CLINICAL ARTICLE

Educational Attainment Affects the Early Rehabilitation of Total Knee Arthroplasty in Southwest China

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Objective: To assess if the educational level of patients in Southwestern China will affect the functional recovery after total knee arthroplasty (TKA).

Methods: This retrospective study included a total of 334 patients (48 males, 286 females, with an average age of 68 years, range from 51 to 84 years) who had undergone primary unilateral TKA from March 2017 to April 2018. Patients were screened for enrollment and classified into four groups (illiterate group, the primary school group, high school group, and university group) according to their educational attainment. All patients were monitored for at least 2 years after TKA. The primary outcome was determined using the Hospital for Special Surgery knee (HSS) score at the time of follow-up. The secondary outcomes were determined using the 12-Item Short Form Health Survey (SF-12) and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores, the satisfaction level, and complications of the surgery.

Results: Three hundred and thirty-four patients were divided into four groups based on their highest educational level: 83 patients in the illiteracy group, 84 in the primary school group, 91 in the high school group, and 76 in the university group. They were followed up for at least 2 years. For the primary outcome, patients with high school and university education had noteworthy better HSS scores on the surgical-side knee than those in the primary school and illiterate groups (illiteracy group 86.71 ± 5.94 *vs* primary school group 85.36 ± 5.88 *vs* high school group 89.48 ± 3.66 *vs* university group 88.95 ± 3.55; $P < 0.05$). For secondary outcomes, the mental component summary (MCS) in the university group was significantly lower than the other three groups ($P < 0.05$). The results of WOMAC scores were consistent with the results of the HSS score: patients in the university group and the high school group had better results when compared with the other two groups ($P < 0.05$). There were no statistical differences in the comparison of additional indicators and complications among the four groups, but more patients (12 peoples, 15.8%) in the university group were dissatisfied with knee function after TKA.

Conclusion: In Southwest China, patients with high school education or above can achieve better joint function after TKA but do not get better postoperative satisfaction, which may be related to the patients' higher surgical expectations for social and mental needs.

Key words: Early rehabilitation; Education; Total knee arthroplasty

Introduction

Total knee arthroplasty (TKA), as an effective treatment for end-stage knee disease, has been routinely carried out for more than 40 years, and the use of knee arthroplasty continues to grow worldwide[1]. In the UK, more than 100,000 knee replacements are now performed each year, and many joint registries around the world have reported a similar increase in frequency. The total number of operations

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Received 18 May 2020; accepted 23 August 2020

in the United States has now reached 700,000 per year, and there are nearly 300,000 in China each year. It is estimated that by 2030, the annual number of TKA in the USA will reach 3.48 mn[1, 2]. TKA offers substantial improvements for patients as measured by functional status and quality of life. Although TKA has brought numerous benefits to patients, about 20% of patients are still dissatisfied with the outcome of the operation[3–5]. There are various factors that may affect the result of TKA, such as older age, female gender, low income, high body mass index (BMI), and so on[6, 7]. Ross *et al.* pointed out that the socioeconomic status of patients is an important determinant of surgery-related health outcomes, but the role in joint replacement is poorly understood[8]. Some scholars believe that socioeconomic status is determined by three factors: an individual's occupation, income, and the highest level of education obtained[9]. The level of education of patients appears to have an impact on occupation and income. Some studies have shown that patients with higher education after joint replacement surgery have better functional outcomes than patients with lower education, credited with better social support, coping skills, and better ability to process and apply medical information[10]. Nevertheless, some researchers deny that there is a correlation between education level and postoperative function of patients[11]. Therefore, it is controversial whether the educational level of patients will affect the functional recovery after joint replacement. Some works of literature point out that in poor communities in the UK and the USA, patients with higher schooling levels perform better after TKA than those with lower education levels because they have access to more medical resources[6, 12]. Since there is no sharp distinction between poor and rich communities in China, these findings do not apply to Chinese patients.

Southwest China covers an area of 2.5 mn km^2, with more than 200 mn residents and many mountains and hills. Most of the residents rely on intense physical farming as their main source of income. Although there is no exact statistical data at present, we believe that the incidence of knee osteoarthritis is higher in this area than in other regions. At present, more and more patients receive TKA to relieve their knee joint pain. The number of primary TKA surgeries in our institution (the largest public hospital in Southwest China) has exceeded 1000 per year. Therefore, it is very important to study the relevant factors that may affect the effect of patients' surgery. Coupled with the development process and national conditions of China, at present most of the patients undergoing knee arthroplasty in our institutions are older than 65 years of age, and a considerable number of them have only received low-level education or no education. By consulting the former studies, we found that the education level of patients in these studies is too broad. Most of them take high school or university as the dividing line. Patients with lower academic qualifications are not considered to be independent research units[6, 12, 13].

Until now, it was difficult to know whether the level of education had an impact on the postoperative outcome of patients in Southwest China. Regarding the existing research results, we hypothesized that the education level will affect the functional recovery of patients after TKA. Therefore, we designed this retrospective cohort study to observe: (i) whether educational attainment has an impact on the function of patients after TKA in Southwest China; (ii) how education level affects patients' function after TKA; and (iii) what level of education can bring patients better knee function after TKA.

Materials and Methods

Inclusion and Exclusion Criteria

The inclusion criteria included: (i) hospitalized patients over the age of 18 years with intact cognitive function, (ii) patients who were scheduled for primary unilateral TKA for osteoarthritis of the knee in the Department of Joint Surgery of West China Hospital; (iii) patients with intact medical records for paralleled comparison among different educational attainments; (iv) the clinical outcomes could be evaluated by functional improvements, patient-reported scales, complication, as well as patients' satisfaction; and (v) a design which was consistent with a retrospective study. Exclusion criteria included: (i) revision procedures; (ii) previous knee surgery; (iii) bilateral procedures at the same term; (iv) flexion deformity of ≥30°; (v) varus–valgus deformity of ≥30°; (vi) non-osteoarthritis knee joint disease such as rheumatoid arthritis, traumatic arthritis, and so on; (vii) American Society of Anesthesiologists (ASA) grade IV.

Patients and Groups

This retrospective cohort study was authorized by the Regional Ethics Committee of West China Hospital, Sichuan University between March 2017 and April 2018. During this time, the educational level of each patient at our institution was registered in their files. We divided the patients into four groups depending on their educational attainment. Patients who had never been educated were placed in the illiterate group, the other patients were separated into the primary school group, high school group, and university group according to their highest educational level.

Surgery Process and Perioperative Management

Anesthesia and Position

All patients who underwent TKA were given general anesthesia. Patients were placed in supine position for the surgery.

Approach, Exposure, and Main Surgery Process

All of the surgeries were performed by the same group of senior doctors. Tourniquet or postoperative drain were not used. The operations were done in the standard way, using a midline skin incision and a medial parapatellar approach. During the surgery, intramedullary guides were used for all femoral preparations, and extramedullary guides were used for the tibial preparation. After completing the osteotomy, a single brand of cemented posterior-stabilized prosthesis

(DePuy Synthes, Johnson, and Johnson) was utilized. Local infiltration analgesia (LIA) with 0.25% ropivacaine was implemented before suturing the wound.

Perioperative Management

All patients in this study had the same enhanced recovery after surgery (ERAS) protocol. Patients' education for analgesia and rehabilitation was performed by one certain nurse before the surgery. Patients received 200mg celecoxib (Celebrex, Pfizer) two times a day, 2 days before the operation until 2 weeks after surgery. All patients underwent a saphenous nerve block by 30 mL of 0.33% ropivacaine with the help of ultrasound guidance in the operation room before general anesthesia. All of the patients received tranexamic acid (20 mg/kg) intravenously 10 min before the surgery, and then 1g of tranexamic acid intravenously 3 and 6 h after the operation. All of the patients received a standardized thromboembolism prophylaxis protocol, consisting of a subcutaneous injection of 2000 IU enoxaparin sodium (Clexane, Sanofi) 8 h postoperatively and then one time a day (4000 IU); besides, 10 mg rivaroxaban (Xarelto, Bayer) was prescribed for 10 days after discharge. A physical rehabilitation nurse guided the rehabilitation training of all enrolled patients, including knee functional training on the bed, walking with the walker, and daily life training.

Outcome Measures

Patients

Patient's demographics included age, sex, ASA (American Society of Anesthesiologists) classification, body mass index (BMI), and operative side. These data were collected and calculated using international practice.

Function of the Knee, Quality of Life, Satisfaction, and Complications

We used the Hospital for Special Surgery knee score (HSS score) and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) to assess the knee function of patients at the time of follow-up. Quality of life was measured by the 12-Item Short Form Health Survey (SF-12). The satisfaction level and complications of the surgery were also recorded. All of the data were gathered by one attending physician in the outpatient department.

Hospital for Special Surgery (HSS) Knee Score

The HSS knee score evaluation criteria are used for knee joint function assessment. The HSS score system includes seven aspects: pain, function, range of motion, muscle strength, deformity, stability of the knee, and points reduction projects, indicating the overall function of the knee joint surgery. A score of 85–100 is excellent, 70–84 is good, 60–69 is acceptable, and below 60 is poor. The HSS score was recorded at the time of admission and at the follow-up time point.

Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)

The WOMAC score is a commonly used, proprietary set of standardized questionnaires used by health professionals to evaluate the condition of patients with osteoarthritis of the knee and hip. It consists of three subscales: pain (five questions, score range 0–20), stiffness (two questions, score range 0–8), and physical function (17 questions, score range 0–68). These are recorded before the operation and at the follow-up time point. Patients with higher scores have worse knee function.

12-Item Short Form Health Survey (SF-12)

The SF-12 scale is a multipurpose, concise scale used to assess the quality of life of patients. With this instrument, Physical Component Summary (PCS) and Mental Component Summary (MCS) could be obtained to evaluate the physical and mental health status of patients, respectively. Both PCS and MCS are considered to be better with a higher score. The SF-12 was also assessed before the operation and at the follow-up session.

Satisfaction

The satisfaction level of patients was recorded by the method of Mahomed and his colleagues and divided into four levels: very satisfied, somewhat satisfied, somewhat dissatisfied, and very dissatisfied[14].

Complications

Complications include residual pain, periprosthetic infection, aseptic loosening, instability of the knee, patellar complication, and periprosthetic fracture. This information was collected and recorded during patient follow-up. Whether the patient has complications was judged comprehensively by the attending physician who collected the data based on the patient's medical history, symptoms, and imaging examination.

Statistical Analysis

Data were analyzed using SPSS (version 22.0; IBM, Armonk, NY, USA). Continuous data were available as the mean and standard deviation (SD). One-way analysis of variance (ANOVA) with *post hoc* Tukey test was used for normally distributed continuous variables, and the *post hoc* Dunnett T3 test was used for skewed continuous variables. Categorical data were reported as the number and statistical analysis of categorical variables and were analysed using the chi-squared or Fisher's exact tests. Statistical significance was established as $P < 0.05$.

Results

Patients

From March 2017 to April 2018, a total of 390 patients scheduled for a primary unilateral TKA were screened. Fifty-six patients were excluded due to the exclusion

criteria, and the remaining 334 eligible participants were enrolled. There were 83 patients in the illiteracy group, 84 in the primary school group, 91 patients in the high school group, and 76 in the university group. The patients were tracked for at least 2 years. No significant differences were identified among the four groups concerning the patients' baseline demographic variables and perioperative characteristics (Table 1).

TABLE 1 Baseline characteristics and perioperative demographics

Variables	Illiteracy (*n* = 83)	Primary School (*n* = 84)	High School (*n* = 91)	University (*n* = 76)	*P* values*
Age (yr)	68.52 ± 6.62	66.87 ± 7.05	67.81 ± 7.24	69.03 ± 5.46	0.187
Female sex (no.)	77	73	74	62	0.115
Operative side (no.)					0.102
Right	34	34	42	44	
Left	49	50	49	32	
Height (m)	1.60 ± 0.69	1.61 ± 0.75	1.62 ± 0.79	1.62 ± 0.85	0.431
Weight (kg)	59.37 ± 9.99	61.68 ± 10.82	61.47 ± 11.92	62.13 ± 10.63	0.379
BMI (kg/m^2)	23.82 ± 3.24	23.65 ± 3.06	23.40 ± 3.23	23.56 ± 3.07	0.849
ASA class (no.)					0.572
I	12	9	14	9	
II	58	64	69	60	
III	13	14	8	7	
Preoperative knee function					
HSS	53.64 ± 7.41	54.79 ± 8.47	55.70 ± 8.32	55.55 ± 9.33	0.367
SF-12					
PCS	13.00 ± 3.55	12.96 ± 3.67	13.98 ± 2.64	13.62 ± 3.01	0.094
MCS	19.73 ± 3.80	19.44 ± 3.27	19.90 ± 4.23	18.84 ± 2.26	0.112
WOMAC	45.51 ± 13.12	45.27 ± 16.00	45.13 ± 9.98	49.13 ± 14.46	0.216
Surgical duration (min)	69.13 ± 14.18	67.51 ± 14.29	68.04 ± 15.05	64.58 ± 16.50	0.267
Postoperative hospital stay (day)	3.22 ± 1.08	3.08 ± 0.70	3.02 ± 0.65	3.39 ± 1.13	0.065

ASA, American Society of Anesthesiologists; BMI, Body Mass Index; HSS, Hospital for Special Surgery (HSS) knee score; MCS, Mental Component Summary; WOMAC, The Western Ontario and McMaster Universities Osteoarthritis Index.; PCS, Physical Component Summary; SF-12, The 12-Item Short Form Health Survey.; * The *P* value represents the result of one-way analysis of variance for independent means for continuous variables and the chi-squared test or Fisher's exact tests for categorical variables among the three groups. The values are given as the mean and the standard deviation or the number of patients.

TABLE 2 The knee function, quality of life, patient satisfaction and complications

Variables	Illiteracy (*n* = 83)	Primary School (*n* = 84)	High School (*n* = 91)	University (*n* = 76)	*P* values*
Postoperative knee function					
HSS	86.71 ± 5.94	85.36 ± 5.88	89.48 ± 3.66	88.95 ± 3.55	<0.001
SF-12					
PCS	20.92 ± 3.04	21.20 ± 1.96	20.93 ± 2.79	20.43 ± 2.45	0.311
MCS	26.01 ± 2.48	25.86 ± 1.55	26.31 ± 2.11	24.73 ± 2.64	<0.001
WOMAC	20.66 ± 11.68	18.71 ± 8.76	15.09 ± 6.73	15.71 ± 5.08	<0.001
Satisfaction level (no.)					0.903
Very satisfied	40	36	42	35	
Somewhat satisfied	33	39	35	29	
Somewhat dissatisfied	9	7	11	8	
Very dissatisfied	1	2	3	4	
Complications (no.)					
Residual pain	2	3	1	2	0.765
Periprosthetic infection	0	0	0	0	-
Aseptic loosening	0	0	0	0	-
Instability of the knee	1	0	0	1	0.362
Patellar complication	3	2	2	3	0.875
Periprosthetic fracture	0	0	0	0	-

HSS, Hospital for Special Surgery (HSS) knee score; MCS, Mental Component Summary; PCS, Physical Component Summary; SF-12, The 12-Item Short Form Health Survey; WOMAC, The Western Ontario and McMaster Universities Osteoarthritis Index; * The *P* value represents the result of one-way analysis of variance for independent means for continuous variables and the chi-squared test or Fisher's exact tests for categorical variables among the three groups. The values are given as the mean and the standard deviation or the number of patients.

TABLE 3 The differences in postoperative HSS, MCS and WOMAC

Variable	Illiteracy	Primary School	High School	University	*P* Value*
Postoperative HSS†	86.71 ± 5.94	85.36 ± 5.88	89.48 ± 3.66	88.95 ± 3.55	<0.001‡
Post-hoc test					
Illiteracy		1.35(−1.08 to 3.79) *P* = 0.594	−2.77(−4.79 to −0.75) *P* = 0.002‡	−2.24(−4.29 to −0.19) *P* = 0.025‡	
Primary School	−1.35(−3.79 to 1.08) *P* = 0.594		−4.13(−6.12 to −2.13) *P* < 0.001‡	−3.59(−5.62 to −1.56) *P* < 0.001‡	
High School	2.77 (0.75 to 4.79) *P* = 0.002‡	4.13(2.13 to 6.12) *P* < 0.001‡		0.54(−0.95 to 2.02) *P* = 9.14	
University	2.24(0.19 to 4.29) *P* = 0.025‡	3.59(1.56 to 5.62) *P* < 0.001‡	−0.54(−2.02 to 0.95) *P* = 9.14		
Postoperative MCS†	26.01 ± 2.48	25.86 ± 1.55	26.31 ± 2.11	24.73 ± 2.64	<0.001‡
Post-hoc test					
Illiteracy		0.15(−0.52 to 0.83) *P* = 0.652	−0.30(−0.96 to 0.37) *P* = 0.381	1.28(0.58 to 1.97) *P* < 0.001‡	
Primary School	−0.15(−0.83 to 0.52) *P* = 0.652		−0.45(−1.11 to 0.21) *P* = 0.181	1.12(0.43 to 1.81) *P* = 0.002‡	
High School	0.30(−0.37 to 0.96) *P* = 0.381	0.45(−0.21 to 1.11) *P* = 0.181		1.57(0.89 to 2.25) *P* < 0.001‡	
University	−1.28(−1.97 to −0.58) *P* < 0.001‡	−1.12(−1.81 to −0.43) *P* = 0.002‡	−1.57(−2.25 to −0.89) *P* < 0.001‡		
Postoperative WOMAC†	20.66 ± 11.68	18.71 ± 8.76	15.09 ± 6.73	15.71 ± 5.08	<0.001‡
Post-hoc test					
Illiteracy		1.95(−2.31 to 6.21) *P* = 0.78	5.57(1.67 to 9.48) *P* = 0.001‡	4.95(1.18 to 8.72) *P* = 0.004‡	
Primary School	−1.95(−6.21 to 2.31) *P* = 0.78		3.63(0.46 to 6.79) *P* = 0.016‡	3.00(0.018 to 5.99) *P* = 0.048‡	
High School	−5.57(−9.48 to −1.67) *P* = 0.001‡	−3.63(−6.79 to −0.46) *P* = 0.016‡		−0.62(−3.06 to 1.81) *P* = 0.983	
University	−4.95(−8.72 to −1.18) *P* = 0.004‡	−3.00(−5.99 to 0.018) *P* = 0.048‡	0.62(−1.81 to 3.06) *P* = 0.983		

* From 1-way analysis of variance for independent means for continuous variables among the 4 groups.; † The values are given as the mean and standard deviation.; ‡ Significant.; § The values are given as the mean difference, with the 95% confidence interval in parentheses; *P* values from analysis with use of the post-hoc Tukey test or Dunnett T3 test.

Follow-Up

All of the 334 patients have been followed up for at least 2 years in the outpatient department after the operation by an attending physician. The data of HSS score, SF-12 score, and WOMAC score were also collected at that time.

Function of the Knee

A noteworthy difference in the HSS score was found among the four groups. Patients with high school and university education had better HSS scores on the surgical-side knee than those in the primary school and illiterate groups (illiteracy group 86.71 ± 5.94 *vs* primary school group 85.36 ± 5.88 *vs* high school group 89.48 ± 3.66 *vs* university group 88.95 ± 3.55, $P < 0.001$). When compared between groups, the HSS scores of the high school group and the university group were significantly higher than those of the illiterate group and the primary school group, but there was no statistically significant difference when compared between the primary school group and the illiterate group ($P = 0.594$); the results of the comparison between the high school group and the university group were also similar ($P = 9.14$) (Tables 2 and 3).

For the WOMAC score, the results were consistent with the results of the HSS score. Patients in the university group and high school group had better results when compared with the other two groups (for the university group, $P = 0.004$ when compared with the illiterate group, $P = 0.048$ compared with the primary school group, and $P = 0.983$ compared with the high school group) (Tables 2 and 3).

Quality of Life and Satisfaction

There was no statistically significant difference between the four groups of physical component summary (PCS) scale in SF-12, $P = 0.311$. But the mental component summary (MCS) in the university group was significantly lower than the other three groups ($P < 0.001$ compared with the illiterate group, $P = 0.002$ compared with the primary school group, and $P < 0.001$ compared with the high school group). There was no statistically significant difference among the three groups (Tables 2 and 3).

Although there was no statistically significant difference between the four groups in patient satisfaction, more patients (12 people, 15.8%) in the university group were dissatisfied with knee function after TKA (Table 2).

Complications

Some patients complained of chronic pain in the operated knee during follow-up (two in the illiteracy group, three in the primary school group, one in the high school group, and two in the university group), but it did not affect daily life, and those patients occasionally needed to take non-steroidal anti-inflammatory analgesics. One patient in the illiterate group and the university group had knee joint instability after the operation, and good treatment results were obtained by wearing a brace. There were also a small number of patients in each group who had postoperative patella complications, such as patella bounce and friction, but neither affected joint function nor required special treatment. In a comparison of these complications among the four groups, the difference was not statistically significant (Table 2).

Discussion

Possible Reasons for the Influence of Educational Level on Patients' Functional Rehabilitation after TKA

Our results showed that patients with high school education and above had a better joint function after TKA than those who are illiterate or only received primary schooling. However, there was no significant difference in postoperative HSS score between the high school group and the university-educated group. WOMAC score showed a similar trend, but unlike the HSS score, patients with high school education showed the best WOMAC score. These data showed that patients with high school education or above could achieve better postoperative function, which is in agreement with the results of most of the existing literature[9, 10, 12, 13]. There may be other reasons for these results in addition to education level being related to the social and economic status of patients and the medical resources available to them.

Unlike THA, patients after TKA need to make more effort to improve joint function. Preoperative education is directly related to patients' good postoperative function[15–17]. Different from the medical systems in many economically developed countries, China does not have enough community doctors and physiotherapists for postoperative rehabilitation. Functional training after TKA is mainly guided by doctors and nurses during hospitalization, including face-to-face guidance, video, and written materials. From our clinical experience, patients with higher education gain a better understanding of the guidance. At the same time, highly educated patients can learn more through other channels such as the internet and via smartphones, which is also conducive to functional recovery after TKA. Billon *et al.* found that patients who were younger and more educated had a better ability to acquire knowledge[18]. At the same time, some studies have noted that patients with higher education may choose surgery at a relatively younger age, which is beneficial to gain more relevant knowledge and better postoperative recovery[13]. But there was no significant difference in the age of patients among different groups in this study, which may be due to the fact that, although some patients in the higher education group choose surgery earlier, more patients with higher education choose to take TKA at a higher age than patients in the lower education groups. We found that among patients over 80 years of age who underwent TKA, those with high education accounted for the majority of cases.

Family rehabilitation is a unique situation in China, due to the lack of sufficient community medical resources and rehabilitation therapists. The main place of postoperative functional training for Chinese patients is at home, where there is no professional supervision and guidance. Although it has been pointed out in prior studies that people with higher education have better social support conditions, this

is not the case in China. The family members of highly educated patients are often highly educated and full-time workers, and do not get much time to help and supervise patients with their postoperative rehabilitation training. Compared with THA, home-based rehabilitation training after TKA requires patients to have more courage and devote more effort. We believe that another reason why highly educated patients can achieve better postoperative function is that highly educated patients have higher self control and clearer training goals during rehabilitation training, which can help them achieve better training results.

Excessive Surgical Expectations for Highly Educated Patients May Affect Satisfaction

We also found an interesting phenomenon, that although highly educated patients had better knee joint function after TKA, they were not pleased with the operation. We consider that it may be because the highly educated patients' preoperative life was more colorful than the less-educated patients, and the joint pain affects their pursuit of this high quality of life; as they are more eager for TKA to allow them to continue to enjoy their lifestyle, they have higher expectations for surgery and dissatisfaction after their operation may be magnified[19,20]. Yang *et al.* reported that Chinese patients have higher expectations for surgery than Western patients[21]. From the results of the Mental Component Summary in SF-12, we can speculate that patients with higher education hope to complete more social activities in their daily life, but this demand is often not met in the rehabilitation stage after TKA, which may be the reason why those with higher education do not achieve higher satisfaction, despite having a better postoperative function. Of course, this is only the result of our regional population study and does not represent a wider patient group; however, this result is very interesting and worthy of discussion and further study.

Limitations of the Study

In this research, we have conducted a stratified study on illiterate patients and patients with the highest scholastic background of primary school, high school, and university, which can supplement the existing research results. The results of this study confirm that patients with high school education and above in Southwest China can achieve better joint function than those who are illiterate or have only received primary school education. The results indicate that for patients with low academic qualifications, surgeons should devote more energy and patience to their rehabilitation after TKA. There are likewise some limitations to this study. First, this study is a retrospective cohort study and the sample size is only 334 cases; however, we still obtained relatively accurate data and meaningful results, and these results can guide our clinical work. Second, the follow-up time in this study was not very long, but by consulting the former studies, most of the postoperative follow-up times of functioning and satisfaction after TKA were 2 years or less. Many researchers believe that patients can basically recover to their pre-operative mobility 3–6 months after TKA, and from 6 months to 2 years after the operation, the joint function is still in a stage of gradual change; in turn, the functional recovery time lasts until 2 years after the operation[22, 23]. Therefore, we chose 2 years as the follow-up node, which is long enough to evaluate the knee function of patients after TKA.

Conclusion

In conclusion, we found that in Southwest China, patients with high school education or above can achieve better joint function after TKA than illiterate and primary school educated patients. However, highly educated patients do not get better postoperative satisfaction which may be related to the patients' higher surgical expectations of their social and mental needs. Doctors should formulate different guidance strategies according to different cultural levels of patients to help them get a better postoperative function. This issue requires further study with larger sample size and longer follow-up period.

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