Journal of Physical and Rehabilitation Medicine Forecast

Perceived Health Status, Self-Reported and Performance-Based Physical Function in a Sample of Adults with Osteoarthritis of the Knee

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Abstract

Background: Osteoarthritis (OA) is a disease of the whole joint including muscles, tendons ligaments synovium and bone. The knee is the most commonly affected and knee OA represents the leading cause of disability in the adult population. The substantial effect of knee OA on health, fitness, physical, emotional and social functioning of the afflicted, necessitates assessment of perceived health status and physical function of such patients. This study investigated relationship of perceived health status with self-reported and performance- based physical function of patients with knee OA.

Methods: This study is a cross-sectional survey of 197 adults (male 109, females 88) with knee OA. The Health Status Questionnaire HSQ-12 was used to assess perceived health, self- reported physical function was assessed using Osteoarthritis Index of Lequesne, while performance- based physical functions were assessed using Short Physical Performance Battery (SPPB) tests. Data were analysed using descriptives and inferential statistics with significance level set at 0.05.

Results: Participants' mean age was (62.0±8.3) years. Significant positive correlations were observed between these variables: perceived health status and self-reported physical function (r=0.676; p<0.001) perceived health status and performance-based physical function (r=0.416; p<0.001), performance based physical function and self-reported physical function (r=0.415; p<0.001).

Conclusion: This study revealed that perceived health status had a direct relationship with self-reported physical and performance based function in adults with knee osteoarthritis.

Keywords: Knee osteoarthritis; Perceived health status; Physical function; Physical Performance

Introduction

Knee osteoarthritis is a highly prevalent and disabling joint disease [1], which is most common in the elderly. The prevalence estimate of symptomatic knee OA in Nigerian community dwellers aged 40 years and above is 19.6% [2]. Symptoms include: joint pain and stiffness, swelling, grinding noise with joint movement and decreased function of the joint [3].

Health status is an individual's relative level of wellness and illness taking into account the presence of biological or physiological dysfunction, symptoms, and functional impairment. Perceived health status is subjective rating by an individual of his or her health status [4]. Physical function is the ability to perform daily activities and is usually evaluated through self-reported or performance-based measures in which an individual is as ked to indicate his/her perceived level of function during daily activities, using standardised questions [5].

Physical performance measures are clinician-observed measures of physical function that assess tasks or activities. It is assessed directly by an observer while the activity is being performed by an individual, usually by timing, counting, or distance measures. They measure what an individual can do rather than what the individual perceives he can do in contrast to self-reported functional measures [5].

Assessment of perceived health status in patients with Knee osteoarthritis is critical because this chronic disease does not typically cause death, but has a substantial effect on health, fitness,

physical, emotional, and social functioning. Therefore, perceived health status is likely to be a good indicator of both the global effects of osteoarthritis on a patient's life, as well as the effects of treatment [6]. This study investigated perceived health status and its relationship with each of self-reported and performance-based physical functions in patients with knee OA in Nigeria.

Methodology

Participants

Participants were individuals with clinical diagnosis of knee OA purposively recruited from six major hospitals in Abuja, Nigeria between April and September, 2014. Ethical approval was obtained for the study and informed consent was obtained from all participants.

Instruments

1.   *Health status questionnaire-12 (HSQ-12).* A- 12 item version of the short form-36 (SF-36) questionnaire comprising: self-assessment of health, physical functioning, physical role limitation, mental role limitation, social functioning, mental health, energy/fatigue and pain. Response values were recoded from 0-100 for each scale item. The higher the score the better the health status [7]. Scores of perceived health status was dichotomised into poor (score ≤ 50) and good (score < 50).

2.   *Osteoarthritis Index of Lequesne.* This was used to assess self-reported physical function of knee. It comprises of three sections: pain or discomfort, maximum distance walked and activities of daily living. Index of severity is equal to the sum of sections scores. A minimum score for each section is 0 while maximum is 8. Minimum index score is 0 while maximum index score is 24. Lower scores indicate there is less functional impairment [8]. Severity of impairment was dichotomised into mild/moderate functional impairment (index score of 1-7) and severe to extremely severe impairment (index score of ≥8).

3.   *Short physical performance battery (SPPB):* A 3-item physical performance test that measures standing balance, gait speed and ability to rise from a chair. Rating was from 0- 4 points and a summary performance score is a sum of scores from individual SPPB component test (range 0-12) [9]. Higher scores indicate better lower-body function scores of 6 or less is a low performance score, reflecting higher odds of mobility. The scores were dichotomised into low performance (≥ 6) score and high performance (> 6).

4.   Socio-demographic data form: Was used to retrieve information on age, gender, marital status, educational qualification, employment status, religion and monthly income of participants.

5.   Stop-watch (Diamond, England): Was used to measure time in seconds during short physical performance battery tests.

6.   A standard chair: (Straight back chair, approx.43cm seat height, without arm rest) [10] was used for the Chair stand test.

7.   Tape measure was used to measure distance for gait speed test.

Data analysis

Continuous variables were summarized using means and standard deviation. Categorical variables were summarized using frequencies and percentages. Spearman correlation analysis were done to establish relationships among perceived health status and each of self-reported physical function and performance based physical function in participants. Level of significance was set at 0.001.

Table 1: Socio-demographic Characteristics Participants.

Characteristic	Class	Frequency	Percentage
Age (years)	40-49	25	12.7
	50-59	42	21.3
	60-69	91	46.2
	70-75	39	19.8
Gender			
Male	109	55.3	
Female	88	44.7	
Marital status			
Married	135	68.5	
Not married	62	36.5	
Tribe			
Hausa/Fulani	53	26.9	
Igbo	78	39.6	
Yoruba	24	12.2	
Others	42	21.3	
Educational status			
Primary	34	17.3	
Secondary	112	56.9	
Tertiary	51	25.9	
Employment status			
Employed	94	47.7	
Unemployed	103	52.3	
Personal income/month			
Low/middle*	83	42.2	
Moderate/high*	114	57.8	
Health insurance scheme			
Yes	13	6.6	
No	184	93.4	
Perceived health status			
Very good	10	5.1	
Good	96	48.7	
Fair	63	32	
Bad	27	13.7	
Very bad	1	0.5	
Knee affectation			
Unilateral	160	81.2	
Bilateral	37	18.8	
Co morbidities			
None	149	75.6	
Others	48	24.4	

Key: *Low/middle income earner = income of ≤ ₦99, 999/month, *Moderate/high income earner = ≥ N100, 000/month.

Results

Characteristics of participants

Some 237 patients with knee OA were approached for this study (115 males and 122 females). Thirty one (4 males, 27 females) refused to give their consent. Nine (2 males and 7 females) out of those who gave their consent could not complete the required performance-

based physical function, citing time constraint as their reason. The large numbers of women who refused to give their consents were of the Hausa/Fulani tribe.

A total number of 197 patients (109 males and 88 females) aged between 40 and 75 years with mean age of (62.0 ± 8.3) years fully participated in the study. Majority of the participants 135 (68.5%) were married, 112 (56.9%) had secondary school as the highest educational qualification, 103 (52.3%) were unemployed, 114 (57.8%) were of moderate/high income group, 96 (48.7%) rated their health status as good and 160 (81.2%) had unilateral knee affectation (Table 1).

Relationship between perceived health status and self-reported physical function in individuals with knee OA

Table 2 shows the result of Spearman correlation analysis between perceived health status and self-reported physical function. It was observed that significant negative correlation existed between perceived health status and self-reported physical function such that participants who reported higher perceived health status had lower functional impairment (index score of self-reported physical function).

Relationship of Perceived health status to Performance-based physical functions of individuals with knee OA

Table 3 shows the result of Spearman correlation analysis between each of the eight scales of Perceived health status and the performance-based physical function. It was observed that significant positive correlation existed such that participants who reported a better perception of their health status also had higher score for performance-based physical function.

Relationship between self-reported physical function and performance-based physical function in individuals with knee OA

Table 4 shows the result of Spearman correlation analysis between individuals with self-reported physical function and performance-based physical function. Significant negative correlation was found between self-reported physical function and performance-based physical function in individuals with knee OA such that individuals who reported greater functional impairment also had lower scores in performance-based physical function.

Discussion

Majority of the participants though unemployed perceived their health as being good. This is contradictory to the finding of Bambra and Eikemo, [11] who reported that in twenty three European countries, unemployed, retired or inactive report poor or very poor health more often. Differences in sample size of the studies might be a reason for the difference in findings. This could also be explained by the fact that health perception is a subjective rating, hence individuals are accountable to his or her perceived health status. According to Wilson and Cleary [4], some people perceive themselves as healthy despite suffering from one or more chronic diseases, while others perceive themselves as ill when no objective evidence of disease can be found.

Majority of the participants are within age range 60-69 years which is in agreement with what obtains in literature that OA is more common in older people [3]. They were mostly of moderate/high income class, this could be explained by the fact that cost of living in the study site – Abuja, Nigeria is relatively high and may only

Table 2: Spearman correlation of Perceived health status and Self-reported physical function in individuals with knee OA.

Perceived Health Status	Self-rated Physical Function		
	Pain	Max.Dist.Walked	ADL
Physical Functioning	-0.676	-0.758	-0.768
	(0.000*)	(0.000*)	(0.000*)
Role Physical	-0.669	-0.704	-0.742
	(0.000*)	(0.000*)	(0.000*)
Bodily Pain	-0.707	-0.55	-0.686
	(0.000*)	(0.000*)	(0.000*)
Health Perception	-0.711	-0.615	-0.677
	(0.000*)	(0.000*)	(0.000*)
Energy/Fatigue	-0.408	-0.477	-0.427
	(0.000*)	(0.000*)	(0.000*)
Social Functioning	0.476	-0.551	-0.577
	(0.000*)	(0.000*)	(0.000*)
Role Mental	-0.64	-0.691	-0.722
	(0.000*)	(0.000*)	(0.000*)
Mental Health	-0.185	-0.114	-0.211
	(0.000*)	(0.111*)	(0.003*)

Key: Role physical= role limitation attributable to physical health, Role mental = role limitation attributable to mental health, Max. Dist. Walked = maximum distance walked, ADL = Activities of daily living. * Significant correlation at 0.001 level (two-tailed)

Table 3: Spearman correlation between perceived health status and performance-based physical function of individuals with knee OA.

Perceived Health Status	PERFOMANCE-BASED PHYSICAL FUNCTION		
	Balance	Gait Speed	Chair Stand
Scale			
Physical Functioning	0.416	0.39	0.482
	(0.000*)	(0.000*)	(0.000*)
Role Physical	0.377	0.43	0.457
	(0.000*)	(0.000*)	(0.000*)
Bodily Pain	0.398	0.451	0.565
	(0.000)	(0.000*)	(0.000*)
Health Perception	0.387	0.43	0.615
	(0.000*)	(0.000*)	(0.000*)
Energy/Fatigue	0.315	0.27	0.451
	(0.000*)	(0.000*)	(0.000*)
Social Functioning	0.196	0.354	0.298
	(0.000*)	(0.000*)	(0.000*)
Role Mental	0.386	0.414	0.43
	(0.000*)	(0.000*)	(0.000*)
Mental Health	0.032	0.054	0.2
	(0.658*)	(0.000*)	(0.005*)

Key: Role physical= role limitation attributable to: physical health, Role mental = role limitation attributable to: mental health, * Significant Correlation at 0.001 level (two-tailed).

be conveniently inhabited by people with moderate /high income. Ninety three percent of the participants are not on National Health Insurance Scheme. This might be because majority of participants are unemployed (a group yet to be fully integrated into the scheme)

Table 4: Spearman correlation between self-rated physical function and performance-based physical function in individuals with knee OA.

Self rep phy fxn	PERFOMANCE-BASED PHYSICAL FUNCTION		
	Balance	**Gait Speed**	**Chair Stand**
Domain			
Pain	-0.415	-0.485	-0.711
	0.000*	0.000*	0.000*
Max distance walked	-0.468	-0.377	-0.588
	0.000*	0.000*	0.000*
Activities of daily living	-0.465	-0.439	-0.653
	0.000*	0.000*	0.000*

and some of those who were employed were also not covered by the scheme.

In this study, individuals who reported higher perceived health status had lower functional impairment (index score of self-reported physical function). This is expected because such individuals are able to manage their functional impairment relatively that they have not become overwhelmed. In addition, this could imply that individuals with knee OA who had better perception of their health status scored higher in performance-based physical function. This result harmonizes well with the findings of Reichmann, [12] who reported that worse self-reported health status is associated with functional limitation. Indeed, Marks [13] observed that pain and deficiencies are the clinical factors most consistently impacting health status. In this study, participants who reported greater functional impairment scored lower or poorer for performance-based physical function. Individuals with knee OA who reported greater functional impairment in pain, maximum distance walked and activities of daily living exhibited lower performance-based physical function. This is similar to the findings of Sivachidambaram et al, [14]; Adegoke, et al, [15]; Brandes et al, [16], Maly et al, [17] but contradicts the findings of Sutbeyaz et al, [18]. Individuals with knee OA have significant muscle impairments which affect physical function [19]. In addition, deficits in lower limb proprioception and muscle strength are associated with knee OA and may be postulated as causes of impaired balance [20]. Hurley et al, [21] reported that weaker quadriceps lead to more instability and poorer functional performance.

Limitation of Study

The use of self-report instruments is a factor for introducing recall-bias or socially acceptable responses. The researcher along with trained research assistants tried their utmost in gathering as accurate data as possible from participants also in order to increase objectivity in response to questions, scores for each response item was omitted in the questionnaires administered.

Conclusion

This study revealed that for adults with knee osteoarthritis, perceived health status had a direct relationship with self-reported physical and performance based function. The clinical implication of this is that an improved psychosocial wellbeing of individuals with osteoarthritis positively leads to improved physical function and performance.

References

1. Wallace IJ, Worthington S, Felson DT, Robert D. Jurmain RD, Wren KT, et al. Knee osteoarthritis has doubled in prevalence since the mid-20th century. *Proceedings of the National Academy of Sciences. U S A*. 2017; 114: 9332–9336.

2. Akinpelu AO, Alonge TO, Adekanla BA, Odole AC. Prevalence and pattern of symptomatic knee OA in Nigeria. A community-based study. *The Internet Journal of Allied Health Sciences and Practice*. 2009. 7: 1540-1580X.

3. American College of Rheumatology. 2012. Osteoarthritis.

4. Wilson IB, Cleary PD. Linking clinical variables with health-related quality of life. *Journal of the American Medical Association*. 1995; 273: 59-65.

5. Terwee CB, Rienk MA, van der Slikke, Rob C, van Lummel, Rob J, et al. Self-reported physical functioning was more influenced by pain than performance-based physical functioning in knee osteoarthritis patients. *Journal of Clinical Epidemiology*. 2006; 59: 724-731.

6. Scott DG, Thomas KW, Edward HM, Christopher Perry BS. Functional outcome in knee Osteoarthritis after treatment with Hylan G-F 20: A prospective study. *Archives of Physical Medicine and Rehabilitation*. 2000; 81: 479-483.

7. Ware J, Kosinski M, Keller SD. A 12-Item Short Form Health Survey. Construction of scales and preliminary tests of reliability and validity. *Medical Care*. 1996; 34: 220–233.

8. Lequesne MG. The algofunctional indices for hip and knee osteoarthritis. *Journal of Rheumatology*. 1997; 24: 779-781.

9. Guralnik JM, Simonsick EM, Ferucci L, Glynn RJ, Berkman LF, Blazer DG, et al. A short physical performance battery assessing lower extremity function: Association with self-reported disability and prediction of mortality and nursing home admission. *Journal of Gerontology*. 1994; 49: M85-94.

10. Jones CJ, Rikli RE, Beam WC. A 30-s chair-stand test as a measure of lower body strength in community-residing older adults. *Research Quarterly for Exercise and Sport*. 1999; 70: 113-119.

11. Bambra C, Eikemo TA. Welfare state regimes, unemployment and health: a comparative study of the relationship between unemployment and self-reported health in 23 European countries. *J Epidemiol Community Health*. 2009; 63: 92-98.

12. Reichmann G. The 2009 ageing report: Economic and Budgetary Projection for the EU27 member states 2008-2060. European economy-2-2009.

13. Marks R. Perceived health status of women with knee osteoarthritis: A cross sectional study of the relationship of age, body mass, pain and walking limitations. *The open orthopaedics Journal*. 2014; 8: 255-263.

14. Sivachidambaram K, Ateef M, Tashien S. Correlation of self-reported questionnaire (KOOS) with some objective measures in primary OA knee patients. *Rheumatology*. 2014: 301485.

15. Adegoke BOA, Babatunde FO and Oyeyemi AL. Pain, balance, self-reported function and physical function in individuals with knee osteoarthritis. *Physiotherapy Theory and Practice*. 2012; 28: 32–40.

16. Brandes M, Schomaker R, Mollenhoff G and Rosenbaum D. Quantity versus quality of gait and quality of life in patients with osteoarthritis. *Gait and Posture*. 2008; 28: 74–79.

17. Maly MR, Costigan PA and Olney SJ. Determinants of self-report outcome measures in people with knee osteoarthritis. *Archives of Physical Medicine and Rehabilitation*. 2006; 87: 96–104.

18. Sutbeyaz ST, Sezer N, Koseoglu BF, Ibrahimoglu F and Tekin D. Influence of knee osteoarthritis on exercise capacity and quality of life in obese adults. *Obesity*. 2007; 15: 2071–2076.

19. Alnahdi AH, Zeni JA and Snyder-Mackler. Muscle impairments in patients with knee osteoarthritis. *Sports health*. 2012; 4: 284-292.

20. Hinman RS, Bennell KL, Metcalf BR and Crossley KM. Balance impairments in individuals with symptomatic knee osteoarthritis: a comparison with matched controls using clinical tests. *Rheumatology*. 2002; 41: 1388-1394.

21. Hurley MV, Scott LD, Rees J, Newham DJ. Sensorimotor changes and functional performance in patients with knee osteoarthritis. Annals of Rheumatic disease. 1997; 56: 641-648.