

# “VALIDATION OF COMPREHENSIVE INTERNATIONAL CLASSIFICATION OF FUNCTIONING DISABILITY AND HEALTH (ICF) CORE SET FOR KNEE OSTEOARTHRITIS AMONG RURAL POPULATION IN INDIA”

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**ABSTRACT:** Osteoarthritis is a common degenerative joint diseases commonly involving the weight bearing joints like hip and knee. Considering the higher prevalence rate of OA many tools were developed to assess the level of disability and functioning capacity, among which The Western Ontario and McMaster Universities osteoarthritis index (WOMAC) is being commonly used in clinical practice. ICF is an upcoming tool with growing interest. Hence this study focused To assess the validity of Comprehensive International Classification of Functioning, Disability and Health (ICF) core set for knee Osteoarthritis among rural population in India by comparing the outcomes with that of the WOMAC. This one time cross sectional study was carried out among 145 patients with 50 years and above irrespective of gender and who were able to read and comprehend English and tamil. Patients underwent surgeries for osteoarthritis were excluded. The data were collected using comprehensive ICF core set for OA and WOMAC after obtaining the consent from patients diagnosed with osteoarthritis, from nearby communities and physiotherapy opd. The data thus obtained was analysed using differential statistics and Pearson's correlation. Mean and Standard Deviation were calculated for different parameters. The results showed that component body function and body structure from ICF and pain and stiffness from WOMAC showed strong positive correlation ( $r=0.857$ ), while participation in ICF and activity in WOMAC showed moderate positive correlation ( $r=0.640$ ). The present study states that the ICF is a valid tool for the Indian population in comparison with the goal standard scale WOMAC. Although it was found to be an in-depth tool, it still assesses numerous components of functioning and disability, comprehensively.

**Key Words:** ICF, Knee Osteoarthritis, WOMAC, Validity

## INTRODUCTION

Osteoarthritis or Degenerative Arthritis is the most common non inflammatory degenerative joint disease. Osteoarthritis occurs more frequently in old age targeting both the gender and commonly including post menopausal women. It commonly affects weight bearing joints such as knee and hip, where knee joint is mostly affected in India due to cultural and other practices such as sitting on the ground, kneeling, cross-legged sitting, squatting and performing the prayer (Jayanth Joshi, Parakashkotwal). In Particular, rural population are more prone to such condition because of activities involving increased physical stress such as toileting in Indian restroom, cross legged sitting during eating and heavy manual labour works whereas urban population are less prone because of involvement of technology which replaces and lessens manual load. As aging occurs, cartilage begins to degenerate by flaking or forming tiny crevasses. In advanced osteoarthritis, there is a total loss of the cartilage cushion between the bones of the joints. Repetitive use of the worn joints over the years can mechanically irritate and inflame the cartilage, causing joint pain, stiffness and swelling.

Osteoarthritis is classified into 2 major groups on the basis of cause as primary osteoarthritis and secondary osteoarthritis. Primary osteoarthritis is the most commonly diagnosed form of OA. It is considered largely due to “wear and tear” overtime. Age from 50-60 is the most potent risk factor and the longer a person uses their joints are more likely to suffer from this form of OA. Secondary osteoarthritis results from the conditions like significant trauma, congenital joint abnormalities, metabolic defects, diseases and disorders that alter normal function and structure of cartilage. Age groups of 45-50 are more likely to be affected. Risk factors like trauma, sedentary lifestyle, joint overuse, heredity leads to this type of osteoarthritis. However the intensity of osteoarthritis symptoms will vary from each individual, they typically become more severe, more frequent, and more debilitating over time.

In osteoarthritis, pain is the primary symptom which is gradual in onset and aggravates with activity and after prolonged sitting or standing, weight bearing activities. Later on, it becomes

continuous even at rest. The joint becomes swollen due to synovitis and stiffness gradually sets in following severe pain. These changes makes the movement painful and restricted, where crepitus is felt on passive joint movement. There may be some flexion deformity and advanced cases present with genu varum deformity (Hunter Hsu et al,2018). Treatment for osteoarthritis can be done as non surgical and surgical management. Non surgical treatment options include physiotherapy interventions, activity modifications, weight loss, knee bracing, NSAIDs, corticosteroid injections. surgical management include osteotomy, unicompartmental knee arthroplasty and total knee arthroplasty (Hunter Hsu et al,2018) Physiotherapy interventions include exercise therapy for strengthening surrounding structures, electrotherapy modalities for pain relief, thermotherapy, cryotherapy, supportive devices like braces, taping to improve the patients functional ability and quality of life (Riann M.Palmeiri et al 2010)

Important aspect in a treatment planning is not only diagnosis of the condition but also, assessing the level of disability and functioning capacity. Studies have shown that diagnosis alone does not predict service needs, length of hospitalization, level of care or functional outcomes. Although there are many questionnaires to assess functioning of an individual with osteoarthritis, it is seen that Western Ontario and McMaster universities osteoarthritis index (WOMAC) is commonly used in an clinical set up with good validity and reliability.

The Western Ontario and McMaster Universities osteoarthritis index is commonly used for assessing patients with osteoarthritis. It includes five questions about pain, two about stiffness and seventeen about the level of disability in performing the ADL. The scores for each subscale range from 0-20 for pain, 0-8 for stiffness, 0-68 for physical function. The sum of all sub scores gives a total WOMAC score. Higher score indicates severe the condition ie. increased pain, stiffness and functional limitation (WOMAC index,2013).

World Health Organization developed the International Classification of Functioning, disability and health which is a multipurpose classification that helps in organizing information on functioning and disability providing fine details of health and its related states . ICF provides a list of activities and participation which is similar to activities of daily life. It is useful to the person with all form of disability, not only for identifying their healthcare and rehabilitative needs but also in identifying and measuring the level of disability and the effect of physical, social environment that they experience in their daily life. The individuals functioning assessed through ICF is the outcome of interaction between body functions, body structures , activity and participation and environmental factors. Changes in one component may influence other components.

Even though International Classification of Diseases (ICD-10) is most widely used classification, there is a growing interest in the use of ICF particularly with regard to disability. Defining and measuring disability is difficult because it involves many aspect of life and interaction between people and his/her environment. Considering this WHO started a project on assessment and classification of Functioning, Disability and health by representatives from more than 100 countries, researchers and consumers in an international collaboration, to produce ICF as a universal framework (WHODAS 2.0). Although ICF contains extensive classification of individuals functioning, which helps in diagnosing a health condition by applying ICF before its been diagnosed clinically , the same appears to be a limitation as it is time consuming and tedious to be used in daily clinical practice(Sven Bolte et al., 2014). Both quantitative and qualitative data can be organized through ICF.

## PROCEDURE

**Sample collection:** Data were collected using comprehensive international classification of functioning, disability and health (ICF) core set for OA and WOMAC from subjects diagnosed with knee osteoarthritis, above 50 years irrespective of gender from saveetha medical college and hospital and from surrounding communities. A total of 145 subjects diagnosed with knee osteoarthritis were included in the study after fulfilling the inclusion criteria of subject with age group 50 and above including both the gender and who were able to comprehend and read tamil, at the same time subjects who underwent surgeries for osteoarthritis were excluded. All subjects were explained about the study and informed consent were obtained.

**Content validity:** content validity of comprehensive ICF core set was evaluated by experts opinion. The questions were framed for every component in comprehensive ICF core set for OA. Whereas some components from the domain body structure were evaluated by observation of structures. In activity and participation domain, every component has to be assessed in two ways obtaining two qualifiers namely performance qualifier and capacity qualifier. Hence, two questions were framed for every component. The self made questionnaire was submitted to three experts from physiotherapy department, physician

and biostatistician and were kindly requested to validate the tool checking for relevance, clarity, simplicity and ambiguity. After getting their opinion corrections were made and validity was obtained.

**Data collection:** As the target comprise of rural population predominantly, the tool was translated to the regional language (Tamil) with the help of the expert. Data collection was done from subjects using translated self made questionnaire of comprehensive ICF core set for OA by interviewing method after assessing WOMAC with the same population. Demographics and basic health information were assessed according to the ICF format. Also certain components namely body structures were evaluated by observational method. The level of impairment for ICF categories in the Comprehensive ICF Core Set for OA was rated with the ICF qualifier (where 0 = no problem, 1 = mild problem, 2 = moderate problem, 3 = severe problem, and 4 = complete problem). For the environmental factors, the extent to which the category is a barrier or facilitator was quantified on a scale ranging from -4 to +4, with negative values indicating the extent to which it is a barrier and positive values indicating the extent to which the category is a facilitator. The qualifier 8 and qualifier 9 was applied when the available information was not sufficient to mark the severity and when the given component is not applicable to the subject.

**4. Data analysis:** The collected data from comprehensive ICF core set were analyzed by correlating the outcomes with that of WOMAC. Two correlations were done between ICF body function & body structure with WOMAC pain & stiffness and ICF participation with WOMAC activity. Pearson's correlation method was used for statistical analysis.

## RESULTS AND DISCUSSION:

The collected data was tabulated and analyzed using descriptive & inferential statistics. To all parameters mean and standard deviation (SD) was used. Pearson's correlation was used to analyze and correlate different variables. P value <0.001 was considered as statistically significant.

**Table 1**

DOMAINS	MEAN	STANDARD DEVIATION	r	P
ICF body function and body structure	20.0833	10.31216	0.857	<0.001
WOMAC pain and stiffness	11.1517	4.24482		

Table 1 and figure 1 shows that ICF body function & body structure and WOMAC pain & stiffness are significantly correlated (P<0.001) with each other with a positive r value (0.857- which denotes a strong positive correlation) meaning higher the score on ICF, higher the score on WOMAC.

**Table 2**

DOMAINS	MEAN	STANDARD DEVIATION	r	P
ICF participation	18.32	6.689	0.640	<0.001
WOMAC activity	23.5655	7.99289		

Table 2 and figure 2 shows that ICF participation and WOMAC activity are significantly correlated (p<0.001) with each other with a positive r value (0.640- which denotes a moderate positive correlation) meaning higher the score on ICF, higher the score on WOMAC.

International classification of functioning, disability and health is a globally agreed framework which defines the extent of problems in functioning of patients with osteoarthritis. ICF core sets are derived from the components of ICF checklist according to the conditions they assess, which can be used in clinical practice. The present study has investigated the validity of comprehensive ICF core set for OA by using Pearson's correlation method. Although some components were found to be not applicable for selected population, the core set was found to be valid among rural population in India and can be used in clinical practice to assess the severity of illness and planning for the management.

Osteoarthritis is mentioned among 3rd most disabling conditions in developed countries targeting the elderly population. Considering the higher prevalence rate of osteoarthritis in India, many tools were developed to assess the level of disability. ICF was selected for the study considering its wide usage across various countries with good validity and reliability (yesim Kurtais et al.2011, Catherine Glocker et al.2012,Xie F et al 2007)

One of the major finding of this study is that sensation of pain (b280) was found to be more prevalent among the osteoarthritis patients, this could be attributed to the weight bearing activities of daily life. Among environmental factor, the category "immediate family (e310)" was found to be a significant facilitator for the health condition of individual with osteoarthritis while were also moderate facilitators for

the same, this result goes in line with a study (Michaela Coenen et al.2006) which reported that social support has been stated to be significant contributor for patients physical functioning and well being.

It has been stated in literature (A.M.Jette et al 2003) that social roles of an individual has significant impact on physical functioning, making the assessment of environmental factors more significant. In environmental factors, the component design, construction and building products and technology of buildings for public use (e150) was reported as more facilitator for people with osteoarthritis, this could be reported as a result of upcoming technology like metro railway stations, facility of escalators and elevators in public use buildings.

A component from ICF checklist namely assets (e165) was not included in the comprehensive core set because it was identified to be a limitation where patients difficulty in doing job, loss of paid work due to physical disability resulting in income reduction and its influence on daily living as a barrier or facilitator is not being assessed. The same has been reported multiple times in similar studies (Michaela Coenen et al 2006) but for different population.

In body structure component, the structure of lower extremities and pelvic region assessed almost every aspect related to knee osteoarthritis. The subjects were assessed for swelling and oedema in and around knee joint, any deformities like genu varum and flexion deformity which appears in chronic cases of OA, thus influencing structural changes in hip joint like coxa valga leading to secondary osteoarthritis of hip joint.the remaining factors were seemed excess for selected population and also time consuming. Whereas the first two factors namely structure of shoulder region (s720) and structure of upper extremity (s730) was not applicable for the same population. Hence they were not assessed.

Among activity and participation domain, toileting (d530) has been reported as a chief complaint to a greater extent followed by walking (d450) and moving around (d455) after the diagnosis of osteoarthritis, this attributes to the cultural practice in India like cross legged sitting and performing squatting activities often while toileting & washing clothes & while performing labour works.

Although ICF assesses multiple factors related to osteoarthritis, there is a overlap between the items leading to a questionable accuracy of the outcome measure (Yesim Kurtais et al.2011). It is assumed that if the activity and participation are classified without any overlap it would be more feasible and easier to be used in clinical practice. Also, assessing the recreation and leisure component was a challenge in the present study, as the term reflected a broader concept, which again is a very subjective aspect for every individual with only a few patients reporting leisure activities demanding more of physical functioning. Hence, the results of this dimensions seems to be skewed.

Some components in the comprehensive core set of OA like “muscle power function (b730), muscle tone functions (b735) and muscle endurance functions (b740)” were seemed difficult to document by physiotherapists, because of the difference in the outcome measures of the assessment for these aspects including MMT, repeated knee flexion and extension for endurance. Hence, to obtain a uniformed outcome measure, observational method was adopted in this present study, which could have had a impact over the results.

Similarly some limitations were found in WOMAC where 3 ( getting in/out of a car, putting on socks/stockings, taking of socks/stockings) out of 17 components in activity domain were found to be not applicable for the selected population.

Another limitation of ICF is that the ICF guideline list the ICF categories to be measured for specific conditions but they provide no information on how to measure them. Comprehensive ICF core set for OA contains only components to be assessed, whereas the information on the method of assessment is not provided which posed a greater challenge in the assessment.

## CONCLUSION :

On the whole, even with certain limitations, the comprehensive ICF core set for osteoarthritis was found to be a valid tool to measure the functioning capacity and level of disability in patients with knee osteoarthritis among rural population in India. In line with the result of previous studies, ICF is found to hold a strong validity and reliability among different cultures and different health conditions in various countries. Although the tool is being recommended for a routing clinical use, accounting to its time consumption and complexity, the briefer version (brief ICF core set for osteoarthritis) is found to be more appropriate and practically feasible to be used in a routine clinical practice and subjects with only knee osteoarthritis were included in the study which is considered as a limitation of this study, with recommendation of Considering the prevalence of knee osteoarthritis in India, a site specific tool would be more appropriate and helpful in assessing the functioning capacity and level of disability with more accuracy.

**REFERENCES:**

1. **Bellamy, N., Buchanan,W.W., Goldsmith,C.H.**, Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. *J Rheumatol*, vol.15 1988.
2. **Cieza, A., Hilfiker,R., Chatterji,S., Kostanjsek,N., Ustün,B.T., Stucki,G.** The International Classification of Functioning, Disability, and Health could be used to measure functioning. *J Clin Epidemiol*, vol.62 2009. Pp- 899-911.
3. **Deyle,G.D., et al.**, Physical Therapy Treatment Effectiveness for Osteoarthritis of the Knee: A Randomized Comparison of Supervised Clinical Exercise and Manual Therapy Procedures Versus a Home Exercise Program, *Physical Therapy Journal*, vol.85(12), 2005,pp- 1301-1317.
4. **Dijkers,M.P.** Issues in the Conceptualization and Measurement of Participation: An Overview. *Arch Phys Med Rehabil*, vol.91,2010,pp- S5-16.
5. **Gerold Stucki., Oliver Sangha., Susanne Stucki.** et al.,Comparison of the WOMAC (Western Ontario and McMaster Universities) osteoarthritis index and a self-report format of the self-administered Lequesne- Algodfunctional index in patients with knee and hip osteoarthritis. *Osteoarthritis research society*, vol.6.1998,pp-79-86.
6. **Gerold Stucki., Oliver Sangha., Susanne Stucki.** et al., Comparison of the WOMAC (Western Ontario and McMaster Universities) osteoarthritis index and a self-report format of the self-administered Lequesne- Algodfunctional index in patients with knee and hip osteoarthritis. *Osteoarthritis and Cartilage*, vol.6, 1998,pp- 79–86.
7. **Jayanth Joshi., Parakashkotwal.**, essentials of orthopaedics and applied physiotherapy- third edition.New delhi,India,pp-371-381
8. **Pollard,B., Johnston, M.**, The assessment of disability associated with osteoarthritis. *Curr Opin Rheumatol*, vol.18, 2006, pp-531-536.
9. **Riann,M., Palmieri,Smith., Abbey, C., Thomas., et al.**, A Clinical Trial of Neuromuscular Electrical Stimulation in Improving Quadriceps Muscle Strength and Activation Among Women With Mild and Moderate Osteoarthritis, *Physical Therapy*, 10 oct 2010,Vol. 90.
10. **Roos, E.M., Toksvig-Larsen, S.**, Knee injury and Osteoarthritis Outcome Score (KOOS) - validation and comparison to the WOMAC in total knee replacement. *Health Quality Life Outcomes*,2003 May 25,pp-1:17.
11. **Sven Bölte., Elles de Schipper.,Martin Holtmann., Sunil Karande., et al.**, Development of ICF Core Sets to standardize assessment of functioning and impairment in ADHD: the path ahead.european child and adolescent psychiatry, 2014.
12. **Ryan, M.siwiec., Hunter Hsu.**, osteoarthritis knee, June 15,2018.
13. **Ustun,T.B.,WHODAS 2.0**,Measuring health and disability-World Health Organization Pp- 11.
14. **Weigl,M., Cieza,A., Harder,M., Geyh, S., Amann, E.,et al.**, Linking osteoarthritis-specific health-status measures to the International Classification of Functioning, Disability, and Health (ICF). *Osteoarthritis Cartilage*,vol.11,2003,pp-519-523.
15. 2002 “introduction to ICF”(2-3) “concepts of functioning and disability”(9-11)
16. **WOMAC osteoarthritis index**.assessed 12 july 2013

**FIGURES:****Correlation between ICF body function and body structure & WOMAC pain and stiffness.**

figure 1

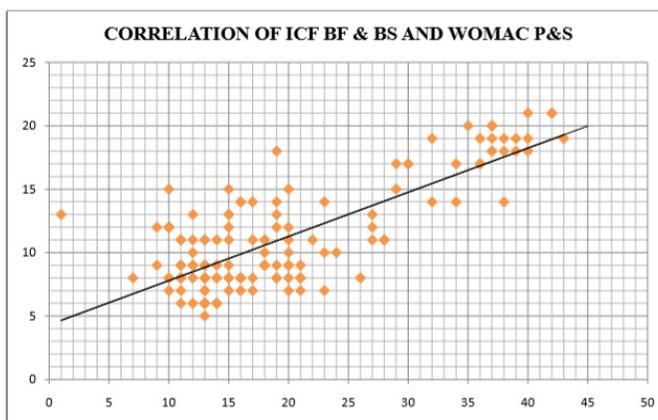


Table 1 and figure 1 shows that ICF body function & body structure and WOMAC pain & stiffness are significantly correlated ( $P < 0.001$ ) with each other with a positive  $r$  value (0.857- which denotes a strong positive correlation) meaning higher the score on ICF, higher the score on WOMAC.

### Correlation between ICF participation and WOMAC activity

figure 2

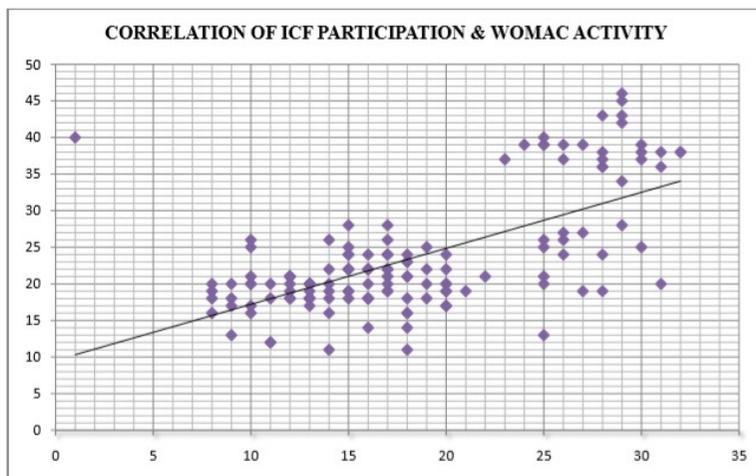
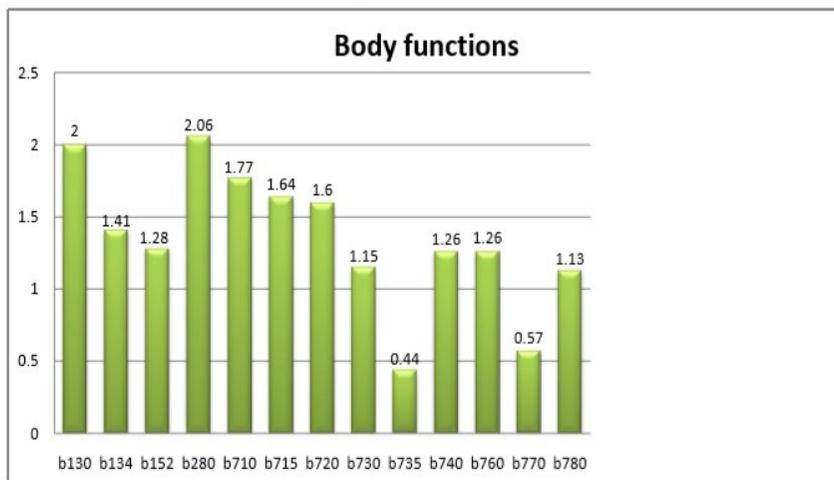


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### The components of body function in comprehensive ICF core set for Osteoarthritis

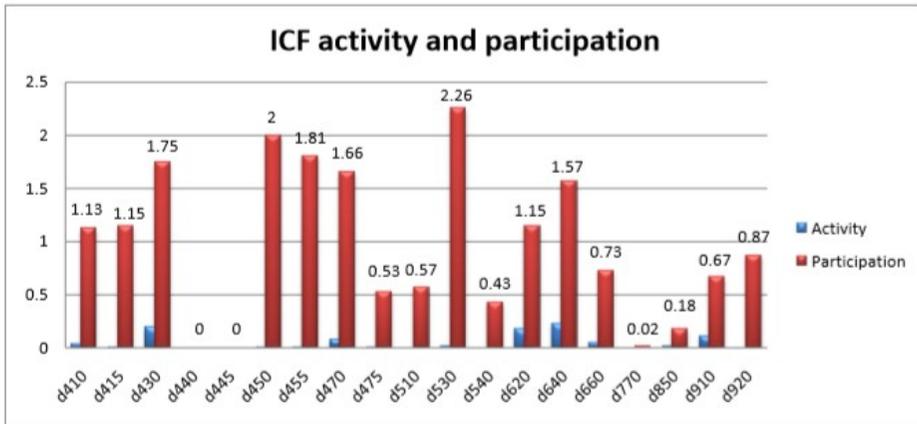
Figure 3



The above figure shows that sensation of pain (b280) is found to be more prevalent for patients with osteoarthritis following that energy & drive functions (b130) and mobility of joint functions (b710) are also reported by comparatively more number of patients. whereas muscle tone functions and gait pattern functions are found to be least prevalent among the same population.

**The components of activity and participation from comprehensive ICF core set for osteoarthritis**

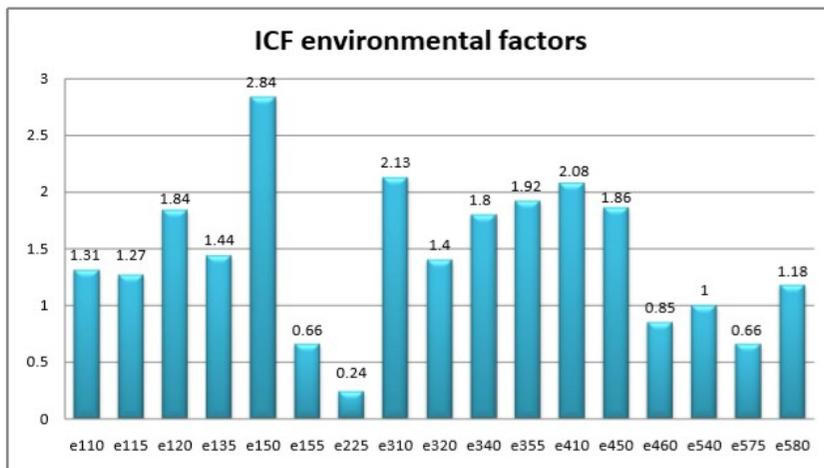
figure 4



The above figure shows that activity toileting (d530) seems to be affected to a greater extent after being diagnosed with osteoarthritis. Followed by, the activity of walking (d450) and moving around (d455) are also reported to be difficult after the diagnosis.

**The components of environmental factors from comprehensive ICF core set for Osteoarthritis**

figure 5



The above figure shows that design, construction and building products and technology of buildings for private use (e150) found to be more facilitator among environmental factors for patient with osteoarthritis. Whereas, although not as barrier, factors like climate (e225) and general social support services, system and policies (e575) are found to be least facilitator among this population.