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Original Research

Understanding Hip Pain Through Social Media: An Initial Overview of an International Web-Based Survey

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ABSTRACT

Background: We aimed to understand the adult experience of hip pain through a web-based REDCap platform via social media. The purpose of this study was to assess the possibility of collecting patient-reported data through social media in people with hip pain while outlining the contents of the survey and analyzing the demographics of the sample population.

Methods: The survey link was active from October 1, 2023, to May 1, 2024, and available on social media platforms. Respondents provided consent prior to survey participation. Responses were anonymous, and only unique, fully complete surveys were analyzed. The comprehensive hip survey included demographic and overall health reporting, as well as hip-specific diagnoses, hip-specific functional measures, and mental health outcomes.

Results: Six hundred twenty-seven surveys were initiated, with 509 surveys completed. Twenty-six countries were represented with most responses originating from the United States (72.1%, n = 367), United Kingdom (10%, n = 51), Canada (5.5%, n = 28), and Australia (4.1%, n = 21). Ninety-three percent of respondents were women, with a mean age of 39 (range: 18-77). Top diagnoses reported were hip dysplasia (60.9%, n = 310), femoroacetabular impingement syndrome (45.2%, n = 230), Perthes disease (6.4%, n = 33), and osteoarthritis (6.3%, n = 32). Seventy-one percent (n = 366) reported previous hip surgery, with hip arthroscopy (60.7%, n = 222), periacetabular osteotomy (50.3%, n = 184), and total hip arthroplasty (24.3%, n = 89) being the most reported procedures.

Conclusions: This study demonstrates the feasibility of utilizing social media for a comprehensive web-based survey to gather patient-reported outcomes from individuals with various sources of hip pain internationally.

Introduction

Hip pain is a widespread concern of patients across all age demographics, often leading to a loss of function, diminished quality of life, and increased psychological distress [1-4]. Roughly 14% of patients in the United States over the age of 60 years report hip pain [5,6]. Potential diagnoses of hip pain can be varied, but common causes include hip dysplasia, femoroacetabular impingement syndrome (FAI), Perthes disease, slipped capital femoral epiphysis (SCFE), labral tears, osteonecrosis, and osteoarthritis (OA), with these diseases frequently overlapping [1,2].

Social media and web-based surveys are becoming more popular due to cost-effectiveness and the ability to reach large audiences [7-11]. Web-based surveys have proven to collect quality data with good response rates [7,12,13]. The ability for web-based surveys to be completed at the respondent's time and place of choosing may contribute to these observed improvements [14]. Furthermore, the utilization and analysis of data from web-based

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surveys has become more straightforward, subsequently increasing efficiency [7]. Social media allows patients to connect with others that are facing similar problems, creating virtual communities to share advice, support, and personal anecdotes [9,10].

Web-based surveys have previously been used to study a diverse range of medical subjects including child mental health, women with cancer, chronic venous disease, and atopic dermatitis [15-18]. A prior study collected data on adults affected by Perthes' disease during childhood using a web-based survey methodology [19]. Yet, to our knowledge, there are no previous studies employing a web-based survey methodology to comprehensively investigate hip pain in the young and adult population utilizing social media. The Hip Pathology Web-Based Survey was created to assess the ability to obtain surveys through social media while collecting demographic data, patient experiences, and patient-reported outcome measures (PROMs) of individuals currently experiencing or previously affected by hip pain. With a greater understanding of the adult experience of patients with hip pain, health-care professionals can become a better voice for the patient. This introductory paper aimed to 1) determine the possibility of using social media to gather large amounts of comprehensive patient data in people with hip pain and 2) outline the features of our comprehensive web-based survey and analyze the demographic composition and characteristics of our sample population. We hypothesize that a web-based survey will be a feasible method for collecting extensive patient-reported data; furthermore, we expect a majority of the respondents to be women from the United States with a diagnosis of either hip dysplasia or FAI.

Table 1
Facebook groups that participated in survey distribution.

Facebook group name	
1. Hip Labral Tear Support Group	18. Hip Impingement (FAI) Support North America
2. Hip replacement support group	19. Hip Replacement Forum for Active and Young People
3. Hip Replacement group for Active people	20. Hip Labral Tear Recovery/ Private Group
4. Hip Replacement Complication Forum	21. Hip arthroscopy, labrum repair.
5. Slipped Capital Femoral Epiphysis (SCFE)	22. Hip Labral Tear – SI, Posterior, Hamstring Pain
6. Avascular Necrosis Support Est. 2012	23. Hip Impingement Awareness (FAI,PAO,THR)
7. hip arthritis journey	24. Total Hip Replacement News
8. Avascular Necrosis Young Support Group	25. Adult Hip Dysplasia Group
9. Avascular Necrosis (AVN) Non-Operative Treatment Group	26. Hip Pain & Hip Replacement Advice and Support for Patients
10. Slipped Capital Femoral Epiphysis Support and Help (SCFE)	27. Hip Dysplasia
11. Legg Calve Perthes Disease Support Group	28. Femoroacetabular Hip Impingement (FAI) Support Group
12. SCFE - SUFE	29. Hip Pain Support & Management
13. Perthes Disease awareness & support UK	30. Periacetabular Osteotomy (PAO)
14. osteonecrosis	31. Osteonecrosis
15. Osteoporosis Education and Support	32. **Perthes Disease Support from Perthes.org**
16. Adults who had Perthes Disease.	33. Understanding Hip Impingement, FAI
17. PERTHES FOUNDATION: Global Support Group for Legg-Calve-Perthes Disease	

Material and methods

Following institutional review board approval for this cross-sectional study (IRB-23-0325), the Hip Pathology Web-Based Survey was posted on social media from October 1, 2023, until May 1, 2024. The survey was placed on X (formerly known as "Twitter") at the onset of the study using the author's personal profile. The survey was also distributed across multiple Facebook support groups related to hip pain, hip pathologies, or hip treatments twice monthly for the duration of the study. In total, 33 separate Facebook groups allowed the survey to be disseminated to their members (Table 1). Twenty groups either did not respond or declined to distribute the link among their group (Table 2). The web-based survey utilized the Research Electronic Data Capture (REDCap) survey platform, a web-based tool designed to create secure online surveys and databases [20,21].

Consent was required to participate in the survey. All responses were anonymous. Surveys were excluded from analysis for a reported age of less than 18 years old, being incomplete, or being duplicate responses. Duplicated records were analyzed and removed based on exact similarities between demographics and past medical history (PMH).

The comprehensive survey consisted of a diagnosis section in which multiple diagnoses were able to be reported, demographics, PMH, hip pain-specific history, and PROMs previously validated in hip populations including the University of California Los Angeles (UCLA) Activity Score [22], Hip Function visual analog scale (VAS) [23,24], Hip Disability and Osteoarthritis Outcome (HOOS) Global [25], Athletic PMH Questionnaire [26], Pain Catastrophizing Scale (PCS) - Pain scale [27], patient-reported outcomes measurement information system Pain Interference scale [28,29], patient-reported outcomes measurement information system Physical Function scale [28,29], Short Form (SF)-12 [30,31], 12-item Grit scale [32], Pain Self-Efficacy Questionnaire [33], and Chronic Illness Resources Survey [34].

The HOOS Global contains 8 questions related to a respondent's pain, function of activities of daily living, and quality of life and is scored from zero to 100 (zero = complete hip disability, 100 = perfect hip health) [25]. The VAS displays the patient-perceived hip pain levels and is scored from zero to 10 (zero = no pain at all, 10 = pain as bad as it can be) [23,24]. The PCS measured patient-perceived pain catastrophizing using a 13-item scale; scores $\geq$30 are considered clinically significant [27]. The UCLA assesses a patient's activity levels with a score from zero to 10 (one = completely inactive, 10 = regular participation in impact sports) [22]. The SF-12 analyzes a patient's overall health and uses a comparative normal

Table 2
Facebook groups that did not participate in survey distribution.

Facebook group name	
1. Adult Hip Dysplasia Rehab Strategies	11. Hip Labral Reconstruction Warriors
2. Young hip impingement/dysplasia (FAI, THR, PAO) support	12. Hip Dysplasia, Total Hip Replacements & Hip & Knee problems
3. Hip Dysplasia Support Group. Any age.	13. Hip Labral Tear Non Surgical Support Group
4. Pacific Northwest Periacetabular Osteotomy (PAO)	14. Multiple Symptom Patients: Chronic Hips, Pelvis, SI joint, Ehlers-Danlos
5. Trochanteric Bursitis (hip)	15. Hip Replacement for Horse People
6. and Hip pain.Osteoarthritis and patellofemoral syndrome support Group.	16. HIP REPLACEMENT FRIENDS AND SUPPORT
7. Women Runners with Hip Pain	17. SUFE/SCFE Slipped Upper Femoral Epiphysis
8. Hip Replacement and Recovery	18. Hip Arthroscopy
9. Hip Labral Tear & Impingement Physical Therapy	19. Chronic Hip Pain: Nonsurgical Solutions
10. Hip Bursitis Support Group: Trochanteric Bursitis	20. Hip Dysplasia Awareness and Support

population with a mean of 50 [30,31]. Scores above 50 correlate with above-average health, whereas scores less than 50 show below-average health [30,31].

An initial set of 18 variable traits was selected for analysis. These traits were chosen for their potential ability to provide thorough insights into the study sample's demographic composition and characteristics. The variables included percentage of completed surveys vs incomplete, diagnosis, respondents with more than one diagnosis, gender, age, body mass index (>30 kg/m^2 vs ≤ 30 kg/m^2), race, comorbidities, geographic location, history of hip surgery, common surgeries, pain improvement after surgery, family history of orthopaedic problems, HOOS Global, UCLA, VAS, PCS, and SF-12.

Data analyses

The demographic and clinical attributes of the survey respondents were analyzed, utilizing frequencies and percentages to summarize categorical variables and sample means and standard deviations to summarize continuous variables. All demographic and clinical attributes were analyzed using SAS/STAT software, Version 8.3.

Results

A total of 627 survey attempts were initiated, of which 34 were excluded due to respondents being younger than 18. An additional 84 surveys were excluded due to being either incomplete or a duplicated record, resulting in 509 unique surveys used for analysis (Fig. 1). Women accounted for 93.3% (n = 475) of respondents with a mean age of 39 (range 18-77). One hundred twenty-two respondents (24.0%) had a body mass index >30 kg/m^2. Survey participation was global, with responses from 26 countries (Table 3). Most responses were from the United States (72.1%, n = 367), followed by the United Kingdom (10.0%, n = 51), Canada (5.5%, n = 28), and Australia (4.1%, n = 21). Respondents reported comorbidities including anxiety (44.6%, n = 227), depression (31.8%, n = 162), OA (29.5%, n = 150), and previous fractures (29.3%, n = 149) (Table 4).

Three hundred sixty-six (71.9%) respondents had undergone at least one surgery prior to survey participation, with 266 (72.7%) reporting improvement in hip pain postsurgery. Two hundred twenty-two (60.7%) respondents underwent hip arthroscopy, 184 underwent periacetabular osteotomy (PAO), 89 had total hip arthroplasty, and 69 had femoral osteotomies. Among those with previous hip surgeries, 219 (59.8%) reported having multiple surgeries for their hips (Table 5). In patients who underwent multiple surgeries, 24.6% (n = 125) reported both hip arthroscopy and PAO (24.6%, n = 125), while 8.6% (n = 44) reported both hip arthroscopy and femoral osteotomy.

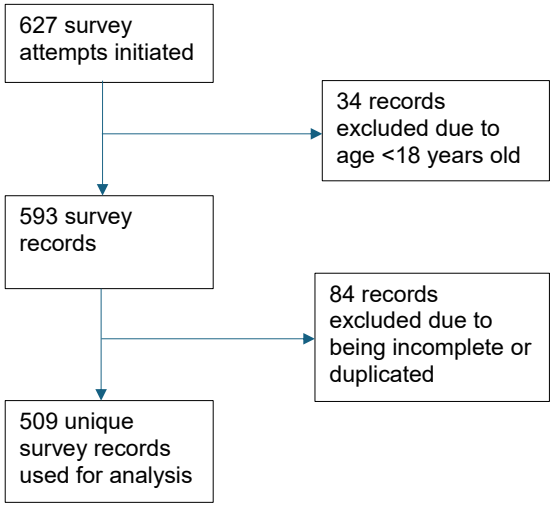

Figure 1. Flowchart showing the study population and reasons for exclusion.

Table 3
Baseline characteristics of survey respondents.

Variable	All participants (n = 509)
Age	
Mean ± SD	39 ± 13
Range (Min, Max)	59 (18, 77)
Women, n (%)	475 (93.3)
Country of origin, n (%)	
United States	367 (72.1)
United Kingdom	51 (10.0)
Canada	28 (5.5)
Australia	21 (4.1)
Other	42 (8.2)
Race, n (%)	
White	458 (90.0)
Hispanic or Latino	20 (3.9)
Asian	15 (3.0)
Black	6 (1.2)
Other	6 (1.2)
Declined	4 (0.8)
BMI, n (%)	
≤30 kg/m^2	387 (76.0)
>30 kg/m^2	122 (24.0)
Alcohol usage, n (%)	
Never	96 (18.9)
Rarely	272 (53.4)
Weekly	122 (24.0)
Daily	19 (3.7)
Tobacco usage, n (%)	
Never a smoker	391 (76.8)
Former smoker	88 (17.2)
Current smoker	27 (5.3)
Nonsmoker, current tobacco product user	3 (0.6)
Participants with a family history of orthopaedic problems, n (%)	187 (36.7)
Participants who underwent surgery, n (%)	366 (71.9)
Participants who improved with surgery, n (%)	266 (72.7)

BMI, body mass index.

Nineteen separate diagnoses were recorded in the web-based survey (Table 6). Hip dysplasia (60.9%, n = 310) and FAI (45.2%, n = 230) were reported by this population at higher rates than the other diagnoses. Ten percent of the respondents reported a femoral torsion abnormality (n = 51), while Perthes disease, OA, osteonecrosis, and SCFEs were seen in 6.4% (n = 33), 6.3% (n = 32), 4.9% (n = 25), and 3.3% (n = 17) of our respondents, respectively. Multiple diagnoses were able to be reported, and 26.9% of the respondents documented a dual diagnosis of hip dysplasia and FAI (26.9%, n = 137).

Table 7 shows the demographics of the web-based survey population when further broken down by the 7 most reported diagnoses. Hip dysplasia respondents (60.9%, n = 310) had a mean age of 35 years old and were mostly White (92.6%, n = 287) and women (98.1%, n = 304). Two hundred forty-one (77.7%) of the dysplastic respondents reported undergoing surgery prior to survey participation with 71% (n = 171) of them citing improvement postsurgery. PAOs (72.1%, n = 174) and hip arthroscopy (63.9%, n = 154) were the predominant surgical treatments for this population. One hundred seventy-eight reported an additional diagnosis (57.4%, n = 178).

Respondents with FAI (45.2%, n = 230) had a mean age of 37 years old, were of White ethnicity (93.5%, n = 215), and were

Table 4
Current or past medical conditions of survey respondents.

Variable	All participants (n = 509)
Current or past medical conditions, n (%)	
Anxiety	227 (44.6)
Depression	162 (31.8)
Osteoarthritis	150 (29.5)
Fracture/broken bone	149 (29.3)
Asthma	124 (24.4)
Hypermobility	112 (22.0)
Vitamin D deficiency	106 (20.8)
Pregnant	79 (15.5)
Anemia	76 (14.9)
Anxiety disorder	76 (14.9)
Thyroid disorder	69 (13.6)
None	60 (11.8)
High blood pressure	54 (10.6)
Breastfeeding	52 (10.2)
Ehlers-Danlos	43 (8.5)
Scoliosis	43 (8.5)
High cholesterol	41 (8.1)
Mental illness	37 (7.3)
Neuropathy	22 (4.3)
Rheumatoid arthritis	15 (3.0)
Osteoporosis	14 (2.8)
Chronic bronchitis	13 (2.6)
Diabetes	13 (2.6)
Cancer	12 (2.4)
Alcohol abuse	11 (2.2)
Liver disease	7 (1.4)
Seizure disorder	7 (1.4)
Heart disease	7 (1.4)
Kidney disease	6 (1.2)
Bleeding disorder	5 (1.0)
Gout	5 (1.0)
Drug abuse	5 (1.0)
MRSA	4 (0.8)
Hepatitis	3 (0.6)
COPD	2 (0.4)
Cerebral palsy	1 (0.2)
Sickle cell disease/trait	1 (0.2)
Stroke	1 (0.2)
HIV/AIDS	0 (0)
Dementia	0 (0)

MRSA, methicillin-resistant Staphylococcus aureus; COPD, chronic obstructive pulmonary disease; HIV/AIDS, human immunodeficiency virus/acquired immunodeficiency syndrome.

women (94.8%, n = 218). One hundred fifty-seven (89.2%) of 176 surgical FAI respondents noted previous hip arthroscopy prior to survey participation.

Forty-nine (96.1%) of the 51 respondents reporting a femoral torsion abnormality (n = 51) cited an additional diagnosis. Forty-one (80.4%) underwent surgery with 73.2% (n = 30) and 70.7% (n = 29) reporting a previous hip arthroscopy or PAO, respectively. Fifteen of the respondents with Perthes disease (n = 33) originated outside of the United States. Twenty-four (72.7%) Perthes disease respondents received prior surgical treatment, of which 20 (83.3%) cited improvement after. OA respondents (n = 32) had a mean age of 47 years old, and 84.4% (n = 27) reported experiencing OA in a separate joint. Only 19 (59.4%) reported prior surgery; however, 17 (89.5%) noted an improvement after surgery.

Respondents with SCFE and hip dysplasia reported the highest HOOS (55.7 ± 26.1 and 54.9 ± 13.9, respectively) and lowest VAS (3.8 ± 3.0 and 4.2 ± 2.5, respectively), while respondents with femoral torsion abnormalities showed the highest activity levels with UCLA scores of 5.7 ± 2.4 (Table 8). SCFE, Perthes disease, and hip dysplasia respondents reported the lowest PCS score (19.6 ± 15.9, 19.7 ± 16.2, and 20.7 ± 12.4, respectively). Perthes disease respondents reported the highest SF-12 Physical (42.6 ± 10.1) and Mental (46.5 ± 6.2) components.

Table 5
Common surgeries of survey respondents.

Variable	Surgical participants (n = 366)
Participants who have undergone multiple surgeries, n (%)	219 (59.8)
Surgery type, n (%)	
Hip arthroscopy	222 (60.7)
Periacetabular osteotomy	184 (50.3)
Total hip arthroplasty	89 (24.3)
Femoral osteotomy	69 (18.9)
Hardware removal	39 (10.7)
Hip pinning	37 (10.1)
Surgical hip dislocation	22 (6.0)
Nerve decompression	7 (1.9)
Osteochondroplasty	5 (1.4)
Irrigation and debridement	4 (1.1)
Gluteus Medius repair	4 (1.1)
Revision hip scope	3 (0.8)
Revision hip arthroplasty	2 (0.5)
Iliopsoas release	2 (0.5)
Hip resurfacing	2 (0.5)
Hip nailing	1 (0.3)
Autologous matrix-induced chondrogenesis	1 (0.3)
Top 5 combinations of surgeries, n (%)	
Hip scope + periacetabular osteotomy	125 (24.6)
Hip scope + femoral osteotomy	44 (8.6)
Femoral osteotomy + periacetabular osteotomy	32 (6.3)
Hip scope + hip arthroplasty	24 (4.7)
Hip scope + hardware removal	24 (4.7)

Discussion

This initial study's purpose was to determine the feasibility of using social media and a web-based survey to collect patient-reported data while simultaneously providing an overview of the Hip Pathology Web-Based Survey and examining the survey population's demographic makeup and features. Our study shows obtaining patient-reported data through social media using a web-based survey methodology is feasible and can provide a

Table 6
Diagnoses of survey respondents.

Variable	All participants (n = 509)
Diagnosis, n (%)	
Hip dysplasia	310 (60.9)
Femoroacetabular impingement (FAI)	230 (45.2)
Femoral torsion abnormality (retroversion, anteversion)	51 (10.0)
Perthes disease	33 (6.4)
Osteoarthritis	32 (6.3)
Osteonecrosis/avascular necrosis (AVN)	25 (4.9)
Slipped capital femoral epiphysis (SCFE)	17 (3.3)
Bursitis	9 (1.8)
Acetabular retroversion	5 (1.0)
Hip instability	2 (0.4)
Protrusio acetabuli	2 (0.4)
Ankylosing spondylitis	1 (0.2)
Coxa profunda	1 (0.2)
Coxa valga	1 (0.2)
Coxa vera	1 (0.2)
Enchondroma	1 (0.2)
Psoriatic arthritis	1 (0.2)
Sciatica	1 (0.2)
Participants with multiple diagnoses, n (%)	217 (42.6)
Top 5 combinations of diagnoses, n (%)	
Hip dysplasia + FAI	137 (26.9)
Hip dysplasia + femoral torsion abnormality	44 (8.6)
FAI + labral tear	37 (7.3)
FAI + femoral torsion abnormality	31 (6.1)
Hip dysplasia + labral tear	31 (6.1)

Table 7
Baseline characteristics of survey respondents (n = 509), by diagnosis.

Variable	Hip dysplasia (n = 310)	Femoroacetabular impingement (FAI) (n = 230)	Femoral torsion abnormality (n = 51)	Perthes disease (n = 33)	Osteoarthritis (n = 32)	Osteonecrosis/ avascular necrosis (AVN) (n = 25)	Slipped capital femoral epiphysis (SCFE)) (n = 17)
Age							
Mean ± SD	35 ± 11	37 ± 11	32 ± 10	43 ± 15	47 ± 15	44 ± 15	41 ± 14
Range (Min, Max)	58 (18, 76)	47 (18, 65)	43 (19, 62)	54 (19, 73)	52 (20, 72)	58 (18, 76)	57 (18, 75)
Women, n (%)	304 (98.1)	218 (94.8)	50 (98.0)	27 (81.8)	20 (90.6)	21 (84.0)	15 (88.2)
Country of origin, n (%)							
United States	224 (72.3)	180 (78.3)	42 (82.4)	18 (54.6)	22 (68.8)	19 (76.0)	13 (76.5)
International	86 (27.7)	50 (21.7)	9 (17.7)	15 (45.4)	10 (31.3)	6 (24.0)	4 (23.5)
Race, n (%)							
Black	2 (0.7)	2 (0.9)	0 (0)	2 (6.1)	0 (0)	1 (4.0)	0 (0)
Asian	7 (2.2)	4 (1.7)	1 (2.0)	2 (6.1)	0 (0)	2 (8.0)	0 (0)
White	287 (92.6)	215 (93.5)	45 (88.2)	26 (78.8)	29 (90.6)	20 (80)	16 (94.1)
Hispanic or Latino	11 (3.6)	3 (1.3)	2 (3.9)	3 (9.1)	2 (6.3)	2 (8.0)	0 (0)
Other	2 (0.7)	3 (1.3)	1 (2.0)	0 (0)	1 (3.1)	0 (0)	1 (5.9)
Declined	1 (0.3)	3 (1.3)	2 (3.9)	0 (0)	0 (0)	0 (0)	0 (0)
BMI, n (%)							
≤30 kg/m^2	246 (79.4)	184 (80)	40 (78.4)	22 (66.7)	22 (68.8)	16 (64.0)	8 (47.1)
>30 kg/m^2	64 (20.7)	46 (20)	11 (21.6)	11 (33.3)	10 (31.3)	9 (36.0)	9 (52.9)
Participants with a family history of orthopaedic conditions, n (%)	36 (34.2)	98 (42.6)	16 (31.4)	8 (21.2)	16 (50)	8 (32.0)	6 (35.5)
Participants who underwent surgery, n (%)	241 (77.7)	176 (76.5)	41 (80.4)	24 (72.7)	19 (59.4)	20 (80)	17 (100)
Top 5 surgery types, n (%)							
	Periacetabular osteotomy, 174 (72.1)	Hip scope, 157 (89.2)	Hip scope, 30 (73.2)	Hip arthroplasty, 15 (62.5)	Hip arthroplasty, 15 (78.9)	Hip replacement, 15 (75.0)	Hip pinning, 14 (82.4)
	Hip scope, 154 (63.9)	Periacetabular osteotomy, 84 (47.7)	Periacetabular osteotomy, 29 (70.7)	Femoral osteotomy, 12 (50.0)	Hip scope, 4 (21.1)	Hip scope, 7 (35.0)	Hip scope, 4 (23.5)
	Hip arthroplasty, 45 (18.7)	Femoral osteotomy, 41 (23.3)	Femoral osteotomy, 13 (31.7)	Hip pinning, 5 (20.8)	Periacetabular osteotomy, 3 (15.8)	Periacetabular osteotomy, 4 (20.0)	Hip replacement, 4 (23.5)
	Femoral osteotomy, 43 (17.8)	Hip arthroplasty, 22 (12.5)	Surgical hip dislocation, 5 (12.2)	Periacetabular osteotomy, 5 (20.8)	Femoral osteotomy, 1 (5.3)	Femoral osteotomy, 3 (15.0)	Hardware removal, 3 (17.7)
	Hardware removal, 37 (15.4)	Hardware removal, 15 (8.5)	Hip arthroplasty, 5 (12.2)	Hip scope, 4 (16.7)	Surgical hip dislocation, 1 (5.3)	Hardware removal, 2 (10.0)	Periacetabular osteotomy, 3 (17.7)
Participants who improved with surgery, n (%)	171 (71.0)	128 (71.2)	25 (62.5)	20 (83.3)	17 (89.5)	11 (61.1)	15 (88.2)
Participants with multiple diagnoses, n (%)	178 (57.4)	172 (74.8)	49 (96.1)	10 (30.3)	15 (46.9)	9 (36.0)	7 (41.2)
Concomitant labral tear, n (%)	31 (10)	37 (16.1)	4 (7.8)	1 (3.0)	0 (0)	1 (4.0)	0 (0)
Top 5 comorbidities, n (%)							
	Anxiety, 148 (47.7)	Anxiety, 109 (47.4)	Anxiety, 24 (47.1)	Osteoarth., 19 (57.6)	Osteoarth., 27 (84.4)	Anxiety, 11 (44.0)	Anxiety, 10 (58.8)
	Depression, 111 (35.8)	Depression, 71 (30.9)	Depression, 20 (39.2)	Fract/B Bone, 10 (30.3)	Fract/B Bone, 14 (43.8)	Osteoarth., 9 (36.0)	Depression, 6 (35.3)
	Fract/B Bone, 100 (32.3)	Fract/B Bone, 67 (29.1)	Hypermobility, 20 (39.2)	Depression, 9 (27.3)	Anxiety, 13 (40.6)	Vitamin D Defic., 7 (28.0)	Osteoarthritis, 6 (35.3)
	Hypermobility, 87 (28.1)	Osteoarthritis, 59 (25.7)	Asthma, 17 (33.3)	Anxiety, 9 (27.3)	Depression, 11 (34.4)	Depression, 6 (24.0)	Vitamin D Defic., 5 (29.4)
	Asthma, 83 (26.8)	Hypermobility, 58 (25.2)	Fract/B Bone, 17 (33.3)	Thyroid Disorder, 6 (18.2)	Vitamin D Defic., 9 (28.1)	Asthma, 5 (20)	Pregnant, 5 (29.4)

Variable	Osteonecrosis/ avascular necrosis (AVN) (n = 25)	Slipped capital femoral epiphysis (SCFE) (n = 17)
Age		
Mean ± S.D.	44 ± 15	41 ± 14
Range (Min, Max)	58 (18, 76)	57 (18, 75)
Women, n (%)	21 (84.0)	15 (88.2)
Country of origin, n (%)		
United States	19 (76.0)	13 (76.5)
International	6 (24.0)	4 (23.5)
Race, n (%)		
Black	1 (4.0)	0 (0)
Asian	2 (8.0)	0 (0)
White	20 (80)	16 (94.1)
Hispanic or Latino	2 (8.0)	0 (0)

(*continued on next page*)

Table 7 (*continued*)

Variable	Osteonecrosis/ avascular necrosis (AVN) (n = 25)	Slipped capital femoral epiphysis (SCFE) (n = 17)
Other	0 (0)	1 (5.9)
Declined	0 (0)	0 (0)
BMI, n (%)		
≤30 kg/m^2	16 (64.0)	8 (47.1)
>30 kg/m^2	9 (36.0)	9 (52.9)
Participants with a family history of orthopaedic conditions, n (%)	8 (32.0)	6 (35.5)
Participants who underwent surgery, n (%)	20 (80)	17 (100)
Top 5 surgery types, n (%)		
	Hip arthroplasty , 15 (75.0)	Hip pinning, 14 (82.4)
	Hip scope, 7 (35.0)	Hip scope, 4 (23.5)
	Periacetabular osteotomy, 4 (20.0)	Hip arthroplasty, 4 (23.5)
	Femoral osteotomy, 3 (15.0)	Hardware removal, 3 (17.7)
	Hardware removal, 2 (10.0)	Periacetabular osteotomy, 3 (17.7)
Participants who improved with surgery, n (%)	11 (61.1)	15 (88.2)
Participants with multiple diagnoses, n (%)	9 (36.0)	7 (41.2)
Concomitant labral tear, n (%)	1 (4.0)	0 (0)
Top 5 comorbidities, n (%)		
	Anxiety, 11 (44.0)	Anxiety, 10 (58.8)
	Osteoarth., 9 (36.0)	Depression, 6 (35.3)
	Vitamin D Defic., 7 (28.0)	Osteoarthritis, 6 (35.3)
	Depression, 6 (24.0)	Vitamin D Defic., 5 (29.4)
	Asthma, 5 (20)	Pregnant, 5 (29.4)

BMI, body mass index.

unique view of the demographic and treatment trends among individuals with hip pain.

Social media can be used as a resource for both patients and researchers. Patients seek out others in similar situations for guidance or support using hashtags and Facebook groups [9,10]. Researchers can use social media as a means of gathering large pools of data quickly, especially when studying uncommon disorders and procedures. Owing to the low incidence of hip pathology leading to PAO, traditional methods of research involving PAO are slow to accumulate substantial data. A recent study using a national database in the United Kingdom found 630 PAO cases from January 2012 to February 2019, averaging 90 cases per year [35]. In our study, we were able to gather 184 PAO cases within 7 months using social media and a web-based survey. Furthermore, we collected data from over 500 unique patients, each with specific diagnoses and distinct medical histories, at relatively low cost compared to traditional mailings, phone calls, or chart abstraction.

One hundred thirty-seven (26.9%) of our survey sample reported having been diagnosed with both hip dysplasia and FAI. The clinical signs of these separate pathologies share similar characteristics [36,37]. Furthermore, the use of radiographic imaging alone has been proven to be ineffective in diagnosis of diseases of the hip [38,39], as cam morphology of the femoral head is seen in both dysplastic and FAI patients [40,41]. This overlap in symptoms and radiographic findings places an emphasis on using a combination of both clinical examinations and imaging findings to make a diagnosis.

With 509 surveys completed, 475 women in our sample represent 93.3% of respondents. Hip dysplasia, the most common diagnosis of our population, has been shown to affect women

Table 8
Patient-reported outcome measures of survey respondents (n = 509), by diagnosis.

Variable	Hip dysplasia (n = 310)	Femoroacetabular impingement (FAI) (n = 230)	Femoral torsion abnormality (n = 51)	Perthes disease (n = 33)	Osteoarthritis (n = 32)	Osteonecrosis/avascular necrosis (AVN) (n = 25)	Slipped capital femoral epiphysis (SCFE) (n = 17)
HOOS							
Mean ± SD	54.9 ± 13.9	53.2 ± 12.9	53.5 ± 12.9	54.0 ± 19.4	53.8 ± 20.7	51.4 ± 18.3	55.7 ± 26.1
UCLA							
Mean ± SD	5.4 ± 2.4	5.6 ± 2.4	5.7 ± 2.4	5.1 ± 2.3	5.3 ± 2.4	4.2 ± 2.0	5.4 ± 3.1
VAS							
Mean ± SD	4.2 ± 2.5	4.3 ± 2.4	4.5 ± 2.4	4.3 ± 2.9	4.4 ± 3.0	4.6 ± 2.7	3.8 ± 3.0
PCS							
Total: Mean ± SD	20.7 ± 12.4	21.5 ± 12.4	22.8 ± 13.7	19.7 ± 16.2	22.8 ± 13.6	21.6 ± 14.2	19.6 ± 15.9
Rumination: Mean ± SD	7.3 ± 4.4	7.5 ± 4.3	8.0 ± 4.7	6.2 ± 5.6	8.3 ± 5.1	7.2 ± 4.9	7.0 ± 6.1
Magnification: Mean ± SD	4.0 ± 3.0	4.0 ± 2.9	4.3 ± 3.5	3.5 ± 3.7	4.3 ± 2.8	4.0 ± 3.4	3.9 ± 3.4
Helplessness: Mean ± SD	9.4 ± 6.1	10.0 ± 6.3	10.5 ± 6.7	10.0 ± 7.7	10.2 ± 7.0	10.4 ± 6.9	8.7 ± 7.3
SF-12							
Physical Component: Mean ± SD	41.9 ± 10.3	41.0 ± 10.0	39.9 ± 11.9	42.6 ± 10.1	41.3 ± 9.6	36.1 ± 12.0	41.2 ± 12.1
Mental Component: Mean ± SD	45.5 ± 7.5	45.5 ± 7.4	45.5 ± 7.7	46.5 ± 6.2	44.5 ± 6.9	45.3 ± 7.5	45.7 ± 5.5

disproportionately, as a recent study analyzed a cohort of 137 hip dysplasia patients, of which 82.5% were women [42]. Another study of 2368 German pupils found a significant positive correlation between women and the development of hip pain [43]. A recent study using a United Kingdom Non-Arthroplasty Hip Registry examined PAOs performed in hip dysplasia and FAI patients, of which 90% were women [35]. The consistent gender distribution across various studies highlights the importance of developing gender-specific strategies for recognizing, diagnosing, and treating hip disorders.

Anxiety (44.6%, n = 227) and depression (31.8%, n = 162) were the most common comorbidities present in respondents. Anxiety and depression both have a complex interplay with pain levels, with previous studies showing higher rates of these conditions in patients with hip pain and musculoskeletal disorders [4,44]. Fortunately, total hip arthroplasties and hip preservation surgeries such as hip arthroscopy and PAOs have proven to be effective in improving patients' pain levels, anxiety, and depression; however, positive outcomes are inferior to those of patients without anxiety and depression before surgery [45-47]. Therefore, efforts to treat and improve levels of anxiety and depression before surgery may lead to even better outcomes and warrant further investigation. Furthermore, this study identifies the high prevalence of anxiety and depression potentially in patients undergoing PAO and highlights the need for screening and intervention efforts to improve outcomes.

This study is limited by recall and reporting bias inherent to all survey studies. The volunteers were not randomly selected, which introduces potential selection bias and may limit the generalizability of the results to all patients with hip pain. Furthermore, people experiencing higher levels of pain might be more likely to participate in the survey, possibly affecting the results. Due to the survey being web-based and disseminated through Facebook groups, diagnosis confirmation was not achievable. However, the persistence of these patients' hip pain, along with a high percentage of respondents undergoing surgery to treat their pain, means patients are likely familiar with recounting their medical history. Finally, given that the survey was written in English and required internet access to participate, it potentially explains why 91.7% of the respondents were from the United States, United Kingdom, Canada, or Australia. Therefore, these results may be more generalizable to hip pain in Western countries rather than to the global hip pain population.

Conclusions

Our study demonstrates the possibility of collecting a large amount of patient-reported data from an international population with hip pain. This study provides useful insights into this population's demographic and treatment trends that warrant analysis in future investigations. Future studies involving this dataset seek to analyze correlations between specific pathologies or surgical treatments and patient characteristics and PROMs. These studies will help to expand our understanding of the demographics of "hip pain" patients and truly identify what patients reported outcomes matter most to patients.

Conflicts of interest

The authors declare there are no conflicts of interest.

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CRediT authorship contribution statement

John M. Gaddis: Writing – original draft, Visualization, Validation, Project administration, Methodology, Investigation, Data curation, Conceptualization. **Erika Shults:** Writing – review & editing, Validation, Software, Methodology, Formal analysis, Data curation. **Bretton Laboret:** Writing – review & editing, Visualization, Validation, Methodology, Data curation. **Ryan Bialaszewski:** Writing – review & editing, Visualization, Validation, Data curation. **Katerina Wells:** Writing – review & editing, Visualization, Validation, Project administration. **Charles South:** Writing – review & editing, Validation, Software, Formal analysis. **Joel E. Wells:** Writing – review & editing, Visualization, Validation, Supervision, Methodology, Conceptualization.

References

[1] IR de Oliveira B, Smith AJ, O'Sullivan PPB, Haebich S, Fick D, Khan R, et al. 'My hip is damaged': a qualitative investigation of people seeking care for persistent hip pain. Br J Sports Med 2020;54:858–65.

[2] Mosler AB, Kemp J, King M, Lawrenson PR, Semciw A, Freke M, et al. Standardised measurement of physical capacity in young and middle-aged active adults with hip-related pain: recommendations from the first International Hip-related Pain Research Network (IHiPRN) meeting, Zurich, 2018. Br J Sports Med 2020;54:702–10.

[3] Prather H, Creighton A, Sorenson C, Simpson S, Reese M, Hunt D, et al. Anxiety and insomnia in young and middle-aged adult hip pain patients with and without femoroacetabular impingement and developmental hip dysplasia. PM R 2018;10:455–61.

[4] Hampton SN, Nakonezny PA, Richard HM, Wells JE. Pain catastrophizing, anxiety, and depression in hip pathology. Bone Joint J 2019;101-B:800–7.

[5] Battaglia PJ, D'Angelo K, Kettner NW. Posterior, lateral, and anterior hip pain due to musculoskeletal origin: a narrative literature review of history, physical examination, and diagnostic imaging. J Chiropr Med 2016;15:281–93.

[6] Mengiardi B, Pfirrmann CW, Hodler J. Hip pain in adults: MR imaging appearance of common causes. Eur Radiol 2007;17:1746–62.

[7] Ball HL. Conducting online surveys. J Hum Lact 2019;35:413–7.

[8] Levi R, Ridberg R, Akers M, Seligman H. Survey fraud and the integrity of web-based survey research. Am J Health Promot 2022;36:18–20.

[9] Bialaszewski R, Gaddis J, Laboret B, Bergman E, Mulligan EP, LaCross J, et al. Perceived outcomes of periacetabular osteotomy. Bone Jt Open 2024;5:53–9.

[10] Gaddis JM, Laboret B, Bialaszewski R, Bergman E, LaCross J, Mulligan E, et al. Periacetabular osteotomy: an analysis of social media to determine the most common questions asked by the periacetabular osteotomy population. BMC Musculoskelet Disord 2024;25:150.

[11] Laboret B, Bialaszewski R, Gaddis J, Middleton E, Kendall B, Lynch K, et al. A social media analysis of patient-perceived complications following periacetabular osteotomy (PAO): a retrospective observational study. BMC Surg 2024;24:36.

[12] Zuidgeest M, Hendriks M, Koopman L, Spreeuwenberg P, Rademakers J. A comparison of a postal survey and mixed-mode survey using a questionnaire on patients' experiences with breast care. J Med Internet Res 2011;13:e68. https://doi.org/10.2196/jmir.1241.

[13] van Gelder MM, Bretveld RW, Roeleveld N. Web-based questionnaires: the future in epidemiology? Am J Epidemiol 2010;172:1292–8.

[14] Caetano R, Noel J. Web-based research: strengths, weaknesses, and JSAD's guidance for authors. J Stud Alcohol Drugs 2018;79:813–5.

[15] Barbarot S, Auziere S, Gadkari A, Girolomoni G, Puig L, Simpson EL, et al. Epidemiology of atopic dermatitis in adults: results from an international survey. Allergy 2018;73:1284–93.

[16] Rabe E, Regnier C, Goron F, Salmat G, Pannier F. The prevalence, disease characteristics and treatment of chronic venous disease: an international web-based survey. J Comp Eff Res 2020;9:1205–18.

[17] Heiervang E, Goodman R. Advantages and limitations of web-based surveys: evidence from a child mental health survey. Soc Psychiatry Psychiatr Epidemiol 2011;46:69–76.

[18] Hagan TL, Belcher SM, Donovan HS. Mind the mode: differences in paper vs. Web-based survey modes among women with cancer. J Pain Symptom Manage 2017;54(3):368–75.

[19] Kim HKW, Almakias R, Millis MB, Vakulenko-Lagun B, International Perthes Study G. How are adults who had Perthes' disease functioning?: results of over 900 participants from an international web-based survey. Bone Joint J 2022;104-B:1304–12.

[20] Harris PA, Taylor R, Minor BL, Elliott V, Fernandez M, O'Neal L, et al. The REDCap consortium: building an international community of software platform partners. J Biomed Inform 2019;95:103208. https://doi.org/10.1016/j.jbi.2019.103208.

[21] Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)–a metadata-driven methodology and workflow

process for providing translational research informatics support. J Biomed Inform 2009;42:377–81.
[22] Terwee CB, Bouwmeester W, van Elsland SL, de Vet HC, Dekker J. Instruments to assess physical activity in patients with osteoarthritis of the hip or knee: a systematic review of measurement properties. Osteoarthritis Cartilage 2011;19:620–33.
[23] Snaebjornsson T, Anari SS, Lindman I, Desai N, Stalman A, Ayeni OR, et al. Most elite athletes who underwent hip arthroscopy for femoroacetabular impingement syndrome did not return to the same level of sport, but the majority were satisfied with the outcome of surgery. Arthrosc Sports Med Rehabil 2022;4:e899–906.
[24] Kersten P, White PJ, Tennant A. The visual analogue WOMAC 3.0 scale–internal validity and responsiveness of the VAS version. BMC Musculoskelet Disord 2010;11:80.
[25] Jacobs CA, Peabody MR, Duncan ST, Muchow RD, Nunley RM, Group A, et al. Development of the HOOS(global) to assess patient-reported outcomes in patients undergoing hip preservation procedures. Am J Sports Med 2018;46:940–6.
[26] Anderson LA, Anderson MB, Kapron A, Aoki SK, Erickson JA, Chrastil J, et al. The 2015 frank stinchfield award: radiographic abnormalities common in senior athletes with well-functioning hips but not associated with osteoarthritis. Clin Orthop Relat Res 2016;474:342–52.
[27] Darnall BD, Sturgeon JA, Cook KF, Taub CJ, Roy A, Burns JW, et al. Development and validation of a daily pain catastrophizing scale. J Pain 2017;18:1139–49.
[28] Dvorzhinskiy A, Gausden EB, Levack AE, Nwachukwu BU, Nguyen J, Gadinsky NE, et al. The performance of PROMIS computer adaptive testing for patient-reported outcomes in hip fracture surgery: a pilot study. Arch Orthop Trauma Surg 2022;142:417–24.
[29] Gerlach E, Selley R, Johnson D, Nicolay R, Versteeg G, Plantz M, et al. Patient-reported outcomes measurement information system validation in hip arthroscopy: a shift towards reducing survey burden. Cureus 2021;13:e13265. https://doi.org/10.7759/cureus.13265.
[30] Paulsen A. Patient reported outcomes in hip arthroplasty registries. Dan Med J 2014;61:B4845.
[31] Ware Jr J, Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. Med Care 1996;34:220–33.
[32] Ursua F, Altholz J, Durning S, Torre D, Dong T. Once in the door, Grit may matter more: an evaluation of Grit in medical students. Mil Med 2021;186:13–7.
[33] Fu K, Metcalf B, Bennell KL, Zhang Y, Deveza LA, Robbins SR, et al. The association between psychological factors and pain exacerbations in hip osteoarthritis. Rheumatology 2021;60:1291–9.
[34] Fabbri M, Finney Rutten LJ, Manemann SM, Boyd C, Wolff J, Chamberlain AM, et al. Patient-centered communication and outcomes in heart failure. Am J Manag Care 2020;26:425–30.
[35] Holleyman R, Sohatee MA, Witt J, Bankes MJK, Andrade TJ, Board T, et al. Periacetabular osteotomy for developmental dysplasia of the hip and femoroacetabular impingement: a study using the U.K. Non-arthroplasty hip Registry (NAHR) data set. J Bone Joint Surg Am 2020;102:1312–20.
[36] Clohisy JC, Knaus ER, Hunt DM, Lesher JM, Harris-Hayes M, Prather H. Clinical presentation of patients with symptomatic anterior hip impingement. Clin Orthop Relat Res 2009;467:638–44.
[37] Nunley RM, Prather H, Hunt D, Schoenecker PL, Clohisy JC. Clinical presentation of symptomatic acetabular dysplasia in skeletally mature patients. J Bone Joint Surg Am 2011;93(Suppl 2):17–21.
[38] Clohisy JC, Carlisle JC, Trousdale R, Kim YJ, Beaule PE, Morgan P, et al. Radiographic evaluation of the hip has limited reliability. Clin Orthop Relat Res 2009;467:666–75.
[39] Smith JT, Jee Y, Daley E, Koueiter DM, Beck M, Zaltz I. Can the femoroepiphyseal acetabular roof (FEAR) index Be used to distinguish dysplasia from impingement? Clin Orthop Relat Res 2021;479:962–71.
[40] Matsuda DK, Wolff AB, Nho SJ, Salvo Jr JP, Christoforetti JJ, Kivlan BR, et al. Hip dysplasia: prevalence, associated findings, and procedures from large multicenter arthroscopy study group. Arthroscopy 2018;34:444–53.
[41] Schauwecker N, Xi Y, Slepicka C, Dessouky R, Fey N, Chatzinoff Y, et al. Quantifying differences in femoral head and neck asphericity in CAM type femoroacetabular impingement and hip dysplasia versus controls using radial 3DCT imaging and volumetric segmentation. Br J Radiol 2020;93:20190039. https://doi.org/10.1259/bjr.20190039.
[42] Ghaznavi A, Mohammadpour M, Noori A, Rajei M. Geographical distribution of developmental dysplasia of the hip: a brief epidemiological study of Iran. Med J Islam Repub Iran 2023;37:13.
[43] Spahn G, Schiele R, Langlotz A, Jung R. Hip pain in adolescents: results of a cross-sectional study in German pupils and a review of the literature. Acta Paediatr 2005;94:568–73.
[44] Bair MJ, Wu J, Damush TM, Sutherland JM, Kroenke K. Association of depression and anxiety alone and in combination with chronic musculoskeletal pain in primary care patients. Psychosom Med 2008;70:890–7.
[45] Gudmundsson P, Nakonezny PA, Lin J, Owhonda R, Richard H, Wells J. Functional improvement in hip pathology is related to improvement in anxiety, depression, and pain catastrophizing: an intricate link between physical and mental well-being. BMC Musculoskelet Disord 2021;22:133.
[46] Steiner Q, Watson AM, Mosiman SJ, Spiker AM. Association between symptoms of anxiety and depression, hip pathology, and patient-reported outcomes after hip arthroscopy for femoroacetabular impingement. Am J Sports Med 2024;52:1728–34.
[47] Wood TJ, Gazendam AM, Kabali CB, Hamilton Arthroplasty G. Postoperative outcomes following total hip and knee arthroplasty in patients with pain catastrophizing, anxiety, or depression. J Arthroplasty 2021;36:1908–14.