Satisfaction rates, function, and return to activity following young adult total hip arthroplasty

From Royal National Orthopaedic Hospital, London, UK

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Cite this article:
Bone Jt Open 2024;5(4):
304–311.

DOI: 10.1302/2633-1462.
54.BJO-2024-0005.R1

Aims

Young adults undergoing total hip arthroplasty (THA) largely have different indications for surgery, preoperative function, and postoperative goals compared to a standard patient group. The aim of our study was to describe young adult THA preoperative function and quality of life, and to assess postoperative satisfaction and compare this with functional outcome measures.

Methods

A retrospective cohort analysis of young adults (aged < 50 years) undergoing THA between May 2018 and May 2023 in a single tertiary centre was undertaken. Median follow-up was 31 months (12 to 61). Oxford Hip Score (OHS) and focus group-designed questionnaires were distributed. Searches identified 244 cases in 225 patients. Those aged aged under 30 years represented 22.7% of the cohort. Developmental dysplasia of the hip (50; 45.5%) and Perthes' disease (15; 13.6%) were the commonest indications for THA.

Results

Preoperatively, of 110 patients, 19 (17.2%) were unable to work before THA, 57 (52%) required opioid analgesia, 51 (46.4%) were reliant upon walking aids, and 70 (63.6%) had sexual activity limited by their pathology. One patient required revision due to instability. Mean OHS was 39 (9 to 48). There was a significant difference between the OHS of cases where THA met expectation, compared with the OHS when it did not (satisfied: 86 (78.2%), OHS: 41.2 (36.1%) vs non-satisfied: 24 (21%), OHS: 31.6; $p \leq 0.001$). Only one of the 83 patients (75.5%) who returned to premorbid levels of activity did so after 12 months.

Conclusion

Satisfaction rates of THA in young adults is high, albeit lower than commonly quoted figures. Young adults awaiting THA have poor function with high requirements for mobility aids, analgesia, and difficulties in working and undertaking leisure activities. The OHS provided a useful insight into patient function and was predictive of satisfaction rates, although it did not address the specific demands of young adults undertaking THA. Function at one year postoperatively is a good indication of overall outcomes.

Take home message

- Satisfaction rates of total hip arthroplasty (THA) in young adults are high, albeit lower than commonly quoted figures.
- Young adults awaiting THA have poor function with high requirements for mobility aids, analgesia, and difficulties in working and undertaking leisure activities.
- The Oxford Hip Score provided a useful insight into patient function and was predictive of satisfaction rates, although it did not address the specific demands of young adults undergoing THA.

Bone & Joint Open

Introduction

Total hip arthroplasty (THA) has revolutionized the management of debilitating hip arthritis.[1,2] In the UK, 95% of primary THAs are performed on patients aged over 50 years.[3-5] Success of surgery in this cohort has been predominantly demonstrated using standardized patient-reported outcome measures, radiological parameters, and technical outcomes, including revision and complication rates.[6-9]

Since its establishment in the early 1960s, the indication for THA in young adults has broadened owing to improvements in surgical technique, implant materials, and long-term patient outcomes.[10-12] Indication for surgery in patients aged under 50 years differs vastly from an older cohort. The 20th annual report from the National Joint Registry (NJR) of England, Wales, Northern Ireland, the Isle of Man and Guernsey recognizes primary osteoarthritis (OA) as the most common indication for surgery across all age groups; however, developmental dysplasia of the hip, Perthes' disease, and avascular necrosis are more prevalent in younger patients.[13]

Despite advances in hip conservation techniques, THA in young adults is increasingly documented; however, there remains a paucity of data describing disease severity, impact on preoperative quality of life (QoL), and qualitative outcomes.[10,14-16] The Oxford Hip Score (OHS)[17] is regularly used, yet focuses on the demands of a typical THA cohort, hence it is questionable whether the OHS is generalizable to a young, active population. Previous studies have described mixed results with regard to the ceiling effect of the OHS, and a young patient cohort may be prone to this.[18]

Therefore, the primary aims of the present study are to describe pre-morbid function and impact on QoL factors, and assess analgesic requirements associated with young adult THA. The secondary aims of this study are to assess postoperative satisfaction levels, functional outcomes, and assess how these functional outcomes compare to the OHS. We hypothesize that preoperative disease burden is significant, satisfaction with THA is high, and commonly used patient-reported outcome measures do not assess the demands specific to a young adult.

Methods

Study design

We conducted a retrospective cohort analysis of young adults undergoing THA between May 2018 and May 2023 at a tertiary orthopaedic arthroplasty centre (Royal National Orthopaedic Hospital, London, UK).

Inclusion and exclusion criteria

Young adults were defined as patients under the age of 50 years. We included all patients requiring THA during the defined period. For the purposes of this study, six teenagers (aged 14 to 19 years) were included under the definition of young adults. Patients receiving proximal femoral endoprosthesis, or THA secondary to malignancy, were removed from our study. Patients with incomplete datasets, long-term follow-up outside of our institution, and irretrievable records were also excluded.

Data collection

Prior to commencing data collection, our study was reviewed by the local research and ethics committee. Based on the HRA "Defining Research" leaflet,[19] our project was classed as service evaluation and did not require further approval from an institutional review board. Patient consent was obtained prior to questionnaire completion. Cases were identified from the institution's (Royal National Orthopaedic Hospital) prospectively populated surgical database using International Classification of Diseases 10th Revision (ICD-10) codes,[20] and manual review by the senior author (RM). Demographic and clinical data was extracted from selected patients' electronic medical records (EMRs).

Patients were contacted via email and telephone to complete the Oxford Hip Score (OHS) and Young Adult Hip Questionnaire (YAHQ) (see Supplementary Material). The OHS was selected due to its proven validity and utility in previous publications on the subject. The YAHQ was developed by orthopaedic surgeons (RM, JD, JS), in collaboration with a focus group of patients who have previously undergone THA. The questionnaire was evaluated for its content validity by the wider authorship group (RG, KM, RM). It was pilot tested within a focus group of young adult THA patients prior to its distribution.

Outcome evaluation

Demographic and clinical data included age, sex, and American Society of Anesthesiologists (ASA) grade.[21] Comorbidities were graded utilizing the Charlson Comorbidity Index (CCI).[22]

THA procedure date, indication, and laterality were recorded. Perioperative outcomes included complications (intra- and postoperatively), length of hospital stay, and reoperation rate. Longer-term outcomes included OHS, YAHQ, and revision rates. The YAHQ evaluated premorbid functionality, hospital stay, and postoperative functionality, including assessment of satisfaction levels. Ambulation, occupation, analgesic requirements, ability to exercise and drive, and take part in sexual activity were documented pre- and post-THA. The questionnaire facilitated free text answers, from which the authors derived and collated major paraphrased themes. Responses to these questions were analyzed using a reflexive thematic analysis by the authorship group. Both questionnaires were obtained at an average of 31 months following primary arthroplasty, with included cases a minimum of 12 months post-surgery. All data were independently verified by a detailed review of hospital operative reports, anaesthesia records, and clinical records.

Operative protocol

Preoperatively, patients are discussed in the multidisciplinary team setting. Patients are encouraged to engage in service-led or independent pre-habilitation to strengthen secondary stabilizers of the hip prior to arthroplasty. Patients are discharged following postoperative radiographs, independent mobilization, and once pain is well controlled. Upon discharge, patients are reviewed in orthopaedic clinic after six to eight weeks, typically by a clinical nurse specialist.

Statistical analysis

Statistical analysis was performed on Excel (Microsoft, USA) and using independent-samples *t*-test for continuous variables, and chi-squared test for categorical variables. Statistical significance was determined as $p < 0.05$ a priori.

Demographics

We performed a total of 325 THAs in 303 young adults, 22 of these representing bilateral cases, during the study period (Figure 1). Six of these patients were teenagers. No patients were lost to follow-up. Table I describes the baseline patient demographics and clinical data at the time of arthroplasty procedure between questionnaire responders and non-responders. There were no statistically significant differences in baseline demographics or comorbidity.

Results

Table II describes participants' pre-THA status. Before THA, 19 patients (17.2%) were unable to work, 51 (46.4%) required some form of mobility aid, 101 (91.8%) used regular analgesia of varying strengths, 70 (63.6%) were unable to exercise, and 70 (63.6%) felt their sexual activity was limited by their hip pathology. Of nine patients, 35% of those aged under 30 years required a mobility aid and 18 (72%) were unable to exercise. Of 47 patients, 39 (83%) of those aged between 40 and 49 years remained in full-time work, while six (12.8%) used a wheelchair to mobilize preoperatively. The highest proportion of those unable to work were aged between 30 and 39 years. Patients using narcotics post0peratively had a mean OHS of 38 (9 to 48), with THA meeting expectation in 79% (45/57) of cases. Those not using postoperative narcotics had a higher mean OHS of 41 (9 to 48) ($p = 0.105$), with THA also meeting expectation in 79% (42/53) of cases.

Table III delineates perioperative and short-term patient-reported outcomes. Mean length of stay was 3.8 days (1 to 27). One case required revision, indicated secondary to prosthesis instability, and was within the aged 40 to 49 years cohort. THA met expectation in 78.2% of cases (86/110). In all, 76 patients (69.1%) returned to their previous level of work, all within a 12-month period. In addition, 76 patients (69.1%) returned to their pre-morbid level of sexual activity, and 83 (75.5%) returned to their pre-morbid exercise levels; all but one patient returned to pre-morbid exercise levels within 12 months. A higher proportion of those aged less than 30 years returned to their previous level of work (18/25; 72%), resumed normal sexual activity (19/25; 76%), and returned to pre-morbid exercise levels (20/25; 80%) than their elder counterparts.

The most prevalent indication for surgery was developmental dysplasia of the hip (DDH) followed by Perthes' disease in the aged under 30 years cohort (DDH: 8/25 (32%), Perthes': 6/25 (24%)). In the aged 30 to 39 years group, DDH was more prevalent (20/38, 52.6%), with femoroacetabular impingement (FAI) resulting in OA, Perthes' disease, and SUFE the joint second leading causes (FAI/Perthes'/SUFE; 4/38 (10.5%)). In the 40 to 49 year old group DDH was most prevalent followed by FAI (DDH; 22/47, 46.8%, FAI; 8/47, 17%). The mean postoperative OHS was 39 (9 to 48) for entire cohort; 43 (28 to 48) in those aged under 30 years, 37 (9 to 48) in those aged 30 to 39 years, and 39 (9 to 48) in those aged 40 to 49 years. In all, 23 (20.9%) of the entire cohort had an OHS of 48. Table IV demonstrates the OHS that correlate with participants answers to questions regarding expectation, return to work, sexual activity, and exercise. There was a statistically significant difference in the OHS of participants answering "yes" and "no" to all four questions. There was no

Table I. Demographics of responders and non-responders.

Variable	Responders	Non-responders	p-value*
Total patients, n	110	134	
Age, yrs, n (%)			
< 30	25 (22.7)	40 (29.9)	
30 to 39	38 (34.5)	36 (26.9)	
40 to 49	47 (42.7)	58 (43.2)	
Mean age on admission, yrs (range)	36.4 (14 to 49)	35.8 (15 to 49)	0.321
Sex, n (%)			
Male	64 (58.2)	79 (59)	
Female	46 (41.8)	55 (41)	
Mean time since operation, mths (range)	28 (1 to 60)	29 (2 to 61)	0.314
Mean ASA grade (range)	1.25 (1 to 3)	1.00 (1 to 3)	0.192
ASA I, n (%)	45 (40.9)	53 (39.6)	
ASA II, n (%)	58 (52.7)	65 (48.5)	
ASA III, n (%)	7 (6.4)	16 (11.9)	
ASA IV, n (%)	0.0 (0)	0.0 (0)	
ASA V, n (%)	0.0 (0)	0.0 (0)	
Mean CCI score (range)	0.25 (1 to 3)	0.32 (1 to 6)	0.174
CCI 0, n (%)	87 (79.1)	96 (71.6)	
CCI 1, n (%)	20 (18.1)	33 (24.6)	
CCI 2, n (%)	1 (0.9)	5 (3.7)	
CCI ≥ 3, n (%)	2 (1.8)	0.0 (0)	
Arthroplasty side, n (%)			
Right	56 (50.9)	69 (51.5)	
Left	54 (49.1)	65 (48.5)	
Indication, n (%)			
FAI with secondary OA	12 (10.9)	N/A	
DDH	50 (45.5)	N/A	
Perthes' disease	15 (13.6)	N/A	
Skeletal dysplasia	2 (1.8)	N/A	
AVN	9 (8.2)	N/A	
Inflammatory arthritis	3 (2.7)	N/A	
Post infection	5 (4.5)	N/A	
Post-trauma	4 (3.6)	N/A	
SUFE	8 (7.3)	N/A	
Protrusio acetabuli	2 (1.8)	N/A	

*Independent-samples *t*-test.
ASA, American Society of Anesthesiologists; AVN, avascular necrosis; CCI, Charlson Comorbidity Index; DDH, developmental dysplasia of the hip; FAI, femoroacetabular impingement; N/A, not applicable; OA, osteoarthritis; SUFE, slipped upper femoral epiphysis.

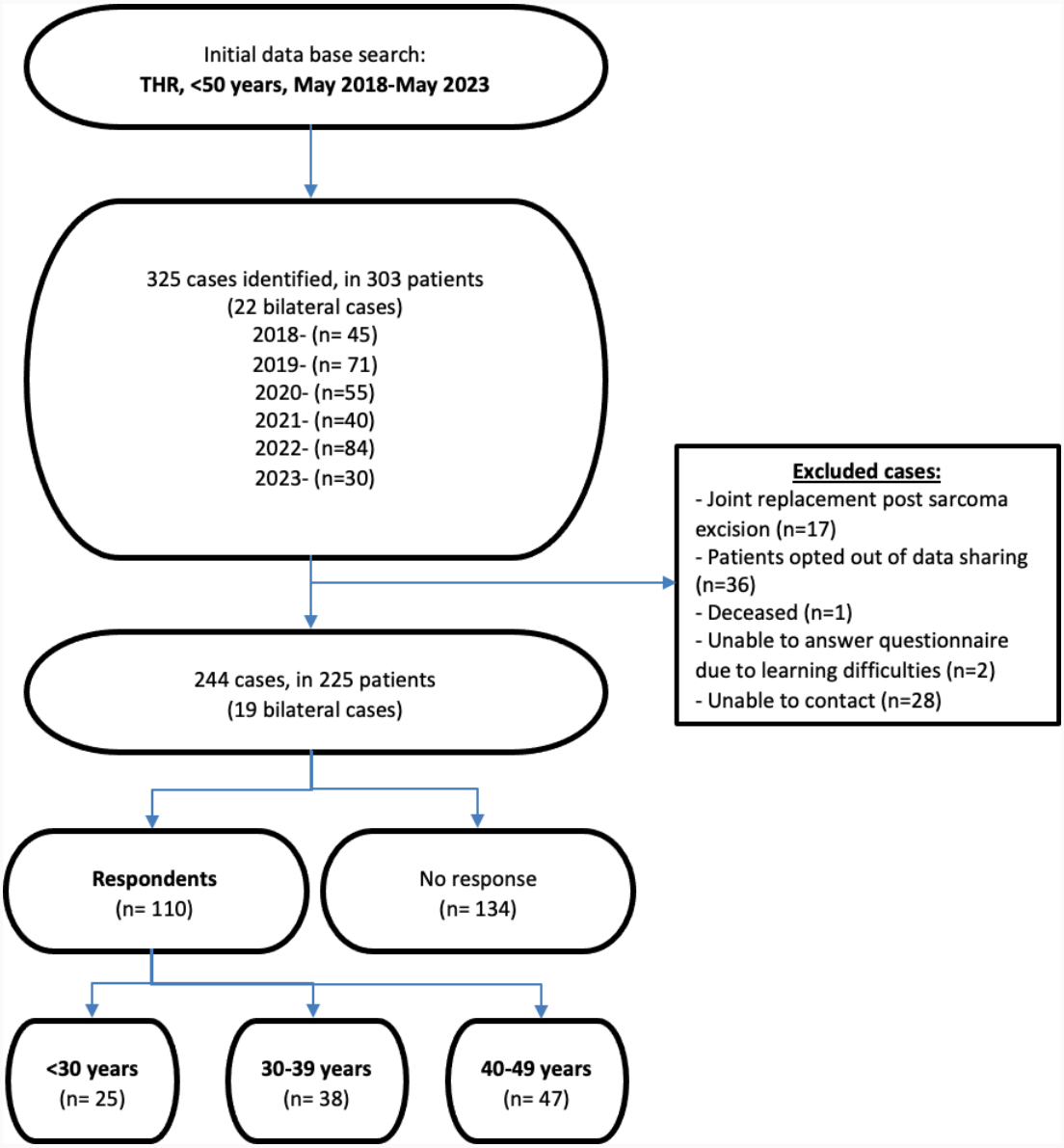

Fig. 1
Flow diagram. THR, total hip replacement.

statistically significant difference between the postoperative OHS of patients requiring and not requiring mobility aids prior to surgery (37.3 vs 40.8; p = 0.057); however, there was statistically significant difference between the postoperative satisfaction rates with THA (88.2% (45/51) vs 69.5% (41/59); p = 0.017) (Table V).

Qualitative comments demonstrated several themes, which are summarized in Table VI. Direct quotes included: "Before my operation, questions asked felt more relevant to an older individual, such as do I have difficulty climbing the stairs?", "The OHS does not assess the most relevant challenges in my day-to-day life", and "I am more challenged with fear of picking up and playing with my children". Others expressed frustration that clinicians, family, and friends overestimated their ability to recover and rehabilitate from surgery: "Family and friends must be patient with relatives undergoing surgery and understand their frustration at their lack of independence post operatively". Patients described exercise and sexual activity being limited not by the hip itself, but by the fear of pushing their new implant too far. While exercise with their native hip was often very painful, this was sometimes anxiety-free.

Discussion

This paper demonstrates the preoperative functional burden of young patients undergoing THA and their postoperative outcomes using a mixed qualitative methodology. We report good outcomes for THA in young patients, but with significant differences compared to a 'standard' THA population.

In our cohort, functional recovery at 12 months appeared predictive of maximum function post-THA. Additionally, qualitative data analysis demonstrated themes of frustration from patients towards clinicians, family, and friends regarding the often-unrealistic expectation for rapid recovery due to their young age. The mean length of stay in the study

Table II. Participant status three months prior to operation.

Variable	All	Age < 30 yrs	Age 30 to 39 yrs	Age 40 to 49 yrs
Employment status, n (%)				
Full-time work	80 (72.7)	15 (60)	26 (68.4)	39 (83)
Full-time education	6 (5.5)	6 (24)	0 (0)	0 (0)
Unable to work	19 (17.2)	2 (8)	10 (26.3)	7 (14.9)
Looking after dependents	2 (1.8)	0 (0)	1 (2.6)	1 (2.1)
Retired	1 (0.9)	0 (0)	1 (2.6)	0 (0)
Unemployed	2 (1.8)	2 (8)	0 (0)	0 (0)
Mobility status, n (%)				
No aids required	59 (53.6)	16 (65)	19 (50)	24 (51.1)
1 stick/1 crutch	26 (23.6)	2 (8)	12 (31.6)	12 (25.5)
2 sticks/2 crutches	16 (14.5)	6 (24)	5 (13.2)	5 (10.6)
Wheelchair	9 (8.2)	1 (4)	2 (5.3)	6 (12.8)
Analgesia, n (%)				
None	9 (8.2)	2 (8)	5 (13.2)	3 (6.4)
Non-opioid analgesics	39 (35.5)	12 (48)	16 (42.1)	10 (21.3)
Weak opioid	35 (31.8)	6 (24)	10 (26.3)	19 (40.4)
Strong opioid	17 (15.5)	4 (16)	3 (7.9)	10 (21.3)
Strong opioid + topical patches	5 (4.5)	1 (4)	1 (2.6)	3 (6.4)
Gabapentin/amitriptyline	5 (4.5)	0 (0)	3 (7.9)	2 (4.3)
Exercise status (ability to perform), n (%)				
Yes, as much as would like	7 (6.4)	1 (4)	4 (10.5)	2 (4.3)
Yes, somewhat less than would like	8 (7.3)	2 (8)	1 (2.6)	5 (10.6)
Yes, significantly less than would like	25 (22.7)	4 (16)	10 (26.3)	11 (23.4)
No, unable to exercise	70 (63.6)	18 (72)	23 (60.5)	29 (61.7)
Sexual activity (limited by hip pathology), n (%)				
Yes	70 (63.6)	15 (60)	23 (60.5)	32 (68.1)
No	22 (20)	5 (20)	9 (23.7)	8 (17)
Not applicable	18 (16.4)	5 (20)	6 (15.8)	7 (14.9)

Table III. Outcomes, Oxford Hip Score, satisfaction, and return to activity postoperatively.

Varable	All	Age < 30 yrs	Age 30 to 39 yrs	Age 40 to 49 yrs
Mean length of stay, days (range)	3.8 (1 to 27)	3.2 (1 to 7)	4.7 (1 to 27)	3.4 (1 to 11)
Readmission, n (%)	3 (2.7)	0 (0)	2 (5.3)	1 (2.1)
Complications, n (%)	4 (3.6)	0 (0)	3 (7.9)	1 (2.1)
Revision, n (%)	1 (0.9)	0 (0)	0 (0)	1 (2.1)
Mean Oxford Hip Score (range)	39 (9 to 48)	43 (28 to 48)	37 (9 to 48)	39 (9 to 48)
Did THA meet expectations?, n (%)				
Yes	86 (78.2)	20 (80)	27 (71.1)	39 (83)
No	24 (21.8)	5 (20)	11 (28.9)	8 (17)
Return to previous level of work, n (%)				
Yes	76 (69.1)	18 (72)	25 (65.8)	33 (70.2)
No	34 (30.9)	7 (28)	13 (34.2)	14 (29.8)
Within 3 mths	48 (43.6)	12 (48)	14 (36.8)	22 (46.8)
3 to 12 mths	28 (25.5)	6 (24)	11 (28.9)	11 (23.4)
> 12 mths	0 (0)	0 (0)	0 (0)	0 (0)
Ability to resume sexual relations, n (%)				
Yes	76 (69.1)	19 (76)	23 (60.5)	34 (72.3)
No	16 (14.5)	0 (0)	8 (21.1)	8 (17)
Not applicable	18 (16.4)	6 (24)	7 (18.4)	5 (10.6)
Return to pre-morbid exercise levels, n (%)				
Yes	83 (75.5)	20 (80)	28 (73.7)	35 (74.5)
No	27 (24.5)	5 (20)	10 (26.3)	12 (25.5)
Within 3 mths	28 (25.5)	7 (28)	7 (18.4)	14 (29.8)
3 to 12 mths	54 (49.1)	13 (52)	20 (52.6)	21 (44.7)
> 12 mths	1 (0.9)	0 (0)	1 (2.6)	0 (0)

THA, total hip arthroplasty.

group was 3.8 days, which is in fact higher than the average for the department as a whole. It is important to note that these patients are often more surgically complex; therefore, despite being a young cohort, these patients often need a prolonged hospital stay before a safe discharge. Of note, younger adults in our study did not return to work significantly faster than their elder counterparts. Previous studies, focused on an older average population, have described similar average times to maximum functional recovery, and meta-analyses have exposed a lack of qualitative research investigating young adults undergoing THA.[23–25] THA is major surgery and those involved in pre- and postoperative care must recognize and validate the impact it has on patient QoL. This study's results can guide clinicians and patients regarding defining preoperative expectations for rehabilitation.

There was a significant difference between the OHS of cases where THA met expectation, compared with the OHS when it did not. Nevertheless, qualitative themes reflected concern that the OHS does not assess the specific demands of young adults undertaking THA, such as commuting to work, performing sports, and engaging in sexual activity. The OHS has been criticized due to a potential ceiling effect, lack of clarity, and restrictive or irrelevant questions.[26,27] The authors conclude that the OHS provides a useful insight into patient function and may be predictive of overall satisfaction rates; however, it may also be susceptible to the previously described ceiling effect. The necessity of further qualitative research in this field is evident, as without exploring young adults' priorities, expectations, and experiences, the

Table VI. Major paraphrased themes.

Major paraphrased themes
OHS questions do not assess most relevant challenges faced by young adults
Clinicians, family, and friends often underestimate difficulty of postoperative rehabilitation in young adults
Postoperative activities limited by anxiety relating to implant, as opposed to pain/reduced ROM
Lack of postoperative clarity regarding specific limits/boundaries of activity with a hip prosthesis
Many advocating for early surgery, referencing unnecessary delays and impact on youthful years' quality of life

OHS, Oxford Hip Score; ROM, range of motion.

Table IV. Associated Oxford Hip Scores.

Variable	Oxford Hip Score	p-value*
Did THA meet expectations?		< 0.001
Yes	41.2	
No	31.6	
Return to previous level of work		< 0.001
Yes	42.3	
No	31.9	
Ability to resume sexual relations		< 0.001
Yes	40.9	
No	31.8	
Return to pre-morbid exercise levels		< 0.001
Yes	42.2	
No	30.3	

*Chi-squared test.
THA, total hip arthroplasty.

Table V. Preoperative mobility versus Oxford Hip Score and satisfaction.

Variable	Oxford Hip Score	p-value*	THA met expectation, n (%)	p-value*
Mobility aids 3 mths pre-THA		0.057		0.017
None	40.8		41/59 (69.5)	
1 stick or more	37.3		45/51 (88.2)	
Able to take part in exercise pre-THA		0.87		0.116
Yes	39.4		28/40 (70)	
No	39.1		58/70 (82.9)	
Hip limited sexual activity pre-THA		0.195		0.642
Yes	38.6		54/70 (77.1)	
No	41.7		18/22 (81.8)	

*Chi-squared test.
THA, total hip arthroplasty.

literature may be presenting what researchers merely assume is important to this patient cohort.[25]

Our results provide unique insight into preoperative morbidity, analgesic requirements, and function. An unemployment rate of 17% was similar to previously quoted numbers; however, these were based on a "typical" THA population, highlighting the QoL impact preoperatively on a young and active population.[28] Over 50% of our cohort required opioid analgesia preoperatively, vastly higher than previously reported rates.[29] In our study, these patients had near identical satisfaction with THA than those not using narcotics preoperatively, and lower average OHS, without statistical significance. Narcotic usage prior to THA has previously been associated with longer hospital stay, higher complication rates, and worse outcomes, and is an independent predictor of chronic opioid usage.[29–31] Considering the toxicity, dependence, link with poorer outcomes, and societal impact associated with chronic opioid usage, clinicians should counsel patients regarding their usage and consider alternative regimes where possible.[32] A previous study analyzing sexual function in young adults pre-THA demonstrated difficulty in 64% of patients, almost equal to our findings.[33] Sexual activity has a large bearing on QoL, and correlates with mental wellbeing and physical health; however, further commentary on this goes beyond the scope of this paper.

Despite low rates of revision and complications, the relatively high proportion of patients not returning to pre-morbid function indicates the complexity of operating in this cohort.[34] Length of stay was notably prolonged compared to our centre's median length of stay post-THA of 2.2 days, drawing attention to the associated resource requirement.[35] Nearly 80% of patients felt their THA met personal expectation, despite a lesser percentage returning to their previous level of work, sexual activity, and exercise levels. These results provide patients and clinicians with useful data to inform pre- and postoperative counselling. There is a paucity of research exploring the expectations of young adults undergoing THA, with some evidence emphasizing the importance of managing preoperative expectations.[36]

Patients with poorer preoperative mobility had a worse OHS, but higher satisfaction rate with THA than those mobilizing independently preoperatively. This suggests that high OHS is not an independent predictor of patient satisfaction, and re-emphasizes the importance of patient selection and defining expectation preoperatively. OHS was highest in the aged under 30 years cohort, whereas those aged 30 to 39 years appeared least satisfied; the group also had the lowest rates of return to work, exercise, and sexual activity. DDH was the indication for surgery in over 50% of this sub-group. There are mixed results in the literature with regard to the effects of age on post-THA satisfaction, with some evidence suggesting that younger patients have less satisfaction.[37,38] This could be related to differences in patient expectations compared to a typical arthroplasty population.

Thematic analysis revealed that young adults often wanted to know the limits of their rehabilitation and prosthesis. Patients often advocated early surgery. Our cohort had a maximum of five years' follow-up; therefore, a prospective

cohort analysis may be useful to analyze how these patient perspectives change over a longer-term follow-up period.

Our study has limitations. Looking at the number of respondents, the response rate is less than 40%. This only increases to 45% when the sarcoma cases and patients who declined or were unable to take part were excluded. Additionally, this is a heterogenous group in terms of case mix, implant manufacturer, and indication for procedure. However, we would argue that there were no significant differences in demographic variables between responders and non-responders, therefore adding to the applicability of our findings. Surgical technology and technique have naturally progressed throughout our study period, potentially confounding our results. The OHS does not require clinician input, and measures patients' perceptions, yet has its own limitations. The authors note the relatively short study period, but this is essential to ensure accurate recall from the patients and their experience. Our study period encompassed the COVID-19 pandemic and thus, considering the increase in hybrid office work, the return to the previous level of work may have been underestimated, as many did not return secondary to a change in work circumstances.

In conclusion, this article informs both clinician and patient on expectations and outcomes of THA in the young adult, while highlighting the under-reported comorbidity in this group. Satisfaction rates of THA in young adults is high, albeit lower than commonly quoted figures. Young adults awaiting THA have poor function, with high requirements for mobility aids and analgesia, and difficulties in working and undertaking leisure activities. The OHS provides a useful insight into patient function and was predictive of satisfaction rates, although it did not address the specific demands of young adults undertaking THA. Function at one year postoperatively is a good indication of overall outcomes.

Supplementary material

Young Adult Hip Questionnaire.

References

1. **Learmonth ID**, **Young C**, **Rorabeck C**. The operation of the century: total hip replacement. *Lancet*. 2007;370(9597):1508–1519.
2. **Varacallo M**, **Luo TD**, **Johanson NA**. Total hip athroplasty techniques. In: *StatPearls Publishing*. Treasure Island (FL), 2023.
3. **No authors listed**. Age of patients undergoing primary hip replacement. National Joint Registry. 2023. https://reports.njrcentre.org.uk/hips-primary-procedures-patient-characteristics/H08v2NJR?reportid=3796AA8C-5E9F-4694-B1F2-D91E269FD823&defaults=DC__Reporting_Period__Date_Range=%22MAX%22,H__JYS__Filter__Calendar_Year__From__To=%22MIN-MAX%22,R__Filter__Gender=%22All%22,H__Filter__Joint=%22Hip (date last accessed 2 April 2024).
4. **No authors listed**. Patient chacteristics for primary hip replacement procedures. National Joint Registry. 2023. https://reports.njrcentre.org.uk/hips-primary-procedures-patient-characteristics/H04v9NJR?reportid=E3ACD4F8-60DB-4B08-9052-BEBBE4440494&defaults=DC__Reporting_Period__Date_Range="MAX",J__Filter__Calendar_Year="MAX",H__Filter__Joint="Hip (date last accessed 2 April 2024).
5. **Christofilopoulos P**, **Lübbeke A**, **Peter R**, **Hoffmeyer P**. Le point sur la prothèse totale de hanche [Published in French]. *Rev Med Suisse*. 2010;6(276):2454–2458.
6. **Horne G**, **Culliford N**, **Adams K**, **Devane P**. Hybrid total hip replacement: outcome after a mean follow up of 10 years. *ANZ J Surg*. 2007;77(8):638–641.
7. **Söderman P**, **Malchau H**, **Herberts P**. Outcome of total hip replacement: a comparison of different measurement methods. *Clin Orthop Relat Res*. 2001;390:163–172.
8. **Evans JT**, **Evans JP**, **Walker RW**, **Blom AW**, **Whitehouse MR**, **Sayers A**. How long does a hip replacement last? A systematic review and meta-analysis of case series and national registry reports with more than 15 years of follow-up. *Lancet*. 2019;393(10172):647–654.
9. **Garriga C**, **Murphy J**, **Leal J**, **et al**. Assessment on patient outcomes of primary hip replacement: an interrupted time series analysis from the National Joint Registry of England and Wales *BMJ Open*. 2019;9(11):e031599.
10. **Bessette BJ**, **Fassier F**, **Tanzer M**, **Brooks CE**. Total hip arthroplasty in patients younger than 21 years: a minimum, 10-year follow-up. *Can J Surg*. 2003;46(4):257–262.
11. **Callaghan JJ**, **Albright JC**, **Goetz DD**, **Olejniczak JP**, **Johnston RC**. Charnley total hip arthroplasty with cement. Minimum twenty-five-year follow-up. *J Bone Joint Surg Am*. 2000;82-A(4):487–497.
12. **Shon WY**, **Park B-Y**, **R RN**, **Park PS**, **Im JT**, **Yun HH**. Total hip arthroplasty: past, present, and future: what has been achieved? *Hip Pelvis*. 2019;31(4):179–189.
13. **Ben-Shlomo Y**, **Blom A**, **BoultonC**, **et al**. The National Joint Registry 20th Annual Report 2023. National Joint Registry. 2023. https://reports.njrcentre.org.uk/Portals/0/PDFdownloads/NJR%2020th%20Annual%20Report%202023.pdf (date last accessed 2 April 2024).
14. **de Kam DCJ**, **Gardeniers JWM**, **Veth RPH**, **Schreurs BW**. Total hip arthroplasty in patients under 40 years of age and, if indicated, reconstruction of acetabular defects with bone impaction grafting. *Ned Tijdschr Geneeskd*. 2010;154:A811.
15. **Callaghan JJ**, **Forest EE**, **Sporer SM**, **Goetz DD**, **Johnston RC**. Total hip arthroplasty in the young adult. *Clin Orthop Relat Res*. 1997;344(344):257–262.
16. **Mei XY**, **Gong YJ**, **Safir O**, **Gross A**, **Kuzyk P**. Long-term outcomes of total hip arthroplasty in patients younger than 55 years: a systematic review of the contemporary literature. *Can J Surg*. 2019;62(4):249–258.
17. **Holmenlund C**, **Overgaard S**, **Bilberg R**, **Varnum C**. Evaluation of the Oxford Hip Score: does it still have content validity? Interviews of total hip arthroplasty patients. *Health Qual Life Outcomes*. 2021;19(1):237.
18. **Lim CR**, **Harris K**, **Dawson J**, **Beard DJ**, **Fitzpatrick R**, **Price AJ**. Floor and ceiling effects in the OHS: an analysis of the NHS PROMs data set. *BMJ Open*. 2015;5(7):e007765.
19. **No authors listed**. Health Research Authority. 2022. https://www.hra-decisiontools.org.uk/research/docs/DefiningResearchTable_Oct2022.pdf (date last accessed 10 April 2024).
20. **Steindel SJ**. International classification of diseases, 10th edition, clinical modification and procedure coding system: descriptive overview of the next generation HIPAA code sets. *J Am Med Inform Assoc*. 2010;17(3):274–282.
21. **Saklad M**. Grading of patients for surgical procedures. *Anesthesiol*. 1941;2(3):281–284.
22. **Charlson ME**, **Carrozzino D**, **Guidi J**, **Patierno C**. Charlson Comorbidity Index: a critical review of clinimetric properties. *Psychother Psychosom*. 2022;91(1):8–35.
23. **Nilsdotter A-K**, **Lohmander LS**. Age and waiting time as predictors of outcome after total hip replacement for osteoarthritis. *Rheumatology (Oxford)*. 2002;41(11):1261–1267.
24. **Sato EH**, **Stevenson KL**, **Blackburn BE**, **et al**. Recovery curves for patient-reported outcomes and physical function after total hip arthroplasty. *J Arthroplasty*. 2023;38(7S):S65–S71.
25. **Mew L**, **Heaslip V**, **Immins T**, **Wainwright T**. What is important to the younger person (≤50 years) when having a total hip arthroplasty: a systematic literature review. *Orthop Nurs*. 2023;42(4):213–229.
26. **Marx RG**, **Jones EC**, **Atwan NC**, **Closkey RF**, **Salvati EA**, **Sculco TP**. Measuring improvement following total hip and knee arthroplasty using patient-based measures of outcome. *J Bone Joint Surg Am*. 2005;87-A(9):1999–2005.
27. **Wylde V**, **Learmonth ID**, **Cavendish VJ**. The Oxford hip score: the patient's perspective. *Health Qual Life Outcomes*. 2005;3:66.
28. **Bohm ER**. The effect of total hip arthroplasty on employment. *J Arthroplasty*. 2010;25(1):15–18.

29. **Kunkel ST**, **Gregory JJ**, **Sabatino MJ**, **et al**. Does preoperative opioid consumption increase the risk of chronic postoperative opioid use after total joint arthroplasty? *Arthroplast Today*. 2021;10:46–50.
30. **Pivec R**, **Issa K**, **Naziri Q**, **Kapadia BH**, **Bonutti PM**, **Mont MA**. Opioid use prior to total hip arthroplasty leads to worse clinical outcomes. *Int Orthop*. 2014;38(6):1159–1165.
31. **Rozell JC**, **Courtney PM**, **Dattilo JR**, **Wu CH**, **Lee G-C**. Preoperative opiate use independently predicts narcotic consumption and complications after total joint arthroplasty. *J Arthroplasty*. 2017;32(9):2658–2662.
32. **Goesling J**, **Moser SE**, **Zaidi B**, **et al**. Trends and predictors of opioid use after total knee and total hip arthroplasty. *Pain*. 2016;157(6):1259–1265.
33. **Yang D**, **Zhang J**, **Zhang K**, **et al**. Sexual function and sexual activity in young total hip arthroplasty Chinese patients: a retrospective cohort study. *Front Surg*. 2022;9:960721.
34. **Walker RP**, **Gee M**, **Wong F**, **et al**. Functional outcomes of total hip arthroplasty in patients aged 30 years or less: a systematic review and meta-analysis. *Hip Int*. 2016;26(5):424–431.
35. **Zomar BO**, **Marsh JD**, **Bryant DM**, **Lanting BA**. The cost of outpatient versus inpatient total hip arthroplasty: a randomized trial. *Can J Surg*. 2022;65(5):E553–E561.
36. **Mew L**, **Heaslip V**, **Immins T**, **Wainwright T**. What is important to the younger person (≤50 years) when having a total hip arthroplasty: a systematic literature review. *Orthop Nurs*. 2023;42(4):213–229.
37. **Okafor L**, **Chen AF**. Patient satisfaction and total hip arthroplasty: a review. *Arthroplasty*. 2019;1(1):6.
38. **Rolfson O**, **Kärrholm J**, **Dahlberg LE**, **Garellick G**. Patient-reported outcomes in the Swedish Hip Arthroplasty Register: results of a nationwide prospective observational study. *J Bone Joint Surg Br*. 2011;93-B(7):867–875.

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Funding statement

The authors received no financial or material support for the research, authorship, and/or publication of this article.

ICMJE COI statement

J. Skinner discloses being an editorial board member of *The Bone & Joint Journal*, which is unrelated to this work. All other authors have no disclosures or conflicts of interest to declare.

Data sharing

The datasets generated and analyzed in the current study are not publicly available due to data protection regulations. Access to data is limited to the researchers who have obtained permission for data processing. Further inquiries can be made to the corresponding author.

Ethical review statement

Prior to commencing data collection, our study was reviewed by the local research and ethics committee. Based on the Health Research Authority "Defining Research" leaflet, our project was classed as service evaluation and did not require further approval from an Institutional Review Board.

Open access funding

The authors report that the open access funding for this manuscript from was self-funded by R. McCulloch.