

## Article

# Pregnancy-Related Decision-Making and Perceptions of Risk among Reproductive-Age Females Undergoing Hip Arthroscopy for Femoroacetabular Impingement Syndrome: A Single-Surgeon Cross-Sectional Study

Dhruv S. Shankar , Zachary I. Li , Jairo Triana , Jordan A. Eskenazi, Rae Lan, Andrew J. Hughes  and Thomas Youm \* 

Department of Orthopedic Surgery, New York University Langone Health, 333 East 38th St, 4th Floor, New York, NY 10016, USA

\* Correspondence: thomas.youm@nyulangone.org

**Abstract:** Females of reproductive age constitute one of the largest demographics of the hip arthroscopy population, but it is unclear as to how pregnancy planning affects decision-making regarding surgery or vice versa. The purpose of this study was to assess perceived risks to pregnancy from hip pain and/or hip arthroscopy among reproductive-age females who underwent arthroscopic treatment of femoroacetabular impingement syndrome (FAIS). A cross-sectional study was conducted involving females aged 18–44 years who underwent hip arthroscopy for the treatment of FAIS, with a single surgeon included in the study. Subjects completed a survey that assessed obstetric and gynecologic history, decision-making regarding the planning and timing of hip surgery and pregnancy, and perceived risks to pregnancy from hip pain and/or hip surgery. Subjects were classified as nulligravid (Group 1), pregnant at least once before hip surgery but never again following hip surgery (Group 2), or pregnant at least once following hip surgery (Group 3). A total of 85 patients were enrolled with a mean age of  $32.3 \pm 6.5$  years at the time of surgery. The mean follow-up time was  $51.9 \pm 34.5$  months. There were 39 subjects in Group 1 (45.9%), 20 in Group 2 (23.5%), and 26 in Group 3 (30.6%). About half of all subjects expressed “some” to “a lot of” concern that their hip pain could get worse during pregnancy (49.4%), and about half had “no concern” that hip arthroscopy would affect the health of their fetus/baby (54.1%). Reproductive-age females undergoing hip arthroscopy for FAIS generally consider the procedure to be safe with respect to future pregnancy outcomes.

**Keywords:** hip arthroscopy; pregnancy; femoroacetabular impingement syndrome; labral tear; hip pain



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## 1. Introduction

Over the past decade, hip arthroscopy has become the operative treatment of choice for addressing hip pain and dysfunction secondary to femoroacetabular impingement syndrome (FAIS) and associated labral tearing [1]. Hip arthroscopy for the treatment of FAIS has been consistently associated with high rates of return to sport and significant pre-to-postoperative improvement in patient-reported outcome measures of pain and physical function at long-term follow-up [2,3]. The incidence of hip arthroscopy is known to be higher among females, and a majority of patients undergoing hip arthroscopy are between the ages of 18–42 years old [1]. By extension, females of reproductive age make up one of the largest demographics of the hip arthroscopy population. There are a variety of non-clinical factors such as finances, personal time commitments, employment status, and expectations of therapeutic benefit that can influence patients’ decisions to undergo or defer elective surgeries such as hip arthroscopy, and among reproductive-age females, planning for future pregnancy could potentially be one such factor.

It is known that over 50% of females experience lumbopelvic or hip pain during pregnancy [4], and thus, it stands to reason that some reproductive-age females with FAIS and labral tearing may seek out operative treatment in anticipation of their hip pain worsening during a future pregnancy. Indeed, anecdotal evidence from the senior author's clinical practice supports the notion that reproductive planning is a major consideration among female patients who decide to undergo hip arthroscopy. However, most of the literature on hip surgery and pregnancy planning/outcomes pertains to total hip arthroplasty rather than arthroscopy [5–8], and there is a dearth of literature exploring whether pregnancy planning is a major factor in female patients' decisions to undergo hip arthroscopy.

The purpose of this study was to assess perceived risks to pregnancy from hip pain and/or hip arthroscopy among reproductive-age females who underwent arthroscopic treatment of FAIS. It was hypothesized that most patients would consider the possibility of hip pain getting worse during pregnancy as a major factor in their decision to undergo hip arthroscopy based on anecdotal evidence from the senior author's practice.

## 2. Materials and Methods

### 2.1. Study Design and Setting

A cross-sectional study was conducted involving the patients of a single sports medicine fellowship-trained surgeon at a single urban academic medical center.

### 2.2. Ethical Approval

Ethical approval was obtained from the New York University Langone Health institutional review board (approval #20-01686) before commencing any study procedures. A waiver of consent was obtained for patient recruitment.

### 2.3. Patient Population and Eligibility Criteria

Eligible subjects were identified using a prospectively collected database of patients who underwent hip arthroscopic procedures performed by a single surgeon (T.Y.) between 1 January 2010 and 31 December 2020. Inclusion criteria were: (1) primary or revision hip arthroscopy for the indication of symptomatic FAIS with or without associated labral tears and (2) biological females of reproductive age (18–44 years old) [9] at the time of surgery. Primary arthroscopic procedures included labral repair and/or debridement, labral reconstruction, femoral osteochondroplasty, and acetabuloplasty. Exclusion criteria were: (1) hip arthroscopy for primary indication besides FAIS (ex. septic hip, snapping hip syndrome), (2) infertility at the time of surgery due to biological or pathological causes, or (3) age outside of inclusion age range. As this was a cross-sectional study, there was no minimum follow-up time for inclusion.

### 2.4. Diagnostic Protocol and Surgical Indications

The senior author's indications for performing hip arthroscopy for FAIS were based on a combination of physical exam and radiographic findings. Patients with a clinical history of pain localized to the hip underwent provocative testing using the anterior impingement test and Patrick test. Standing anteroposterior (AP), 45° and 90° Dunn view radiographs of the pelvis were obtained to assess for FAI bony morphology. Magnetic resonance imaging (MRI) or magnetic resonance arthrography (MRA) were used to assess for chondrolabral pathology. Radiographic evidence of FAIS included lateral center edge angle (LCEA)  $> 40^\circ$ , alpha angle  $\geq 60^\circ$ , and/or acetabular retroversion (proximal crossover sign) on the pelvic X-ray, with labral tears and focal chondrolabral delamination identified on MRI or MRA. For the purposes of this study, acetabular retroversion refers to focal proximal retroversion and not acetabular retroversion associated with hip dysplasia.

Once a diagnosis of FAIS was made, hip arthroscopy was not considered until patients failed non-operative treatment, during which they attempted at least six weeks of physical therapy. Hip arthroscopy was contraindicated in patients with evidence of hip osteoarthritis, which included Tönnis grade  $> 1$  or hip dysplasia indicated by LCEA  $< 20^\circ$ .

### 2.5. Surgical Technique and Postoperative Protocol

The senior author's preferred surgical technique and postoperative protocol have been previously described in depth [10,11]. To summarize briefly, all procedures were performed under general or regional anesthesia in the supine position on a hip distractor system. Arthroscopy was performed through standard anterolateral and mid-anterior portals. The capsule was accessed using an interportal capsulotomy and imbricated at the end of the case. Labral repair (with suture anchors), debridement, and/or reconstruction (with peroneal longus allograft) were performed as clinically appropriate. Cam and pincer resections were performed under dynamic examination with fluoroscopy. The capsule was routinely repaired at the conclusion of the case. All patients were foot-flat weight-bearing in a hip brace for at least one month following surgery. With regard to physical therapy, patients progressed their internal rotation Range of Motion (ROM) for the first month; progressed their external rotation ROM and participated in strength and balance training for the second month; participated in endurance and dynamic balance activities for the third month; and finally advanced to treadmill running and sport-specific agility drills during months 3–6.

### 2.6. Demographic and Operative Information

Demographics (age, sex, and body mass index) and operative information (procedure laterality, procedures performed, and intraoperative findings) were abstracted from clinic visit notes and intraoperative reports.

### 2.7. Survey Description

This study survey was designed and administered electronically using REDCap data collection software version 13.7.31 (Vanderbilt University, Nashville, TN, USA) [12,13]. Patients were initially contacted via phone call to inquire about their disposition to receive a survey regarding reproductive decision-making and pregnancy in the setting of planned hip arthroscopy. Upon acceptance of participation, surveys were distributed via email to all agreeable subjects.

The survey assessed obstetric and gynecologic history, decision-making regarding the planning and timing of hip surgery and pregnancy, and perceived risks to pregnancy from hip pain and/or hip surgery. The survey was designed to display or omit questions based on whether the respondent fell into one of three categories: (1) nulligravid, (2) pregnant at least once before hip surgery but never again following hip surgery, or (3) pregnant at least once following hip surgery. These categories were designated Groups 1, 2, and 3, respectively.

#### 2.7.1. Obstetric and Gynecologic (OB/GYN) History

All subjects were asked if they had ever been pregnant in their life, and if so, how many times they had been pregnant (gravida) and how many of those pregnancies resulted in a live birth (para). Subjects were also asked if they had a pregnancy after their hip surgery, and if so, how long after their surgery did the pregnancy occur. All subjects were asked whether they were considering pregnancy in the future.

#### 2.7.2. Surgical and Pregnancy Planning

Group 1 (nulligravid) subjects were asked to rank the extent to which their hip pain was a factor in delaying or avoiding pregnancy on a 4-point Likert scale ranging from "the main factor" to "not a factor". Group 1 subjects were also asked to rank the extent to which their plans to undergo hip surgery were a factor in delaying or avoiding pregnancy on a 4-point Likert scale. Group 3 subjects (those pregnant after hip surgery) were asked whether or not they had concerns about having hip pain during pregnancy that affected their decision to get hip surgery prior to getting pregnant and, if so, whether or not they were satisfied with their decision to get surgery prior to getting pregnant, whether or not they felt the surgery allowed them to have an uneventful pregnancy, whether or not the

expectation of getting pain relief from surgery was a factor in their decision to get pregnant, and whether or not surgery caused them to delay their plans for pregnancy.

### 2.7.3. Perception of Risks to Pregnancy from Hip Pain and Hip Surgery

All subjects were asked to rank the extent to which their hip pain caused them concern about the following issues on a 4-point Likert scale ranging from “a lot of concern” to “no concern”: hip pain getting worse during pregnancy, having complications during pregnancy, having complications during labor, having complications after delivery, having impaired hip function after pregnancy, and affecting the health of the fetus/newborn. Subjects were then asked to rank the extent to which their hip surgery caused them concern about the same issues using the same 4-point Likert scale.

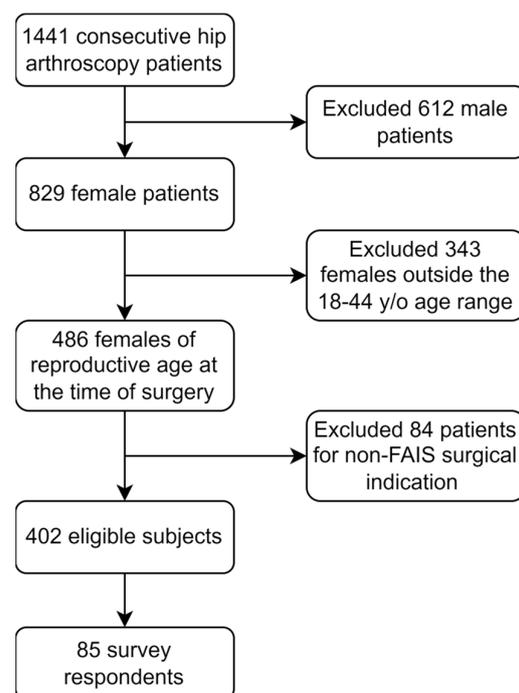
### 2.8. Statistical Analysis

All statistical analyses were performed in SAS Studio version 9.4 (SAS Institute, Cary, NC, USA). Descriptive statistics were calculated for all variables, including means and standard deviations for continuous variables and counts and percentages for categorical variables. Continuous variables were assessed for normality using the Shapiro-Wilk test. For normally distributed continuous variables, inter-group comparisons were performed using analysis of variance (ANOVA) with Tukey post-hoc testing, and intra-group time point comparisons were performed using Student’s one-sample *t*-test. For non-normally distributed continuous variables, inter-group comparisons were performed using the Kruskal-Wallis test with Dwass-Steel-Critchlow-Fligner (DSCF) post-hoc testing, and intra-group time point comparisons were performed using the Wilcoxon signed-rank test. Categorical variables were compared using Fisher’s exact test. All *p*-values < 0.05 were considered significant.

## 3. Results

### 3.1. Patient Flow

Patient flow through this study is summarized in Figure 1. Out of 402 subjects that met eligibility criteria, 85 (21.1%) responded to the study’s survey.



**Figure 1.** Patient flow through this study.

### 3.2. Subject Demographics

Subject demographic data is presented in Table 1. Of the 85 subjects, 39 were in Group 1 (45.9%), 20 were in Group 2 (23.5%), and 26 were in Group 3 (30.6%). The mean age of this study's sample was  $32.3 \pm 6.5$  years (range 18–44), and the mean BMI was  $24.5 \pm 4.7$ . Group 1 subjects were significantly younger on average ( $29.6 \pm 6.6$  years) than Group 2 subjects ( $36.6 \pm 5.4$  years) and Group 3 subjects ( $33.2 \pm 5.1$  years) ( $p = 0.002$ ). There were no statistically significant inter-group differences in BMI, incidence of prior surgery on the index hip, or time elapsed between surgery and survey completion (all  $p > 0.05$ ).

**Table 1.** Demographics and obstetric/gynecologic history.

Variable <sup>a</sup>	All subjects ( <i>n</i> = 85)	Group 1 <sup>b</sup> ( <i>n</i> = 39)	Group 2 <sup>b</sup> ( <i>n</i> = 20)	Group 3 <sup>b</sup> ( <i>n</i> = 26)	<i>p</i> -Value <sup>c</sup>
Number of subjects	85	39	20	26	-
Age at the time of surgery (years)	$32.3 \pm 6.5$	$29.6 \pm 6.6$	$36.6 \pm 5.4$	$33.2 \pm 5.1$	0.002 * 1 < 3 2 < 3
BMI at the time of surgery	$24.5 \pm 4.7$	$24.2 \pm 4.2$	$26.5 \pm 6.8$	$23.2 \pm 2.6$	0.62
Prior surgery on the index hip	8 (9.4%)	6 (15.4%)	1 (5.0%)	1 (3.9%)	0.31
Gravidity	n/a	G0: 39 (100.0%)	G1: 5 (25.0%) G2: 6 (30.0%) G3: 1 (5.0%) G4: 4 (20.0%) G5: 3 (15.0%) G6: 1 (5.0%)	G1: 11 (42.3%) G2: 10 (38.5%) G3: 4 (15.4%) G4: 0 (0.0%) G5: 1 (3.9%) G6: 0 (0.0%)	n/a
Parity	n/a	P0: 39 (100.0%)	P0: 4 (20.0%) P1: 2 (10.0%) P2: 8 (40.0%) P3: 4 (20.0%) P4: 2 (10.0%)	P0: 1 (3.9%) P1: 12 (46.2%) P2: 12 (46.2%) P3: 1 (3.9%) P4: 0 (0.0%)	n/a
Time from surgery to subsequent pregnancy (months)	$51.9 \pm 34.5$	$46.8 \pm 33.6$	$48.1 \pm 31.3$	$62.6 \pm 36.8$	0.23
Considering future pregnancy	43 (50.6%)	28 (71.8%)	2 (10.0%)	13 (50.0%)	<0.001 *
Time elapsed from surgery to survey response (months)	$51.9 \pm 34.5$	$46.8 \pm 33.6$	$48.1 \pm 31.3$	$62.6 \pm 36.8$	0.23

<sup>a</sup> Continuous variables are reported as mean  $\pm$  standard deviation, categorical variables are reported as count (%);

<sup>b</sup> Group 1—nulligravid, Group 2—pregnant at least once before hip surgery but never again following hip surgery, Group 3—pregnant at least once following hip surgery; <sup>c</sup> Significant pairwise comparisons on post-hoc testing are reported for continuous variables; \* *p*-value < 0.05; Abbreviations: BMI—body mass index, n/a—not applicable.

### 3.3. OB/GYN History

OB/GYN history data is presented in Table 1. Most subjects reported gravidity of 1 (16 subjects, 34.8%) or 2 (16 subjects, 34.8%), and the highest reported gravidity was 6. There was a higher proportion of primigravids in Group 3 (11 subjects, 42.3%) compared to Group 2 (5 subjects, 25.0%). Most subjects reported a parity of 1 (13 subjects, 28.9%) or 2 (20 subjects, 44.4%), and the highest reported parity was 4. Among the 46 subjects who had been pregnant at least once (i.e., Groups 2 and 3), five reported nulliparity (10.9%), of whom four were in Group 2 (4 of 20 subjects, 20.0%). About half of all the subjects were considering pregnancy in the future (43 subjects, 50.6%), with the highest proportion among Group 1 (28 subjects, 71.8%) followed by Group 3 (13 subjects, 50.0%) and Group 2 (2 subjects, 10.0%).

### 3.4. Pregnancy Decision-Making among Group 1 Subjects (Nulligravidae)

Among Group 1 subjects, the majority stated that hip pain was “not a factor” in their decision to delay or avoid pregnancy (32 subjects, 82.1%), while five subjects (12.8%) said it was a “major factor”, one subject (2.6%) said it was a “minor factor”, and one subject (2.6%) did not respond. Furthermore, the majority stated that planning for hip surgery was “not a factor” in their decision to delay or avoid pregnancy (33 subjects, 84.6%), while one subject (2.6%) said it was a “major factor”, three subjects (7.7%) said it was a “minor factor”, and two subjects (5.1%) did not respond.

### 3.5. Pregnancy Decision-Making among Group 3 Subjects

Among Group 3 subjects, half (13 subjects) reported that their concerns about having hip pain during pregnancy affected their decision to undergo surgery prior to getting pregnant, while the other half reported that these concerns were “not a factor” in their decision. Among the 13 subjects who answered in the affirmative, 12 (92.3%) reported that they were satisfied with their decision to undergo surgery prior to getting pregnant. Of these same 13 subjects, eight (61.5%) stated that they felt their hip surgery allowed them to have an uneventful pregnancy, two (15.4%) stated that they did not feel this way, and three (23.1%) stated that they were unsure of how they felt. Most Group 3 subjects stated that the expectation of getting pain relief from hip surgery was “not a factor” in their decision to get pregnant (16 subjects, 61.5%) and that their hip surgery did not cause them to delay plans for pregnancy (18 subjects, 69.2%).

### 3.6. Hip Pain and Perceived Risks to Pregnancy

Subjects’ concerns about the impact of their hip pain on pregnancy outcomes are summarized in Figure 2. Subjects most frequently expressed the highest level of concern (“a lot of concern”) to the following scenarios: hip pain getting worse during pregnancy (25 subjects, 29.4%), having complications during labor (23 subjects, 27.1%), and having impaired hip function after pregnancy (23 subjects, 27.1%). Conversely, subjects most frequently expressed the lowest level of concern (“no concern at all”) to the following scenarios: affecting the health of the fetus/baby (46 subjects, 54.1%), having complications during pregnancy (29 subjects, 34.1%), and having complications during labor (26 subjects, 30.6%).

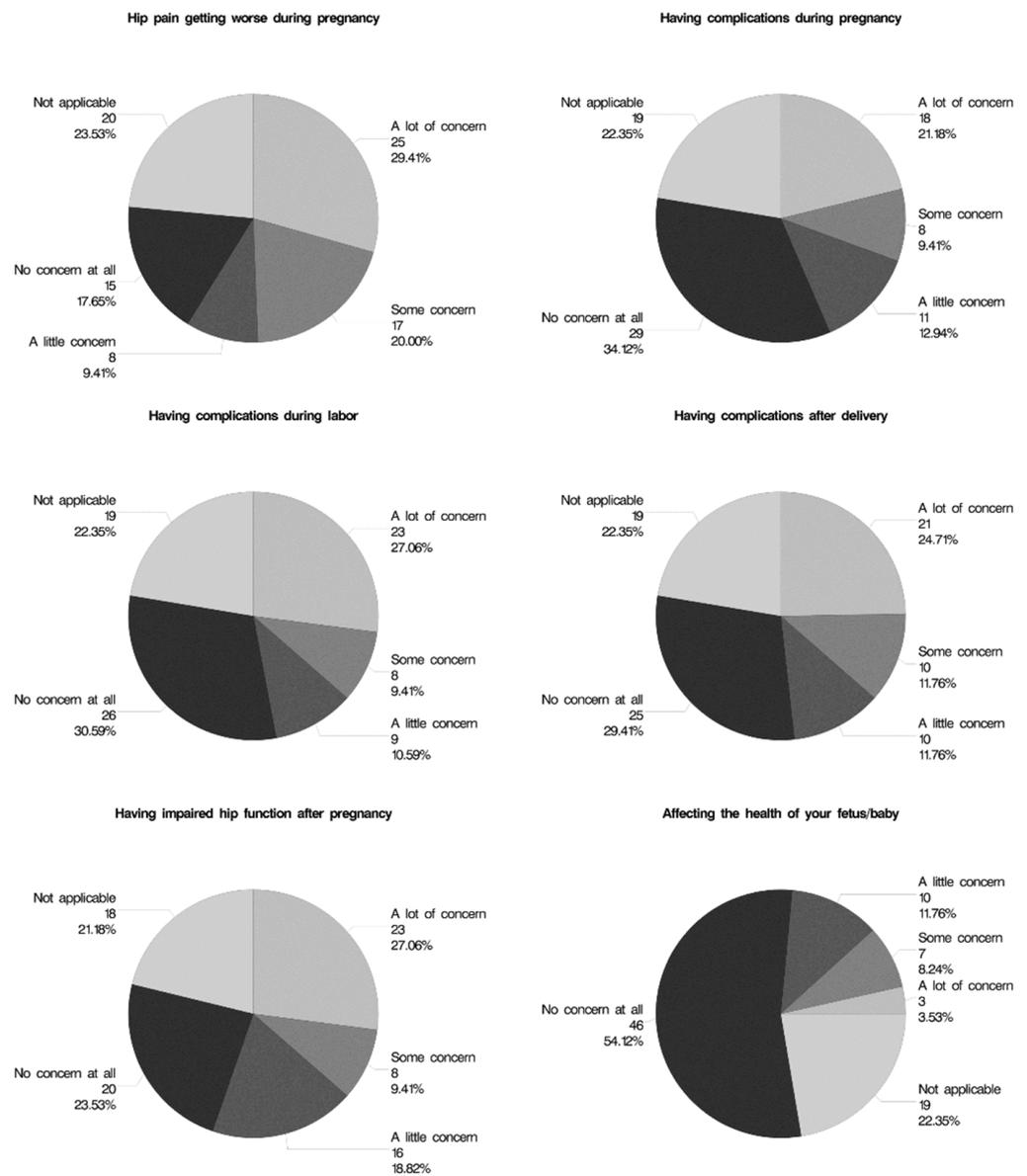
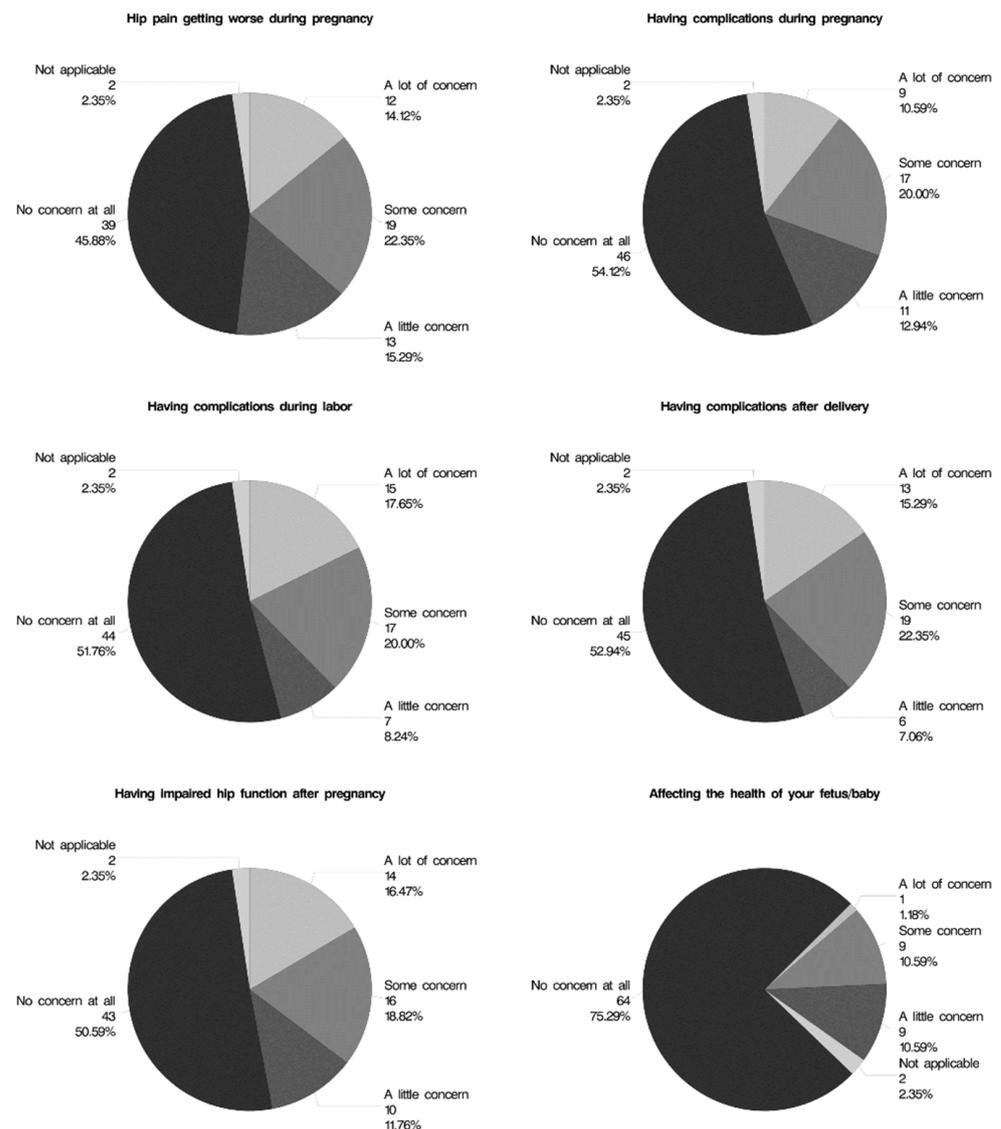


Figure 2. Subjects’ perceptions of the risks of hip pain on pregnancy outcomes.

### 3.7. Hip Surgery and Perceived Risks to Pregnancy

Subjects’ concerns about the impact of hip arthroscopy on pregnancy outcomes are summarized in Figure 3. Subjects most frequently expressed the highest level of concern (“a lot of concern”) to the following scenarios: having complications during labor (15 subjects, 17.7%), having impaired hip function after pregnancy (14 subjects, 16.5%), and having complications after delivery (13 subjects, 15.3%). Conversely, subjects most frequently expressed the lowest level of concern (“no concern at all”) to the following scenarios: affecting the health of the fetus/baby (64 subjects, 75.3%), having complications during pregnancy (46 subjects, 54.1%), and having complications after delivery (45 subjects, 52.9%).



**Figure 3.** Subjects' perceptions of the risks of hip surgery on pregnancy outcomes.

#### 4. Discussion

The primary finding of this study was that most reproductive-age females undergoing hip arthroscopy for FAIS and labral tearing were not concerned that their surgery would affect the health of their future fetus/baby nor that it would cause complications during pregnancy or after delivery. Furthermore, a majority of nulligravidae with FAIS did not consider their baseline hip pain to be a major factor in deciding not to become pregnant, while subjects who became pregnant after hip arthroscopy were split evenly as to whether their hip pain before pregnancy affected their decision to undergo surgery before getting pregnant. The overall findings suggest that females of reproductive age with FAIS do not consider hip arthroscopy to be harmful to pregnancy outcomes, and also, the possible detrimental impact of pre-existing hip pain on future pregnancies is not a major impetus for undergoing arthroscopic treatment.

Intrapartum and postpartum hip pain is a common occurrence among reproductive-age females and has been attributed to various anatomic and physiological changes associated with pregnancy [4]. First, weight gain during pregnancy results in increased loading of the hip joints and biomechanical changes in hip joint function [14], which in turn may predispose patients to the development of FAIS and other intra-articular hip pathologies [15]. Second, serum relaxin levels are elevated during pregnancy and are

associated with increased soft tissue and joint laxity [16], which in turn may increase the risk of hip labral injury during pregnancy. Third, lithotomy positioning during vaginal delivery, which involves forced hip flexion and internal rotation, can potentially lead to acetabular labral tears [17]. Fourth, there is some evidence that deep tissue pain sensitivity increases during pregnancy, perhaps due to both physical and psychological changes [18], and one could speculate that this contributes to the onset of hip pain or worsening of pre-existing hip pain from FAIS during pregnancy. It should be noted that sources of hip pain during pregnancy include both extra-articular (ex. trochanteric bursitis) and intra-articular (ex. FAIS, labral tearing) etiologies, and it is unclear what percentage of patients with intrapartum/postpartum hip pain have intra-articular pathology or FAIS specifically [4]. Nonetheless, it is reasonable to assume that at least some proportion of the reproductive-age female population will experience hip pain secondary to FAIS and labral tearing before, during, and after pregnancy, and thus, there exists a need to understand the role of hip arthroscopy for managing these symptoms.

There are currently no recommendations from the Centers for Disease Control and Prevention (CDC) or the American College of Obstetricians and Gynecologists (ACOG) regarding when to perform hip arthroscopy in patients planning to become pregnant. While the ACOG recommends that elective surgeries for pregnant patients be postponed until after delivery [19], there is little guidance on whether or not to seek elective surgery for hip pain before pregnancy, how long to wait after surgery before becoming pregnant, or how prior hip arthroscopy may affect pregnancy outcomes. The lack of recommendations on this subject is reflective of the sparse research on hip arthroscopy and pregnancy decision-making and outcomes. However, there does exist some rationale for reproductive-age females to undergo hip arthroscopy for FAIS prior to becoming pregnant. First, arthroscopic treatment of FAIS could improve the hip range of motion and alleviate positional tenderness [20], making it easier for pregnant patients to remain in a lithotomy position during labor and delivery. Second, arthroscopic treatment of FAIS may help to alleviate sexual dysfunction caused by painful hip flexion and abduction during intercourse [21,22], and this could help facilitate female patients' efforts to become pregnant. Third, there is some evidence that females less than 30 years old may achieve clinically significant thresholds of improvement, such as the minimum clinically important difference (MCID) and patient acceptable symptom state (PASS) at higher rates than their male or older counterparts following hip arthroscopy [23], and, thus, it may make sense for them to address their FAIS-related hip pain prior to pregnancy since there is expectation of therapeutic benefit.

Conversely, there are some hypothetical risks to undergoing hip arthroscopy prior to pregnancy. Two case reports have described female patients who had previously undergone hip arthroscopy for FAIS and labral tearing and later developed rapidly progressive osteoarthritis during pregnancy, resulting in the need for a total hip arthroplasty (THA) postpartum [24,25]. Both reports attributed this progression to a transient state of ligamentous laxity due to elevated levels of progesterone, estrogen, and relaxin during pregnancy in combination with a dysplastic acetabulum (either congenital or iatrogenic) and joint instability [24,25]. However, it is unclear whether rapid weight gain during pregnancy may have also played a role in the onset of hip osteoarthritis [14,24]. In the absence of any larger studies on this pathology, it can be assumed that this is a rare sequelae of hip arthroscopy and of minor concern to most reproductive-age females seeking treatment for FAIS.

Given the paucity of research on hip arthroscopy and pregnancy outcomes with which to guide preoperative counseling, it may be necessary to extrapolate some results from the hip arthroplasty literature. Considerations regarding pregnancy have been investigated following THA, with substantial attention placed on clinical outcomes, safety, and prosthesis durability [26]. Meldrum et al. [27] reported on pregnancy-related issues and outcomes in 13 women who became pregnant at a mean of three years after THA and found no hip-related obstetric complications with either vaginal or Cesarean delivery [5,6,8]. Meldrum et al. also described significantly higher mean Harris Hip Score (mHHS) in patients that became pregnant after THA (mean 93) compared to patients that did not

(mean 80). Sierra et al. [8] conducted a survey of 47 women who experienced increased pain with pregnancy following THA, in which 76% reported pain occurrence during the third trimester. Among the Sierra et al. study sample, seven subjects reported persistent pain after pregnancy that was predominantly located in the groin. An important caveat when comparing pregnancy-related studies between hip arthroplasty versus arthroscopy populations is that THA in females of reproductive age is usually indicated for congenital hip dysplasia, avascular necrosis, advanced degenerative joint disease, and/or systematic inflammatory arthropathies [27,28]. Therefore, the comparability of pregnancy-related research in the THA population to the hip arthroscopy population is limited by the significant comorbidities prevalent among young patients indicated for arthroplasty.

Ultimately, while the present study suggests that reproductive-age female patients with FAIS regard hip arthroscopy as a safe intervention with regard to its potential impact on future pregnancies, it is clear that additional research is necessary to assess the effects of these procedures on pregnancy outcomes and to determine whether or not surgical treatment of FAIS before versus after pregnancy results in superior hip pain and functional outcomes. In lieu of more robust evidence, the authors propose the following conservative recommendations: (1) physical exam and imaging findings should be used to distinguish intra-articular versus extra-articular causes of hip pain in peripartum patients, (2) elective hip arthroscopy should not be performed during pregnancy as per ACOG guidelines [19], (3) reproductive-age females seeking arthroscopic treatment of FAIS should be made aware of the potential risk for rapidly progressive osteoarthritis during pregnancy [24,25], (4) surgeons should inquire about sexual dysfunction in female patients with FAIS and whether this is a barrier to attempts to become pregnant [21,22], and (5) reproductive-age female patients should be counseled about their expected outcomes following hip arthroscopy relative to their male and older counterparts [23].

#### *Limitations*

We note several limitations of the present study design. First, the present study employed a cross-sectional design and thus could not assess how survey responses may have changed over time (e.g., before/after surgery, before/after pregnancy). Second, survey respondents were asked to retrospectively recall perceptions and attitudes they had prior to undergoing hip arthroscopy, and thus, all survey responses are subject to recall bias. Third, this study's survey did not assess pregnancy-related decision-making among subjects who were pregnant before their surgery but not after (i.e., Group 2 subjects). Fourth, the survey response rate was low, with only 85 of 402 eligible patients responding (21.1%). Therefore, the results may be affected by non-response bias and may underrepresent patients who had poor surgical outcomes and were more likely to be lost to follow-up. Fifth, this study's sample included patients who underwent both primary and revision hip arthroscopy. Specifically, the nulligravid group (Group 1) had a non-significantly higher proportion of revision procedures than the multigravid groups (Groups 2 and 3), and this may have been a confounding factor in the results.

#### **5. Conclusions**

Reproductive-age females undergoing hip arthroscopy for FAIS generally consider the procedure to be safe with respect to future pregnancy outcomes.

**Author Contributions:** Conceptualization, T.Y.; Data curation, D.S.S., Z.I.L., J.T., J.A.E. and R.L.; Formal analysis, D.S.S.; Investigation, Z.I.L., J.T., J.A.E. and R.L.; Methodology, D.S.S. and Z.I.L.; Project administration, T.Y.; Software, D.S.S.; Supervision, A.J.H. and T.Y.; Visualization, D.S.S.; Writing—original draft, D.S.S., Z.I.L. and J.T.; Writing—review and editing, Z.I.L., J.T., A.J.H. and T.Y. All authors have read and agreed to the published version of the manuscript.

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**Institutional Review Board Statement:** This study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of New York University Langone Health (protocol code 20-01686, approved 25 October 2020).

**Informed Consent Statement:** Patient consent was waived due to this study being deemed “minimal risk” by the Institutional Review Board.

**Data Availability Statement:** The data for this study is not publicly available.

**Conflicts of Interest:** T.Y. has received intellectual property royalties, consulting fees, and speaker fees from Arthrex, Inc. that are not related to this study. The remaining authors have no financial or non-financial conflicts of interest to disclose.

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