Original article

Correlation among pain catastrophizing, depressive symptom, and activity of daily living in older Thai Buddhist monks with knee osteoarthritis

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Background: Older Thai Buddhist monks are usually accustomed to a unique lifestyle that potentially relates to knee osteoarthritis (OA) such as long-standing kneeling on the hard surface. Understanding the association among pain catastrophizing, depressive symptoms, and activity of daily living (ADL) in this population with knee OA may help reduce the psychosocial problems and promote their sacred activities.
Objective: To determine the relationship between pain catastrophizing, depressive symptoms, and ADL in older Thai Buddhist monks with knee OA.
Methods: In all, 105 older monks with knee OA were recruited in this study. Data were collected by using a set of questionnaires and analyzed with descriptive statistics and Pearson's product-moment coefficient correlations.
Results: Accordingly, 2.86% and 27.62% of the subjects experienced pain catastrophizing and depressive symptoms, respectively. There was a moderate positive correlation between pain catastrophizing and depressive symptoms ($r = 0.43$, $P = 0.01$). Interestingly, pain catastrophizing and depressive symptoms had a strong negative correlation with ADL ($r = -0.65$; $P = 0.01$, and $r = -0.52$; $P = 0.01$, respectively).
Conclusion: The significant correlation between pain catastrophizing and depressive symptoms was demonstrated among older Thai monks with knee OA. Pain catastrophizing and depressive symptoms had a strong reverse correlation with ADL. Further studies are required to develop nursing care that potentially reduces psychosocial threats and promotes ADL in the at-risk population with knee OA.

Keywords: Activity of daily living, depressive symptom, knee OA, older Thai Buddhist monk, pain catastrophizing.

Knee osteoarthritis (OA) is a significant burden among older adults.[1] The prevalence of knee OA was 49.60% and 9.00% among the population in the United States and Thailand, respectively.[2, 3] Some behaviors such as the sitting position (knee bending, kneeling, and squatting) were associated with increased prevalence of knee OA, particularly in Thai Buddhist monks.[4] As a result, the higher prevalence of knee OA was found among Thai Buddhist monks, which were for one-third of this population.[5] Pain, one of the most troublesome knee OA symptoms, often leads the patients to hospital.[6] Unfortunately, more than half of the patients with knee OA received inadequate pain management.[7] Suffering from pain can limit the patients' level of activity of daily living (ADL)[8] and produce psychiatric problems such as pain catastrophizing and mental depression.[9]

Pain catastrophizing is an overestimation of the pain perception in patients with an inadequate chronic pain treatment. It is associated with the severity of pain and physical disability in patients with knee OA.[10] Consequently, the patients who are unable to perform their daily activity eventually develop depressive symptoms [11] and physical dependence. [12]

Unfortunately, previous studies were conducted in female patients with knee OA. However, the studies in the specific population, such as Thai monks who are always male and usually have less access to the health care system are sparse.[5] Also, only few studies were emphasized on psychosocial aspects other than the patients' symptoms and their physiological counterparts. The primary aim of this study was to investigate the correlation among pain catastrophizing, depressive symptoms, and ADL in older Thai monks with knee OA.

Materials and methods
Participants

Thai monks with knee OA who attended the Outpatient Clinic of Priest Hospital, Bangkok, Thailand between February and March 2019 were enrolled in the study. Eligible subjects were Thai Buddhist monks aged more than 60 years who: 1) were diagnosed of knee OA by the physicians with 3 - 4 Kellgren Lawrence grading scale on knee radiographs; 2) were able to communicate in Thai language; 3) did not have cognitive impairment assessed by Mini-Cog questionnaire with the score equal or more than 3 points [13]; and, 4) were willing to participate in this study and signed an informed consent. Patients were excluded if they were: 1) having a history of extremities injury, e.g., fractures; 2) having an orthopedic surgery in a major lower extremity joint e.g., total knee arthroplasty; 3) treated with steroid injection into the knee joint within 1 month; 4) having co-morbidities related to knee activities and walking abilities e.g. rheumatoid arthritis, bone cancer; and, 5) decline to consent. The investigators recruited the participants with a purposive sampling method after the Institutional Review Broad of Faculty of Medicine Ramathibodi Hospital, Mahidol University (ID: 12-61-73) and Priest Hospital (ID: 4/2562) approved this study. Patients' rights to privacy and confidentiality were acknowledged throughout the study process.

Instruments

The demographic questionnaire consisted of 9 items including age, body mass index (BMI), years of ordination, educational level, co-morbidities, medical history use, pain severity score, duration of religious practice per day.

Pain catastrophizing was assessed with the Pain Catastrophizing Scale (PCS) developed by Sullivan MJ, et al. [14] and was translated into Thai by Youngcharoen P, et al. [15] The PCS comprises 3 subscales to evaluate rumination of pain experience (4 items), magnification of pain perception (3 items), and helplessness for pain alleviation (6 items). The scales are rated from 0 (no symptom) to 4 (all the time). The possible total score was 0 to 52. The higher score indicates that the subject had higher pain catastrophizing.

The depressive symptoms were assessed by using the 15 - Thai geriatrics depression scale (15-TGDS) [16] which was translated from the original version developed by Yesavage JA, et al. [17] The possible total score ranges from 0 to 15. The higher score indicates more depressive symptoms.

The ADL subscale of Knee Observe Outcome Score (KOOS - ADL) was used to evaluate the ADL capability in the subjects [18] and has shown the correlation and internal consistency in patients with knee OA.[19] Its Thai modified version developed by Chaipinyo K, et al. [20] The scales range from 0 (no problems) to 4 (extreme problems) and was transformed into 0 to 100 point. Higher scores represent more ADL activity performed by the subjects.

All three questionnaires had good validity and reliability. [15, 16, 20]

Statistical analysis

The sample size was calculated by using the G * power [21] analysis with the level of significance of 0.05, the statistical power of 0.80, and the correlation coefficient of 0.27 according to Scopaz KA, et al. [22]

We used the SPSS software for Mac version 18 (SPSS Inc., Chicago, IL) in all analyses. The demographic data were analyzed with descriptive statistics. Pearson's product-moment correlation coefficient was used to examine the correlation among study variables. A P-value less than 0.05 was considered a statistical significance.

Results
Characteristics and health information

In total, 105 Thai Buddhist monks were recruited in the study. The demographic data and characteristics of the subjects are shown in Table 1 and 2.

Pain catastrophizing, Depressive symptom, and ADL

The scores in pain catastrophizing, depressive symptom, and ADL are shown in Table 3.

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The correlations analyzed by using Pearson's
product-moment correlation coefficient are shown in
Table 4.

Table 1. The characteristics of the subjects (n = 105).

Characteristics	n	%	Characteristics	n	%
Age (year)			**BMI (kg/m²) ***		
60 - 69	63	60.00	< 18.50	8	7.62
70 - 79	28	26.70	18.50 - 22.99	20	19.05
> 80 years	14	13.33	23.00 - 24.99	13	12.38
Years of the ordain			25.00 - 29.99	45	42.86
< 5	10	9.52	≥ 30.00	19	18.09
5 – 10	20	19.05	**Level of education**		
11 – 15	17	16.19	No school education	2	1.90
16 – 20	20	19.05	Primary school	67	63.81
21 – 25	13	12.38	High School	27	25.72
> 25	25	23.81	Bachelor or more	9	8.57

*based on Asian criteria

Table 2. The health information of the subjects (n = 105).

Health information	n	%	Health information	n	%
Side of affected knee			**Average pain score during a week**		
Left	18	17.14	0 - 3 (mild)	20	19.05
Right	48	45.72	4 - 6 (moderate)	58	55.24
Both	39	37.14	7 - 10 (severe)	27	25.71
Knee OA (years) since diagnosed			(mean = 5.29 ± 1.96; range 1 - 10)		
0 - 5	71	67.62	**Duration of daily activities***		
6 - 10	29	27.62	Chant or meditation	102	97.14
> 10 years	5	4.76	1 - 2 hours / day	83	81.37
Comorbidities			3 - 4 hours day	19	18.63
No	12	11.43	**Walking alms**	84	80
Yes*	93	88.57	1 - 2 hours day	80	95.24
Metabolic syndrome	89	75.20	3 - 4 hours day	4	4.76
Hyperlipidemia	65	61.90	**Sweeping the temple**	74	70.48
Hypertension	65	61.90	1 - 2 hours /day	70	94.59
Diabetes mellitus	39	37.14	3 - 4 hours /day	4	5.41
Prostatic hyperplasia	16	15.24	**Walking meditation**	32	30.48
Heart diseases	15	14.29	1 - 2 hours /day	32	100
Cataract	9	8.57	**Pain medications***		
COPD[a]	8	7.62	NSAIDs[b]	73	69.52
Renal failure	3	2.86	Acetaminophen	65	61.90
Number of comorbidities			Opioids	37	35.20
< 3 diseases	60	57.14	Combined drugs	21	20.00
≥ 3 diseases	45	42.86	**Adjuvant drugs***		
Pain relieving methods*			Glucosamine sulfate	100	100.00
Oral medications	105	100	Anticonvulsants	49	46.67
Topical medications	91	86.67	Antidepressants	22	20.95
Rest	47	44.76			
Massage	40	38.10			

*more than 1 answer

[a] Chronic obstructive pulmonary disease

[b] Non-Steroidal anti-inflammatory drugs

Table 3. Descriptive data of the pain catastrophizing, depressive symptom, and ADL scores (n = 105).

Variables	n (%)	Possible score	Range	Mean ± SD
Pain catastrophizing	105 (100.00)	0 - 52	2 - 31	10.61 ± 6.47
No	102 (97.14)	0 - 29	2 - 29	10.03 ± 5.59
Yes	3 (2.86)	30 - 52	30 - 31	30.33 ± .58
Depressive symptom	105 (100.00)	0 - 15	0 - 11	3.42 ± 2.06
No depressive symptom	76 (72.38)	0 - 4	0 - 4	2.41 ± 1.06
Possible	28 (26.67)	5 - 10	5 - 10	6.07 ± 1.65
Definite	1 (0.95)	11 - 15	11	11.00 ± 0.00
Activity of daily living (ADL)	105 (100.00)	0 - 100	37 - 93	73.67 ± 11.51

Table 4. The correlation among study variables.

Variables	Pain catastrophizing	Depressive symptom	ADL
Pain catastrophizing	1		
Depressive symptom	0.43*	1	
ADL	- 0.65*	- 0.52*	1

* $P < 0.01$

Discussion

Pain catastrophizing, depressive symptom, and ADL

Our study showed that a small number of the subjects had pain catastrophizing whereas a previous study revealed a higher incidence of the problem.[23] This finding could be explained by the fact that our population may have had less severe disease with moderate overall pain intensity score. Furthermore, more than half of the subjects have been using multiple pain medications. Substantial pain relief can significantly reduce pain catastrophizing.[24] Moreover, all subjects in this study received the adjuvant therapies that could have modified pain perception such as glucosamine sulfate, anticonvulsants or antidepressants. These therapies could potentially decrease pain catastrophizing according to the result of a meta-analysis.[25]

According to our study, about one-third of the subjects had suggestive symptoms of depression while limited number (< 1.00%) had definite depressive symptoms. Previous studies showed that the percentage of patients who developed depressive symptoms among the general population was higher than that of this study.[26, 27] The religious activities of Thai Buddhist monks such as routine meditation and making merit may help alleviate mental stress and improve their depressive symptoms.[28]

For ADL assessment, most of our participants (60.00%) could perform effortless ADL (e.g., alms round, sweeping the garden) despite their advanced age. About one-third of the subjects used weak opioids for pain relief. This could be a factor to explain the high ADL scores in our subjects. Because a study showed, the patients who used opioids for their pain had higher activity than those who did not.[23]

The correlation among pain catastrophizing, depressive symptom, and ADL

Our study showed a moderately positive correlation between pain catastrophizing and depressive symptoms. The similar outcomes were shown among the earlier studies.[10, 29, 30] However, a weaker correlation between pain catastrophizing and depressive symptoms was demonstrated in a previous study.[23] More advanced age of the subjects in our study probably contributed the age-related psychosocial problems such as depression.[31, 32]

A strong negative correlation was demonstrated between pain catastrophizing and ADL. The results could be explained by the fact that if the patients with knee OA had high pain catastrophizing, they would overestimate their pain during the activities. Subsequently, they would reduce their activities to prevent possible aggravating pain. This sedentary activity potentially produces joint stiffness and deformities, thus decreased overall physical activity.[33]

We also found a strong negative correlation between depressive symptom and ADL. However,

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the previous studies [22, 29] revealed a weakly negative relationship. Since our study included the older population with more degenerative diseases and comorbidities, they may have developed a higher possibility of having depressive symptom. [31]

Our study had some limitations. First, the study result could not be generalized to a larger population since this study was done in the highly-specific subgroup with particular daily life activities and attitude in a limited number of subjects. Second, the measurement tools were the self - report questionnaires, which may not be a precise evaluation compared with physical assessment. Lastly, the level of education of the subjects may have affected the understandability of the questionnaire. Further study in larger population with appropriate measurement is required to better understand the psychosocial factors and their consequences on ADL in older patients with knee OA.

Conclusions

This study highlighted the intricacies of psychosocial problems among older Thai Buddhist monks with knee OA by demonstrating the correlation among pain catastrophizing, depressive symptom, and ADL. The knowledge from the study results potentially guide a nursing care and provides the specific interventions to reduce psychosocial factors and to promote ADL in this population.

Acknowledgements

Conflict of interest

The authors, hereby, declare no conflict of interest.

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