.19%, n=106). Table 3 shows the knee pain prevalence correlated with the various factors, including the gender, age, body mass index (BMI), occupation, exercise level, alcohol use and smoking behaviour. There were no correlations between the knee pain prevalence during the past 7 days and from 12 months until 7 days ago and the various factors. However, there was an association between a knee pain prevalence of more than 12 months and a maximum physical activity load (OR=2.39, 95% CI: 1.06 to 5.39, p<0.05).

DISCUSSION

This study examined the knee pain prevalence of older farmers living in the same cultural area. The results showed high knee pain prevalence over the past 7 days and longer than 12 months ago. The physical activity risk factors that were significantly associated with knee pain included prolonged walking, standing and side sitting. Moreover, in this group of older farmers, the results suggested that a high knee pain prevalence may be particularly associated with sustaining a weight-bearing position over time.

Although, this study found the highest prevalence of shoulder pain; but, the most risk of knee pain was associated with prolonged physical activity. Similar to our results, Puntumetakul et al. reported that the knee pain prevalence of farmers for the past 7 days and 12 months were 28.6% and 35.4%, respectively. Thotsathit et al. determined that the knee pain prevalence of sewing workers ranged from 17.6% to 21.9%. Moreover, the prevalence of frequent knee pain was 25.1% higher in middle-aged or elderly females. Heavy physical activity that causes the tissues around the joints to become inflamed and painful is a risk factor for the development of KOA. The results of this study showed that knee pain was significantly correlated with a maximum physical activity load, including walking, standing and side sitting. Walking and side sitting both apply high pressure to the knee joint. Moreover, farmers, construction workers and teachers who stand for prolonged periods of time exhibit a greater risk of KOA that individuals in other occupations.

Previous systematic reviews and meta-analyses have indicated that an increased BMI, gender and age are risk factors for the onset of KOA in older adults. Additionally, the loss of patellar cartilage occurs at a higher rate in females than in males. However, therapeutic exercise can help to prevent and relieve knee pain. Therefore, older farmers who are at risk for knee pain or KOA should be provided with information about proper exercises and working postures. To validate the results of this study, further studies should consider the physical activity levels of older farmers with knee pain.

In conclusion, high knee pain prevalence was found in the older farmers during the previous 7 days and longer than 12
months previously. Moreover, the knee pain prevalence was significantly associated with a maximum physical activity load. These findings could provide knee OA education and self-care for older farmers.

**Funding**
BNOJPH, Khon Kaen University, Thailand.

**Conflicts of interest**
None.
### Table 3. Odds ratio of knee osteoarthritis according to demographic characteristics and physical activity

| Factors                        | Past 7-days (N=68) | Past 7-days to 12-months (N=18) | Past 12-months (N=68) |
|--------------------------------|--------------------|---------------------------------|----------------------|
|                                | Number (%)         | OR (95% CI)                     | p-value              |
|                                |                    |                                 |                      |
| Gender                         |                    |                                 |                      |
| Men                            | 24 (23.3)          | 1                               |                      |
| Women                          | 44 (24.2)          | 1.05 (0.59, 1.85)                | 0.87                 |
| Age                            |                    |                                 |                      |
| 60 and < 70                    | 31 (20.4)          | 1                               |                      |
| ≥ 70                           | 37 (27.8)          | 1.50 (0.87, 2.60)                | 0.14                 |
| BMI (kg/m²)                    |                    |                                 |                      |
| < 23                           | 22 (20)            | 1                               |                      |
| ≥ 23                           | 46 (26.3)          | 1.43 (0.78, 2.67)                | 0.23                 |
| Alcohol                        |                    |                                 |                      |
| Never                          | 49 (24.8)          | 1                               |                      |
| Former                         | 19 (21.8)          | 0.85 (0.47, 1.55)                | 0.59                 |
| Smoking                        |                    |                                 |                      |
| Never                          | 57 (24.9)          | 1                               |                      |
| Former                         | 11 (19.6)          | 0.74 (0.36, 1.52)                | 0.41                 |
| Load of physical activity      |                    |                                 |                      |
| Mild                           | 31 (23.7)          | 1                               |                      |
| Moderate                       | 30 (24.8)          | 1.06 (0.60, 1.89)                | 0.83                 |
| Maximum                        | 7 (21.2)           | 0.87 (0.34, 2.19)                | 0.77                 |
| Exercise                       |                    |                                 |                      |
| Always exercise                | 5 (16.7)           | 1                               |                      |
| No exercise                    | 63 (24.3)          | 1.65 (0.61, 4.49)                | 0.33                 |

OR: odds ratio; 95%CI: 95% confidence interval.

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