

Original Research Article

Correlation of Ahlback grading and knee society score in patients with moderate to severe osteoarthritis of the knee

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ABSTRACT

Background: Knee osteoarthritis (OA) is a most common rheumatological disorder that causes functional limitation and disability. The most common problem in knee OA are joint pain and stiffness. It will lead to decreased quality of life and it have a serious economic burden on any country due to effect of disability and treatment.

Methods: A correlational study was conducted to find out correlation between Ahlback grading and knee society score (KSS) on a sample of 100 moderate to severe knee OA patients and 142 OA knees. Data was collected at orthopedics OPD, for a period of 3 months by purposive sampling.

Results: On evaluation, mean age of the participants was 60.19±1.01. Out of 100 patients, 42 patients had bilateral knee OA, therefore total 142 knees included in the analysis. More than half (51%) participants were overweight. Only 34% subjects had compliance to physiotherapy. Around 76% subjects taking analgesics and massage therapy to reduce knee pain. Maximum 82.4% subjects had a poor knee condition in KSS and mean score is 49.07±1.06. Ahlback grading in X-ray had negative correlation -0.610 with KSS. Hence it is evaluated, both the scales have approximately same result as it is analyzed that both scales are moderately correlated. There is significant association of age, occupation and physiotherapy with Ahlback grading followed with KSS significant associated with BMI, occupation and physiotherapy.

Conclusions: The study concluded that there is a moderate correlation found between Ahlback X-ray grading and knee society scoring. X-ray and knee society scoring (clinical evaluation) both are essential for effective treatment of OA.

Keywords: Ahlback grading, KSS, Osteoarthritis, Knee

INTRODUCTION

Knee OA is a degenerative, non-inflammatory joint disease characterized by the breakdown of articular cartilage and formation of new bone (osteophytes) at the joint surfaces and margins.¹ OA leads to decreased quality of life and it is most common in older persons. Knee OA have a serious economic burden on any country due to effect of disability and treatment.² Severely disabled people of OA has difficulty in performing the activities of daily living due to muscle spasm.³ The prevalence of knee OA estimated from 4 to 30% in adults, depends on age, gender and physical activity of

the person. The high susceptibility of knee OA is mainly due to joint loading, which makes it susceptible to wear and tear pressure.³ More than 50% population have bilateral knee OA.¹ Ahlback is radiographic grading of severity of knee OA.⁴ KSS is an objective scoring system to rate the patient's functional abilities of the knee.⁵ In current practice, diagnosis of knee OA is done by using X-ray findings and patient clinical symptoms. Radiographic evidence of osteoarthritis in the knee joint is the most common manifestation of pathology in this joint and a different grading system is used to grade the severity of OA such as Kellgren and Lawrence system and the Ahlback classification. In this study Ahlback

classification is used because this classification is widely used to assess the degree of involvement, monitor disease progression and assist in surgical planning of treatment.⁴

Most of the time functional limitation of knee OA is not taken into consideration while making a diagnosis. KSS helps to find out the functional limitation seen in knee OA patients. It helps in better evaluation and management of knee OA.

METHODS

An observational (correlational) study was conducted on a sample of 100 moderate to severe knee OA patients, age 40 years and above, attending the OPD of orthopedic included in this study. Non probability purposive sampling technique was used in this study and data was collected between October to December 2018.

Sample size calculation

According to Chandra PP et al the prevalence of knee OA in India was 28.7%.⁶ Keeping 95% confidence interval and 10% precision, the sample size calculated using the formula,

$$N = \frac{Z^2 P (1-P)}{C^2},$$

$$N = \frac{(1.96)^2 \times 28.7 \times 71.6}{102} = 78.94 \approx 79$$

But the researcher recruited 100 subjects as per the availability of samples during the period of data collection considering improvising the level of precision. So, the final sample size was 100 patients and total 142 OA knees because 42 patients had bilateral knee OA.

Inclusion criteria

Patients who were willing to participate in the study and patients who had moderate to severe knee OA as per Ahlback scoring on X-ray were included in this study.

Exclusion criteria

Patients with any previous surgery of knee, patients with any neurologic problems and mental disorders, patients with paraplegia and paralysis, patients with rheumatic diseases, genetics, bone and joint disease were excluded from this study.

Data collection tools

The demographic data tool was developed and Ahlback, KSS standardized tool was used.

Part A

Personal variable data such as name/ID, age, gender, BMI grading, diet pattern, Ahlback classification of knee, knee affected, compliance to physiotherapy and previous treatment.

Part B

Ahlback grading

Ahlback grading is a standardized tool to assess the severity of knee OA by X-ray.

The Ahlback radiographic classification of knee OA was originally proposed by Ahlback et al in 1968 and modified by Keyes et al in 1992. It is subdivided into five grades from I to V and it is widely used in clinical practice. This classification is widely used to assess the degree of involvement, monitor disease progression and assist in surgical planning of treatment.⁷

According to Ahlback grading, knee OA classified as; grade 1 joint space narrowing (less than 3 mm), grade 2 joint space obliteration, grade 3 bone defects/loss (0-5 mm), grade 4 moderate bone defects/loss (5-10 mm), grade 5 severe bone defects/loss (more than 10 mm).

KSS

KSS is a standardized tool to rate the patient's knee and functional abilities in knee OA patients.⁸ KSS has two components; knee score (KS), function score (FS). Both components have 0-100 points.

Procedure for data collection

After taking formal permission to conduct the study, data for the study was collected. X-ray of patients with knee pain was taken. After diagnosis of OA, Ahlback grading of knee osteoarthritis was done on the basis of severity on X-ray. Consenting patients with moderate to severe knee OA taken for KSS data collection. Participants were explained regarding the study and assured of the confidentiality of information. Physical assessment of the knee done and record the KSS. Approximately time taken to complete the questionnaire will be ranging from 5-10 minutes.

RESULTS

In the present study maximum number of patients in the age group of 56-70 years of age and nearly half (42%) patients had bilateral knee OA (Table 1).

Table 2 shows that most of the patients (47.2%) had grade 3 knee OA, followed by 29.6% patients had grade 4 knee OA, 16.9% patients had grade 2 knee OA and only 6.3% patients had grade 5 OA knee.

Table 3 shows that most of the patients (82.4%) had poor knee condition, followed by 16.9% patients had the fair knee condition and only 0.7% patients had good knee condition. The mean of KSS is 49.07 ± 1.06 .

Table 4 depicts that one third (35.2%) of patients had the fair knee condition followed with 27.5% patients who had poor knee condition. 31.7% patients had a good knee condition and 5.6% patients had excellent knee condition. The mean of knee function score is 59.82 ± 1.38 .

Table 1: Frequency and percentage distribution of knee OA patients in terms of personal variables.

Sr. No.	Personal variables	F (%)
1.	Age (in years)	
	40-55	35 (35)
	56-70	54 (54)
	71-85	11 (11)
2.	Gender	
	Male	44 (44)
	Female	56 (56)
3.	Body mass index (BMI) grading	
	<18.5 (underweight)	2 (2)
	18.5- 24.9 (normal)	28 (28)
	25.0-<30 (overweight)	51 (51)
	>30 (obese)	19 (19)
4.	Diet pattern	
	Vegetarian	81 (81)
	Non vegetarian	19 (19)
5.	Occupation	
	Home maker	55 (55)
	Agriculture	11 (11)
	Private service	9 (9)
	Government service	9 (9)
	Unemployed	16 (16)
6.	Knee affected	
	Right	30(30)
	Left	28(28)
	Both	42(42)
7.	Compliment to physiotherapy	
	Yes (regular)	34 (34)
	Yes(sometimes)	27 (27)
	No	39 (39)
8.	Previous treatment of knee osteoarthritis	
	Yes	76 (76)
	No	24 (24)
9.	Any other health problems	
	Yes	42 (42)
	No	58 (58)

Table 2: Frequency and percentage OA patients as per Ahlback grading (N=142#).

Grading	F (%)
Grade 2	24 (16.9)
Grade 3	67 (47.2)
Grade 4	42 (29.6)
Grade 5	9 (6.3)

#142 OA knees of 100 patients.

Table 3: Frequency and percentage of knee OA patients as per grading of KSS (N=142#).

Sr. No.	Grading	F (%)	Mean±SD
1	Excellent (80-100)	Nil	49.07±1.06
2	Good (70-79)	01 (0.7)	
3	Fair (60-69)	24 (16.9)	
4	Poor (below 60)	117 (82.4)	

#142 OA knees of 100 Patients, KSS minimum score is 0 and maximum score is 100.

Table 4: Frequency and percentage of knee OA patients as per grading of knee function score (N=142#).

Sr. No.	Grading	f (%)	Mean±SD
1	Excellent (80-100)	8 (5.6)	59.82±1.38
2	Good (70-79)	45 (31.7)	
3	Fair (60-69)	50 (35.2)	
4	Poor (below 60)	39 (27.5)	

#142 OA knees of 100 patients KFS minimum score is 0 and maximum score is 100.

Table 5: Correlation between Ahlback grading, KSS and KFS of knee OA (N=142#).

Score/grading	Spearman's rho
Ahlback and KSS	-0.55
Ahlback and KFS	-0.53
Ahlback and complete KSS	-0.61

DISCUSSION

A study conducted by Radhakrishna AM et al in 2017 in Bengaluru India included 60 OA knees with pre-op and post-op knee clinical score and knee functional score.⁹ Average pre-op knee score is 24.7 and at 1 year of follow-up average knee score is 89.9. Average pre-op KFS is 41.2 and the post-op score is 87.8. Another study conducted by Sancheti KH et al shown the pre op mean score of KSS is 39.4 and KFS is 46.7.¹⁰ Difference in pre-op mean score is due to study included only severe knee OA for surgery and this study includes both moderate and severe knee OA.

Correlation is calculated with Spearman rho (ρ) correlation formula. Correlation between Ahlback grading of knee OA and KS is -0.55 followed by -0.53 between Ahlback and KFS. Correlation between Ahlback and complete KSS (both clinical and functional score) is -0.61 with 95% confidence interval and at the 0.05 level of significance (Table 5).

There is a moderate negative correlation (-0.61) found between Ahlback X-ray grading and KSS. The correlation is negative because there is reverse scoring of severity in both scales, hence it is evaluated that Ahlback grading (X-ray) and clinical score (KSS) have approximately same results. KSS also assess the severity of knee OA as per Ahlback grading.

Anatomical defect of knee OA and functional defects both had a fair correlation hence X-ray and the clinical evaluation (KSS) both are essential for the better and

effective treatment of knee OA because these two gradings are moderately correlated not strongly correlated.

There were studies conducted to find correlation between Ahlback grading and other orthopaedics scores (like WOMAC, SF -36, HSS) but there is no study found on correlation between Ahlback grading and KSS score.

Association between Ahlback grading and selected personal variables calculated with chi square test and it is shown that severity of knee OA in Ahlback grading by X-ray was found to significantly associate with age, occupation and physiotherapy at 0.05 level of significance. Whereas chi-square values computed for Ahlback grading with gender, BMI, diet pattern and treatment were found statistically not significant at 0.05 level of significance.

Severity of knee OA in knee society score was found to significantly associate with occupation and physiotherapy at 0.05 level of significance. Severity of knee OA in knee function score was found to significantly associate with age, diet pattern, BMI, occupation and physiotherapy at 0.05 level of significance. Whereas chi-square values computed for knee function score with gender and treatment were found statistically not significant at 0.05 level of significance.

CONCLUSION

Knee OA is the most common musculoskeletal problem in middle age or older age population. There are

approximately 100 million population of more than 45 years old suffering from OA of the knee. Study conducted to assess correlation between X-ray (Ahlback grading), health care professional score (KSS). Study conducted at orthopaedics OPD, of knee OA patients, age 40 years or above. There is a moderate negative correlation (-0.61) between Ahlback grading and KSS.

Analysis showed that Ahlback and KSS presents the same results. Personal variables like age, BMI, occupation and physiotherapy shows association with Ahlback and KSS scores. Study concluded that for better and effective treatment, X-ray and KSS of the knee is essential.

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REFERENCES

1. Ebnezar J, John R. Textbook of Orthopaedics. 3rd ed. New Delhi: Jaypee Publication; 2010: 674-8.
2. Liu C, Qiaoqin W, Weijiao Z, Xiaolin F, Shang S. Factor associated with balance function in patients with knee osteoarthritis: a multicenteric review. Int J Nurs Sci. 2017;4(4):402-9.
3. Garza PPF, Garcia EOA, Salas LK, Salas FO. Association between ischiotibial muscle flexibility, functional capacity and pain in patients with knee osteoarthritis. Medicina Universitaria. 2017;19(76): 111-4.

4. Serban O, Porojan M, Deac M, Cozma F, Solomon C, Lenghel M, et al. Pain in bilateral knee osteoarthritis-correlations between clinical examination, radiological, and ultrasonographical findings. Med Ultrason. 2016;18(3):318-25.
5. Martimbianco AL, Calabrese FR, Iha LA, Petrilli M, Lira Neto O, Filho CM. Reliability of the American knee society score (AKSS). Acta Ortop Bras. 2012;20(1):34-8.
6. Pal CP, Singh P, Chaturvedi S, Pruthi KK, Vij A. Epidemiology of knee osteoarthritis in India and related factors. Indian J Orthop. 2016;50(5):518-22.
7. Martins GC, Camanho GL, Ayres LM, Oliveiras ES. Correlation between Ahlbäck radiographic classification and anterior cruciate ligament status in primary knee arthrosis. Rev Bras Ortop. 2016;52(1):69-74.
8. Dowsey MM, Choong PF. The utility of outcome measures in total knee replacement surgery. Int J Rheumatol. 2013;2013:506518.
9. Radhakrishna AM, Shivananda S, Girish S. A study of clinical and functional outcome of primary total knee arthroplasty using posterior cruciate substitute design. Int J Res Orthop. 2017;3:380-9.
10. Sancheti KH, Laud NS, Bhende H, Reddy G, Pramod N, Mani JN. The INDUS knee prosthesis-prospective multicentric trial of a posteriorly stabilized high-flex design: 2 years follow-up. Indian J Orthop. 2009;43(4):367-74.

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