

Level of pain and physical function in patient with chronic knee pain visiting Dhulikhel hospital: A cross sectional study

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Abstract

Background

Knee pain is one of the common causes of chronic pain mainly in the older adults. Chronic knee pain (CKP) is commonly due to arthritic changes (osteoarthritis). Chronic knee pain is a common and major health problem in ageing population. Knee pain is associated with high levels of disability. So early detection and treatment of pain related functional limitation is likely to have major influence on healthy ageing. The general objective of this study was to quantify the level of pain and physical function in patient with CKP.

Methods

Preliminary screening of population with chronic knee pain was taken and cross sectional descriptive study was done. Questionnaire with inclusion criteria was fulfilled with administration of Nepali version of Numerical Pain Rating Scale and Nepali version of Patient Specific Functional Scale on interview as well as self-report basis and the data was managed by SPSS version 23.

Results

75.6% of female with chronic knee pain was found with the average pain level found to be 5 in N-NPRS scale. Among them 80.8% of chronic knee pain was due to knee osteoarthritis. Sitting function was found to be affected in 82.1% of population with mean Nepali version of Patient specific functional Scale score of 2. Similarly 80.8% reported going downstairs to be difficult due to knee pain with N-PSFS score of 2.

Conclusion

Pain and functional disability are the principle findings in patient with chronic knee pain for which they seek medical treatment. So the treatments should target on functional task with effective strategy addressing disability. Focus on function is important for the development of optimal rehabilitation programs in patients with chronic knee pain.

Background

Pain is defined as unpleasant sensory or emotional disturbance that occurs due to actual or potential tissue damage [1]. So the pain is considered to be chronic if the duration of pain is more than 3 month and pain prolongs past normal healing time and hence lack the acute warning function of the physiological nociception [2, 3]. There are seven classification of chronic pain where chronic knee pain falls mainly under chronic musculoskeletal pain [3]. Knee pain is one of the common causes of chronic pain mainly in the older adults [3, 4].

In a study done in the community dwelling adults of Iran, the prevalence of chronic knee pain was found to be 29.97% [5]. Chronic knee pain is commonly due to arthritic change and knee osteoarthritis is one of the leading cause of chronic knee pain [6]. The patellofemoral pain syndrome is one of the leading causes of pain in adults and adolescents [7]. Since knee is one of the largest weight bearing joint in our body, it is always prone to overload and overuse causing pain and limiting the lower limb function [8]. Usually the mechanical axis passes through or just medial to the centre of the knee joint in the coronal plane [9]. Deviation of the mechanical axis away from this leads to increased contact stresses at the joint surface. Mainly during maximum knee flexion of 20 degree, the patellofemoral compressive force is approximately 25 to 50 % of body weight [9]. The consequence of the altered biomechanics of the knee leads to chronic symptoms [10]. People with knee pain have 5 fold raise in risk of worst lower extremity function compared to people without knee pain [12]. Chronic knee pain is associated with functional impairment and this will cause social isolation [12, 13]. In a study prevalence of chronic knee pain was found to be 12.1% [14]. Most of the participants in the study were not able to go uphill and downhill. Chronic knee pain is a major health problem and is also very common in ageing population [14]. Kneeling, squatting on the toilet, carrying heavy weights, getting on and off the toilet, were the activities that had the greatest proportion of participants reporting knee pain [14]. Knee pain is associated with high levels of disability [9]. So early treatment of pain related functional limitation is likely to have major influence on healthy ageing for adult with chronic knee pain. Functional exercises are regarded in rehabilitation to restore good knee function [12, 13].

Pain is the main complain of people living with osteoarthritis and they are distressed mainly because of its impact on their physical function [15, 16]. Identification of the key impairments related to pain and function may assist in delineating physical therapy treatment approaches for patients with PFPS. If it can be shown that particular impairments are associated with function and pain, targeting such impairments may improve the effectiveness of physical therapy for patients with PFPS [17]. The exercise that will improve the physical factors will be based on functional exercise [18]. A home based program based on functional exercises and the management of kinesiophobia was useful in changing the course of disability, fear-avoidance beliefs, pain, and the quality of life in patients with TKA [19].

Methods

Study type and design

A cross sectional study was designed as the study aimed to determine the level of pain and function with the demographic characteristics of people with chronic knee pain

Place and duration of study

Dhulikhel Hospital: Physiotherapy outpatient department and orthopedic outpatient department. It is an excellent site for data collection as it receives patients with knee pain from both rural and urban communities with different ethnicity and background making the sample more representative. The data was collected within 2 weeks of times and the study was done within 6 month of time.

Sample size and sampling method

A total of 78 participants was recruited after calculating sample size for non probability convenience sampling method for this study

Methods of data collection

Individuals with chronic knee pain and who show willingness to participate in the study were screened for the eligibility criteria. After screening, participants who were eligible were provided with a subjective information sheet. The participants were provided with demographic form with N-NPRS and N-PSFS questionnaire to fill up which took 3.5 to 5 minutes to complete. The data was collected, recorded and analyzed using Statistical Package for the Social Sciences (SPSS) version 23.

Ethical approval and consent

This research was conducted after the approval from Institutional Review Committee, Kathmandu University School of Medical Sciences considering the guidelines to conduct research given by Declaration of Helsinki. Written informed consent was obtained from all participants prior to data collection. Verbal consent was obtained if the participants could not sign, and a witness signed on their behalf.

Inclusion and exclusion criteria

Inclusion criteria:

- Male and female participants of 18 years and above
- Participants who understands Nepali
- Participants who have knee pain for minimum 3 months

Exclusion criteria:

- Malignant conditions like Carcinoma of knee and other body parts.
- Recent knee surgery/ trauma / fractures (less than 3 months)

Statistical analysis and software used

Statistical analysis was done by using SPSS version 23 and 78 participants was be recruited from the formula of Sample size calculation:

$$N = \frac{z^2 p(1-p)}{d^2}$$

Where, z =desired level of significance (1.96)
 p = prevalence of chronic knee pain (12.1%)
 d =precision value (0.07)

Outcome Measures

We used Nepali version of numerical pain rating scale and Nepali version of patient specific functional scale. NPRS is routinely used outcome measure for accessing the pain intensity in daily clinical practice. Out of many versions, the 11 point NPRS is most commonly preferred. It has acceptable psychometric properties. One of the main advantages of NPRS is that it can be used by people with low level of literacy as well and is routinely used in many countries and languages. NPRS-NP showed excellent test-retest reliability and a MDC of 1.13 points. NPRS-NP demonstrated a good construct validity The anchor on the left side corresponds to “no pain” that is zero and the anchor at the right side corresponds to the “worst possible pain” or “maximum pain”. It was administered by patient self-report and by face to face interview[25,26]. Patient specific functional scale is a patient reported outcome measure in which patient themselves identifies the activity that are most important to them and rate them in a scale of 0 to 10 where higher score shows the better physical function. The proposed advantages of the PSFS include its wide applicability and ease of use clinically. PSFS-NP showed good reliability with Cronbach’s alpha = 0.75; ICC = 0.89. Self-reported difficulty in function using scale from the questionnaire was done in our study [27].

Results

Data were collected from the 78 participants. Descriptive statistics of the demographic characteristics, knee pain results and PSFS-NPRS findings are illustrated in table I, II and III respectively. Similarly, distribution by PSFS findings is depicted in Fig. 1.

The mean age of the patient was 52.59 ± 14.98 years. 75.6% of the participants with chronic knee pain were female. Among 78 participants 80.8% of them were illiterate and 46.2% of them were farmers. Newar community patients were more i.e. 37.2%. Chronic knee pain was found to be more in illiterate female patients who were mostly farmer. Knee OA was the main cause of Chronic Knee pain followed by patella femoral pain syndrome. Bilateral knee pain was found to be prevalent in 59% of the patient with mean duration of 20 month.

Table III shows about the functional level of the population where sitting function was found to be affected in 82.1% of population with mean PSFS score of 2. Similarly carrying load was found to be the most difficult task with PSFS score of 1. Mean pain level of patient with chronic knee pain in numerical pain rating scale was 5 with maximum score of 7 and minimum score of 2.

Discussion

The study shows sitting function was mostly affected in 82.1% of population with mean PSFS score of 2. Similarly carrying load was the most difficult task with mean PSFS score of 1. 80.8% of them reported going downstairs to be difficult due to knee pain with PSFS score of 2. Going upstairs was found to be difficult for 74.4% with PSFS score of 3. Mean pain level of patient with chronic knee pain in Nepali version of Numerical Pain Rating scale was 5 with maximum NPRS score 7 and minimum score of 2.0. The main cause of chronic knee pain in following study shows knee osteoarthritis which is consistent with the similar study that has been done in Iran[5].

To the best of our knowledge no prior study has been done about pain level in chronic knee pain using the NPRS scale; thus a direct comparison of present findings with the other studies couldn't be made. One study reported the baseline score of pain of people with Knee osteoarthritis to be 5.9 in Numerical rating scale which is expressed in a scale of 0 to 10 [10]. Combination of tibio-femoral and patello-femoral pain was associated with greater self-reported pain. The difference in pain between individual can be due to risk factors like age and gender[12]. There are studies suggesting that the psychological factors and the structural damage to the surrounding structures were the leading causes of pain [13]. Although this study didn't consider the level of pain during rest or movement, the rest pain in previous study shows 2 in VAS and 7 with the movement [29].

It may be argued that the specific site of cartilage destruction within a joint might explain the presence of pain at rest and/or movement [29]. CKP was found to be more in female patients than in the male patients in the present study which is consistent with a study that has been done in Japan. This type of finding warrants the sex specific preventive measures and management of chronic knee pain [30]. Studies have indicated that individuals in the older age group perform less functional activities than younger counterparts. [31] This will lead to muscle dysfunction and finally osteoarthritis of knee [31]. In old age group, there is decline in the number of proprioceptors due to muscle atrophy and weakness. Increase knee ROM requirements during weight bearing activities such as going up and down, sit to stand can significantly elevate the tibiofemoral and patellofemoral joint compressive forces leading to greater pain and thus rendering task performance difficult [32]. Reduced muscle activation leads to reduction in joint proprioception as a result of decreased functional activity. Hence there is increase in nociceptors. [31, 32]. Diminished quadriceps strength is an important determinant of functional loss [34]. Reduced muscle activation leads to reduction in joint proprioception as a result of decreased functional activity. Hence there is increase in nociceptors. [31, 32]. It was theorized that knee joint proprioception is essential for accurate modulation and activation of muscles [34]. When proprioceptive acuity decreases, functional ability can only be maintained if there is sufficient muscle strength to compensate for the decrease in accuracy of modulation and activation of muscles [34]. Thus, it was predicted that functional ability will be more strongly affected in the presence of both proprioceptive inaccuracy and muscle weakness [34].

It is necessary to focus on the functional consequence which is important because knowledge of functional consequences is essential for development of optimal rehabilitation programs inpatient with

CKP.[32]

Limitation of the study

First the study is a cross sectional study design so no casual conclusions can be drawn from the study results. Secondly, the association of pain and function was not analyzed. Psychological variables and health related beliefs are important determinants of functioning which was not analyzed in this study which is another potential limitation of the study.

Conclusion

Pain and functional limitation was main finding among the population with chronic knee pain. Regarding function, sitting function was mainly hampered. Along with this sit to stand, walking in upstairs and downstairs were also significantly affected. Knee osteoarthritis was the main cause of CKP. Proper functional rehabilitation protocol is necessary for such population .Olderage group was found with more pain as well as functional problem. So the functional rehabilitation should have focus on the older age group.To conclude knowledge of functional consequences is essential for development of optimal rehabilitation programs inpatient with CKP. Identification of the key impairments related to pain and function may assist in delineating physical therapy treatment approaches for patients with CKP.

Recommendation

Factors like medication, depression might have influenced the self-reported functional limitation of participants. So further study should be done regarding these factors.

Abbreviations

CKP

Chronic Knee Pain

N-NPRS

Nepali version of Numerical Pain Rating Scale

N-PSFS

Nepali version of Patient Specific Functional Scale

IRC

Institutional Review Committee

KUSMS

Kathmandu University School of Medical Sciences

SPSS

Statistical Package for the Social Sciences

PFPS

Patellofemoral Pain Syndrome

TKA
Total Knee Arthroplasty
MDC
Minimal Detectable Change
ICC
Inter-class Correlation Coefficient

Declarations

Ethics approval and consent to participate

Study was approved by the Institutional Review Committee of Kathmandu University School of Medical Sciences, Dhulikhel, Nepal (ethical approval number 141/19).

Informed consent to participate in the study was obtained from all participants.

Consent for publication

Not Applicable

Availability of data and materials

The data sets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests,

Funding

No funding received.

Authors' contribution

BK led the concept and design of the study, SB did the literature search data acquisition and performed the statistical analyses. BK drafted the manuscript with important intellectual content. Also tabulated the results and illustrated the figures to conclude the study. BK was involved in the review of the draft manuscript, read, and approved the final version prior to submission. BK being the corresponding author is responsible for submission and follow up.

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Tables

Table I: Demographic characteristics of sample (N=78)

Characteristics	N	Percentage
Sex		
Male	19	24.4
Female	59	75.6
Educational status		
Illiterate	63	80.8
Primary	7	9.0
Secondary	6	7.7
Bachelor and above	2	2.6
Occupation		
Farmer	36	46.2
Business	7	9
Student	4	5.1
Housewife	26	33.3
Unemployed	2	2.6
Others	3	3.8
Ethnicity		
Brahmin	23	29.5
Newar	5	37.2
Chhetri	29	6.4
Tamang	12	15.4
Others	9	11.5
Age	Mean (standard deviation)	Range
Years	52.59(14.98)	18-82

Table II: Features of Knee pain (N=78)

	N	Percentage
Diagnosis of knee pain		
Knee OA	63	80.8
Patello femoral pain syndrome	10	12.8
Chronic post- surgical pain	5	6.4
Side of knee pain		
Right	25	32.1
Left	7	9.0
Bilateral	46	59.0
Duration of knee pain	Mean (standard deviation)	Range
Months	20.09(22.43)	4-96

Table III: PSFS and NPRS Findings (N=78)

	N	Percentage	PSFS score(average)
Activities			
Sitting	64	82.1	2
Going downstairs	63	80.8	2
Going upstairs	58	74.4	3
Sit to stand	51	65.4	2
Walking	48	61.5	3
Toileting	47	60.3	2
Prolong standing	32	41.0	3
Carry load	10	12.8	1
Bending	1	1.3	4
NPRS Findings	Male	Female	Total
Mean (Standard deviation) [range]	5.15(±1.03)[2.3-7]	5.12(±1.04)[2-7.33]	5.1(±1.04)[2-7]

Figures

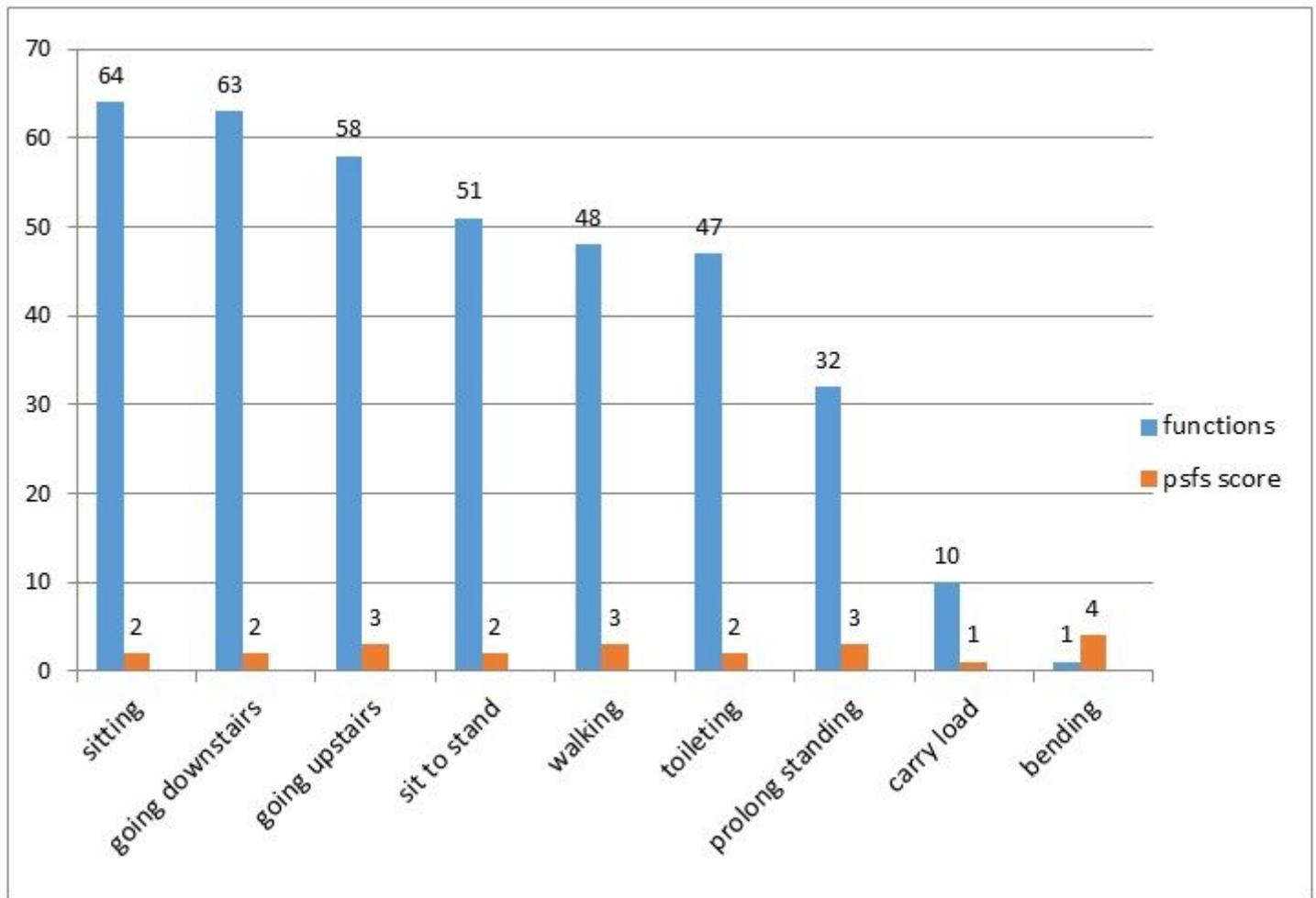


Figure 1

Distribution by PSFS score