

Demographic and Socioeconomic Patient Data Are Rarely Included in Randomized Controlled Trials for Femoral Acetabular Impingement and Hip Arthroscopy: A Systematic Review



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Purpose: To determine the rate of reporting for sociodemographic variables in randomized controlled trials (RCTs) investigating femoral acetabular impingement (FAI) and hip arthroscopy. **Methods:** PubMed, Scopus, and Web of Science were queried for articles relating to FAI and hip arthroscopy. Articles included in final analysis were RCTs investigating operative management of FAI. Included RCTs were analyzed for reporting of age and sex or gender as well as the following sociodemographic variables: race, ethnicity, insurance status, income, housing status, work status, and education level in the results section or any section of the paper. Data was analyzed using χ^2 and Fisher exact tests with significance defined as $P < .05$. **Results:** Forty-eight RCTs were identified from 2011 to 2023. Age was reported in 48 of 48 (100%) of included papers; sex or gender was reported in 47 of 48 (97.9%). Reporting of sociodemographic variables in any section respectively was: race (7/48, 14.6%), ethnicity (4/48, 8.33%), insurance status (0/48, 0%), income (1/48, 2.08%), housing status (0/48, 0%), work status (3/48, 6.25%), and education (2/48, 4.17%). There was no significant difference for reporting demographic variables with respect to journal or year of publication ($P = .666$ and $P = .761$, respectively). Sociodemographic variables (9/48) were reported significantly less frequently than age and sex or gender (48/48) ($P < .001$). **Conclusions:** This study found that sociodemographic variables in FAI and hip arthroscopy RCTs are reported with much lower frequency than age and sex or gender. These findings may demonstrate the need to include patient sociodemographic data in RCTs so that their results can be better generalized and applied to the appropriate patient population. **Level of Evidence:** Level II, systematic review of level I and II evidence.

Numerous studies have shown the significant relationship between patients' socioeconomic and demographic variables and their health outcomes. This is no different in the femoral acetabular impingement (FAI) and hip arthroscopy literature, where race,^{1,2} work status,³ insurance status,⁴ and income⁵ have all been found to have a significant impact on patient outcomes. Yet, studies also have shown that these variables have been drastically under-reported in randomized

controlled trials (RCTs) across many medical and surgical specialties,⁶⁻⁸ including orthopaedic RCTs.⁹⁻¹¹

RCTs have long been considered the best way to evaluate the effectiveness of medical therapies. Since there is evidence of a correlation between sociodemographic variables and health outcomes, these can serve as possible confounding factors that need to be controlled for in RCTs. Otherwise, it is difficult to assess whether a study outcome is solely due to the investigational therapy or whether it is merely the result of a confounding variable. As a result, inclusion of these variables in RCTs is likely to be helpful in ensuring the validity of study results and will help physicians to apply these results to the proper patient population.

This study aims to determine the rate of reporting for sociodemographic variables in RCTs investigating FAI and hip arthroscopy. We hypothesized that FAI and hip arthroscopy RCTs would significantly under-report these variables.

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Methods

Literature Review

PubMed, Scopus, and Web of Science were searched for the terms “femoral acetabular impingement,” “femoroacetabular impingement,” “hip arthroscopy,” and “randomized control* trial” on January 10, 2024. Inclusion criteria were RCTs investigating operative management of FAI published in English. Exclusion criteria were studies not published in English, studies with no accessible full-text, and other study designs besides RCTs. Studies were screened for inclusion by 2 authors (J.K. and P.K.), with discrepancies resolved by a third (A.F.).

Data Collection

The title, journal, and year of publication for each article were recorded. Age and gender or sex as well as the sociodemographic variables of race, ethnicity, insurance status, income, housing status, work status, and education were collected (Appendix Table 1, available at www.arthroscopyjournal.org). Two authors (J.K. and P.K.) reviewed the entire manuscript to determine which variables were included in the paper. The data were collected in a binary fashion (“yes”/“no”) as to whether each variable was included. For the variables race, ethnicity, insurance, housing, and education, no variations in terminology were considered. For work status, the term “employment” was considered as well and for income, “socioeconomic status” was also included. All data were recorded using Google Sheets (Google, Mountain View, CA).

Statistical Analysis

χ^2 tests were used for analyses comparing 2 categorical variables, whereas Fisher exact tests were used to compare 3 or more categorical variables. For all tests, alpha was defined as $P < .05$. All statistical analyses were done using STATA (version 17.0; StataCorp, College Station, TX).

Results

Forty-eight RCTs were selected for inclusion.¹²⁻⁵⁹ Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow sheet of study selection can be found in Figure 1. Included RCTs were published in 21 journals from 2011 to 2023 (Table 1).

Age of study participants was reported in all of the included studies (48/48, 100%). Sex or gender was reported in 47 of 48 (97.9%) studies. With respect to sociodemographic variable reporting, race was included in 7 of 48 (14.6%) studies, ethnicity in 4 of 48 (8.33%), income in 1 of 48 (2.08%), work status was included in 3 of 48 (6.25%), and education was included in 2 of 48 (4.17%). Insurance status and housing status were not mentioned in any papers (Table 2).

There was no significant difference in reporting of any sociodemographic variables among included journals ($P = .666$) or by year of publication ($P = .761$) (Table 3). Of note, only 2 studies before 2020 reported any sociodemographic variable (2/22, 9.09%), whereas several studies after 2020 have done so (7/26, 35.3%) ($P = .151$). Sociodemographic variables (9/48) were reported significantly less frequently than age and sex or gender (48/48) ($P < .001$).

Discussion

The most important finding of this study was that sociodemographic variables are rarely reported in RCTs investigating hip arthroscopy for FAI, with only 7 of 48 (14.6%) of included RCTs reporting race of study participants and less than 10% reporting ethnicity, income, work status, and education, and no studies including insurance status and housing status. This is in contrast to age and sex or gender, which were reported in 100% and 97.9% of the papers, respectively.

The large percentage of papers we found that included age and sex or gender highlights their established importance. Many studies have shown that these variables affect patient outcomes. With respect to age, for example, Degen et al.⁶⁰ conducted a population-based analysis that showed a nearly 5-fold increase in hip arthroscopy revision surgery rates for patients older than 50 years old compared with patients younger than 40 years old (14.3% vs 3.2%, $P < .001$). Lin et al.⁶¹ and Kyin et al.⁶² demonstrated similar outcomes, with both finding a significant correlation between increased age and poorer outcomes following hip arthroscopy (both $P < .001$). With respect to gender, O’Reilly et al.⁶³ found female patients to have worse outcomes compared with male patients after hip arthroscopy with respect to postoperative visual analog scale score (3.51 vs 2.21, $P = .0042$) and Harris Hip Score (76.85 vs 88.02, $P = .003$). Beck et al.⁶⁴ conducted a study that compared both age and gender with functional outcome. In this study, it was found that female patients reached the Harris Hip Score threshold for minimal clinically important difference at a significantly greater rate than male patients after hip arthroscopy for FAI, whereas patients younger than 30 years old achieved minimal clinically important difference at a significantly greater rate compared with patients older than 45 years old for either gender. These findings highlight that both patient age and sex or gender have a significant impact on patient outcomes after hip arthroscopy for FAI, and thus it is expected that these variables be included in RCTs on these subjects.

Like age and sex or gender, race and ethnicity have been shown to influence health outcomes. Hu et al.⁶⁵ showed that African American patients on average experience worse clinical outcomes with greater rates of complication, rehospitalizations, and revision surgery

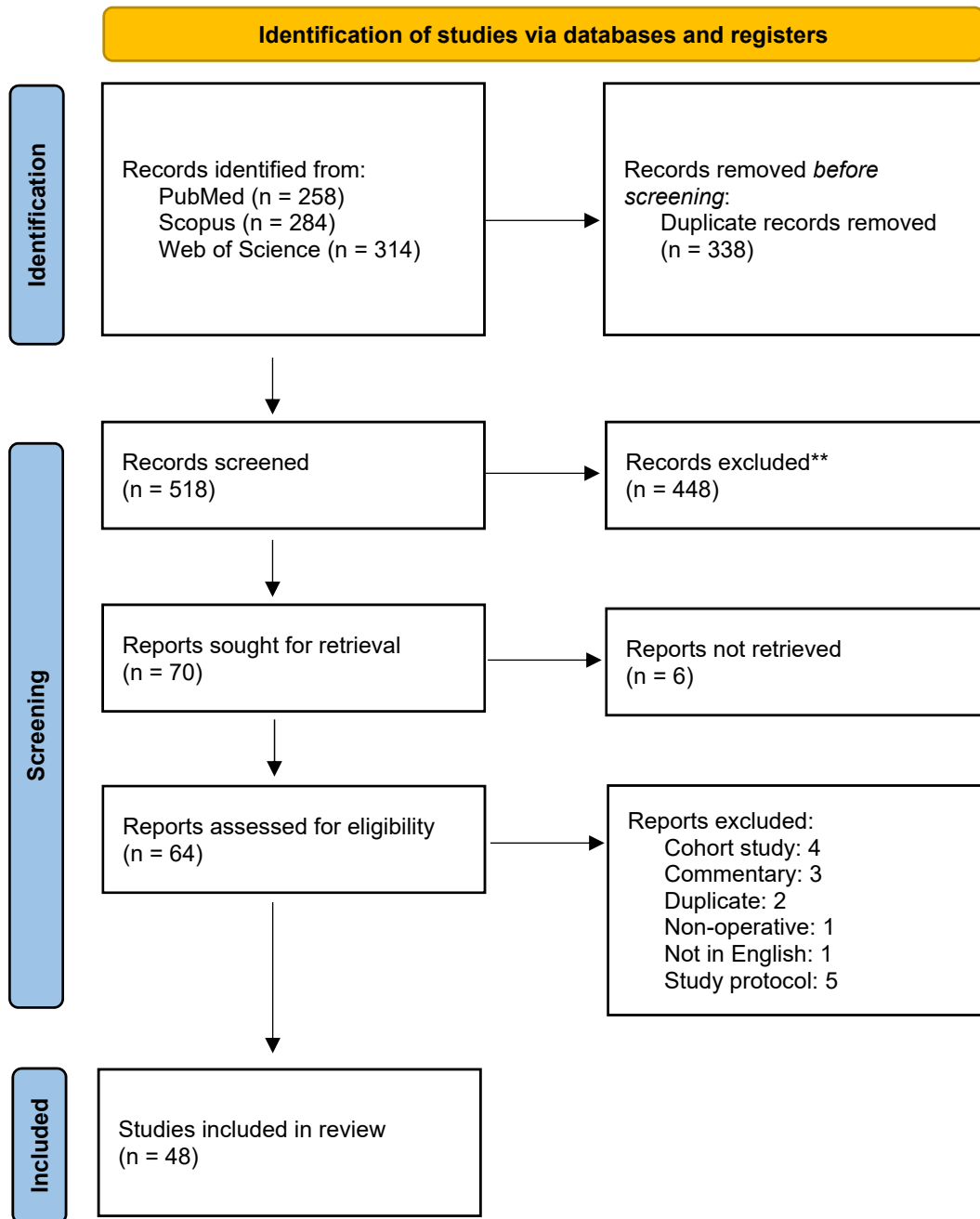


Fig 1. PRISMA flow chart for study selection. (PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.)

after hip arthroscopy. The author attributed these outcomes in large part to societal factors including systemic racism, faults in the health care system, and lower social support. In a study comparing White and Chinese patients, Van Houcke et al.⁶⁶ found that there was a significant difference in hip anatomy, noting that White subjects had a less spherical femoral head and Chinese patients having less lateral acetabular coverage. In addition, Chinese women have a shallower acetabulum compared with men. These findings could have

implications regarding FAI and hip arthroscopy outcomes. Other racial disparities are found in racial underuse of hip arthroscopy. Choi et al.⁶⁷ found that White patients were almost 4 to 5 times more likely to receive hip arthroscopy compared with African American, Hispanic, or Asian patients across the United States. These findings demonstrate the importance of including race in RCTs to control for confounding variables and ensure results are generalizable to patients of different racial backgrounds. Nevertheless, our study

Table 1. Journal and Publication Year of Randomized Controlled Trials

	N	%
Journal		
<i>American Journal of Sports Medicine</i>	8	16.6
<i>Anesthesia & Analgesia</i>	1	2.08
<i>Anesthesiology</i>	2	4.17
<i>Arthroscopy</i>	14	29.2
<i>BMC Musculoskeletal Disorders</i>	1	2.08
<i>The BMJ</i>	1	2.08
<i>British Journal of Sports Medicine</i>	1	2.08
<i>Clinical Journal of Sports Medicine</i>	2	4.17
<i>European Journal of Orthopaedic Surgery and Traumatology</i>	1	2.08
<i>Health Technology Assessment</i>	1	2.08
<i>Hip International</i>	2	4.17
<i>Journal of the American Academy of Orthopaedic Surgeons</i>	1	2.08
<i>Journal of Bone and Joint Surgery</i>	2	4.17
<i>Journal of Clinical Anesthesia</i>	1	2.08
<i>Journal of Clinical Medicine</i>	1	2.08
<i>Journal of Clinical Orthopaedics and Trauma</i>	1	2.08
<i>Journal of International Medical Research</i>	1	2.08
<i>Journal of Hip Preservation Surgery</i>	3	6.25
<i>Knee Surgery, Sports Traumatology, Arthroscopy</i>	2	4.17
<i>The Lancet</i>	1	2.08
<i>Orthopedic Journal of Sports Medicine</i>	1	2.08
Year of publication		
2023	3	6.25
2022	6	12.5
2021	12	25.0
2020	5	10.4
2019	3	6.25
2018	7	14.6
2017	3	6.25
2016	0	0.00
2015	3	6.25
2014	2	4.17
2013	1	2.08
2012	2	4.17
2011	1	2.08

found race to be reported in only 14.6% of RCTs. Our result is in line with prior research by Paul et al.,⁶⁸ who found only 7.3% of the 482 orthopaedic RCTs included race.

Patient work status also has been shown to affect medical and surgical outcomes. This can be assessed in 2 ways: the ability of the therapies to allow patients to return to work (RTW) postoperatively and the access to workers' compensation and its influence on health outcomes. In a 2013 study by Stake et al.,⁶⁹ workers' compensation patients undergoing hip arthroscopy for labral tears had lower pre-operative and postoperative patient reported outcome scores ($P < .001$) compared with control patients. A meta-analysis by Blaeser et al.³ demonstrated a rate of RTW of 71.35% with an average time of RTW of 115 days after hip arthroscopy. The study also found that workers performing light jobs had a significantly greater RTW rate compared with those working more strenuous jobs (odds ratio, 0.53, $P < .05$).³ In our study, only 6.25% of RCTs included

work status. Given the impact of work status on outcomes after hip arthroscopy, it is imperative RCTs include patient work status so that physicians are able to properly counsel patients and manage perioperative expectations.

Socioeconomic status has also been demonstrated to impact health outcomes. Lu et al.⁵ found that across multiple studies, patients with low income have a decreased rate of health care use and increased rates of complications. Our study found that only one included income (2.08%) mentioned patient income status and no studies mentioned housing status. Like socioeconomic status, insurance status has an established impact on health outcomes after FAI. Gillinov et al.⁴ conducted a study that found that Medicaid patients had a significantly greater 90-day complication rate compared to commercially insured patients (odds ratio, 1.2, $P = .02$) after undergoing primary hip arthroscopy for FAI.⁴ None of the studies in our analysis mentioned patient insurance status. Patient educational level and health literacy also has a great impact on health outcomes. A 2020 study by Waryasz et al.⁷⁰ study found that in patients undergoing hip arthroscopy, those with a lower level of education had lower health literacy regarding surgical management and potential complications. In our review, education was included in only 4.17% of RCTs. Studies across health care suggest that low health literacy is associated with worse patient outcomes.⁷¹⁻⁷³

The findings from our study are supported by previous similar studies in other specialties. Driessen et al.⁶ found that radiology RCTs reported race or ethnicity at a rate of 4% and that any sociodemographic variable was reported in 6% of studies. Paul et al.⁸ found that urology RCTs had a 33.3% rate of reporting race and ethnicity variables. Our findings are similar to those in other orthopedic fields as well. Somerson et al.⁷⁴ found race and ethnicity to be included in 20.3% of 158 RCTs across all orthopedic specialties. Certain orthopaedic specialties have been shown to report at greater rates. A 2023 study by Kirchner et al.⁹ found race and ethnicity

Table 2. Variable Inclusion in Femoral Acetabular Impingement and Hip Arthroscopy Randomized Controlled Trials

Factor	Included in Any Section, n (%)
Total	48 (100)
Age	48 (100)
Sex or gender	47 (97.9)
Race	7 (14.6)
Ethnicity	4 (8.33)
Work status	3 (6.25)
Insurance status	0 (0.00)
Income	1 (2.08)
Housing status	0 (0.00)
Education	2 (4.17)

Table 3. Sociodemographic Variable Inclusion in Any Section of the Manuscript by Journal and Year of Publication

Factor	n/total	Percent	P
Journal			.666
<i>American Journal of Sports Medicine</i>	3/8	37.5	
<i>Anesthesia & Analgesia</i>	1/1	100	
<i>Anesthesiology</i>	0/2	0.00	
<i>Arthroscopy</i>	2/14	14.3	
<i>BMC Musculoskeletal Disorders</i>	0/1	0.00	
<i>The BMJ</i>	0/1	0.00	
<i>British Journal of Sports Medicine</i>	0/1	0.00	
<i>Clinical Journal of Sports Medicine</i>	1/2	50.0	
<i>European Journal of Orthopaedic Surgery and Traumatology</i>	0/1	0.00	
<i>Health Technology Assessment</i>	0/1	0.00	
<i>Hip International</i>	0/2	0.00	
<i>Journal of the American Academy of Orthopaedic Surgeons</i>	1/1	100	
<i>Journal of Bone and Joint Surgery</i>	0/2	0.00	
<i>Journal of Clinical Anesthesia</i>	0/1	0.00	
<i>Journal of Clinical Medicine</i>	0/1	0.00	
<i>Journal of Clinical Orthopaedics and Trauma</i>	0/1	0.00	
<i>Journal of International Medical Research</i>	0/1	0.00	
<i>Journal of Hip Preservation Surgery</i>	0/3	0.00	
<i>Knee Surgery, Sports Traumatology, Arthroscopy</i>	1/2	50.0	
<i>The Lancet</i>	0/1	0.00	
<i>Orthopedic Journal of Sports Medicine</i>	0/1	0.00	
Year of publication			.761
2023	0/3	0.00	
2022	3/6	62.5	
2021	3/12	23.1	
2020	1/5	20.0	
2019	0/3	0.00	
2018	1/7	12.5	
2017	0/3	0.00	
2016	0/0	0.00	
2015	0/3	0.00	
2014	0/2	0.00	
2013	0/1	0.00	
2012	1/2	50.0	
2011	0/1	0.00	

to be reported in 37% and 27.8% respectively of spine surgery RCTs.

In summary, our findings demonstrate a lack of sociodemographic variable reporting in the FAI and hip arthroscopy RCTs despite the fact that some of these variables have been shown to have a significant effect on patient health outcomes. There are many reasons why this is a cause for concern. By failing to report these variables, it is difficult to know whether study results are generalizable. This limits our ability to be confident when applying these results to different patient populations and creates a substantial degree of imprecision when counseling patients. Furthermore, failing to report sociodemographic variables makes it impossible to control for potential confounding sociodemographic variables, which thus decreases confidence in the results of

our RCTs. In order to correct these oversights, we believe RCTs should be held accountable for including these variables in the data they collect. Future studies on sociodemographic variable reporting in FAI and hip arthroscopy RCTs should focus on how variable reporting can improve patient outcomes and better manage expectations in the perioperative period.

Limitations

This study had several limitations. A great number of socioeconomic and demographic variables have either been shown to affect health outcomes or could be hypothesized to do so. As this was a finite study, we could not include all of them and may have left out variables that will be shown to have an impact on outcomes after hip arthroscopy for FAI. Nevertheless, we believe we have included the most relevant sociodemographic variables at this time. Furthermore, although our study design allowed for an effective presentation of sociodemographic variable reporting, it did not explore the ways specific sociodemographic variables affect health outcomes.

Conclusions

This study found that sociodemographic variables in FAI and hip arthroscopy RCTs are reported with much lower frequency than age and sex or gender. These findings may demonstrate the need to include patient sociodemographic data in RCTs so that their results can be better generalized and applied to the appropriate patient population.

Disclosure

The authors declare the following financial interests/ personal relationships which may be considered as potential competing interests: J.N.L. reports a relationship with Stryker Orthopaedics that includes speaking and lecture fees and a relationship with Innocoll Biotherapeutics NA Inc that includes travel reimbursement. F.A.P. reports a relationship with Exactech that includes consulting or advisory, a relationship with Stryker Orthopaedics that includes consulting or advisory, and a relationship with OSSIO that includes consulting or advisory. All other authors (J.L.K., A.F., P.K., C.K.M., M.O.) declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. Full ICMJE author disclosure forms are available for this article online, as [supplementary material](#).

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