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JOURNAL OF MEDICAL TECHNOLOGY AND PHYSICAL THERAPY

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ORIGINAL ARTICLE

ผลของการบริการกายภาพบำบัดแบบมีผู้ป่วยเป็นศูนย์กลางต่อความต่อเนื่องของการปฏิบัติโปรแกรมที่บ้านของผู้ที่มีอาการปวดเข่า[$]

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บทคัดย่อ

อาการปวดเข่าพบมากในวัยผู้ใหญ่ ส่งผลให้การเคลื่อนไหวและคุณภาพชีวิตลดลง การออกกำลังกายเป็นการรักษาที่มีประสิทธิภาพสำหรับผู้ที่มีอาการปวดเข่า อย่างไรก็ตาม ผู้ป่วยจำนวนมากไม่ออกกำลังกายที่บ้านอย่างต่อเนื่อง ส่งผลให้ประโยชน์ของการออกกำลังกายลดลงเมื่อเวลาผ่านไป ความต่อเนื่องของการปฏิบัติของผู้ป่วยเกี่ยวข้องกับปัจจัยหลายประการ ซึ่งปัจจัยหนึ่งที่สำคัญคือการมีส่วนร่วมของผู้ป่วยในการดูแลตนเอง การวิจัยนี้มีวัตถุประสงค์เพื่อประเมินผลของการบริการกายภาพบำบัดที่มีผู้ป่วยเป็นศูนย์กลางต่อความต่อเนื่องของการปฏิบัติโปรแกรมที่บ้านและระดับอาการปวดของผู้ที่มีอาการปวดเข่า ศึกษาในผู้ที่มีอาการปวดเข่าในชุมชน ซึ่งแบ่งเป็นกลุ่มที่ได้รับบริการกายภาพบำบัดแบบมีผู้ป่วยเป็นศูนย์กลาง (PC) 21 คน (อายุเฉลี่ย 67.1 ± 8.2 ปี) และกลุ่มที่ได้รับบริการกายภาพบำบัดแบบมีนักกายภาพบำบัดเป็นศูนย์กลาง (TC) 22 คน (อายุเฉลี่ย 62.2 ± 7.9 ปี) ทั้ง 2 กลุ่มได้รับบริการเป็นเวลา 8 สัปดาห์ ผู้วิจัยประเมินความต่อเนื่อง (ประกอบด้วย ความถี่และระยะเวลา) ของการปฏิบัติโปรแกรมที่บ้านของอาสาสมัคร โดยการสัมภาษณ์และบันทึกทุก ๆ 2 สัปดาห์ และประเมินความรุนแรงของอาการปวดเข่าโดยให้อาสาสมัครระบุระดับอาการปวดด้วยตนเอง (numeric rating scale 0-10) ก่อนและหลังการเข้าร่วมการศึกษา ผลการวิจัยพบว่าความต่อเนื่องของการปฏิบัติโปรแกรมที่บ้านของอาสาสมัครกลุ่ม PC และ TC มีความแตกต่างกันอย่างไม่มีนัยสำคัญทางสถิติ โดยในช่วงเวลาการศึกษา 8 สัปดาห์ อาสาสมัครกลุ่ม PC และ TC ปฏิบัติโปรแกรมที่บ้านด้วยความถี่ 4-6 วันต่อสัปดาห์ เป็นเวลา 35-50 นาทีต่อวัน ส่วนการประเมินระดับอาการปวดเข่าด้วยตนเองพบว่า ภายหลังเข้าร่วมการศึกษา 8 สัปดาห์ อาสาสมัครทั้ง 2 กลุ่มมีอาการปวดเข่าลดลงอย่างมีนัยสำคัญเมื่อทดสอบด้วยสถิติ paired t-test (ค่าเฉลี่ย[ส่วนเบี่ยงเบนมาตรฐาน] -2.0[2.3], P = 0.001 สำหรับกลุ่ม PC และ -1.7[2.6], P = 0.005 สำหรับกลุ่ม TC) แต่ไม่พบความแตกต่างกันอย่างมีนัยสำคัญทางสถิติในระดับอาการปวดเข่าที่ลดลงเมื่อเปรียบเทียบระหว่างกลุ่ม จึงอาจเสนอแนะได้ว่า การบริการกายภาพบำบัดทั้งแบบมีผู้ป่วยและผู้ให้บริการเป็นศูนย์กลางล้วนก่อประโยชน์แก่ผู้ที่มีอาการปวดเข่าในชุมชน อย่างไรก็ตาม ควรทำการศึกษาเพิ่มเติมเกี่ยวกับผลระยะยาวของการบริการกายภาพบำบัด 2 แบบนี้

คำสำคัญ: การบริการแบบมีผู้ป่วยเป็นศูนย์กลาง, การบริการแบบมีผู้ให้บริการเป็นศูนย์กลาง, ปวดเข่า, ความต่อเนื่องของการปฏิบัติ

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ORIGINAL ARTICLE

The effects of a physical therapy service based on patient-centered approach on adherence to home programs in persons with knee pain[$]

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Abstract

Knee pain is a common symptom reported in older adults, contributing to the decreased physical function and quality of life. Exercises have been suggested to be an effective intervention for persons with knee pain. However, a high rate of non-adherence with home-based exercises has been reported, resulting in a decline in the benefits of exercise over time. Patient adherence could be affected by a number of factors; one of them is patients' participation in their care. This study was aimed to evaluate the effects of a physical therapy service based on patient-centered approach on adherence to home programs and pain in persons with knee pain. An 8-week study was conducted to community-dwelling persons with knee pain who were allocated to either patient-centered (PC, n = 21, mean age 67.1 ± 8.2 years) or therapist-centered (TC, n = 22, mean age 62.2 ± 7.9 years) physical therapy services. Participants' adherence (frequency and duration) to home programs was interviewed and recorded every 2 weeks. Their severity of knee pain was evaluated on a numeric rating scale (0-10) at pre- and post-program study. The results showed no significant difference in the adherence to home programs between the PC and TC groups. During the 8-week study, the PC and TC participants conducted their home programs about 4-6 days a week. The time they took performing the programs on each day was about 35-50 minutes per day. For the self-reported severity of knee pain, the paired t-test revealed a significant decrease in pain after 8 weeks of both PC and TC participants (mean[SD] -2.0[2.3], $P = 0.001$; and -1.7[2.6], $P = 0.005$, respectively) without a significant difference between groups. It is suggested that community dwellers with knee pain could benefit from both patient- and therapist-centered physical therapy services. Future studies should be considered to explore the long-term effects of these physical service approaches.

Keywords: Patient-centered service, Therapist-centered service, Knee pain, Adherence

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Introduction

Knee pain is a common symptom reported in older adults and may predispose to later osteoarthritis[1]. It is a major source of morbidity, disability and loss of function[2], contributing to decreased efficiency of work and quality of life[3]. The prevalence of knee pain increases universally with age, especially in women[1]. In Thailand, the prevalence of knee pain in older adults aged 60-69 years was presented at 22.9 %[4]. Since knee pain is a considerable public health issue, a less expensive home-based treatment would be desirable. In the recent time, there are high-quality evidences showing that exercise reduces pain and improves physical function in persons with knee pain/ osteoarthritis[5]. However, a high rate of non-adherence with home-based exercise programs was reported in persons with knee pain[6,7], resulting in a declining impact of the benefits of exercise over time[6].

Patient non-adherence to the recommended treatment regimens has consistently been found in health care[8]. It is a significant issue as it can be a threat to health and well-being[9]. The issue of non-adherence has been neglected by physical therapists who are recommended first line therapy for many chronic musculoskeletal disorders[8]. In a study involving a physical therapy exercise regimen, only 35 % of patients adhered fully to the assigned program whereas 76 % followed their prescribed regimen partly[10].

Patient adherence could be affected by a number of factors including realistic assessment of patients' knowledge and understanding of the regimen, clear and effective communication between health professionals and their patients, the nurturance of trust in the therapeutic relationship and patient involvement and participatory decision-making[9]. The need for patients to participate in and make decisions about their care has recently gained consensus among health professionals for improving patient adherence[11]. There are needs for health professionals to change from holding a paternalistic view of care to encouraging patients to choose and negotiate about their care and take the lead in decision-making. The patient-centered service emphasizes the central role of patients to play in the therapist-patient encounter, whereas the therapist-centered service imposes on professional decisions[12]. The advantage of patient-centered service for physical therapists was supported by Srisoparb and colleagues[13] who applied the patient-centered approach to persons with chronic stroke. The patients and their caregivers were encouraged to participate and act as 'active recipients'. Each patient's problems, achievable goals of rehabilitation, and home-based rehabilitation programs relevant to each patient were cooperatively discussed and designed among the patients, their caregivers and physical therapists. The results demonstrated that stroke survivors who still kept performing rehabilitation programs on their own without the therapist's facilitation were the ones who had high level of participation in developing the programs at the beginning of the study. This randomized controlled trial was aimed to examine the outcome of a physical therapy service based on patient-centered approach in a sample of individuals with knee pain. It was hypothesized that a patient-centered physical therapy service for persons with knee pain would have a more favorable impact on adherence to home programs and, consequently, also on pain than those from a therapist-centered service.

Materials and Methods

Participants

Persons with knee pain who lived in Samliam community, Naimuang Sub-district, Muang District, Khon Kaen Province, were recruited with the following inclusion criteria: age 45-75 years, having unilateral or bilateral knee pain when moving on most days for at least a month, independent ambulation with or without gait aid, and being able to verbally communicate. Volunteers were excluded if they had a

history of the following medical conditions including rheumatoid arthritis, gouty arthritis, tendon/ligament/menisci injury and neurological diseases such as stroke, Parkinson's disease, and cerebellar disease, received any intra-articular injection to the knee within the previous 30 days, and had inflammatory signs at the knee and surrounding structures, a history of or found myofascial pain syndrome of vastus medialis, vastus lateralis, rectus femoris, hamstrings, and popliteus muscles, knee replacement or lower limb amputation, a surgical procedure on either lower extremity within the past 6 months, and significant psychiatric or general medical morbidity that would either preclude the subject's understanding of the nature of the intervention or undertaking the exercises. All screening processes including an interview and physical examination were performed by one of the investigators.

Eligible participants were divided into sub-groups, according to severity of knee pain (self-rated scale 0-10) and enthusiasm for participating in the study observed by the investigator. Individuals in each sub-group were then randomly allocated to the patient-centered and therapist-centered groups. All participants were requested to give informed consent in accordance with the requirements of The Khon Kaen University Ethics Committee for Human Research.

Outcome measures

The primary outcome was the adherence (frequency and duration) to home programs. The participants were requested to complete a diary documenting their practices the programs. Furthermore, they were interviewed by the investigator during home visits to detail how often and how long they performed the programs in the previous week.

The secondary outcome was a self-reported level of knee pain measured by the numeric rating scale (NRS) using a horizontal line with words that conveyed "no pain" at the scale 0 (zero), "moderate pain" at the scale 5, and "worst pain" at the scale 10. The participants were asked to place a mark along the line that indicated their pain level. The NRS was chosen because it had been found reliable (r = 0.56-0.89)[14,15], and easy for the patient to understand and for the investigator to score[16-18]. A high correlation between the NRS and visual analogue scale scores has been revealed when measured in the same patient[19,20].

Home-based physical therapy programs

Participants were instructed to perform home-based physical therapy programs on a daily basis involving self-massage, patellofemoral joint mobilization, and stretching, range of motion as well as strengthening exercises.

Self-massage and mobilization were designed to promote better mobility of the patella and muscles surrounding the knee by using the modified technique of Thai therapeutic massage for persons with knee osteoarthritis[21,22]. The participants were advised to perform the massage and mobilization daily at least 10 minutes in total.

A combination of exercises (stretching, range of motion and strengthening) was designed to increase flexibility, range of motion, and strength of the knee and surrounding structures[23-26]. Strengthening exercises included both weight and non-weight bearing manners. The participants were recommended to perform the exercises daily at least 25 minutes in total.

Procedures

An initial baseline assessment for knee pain level was performed to all participants at their residences. One week later, 3-hour group meetings were separately arranged for the PC and TC groups. For the PC participants, the concept of patient-centered service was strongly applied during the meeting, that is, the participants acted as 'partners or active recipients'. The PC participants were encouraged to express their opinions and experiences with the group about knee pain, e.g. causes and the consequences, signs and symptoms, pain management, meanwhile the investigator

provided health education and advice, and shared the body of knowledge related to knee pain to the group. The PC participants were also encouraged to raise their awareness of knee pain and its consequences, and to analyze causes of their knee pain. The topic of pain management with non-pharmacological procedures, e.g. exercises, nutrition, weight reduction, was cooperatively discussed. Practical sessions about self-massage and mobilization as well as exercises were arranged for the participants during the group meeting. A patient handout containing all information as well as instructions and photographs of the massage, mobilization and exercises was also provided. Finally, each participant had an opportunity to choose the exercise procedures to manage their knee pain. Emphasis was placed on self-management and adjustment to their preferences. For the TC, the concept of patient-centered service was not applied during the group meeting. The investigator strongly acted as an expert who provided health education about knee pain and designed a home-based physical therapy program (massage, mobilization and exercises) for the participants. This implied that the TC participants were treated as 'passive recipients' and had no opportunity to share their opinions and choose the exercise procedures to manage pain with their preferences.

Immediately after the group meetings, all participants were encouraged to practice their home programs for 8 weeks and recorded their practices each day in the diary. The investigator visited the participants every 2 weeks to interview and records the adherence to home program, encourage the participants to keep practicing the programs, monitor symptoms, and offer advice. All health related incidents of falls or medical treatments which occurred with the participants throughout the study period were also recorded during the home visits.

At the completion of the 8-week home program, the post-intervention assessment for pain level was performed.

Data analysis

The target sample size of 38 (19 in each group) was calculated to ensure at least 80% power to detect a difference of 2 between the groups at 2-side α = 0.05 in pain measured with the NRS. A maximum drop-out rate of 15 % was assumed.

Descriptive statistics were applied to describe the demographic and descriptive data. Mann-Whitney U tests were performed to compare the effects of the patient- and therapist-centered interventions on adherence to home programs. Independent t-tests were used to compare the between group difference resulting from 8 weeks of home programs. Paired t-tests were used to compare the within group difference from baseline to 8 weeks to evaluate the extent of improvement for all participants. Statistical significant was inferred at a value of $P < 0.05$. All analyses were performed using the SPSS version 17.0.

Results

A flowchart describing the progress of participants through each stage of the trial is shown in **Figure 1**. Ninety-two persons with knee pain of Samliam community volunteered for the study. They received home visits for screening process, and all of them were eligible to the study. However, 48 persons (52.2 %) declined to participate in the study because of no free time. Forty-four volunteers were then divided into sub-groups, according to severity of knee pain (self-rated scale ≤ 5 or > 5) and enthusiasm for participating in the study observed by the investigator (high, moderate or low levels). Individuals in each sub-group were randomly allocated to the patient-centered (PC, n = 22) and therapist-centered (TC, n = 22) groups. However, a volunteer in the PC group missed the group meeting because of an urgent reason. Therefore, 21 participants were left in the PC group. All 43 participants completed the 8-week study.

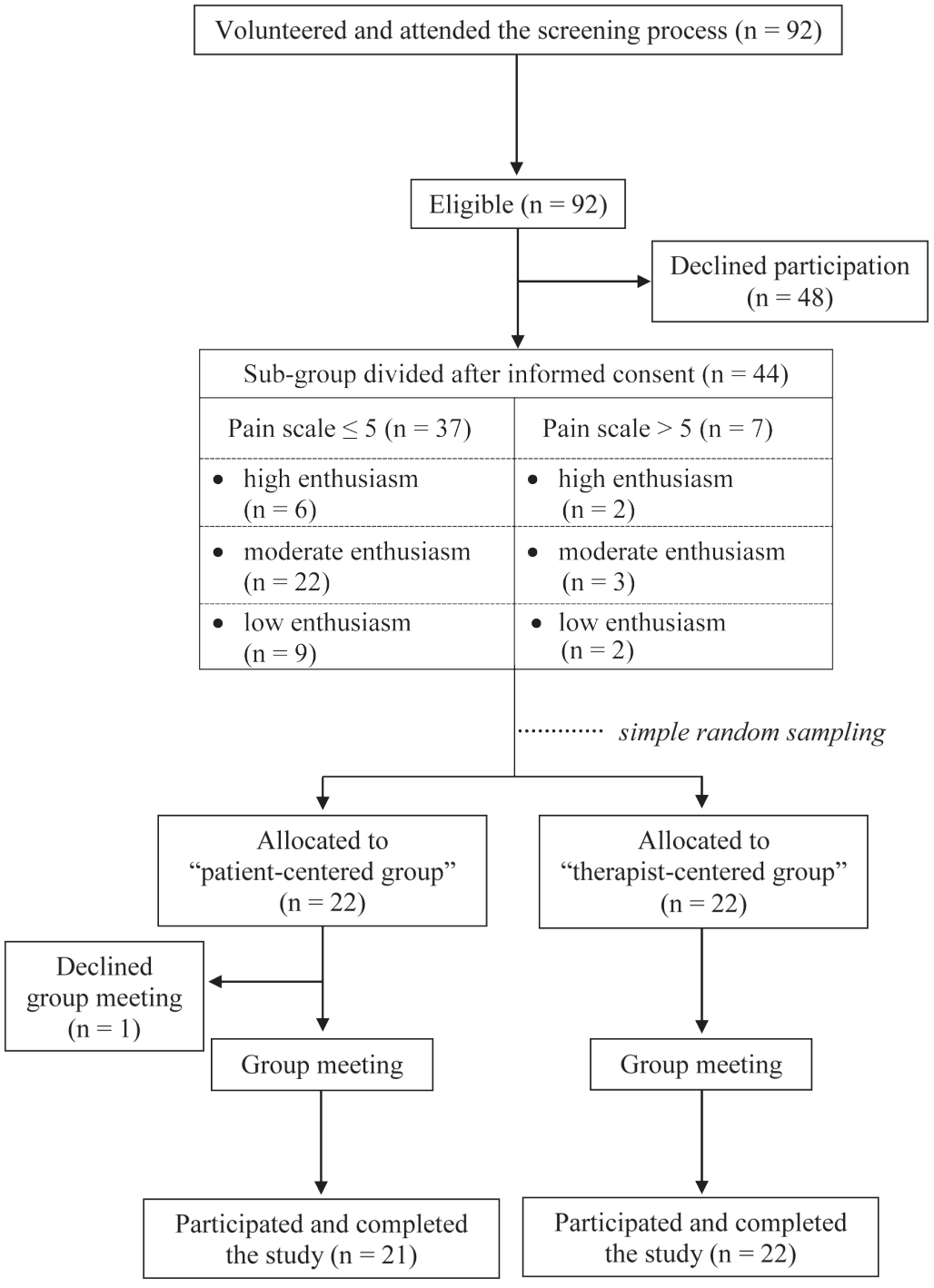

Figure 1 Participant flowchart

Table 1 outlines the baseline characteristics of the PC and TC participants. The mean age of the 43 participants was 64.6 ± 8.3 years and the mean body mass index was 25.9 ± 3.1 kg/m^2. Most participants were housewife and experienced pain during daytime almost every day.

The adherence to home programs of the PC and TC groups is shown in **Table 2**. There was no significant difference in the frequency of home exercises between the groups. Throughout the study period, both PC and TC participants conducted their home programs about 4-6 days a week which was less than

a recommended frequency of 7 days a week. The time they took performing the programs on each day was also non-significantly different between the groups. It was observed that both groups of participants tended to perform the programs longer than the recommended duration of 35 minutes per day, especially in the PC group.

For the self-reported level of knee pain measured by the NRS, both PC and TC participants showed a significant decrease in pain at 8 weeks (paired t-test, P =0.001 and 0.005, respectively). However, no significant difference between the groups was found for this outcome measure (mean difference -0.32, 95% CI -1.8 to 1.2) (**Table 3**).

Table 1 Baseline characteristics of participants.

Demographic characteristics	PC (n = 21)	TC (n = 22)
Age (years) (mean ± SD)	67.1 ± 8.2	62.2 ± 7.9
Female : Male (n)	21 : 0	20 : 2
Body mass index (kg/m^2) (mean ± SD)	26.5 ± 3.6	25.2 ± 2.4
Enthusiasm for participating in this study (n)		
high	4	4
moderate	11	14
low	6	4
Level of knee pain (self-rate scale 0-10)		
mean ± SD	4.8 ± 1.2	4.5 ± 1.8
median	5	8
Side of knee pain (n)		
left	3	3
right	10	8
bilateral	8	11
Area of knee pain (n)		
medial side	7	3
lateral side	4	4
both sides	7	8
beneath patella	3	7
Duration of knee pain (month)		
mean ± SD	72.9 ± 93.8	77.8 ± 99.6
max	360	423
min	3	1

PC = patient-centered approach group, TC = therapist-centered approach group

Table 2 Mean ± SD (median) of the adherence (frequency and duration) to home programs during the study period and comparisons between groups (*P*-values obtained through Mann-Whitney U tests).

Adherence	PC (n = 21)	TC (n = 22)	*P*-value
Frequency (days/week)			
week 2	6.0 ± 1.6 (7)	5.6 ± 1.7 (7)	0.42
week 4	5.1 ± 2.5 (7)	5.0 ± 2.4 (6)	0.89
week 6	5.2 ± 2.1 (7)	4.6 ± 2.6 (5)	0.54
week 8	4.9 ± 1.9 (5)	4.4 ± 1.7 (4.8)	0.34
Duration (minutes/day)			
week 2	48.1 ± 17.7 (45)	36.6 ± 18.8 (35)	0.08
week 4	51.4 ± 37.4 (45)	43.5 ± 25.1 (38.8)	0.47
week 6	41.5 ± 23.1 (35)	39.9 ± 16.4 (40)	0.75
week 8	40.6 ± 21.5 (35)	35.9 ± 14.4 (36.3)	0.80

PC = patient-centered approach group, TC = therapist-centered approach group

Table 3 Mean ± SD (median) of the level of knee pain at weeks 0 and 8 and comparisons within groups (*P*-values obtained through paired t-tests).

Groups	Week 0	Week 8	Difference within groups (week 8 - week 0)	95 % CI	*P*-value
PC (n = 21)	4.8 ± 1.2 (5)	2.8 ± 2.2 (2)	-2.0 ± 2.3 (-2)	-3.1 to -1.0	0.001
TC (n = 22)	4.5 ± 1.8 (5)	2.8 ± 2.5 (3)	-1.7 ± 2.6 (-2)	-2.9 to -5.8	0.005

PC = patient-centered approach group, TC = therapist-centered approach group

Discussion and Conclusion

The present study was designed to explore how a physical therapy service based on patient-centered approach affected the adherence to home programs as well as pain of persons with knee pain. It was revealed that, contrast to our assumption, there was no strong evidence to suggest that the frequency and time spent home exercising differed between the patient- and therapist-centered physical therapy groups. Furthermore, each of the approaches of physical therapy services resulted in a decrease in knee pain for the participants. These non-significant differences may be due to regular home visits provided to all participants by the investigator. Although the PC and TC participants were received different approaches during the group meetings, both groups of participants received home visits twice monthly by the investigator. This may lead to a good relationship between participants and the investigator, which is one of the main factors for promoting patient adherence[27,28]. Development of the patient-therapist relationship and positive feedback from physical therapists may increase adherence[8,10]. Quality of the relationships between patients and therapists as well as degree of patient satisfaction with the relationship is a factor implicating in exercise adherence[29]. Patients who feel that their therapists communicate well with them tend to be more motivated to adhere[28]. Trusting relationships between therapists and patients can greatly affect patient outcomes. Therefore, future studies without home visits, or using telephone calls instead, are suggested to evaluate the impact of a patient-centered service on adherence to home programs. Nevertheless, it could be suggested from the current study that whatever physical therapists apply patient - or therapist-centered approaches for patients in community, they should realize to the importance of interpersonal factors, and that a regular and frequent home visit could be a good choice for promoting the patient-therapist relationship. A longer study period is recommended to explore the long-term effects of such physical service approaches. Further studies with a greater number of participants and in other study areas are also suggested to verify the findings.

In fact, it may be too complicated for physical therapists to provide patient-centered services to their clients. Based on the concept of patient-centered approach, patients have to be encouraged to discuss and analyze with therapists about their health problem and its causes[12]. Then, intervention programs should be cooperatively designed and individually tailored to each patient. Because of a typically Thai culture, however, Thai people tend to respect professional suggestion rather than their own ideas and have not been familiar with health services in a patient-centered manner. Furthermore, it was revealed in a previous study[13] that patients who had high education level and/or had some knowledge of exercise or rehabilitation would very much cooperate with the therapists in discussing and designing the therapy program. Therefore, to achieve the optimal aim of patient-centered approach, it seems that physical therapists should apply this approach to clients with specific criteria, such as relatively high education persons, and also have enough time and skills for facilitating participation of the patients. At present, however, most physical therapists have to spend their time with a huge number of patients and administrative works, and may have no plenty of time for other activities. Furthermore, physical therapists are generally familiar with physical skills more than psychological skills which are necessary for being a good facilitator during patient-centered services. Then, using a patient-centered approach may not be as simple as using a therapist-centered one for physical therapists. Applying a more usual approach, the therapist-centered service, with regular and frequent home visits might provide the same benefits as those of the patient-centered service, as presented in the current study.

A limitation of this study was devoted to the assessments of adherence and pain which were a self-reported manner. It could be criticized that the participants might over-report adherence and/or under-report pain because of unwillingness to disappoint the investigator. Further studies with an assessor who does not involve in the study area and blinds to the study procedure should be considered. Despite some biases, self-reported adherence as well as pain is a widely used method in clinical practice and research[14,15,30]. It has been suggested that the development of a trusting and accepting relationship between the patient and the therapist is related to the accurate assessment of adherence[28]. In addition, patients tend to be sincere in their adherence reports if they feel free to admit adherence difficulties without the risk of criticism and in the context of true partnership with their therapists. Because of familiarity with the study area as well as the participants for more than a year, the investigator has believed that the participants will dare to sincerely report their self-assessment without a desire to preserve the therapist-patient relationship. Therefore, all data obtained in the current study should be acceptable.

In conclusion, persons with knee pain could benefit from both patient- and therapist-centered physical therapy services. Future studies should be considered to explore the long-term effects of these physical service approaches.

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