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ความชุกอาการปวดและสุขภาพโดยทั่วไปภายหลังจากการเปลี่ยนข้อเข่าเทียม; การศึกษาแบบตัดขวาง

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Prevalence of Pain and General Health Score After Total Knee Arthroplasty; A Cross-Sectional Study

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บทคัดย่อ

หลักการและวัตถุประสงค์: คนไข้หลังผ่าตัดเปลี่ยนข้อเข่าเทียมจำนวนหนึ่งยังมีอาการปวด ดังนั้นการศึกษานี้จึงมีวัตถุประสงค์เพื่อศึกษาความชุกของอาการปวดและสุขภาพจิตของผู้ป่วยเหล่านี้

วิธีการศึกษา: เป็นการศึกษาเชิงพรรณนาแบบย้อนหลังในผู้ป่วยร่วมงานรวมพลคนข้อใหม่ที่ โรงพยาบาลศรีนครินทร์ พ.ศ. 2562 จากแบบสอบถามระบุตำแหน่ง ระดับความปวด แบบประเมิน Thai GHQ-28

ผลการศึกษา: ผู้ป่วย 53 ราย ได้รับการผ่าตัดเปลี่ยนข้อเข่าเทียม 76 ข้อ พบอาการปวดด้านหน้าเข่าร้อยละ 57.89 ค่าเฉลี่ยคะแนนความปวดเมื่อเดินและคะแนนรวม Thai GHQ-28 score เป็น 1.49±2.13 และ 1.77±2.85 ตามลำดับ ความปวดเมื่อเดิน เมื่อพักข้อฝืดติดช่วงเช้า ฝืดติดระหว่างวันสัมพันธ์ต่ำกับความบกพร่องทางสังคม (correlation coefficient 0.317, 0.307, 0.385, 0.339; p<0.05) นอกจากนี้ ความปวดเมื่อพักยังมีความสัมพันธ์ปานกลางกับอาการซึมเศร้าที่รุนแรง (correlation coefficient=0.441, p=0.001)

สรุป: ร้อยละ 58 ของผู้ป่วยหลังการผ่าตัดเปลี่ยนข้อเข่าเทียมมีอาการปวดเล็กน้อย ส่วนใหญ่ปวดที่บริเวณหน้าข้อเข่า อาการปวดและข้อฝืดมีความสัมพันธ์ระดับต่ำกับความบกพร่องทางสังคม นอกจากนี้ อาการปวดเมื่อพักภายหลังจากเปลี่ยนข้อเข่าเทียมยังสัมพันธ์ปานกลางกับอาการซึมเศร้าที่รุนแรงด้วย

คำสำคัญ: การเปลี่ยนข้อเขาเทียม, การผ่าตัดเปลี่ยนข้อเข่าเทียม, สุขภาพจิต, ความเจ็บปวด

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Abstract

Background and Objective: Some patients who underwent total knee replacement still have an unfavorable pain. This study aimed to evaluate the pain prevalence, and mental health in these patients.

Methods: This was a descriptive retrospective study of patients joined the meeting in 2019 at the Srinagarind Hospital. We used questionnaires to evaluate the locations, pain score, and the Thai GHQ-28.

Results: 53 patients, 76 total knee replacements, had anterior knee pain 57.89%. Mean walking pain and Thai GHQ-28 score were 1.49±2.13 and 1.77±2.85, respectively. Walking pain, rest pain, morning stiffness, and stiffness during the day had a low correlation to the social dysfunction subscale (correlation coefficient 0.317, 0.307, 0.385, 0.339; $p<0.05$). In addition, pain at rest had a moderate correlation to the severe depression subscale (correlation coefficient=0.441, p=0.001)

Conclusion: Fifty-eight percent of the patients who underwent total knee replacement still had mild pain, mainly at the anterior area of knees. This pain and stiffness had a low correlation to social dysfunction. Furthermore, pain at rest after knee arthroplasty also had a moderate correlation to severe depression.

Keyword: total replacement, total knee arthroplasty, mental health, pain

Introduction

Total knee replacement is an operative treatment for osteoarthritis patients who fail to improve with the conservative treatment[1]. The majority of the patient clinical results are improved, however, systematic reviews[2,3] report that 8-26.5% of patients still have unfavorable pain after the surgery, which leads to dissatisfaction after the procedure. This pain could affect the efficacy of work, quality of life, mental health, and general health[4].

The studies or reports related to pain and mental health in total knee replacement patients are limited. Therefore, this study was created to evaluate the clinical outcome, emotional distress, and mental health in the patients who underwent total knee replacement.

Methods

This study was approved by the Khon Kaen University Ethics Committee for Human Research (Protocol ID HE641271). This study was a retrospective descriptive study. We collected data from the patients who underwent a total knee replacement procedure and came in person with the New Joint Annual Meeting in December 2019 at the Srinagarind Hospital, Faculty of Medicine, Khon Kaen University. This study included patients who were older than 18 years old and received a total knee arthroplasty procedure. The exclusion criteria included patients who had abnormal neurological or cognitive function.

Outcome and questionnaire

Demographic data including gender, age, BMI, and follow-up time were collected. We collected the area of pain by using the photographic knee pain map (PKPM)[5] (Figure 1A,1B). The visual analogue scale for pain when walking and rest, the stiffness score in the morning and during the day were collected as a continuous scale from 0 to 10. The Thai General Health Questionnaire-28 (Thai GHQ-28)[6] was used to collect the emotional distress and mental health. It consists of 28 questions, 4 subscales: somatic symptoms, anxiety/insomnia, social dysfunction, and severe depression. Thai GHQ-28 is scored between 0 to 28. The total score of 6 or more indicates of probable mental illness.

Statistical analysis

Statistical analyses were performed by the program SPSS version 26.0. The demographic data, pain area, clinical scores, and the Thai GHQ-28 score were presented in percentage, mean, and standard deviation. The correlation between pain visual analogue scales or stiffness scores and the Thai GHQ-28 were analyzed by Spearman's rank correlation. The strength of correlation was defined as high (0.8-1.0), marked (0.6-0.8), moderate (0.4-0.6), low (0.2-0.4), and no (0-0.2). Statistical p-value less than 0.05 presented a significant value.

Results

This study included 53 patients who underwent 76 total knee replacements. 38 were female (71.70%). The mean age and mean BMI of patients were 69.17±7.27 years old, and 26.64±4.54 kg/m^2, respectively. The mean follow-up time was 29.42± 28.13 months (Table 1).

44 of 76 knees (57.89%) had anterior knee pain, followed by posterior (35.53%), lateral (15.79%), medial (10.53%), and proximal tibia (10.53%), in order (Table 2). Nevertheless, the mean pain visual analogue scale at walking and rest were low (1.49±2.13 and 0.28±0.95, orderly). The mean stiffness in the morning and during the day were 1.94±2.48 and 1.32±2.09, in order (Table 3).

The mean of the Thai GHQ-28 total score was 1.77±2.85 from 28. Only 4 of 53 patients reached 6 scores that determined the abnormality. The mean of the somatic symptoms subscale was 0.64±1.11, followed by the social dysfunction subscale (mean=0.55±0.85), anxiety/ insomnia subscale (mean=0.43±1.01), and severe depression subscale (mean=0.17±0.98) (Table 4).

The Spearman's rank correlation of the Thai GHQ-28 total score to pain and stiffness were not significant. Nonetheless, pain at walking, pain at rest, morning stiffness, and stiffness during the day scores had a significantly low correlation to the social dysfunction subscale. The pain at rest score had a moderate correlation to the severe depression subscale (correlation coefficient=0.441, p=0.001) (Table 5).

Table 1 Patient demographic characteristics

Characteristics	Amount (Total = 53)
Gender	
Male	15 (28.30%)
Female	38 (71.70%)
Mean age± SD [years] (range)	69.17±7.27 (54-89)
Mean BMI±SD [kg/m^2] (range)	26.64±4.54 (15.92-38.58)
Mean follow up time± SD [months] (range)	29.42±28.13 (1-156)

Table 2 Pain area

Pain area	n (%)
Anterior	44 (57.89)
Posterior	27 (35.53)
Lateral	12 (15.79)
Medial	8 (10.53)
Proximal tibia	8 (10.53)
Other areas	7 (9.21)

Table 3 Pain visual analogue scales and stiffness scores of the knee

Pain/Stiffness	Mean ±SD
Pain at walking	1.49±2.13
Pain at rest	0.28±0.95
Morning stiffness	1.94±2.48
Stiffness during the day	1.32±2.09

Table 4 The Thai GHQ-28 total score and subscale divisions

Score (range)	Mean ± SD
Total score (0-28)	1.77±2.85
Somatic symptoms subscale (0-7)	0.64±1.11
Anxiety/ insomnia subscale (0-7)	0.43±1.01
Social dysfunction subscale (0-7)	0.55±0.85
Severe depression subscale (0-7)	0.17±0.98

Table 5 The correlations between the pain or stiffness score and the Thai GHQ-28

Correlation coefficient	Total score	Somatic symptoms subscale	Anxiety/ insomnia subscale	Social dysfunction subscale	Severe depression subscale
Pain at walking (p-value)	0.233 (0.093)	0.147 (0.295)	0.042 (0.763)	0.317 (0.021*)	0.138 (0.324)
Pain at rest (p-value)	0.258 (0.062)	0.221 (0.112)	0.120 (0.390)	0.307 (0.025*)	0.441 (0.001*)
Morning stiffness (p-value)	0.247 (0.074)	0.074 (0.597)	-0.043 (0.759)	0.385 (0.004*)	0.167 (0.231)
Stiffness during the day (p-value)	0.239 (0.085)	0.215 (0.121)	-0.033 (0.814)	0.339 (0.013*)	0.139 (0.321)

* p-value less than 0.05

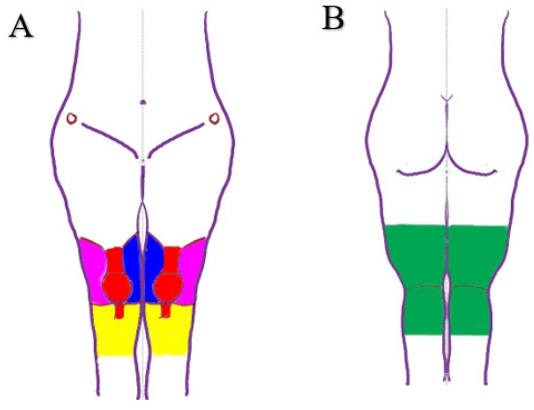

Figure 1 The photographic knee pain map 1A. Red=Anterior, Blue=Medial, Purple=Lateral, Yellow=Proximal tibia 1B. Posterior=Green

Discussion

This retrospective descriptive study examined the location of knee pain, clinical scores, mental health score, and the correlation between the clinical scores and the mental health score. The results showed that the patients in this study who underwent total knee replacement still had low pain score, especially anterior knee area, and low stiffness score. In addition, these pain and stiffness had a low correlation to social dysfunction. That means the very low pain and stiffness knee did not affect the mental health and social dysfunctions of the patients who underwent total knee replacement.

The previous studies[7–10] demonstrated the incidence of anterior knee pain was between 19%-49.2%. Popovic and Lemaire[7] reported that 49.2% of patients had anterior knee pain after the total knee replacement and most of these had mild anterior knee pain. Van Jonbergen et al[8] reported the incidence of anterior knee pain in patients who underwent total knee arthroplasty was 25.6% and the majority of these patients had mild pain. In the same way as previous studies, we report the incidence of anterior knee pain was 57.89%; the pain visual analogue scales were mild when the patients walked and rested.

Papakostidou et al.[11] reported a correlation between pain score and the Center of Epidemiologic Studies Depression Scale, 10-item version (CES-D10) which evaluated the quality of life during the pre-operative period, and post-operative 6 weeks, 3 months, 6 months, and 12 months period. Thiam et al.[12] performed the study in Singapore, reported a moderated correlation between the Oxford knee score, which assessed pain and physical disability, and the social functioning in the 36-Item Short Form Survey (SF-36). In addition, the Oxford knee score still had a little correlation to mental health. Similar to our study, pain and stiffness were correlated with the social dysfunction issue. Furthermore, pain at rest still had a moderate correlation with the severe depression subscale domain in Thai GHQ-28.

Our study has some limitations. First of all, this study was a retrospective study which some data were missing. Secondly, our study had a small sample size. Some patients were unable to participate in the annual meeting. Thirdly, this study was a cross-sectional study. Therefore, there were vary in time of follow-up, pain, stiffness, and Thai GHQ-28 score.

Conclusion

This retrospective descriptive study revealed that 58% of the patients who underwent the total knee replacement still had mild pain, mainly at the anterior area. There was a low correlation between pain, stiffness of the knee, and social dysfunction. Furthermore, pain at rest after knee arthroplasty also had a moderate correlation to severe depression.

References

1. Mihalko WM. Arthroplasty of the knee. In: Azar FM, Beaty JH, editors. Campbell's Operative Orthopaedics. 14th ed. Philadelphia: Elsevier; 2021:406–84.
2. Beswick AD, Wylde V, Gooberman-Hill R, Blom A, Dieppe P. What proportion of patients report long-term pain after total hip or knee replacement for osteoarthritis? A systematic review of prospective studies in unselected patients. BMJ Open 2012;2(1):e000435. doi:10.1136/bmjopen-2011-000435
3. Kahlenberg CA, Nwachukwu BU, McLawhorn AS, Cross MB, Cornell CN, Padgett DE. Patient satisfaction after total knee replacement: a systematic review. HSS J 2018;14(2):192–201. doi:10.1007/s11420-018-9614-8
4. Wylde V, Beswick A, Bruce J, Blom A, Howells N, Gooberman-Hill R. Chronic pain after total knee arthroplasty. EFORT Open Rev 2018;3(8):461–70. doi:10.1302/2058-5241.3.180004

5. Elson DW, Jones S, Caplan N, Stewart S, St Clair Gibson A, Kader DF. The photographic knee pain map: locating knee pain with an instrument developed for diagnostic, communication and research purposes. Knee 2011;18(6):417–23. doi:10.1016/j.knee.2010.08.012
6. Nilchaikovit T, Chakkrit S, Silpakit C. Reliability and validity of the Thai version of the General Health Questionaire. J Psychiatr Assoc Thai 1996;41(1):2–17.
7. Popovic N, Lemaire R. Anterior knee pain with a posterior-stabilized mobile-bearing knee prosthesis: the effect of femoral component design. J Arthroplasty 2003;18(4):396–400. doi:10.1016/s0883-5403(03)00059-7
8. van Jonbergen HPW, Scholtes VAB, van Kampen A, Poolman RW. A randomised, controlled trial of circumpatellar electrocautery in total knee replacement without patellar resurfacing. J Bone Joint Surg Br 2011;93-B(8):1054–9. doi:10.1302/0301-620X.93B8.26560
9. Baliga S, McNair CJ, Barnett KJ, MacLeod J, Humphry RW, Finlayson D. Does circumpatellar electrocautery improve the outcome after total knee replacement?: A prospective, randomised, blinded controlled trial. J Bone Joint Surg Br 2012;94-B(9):1228–33. doi:10.1302/0301-620X.94B9.27662
10. Smith AJ, Wood DJ, Li MG. Total knee replacement with and without patellar resurfacing: A prospective, randomised trial using the profix total knee system. J Bone Joint Surg Br 2008;90-B(1):43–9. doi:10.1302/0301-620X.90B1.18986
11. Papakostidou I, Dailiana ZH, Papapolychroniou T, Liaropoulos L, Zintzaras E, Karachalios TS, et al. Factors affecting the quality of life after total knee arthroplasties: a prospective study. BMC Musculoskelet Disord 2012;13(1):116. doi:10.1186/1471-2474-13-116
12. Thiam WD, Teh JWD, Razak HRBA, Tan HCA. Correlations between functional knee outcomes and health-related quality of life after total knee arthroplasty in an asian population. J Arthroplasty 2016;31(5):989–93. doi:10.1016/j.arth.2015.11.004

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