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Evaluation of the Factors Affecting Concerns and Expectations of Patients Undergoing Total Knee Arthroplasty in China

Department of Orthopedics, Peking University Third Hospital, Beijing, P.R. China

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

ABCDE **Yang Li**
AD **Hong Cai**
BG **Hua Tian**
AFG **Ke Zhang**

Corresponding Author: Hong Cai, e-mail: hongcai@bjmu.edu.cn
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Background: The aim of this study was to assess the level of concern and expectations of patients and their families of total knee arthroplasty (TKA), peri-operative procedures, postoperative rehabilitation, and outcome in a Chinese population.





Material/Methods: The study recruited 133 patients with osteoarthritis, scheduled to undergo primary elective TKA. Before surgery, the surgeon completed the Hospital for Special Surgery (HSS) Knee Score questionnaire on pain, function, range of motion (ROM), and muscle strength. There were 128 patients and 127 family members (spouses, sons, or daughters) who completed the 24-item Western Ontario and McMaster University Osteoarthritis Index (WOMAC) questionnaire on pain, stiffness, and physical function, and also a 61-item questionnaire that included direct questions on their concerns and expectations on TKA and its outcome, using scores of: 1, not concerned; 2, somewhat concerned; 3, very concerned; and 4, extremely concerned.

Results: The five greatest pre-operative concerns for patients included the degree of postoperative mobility; the experience and expertise of their surgeon; the risk of failure of TKA; the duration of the joint implant; and their expected degree of postoperative independence. Scores for Chinese patients indicated a higher level of concern compared with Western patients. Family members were significantly more concerned than patients regarding the postoperative restoration of knee function and alleviation of pain ($p=0.001$), the ability to squat ($p=0.049$) and to kneel ($p=0.039$).

Conclusions: Communicating pre-operative information on TKA might result in realistic expectations for patients and their families, alleviate concerns, and improve relationships between doctors and patients.

MeSH Keywords: **Arthroplasty, Replacement, Knee • Attention • Life Expectancy**

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Background

The goals of surgeons who perform total knee arthroplasty (TKA) are to improve patient quality of life, relieve pain, restore joint function, and ensure the ability to perform knee flexion activities that improve mobility and independence in patients who suffer from osteoarthritis [1–3]. These goals are key factors that determine the clinical outcome in patients following TKA [4]. However, an important outcome following TKA should be patient satisfaction or fulfillment of pre-operative expectations [5–7].

The objective outcomes of TKA, such as range of motion (ROM) of the knee, are always limited in their ability to reflect whether or not a patient is satisfied with their treatment [4,8]. There have been several previously published studies that have shown that the preoperative expectations of the patient are strong determinants of the outcome of TKA in terms of patient satisfaction and quality of life [5,6,9–14]. Patients may have very different expectations and concerns about undergoing TKA than surgeons [4,15,16]. Consequently, more accurate information about the expectations and concerns of patients should be collected and evaluated, and the treatment process should be more effectively explained to ensure patients fully understand the surgical procedure and that they have realistic expectations of the surgical outcome before they consent to have the TKA procedure.

There have been few published studies that have specifically investigated the concerns of patients regarding TKA [17–19], but no study has focused on the expectations and concerns of Chinese patients. There are cultural differences between China and Western countries, including differences in the availability of medical information for patients and their families. Also, family duty is a traditional obligation in Chinese families, so families play a significant role in the decision to undergo medical and surgical treatments by family members, including for TKA. Family satisfaction with clinical treatment affects patient satisfaction, and when evaluating patient concerns and expectations of treatment in Chinese populations, including for surgical procedures such as TKA, the concerns and expectations of close family members should also be considered.

Therefore, the aim of this study was to assess the level of concern and expectations of TKA for patients and their families, including peri-operative procedures, postoperative rehabilitation, and outcome in a Chinese population, with the goal of reducing concerns and developing more realistic expectations.

Material and Methods

Between April and August 2010, a total of 133 patients with osteoarthritis were scheduled to undergo primary total knee

arthroplasty (TKA) and were initially recruited into the study, with their immediate family members. Patients were excluded from the study if they had other causes of disease of the knee joint, such as rheumatoid arthritis or traumatic arthritis. Patients were excluded if they were scheduled to have revision arthroplasty or a second TKA. Patients were also excluded if they had a diagnosis of osteoarthritis in other joints, such as the hips or spine.

Patients were asked to complete a questionnaire before the discussion with their surgeon and an anesthesiologist who would further explain the risks and benefits of the surgery.

The decision to undergo TKA was made by the patients and their families after discussion with their surgeon. The surgeon briefly explained the surgical procedure, the average length of stay, and the costs of treatment. An anesthesiologist further explained the risks and benefits of the surgery. Pre-operatively, for each patient, surgeons completed the Hospital for Special Surgery (HSS) Knee Score questionnaire on pain, function, range of motion (ROM), and muscle strength. Patients and their families completed the Western Ontario and McMaster University Osteoarthritis Index (WOMAC) questionnaire containing 24 items on pain, stiffness, and physical function. If patients and their family members were unable to read, a specific investigator read the questions aloud and recorded the answers, without influencing the responses.

A further three-part questionnaire was given to the patients to complete. The first part of the questionnaire included questions on patient demographics, age, gender, disease duration, living conditions (rural or urban, alone or with family), and the relationship between the patients and family members. The second part of the questionnaire included the severity of osteoarthritis according to the HSS Knee Scores and WOMAC questionnaire scores. The third part of the questionnaire included 61 items associated with patient and family concerns before surgery, with respondents asked to rate their concern on a scale from 1 to 4 that included: 1, not concerned; 2, somewhat concerned; 3, very concerned; and 4, extremely concerned.

Statistical analysis was performed using SPSS for Windows version 23.0 software (SPSS Inc., Chicago, IL, USA). A mean score was generated for each topic. The independent sample t-test and the chi-squared (χ^2) test were used to test associations between each concern and demographic factors including gender, age, and living conditions. Statistical analysis was also performed using the t-test to identify associations between concerns of patients and their family members. P-values <0.05 were considered as statistically significant.

Results

Five incomplete questionnaires by patients and six by family members were excluded from the analysis. The remaining 128 completed patient questionnaires and 127 questionnaires completed by family members were available for analysis.

The results from patients who underwent primary elective total knee arthroplasty (TKA) for osteoarthritis were analyzed. The mean age of patients was 65.4 years (range, 50–82 years); 60 patients (47%) were <65 years-of-age, and 68 patients (53%) were ≥65 years-of-age. A total of 84% of the respondents were women, and 16% were men. 91 patients (71%) lived in urban areas, and 37 patients (29%) lived in rural areas. The mean disease duration was 12.4 years (range, 0.5–30 years), the mean body mass index (BMI) was 27.6 kg/m² (range, 20.5–38.7 kg/m²). All patients in the study lived with family members. The mean Hospital for Special Surgery (HSS) Knee Score was 54.5 (range, 35–75), and the mean Western Ontario and McMaster University Osteoarthritis Index (WOMAC) score was 48.2 (range 29–64).

The 127 family members were all spouses, sons, or daughters. The mean age of family members was 46.3 years (range, 25–73 years) with 55 men (43%) and 72 women (57%). Thirty-two (25%) family members were spouses, and 95 (75%) were sons or daughters.

The scores that evaluated the level of concern regarding the outcome following TKA in 128 patients ranged from 1.50 (ability to drive a car) to 3.79 (ability to walk as much as possible), with a mean score of 3.12. The top five concerns of patients were the ability to walk as much as possible (3.79), the experience and expertise of the surgeon (3.73), the risk of failure of the surgery (3.69), the duration of the joint implant (3.64), and their expected degree of postoperative independence (3.61). The five least concerns were the ability to drive a car (1.50), the ability to resume sexual activity (1.64), the ability to lift heavy objects (2.31), the possibility of a short hospital stay (2.39), and the ability to undertake childcare (2.40) (Table 1).

No significant differences were found in the scores for concerns regarding TKA between male and female patients ($p=0.332$). However, female patients were more concerned about four items (Table 2), whereas male patients were significantly more concerned about the risk of failure of the surgery ($p<0.001$), and joint stiffness after surgery ($p=0.042$).

Patients <65 years old were more concerned about five items (Table 3) compared with patients who were ≥65 years. The significant main concerns of the older patients, compared with younger patients, included concerns about the risk of anesthesia ($p=0.027$), the experience of the anesthesiologist

($p=0.034$), and pain after surgery ($p=0.047$). No significant differences were found in the other concerns between the two age groups ($p=0.633$).

Rural patients, compared with urban patients, were more concerned with nursing care ($p=0.014$), length of surgery ($p=0.018$), and the company of family members during the hospital stay ($p=0.034$). Urban patients, compared with rural patients, were more concerned about hospital expenses ($p=0.038$).

The mean scores derived from the patient questionnaires showed that the overall mean level of concern among family members was 3.19, with a range that included 1.74 (ability to drive) to 3.87 (experience of the surgeon). The top five concerns were the experience of the surgeon (3.87), ability to walk as much as possible (3.83), the possibility that the surgery would not alleviate pain (3.75), joint stiffness after surgery (3.73), and pain after surgery (3.69). The five least concerns were the ability to drive (1.74), the ability to resume sexual activity (1.75), the ability to undertake child care (2.25), postoperative scarring (2.35), and the possibility of a shorter hospital stay (2.41). Compared with the patients, their family members were more concerned that the patients might not have their pain alleviated after surgery ($p=0.001$), and the ability to squat ($p=0.049$) and the ability to kneel ($p=0.039$). No significant differences were observed in any of the other questionnaire items between the patients and their family members ($p=0.310$).

Discussion

Total knee arthroplasty (TKA) is the main treatment for advanced osteoarthritis. However, despite advances in surgical treatment and surgical techniques, satisfaction rates range from only 82–89% among patients undergoing TKA [5,11,20–24]. The main reason for patient dissatisfaction following TKA is that patient expectations are not met following surgery [25]. Most surgeons regard positive objective outcomes, such as improved range of motion (ROM), improved knee stability, and good radiographic results, as signs of a successful outcome following TKA [4]. However, a series of studies have shown that patients and surgeons do not always agree on the presence or degree of improved quality of life after TKA [5,11,16,23,26]. Therefore, it is important to assess the concerns and expectations of patients and their family members to improve the quality of medical services as well as help ensure that patients and family members have clear and realistic expectations about TKA.

There have been some previously published studies that have reported the concerns of patients before TKA [17–19,27]. However, Chinese patients may differ from other study populations in terms of their concerns and expectations of surgical

Table 1. Mean level of concern among patients before total knee arthroplasty.

Rank	Concern	Mean	Standard deviation
1	Ability to walk as much as possible	3.79	0.57
2	Surgeon's experience	3.73	0.70
3	Failure risk of surgery	3.69	0.83
4	Lifespan of the implant	3.64	0.70
5	Ability to take care of oneself	3.61	0.70
6	Anesthesiologist's experience	3.60	0.68
7	Infections after surgery	3.60	0.82
8	Stiffness in joint after surgery	3.59	0.86
9	Risk of dislocation of the new joint	3.58	0.88
10	Risk of anesthesia	3.58	0.84
11	Pain after discharge from the hospital	3.57	0.77
12	Thrombus after surgery	3.55	0.86
13	Rejection reaction from joint materials	3.55	0.87
14	Risk of getting AIDS from a transfusion	3.52	0.95
15	Risk of getting hepatitis from a transfusion	3.48	0.91
16	Bone fracture around the new joint	3.48	0.89
17	Need to use crutches permanently	3.46	0.89
18	Chance surgery will not alleviate pain	3.43	0.82
19	Heart problems during surgery	3.43	0.98
20	Ability to go up and down stairs	3.43	0.95
21	Heart problems after surgery	3.42	0.96
22	Surgeon used the implant material I chose	3.41	0.98
23	Need to have the surgery again	3.40	1.03
24	Nursing care	3.39	0.89
25	Pain after surgery	3.40	0.87
26	Pain during surgery	3.39	0.86
27	Deformity caused by lack of rehabilitation due to pain	3.37	0.89
28	Pain during rehabilitation after surgery	3.30	0.97
29	Risk of amputation	3.30	1.15
30	Ability to get dressed and put on shoes	3.30	0.97
31	Uneven length of legs after surgery	3.23	1.11
32	Length of recovery time	3.23	0.87
33	Families' company during hospital stay	3.23	1.10
34	Ability to squat	3.22	0.91
35	Nerve problems after surgery	3.20	1.06
36	Risk of dying	3.18	1.21
37	Operation performed on the correct side	3.10	1.29
38	Cleanliness of hospital facilities	3.10	1.06
39	Sleep quality in the hospital	3.09	0.97
40	Need for blood transfusion	3.02	1.02
41	Operating room quality	2.95	1.15

Table 1 continued. Mean level of concern among patients before total knee arthroplasty.

Rank	Concern	Mean	Standard deviation
42	Physical therapy provided after surgery	2.91	1.21
43	Surgeon too young	2.90	1.00
44	Length of surgery	2.90	1.07
45	Hospitalization expenses more than expected	2.89	1.28
46	Hearing operating noises during surgery	2.80	1.25
47	Surgeon too old	2.77	1.12
48	Ability to pay all bills	2.74	1.26
49	Ability to return to recreational activities	2.73	1.13
50	Hospital food	2.66	1.01
51	Ability to ride a bike	2.62	1.27
52	Possibility of long hospital stay	2.61	1.21
53	Ability to go back to work	2.59	1.25
54	Ability to sit with legs crossed	2.59	1.15
55	Ability to kneel	2.55	1.17
56	Scar problems	2.41	1.10
57	Ability to take care of children	2.40	1.25
58	Possibility of short hospital stay	2.39	1.24
59	Ability to lift heavy objects	2.31	1.22
60	Ability to resume sexual activity	1.64	1.08
61	Ability to drive a car	1.50	0.99

Table 2. The four concerns that were significantly greater among women.

Concern	Women	Men	P-value
Surgery will not alleviate pain	3.56	2.98	0.005
Ability to take care of myself	3.73	3.12	0.019
Ability to go back to work	2.65	2.01	0.030
Pain after surgery	3.47	3.07	0.048

Table 3. The five concerns that were significantly greater among older patients.

Concern	Age <65y	Age ≥65 y	P-value
Ability to take care of children	2.94	1.89	<0.001
Ability to recreational activities	3.09	2.41	0.001
Lifespan of the implant	3.84	3.47	0.004
Ability to ride a bike	2.97	2.32	0.006
Ability to lift heavy objects	2.58	2.07	0.024

Table 4. Comparison of the top five issues of concern between the current and previous studies.

Rank	Moran et al. [13]		Trousdale et al. [12]	
	Item of concern	Concern level	Item of concern	Concern level
1	Cancellation of surgery	2.66	Ability to walk as much as possible	2.08
2	No decrease in pain	2.60	Ability to go up and down stairs	2.04
3	Risk of amputation	2.46	Pain immediately after surgery	2.03
4	Risk of joint infection	Unavailable	Length of recovery	2.03
5	Risk of dying	2.31	Risk of getting AIDS from a transfusion	1.99
Rank	Kim et al. [14]		Current study	
	Item of concern	Concern level	Item of concern	Concern level
1	Pain after surgery	3.21	Ability to walk as much as possible	3.79
2	Pain after discharge from hospital	2.92	Surgeon's experience	3.73
3	Chance surgery will not alleviate pain	2.78	Failure risk of the surgery	3.69
4	Pain during surgery	2.78	Lifespan of the implant	3.64
5	Risk of getting AIDS from a transfusion	2.69	Ability to care for oneself	3.61

* Range of scores: 1 – not concerned; 2 – somewhat concerned; 3 – very concerned; 4 – extremely concerned.

treatment [28–31]. Trousdale et al. [17], in a US population undergoing total hip arthroplasty (THA) and TKA, used a visual analog scale (VAS) with similar scoring to the present study, and only a 1.90 level of concern on 11 of 59 items. Moran et al. [18] reported that the mean concern level in the UK was 1.90 (29 items, score range: 1.21–2.66). Park et al. [19] reported a mean concern level of 1.98 among a South Korean population (65 items, score range: 1.09–3.21). The findings of the present study showed a mean level of concern of 3.12 among 128 Chinese patients, which is much higher than that reported in previous studies. This difference might be related to differences in socioeconomic status, medical systems, and differences in how various populations understand the procedure of TKA [32,33]. The majority of Chinese patients in this study had little understanding of TKA, and with the addition of the high cost of surgery and lack of medical insurance, the respondents in this study might be considered to be a very concerned population.

Differences were also found in this study between the items of most concern for Chinese patients undergoing TKA and in previously published studies that included patients in other countries. A previous study concluded that the British were more concerned with whether or not the surgery would be canceled, and with the pain and risks of the surgery [18]. Patients in the US were reported to be more concerned about the postoperative improvement in quality of life and reduction in pain following surgery [17]. Korean patients were reported to be mainly concerned about pain during and after surgery [19] (Table 4).

The Chinese patients in the present study were most concerned about the experience and expertise of the surgeon performing the TKA, and the restoration of function of the knee, but

these were not the main concerns of patients in other countries. This difference in the concerns of patients in China is likely to be due to differences in medical systems and general medical knowledge of the population. Chinese patients ranked surgeon experience as their second highest concern, but this ranked 48 out of 54, and 56 out of 65, in the United States and South Korea, respectively. This finding suggests that Chinese patients lack trust in their surgeons but also have higher expectations with regard to the outcome of the surgery, and these expectations may not be realistic.

Previous studies have reported that the main patient concern is of pain during and after TKA, but Chinese patients were less concerned with pain. Chinese patients ranked pain after delayed discharge from the hospital as 11, the chance to alleviate the pain after surgery as 18, and immediate pain after surgery as 25, respectively. The reason for these differences is not clear, but a possible explanation is that, due to the limitations of the medical system and differences in understanding the surgical procedure, Chinese patients felt that the disability due to poor knee function would affect their quality of life more than the pain of osteoarthritis.

A previous study that included female Chinese and Korean patients showed that these patients were not very concerned about the three high-flexion positions that reflect clinical outcome from TKA, namely squatting (ranked 34), crossing legs (ranked 54), and kneeling (ranked 55) [19]. Therefore, the degree of flexibility of the knee joint might not be the main patient expectation in TKA in a Chinese patient population.

The findings of the present study showed differences in patient concerns about TKA in terms of gender, age, and living environment. Female patients were more concerned about the restoration of knee function and the pain involved. Younger patients expressed more concern about the restoration of knee function and the duration of the joint implant before further replacement might be required. Older patients were concerned about their higher risk during anesthesia, and so were also concerned about the experience of the anesthesiologist. Families living in rural areas were concerned about receiving treatment in an unfamiliar city environment.

Currently, to our knowledge, there have been no previously reported studies that have investigated the concerns of family members regarding TKA. In the present study, 127 family members had similar concerns with most of the items listed by the patients, but family members were more concerned than patients about pain relief, which was ranked 18 in patients, and ranked 3 among family members. Family members were also more concerned than patients about the ability to squat and kneel (high-flexion activities) after TKA. This finding might reflect the high expectations that family members were had following TKA, that would allow for both restoration of knee function and relief of pain.

This study had several limitations. Of note, only 16% of patients were men, but this finding did reflect the fact that osteoarthritis of the knee is more common in women [34–36]. However, because the study obtained limited data about the concerns about TKA among male patients, the study findings might not reflect the concerns about TKA found in the male population in China. Also, most patients included in this study lived in areas around Beijing, so the results may not be representative of the general Chinese population. The items listed in the questionnaire were simple phrases without

elaboration, which means that patients might have interpreted the items differently, which may have affected their responses. This study only explored patient and family concerns before TKA, but some studies have shown that patient attitudes about their treatment can change following TKA and they select different items as being of concern after their pain is relieved by surgery [5,6]. Because the current study included pre-operative data, future studies should be conducted that also include analysis of postoperative concerns and attitudes by both patients and family members following TKA.

Conclusions

This study included Chinese patients who were scheduled for primary elective total knee arthroplasty (TKA) for osteoarthritis. The findings of this study showed that patients in China who were about to undergo TKA were most concerned about the restoration of knee function, the ability of their surgeon, and the quality of treatment. The overall level of concern regarding TKA was greater for patients in China compared with the findings from Western countries, as the ability to perform high-flexion activities were not the main concern of Chinese patients. Also, in China, family members were more concerned than patients about restoration of knee function after TKA. The findings of this study suggest that communication by surgeons and physicians of pre-operative information on total knee arthroplasty (TKA) might result in realistic expectations for patients and their families, alleviate concerns, and improve relationships between doctors and patients.

Conflict of interest

None.

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