ENVIRONMENTAL AND PSYCHOLOGICAL FACTORS AS PREDICTORS OF CHRONIC LOW BACK PAIN AMONG THAI ELDERLY IN SAMUTPRAKARN PROVINCE, THAILAND

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ABSTRACT:

Background: Thailand has become to an aging society. In 2040, Thai elderly will be raise to more than the one-third of total population. Chronic low back pain (CLBP) is the most common symptom of musculoskeletal chronic pain in worldwide and very common in aging population. This study aimed to estimate the prevalence of CLBP and identify factors related to CLBP among the elderly.

Methods: A cross-sectional study was conducted to determine elderly characteristics, environmental factors, and psychological factor in relation to CLBP. Face to face interviews and the observation of the sitting, standing, walking postures was conducted among 188 participants of elderly clubs in Phrapradaeng district, Samutprakarn province, Thailand.

Results: The results showed that the prevalence of CLBP was 66.1 %. Only 22.7% was at mild intensity; followed by 23.8% and 19.6% at moderate and severe level respectively. Half (51.1%) of them was 60 to 69 years. About three-fifth was female (60.6%). Nutritional status as considered from their body mass index (BMI), 41.5% was obese while 21.3% was overweight. Majority of elderly (83.5%) have had chronic diseases. The most common three diseases were hypertension, dyslipidemia, and diabetes mellitus respectively. About 79.8% did exercise within the last three months. The majority had a correct posture on sitting and standing. Fifty-eight percent had a correct posture on walking. Number of chronic diseases, getting up from bed posture, and walking posture were significantly associated with CLBP.

Conclusion: To reduce CLBP, improving postures in the daily activities and gait pattern among the elderly people for CLBP prevention is suggested.

Keywords: Elderly; Chronic low back pain; Thailand

INTRODUCTION

The world population is becoming into aging society. The estimated of aging in the world will increase from 11% in 2000 to 22% in 2050 [1]. Thailand is the second highest elderly country in ASEAN. In 2015, 15.8 percent of Thai population was elderly and will be raise to more than one-third in 2040. Declining fertility and increasing longevity are the two main factors contributed to an increasing of elderly population [2-4]. The Eleventh National Economic and Social Development Plan emphasizes that all of government sections should be continually developed, integrated health care system and attempt to encourage community participation for elderly management [5].

Chronic low back pain (CLBP) is the most common symptom of chronic musculoskeletal pain worldwide [6] and very common in aging population [7-10]. The reported of pain was varied by difference ethnicity. The Asian populations were more pain sensitivity than other ethnic [11, 12]. The

prevalence of CLBP among the elderly ranged from 31.5% to 58% which were 52% in United States [13], 58% in Israel [14], 31.5% in Italy [15]. In Thailand, Chaiwanichsiri D. et al, reported the prevalence of self-reported CLBP in the last 6 months was 54.8% [16] and the study of Chaimay et al. showed that the prevalence of low back pain (LBP) was 39.7% among Phatthalung elderly [17]. CLBP is not only impact on individual level; decrease speed of walking, insomnia, activities limitation, impair social activities, and reduce quality of life but also impact on family, community and government for health care and management [14, 18-22]. Patients with CLBP should receive many treatments and long-term care that affects to the expense on health care and economic burden. CLBP are caused by multiple etiologies [6, 23-25]. The factors affected to CLBP are classified by Tulder M. into three main categories; individual factors, environmental factors, and psychosocial factors [26, 27].

The National Statistical Office reported that Samutprakarn province is the highest elderly population in the central region of Thailand [28]. Phrapradaeng district is in the northwest part of this province. This district has the highest proportion of the elderly in Samutprakarn province and there are about 6,721 people [29-31]. The study of Chitpitaklert et al. showed that the prevalence of back pain among elderly in Nakhon Ratchasima was 23.3 [32]. In Thailand, the prevalence of CLBP in elderly is very high but few studies were carried out to estimate the prevalence and identify factors related to CLBP in the elderly. This study aims to estimate the prevalence of CLBP and identify the factors associated to CLBP. The results of this study will facilitate the government to plan future CLBP program among the elderly.

MATERIALS AND METHODS

Research design

A cross-sectional study was conducted to determine elderly characteristics, environmental factors, and psychological factor in relation to CLBP among Phrapradaeng elderly.

Population and sample size

The study population was the elderly age over 60 years who were currently living and being a member of elderly club, Phrapradaeng district of Samutprakarn province during April to May 2014. Those elderly was well and home bound elderly who can change behavior better than bedridden elderly.

The sample size was calculated from sample size of cluster sampling [33]. P is the prevalence of LBP among elderly. The study of Chaimay et al. showed that the prevalence of LBP among elderly was 39.7% [17]. ε is the allowance error in estimated prevalence set at 23% of the prevalence. The sample size was 188 elderly. The two-stage cluster sampling was applied to recruit three biggest elderly clubs from six total elderly clubs in green area of Phrapradaeng district, Samutprakarn province at the 1st stage and 61-63 persons who participated the elderly activity on the data collection day were accidental included from each sampled elderly club at the 2nd stage.

Instruments

The structured interviewed questionnaires was developed and validated the content validity by the experts. The Cronbach's alpha coefficient was 0.832. The gold standard of pain measurement is self-report [34, 35]. CLBP defines as "all condition of pain and discomfort at least three months in the back region" [36]. The severity of CLBP is classified into 3 levels using face pain rating scales ranging from 0 to 5 points; no pain (0 point), mild severity is hurts a little bit (1 point), moderate and severe severity is hurts a little more, hurts even more, hurts a whole lot, or hurts worse (2 - 5 points).

There were six parts of face to face interview. *Part I elderly characteristics:* for example; occupation refers to occupation of before the 60 years and currently. Occupation had a low risk of LBP including; government officer/office worker/state enterprise/business own. Occupation had a high risk of LBP including; agriculture/daily wage earner/seller. Occupation is classified into 5 categories; (1) no have occupation before 60 years and currently (2) both occupations before 60 years and currently had a low risk of LBP (3) Occupation before 60 years had a low risk of LBP and current occupation had a high risk of LBP (4) Occupation before 60 years had a high risk of LBP and current occupation had a low risk of LBP (5) Both occupations before 60 years and currently had a high risk of LBP. *Part II CLBP:* the following the questions concerning of CLBP, "Have you ever had continuous low back pain in the last 3 months?" [37]. *Part III exercise* consists of back strengthening and stretching exercise. *Part IV perception on causes and prevention of LBP* which were 10 items with 3-likert rating scale questions including agree, uncertain, and disagree. *Part V postures of daily living activities within the last 3 months:* the

Table 1 Number and percent of elderly characteristics among 188 elderly

Elderly characteristics	Number	%
Age (years)		
60-69	96	51.1
70-79	79	42.0
≥80	13	6.9
Mean = 70.1 years SD = 6.6 years Median = 69.0 years		
Gender (female)	114	60.6
Marital status		
Single	19	10.1
Married	97	51.6
Widowed/divorced/separated	72	38.3
Educational attainment		
Primary school and lower	142	75.5
Secondary school	34	18.1
High vocational certificate and diploma	3	1.6
College and higher	9	4.8
BMI (kg/m^2)		
Underweight (<18.5)	10	5.3
Normal (18.5-22.9)	60	31.9
Overweight (23-24.9)	40	21.3
Obese (≥25)	78	41.5
Mean = 24.7 SD = 4.7 Median = 24.1		
Number of chronic disease		
0	31	16.5
1	61	32.4
2	48	25.5
3	32	17.0
4	14	7.4
5	2	1.1
Mean = 1.7 diseases SD = 1.2 diseases Median = 2.0 diseases		
Exercise within the last 3 months	150	79.8
Level of perception		
Moderate (10-24)	67	35.6
Good (25-29)	78	41.5
Very good (30)	43	22.9
Mean = 26.0 SD = 3.5 Median = 26.5		

researchers have been observed posture during an interview and measured the body weight and height. According to physiotherapy knowledge, correct sitting posture refers to sitting with back straight. Correct standing posture means standing with back straight, no round shoulder, arm attached to the trunk, no knee hyperextension, leg slightly apart, and symmetrical weight bearing on both feet. Correct walking posture means walking with back straight, no round shoulder, not much arm swing, weight bearing on heel before forefoot, and *Part VI psychosocial status (stress)* is feeling responses which are unpleasant and negative felling during lived in under pressure situations. Stress was measured by modified stress test questionnaire (ST5) which was 6 items with 4-likert rating scale questions [38].

The data collection was conducted by researcher (physiotherapist) and research assistants (two physiotherapists). Two assistants were trained by researcher before implementing data collection for quality control. Moreover, rehearsal on interviewing using all of question was also conducted and they were observed that all questions were understandable.

Statistical analysis

Descriptive statistics were performed to summarize in each variable. Mean and standard deviation were used to describe quantitative variables. Number and percent were used to describe qualitative variables. Multivariate binary logistic regression was analyzed to identify the relationship between elderly characteristics, environmental factors, and psychological factor on

Table 2 Number and percent of environmental factors among 188 elderly

Environmental factors	Number	%
Having occupation (before 60 years)	173	92.0
Having occupation (current occupation)	81	43.1
Smoking		
Never	134	71.3
Ever	33	17.6
Current	21	11.2
Drinking		
Never	131	69.7
Ever	30	16.0
Current	27	14.4
Level of risky postures in daily living activities		
Rather less risky (0-24)	61	32.4
Less risky (25-50)	82	43.6
Moderate risky (51-60)	22	11.7
High risky (61-100)	23	12.2
Min = 0 Max = 93.0		
Mean = 35.5 SD = 19.7 Median = 31.7		
Type of bed		
Kapok mattress	62	33.0
Rubber mattress	51	27.1
Wooden bed/mat/floor	35	18.6
Spring mattress	25	13.3
Coconut fiber mattress	15	8.0
Getting up from bed posture by supine to sitting with side lying	131	69.7
Correct sitting posture	163	86.7
Correct standing posture	148	78.7
Correct walking posture	109	58.0

CLBP. The forward stepwise selection was the strategies to find an appropriate model which a combination of forward and backward. Forward stepwise was start with no variables in the model. At each step, the variable was dropped and added using the cut-point (*p-value*).

Ethical consideration

This study has been approved by the Ethic Committee for Human Research, Faculty of Public Health, Mahidol University (COA. No. MUPH 2015-057). Participation in this study was on voluntary. Informed consent was obtained from all participants after explaining the objective of this study.

RESULTS

Prevalence of CLBP among the elderly

Prevalence of CLBP using face to face interview within the last 3 months was 66.1% (95% CI: 0.59 – 0.73), 22.7% was at mild intensity followed by 23.8% and 19.6% at moderate and severe level respectively.

Characteristics of the elderly

About half (51.1%) of them was early elderly (60 to 69 years). About three-fifth was female (60.6%). Regarding educational attainment, majority (75.5%) completed compulsory level. Nutritional status as considered from their BMI, 41.5% was obese while 21.3% was overweight. Sickness especially chronic diseases among elderly was rather common, 83.5% of elderly have had chronic diseases. The most common three chronic diseases were hypertension (65.4%), dyslipidemia (36.2%), and DM (25.0%). In regards to exercise, 79.8% of elderly did exercise within the last three months. For perception on causes and prevention of LBP, 22.9% was at very good level whereas none of them was at poor level as the detailed shown in Table 1.

Environmental factors

The majority of them (92.0%) had been working before retirement. Only 43.1% reported of working currently. Smoking and alcohol drinking status were also inquired, 71.3% and 69.7% of them were non-smokers and non-alcohol drinkers. The

Table 3 Level of stress among 188 elderly

Level of stress	Number	%
Mild (0-5)	131	69.7
Moderate (6-9)	50	26.6
Severe (10-11)	6	3.2
Very severe (12-18)	1	0.5
Mean = 4.0 SD = 2.8 Median = 4.0		

Table 4 Elderly characteristics, environmental factors, and psychological factor significantly related to CLBP (n=188)

Variables	$\widehat{B}$	$SE(\widehat{B})$	$\widehat{OR}$	95% CI of OR	
				Lower	Upper
Constant	0.15	0.46	1.16		
Number of chronic diseases (0[†])					
1	-0.08	0.48	0.92	0.36	2.36
2	1.26	0.54	3.53	1.23	10.16
≥3	1.44	0.55	4.21	1.43	12.38
Getting up from bed posture by supine to sitting without side lying (with side lying[†])	-0.88	0.39	0.41	0.19	0.89
Incorrect walking posture (correct[†])	1.61	0.39	4.99	2.34	10.62

[†] Reference group

level of risky postures of daily living activities, 23.9% was at the moderate to high risky. The response to question on type of bed and toilet, about one-third (33.0%) reported on sleeping in the kapok mattress. 69.7% was getting up from bed with side lying posture. The observation on sitting, standing, and walking posture during interviewing, the majority (86.7% and 78.7%) had a correct posture on sitting and standing. Only 58.0% had a correct posture on walking, as presented in Table 2.

Psychological factor

An overall level of stress among elderly, about three-fifth (69.7%) was at mild level. However, those who were at severe and very severe level of stress were 3.2% and 0.5% respectively as the detailed shown in Table 3.

The association between several factors and CLBP

Number of chronic diseases, getting up from bed posture, and walking posture were significantly associated with CLBP using multivariate binary logistic regression analysis, as presented in Table 4.

DISCUSSION

The prevalence of CLBP among the elderly was 66.1% (95% CI: 0.59-0.73). The difference found among various study may be due to its definition [14, 15, 39]. In Thailand, the study of lumbar disc degeneration among elderly aged over 50 years from Rom Klao community revealed that the prevalence of self-reported CLBP in the last 6 months was 54.8% [16]. The definition of CLBP was similar to this study. The higher prevalence of Phrapradaeng elderly can be explained that age of elderly of Rom Kloa elderly was younger. The degenerative change of lumber spine of the older is more than the younger.

Although there was no association between educational attainment and CLBP, elderly with primary school or lower had a slightly higher risk of CLBP than those secondary school or higher. This result was similar to the study of Weiner et al. among elderly aged 65 to 84 years in community-dwelling, United States and Docking et al. among elderly whose aged 75 years and old in United Kingdom [40, 41]. It was observed that elderly with primary school or lower tended to work hard such as agriculture, daily wage earner, or seller and they are risky to develop CLBP before 60 years more than those who currently work hard. Considering chronic diseases, it was found from this study that elderly with chronic diseases was at a higher risk of developing CLBP. Hartvigsen et al. and Jacobs et al., reported that chronic diseases were significantly related to back pain among elderly [14, 39] but contradicted to Cecchi et al, reported that chronic diseases did not related to back pain among elderly aged 65 years and over [15]. Metabolic syndrome is an increasing risk of intervertebral disc prolapse [42]. Elderly with DM increases risk of developing LBP due to the changes of metabolism in discs of lumbar spine. It could be induced annulus fibrosus

weaken and lumbar disc herniation [43]. In this study, the elderly with musculoskeletal pain were highly associated to CLBP. It could be explained by widespread pain.

Elderly posture of getting up from bed without side lying had a lower risk of CLBP compared to those with side lying. It could be explained that among those with CLBP went to the hospital or clinic. Patients' especially elderly are advised to do the altered posture in daily living. An incorrect walking posture was also significantly related to CLBP among this group of elderly. The elderly with incorrect walking posture was at 4.9 times of developing to CLBP than those with correct walking posture. Patients with CLBP alter posture and gait by decreasing complexity; do not simultaneously movement between thoracic and pelvic region during walking [21, 39]. Some elderly had abnormal gait pattern; stooped posture, inadequate swing arms, knee hyperextension, and decreased step length. This finding was similar to a study of Newell et al. [21], showed that patients with CLBP had decreased complexity, step length, and velocity during walking compared to control group. Therefore, abnormal gait pattern affect to CLBP.

CONCLUSION AND RECOMMENDATIONS

An estimated prevalence of CLBP within the last 3 months was 66.1%. For further study, the cohort study or longitudinal study is recommended. To prevent CLBP among elderly, improve postures of daily living activities, control of chronic diseases, and perform specific back exercise regularly are suggested. In addition, the corrected posture program and physical activities must be emphasis and more promoted in the elderly club, since it helps on controlling body weight, alleviating of CLBP and preventing many chronic diseases especially CLBP.

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