



## Original article

# Effects of preoperative walking ability and patient's surgical education on quality of life and functional outcomes after total knee arthroplasty<sup>☆</sup>



Sunil K. Dash<sup>a</sup>, Nishit Palo<sup>a,b,\*</sup>, Geetanjali Arora<sup>c</sup>, Sidharth S. Chandel<sup>d</sup>, Mithilesh Kumar<sup>e</sup>

<sup>a</sup> Hi-Tech Medical College, Department of Orthopaedics, Odisha, India

<sup>b</sup> Care Hospitals, Department of Orthopaedics, Odisha, India

<sup>c</sup> Hi-Tech Medical College, Department of Anatomy, Odisha, India

<sup>d</sup> Jaypee Hospital, Department of Orthopaedics, Noida, India

<sup>e</sup> Care Hospitals, Department of Physiotherapy, Odisha, India

## ARTICLE INFO

## Article history:

Received 15 May 2016

Accepted 20 June 2016

Available online 30 December 2016

## Keywords:

Arthroplasty, replacement, knee

Biomechanical phenomena

Knee joint

Quality of life

Treatment outcome

## ABSTRACT

**Objective:** Prospectively analyze the effect of preoperative walking status and the patient's surgical education on functional outcomes and the three dimensions of quality of life (QoL) (pain, physical function, and mental health) after elective total knee arthroplasty (TKA).

**Methods:** A comparative analysis on the QoL and functional outcomes in patients who underwent total knee arthroplasty between January 2014 and June 2015. To compare effects of the patient's walking status and knowledge of the surgical procedure on QoL and functional outcomes following TKA by means of SF-36 questionnaire, CES D10, VAS, KSS, KSFS, WOMAC, as well as Friedmann and Wyman scores, 10MWT, and 30-second timed chair test, assessed before the operation and one, three, and six months after the operation.

**Results:** There were 168 knees in 154 patients: 46.75% men and 53.24% women. 52.38% of knees had grade-III OA and 40.47% of knees had grade-IV OA. Preoperatively, SF-36 PCS was 33.2 and MCS was 35.4. Mean KSS and KSFS in females was 37.3 (16.2) and 31.5 (13.8); in males it was 49.2 (18.4) and 42.5 (15.7), respectively. Mean WOMAC scores were 64.2 in females and 56.5 in males. Mean VAS and CES D10 scores were 8.8 and 8.2 in females, and 6.9 and 6.4 in males, respectively. Post operatively at the first, third, and sixth month, significant improvements in QoL and mean SF-36, CES D10, VAS, KSS, KSFS, WOMAC, and Friedmann and Wyman scores were observed, as well as in the 10MWT and 30 s timed chair test scores. Patients with better preoperative functional activity and satisfactory understanding of TKA presented a better functional performance and achieved a good quality life ( $p < 0.01$ ).

**Discussion:** Surgeons educate TKA candidates regarding the surgical procedure, the nature of implants, and how the procedure would affect their lifestyle and what their expectations from TKA should be. These crucial considerations should boost their confidence, enhancing their involvement and cooperation in post-surgical rehabilitation, thereby improving their QoL, functional results, and post TKA experience.

<sup>☆</sup> Work performed in the centers in Bhubaneswar, Odisha, India.

\* Corresponding author.

E-mail: [nishit\\_palo@yahoo.com](mailto:nishit_palo@yahoo.com) (S.K. Dash).

<http://dx.doi.org/10.1016/j.rboe.2016.12.011>

2255-4971/© 2016 Sociedade Brasileira de Ortopedia e Traumatologia. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

*Conclusion:* TKA candidates with good preoperative walking ability and understanding of knee arthroplasty have better QoL in early and late post-surgery periods. Patient's lifestyle and understanding significantly enhances the postoperative functional ability.

© 2016 Sociedade Brasileira de Ortopedia e Traumatologia. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Efeitos da habilidade ambulatoria pré-operatória e da educação cirúrgica do paciente sobre a qualidade de vida e os resultados funcionais após artroplastia total do joelho

### R E S U M O

#### Palavras-chave:

Artroplastia, substituição, joelho  
Fenômenos biomecânicos  
Articulação do joelho  
Qualidade de vida  
Resultado do tratamento

*Objetivo:* Analisar prospectivamente o efeito do estado ambulatorio pré-operatório e da educação cirúrgica do paciente sobre os resultados funcionais e das três dimensões da qualidade de vida (QV; dor, função física e saúde mental) após a artroplastia total do joelho (ATJ).

*Métodos:* Análise comparativa da QV e dos resultados funcionais em pacientes submetidos a artroplastia total de joelho entre janeiro de 2014 e junho de 2015. Para comparar os efeitos do estado ambulatorio do paciente e o conhecimento sobre o procedimento cirúrgico na qualidade de vida e nos resultados funcionais após ATJ, os questionários SF-36, CES D10, EVA, KSS, KSFS e WOMAC foram usados, bem como os escores de Friedman e Wyman, 10MWT e o teste de cadeira de 30 segundos, no pré-operatório e um, três e seis meses após a cirurgia.

*Resultados:* O estudo incluiu 168 joelhos de 154 pacientes: 46.75% homens e 53.24% mulheres. 52,38% dos joelhos apresentaram OA de grau III e 40,47% dos joelhos, OA de grau IV. No período pré-operatório, o SF-36 PCS foi 33,2 e o MCS foi 35,4. A média do KSS e do KSFS em mulheres foi 37,3 (16,2) e 31,5 (13,8), respectivamente; nos homens, foi 49,2 (18,4) e 42,5 (15,7), respectivamente. Os escores médios do WOMAC foram 64,2 para as mulheres e 56,5 para os homens. Os escores médios da EVA e CES D10 foram 8,8 e 8,2 nas mulheres e 6,9 e 6,4 nos homens, respectivamente. No primeiro, terceiro e sexto meses pós-operatórios, foram observadas melhorias significativas na QV e na média dos escores SF-36, CES D10, EVA, KSS, KSFS, WOMAC e Friedmann e Wyman, bem como no 10MWT e no teste de cadeira de 30 segundos. Pacientes com melhor atividade funcional pré-operatória e com compreensão satisfatória sobre a ATJ obtiveram resultados funcionais melhores e alcançaram uma boa qualidade de vida ( $p < 0,01$ ).

*Discussão:* Cirurgiões explicam aos pacientes candidatos a ATJ o procedimento cirúrgico, a natureza dos implantes, como o procedimento afetaria o estilo de vida e quais devem ser as expectativas em relação ao resultado da ATJ. Estas considerações cruciais devem aumentar a confiança do paciente, aumentando o seu envolvimento e cooperação no processo de reabilitação pós-cirúrgica, melhorando assim sua qualidade de vida, resultados funcionais e experiência após a ATJ.

*Conclusão:* Candidatos à ATJ com boa capacidade ambulatoria pré-operatória e compreensão da cirurgia apresentam melhor qualidade de vida no período pós-operatório inicial e de longo prazo. O estilo de vida e o grau de compreensão do paciente em relação à cirurgia aumentam significativamente a capacidade funcional pós-operatória.

© 2016 Sociedade Brasileira de Ortopedia e Traumatologia. Publicado por Elsevier Editora Ltda. Este é um artigo Open Access sob uma licença CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Introduction

Osteoarthritis especially of the hip and knee not only affects the quality of life of the individual not only physically but also emotionally and socially, limiting activities such as walking, climbing stairs, and self-care.<sup>1</sup>

Total knee arthroplasty has become a common procedure<sup>2,3</sup> in treatment of advanced knee osteoarthritis.

TKA is the most effective surgical procedure for reducing pain and increasing functional capacity, correct the deformity and improve the patient's quality of life (QoL)<sup>4-8</sup> when conservative treatment fails<sup>9</sup> with greatest improvements in pain and function occur during the first 3-6 months after surgery.<sup>10,11</sup>

Majority of patients receiving TKA report improved pain and function,<sup>12-14</sup> whereas 15-30% report no improvement<sup>15,16</sup> or worsened pain and functional status after surgery. The unfavorable outcomes may result from preoperative

medical comorbidities, gender, mental health status,<sup>15,16</sup> social support,<sup>17,18</sup> obesity,<sup>19</sup> sedentary lifestyle, lack of walking, bed ridden patients or increased waiting time for knee replacement.<sup>20</sup>

These patients may not tolerate the operative stress and less often involve themselves or cooperate in the postoperative physical therapy and hence remain deprived of beautiful outcomes of TKA. They often experience persistent pain, swelling, stiffness and difficulty in walking or perform routine activities and remain dissatisfied in comparison to some patients who perform really well following TKA and experience minimal pain or discomfort.

Various studies have correlated the results from total knee replacements with various pre surgical and comorbid factors.<sup>10-17</sup> However, little has been described regarding the effects of pre surgical walking status and patient's education regarding the procedure on functional outcomes and QoL after surgery of patients underwent surgical treatment.

Thus, we prospectively analyzed the effect of preoperative walking status and patient's surgical education on functional outcomes and the three dimensions of QoL (pain, physical function and mental health) after elective total knee arthroplasty.

## Materials and methods

A prospective cohort study was completed of patients undergoing unilateral primary TKAs for the treatment of knee osteoarthritis. Patients were recruited and followed up between January 2014 and October 2015 at 3 centers in Bhubaneswar, Odisha, India. We prospectively reviewed 168 knees in 154 patients with knee osteoarthritis admitted for TKA to analyze the effect of preoperative walking status and patient's surgical education on functional outcomes and QoL after elective total knee arthroplasty. 14 patients had a contralateral TKA within 12 months of the first procedure during the course of the study. The study was approved by institutional ethics committee and all patients provided agreement and consent for inclusion in the study.

We excluded patients with the following: functional illiteracy, inflammatory or other severe musculoskeletal conditions (e.g., rheumatoid arthritis, sciatica), metabolic or neoplastic disease, and severe psychopathology, knee infection or comorbidity (defined as a diagnosis, such as heart failure or respiratory disease severe enough to impede total participation in procedures).

Patient selection, informed consent and patient details were obtained using a standard protocol by two surgeons (SKD, NP). All surgeries were performed by the same surgeon team.

The surgical technique was the same in all cases: an anteromedial approach without patellar resurfacing using a femoral and tibial intramedullary cutting guide. The femoral and tibial components were cemented. The prostheses used was standard or posterior stabilized P.F.C.® sigma™ knee systems (DePuy Orthopedics, Warsaw, IN, USA) in all patients.

### QoL outcome measures

Functional ability: were assessed with Western Ontario and McMaster's Universities osteoarthritis index (WOMAC) and

Friedmann and Wyman Classification of Functional Outcome, the Knee Society Score (KSS), Walking Status Grading and 10-meter walk test (10MWT) and Short Form-36 Questionnaire (SF-36) for physical health.

### Locomotor function

Were assessed using Walking Status Grading, 10-meter walk test (10MWT) and the 30 second timed chair stand tests. General health, lower limb strength, range of movement and compliance with exercise were also measured.

### Pain and social disability

Was assessed by the visual analog scale (VAS) for pain and the Center for Epidemiological Studies Depression Scale (CES D10) for mental health.

Waiting-time to surgery in weeks and length of hospital stay in days, were also included. All the tests were performed and data were obtained at baseline before surgery, 1 month, 3 months and 6 months through face-to-face interaction and, where appropriate, examination of hospital medical records. Data on perioperative and postoperative complications, post-hospital care and destination at discharge, compliance with exercise were also measured, as well as rehabilitation were gathered at the follow-up interviews.

### Methodology

The preliminary data of all these patients were entered in the data charts at 3 centers and later were entered into the registry at the parent institution. The patients were subjected to history, clinical examination, standing Skiagram of Bilateral lower limbs with knee in Anteroposterior and Lateral Views and routine blood investigations like blood sugar, serum uric acid, serology, differential and complete blood counts were performed. Preoperatively the patients had multiple sessions with the operating surgeons, where they were counseled, motivated and explained in details about TKA procedure, nature of implants and the outcomes of surgery. Post-operatively, the patients were hospitalized for 1 week, during which time they received physiotherapy to achieve flexion of 90 and autonomous walking using canes or walker cages at discharge. TKA, rehabilitation, and other treatments were standardized according to hospital protocols. Patients were treated with low molecular weight heparin as prophylaxis for thromboembolic events for 1 month and 4 doses of cefuroxime, 1.5 g were administered as antibiotic prophylaxis. Patients were seen 15 days after surgery to check the surgical wound and remove staples. Follow-up at 1, 3, 6 months included radiography, clinical evaluation, motivation and counseling, medications, physiotherapy and questionnaire fill up. Home visits were performed when required. The results were tabulated at 6 month follow up. The type of major complications evaluated after discharge included: knee stiffness, deformity of the lower limb, pain, extensor muscle weakness, superficial infection and deep vein thrombosis.

### Statistical analysis

The Mann-Whitney test was used to compare the QOL among patients with Walking Ability and Knee Range of Movements

(satisfactory vs unsatisfactory) and patients with good surgical understanding (satisfactory vs unsatisfactory) at 1st, 3rd and 6th month after surgery. The independent-samples 't' test was performed to compare two group's scores on the same variable. The variables were tabulated in the Excel software. The data were analyzed descriptively and organized in tables and graphs. A value of  $p < 0.05$  was considered statistically significant. The 95% confidence intervals were measured when appropriate. Statistical analyses were performed using SPSS 13.0. (SPSS Inc., Chicago, IL, USA).

**Results**

**Sample characterization**

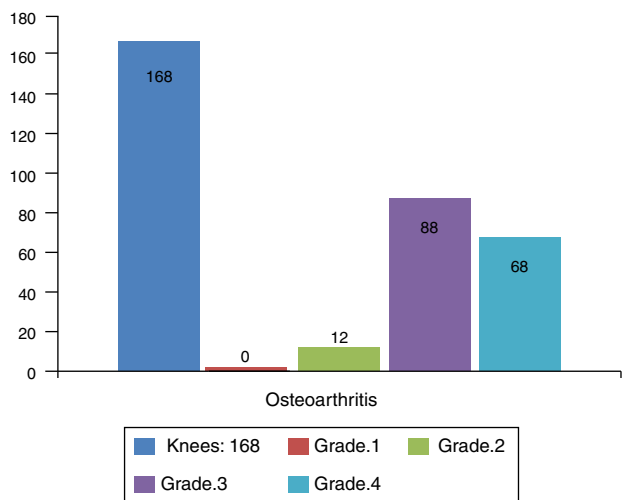
The sample composed of 168 knee in 154 patients: 72 men (46.75%) and 82 women (53.24%). 14 patients had a contralateral TKA during the course of the study: 9 men (64.28%) and 5 women (35.71%). The ages of the patients evaluated ranged from 62 years (minimum) to 92 years (maximum) with a mean of  $76 \pm 6$  years.

**Clinical factors**

Among the patients evaluated; 96 patients (62.33%) were affected on their right-hand side and 44 patients (28.57%) were affected on their left-hand side. 14 patients (9.09%) had bilateral affection within 12 months of the first procedure during the course of the study. 114 patients (74.13%) were married, 40 patients (25.98%) were widowed and 45 patients were working at the time presentation to hospital.

Among 168 knees; 12 knees (7.14%), had grade-II osteoarthritis, 88 knees (52.38%) had grade-III osteoarthritis and 68 knees (40.47%) had grade-IV osteoarthritis (Fig. 1) based on the radiological classification (Table 1).

Preoperative Knee Range of movements, Educational status and comorbidities among the patients is outlined in Table 2. The most frequent were Diabetes mellitus in Females (62.1%) and Hypertension in Males (59.7%). Preoperatively, mean 10 MWT results for self-selected velocity was 0.2m/s and Fast



**Fig. 1 – Pattern of knee osteoarthritis (n = 154).**

**Table 1 – Radiographic classification of degenerative joint disease.**

Grade	Description
<b>Knees</b>	
0	Normal
1	Doubtful narrowing of joint space and possible osteophytic lipping
2	Definite osteophytes and possible narrowing of joint space
3	Moderate multiple osteophytes, definite narrowing of joint space, some sclerosis, and possible deformity of bone ends
4	Large osteophytes, marked narrowing of joint space, severe sclerosis, and definite deformity of bone ends. Subchondral cysts may be present.
<b>Hips</b>	
0	Normal
1	Possible narrowing of joint space medially and possible osteophytes around the femoral head
2	Definite narrowing of joint space inferiorly, definite osteophytes, and slight sclerosis
3	Marked narrowing of joint space, slight osteophytes, some sclerosis and cyst formation, and deformity of femoral head and acetabulum
4	Gross loss of joint space with sclerosis and cysts, marked deformity of femoral head and acetabulum, and large osteophytes

Source: Adapted from the Council for International Organization of Medical Sciences, 1963 (\*From Weinstein SL, Buckwalter JA. Rheumatic diseases: diagnosis and management. Turek's orthopedics: principles and their application, 6th edition, p.154).

**Table 2 – Clinical characteristics of the patients.**

Variables	Female (82)		Male (72)	
	N	%	N	%
<b>1. Knee (range of movements) (n = 168)</b>				
0–60° Flexion	42	51.2	28	38.8
61–80° Flexion	21	25.6	22	30.5
81–100° Flexion	12	14.6	13	18.0
100–120° Flexion	7	8.5	9	12.7
<b>2. Educational status (n = 154)</b>				
Grade 8 or lower	17	20.7	10	13.8
Grade 9–12	33	40.3	18	25.0
Bachelor's degree	20	24.3	26	36.2
Post-graduate degree	12	14.7	18	25.0
<b>3. Comorbidities (n = 154)</b>				
Hypothyroidism	26	31.7	18	25
Diabetes mellitus	51	62.1	38	52.7
Hypertension	45	54.8	43	59.7
Parkinson disease	2	2.4	5	6.9
Alzheimer	3	3.6	8	11.1

velocity was 0.4 m/s. The patients had moderately low quality of life both physically and mentally, the baseline mean SF-36 PCS was 33.2 and MCS was 35.4. Pre-operative Functional scores (WOMAC, Friedmann-Wyman Score, KSS, Walking Status Grading, 30 second timed chair test) and Pain and Mental Health scores (VAS, CES D10) are outlined in Table 3.

Postoperative Functional Knee Scores (WOMAC, Friedmann-Wyman Score, KSS, Walking Status Grading, 30 second timed chair test) and Pain and Mental Health scores

**Table 3 – Preoperative functional knee scores and pain and mental health scores.**

Variables	Female knee (92)		Male knee (90)	
	Mean	S.D.	Mean	S.D.
1. WOMAC scores				
Pain	14.3	4.2	13.6	3.8
Function	44.7	14.6	38.5	10.5
Stiffness	5.2	1.6	4.4	1.8
2. KSS				
Knee score	37.3	16.2	49.2	18.4
Function score	31.5	13.8	42.5	15.7
3. 30 second chair test				
	3	1.2	4	2
4. VAS				
	8.8	1.2	6.9	2.9
5. CES D10				
	8.2	1.4	6.4	2.4
	N	%	N	%
6. Friedmann–Wyman score				
Good	17	20.7	10	13.8
Fair	33	40.3	18	25.0
Poor	20	24.3	26	36.2
7. Walking ability				
Gr. IV	8	8.6	9	10
Gr. III	12	13.0	11	12.2
Gr. II	41	44.8	41	45.6
Gr. I	31	33.6	29	32.2

(VAS, CES D10) in Female and Male Knee at 1st, 3rd and 6th month are outlined in Tables 4 and 5.

There were significant improvement in terms of KSS, Walking Status Grading, 30 second timed chair test, WOMAC scores, Friedmann–Wyman Scores, 10MWT, VAS and CES D10, post-operatively and over 1st ( $p=0.02$ ), 3rd ( $p=0.04$ ) and 6th ( $p=0.02$ ) month follow up. At 3rd month post-operatively, we found significant improvement in mean 10 MWT results for self-selected velocity which improved to 0.5 m/s and Fast velocity to 0.9 m/s ( $p<0.01$ ). The patients had moderately good quality of life both physically and mentally, the baseline mean SF-36 PCS was 47.4 and MCS was 59.2 ( $p<0.01$ ).

Patient's motivation and understanding of surgical procedure were assessed by primary surgeons as satisfactory or unsatisfactory. Patients with educational status Grade 9 and above had better compliance and involvement. This may be attributable to interest and activity levels in them.

Moreover, patients with better preoperative functional activity and satisfactory understanding of TKA, performed functionally well and lead good quality life at 1st, 3rd and 6th months ( $p<0.01$ ).

## Discussion

Osteoarthritis (OA), the most common joint disease, is age related, affecting more than 80% of people over the age of 55.<sup>21</sup> It is more common in women, especially after menopause. OA of the knees is common, and risk is strongly linked to body mass index.<sup>21</sup> Symptoms include pain with walking, standing up from a chair, climbing or descending stairs; and stiffness after periods of rest. With new or increased pain there is a natural tendency to reduce activity, so does muscle bulk and strength, which may lead to decreased joint stability, worsening of joint degeneration, and further decline in functional status which can have major systemic consequences, affecting cardiovascular health, emotional health, and sense of well-being. Breaking this cycle requires a team approach targeted toward educating the patient and family, altering the patient's lifestyle, offering assistive devices, and prescribing both physical and pharmacotherapy.

The heterogeneity of osteoarthritis arises from the many factors that can contribute to cartilage damage. TKA is the most effective surgical procedure for reducing pain and increasing functional capacity, correct the deformity and improve the patient's quality of life (QoL)<sup>4-8</sup> when conservative treatment fails.<sup>9</sup> In Canada, with 8,734 joint replacement surgeries in 2004–2005 to >10,000 in 2006–2007, estimated

**Table 4 – Post-operative functional knee scores in females at 1st, 3rd and 6th months.**

Variables	1st month		3rd month		6th month	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. WOMAC scores						
Pain	6.3	1.2	3.2	1.1	2	0.8
Function	21	8.6	16.4	6.4	10.2	7.8
Stiffness	3.8	1.1	2.2	0.8	1.8	1
2. KSS						
Knee score	64.2	12.4	72.8	16.8	78.2	17.2
Function score	55.8	10.6	64.2	12.4	68	12.8
3. 30 second chair test						
	4	1.8	4	2	5	2.4
4. VAS:						
	5.8	2.2	4.2	1.4	3	0.8
5. CES D10:						
	4.2	0.8	3.4	1	2.8	0.6
	N	%	N	%	N	%
6. Friedmann–Wyman score						
Good	48	52.3	52	56.5	64	69.5
Fair	40	43.4	38	41.3	26	28.2
Poor	4	4.3	2	2.2	2	2.2
7. Walking ability						
Gr. IV	32	8.6	37	41.1	63	70.0
Gr. III	30	13.0	33	36.7	19	21.1
Gr. II	22	44.8	16	17.7	8	8.9
Gr. I	6	33.6	4	4.5	0	0



**Table 5 – Post-operative functional knee scores in males at 1st, 3rd and 6th months.**

Variables	1st month		3rd month		6th month	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. WOMAC scores						
Pain	5.3	1.2	2.8	1.4	1.4	0.9
Function	23	8.6	14	6.4	8	6.4
Stiffness	3.6	1.4	1.8	1	0.6	1.6
2. KSS						
Knee score	73.2	16.8	82.4	12.7	8.2	10.2
Function score	62.8	14.9	74.3	15.2	82	7.5
3. 30 second chair test						
	4	2.1	5	1.8	6	1.2
4. VAS						
	4.8	1.4	3.8	1.1	2.6	0.6
5. CES D10						
	3.8	0.5	3.2	1.2	1.8	0.8
6. Friedmann–Wyman score						
	N	%	N	%	N	%
Good	54	60.0	58	64.5	72	80.0
Fair	33	36.6	30	33.3	16	17.3
Poor	3	3.3	2	2.2	2	2.2
7. Walking ability						
Gr. IV	24	8.6	32	34.8	54	58.6
Gr. III	32	13.0	40	43.6	28	30.4
Gr. II	32	44.8	18	19.5	8	8.6
Gr. I	4	33.6	2	2.1	2	2.1

figure is expected to be beyond 20,000 TJA by 2020 with an annual cost of \$230 million.<sup>22</sup> Various potential risk factors for persistent pain, functional limitations, and clinical dissatisfaction after successful elective orthopedic procedures are infection, instability, loosening of the prosthesis, increased waiting time for surgery,<sup>20</sup> lack of surgical information, female gender,<sup>23</sup> depression,<sup>15</sup> anxiety,<sup>6,16,24</sup> obesity<sup>19</sup> and complex regional pain syndrome.

Hudak et al.<sup>25</sup> outlined various assumptions that constrain patients against Total Joint Arthroplasties, i.e., firstly, some participants view osteoarthritis not as a disease but as normal part of aging. Secondly, despite being candidates for TJA according to medical criteria, many participants believed candidacy required a level of pain and disability higher than their current level. Thirdly, some participants believed that if they either required or would benefit from TJA, their physicians would advise surgery. For better post-surgical outcomes, these issues have to be addressed in surgeon-patient meetings pre-operatively.

The results of current study point to a conclusion that patients with active lifestyle, good preoperative walking ability, ROM and understanding of knee arthroplasty preoperatively had significant improvements in functional ability following TKA in early and late post-surgery periods as compared to patients with sedentary lifestyles with poor walking ability, knee stiffness and poor understanding of TKA ( $p < 0.01$ ). In spite of repeated attempts some patients fail to understand the intrigues of the surgical procedure probably due to their literacy levels, social tension, old age, ignorance or cognitive and comorbid limitations. These patients often have a poor preoperative walking ability and functional knee scores, are likely to be dissatisfied following TKA and involve less in post-surgical rehabilitation.

Arthroplasty surgeons must be able to distinguish between patients with sedentary lifestyles, poor preoperative knee scores and understanding who are likely to have persistent pain and clinical dissatisfaction from those that are actually

likely to improve with the joint replacement surgery. Surgeons may guide former group patients to appropriate nonsurgical interventions and physical training, allowing time for enhancing their quality of life (physical, mental and social) before they are planned for surgical intervention.

Surgeons must also incorporate and address these components into discussions with TKA candidates and educate them regarding the surgical procedure, nature of implants and how the procedure would affect their lifestyle and what their expectations from TKA should be. These crucial considerations should boost their confidence; enhance their involvement and cooperation in post-surgical rehabilitation, thereby improving their QoL, functional results and post TKA experience.

## Conclusion

TKA candidates with good preoperative walking ability and understanding of knee arthroplasty have a better quality of life (QoL) in early and late post-surgery periods. Patient's lifestyle and understanding significantly enhances the postoperative functional ability.

## Conflicts of interest

The authors declare no conflicts of interest.

## REFERENCES

1. Dash SK, Panigrahi R, Palo N, Priyadarshi A, Biswal M. Fragility hip fractures in elderly patients in Bhubaneswar, India (2012–2014): a prospective multicenter study of 1031 elderly patients. *Geriatr Orthop Surg Rehabil.* 2015;6(1):11–5.
2. Iorio R, Robb WJ, Healy WL, Berry DJ, Hozack WJ, Kyle RF, et al. Orthopaedic surgeon workforce and volume assessment for

- total hip and knee replacement in the United States: preparing for an epidemic. *J Bone Joint Surg Am.* 2008;90(7):1598-605.
3. Kurtz S, Ong K, Lau E, Mowat F, Halpern M. Projections of primary and revision hip and knee arthroplasty in the United States from 2005 to 2030. *J Bone Joint Surg Am.* 2007;89(4):780-5.
  4. Hawker G, Wright J, Coyte P, Paul J, Dittus R, Croxford R, et al. Health-related quality of life after knee replacement. *J Bone Joint Surg Am.* 1998;80(2):163-73.
  5. Dieppe P. Osteoarthritis: time to shift the paradigm. This includes distinguishing between severe disease and common minor disability. *BMJ.* 1999;318(7194):1299-300.
  6. Dieppe P, Basler HD, Chard J, Croft P, Dixon J, Hurley M, et al. Knee replacement surgery for osteoarthritis: effectiveness, practice variations, indications and possible determinants of utilization. *Rheumatology (Oxford).* 1999;38(1):73-83.
  7. Fitzgerald JD, Orav EJ, Lee TH, Marcantonio ER, Poss R, Goldman L, et al. Patient quality of life during the 12 months following joint replacement surgery. *Arthritis Rheum.* 2004;51(1):100-9.
  8. Ethgen O, Bruyère O, Richy F, Dardennes C, Reginster JY. Health-related quality of life in total hip and total knee arthroplasty. A qualitative and systematic review of the literature. *J Bone Joint Surg Am.* 2004;86(5):963-74.
  9. Mason JB. The new demands by patients in the modern era of total joint arthroplasty: a point of view. *Clin Orthop Relat Res.* 2008;466(1):146-52.
  10. Quintana JM, Escobar A, Aguirre U, Lafuente I, Arenaza JC. Predictors of health-related quality-of-life change after total hip arthroplasty. *Clin Orthop Relat Res.* 2009;467(11):2886-94.
  11. Jones DL, Westby MD, Greidanus N, Johanson NA, Krebs DE, Robbins L, et al. Update on hip and knee arthroplasty: current state of evidence. *Arthritis Rheum.* 2005;53(5):772-80.
  12. Callahan CM, Drake BG, Heck DA, Dittus RS. Patient outcomes following tricompartmental total knee replacement. A meta-analysis. *JAMA.* 1994;271(17):1349-57.
  13. Jones CA, Voaklander DC, Suarez-Alma ME. Determinants of function after total knee arthroplasty. *Phys Ther.* 2003;83(8):696-706.
  14. Singh JA, Gabriel S, Lewallen D. The impact of gender, age, and preoperative pain severity on pain after TKA. *Clin Orthop Relat Res.* 2008;466(11):2717-23.
  15. Mears DC. CORR Insights<sup>®</sup>: does preoperative psychologic distress influence pain, function, and quality of life after TKA? *Clin Orthop Relat Res.* 2014;472(8):2466-7.
  16. Utrillas-Compaired A, De la Torre-Escuredo BJ, Tebar-Martínez AJ, Asúnsolo-Del Barco Á. Does preoperative psychologic distress influence pain, function, and quality of life after TKA? *Clin Orthop Relat Res.* 2014;472(8):2457-65.
  17. Lingard EA, Katz JN, Wright EA, Sledge CB. Predicting the outcome of total knee arthroplasty. *J Bone Joint Surg Am.* 2004;86-A(10):2179-86.
  18. Núñez M, Núñez E, del Val JL, Ortega R, Segur JM, Hernández MV, et al. Health-related quality of life in patients with osteoarthritis after total knee replacement: factors influencing outcomes at 36 months of follow-up. *Osteoarthritis Cartilage.* 2007;15(9):1001-7.
  19. Nuñez M, Lozano L, Nuñez E, Segur JM, Sastre S. Factors influencing health-related quality of life after TKA in patients who are obese. *Clin Orthop Relat Res.* 2011;469(4):1148-53.
  20. Desmeules F, Dionne CE, Belzile E, Bourbonnais R, Frémont P. Waiting for total knee replacement surgery: factors associated with pain, stiffness, function and quality of life. *BMC Musculoskelet Disord.* 2009;10:52.
  21. Weinstein SL, Buckwalter JA. Rheumatic diseases: diagnosis and management. In: In: Turek's orthopaedics: principles and their application. 6th ed. Baltimore: Lippincott Williams & Wilkins; 2005. p. 154-62.
  22. Li L. British Columbia Osteoarthritis survey on 6000 patients. British Columbia Ministry of Health The Arthritis Society, BC & Yukon Division, Arthritis Research Centre of Canada; 2008 January. Available in: <http://arthritis.rehab.med.ubc.ca/files/2011/08/BCOASurvey.pdf>.
  23. Papakostidou I, Dailiana ZH, Papapolychroniou T, Liaropoulos L, Zintzaras E, Karachalios TS. Factors affecting the quality of life after total knee arthroplasties: a prospective study. *BMC Musculoskelet Disord.* 2012;13:116.
  24. Nemet GF, Bailey AJ. Distance and health care utilization among the rural elderly. *Soc Sci Med.* 2000;50(9):1197-208.
  25. Hudak PL, Clark JP, Hawker GA, Coyte PC, Mahomed NN, Kreder HJ, et al. You're perfect for the procedure! Why don't you want it?" Elderly arthritis patients' unwillingness to consider total joint arthroplasty surgery: a qualitative study. *Med Decis Making.* 2002;22(3):272-8.