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CIFKAS A Measurer of Functional Disability Status in Knee Osteoarthritis

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ABSTRACT: Knee osteoarthritis (OA) results in structural and functional abnormalities and reduced functional performance abilities. In developing countries majority of population lives in rural areas having limited resources and socio-cultural biodiversity. Their personal, socio-cultural and occupational habits vary and need to be addressed. So a culturally relevant and contextually appropriate, Composite Indian Functional Knee Assessment Scale (CIFKAS) for measuring the functional status in knee osteoarthritis was formulated. 128 participants from various geographical regions of India of age range 40 to 60 years using convenient sampling were included and informed consent signed by the participants. Each participant was assigned to one of the two groups. 39 participants in group A reported no episode of knee pain while 89 participants in group B reported at least one episode of knee pain in the last two months. Each participant was assessed on Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and CIFKAS and statistical analysis was done. The Pearson correlation coefficient calculated for all 128 subjects for pain, physical functional abilities and total functional disability score were 0.878, 0.925 and 0.945 respectively. Between group analysis was done using Independent t test and p value was found to be not significant for pain ($\leq$.178), highly significant for physical functional abilities (p$\leq$.0001) and very significant for total functional disability status score (p$\leq$.004). The results indicate that both WOMAC and CIFKAS are highly correlated and there is no difference between the two for measuring pain, but for functional ability and overall functional disability status within their functional context, CIFKAS is a better tool than WOMAC.

KEY WORDS: *Knee osteoarthritis; Functional disability; Socio-cultural biodiversities; Functional context*

INTRODUCTION

Knee osteoarthritis (OA) is the leading cause of chronic disability mainly affecting the elderly population, but may appear as early as 35 years of age. It is characterized by a range of disorders of clinical and pathological outcome resulting in structural & functional abnormalities[1-4] and reduced functional performance abilities[4].

Osteoarthritis is a common disorder. It is estimated that approximately four per cent of the world's current population is affected by osteoarthritis. Knee pain is the most frequently reported peripheral joint complaint in community-based studies worldwide[5-8] and has been found to be present in 5–13% of adult populations in Asia by the 'Community Oriented Programme for the Control of Rheumatic Diseases' (COPCORD) studies. Its prevalence estimated in India, Thailand, Malaysia, Shanghai, and Philippines is approximately 13.2%, 12.5%, 9.3%, 10.9% and 5% respectively. The male: female ratio was 2.7%: 6%, 9.4%: 10.9% and 8.5%: 12.3% for the Chinese, Malaysians and Indians respectively[7].

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Knee OA limits a person's ability to participate in physical, occupational and social activities, even during the earliest stage of disease. The signs & symptoms may range from acute pain to chronic pain, swelling, spasm, stiffness, diminished knee range of motion, decreased muscle strength and endurance. In response to pain and stiffness, patients with Knee Osteoarthritis (Knee OA) tend to become more sedentary, which further induces muscle atrophy and functional performance limitations[4], adversely affecting the quality of life.

Various assessment instruments and scales like Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), Arthritis impact measure Scale (AIMS), Health Assessment Questionnaire (HAQ) and Functional Status Index (FSI) are being used to assess Pain and functional status in patients with knee osteoarthritis. Among these, WOMAC has been accepted globally. WOMAC is a tri-dimensional self-administered questionnaire for assessing health status and health outcome in knee osteoarthritis. The questionnaire contains 24 questions targeting areas of Pain, Stiffness and Physical function status. But patients of different educational backgrounds may overrate or underrate their functional ability status. Also there is socioeconomic and cultural diversities in south Asian countries like India, Bangladesh, Sri Lanka, Maldives, and Nepal etc. Their cultural and contextual habits vary drastically so the need for a culturally relevant and contextually appropriate assessment instrument was realized. So Composite Indian Functional Knee Assessment Scale (CIFKAS)[9] was formulated and the study was conducted. The research questions were to see whether there exists a correlation between WOMAC & CIFKAS, and determine their ability to measure functional disability status over each other in patients with knee osteoarthritis.

In developing countries, like India, majority of population lives in rural areas having limited resources and their personal, socio-cultural and occupational habits vary. These cultural and social biodiversities within functional context should be considered.

The CIFKAS[9] considers these cultural and contextual factors. It is a tri-dimensional therapist-administered and self-reported questionnaire (Individual performance based) assessment instrument. The instrument is divided into three major domains of functional performance. The first is the pain domain which assesses each knee separately and includes severity of pain during physical and functional Activities of Daily Living (ADL) activity. The second is the functional disability domain measuring the functional disability status during physical and functional ADL activity. The third i.e. psychosocial domain measures the psychosocial impact of disability on functional performance and socio-cultural integration. **(Figure 1 and Table 1)**
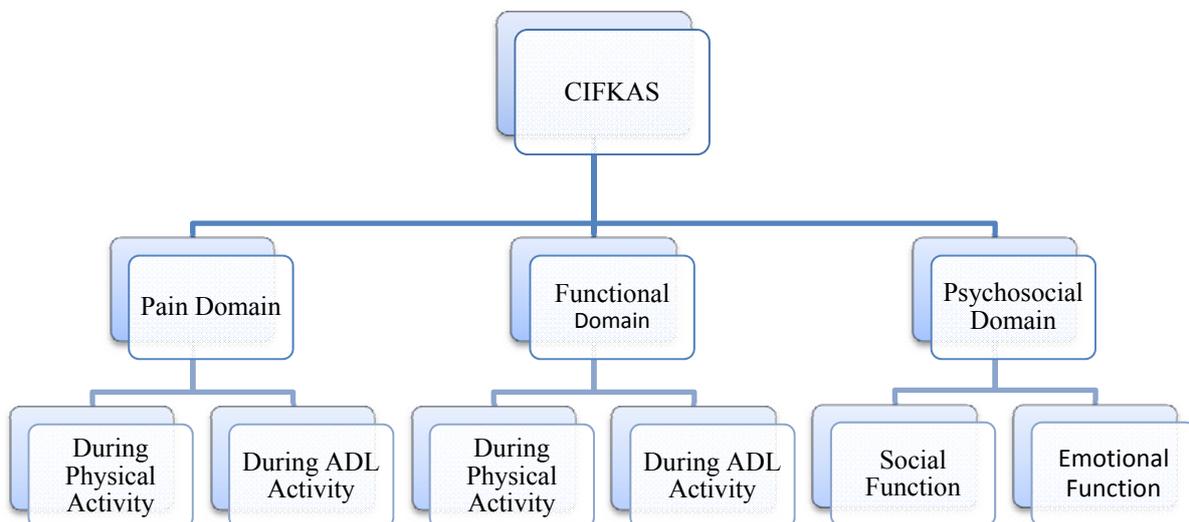

Figure 1: Showing Domains of Composite Indian Functional Knee Assessment Scale (CIFKAS)

Table 1: Showing components Composite Indian Functional Knee assessment scale (CIFKAS)

Part I (Pain domain) (*Left & Right knee*) has two subcomponents (I A & I B)		
Items		**Key to Score**
Part I A assesses pain during physical activity. It has 58 items (29 for each knee)		
Left Knee	Right Knee	*0=None,* *1=Minimal,* *2=Mild,* *3=Moderate,* *4=Severe and* *5=Extreme / Unbearable*
(29 Subcomponents)		
Part I B assesses pain during Functional ADL activity		
Left Knee	Right Knee	
Dressing and Undressing *(3 Subcomponents)* **Toileting** *(3 Subcomponents)* **Bathing** *(2 Subcomponents)* **Homemaking and management skills** *(3 Subcomponents)* **Public Transport** *Low Height* *(3 Subcomponents)* *High Height* *(3 Subcomponents)*		*0=None,* *1=Minimal,* *2=Mild,* *3=Moderate,* *4=Severe and* *5=Extreme / Unbearable*
Part II (*Functional Domain*) This Domain assesses patient's ability to perform physical & functional ADL activities. It has two subcomponents (II A & II B) having 46 items.		
Items		**Key to Score**
Part II A assesses patient's ability to perform physical activity *(29 Subcomponents)*		*0=Not affected (/None),* *1=Minimally affected,* *2=Mildly affected,* *3=Moderately affected,* *4=Severely affected,* *5=Totally affected;*
Part II B assesses patient's ability to perform ADL activity **Dressing and Undressing** *(3 Subcomponents)* **Toileting** *(3 Subcomponents)* **Bathing** *(2 Subcomponents)* **Homemaking and management skills** *(3 Subcomponents)* **Public Transport** *Low Height* *(3 Subcomponents)* *High Height* *(3 Subcomponents)*		*0=Independent,* *1=Minimally affected,* *2=Mildly affected,* *3=Moderately affected,* *4=Severely affected and* *5=Dependent;*
Part III (Psychosocial Domain) This domain assesses social & emotional state of patient. It has 8 items.		
Items		**Key to Score**
III A **Social Function** *(2 Subcomponents)*		*0= Not Affected,* *1=Minimally affected,* *2=Mildly affected,* *3=Moderately affected,* *4=Severely affected and* *5=Extremely affected;*
III B **Emotional Function** *(6 Subcomponents)*		*0=None,* *1=Minimal,* *2=Mild,* *3=Moderate,* *4=Severe and* *5=Extreme*

METHODOLOGY

Participants (n=128) from various geographical regions of India of age range 40 to 60 years, having different socio-cultural, economic and occupational background using convenient sampling method were included. The participants with a history of any psychiatric and cardiac illness were excluded from the study. 39 participants reported no episode of pain or any other complication, during the last two months at the time of assessment. Their baseline evaluation to rule out any neurological or psychiatric condition was done. Ethical approval from the Human institutional Ethical Research Committee of the university was taken and informed consent form signed by the subjects or their accompanying family member at the time of participation.

Each participant was assigned one of the two groups i.e. group A and group B. The participants in group A reported no episode / history of knee pain while participants in group B reported at least one episode of knee pain in the last two months. Each participant was assessed on WOMAC and CIFKAS and statistical analysis was done.

RESULTS

The standardization of WOMAC and CIFKAS scores on 20 cm scale was achieved by division of the scales components and their sum (*i.e. Pain; Physical functional abilities; and total scores*) by number of items. Then the components and total scores of WOMAC were multiplied by 5, while those of CIFKAS were multiplied by 4. Descriptive and inferential statistical analysis was done. The Mean $\pm$ S.D. and Pearson correlation coefficient were calculated. Mean $\pm$ S.D. scores for Pain, Physical functional abilities and total functional disability scores on WOMAC were 2.53 $\pm$ 3.12, 2.30 $\pm$ 2.48 and 2.32 $\pm$ 2.59 while on CIFKAS they were 3.08 $\pm$ 3.44, 3.93 $\pm$ 3.66 and 3.43 $\pm$ 3.47. The Pearson correlation coefficient calculated for Pain, Physical functional abilities and total functional disability score were 0.878, 0.925 and 0.945 respectively which indicates that both WOMAC and CIFKAS are highly correlated, and CIFKAS may also be a potential measure of pain, functional ability and overall functional disability status in patients with knee osteoarthritis. Further analysis was also done to determine the efficacy of both WOMAC and CIFKAS over each other for measuring pain, functional disability and overall functional status. Independent t test was applied and p value so calculated was found to be not significant for pain ($\leq$.178), highly significant for physical functional abilities ($p \leq$.0001) and very significant for total functional disability status score ($p \leq$.004) for CIFKAS. This indicates that there is no difference between WOMAC and CIFKAS for measuring pain, but for physical function abilities and overall functional disability status within functional context CIFKAS is a better measure. (**Table 2**)

Table 2 Comparison of scores between WOMAC and CIFKAS

Component		Mean $\pm$ SD (Score)	Pearson correlation Coefficient	t Value	P Value
Pain	WOMAC	2.53+3.12	0.878	-1.351	0.178
	CIFKAS	3.08+3.44			
Functional Status	WOMAC	2.30 $\pm$ 2.48	0.925	-4.17	<.0001
	CIFKAS	3.93 $\pm$ 3.66			
Total Score	WOMAC	2.32 $\pm$ 2.59	0.945	- 2.89	$p \leq$.004

DISCUSSION

After statistical analysis both WOMAC and CIFKAS were found to be highly correlated for measuring pain, physical function abilities and overall functional disability status but CIFKAS was found to be a more sensitive assessment tool. In developing countries, like India, majority of population lives in rural areas having limited resources and cultural and social biodiversities. Their personal, socio-cultural and occupational habits vary which includes squatting, sitting on the floor, kneeling, long sitting, using floor-level toilets, climbing stairs [9-10] and traveling via high height local transportation system etc [3, 4]. So these social and cultural diversities within the functional context need to be addressed [2, 6]. Although WOMAC (*self-administered questionnaire*) has been accepted globally but the educational backgrounds, socioeconomic and cultural diversities may influence the subject's response. All the above factors have been considered by Composite Indian Functional Knee assessment scale (CIFKAS). The CIFKAS [9] is a culturally relevant and contextually appropriate, therapist-administered and self-administered assessment

instrument for knee OA. Also the CIFKAS [9] has the ability to assess the functional disability status of each knee separately and in combination. Hence CIFKAS has been found to be an effective assessment tool for measuring the actual functional disability status of the subjects with knee osteoarthritis within their functional context with an ability to identify actual functional impairment and disability status.

CONCLUSION

CIFKAS is a more realistic indicator and guiding tool for measuring pain, and functional disability status within functional context emphasizing on evidence based practice. In brief, Composite Indian Functional Knee assessment scale (CIFKAS) gives a holistic view of the functional status of subjects suffering from knee Osteoarthritis.

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