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Patient reported satisfaction following 1578 primary total knee arthroplasties in different ethnic groups in Leicester: are Caucasian patients more satisfied?

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ABSTRACT

Background: Several non-UK and non-European studies, have suggested differences in post-operative outcome measures, including patient satisfaction, following total knee arthroplasty (TKA) when assessed against ethnicity. The aim of our study was to assess patient reported satisfaction following primary TKA in an ethnically diverse part of the UK, Leicestershire, to find out whether the Caucasian patients were more satisfied compared to non-Caucasians.
Methods: Using our regional joint Registry, the Trent and Wales Arthroplasty Audit Group (TWAAG) registry, a retrospective analysis of the prospectively collected patients' reported satisfaction following primary TKA was performed. 1578 patients from Leicester province who had undergone their first TKA in Leicester between 1990 and 2007, and who had responded to their 12 month validated post-operative questionnaires were included.
Results: Overall patient reported satisfaction was 87.6%. Patient satisfaction was 87.7% in 'British White', 92.4% in 'Other White', 83.5% in 'Indian/Pakistani' population. When categorising patient ethnicity to ethnic groups, reported satisfaction was 88.1% in the 'Caucasian' group and 83.4% in the 'non-Caucasian' groups. Fisher's exact test did not indicate a statistically significant difference in the reported satisfaction between these ethnic groups.
Conclusions: In our study, ethnicity was not a significant attributing factor in patient reported satisfaction following primary TKA.

Keywords: Patient satisfaction, Total knee arthroplasty, TKR, Ethnicity, Ethnic groups

INTRODUCTION

Total knee replacement (TKR) is one of the most common operations in orthopaedic surgery and although it is widely accepted as an effective procedure for improvement of pain and function in patients with rheumatoid or osteoarthritic knees it is not always a complete success.[1-3]

Amongst the different means of evaluating total knee arthroplasty (TKA), patient reported satisfaction following surgery has gained significant importance.[1-15] It has become clear that the traditional clinical and radiological features of a successful TKA and lack of surgical complications, will not necessarily correlate to satisfactory patient-reported outcome measures, (PROMS).[1,2] It has also been shown that functional outcomes do not necessarily correlate with patient satisfaction.[7,14]

Reported patient satisfaction following TKA in the current literature is variable however up to 20% of patients are not satisfied with their outcomes.[6,13,14] Patient reported outcome measures (PROMs) figures reported in the 10th annual report of the National Joint Registry for England, Wales and Northern Ireland, suggested that

83.6% of patients had good, very good or excellent satisfaction following their primary total knee replacement (TKR) surgeries. In other words, 16.4% of patients reported fair to poor overall satisfaction.

Although one of the most significant causes of dis-satisfaction following TKA is residual pain following surgery, patient satisfaction is a multifactorial outcome.[1] Understanding patients' expectations from surgery and ensuring that they are realistic and achievable before offering surgery, directly affects their satisfaction and compliance after TKA.[9,11,14-16]

Patient ethnicity has been suggested to have an impact on the outcome measures following TKR surgery.[3,17-18] Studies from USA have shown marked differences in the demographics and outcomes between Afro-Caribbean, Hispanic and Caucasian populations in North America.[20-22] On the other hand in a Canadian study, 551 patients from different ethnicities including Caucasians, South Asians (India, Pakistan, Bangladesh and Sri Lanka) and East Asians (China, Japan, Taiwan and Korea) were followed up prospectively.[19] They used three scoring systems prior to surgery and 1-2 years post operatively and identified the negative prognostic factors on the scoring systems. In their study, Ethnicity did not show a negative correlation for any of the scoring systems.

There is paucity in the ethnicity based studies evaluating the role of ethnicity following primary TKA in the UK. The only relevant ethnicity related study, is a study from Birmingham, which evaluated the ethnic differences in preoperative function of patients undergoing total knee arthroplasty.[17] They compared 63 patients from Asian origin with 63 Caucasian patients who were age, gender matched. The authors concluded that the Asian patients had lower preoperative 'Knee Society Clinical Rating System results' compared with the Caucasian patients.

Due to the ethnically diverse population in Leicester, we undertook this study with the objective of improving the limited available English literature on patients reported satisfaction following their first primary TKA in different ethnic groups. The "hypothesis" of this study is that Caucasian patients have higher reported satisfaction following primary TKA".

METHODS

We performed a retrospective analysis of prospectively collected data from our regional joint register, the Trent and Wales Arthroplasty Audit Group (TWAAG). As part of the TWAAG data collection process, standardised validated Questionnaires were posted to patients; 12 months post-operatively.[23]

The TWAAG database provided demographic (apart from ethnicity) and procedure related information including the type of implant used, BMI, degree of surgeon (Consultant, Registrar, Others including staff grade surgeons), type of implant used (PFC-CR; DePuy, PFC-PS; Depuy, Nexgen-CR; Zimmer, Nexgen-PS; Zimmer and PCA Stryker), whether or not patella resurfacing was also performed, intra-operative complications.

We included patients who underwent their operative management in Leicester, primarily due to the fact that Leicester has one of the most ethnically diverse populations in the UK with "Indian" ethnicity being the largest ethnic minority followed by "White Other" (Non-British white ethnicity). Inclusion of patients who had their TKR in Leicester, also enabled us to match ethnicity on the investigation result system (ICE system) as the original TWAAG database did not include patient ethnicity. The ethnic categories and collection in the ICE system was based on Data Set Change Notice (DSCN) guidance which is standard across the NHS. Patients' ethnicity was recorded as British, Irish, Other White, Indian, Pakistani, Other Asia, African and Afro Caribbean.

From patients who had their first primary TKA in one of the Leicester hospitals between 1990 and 2007 and had responded to their post-operative questionnaires including their post-operative satisfaction report, patients who had bilateral non-simultaneous TKA were selected and were analysed for their first side TKA.

A study from Hepinstall et al examined the effect of patient attributes on expectations before TKA.[24] In their study sample of 1943 patients who completed an "expectations survey" before TKA, a history of a previous joint arthroplasty was associated with significantly lower expectations as compared to patients without a prior joint arthroplasty.

To eliminate the effects of previous TKA we analysed patients reported satisfactions following their first primary TKA. To achieve this we identified patients who had bilateral non-simultaneous TKA, and included patients following their first side primary TKA in the analysis.

Ethics, registration, funding and conflicts of interest

All of the patients in the TWAAG dataset had given formal written consent for the use of their data for research purposes at the beginning of data collection process. Although ethical approval had been granted for utilising the dataset for research purposes by Leicester University Ethics Committee, this project was separately enrolled as a service evaluation project to University Hospitals of Leicester Audit and Development department and their permission was sought prior to starting the project. Our electronic database was password encrypted and anonymous to patients and operating surgeons.

There was no internal and external funding provided for this study and none of the authors had any personal or financial interest in the project.

RESULTS

From the start of TWAAG data collection in 1990 until the end of 2007, a total of 43708 primary total knee arthroplasties were performed in the Trent and Wales region. Although a postal questionnaire was sent to all of these patients 12 months post-operatively, the electronic data from these questionnaires at the time of our data collection was available for 25914 cases. We only included patients who had bilateral non-simultaneous TKA, who had responded to their post-operative questionnaires and for whom we could identify their ethnicity. A total number of 1578 patients (872 female, 706 male), was therefore included and analysed for their first primary TKA. The mean age at the time of TKA was 68.8 years (SD, 8.4) ranging from 19 to 96 years. Table 1 summarises the demographics of the patients.

Table 1: Number and percentage of patients in each ethnicity, gender and mean age at the time of TKA.

Ethnicity	Number of patients	Percentage (%)	Number of Female	Number of Male	Mean age at TKR
British	1259	76.9	676	583	68.9
Any other white	132	8.0	82	50	71.9
Indian/Pakistani	170	10.4	104	66	65.5
Any other Asian	4	0.2	2	2	67.5
African/Caribbean	11	0.7	6	5	67.7
Any other ethnicity	2	0.1	2	0	69
Total	1578	100	872	706	68.8

Table 2: Patient reported satisfaction following first primary TKA in different ethnicities.

Ethnicity	Pleased n (%)	Not pleased n (%)	Unsure n (%)	Total
British	1104 (87.7)	69 (5.5)	86 (6.8)	1,259
Any other white background	122 (92.4)	2 (1.5)	8 (6.0)	132
Indian/Pakistani	142 (83.5)	17 (10.0)	11 (6.5)	170
Any other Asian	4 (100)	0	0	4
African/Caribbean	9 (82.0)	2 (18.0)	0	11
Any other ethnic group	1	1	0	2
Total	1,382 (87.6)	91 (5.8)	105 (6.6)	1,578

Table 3: Number and percentages of patients in each ethnic group, gender and mean age at the time of TKA.

Ethnicity	Number of patients	Percentage (%)	Number of Female	Number of Male	Mean age at TKR
Caucasian	1391	85.0	758	633	69.2
Non-Caucasian	187	11.4	112	75	65.7

Overall satisfaction/pleasure

Of the 1578 patients operations which were performed in total, 1382 patients (87.6%) reported to be pleased. 91 patients (5.8%), were not pleased and 107 (6.5%) reported to be unsure about their satisfaction. The reported satisfaction (Pleased, Not pleased and Unsure) in each ethnicity is shown in Table 2.

Patient reported satisfaction/pleasure following TKR based on ethnicity

The reported satisfaction following primary TKA was 87.7% for 'British Whites', 92.4% for 'Other Whites', and 83.5% for 'Indian/Pakistani' population. When ethnicity was divided in three main ethnic subgroups, 'Caucasians' (British Whites and Other whites), and 'non-Caucasians', the reported satisfaction rates was 88.1% and 83.4% respectively. Table 3 shows the demographic details of patients in the ethnic groups.

A two tailed Fisher's exact test was performed to detect if satisfaction varies significantly amongst different ethnic groups. Satisfaction was categorised in two groups, satisfied and not-satisfied (which included the patients who reported to be unsure) and was compared between each ethnic group. The Fisher exact test did not show statistically significant differences between 'British White', 'Other White', and 'Indian/Pakistani' ethnicities (Table 4). Similar significance test was performed when

ethnicity was categorised to 'Caucasians', and 'Non Caucasians'. This again did not show any significant differences between these ethnic categories (Table 4).

Table 4: P values of the two tailed Fisher exact tests to examine the differences in satisfaction between main ethnicities and ethnic groups.

Ethnicity	'P value' of two tailed Fisher's exact test
British White vs Other White	0.12
British White vs Indian/Pakistani	0.20
Caucasian vs Indian/Pakistani	0.11
Caucasian vs Non-Caucasian	0.08

Table 5. Logistic regression showing no significant association between ethnicity and reported satisfaction.

Logistic regression (satisfaction and ethnicity)						
Ethnic group	**N**	**Coefficient**	**P value**	**Odds ratio**	**95% CI**	
British	1,259	-	-		-	-
Other white background	132	0.53	0.11	1.71	0.88	3.33
South Asian (Indian/Pakistani)	170	-0.34	0.13	0.71	0.46	1.10
African/Caribbean	11	-0.46	0.56	0.63	0.13	2.95
Caucasian	1391	0.36	0.09	1.44	0.94	2.20
Non-Caucasian	187	-0.36	0.09	0.69	0.45	1.06

Logistic regression was performed to assess the association between satisfaction and ethnic background. Satisfaction was categorised into 2 groups, satisfied and not satisfied (including the 'unsure' patients) and the ethnic groups were categorised as 'White British', 'Other White', 'South Asians' (Indian/Pakistani), 'Caucasians' and 'Non-Caucasians'. This analysis suggested that the association between ethnicity and their reported satisfaction was not significant (Table 5).

DISCUSSION

Current English literature has shown differences between functional outcomes, complications and satisfaction following primary TKR in different ethnicities.[3,17,18,20,21] Most of the available evidence is from non UK based studies. US based studies have revealed marked differences in the demographics and outcomes between Afro-Caribbean, Hispanic and Caucasian populations in America to the extent that had led to a documented underuse of Arthroplasty in the USA as a result of fear of having poorer outcomes in certain ethnicities.[20-22] In one study, 202 patients who underwent primary TKAs in 2004 were retrospectively reviewed.[21] They included 90 African-Americans, 87 Caucasians, 4 Asians and 4 Hispanics who were followed up for at least 2 years. They categorised these patients in to two groups (African-Americans and non- African-Americans) and found poorer range of movement and knee society scores (KSS) in the African-American population.

Siow et al compared 5332 patients from three major ethnicities (Chinese, Malays and Indians) in Singapore who underwent primary TKA.[18] They analysed the demographic features as well as pre-operative and post-operative outcome measures amongst the three ethnicities. They found statistically significant differences between different ethnicities with regards to mean age of undergoing TKA surgery and the proportion of patients undergoing TKA surgeries within each ethnicity.

On the other hand in a Canadian study, 551 patients from different ethnicities including Caucasians, South Asians (India, Pakistan, Bangladesh and Sri Lanka) and East Asians (China, Japan, Taiwan and Korea) were followed up prospectively.[25] They used three scoring systems prior to surgery and 1-2 years post operatively and identified the negative prognostic factors on the scoring systems. In their study, older age, years of follow-up, greater comorbidity, and a poor mental health state at the time of surgery, negatively affected the scores but Ethnicity did not show a negative correlation for any of the scoring systems.

The paucity of the adequate available evidence on the effect of ethnicity on TKA satisfaction encouraged us to undertake this study which is a large numbered (1578 patients) study in one of the most ethnically diverse regions in UK, Leicestershire. As discussed, it has been shown that a history of previous arthroplasty can affect patient reported satisfaction on their next joint arthroplasty.[24] To eliminate the effect of previous personal experience of TKA affecting their reported satisfaction, we included patients for their first primary TKA. In order to ensure this we selected patients who had bilateral non-simultaneous TKA and performed our analysis for the first side TKA.

Our study has revealed an important finding which can affect patient care particularly in multicultural societies.

Regardless of patient ethnicities, their reported satisfaction rate following their primary TKA, was relatively high. The reported satisfaction rates for the Caucasians and non-Caucasians in our study was 88.1% and 83.4% respectively which is within the national average range published in NJR (2013). Although a smaller proportion of patients from non-Caucasian ethnic background reported to be pleased following their TKA, this difference was not statistically significant when compared between each of the common ethnic groups (British White, Other White, Indian/Pakistani) or when categorised as Caucasian versus non-Caucasian.

To our knowledge, there are no other studies in the English literature assessing patient reported satisfaction in different ethnic categories within multicultural European societies. We however, acknowledge several limitations of our study. Firstly the number of patients from different ethnic backgrounds is not an exact reflection of the general population in Leicester. A possible explanation for this is that a large proportion of the ethnic population in 1990s when the TWAAG data collection started were not in the joint arthroplasty age group.

The other limiting factor of this study is the small number of patients from certain ethnicities affecting the results of certain statistical tests. However, the most common ethnic groups in the UK in general are "British White", "Indian" and "Other White", which is also reflected in our study population. We also grouped patients to two main ethnic categories i.e. "Caucasians" and "non-Caucasians" and undertook separate analysis for the two main categories and statistical tests did not reveal a significant difference between any of the ethnic groups or the two main ethnic categories.

Thirdly, our strict inclusion criteria have potentially created a selection bias. Although only 4% of patients from TWAAG database who had undergone a primary TKA between 1990 and 2007 were included in our study. Considering the fact that some patients would have moved from other parts of UK or from other counties to Leicestershire, our approach was the only pragmatic way by which we could identify patients for their first primary TKA with certainty and similar to other large databases not all patients had returned their completed post-operative questionnaires.

Finally, one can argue considering patients' age and activity levels, using a Likert scale for satisfaction is a rather simplistic approach to analyse patient reported satisfaction following primary TKA. Although we appreciate the limitations of Likert scales, they have been widely used in the context of patient satisfaction following surgical procedures. Our three point scale is easy to use, reliable and valid.[23] Moreover although personal differences between different individuals cannot be ignored, TKA is generally performed in older patients with the main purpose of symptomatic (mainly pain) improvement with a view to providing normal daily functions. All patients including the younger age group, regardless of their ethnicity, should be counselled appropriately to ensure realistic expectations following surgery. The mean age at the time of TKA between the Caucasian and non-Caucasian groups in our study was 69.2 and 65.7 respectively and this age difference is not statistically significant.

Despite our acknowledgement of these limitations, a total number of 1578 patients were included in our study which has made our study relatively large numbered when compared with other relevant ethnicity based our studies.

CONCLUSION

In this study, ethnicity did not significantly influence patient reported satisfaction following primary TKA. Although our study has improved the currently limited literature on patient satisfaction following TKA in different ethnic categories, larger number studies, ideally from national databases, should be encouraged.

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