RESEARCH ARTICLE

# More value and less waste in research on primary cam morphology and its natural history: a qualitative interview study of stakeholders' perspectives

[version 1; peer review: 1 approved with reservations, 1 not approved]

H Paul Dijkstra[1,2], Sean McAuliffe[3], Jolanda Boersma[1], Mike Clarke[4], Karim Khan[5], Sion Glyn-Jones[2], Trisha Greenhalgh[6]

[1]Department of Medical Education, Aspetar Orthopaedic and Sports Medicine Hospital, Doha, Qatar
[2]Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Oxford, England, UK
[3]Department of Physiotherapy, School of Allied Health, University of Limerick, Limerick, Ireland
[4]Northern Ireland Methodology Hub, Queen's University Belfast, Belfast, Northern Ireland, UK
[5]Department of Family Practice & Kinesiology, The University of British Columbia, Vancouver, British Columbia, Canada
[6]Nuffield Department of Primary Health Care Sciences, University of Oxford, Oxford, England, UK

**v1** **First published:** 19 Sep 2024, **13**:1075
https://doi.org/10.12688/f1000research.154846.1
**Latest published:** 19 Sep 2024, **13**:1075
https://doi.org/10.12688/f1000research.154846.1

## Abstract

### Background

Primary cam morphology, an acquired bony prominence at the head-neck junction of the femur, is highly prevalent in athlete populations, and causally associated with femoroacetabular impingement syndrome and early hip osteoarthritis. Experts agreed on key elements for primary cam morphology and a prioritised research agenda for the field. This research agenda will require higher-quality research to achieve meaningful progress on the aetiology, prognosis and treatment of primary cam morphology in athletes.

### Aim

To explore stakeholders' perspectives of high-quality research in the research field of primary cam morphology and its natural history.

### Methods

Grounded in interpretive description, we used semi-structured interviews to explore stakeholders' perspectives of high-quality research in the primary cam morphology research field. The framework for INcreasing QUality In patient-orientated academic

**Open Peer Review**

**Approval Status** ✗ ?

| | 1 | 2 |
|---|---|---|
| **version 1**<br>19 Sep 2024 | ✗<br>view | ?<br>view |

1. **Samantha Bunzli**, Griffith University and Royal Brisbane and Women's Hospital, Brisbane, Australia
Griffith University, Nathan, Australia
2. **Jinchi Tang**, Erasmus MC University Medical Center Rotterdam, Rotterdam, The Netherlands

Any reports and responses or comments on the article can be found at the end of the article.

clinical REsearch (INQUIRE) informed the interview guide. Audio-recorded interviews were transcribed and analysed using thematic analysis. We recruited a heterogenous and purposive maximum variation sample, drawing from a network of research contacts.

### Results

Fifteen individuals, several with multiple perspectives on research quality in the field, participated. Exploring stakeholders' perspectives on research quality through an established research quality framework (INQUIRE) illuminated areas for immediate action for research communities in the field of primary cam morphology and its natural history. We crafted five action inviting themes: research communities should: partner with athletes/patients; champion equity, diversity and inclusion; collaborate with one another; pursue open science; and nurture young scholars.

### Conclusion

The findings of this study could inform concrete actions by research communities to pursue higher quality research—more research value and less waste—in the field of primary cam morphology and its natural history. Although the five action-inviting themes reflect contemporary trends in research, and could therefore be transferable to other areas of research, their practical application remains context- and field-specific.

**Keywords**
research value; research waste; qualitative research; high-quality research; femoroacetabular impingement syndrome; primary cam morphology;

This article is included in the Research on Research, Policy & Culture gateway.

**Corresponding author:** H Paul Dijkstra (paul.dijkstra@aspetar.com)

**Author roles: Dijkstra HP**: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Project Administration, Resources, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing; **McAuliffe S**: Data Curation, Formal Analysis, Investigation, Writing – Review & Editing; **Boersma J**: Data Curation, Formal Analysis, Writing – Review & Editing; **Clarke M**: Supervision, Writing – Review & Editing; **Khan K**: Supervision, Writing – Review & Editing; **Glyn-Jones S**: Supervision, Writing – Review & Editing; **Greenhalgh T**: Methodology, Supervision, Writing – Review & Editing

**Competing interests:** No competing interests were disclosed.

**Grant information:** The author(s) declared that no grants were involved in supporting this work.

**How to cite this article:** Dijkstra HP, McAuliffe S, Boersma J *et al.* **More value and less waste in research on primary cam morphology and its natural history: a qualitative interview study of stakeholders' perspectives [version 1; peer review: 1 approved with reservations, 1 not approved]** F1000Research 2024, **13**:1075 https://doi.org/10.12688/f1000research.154846.1

**First published:** 19 Sep 2024, **13**:1075 https://doi.org/10.12688/f1000research.154846.1

## Introduction

Primary cam morphology develops as a largely benign prominence at the head-neck junction of the hip in many young athletes.[1] The risk of developing primary cam morphology is associated with the level of athletic activity during skeletal growth.[2–4] Although largely benign, this morphology is associated with femoroacetabular impingement (FAI) syndrome,[5] and causes early hip osteoarthritis, with potentially significant consequences for hip-health and athletic careers.[6–9] Despite the morphology's high prevalence (up to 80% in many athletic populations[10]), many questions remain unanswered. For example, to date, no prospective studies have examined this morphology's formation and/or prognosis in girls or in populations from the Global South. Scientists cannot yet predict the individuals who might develop the morphology or its hip disease consequences, or who might need their hips replaced. Multi-centre and multi-profession collaboration to produce higher quality research with impact is paramount when promoting research value and avoiding research waste.[11]

A concept analysis of primary cam morphology was an important first milestone towards more clarity on the morphology and its natural history.[1] In addition, the **Y**oung **A**thlete's **Hi**p **R**esearch (YAHiR) Collaborative's *Aspetar-Oxford-La Trobe Young Athlete's Hip Webinar Series*, which delivered 11 webinars during the Covid-19 pandemic, contributed to mobilising an international community of athletes, patients, clinicians, and researchers interested in improving clinical outcomes through coproducing knowledge in the field. This collaboration paved the way for the Oxford Consensus Study on primary cam morphology definitions, terminology, taxonomy, and imaging outcomes as well as a prioritised research agenda on conditions affecting the young person's hip.[12,13] However, at the time of the empirical work described below, no peer reviewed evidence existed on the perspectives of stakeholders in this research field on factors contributing to high quality research. Informed by the comprehensive framework for **IN**creasing **QU**ality **I**n patient-orientated academic clinical **RE**search (INQUIRE),[14] we aimed to address this gap.

### Aim

This study aimed to explore research quality on primary cam morphology and its natural history through the perspectives of athletes, patients, parents and coaches, clinicians, and researchers. Exploring stakeholders' diverse perspectives on high-quality research through the lens of an existing research quality framework (INQUIRE) could pave the way for authentic collaboration to enhance research quality on primary cam morphology and its natural history.

## Methods

In this section, we discuss the ontological and epistemological orientation, study design, ethical considerations, sampling strategy, data collection and analysis, and research team reflexivity for this study.

### Ontological and epistemological orientation, and study design

This was a descriptive qualitative study,[15,16] situated within a pragmatism-informed interpretive description research paradigm.[17–19] By 'pragmatism-informed' in this context, we mean drawing on the practical wisdom of practitioners *and* oriented to informing their practice in concrete situations. An interpretative orientation acknowledges that human experience is both constructed and contextual.

While some qualitative methodologies have a primary aim of developing theory, interpretive description emphasises the need for 'informed action':

> Interpretive description is an approach to knowledge generation that straddles the chasm between objective neutrality and abject theorizing, extending a form of understanding that is of practical importance to the applied disciplines within the context of their distinctive social mandates. It responds to the imperative for informed action within the admittedly imperfect scientific foundation that is the lot of the human sciences (Ref. 20, p26).

Interpretative description, responding to the needs within applied health sciences to address pragmatic questions,[21] seeks to describe and understand a process or phenomenon (in this case, research on primary cam morphology and its natural history) through the subjective perspectives of research participants and, importantly, intends to use this knowledge to inform practice.[22,23]

This study's pragmatic orientation manifests at different stages of the research process. For example, the research team's expert clinical knowledge is seen as solid grounding for research design. It is this practical knowledge, tested and validated in the clinic, which is emphasised in interpretive description and used as a way to provide answers to solve real-world problems.[23] Particularly in areas where there is little prior research or empirical data about a health phenomenon, such foreknowledge and expertise are viewed as a useful starting place for orienting research.[21]

Alongside the foreknowledge that the researcher brings to the study, interpretative description aims to explore the subjective experiences of participants relevant to this study: the experiences and perspectives of doing research on primary cam morphology and its natural history. Participants should therefore be a purposive sample representing the full breadth of different kinds of knowledge and experience of the topic being researched.[24,25] Within interpretive description research, this knowledge and understanding is constantly revised in a continuous process of (re) negotiating, where both researchers and participants co-construct a coherent narrative that can inform clinical—and research—practice.[26]

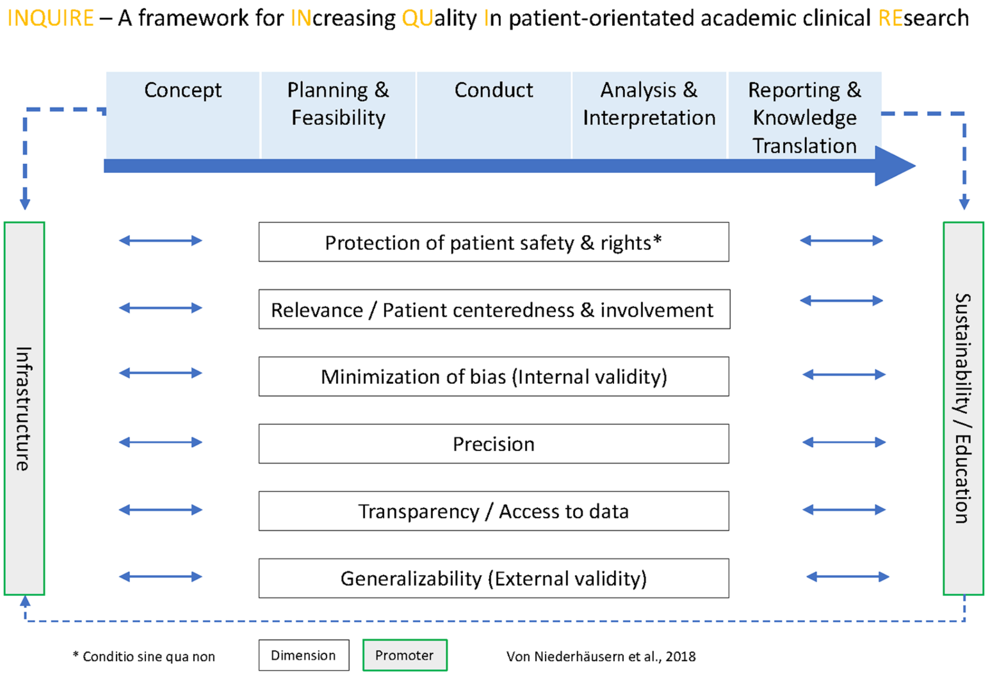
In summary, interpretive description suits the research question for this study. It facilitates straightforward and pragmatic answers to questions that are relevant to researchers, clinicians, patients, and policy makers[15,16] and helps to improve understanding of what works (or might work) best to promote high-quality research in the field of primary cam morphology and its natural history.

Ethical approval was received from the University of Oxford's Medical Sciences Interdivisional Research Ethics Committee (Project ID R66281) and Qatar University Institutional Review Board (QU-IRB 1239-EA/20) prior to conducting the study. We followed the 'Standards for Reporting Qualitative Research: A Synthesis of Recommendations' for this report.[27]

## Instrument development

We developed, piloted, and adapted an interview guide based on the INQUIRE framework to explore participants' perspectives of research quality on primary cam morphology and its natural history. The INQUIRE framework provides a guide for the practical assessment of clinical research quality at all stages of a research project, and for developing quality enhancement initiatives (Figure 1).[14]

This framework was a useful scaffold for developing quality enhancement initiatives (Figure 1), addressing five study stages (concept, planning and feasibility, conduct, analysis and interpretation, and reporting and knowledge translation), and six dimensions: (1) protection of patient safety and rights, (2) relevance/patient centredness and involvement,

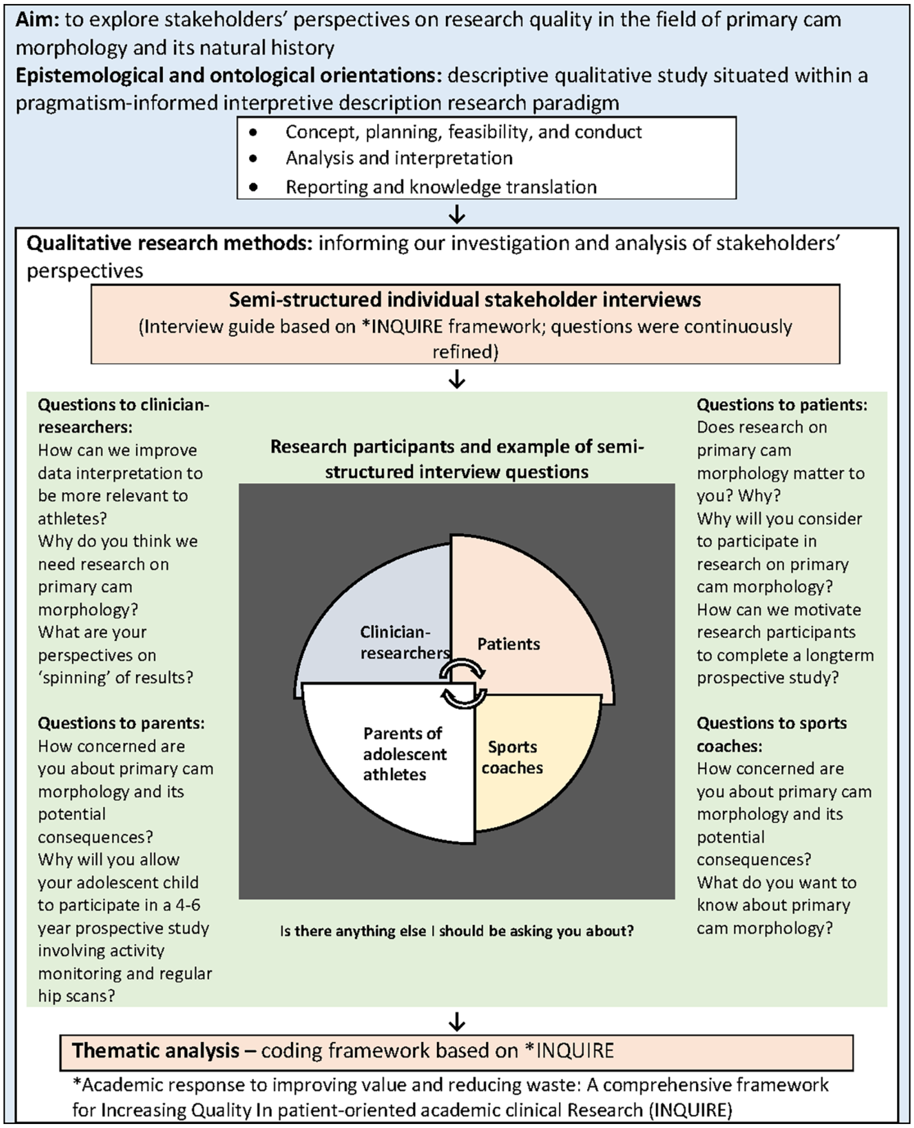


PLoS Med, 2018 https://doi.org/10.1371/journal.pmed.1002580

**Figure 1. Framework for INcreasing QUality In patient-orientated academic clinical Research (INQUIRE) (reproduced and minimally adapted from Ref. 14 under Creative Commons Attribution 4.0 International (CC BY) license).**

(3) minimisation of bias [1] (internal validity), (4) precision, (5) transparency/access to data, and (6) generalisability [2] (external validity) of the study results.

The six dimensions interact with two promoters, a set of factors that may enhance all quality dimensions at a research institution: (1) an established research infrastructure (e.g. well-trained personnel and functional facilities on-site: 3T MRI with trained radiographer and radiologist for serial hip joint imaging), and (2) sustainability through education (the structures and systems to support young researchers and build capacity through mentoring and developing the next generation, and continuous education of all study personnel to secure a long term productive clinical research environment). The Interview Protocol Refinement (IPR) Framework[28] was then used to develop and refine the interview guide (Figure 2).



**Aim:** to explore stakeholders' perspectives on research quality in the field of primary cam morphology and its natural history

**Epistemological and ontological orientations:** descriptive qualitative study situated within a pragmatism-informed interpretive description research paradigm

- Concept, planning, feasibility, and conduct
- Analysis and interpretation
- Reporting and knowledge translation

**Qualitative research methods:** informing our investigation and analysis of stakeholders' perspectives

**Semi-structured individual stakeholder interviews**
(Interview guide based on *INQUIRE framework; questions were continuously refined)

**Questions to clinician-researchers:**
How can we improve data interpretation to be more relevant to athletes?
Why do you think we need research on primary cam morphology?
What are your perspectives on 'spinning' of results?

**Questions to parents:**
How concerned are you about primary cam morphology and its potential consequences?
Why will you allow your adolescent child to participate in a 4-6 year prospective study involving activity monitoring and regular hip scans?

**Research participants and example of semi-structured interview questions**

**Is there anything else I should be asking you about?**

**Questions to patients:**
Does research on primary cam morphology matter to you? Why?
Why will you consider to participate in research on primary cam morphology?
How can we motivate research participants to complete a longterm prospective study?

**Questions to sports coaches:**
How concerned are you about primary cam morphology and its potential consequences?
What do you want to know about primary cam morphology?

**Thematic analysis –** coding framework based on *INQUIRE

*Academic response to improving value and reducing waste: A comprehensive framework for Increasing Quality In patient-oriented academic clinical Research (INQUIRE)

**Figure 2. Study's conceptual framework and interview guide development.**

---

[1] The term 'bias' is usually used in relation to quantitative research. A related term in qualitative research is 'perspective'. Interpretive qualitative researchers consider that there is no such thing as an *unbiased* sample, but that it is important to include a wide range of *perspectives*. This is how we interpreted this criterion in the framework when exploring stakeholders' perspectives on qualitative research.

[2] The term 'external validity' is usually in relation to quantitative research. 'Transferability' refers to the generalisability of inquiry in qualitative research.

## Sample

A purposive and structured variation approach was used to select the sample for this study. This method allowed us to select a sample of stakeholders representing a wide range of expertise and experience. Participants were purposively identified. Most were clinician-researchers who have published in the field between 2010 and 2021; (*n*=9). Other participants (*n*=6) were identified from the first author's collegial, athlete and patient networks, and that of co-researcher Dr Sean McAuliffe (SMA) with oversight by the first author's DPhil supervisors: Professors Trisha Greenhalgh (TG), Siôn Glyn-Jones (SGJ), Karim Khan (KK) and Mike Clarke (MC). The professional background of the research team allowed us to reach a large population of primary cam morphology research stakeholders, guarding against over-representation of one group. We invited all potential participants through e-mail. This sampling strategy is common in interpretive description and rests on the premise that researchers' knowledge of the topic area enables them to identify participants who are especially knowledgeable about or experienced with the topic of interest.[17,18,22,26,29] Potential participants included clinicians, researchers, patients, athletes, sports coaches, and parents of competitive adolescent athletes. Most participants had more than one role, 'researcher, clinician, and parent', for example. This often allowed the first author to explore a multiplicity of perspectives in each individual interview.

The sampling strategy, aimed at maximum variation in stakeholder background and expertise, was informed by literature and the 'closeness continuum' model.[30] According to this model, participants can have different types of expertise, based on closeness to the topic of interest. Some individuals have a degree of 'subjective closeness' to a topic, which involves deep experiential knowledge or real-life experiences. Patients may have this kind of subjective closeness. Participants with professional and/or legal (ethical) responsibility represent a 'mandated closeness'. Finally, individuals can have a degree of 'objective closeness' to a topic, because of their profession or occupation.[30] To represent a wide range of experience and expertise in our sample, we purposively included participants from all three categories.

## Data collection

Fifteen individuals participated: six physiotherapists, five physicians, a sport scientist, and three athletes/patients (Table 1). Two physiotherapists were also patients, four participants had adolescent children playing competitive sport, while three were sports coaches. The lead author conducted semi-structured online interviews during the Covid-19 pandemic between June 2020 and February 2022. The interviews lasted on average 60 minutes (range 44:32 to 68:08 minutes).

Using video conferencing technology (Zoom®), all interviews were audio-recorded with permission. Informed oral consent was recorded during the first part of each interview after confirming that participants understood the research project and their rights. Co-researcher (SMA) attended 14 of 15 interviews and kept field notes that provided further interview context for analysis.[31] Audio-recorded interviews were transcribed by a third member of the research team,

**Table 1. Research participant demographics and roles.**

| Pseudonym | Sex | Profession/Education | Role(s) |
|---|---|---|---|
| P1 | Female | Physiotherapist | Researcher, Clinician, Parent |
| P2 | Male | Physician | Researcher, Clinician |
| P3 | Male | Physiotherapist | Parent, Researcher, Clinician |
| P4 | Male | Sport scientist | Parent, Researcher, Coach |
| P5 | Male | Physiotherapist | Researcher, Clinician |
| P6 | Male | Orthopaedic surgeon | Researcher, Clinician |
| P7 | Female | Physiotherapist | Clinician, Researcher, Parent, Coach |
| P8 | Female | Physiotherapist | Clinician, Athlete, Patient |
| P9 | Male | Athlete | Patient/athlete |
| P10 | Female | Occupational therapist | Patient/athlete, Coach |
| P11 | Male | Radiologist | Researcher, Clinician |
| P12 | Female | Sports coach | Coach, Athlete |
| P13 | Male | Physiotherapist | Researcher, Clinician, Patient |
| P14 | Male | Radiologist | Researcher, Clinician |
| P15 | Male | Orthopaedic surgeon | Researcher, Clinician |

Ms Jolanda Boersma (JB), a research assistant experienced in conducting and transcribing qualitative research, before being imported to qualitative data analysis software NVivo® (QRS international Pty Ltd, Burlington, Massachusetts, United States). To protect their privacy, we assigned a unique number to each participant and deleted identifying information from the transcript.

Given the semi-structured nature of the interview guide, we had the flexibility to invite participants to elaborate on their responses; they could discuss their perspectives in whatever direction, and in as much depth as they wished. We were therefore able to probe beyond the specific questions of the interview guide, exploring participants' unique personal experiences, practices, and preferences, which shaped their perspective on primary cam morphology research.[32] These included, for example, concerns about the morphology that competitive athletes, who were worried about their future sporting careers, might have. We also asked parents and coaches of adolescent athletes how they perceived high load training and competition that might put young athletes at risk of primary cam morphology and future hip disease (Figure 2).

## Analysis

Consistent with interpretive description, we used thematic analysis to analyse the data.[33–35] Thematic analysis is an approach that seeks to develop themes across cases, through reading, re-reading, and charting of data.[34] It is a form of pattern recognition where identified themes become the categories for analysis.[32] Often misunderstood as a single method with one set of procedures, thematic analysis is best thought of as a continuum of methods—from types that place prominent emphasis on developing codes and categories and demonstrating their reliability (both within and between different coders), to more reflexive approaches which place more emphasis on a single researcher developing a plausible and coherent account of the data.[34,35]

In this study, we chose not to prioritise 'coding reliability' since this notion rests to some extent on positivist philosophical assumptions (e.g. that the data are 'out there' waiting to be collected and that every researcher analysing the same data should get identical findings). Rather, we sought to use a structured coding framework to support and inform reflexive thematic analysis.[34]

The analysis therefore incorporated both a deductive coding approach (based on a priori codes generated from the quality dimensions and promoters of the INQUIRE framework[14]) and a data-driven inductive approach. Early analysis of the transcripts was *guided but not constrained* by the preliminary codes derived from the INQUIRE framework: we populated codes according to the coding framework, but we also flagged instances in the data that did not fit. Consistent with thematic analysis, two co-researchers (SMA and JB) and the lead author immersed themselves in the data to become familiar with the depth and breadth of the content. We read interview transcripts several times. Based on the INQUIRE framework, JB and the lead author independently coded all interviews and SMA coded half of the interviews. The lead author regularly met with both co-researchers to discuss and reflect on our perspectives that shaped how we identified primary patterns in the data. Once initial coding was complete, discussions among the research team and further analytic work allowed us to identify underlying patterns of shared meaning that drew together several of the initial 'domain summary' codes into richer and more complex themes (more 'fully realised themes') that revealed multiple facets of a particular meaning or experience.[34,35]

For example, the initial coding framework emphasised 'Protection of patient safety & rights' and 'Relevance/Patient centeredness and involvement' as possible 'domain summary' themes. This evolved into 'Research communities should partner with patients/athletes' to better represent authentic involvement—athletes/patients co-driving research. The process of coding and theme development had both descriptive and interpretive elements, representing what participants said and subjective considerations by the research team of patterns that were not directly evident. Here we aligned with the notion that themes are not 'discovered' nor do they represent pre-existing forms of knowledge waiting to 'emerge'.[33–35] Thematic analysis is seen as an active process of knowledge production by the researcher—themes are patterns that a researcher identifies through their perspective of the data.

## Research team and reflexivity

Interpretive description also draws attention to researchers' disciplinary orientations and subjectivity. To account for their perspectives, researchers should engage in reflexivity. Reflexivity involves recognising that researchers are part of the process of producing data and their meanings—a 'sensitivity to the ways in which the researcher and the research process have shaped the collected data, including the role of prior assumptions and experience …'(Ref. 36, p51). The researcher is a 'valuable instrument' of the research in interpretive description; their technical knowledge, research background and personal experience are 'major sources of insight'.[22] Findings do not 'emerge' from the data, nor do data 'speak for themselves'. The *researcher* ultimately determines what constitutes data, which data are relevant, how the final dataset will be presented and structured, and how and to whom the findings will be disseminated—no matter how participatory and collaborative the method.[37] Therefore, although we acknowledge the influence of our preconceptions, we perceived our subjective clinical experience and prior knowledge (particularly HPD, SMA) to be a resource in this study.[38]

This study's research team consisted of the following: HPD, lead researcher, a practising sport and exercise medicine physician, director of medical education, and DPhil candidate responsible for the overall design of the study, participant recruitment, data collection and analysis; SMA, a practising sports physiotherapist, and PhD-trained qualitative researcher, acted as Qatar-based co-principal investigator, attended 14 of 15 online interviews as an observer and contributed to the analysis; JB, a medical anthropologist with experience in qualitative research (sociology and anthropology) but no clinical experience or prior knowledge of the topic, aided in transcribing and analysing data; TG, a professor of primary healthcare with extensive experience in qualitative and mixed-method research, supervised on all aspects of the study as DPhil supervisor to HPD; SGJ, a practicing orthopaedic surgeon, professor of orthopaedic surgery and experienced researcher, oversaw all aspects of the study as principal investigator and DPhil supervisor to HPD; MC, experienced researcher and DPhil supervisor to HPD, provided oversight to all aspects of the study; KK, sport and exercise medicine physician, and previous journal editor, provided oversight to all aspects of the study as an experienced researcher and DPhil supervisor to HPD. HPD and SMA, SGJ and KK had working relationships with some of the participants.

The research team's diverse academic training and experiences set the foundations for interdisciplinary dialogue and helped to promote reflexivity throughout the project.[25] Olmos-Vega and colleagues (2022, p6) put it thus: '… assumptions become most evident when viewed from the point of view of others who do not share them'.[39] Several discussions, for example, brought together an anthropological, non-clinical perspective (JB) to theme development with that of a physician with intimate knowledge of the field (HPD), and a PhD physiotherapist working in research and elite sport (SMA). In addition, TG, with vast clinical and (qualitative) research experience, shaped how the lead author approached the complicated deductive-inductive coding dance. An excerpt from his research and DPhil supervision diary provides nuance: 'Don't get boxed-in by your (INQUIRE-informed) coding framework. Dive deeper and search for meanings and insightful, new patterns/themes to inform future (research) practice'.

## Methodological reflections

It is important to consider how professional identity and positionality might have influenced aspects of this study, including the research topic, research design, context and process, participants, data collection and analysis.[40,41]

When selecting a sample, we recruited participants who could contribute meaningfully to the aims of the study, either through their research experience, professional involvement, or personal experience with primary cam morphology. Participants were purposively identified, including from the lead author's collegial network (research and clinical), as described. Although diverse to a certain extent (clinicians, researchers, athletes, patients, parents), the ten men and five women participants were all white and from the Global North. Participants representing research teams and athletes from the Global South could have shared different perspectives on research quality.

It is important to reflect on the prior relationship with some interviewees, as this ultimately shaped the data collected during this study. Garton and Copland refer to such interviews as 'acquaintance interviews'.[42] Data are generated in a particular way because participants may invoke prior relationships (most often implicitly, but at times explicitly) in these interviews.[42]

'Insider status' offers affordances and challenges. Insider status can often lead to valuable and even unique insights.[43] A certain social or professional proximity often allows researchers access to resources that are not always available in more traditional interviews and might not be available to researchers who do not share this familiarity with their participants.[42] Thus, some participants could have regarded the lead author as a professional or social proximate rather than an outsider; they might therefore have been more comfortable sharing their perspectives. In keeping with interpretive description, it is through this deep involvement with a small number of individuals familiar with the researcher and willing to share their experiences that it is possible to build trust and gather valuable data.[23]

Cognisant of the fact that insider status could also be a challenge—participants might feel obliged to assist the researcher because of their prior relationship—we ensured participants knew their rights, including the right to change consent or retract completely.[44] Participants received an email explaining the study, their rights, and the informed consent process. They were able to ask questions or raise concerns at any time before or during the interview. Before starting the formal interview, the lead author briefly explained the aim and background of the study again, including participants' rights. As mentioned earlier, the interview started after verbal consent was recorded and documented in the presence of a second member of the research team (SMA).

## Results

Below, we set out the findings on stakeholders' perspectives of high-quality research on primary cam morphology and its natural history, structured according to five themes (informed by the INQUIRE framework's six dimensions and two promotors). These action-inviting themes could bolster efforts by research communities to perform higher quality research in this field: research communities should (1) partner with athletes/patients; (2) collaborate with one another; (3) pursue open science; (4) champion equity, diversity, and inclusion; and (5) nurture young scholars. Each theme is described and illustrated with excerpts from one or more participant interviews. Where appropriate, we refer to intersectionality, for example, an athlete-patient and clinician (P8) describing how her experiences and perspectives as an athlete-patient informed clinical practice. As a result, some quotations are longer when we desired to communicate *the way* a participant illustrated or described a specific situation.

### Theme 1: Research communities should partner with athletes/patients

This theme combines and extends two INQUIRE dimensions: protection of patient safety and rights and relevance/patient centeredness and involvement. Our interviewees reported that athlete/patient-centred research is important and multi-faceted. The athlete/patient distinction is important—most athletes with primary cam morphology will never become patients. Athletes are at risk of developing primary cam morphology but 'we know that obviously only a small percentage of people, even if they have primary cam morphology, develop symptoms'. (P5)

More than just being involved, athletes/patients should co-drive research as equal partners. Athletes/patients in this study expressed keenness to get involved in research. This was especially true 'if patients are aware that the ultimate goal is to help people to get better and to utilise the information in a way that's going to help people'. (P8 – physiotherapist, athlete, patient) She continued to explain:

> I think patients will be willing to help. I think a lot of people want to share their story. And I think it's actually like a therapeutic part of the journey as well. At least I noticed that for me, when I'm able to, even now, kind of reflect on how far I've come. There's a benefit of that. And you realize that: 'Okay, my struggle is actually helping other people.' (P8)

Involvement, however, could be therapeutic at more than one level. Another athlete-patient (P10), discussing how involvement helped her 'own learning about the condition', also felt proud to contribute to research (Table 2, quote 1). Educating research teams and other stakeholders 'can provide valuable input that other people might not be able to give'. (P10)

**Table 2. Quotes, theme 1: research communities should partner with athletes/patients.**

| | Quotation |
|---|---|
| 1. | 'This injury has had a massive impact on my life, whether I sort of accepted it until now is a different story. … So being able to contribute to maybe the future planning and research and things like that, I think, for me is a very proud moment. And it's something that, like I said, I do feel strongly about.' (P10) |
| 2. | 'And I think it's key [involving children/parents], you know, you might plan a great study, but then the parent tells you: "This is impossible, because …" for example: "I drive my son from school to this place. So, in the meantime, I can't get him on this device" or "I can't charge the device, because…" or "He doesn't wear these shoes, because…" you know, all the practicalities of what is realistic only come out when you speak to the relevant people. And the relevant people in that case, are the parents and the kid. You know, like, no one asks the kids: "do you like to wear this? Do you like to put this in your shoes?" And then they go: "Well, I don't like those, because they're too big you or I don't like the colour".' (P4) |
| 3. | '… what we find is important isn't important for some patients. … We want to look at the alpha angle and measuring, but the patient doesn't care about the size of the alpha angle. They're concerned about getting back to football.' (P11) |
| 4. | 'I think the first thing is in plain language. Because that's the biggest mistake we make, in language that even clinicians and other researchers don't understand. So, I'm taking some time to, again, involve the stakeholders, people, end-users, the knowledge-users, and actually involve them right from the beginning. In terms of, how you're going to communicate your findings, and is it meaningful to the people [who] are going to use it?' (P7) |
| 5. | '… there's still a lot of hysteria and alarming language being used in conjunction with things like cam morphology, cam lesions and femoroacetabular impingement syndrome. So, I think, to a certain extent, we need to make sure we don't use that kind of inflammatory language in any kind of education of cam.' (P1) |

**Table 2.** *Continued*

| | |
|---|---|
| 6. | 'So, I've been much more inclined to say somebody has hip pain and maybe associated with cam morphology rather than telling somebody: 'You've got a syndrome, you've got FAI syndrome.' … you've got to be really careful what your wording is, especially in young people … 16-year-olds are usually really worried about their future …' (P15) |
| 7. | '… I had the experience of a player whose … older brother ends up having bilateral hip surgery over the course of a number of years and has to retire from football. And the younger brother … had fixated in his head that he had to have surgery. And the way he described his hip to us, he was using all those words that were scary words, in his mind. About this impingement, and his bone rubbing on bone, and his cartilage wearing off … And he said: 'I've got to be shaved back; it's got to be smoothened out. So, I got a smooth surface that rubs against a smooth surface' that sort of talk. And I was like, if there's anything I learned from this … I have to be really careful on the terminology that I use, because they will create a picture in their mind. And this poor fella ended up having surgery; the surgery didn't go to plan. He's back playing but he's not at the level that he could've been.' (P3) |
| 8. | 'Look I don't have any concerns about my children participating in research. The only concern I would have, is if their photos somehow identify them as individuals, and they were available on the web without us knowing it. … A sort of breach of confidentiality.' (P1) |
| 9. | 'The other concern that I would have, is exposure to radiation. I wouldn't be too keen on my children being exposed to CT-scans and repeated radiation.' (P1) |
| 10. | 'The problem being - as the level increased and I got onto the senior team - the training increased, the volume in terms of the sessions and intensity on top of the gym work and not having anyone kind of looking out for me … I was trying to juggle four or five different managers. But if they [sport scientist, 'strength conditioner', physio and doctor] are not strong enough to speak up to the manager, then who's held accountable? So, then it goes back to the county boards. If the county board is employing a manager to manage a team, they're there to get results. But the players are the people that are being mismanaged. … So, until the manager has a guideline to say: "You're only allowed to do this much training in a week, and that's your responsibility. And if you break this, you're held liable, as is your medical team".' (P9) |
| 11. | 'Is it something that they can provide really valuable insight into? … we're almost asking someone's input about a condition [primary cam morphology] that they may be completely asymptomatic for their whole life … if you have a problem, which is already there, like, for example, knee OA … and you're trying to get participant involvement, there's so many people living with knee OA that have really good insight about the burden that it gives them in their life, their health care …' (P5) |

Discussing his 'passion to try and create change' and 'to try and educate' (especially parents of young athletes) about the morphology and its hip-disease consequences, another athlete (P9) shared how his 'whole life was changed because of [his] hips':

> I think that's where my story, me speaking and educating the parents, and showing them: 'If this resource was available to my family, and this testing or research project, whatever you want to call it, was there … it would have stopped me going through a year of operations. Untold pain, untold misery, sadness, heartache, you know, financial.' The list goes on. I think, one thing that we can do, as people who have a voice is to make sure that these parents [are educated]. (P9)

Our interviewees gave several examples of how a partnership approach could facilitate more value and less waste in research. First, engagement pivots on *and* promotes the relevance of research:

> I think, to really explore your question beforehand, and spend quite a lot of time doing that [is important]. So, refining your research question by involving stakeholders, involving clinicians, involving athletes … seeing what is meaningful to them, what do they want to know. (P7)

Second, athletes/patients (including adolescents, their parents, and coaches) could enlighten, not only researchers, but also the research process by illuminating blind spots in their research plans (Table 2, quote 2). In addition to gaining such insight to 'the practicalities of what is realistic', professionals also learned that patients ascribe importance to different things than researchers do (Table 2, quote 3). Additionally, patients can help in planning research; 'they give us ideas that we wouldn't have if we just think with our research hat on'. (P14)

Third, athlete/patient partnerships change how research communities communicate about research and research findings. A recurring theme in our interviews was the need to avoid jargon and use a language that everyone understands. The way to achieve this, they felt, was to involve all stakeholders from the outset, as illustrated by quote 4 (Table 2). Clinician-researchers and parents of competitive adolescent athletes, in particular, stressed the importance of avoiding alarming and inflammatory language (Table 2, quote 5). A former elite athlete and now sports coach warned that 'things like "abnormality" perhaps trigger a lay person to automatically think that this is something damaging and negative, and will be inhibiting: so, "lesion", when you say to me "lesion", I'm thinking of something more like a scar or an abrasion'. (P12) Although femoroacetabular impingement (FAI) syndrome is the agreed term, 'syndrome is a negative thing' (Table 2, quote 6).

Sharing their experiences, several participants were concerned that language and communication style—in research and in the clinic—could create the need for (unnecessary) interventions. A clinician-researcher shared how a patient's expectations had been shaped by an older footballer-brother who had bilateral hip surgery. The older brother framed the problem based on his own surgical experience (Table 2, quote 7). An athlete-patient and clinician shared her experience as a patient—how the language used and framing of the condition by a surgeon in a position of power left her vulnerable, confused, and distressed:

> And so, I ended up going to this surgeon who's pretty well-known … And I remember, I had not tried physical therapy yet. This was before starting physical therapy. I go in, and I remember, he takes my imaging out that I had, puts it up on the screen and says: 'Oh, you have a large labral tear, you have a cam and pincer lesion. And if you don't have a hip arthroscopy, you're going to get hip arthritis, and end up needing a hip replacement.' And I remember I just sat there, and I was just crying, and I was alone … I didn't know much about cam or pincer or labral tear. And then I remember asking: 'Well, if I don't get the surgery, and I keep running, what will happen?' and I remember him saying like, feeling very, you know, definitive in his wording: 'well, you'll get hip arthritis.' … The appointment ended with him saying: 'Okay, well, you can schedule the surgery on your way out and then we'll be in touch.' … I remember leaving there and I just thought, like: 'Wow!' Like 'this is terrible.' I remember I just was crying because here I was an athlete my whole life. I played college soccer, running was a huge part of my life and to then just be told that I have this condition in my hip. And if I don't get the surgery, I'm going to end up with hip arthritis. And I have to stop running. And it really just led me down that spiral of catastrophising. (P8)

Fourth, our participants, including parents of young competitive athletes, raised the importance of safe research, particularly when children, female athletes, and competitive athletes are involved. Research communities should guard against breaches of confidentiality (Table 2, quote 8), and protect, especially children, from unnecessary exposure to imaging-related radiation (Table 2, quote 9). Protecting athletes' health, including those participating in long-term research, and the influence of power-dynamics in competitive sport—especially when 'juggling' several managers at the same time—was raised as a safety concern by participant 9. Medical teams, particularly those involved in long-term research, must be empowered to protect athletes, and should, with club managers, be accountable to a higher management (Table 2, quote 10).

Finally, engagement could also be a challenge for athletes/patients, given that it requires them to share knowledge of living with primary cam morphology, which, in most, is an asymptomatic, benign morphology—unlike, for example, knee osteoarthritis (OA) (Table 2, quote 11).

In sum, when athletes/patients are equal partners in research—when they share their experiences and expertise—research would likely be more relevant, safer, and more ethical. Athlete/patient partners, as people who have a voice, could help to shape clearer and less threatening communication in research and in the clinic, and expressed eagerness to share their stories and struggles—to get involved in research and education to help others. Healthcare professionals and researchers seemed equally keen to involve and learn from athlete/patient partners.

### Theme 2: Research communities should collaborate with one another

This theme combines and extends elements from several INQUIRE dimensions and promotors, including minimisation of bias (internal validity), precision, infrastructure, and sustainability.

Interviewees discussed the need for coordinated efforts to plan and deliver multi-centre and multidisciplinary research on, for example, primary cam morphology aetiology and prognosis (Table 3, quote 12). To strengthen large-scale multi-centre research collaborations—'helping each other'—research teams should agree on research questions (Table 3, quote 13). Such studies should use the same methodology and capitalise on transparent research centre-specific expertise to facilitate high quality data sharing (Table 3, quote 14).

To reduce attrition and measurement bias, research centre-specific expertise is particularly important when performing and analysing imaging. Long-term prospective studies (with serial hip imaging over time—every five years, for example) could benefit from an international network of collaborating imaging units to accommodate elite athletes who are often contracted to live and play around the world. They could be accommodated at an imaging centre close to them. Imaging

**Table 3. Quotes, theme 2: research communities should collaborate with one another.**

| | Quotation |
|---|---|
| 12. | 'So we need to identify groups around the world that at are working particularly with adolescent football players and try to link data between athletes that are playing without developing hip and groin pain and without developing cam morphology and those who are developing hip and groin pain and cam morphology … and then to be able to track these over time and determine some of the differences that exist between players that go on to develop hip and groin pain, so we can intervene better at earlier stages.' (P1) |
| 13. | 'So, it's more interesting, if you are collaborating with each other and defining exactly what you're doing. What more research do we need to have in this kind of field of area? And if you have the same participants at different hospitals. You don't need to do it all by yourself. No, you can ask each other, helping each other and getting large cohorts and groups with the same questions we want to have answered.' (P11) |
| 14. | 'Some groups in the world are dedicated in studying this topic [primary cam morphology formation], of whom some already have some collaborations. But I think that is one of the most important aspects, to collaborate in studies, multi-centre studies … Using the same methodology, so using the same type of clinical examination, questionnaires, imaging, and stuff like that. So that you can also interchange the data. And more in detail also, quantifying things. So, how do you quantify when somebody has cam morphology? I mean, we talk a lot about that. But I think all the quantitative measures we have to date, they're okay, but they can be improved … So also, that is a field where we can improve and where we preferably use the same methodology as well.' (P6) |
| 15. | 'In terms of infrastructure, it is very important that well, in practical ways, the centre where the expertise is, probably does their part of the study. So, the participants come from everywhere, but the imaging analysis might be done somewhere, where they have a lot of expertise and statistical analysis might be done somewhere else … But what I find really important, especially with the imaging analysis, and software techniques used for that, is that people should be very transparent in what they use, how to use it, and everybody should have the possibility to use it.' (P6) |
| 16. | 'I think the infrastructure is also the internet. Databases. So, I think, if that infrastructure is to improve, we have connection … using the same DICOM images … then connecting them with the same server. I think that infrastructure would be the most important thing to improve on, then we can have large cohorts and large studies. And then you don't need to travel because you're in Australia or somewhere else. And then you can combine it with the same protocol, with the same images, and maybe a computer helping you to investigate the things you want to see.' (P11) |
| 17. | '… to really have a meaningful impact, this kind of work would need to involve an international collaboration. Some sort of registry, a large database, and that will make a really big impact. So this is the challenge, to actually make sure that there are various stakeholders. But I think there is the possibility to do that, because there's a wide interest, there is no competitive advantage anywhere. … because everyone can gain something, you know. If research shows better, kind of procedures to reduce the risks and better clinical outcomes, that's going to save money anyway on the healthcare system as well. So there should be a vested interest, and the financial return for the investing, by doing wider type of collaborations.' (P4) |
| 18. | '… collaboration, international collaboration, and you know, we're always competitive. I'm not particularly competitive; I suppose … because we're smaller, there's not a lot of money, we're really, really good at being collaborative, because we need each other. But I think in in other areas of research, it can be a little bit competitive. So, I think … we're stronger together; that [collaboration] needs to be driven probably by very global bodies, like the IOC, or FIFA or whatever.' (P7) |
| 19. | 'Data sharing is my biggest problem and has always been. And it has never been solved. And it needs to be solved. And I think now there is the technology to do it. So there is a plethora of studies, that are conducted on 10 subjects, 15 subjects, 20 subjects, 30 subjects at best. And none of these actually contribute to really a consensus. So usually, the consensus comes 10 to 15 years later, when there is a big systematic review and meta-analysis that says: 'This thing works, and this thing doesn't work.' And to me, it's a waste of time. Because you have to wait 15 years and a lot of effort from various research groups. While, in a couple of years with the right structure in place, it could be possible to interrogate it.' (P4) |
| 20. | 'We're doing a multi-disciplinary approach of orthopaedic surgeons, sports medicine physicians and the radiology department. So that we can have a collaborative team of three different medical specialties, and I think we're all good at one part. So, the orthopaedic surgeon knows how to carry on when it's symptomatic and probably do surgery or something like that. The sports medicine physician is probably the more conservative part, and the radiologist can give information on how to image those hips for example. I think that might work together really well.' (P2) |
| 21. | And I know that it's that word, it's used all the time, but 'stakeholders'. So, it's multiple stakeholder-involvement, I think, really makes a difference. Because each person is going to add a different dimension to it. The challenge comes in integrating all of that into your outputs. But it can be done. And I think we're seeing a move in sports medicine to do that. … And I think that's one of the things where there is that disconnect between researchers and clinicians. Now because … research is often done in a sterile environment, and clinicians go: 'Well that doesn't work for me.' (P7) |

**Table 3.** *Continued*

| | |
|---|---|
| 22. | '… understand the rationale. And converting that into a performance- and a financial rationale. So, for me, just to say: 'Do you want to do a hip study, to find out how hips grow?' That's not going to land. But to map it out: 'This is the performance-challenge we have. This is a financial challenge we currently have and this is what the future could look like, financially-performance wise.' You have to convert that. So that's number one. The internal messaging has to be: What's in it for the coach. What's in it for the finance director. What's in it for everyone.' (P3) |
| 23. | 'And the questions were determined initially by the medical staff, but ultimately, we had coaches starting to determine the questions, going: 'Here's my performance challenge, how do we unpick that?' So, when you come to find the question and then go to the right university and the right group of people, that understand the landscape of professional sport, that's the easiest mix.' (P3) |
| 24. | 'So, you're getting your question answered. Gone are times … where the University determines the question. And if they did offer a question, it would have to be twisted to be beneficial for the football club. But that went really well actually, us going to university with a series of questions. … So, both sides need to work collaboratively to the same solution. And it's just communication, isn't it? It's really, really trying to understand, what does success look like and how long does it take to do it. I think that's a key one. Because Universities work at such a slow pace, in comparison to a football club, that works so quick.' (P3) |

collaboration could include shared (online) infrastructure like *Digital Imaging and Communications in Medicine* (DICOM) (Table 3, quotes 15 and 16).

International collaboration on a registry or large database could have a 'really big impact' on this field, benefitting research teams, patients, and healthcare systems (Table 3, quote 17). Collaboration could be bolstered when—with a 'we need each other'-approach—coordinated by global sporting bodies like the International Olympic Committee (IOC) or FIFA (Table 3, quote 18). Participants commented on data sharing, including their frustration with it. Meaningful data sharing was acknowledged as 'my biggest problem' (P4). However, if done well, for example through the 11 IOC Research Centres [3], such data sharing could improve small sample bias and result in large datasets 'that could be interrogated with better techniques, and with better statistical knowledge' (Table 3, quote 19).

A common theme was also multidisciplinary team approach to *intra-team* collaboration, including with academic partners. Multidisciplinary team collaboration should involve athletes, coaches, different medical specialties and topic experts, researchers, and methodologists, for example (Table 3, quote 20 and 21). Some participants described their perspectives and experiences on multi-stakeholder collaboration to facilitate research buy-in. Buy-in could make or break research in this field. How researchers frame their research question, especially in elite sport, is key for engaging with management, big stakeholders, and decision-makers, including finance decision-makers (Table 3, quote 22).

Effective research collaboration among academia and professional sports clubs is important in this field.[4,45–47] Researchers working with football clubs benefit when clubs, especially the coaches in the clubs, determine the research questions before engaging 'the right university' (Table 3, quote 23). However, such a collaboration could often be a slog, and someone needs to 'kind of steer the university' on what is possible and what is not impossible (Table 3, quote 24).

In sum, participants discussed how 'we are stronger together' when aligning to pursue large-scale, multi-centre and international collaborations to answer research questions that matter to all. Effective multidisciplinary intra-team collaboration resonated with our interviewees too.

## Theme 3: Research communities should pursue open science

This theme includes and extends the INQUIRE dimension, transparency/access to data. Access—for everyone—to as much information as possible, and translated to lay people's language, resonated with our interviewees (Table 4, quotes 25 and 26). All stakeholders, including athlete/patients and coaches, should have access to research—in 'plain language':

> So, it's going to be athletes and coaches. A lot of scientific language isn't particularly meaningful to them. And even clinicians, who would have been taught in that area, they still have moved into an environment where they don't use that language anymore. So, I think, I think Open Access is good, but I think it still needs plain language. (P7)

---

[3] International Olympic Committee (IOC) Research Centres for the Prevention of Injury and Illness. Eleven IOC Research Centres are supported by a four-year grant for 2023-2026: https://olympics.com/ioc/medical-research/research-centres

**Table 4.** **Quote, theme 3: research communities should pursue open science.**

| Quotation | |
|---|---|
| 25. | '… everyone should have access to as much information as possible, in the most accurate up to date information, where possible. But at least to have the summary or the breakdown, if not the whole thing. To still be able to have access to that information and understand what the study was and what the concluding things were from it.' (P10) |
| 26. | 'Everyone. Everyone should have access. And study results should be translated to lay people's language, for access to the information for the community. So, using things like infographics or factsheets etcetera is absolutely essential. And that's the kind of thing that can help educate parents and football clubs, and coaches.' (P1) |
| 27. | 'Once I stopped studying, obviously, you stop having access to all the database and the resources that the university provides. … Even for my work now, I regularly quote journal articles and research to back up what I'm saying. And so, it is important to have more access to that, to be able to better justify and explain or backup what we're recommending.' (P2) |
| 28. | '… it is basic methodological practice that is going to improve the quality … having protocols, being registered and available in open forums so that people are aware of studies that are happening.' (P1) |
| 29. | 'Most of the bigger studies will publish their protocol, specified which analysis they will do, the outcome measures, the factors they study… So that's the first thing and the other thing might be to publish your database open access.' (P6) |
| 30. | … you have to publish your data set open access. I'm a fan of that, but there are quite some issues involved in that. And probably journals in the future will require that much more. … for me, it's a no-brainer. I think everybody should do that [share anonymised patient data between research groups]. Even for the grants we apply for now, it's even, how you say, necessary to do that. To have your data open access. And I think it's moving more like that. And it might be difficult, what I experienced with other consortia that I worked in, with cohorts that are already established. Because participants did not already give their informed consent for sharing the data outside the centre or whatever. So that might be sometimes a problem. But for newly studies, that should certainly be the case. And for us, we can only run studies if we do that. (P6) |
| 31. | An early career researcher, trying to get his name out there a little bit, is probably … more inclined to go with the high impact, high ranking journal, because it's important for, whatever you're trying to do, whether it be your next job. But I'm aware that that is not great for the dissemination of research, more often than not, because then you've got to drive that separately. On top of the fact that it's already in that journal, you've got to drive it to other people that need to know about it. That creates a lot of work for the researcher. (P5) |
| 32. | 'We had a clear protocol that we discussed with players beforehand: "This will be the approach, this is what you need to sign off, the club doc needs to sign off. And then we release the scans" and so on.' (P15) |
| 33. | 'I would say that there's nothing to share. I mean, I would say that you really don't know enough about that [primary cam morphology]. Because we know that this is, frankly, probably pretty typical development. I don't think you can sit here and say that this is atypical. And I would say, unless you see something that is not something you're looking for, like an osteosarcoma or something like that, I don't think it's warranted to share that with them, other than saying: 'we're in the data collection process and we're trying to understand these things. And we just don't know enough about this.' And I think that would be where I would leave it.' (P13) |
| 34. | 'We also asked them if they wanted their medical staff to be involved or not. Because they are the participants and scientifically seen and ethically seen, their medical staff does not have any right to know their personal information.' (P2) |
| 35. | 'What I'm not in favour of, is the extortionate costs of open access. … the production costs are a lot less. And I'm also a reviewer and an editor that doesn't get paid to do any editing or reviewing. So that is the thing I can't get my head around, you know, we are all doing this work for free.' (P4) |
| 36. | Well, I would say that open access research is paramount. And the basis of research, as we know it nowadays, is completely crazy. So, what we do is that we publish, sometimes with our effort and with our money, and then we transfer our copyrights to an editor and then the editor will ask for money from the universities. … So, this is completely crazy. Right? (P14) |
| 37. | … the problem with open access now, in science in general, is that there is a plethora of low-quality journals that pretty much pay - publish anything, provided that you pay. And the scary thing is that, even researchers don't know what's the difference between a good journal and a bad journal. You know, I had staff in the past that approached me to say: 'Oh, I've been invited to write a paper for this journal.' And I'm thinking about writing it. And I have to explain them what a predatory journal is. And that's people with PhDs and years of experience, and you think: 'Wow, we've got it wrong here.' (P4) |
| 38. | 'I think that Open Access papers are probably not that important. And I say that because there's a fee that's associated with that. And when you do that, then that makes things more difficult to get papers published, because it takes more money to do that, and it pulls money away from doing other research efforts.' (P13) |

An athlete/patient participant warned that financial and career benefits for researchers should not trump end users' access to research —'it's silly and very naïve in this day and age that it's happening'! (P9):

> If a person is paid to do this research and is then publishing papers on their own study, it's again for their benefit. And it's for the benefit of the financier. So why, even though they're doing it for themselves, why should we [athletes/patients] not have access to that? (P9)

Peer reviewed publications buried behind paywalls are problematic for young scholars and clinicians alike (Table 4, quote 27). Access should be easy—'simply click on a button'—and include study protocols to reduce research waste (Table 4, quote 28) and data (Table 4, quote 29). Although open access to data resonated with our interviewees—even if it becomes a future journal requirement for new studies—there are important considerations, including informed consent from participants for anonymised patient data to be shared among research groups (Table 4, quote 30).

Some participants felt that prioritising open access was easier said than done. For example, particularly for early career researchers, impact factor might trump open access; an approach that could disrupt effective dissemination of results (Table 4, quote 31).

Researchers should think carefully when sharing test results with individual research participants (and, in the professional football club context, their sports club medical teams and managers): they should have an agreed protocol for this (Table 4, quote 32) and be comfortable to say: 'there's nothing to share'. Particularly when sharing, for example, 'normal' imaging results of 'frankly, probably a pretty typical development [primary cam morphology]' in athletes (Table 4, quote 33). Research teams should also give athletes/patients ownership of the decision to share, or not to share, their results with club medical staff (Table 4, quote 34).

Finally, participants also expressed concern about, or questioned the need for, open access. They discussed: the high ('extortionate') cost of open access publication (Table 4, quote 35); the 'completely crazy' academic publication system—paying to sign away copyright (Table 4, quote 36); the problem of predatory or low-quality open access journals (Table 4, quote 37); and their perspective that open access papers are 'not that important' as the average clinician 'don't really read research papers'—the cost of open access publication 'pull money away' from research (Table 4, quote 38).

In sum, our study participants discussed how research communities could pursue open science to improve research quality. Clinicians, researchers, and athletes/patients need to have easy access to important findings. There are perverse incentives (e.g. researchers seeking publication in a high impact factor journal that is only available to readers via a paywall). Finally, the cost of making publications open access could be prohibitive.

### Theme 4: Research communities should champion equity, diversity, and inclusion

This theme includes and extends the INQUIRE dimensions: generalisability (external validity), and relevance/patient centredness & involvement. Our interviewees highlighted several equity, diversity, and inclusion (EDI) elements of high-quality research relevant to the steps of a research project in the hip-and-groin research field.

First, as described in theme 1, research communities should partner with athletes/patients. Such partnerships, to inform research questions, for example, should focus on racial/ethnic and sex/gender minoritised individuals and groups in the EDI context of this research field (e.g. girls, women, Black people, and people from the Global South).

Second, considering study populations, the primary cam morphology research field is largely void of research involving girls and women, and people from the Global South—particularly athletes. This was emphasised by our interviewees too (Table 5, quote 39). To engage more diverse populations, research should not only consider the different impact on males and females, but also involve people of different ages, people with disabilities, and people with different ethnicities (P12). To date, very little research in this field is done in the Global South, for example. A clinician-researcher and patient warned that 'to understand the injury or morphology well' it is important not to 'shut out certain geographical areas' (P13). Participant 7 confirmed this perspective, discussing research that involved diverse populations with 'genetic variation' and different athletic backgrounds (Table 5, quote 40).

Third, research team-specific EDI considerations include fostering an inclusive and equitable research climate within teams and their collaborative networks. Our interviewees discussed: (1) team diversity (e.g. female research participants might feel uncomfortable when male researchers perform a groin evaluation, as illustrated in quote 41 (Table 5)); (2) access for team members who live remotely (e.g. accessible and inclusive online meetings, as illustrated in quote 42 (Table 5)); (3) building capacity (e.g. team member compensation and mentoring ensuring socioeconomic status and knowledge about the research topic do not exclude certain team members, as illustrated in quote 43 (Table 5)).

**Table 5.** **Quotes, theme 4: research communities should champion equity, diversity, and inclusion.**

| Quotation | |
|---|---|
| 39. | 'A major thing is to include women, which I think there's a bit of a void. So that's very underrepresented across everything, and particularly across elite athletes. To look at the complexities of researching elite athletes. … listening to the athlete voice … And not just take them as this commodity, with, let's say, a combination of anatomy, physiology - but actually bringing in the bio-psychosocial. So, making it a lot more multi-dimensional, making a lot more inclusive in terms of beyond the elite.' (P7) |
| 40. | 'Having inclusions throughout the world, throughout genetic variation, I guess. So, most of the studies done so far … are in Caucasians. And I think it's important to have people involved as well with different genetic backgrounds. I'm especially interested as well in Asia. Because we know already that their hip morphology is way different than people with other genetic backgrounds. And well, just having enough numbers in different age groups from different athletic backgrounds … (P6) |
| 41. | 'I think the primary [female participant recruitment issue] was, that there were three male researchers that were doing the recruitment. And that required a physical examination of the hip-groin area, which is obviously a sensitive area …' (P5) |
| 42. | 'Move that [meeting] around the world, to try to make it as accessible as possible. And I think doing it via zoom, is really probably the best way to do it. … so you reduce those costs as well. … I think the other part of it, is to include all stakeholders in it. So, the researchers, I think clinicians, and coaches. That is going to be really important. Parents.' (P13) |
| 43. | 'For different countries, it's access to the same resources that we have. So, a good way of trying to encourage this, is getting competent people from other countries, and trying to link up. Try and make links, and then helping provide resources. You know, so developers together and making sure that - maybe an academic unit, where things are more set up, can help. But then you have things like visitation. So it could be that somebody doesn't have much research experience, then comes visits for a few weeks and get some experience and just develops these links that way.' (P15) |

Finally, EDI in knowledge translation include, as discussed above, easy access to research reports written in lay language, ideally with patient partners (Table 4, quote 26).

### Theme 5: Research communities should nurture young scholars

This theme includes and extends the INQUIRE promotor: sustainability/education. Mentoring seems to be key for scholarly growth and has been defined as 'a dynamic, reciprocal relationship in a work environment between and advanced career incumbent (mentor) and a beginner (protégé) aimed at promoting the career development of both.' (Ref. 48, p17). Four archetypes of mentorship have been proposed: the traditional mentor, the coach, the sponsor, and the connector.[49]

> … the mentor guides, the coach improves, the sponsor nominates, and the connector empowers, but always the mentee benefits. (Ref. 49, pE2)

Interviewees illuminated how research communities could nurture young scholars through mentoring, deconstructed here using the four archetypes above. First, through careful mentoring by humble mentors. Humble mentors model imperfection—they are willing to say, 'I don't know'.[50] They seem to carefully guide young scholars to pursue relevant research questions 'as part of something bigger', as quote 44 (Table 6) illustrates. Second, through mentors that challenge mentees in safe spaces (the coach or supervisor-type mentorship), as quote 45 (Table 6) illustrates. Third, through mentors that create opportunities – the sponsor-type mentorship. Scholars should not be 'dumped' into research with a 'good luck, my friend' approach (P2). Rather, research teams—especially senior researchers and mentors—should create opportunities for young scholars to lead (Table 6, quote 46). Finally, through mentors that empower. Clinician-researcher (P3) described his role (as a connector-type mentor) in creating a stable and sustainable environment for young scholars, connecting them with a professional sporting organisation (football club) as employer and a university for academic training:

> Why don't we ask the real - performance, injury, whatever it is – questions? Why don't we generate the questions and then go to the Universities? Get the contract which [is] always the most painful bit. But get the contract sorted out and then doing. If it's a PhD, we do an interview to find the right student that would fit the University and also our needs. Because they'll be imbedded for three years within our program, became effectively a member of staff for us, the players knew no difference, they just saw a member of staff and it went really well. (P3)

**Table 6. Quotes, theme 5: research communities should nurture young scholars.**

| | Quotation |
|---|---|
| 44. | '… one of the things that really helped me was having mentors that were able to represent what we don't know, rather than saying that we have all the answers; we just need you to prove them. To be very open to the fact that there's so much unknown in this area and we would like you to [focus on] this particular aspect of it, so we can built on that and I think that's a really important thing as a PhD-student but also mentoring a PhD-student, that you are part of something that's much, much bigger and you're coming into a team that are trying to answer a bunch of questions that is going to move the field forward and reduce the burden of these injuries to help society. So, I think putting it in perspective of what's happened before and what will happen in the future is very beneficial.' (P1) |
| 45. | 'In the beginning he was very strict, and we had. some really strict deadlines, and there were sometimes that I really hated him, but afterwards that probably was a good lesson for me. So, I think it's really important to have a good supervisor, to have the opportunity to ask questions, to not have a really strict hierarchy. So, we have a professor that is really easy to go to, to talk to, to ask questions to, not only on scientific basis, but also financially and things like that. So that also makes it a really safe environment for scientific research.' (P2) |
| 46. | '… as a student, I provided most of the education for the other researchers. Not the junior researchers, because I was the first one on there. And I set up the protocol and all that sort of thing. So, I was sort of leading that and like, I was thrown in the deep end effectively, but a great learning experience.' (P5) |
| 47. | 'So, providing positions that will facilitate the collection of data would be really beneficial. … at the moment a lot of our positions are very short term and tied to external funding, so that creates considerable stress and lack of certainty about the long-term job and continuity. And that's a problem if you're trying to do long-term prospective studies. And we're already seeing that with our prospective studies, which is now up to five years, that the PhD-students are starting to finish and if we don't have positions available then we lose all the intellectual property that's been developed with this cohort, that incredibly deep and rich intellectual property with that cohort if we can't ensure positions for those PhD-students once they finish. So that is a problem, yes.' (P1) |
| 48. | 'When they go into postgrad, funding is a huge thing. Just trying to support themselves and live as a postgraduate student can become a big issue, getting funding for their research, it tends to be specific areas that are probably over funded. So, things like cancer are hugely funded. Arthritis isn't as well funded, considering it's one of the biggest problems.' (P7) |
| 49. | 'So, until someone has longevity, in a sense of 'Ok, I'm going to do a project that, I'm comfortable I can put 3 to 5 years PhD focus on, and it's protected.' So, we ended up creating agreements for a member of staff, who was doing a PhD, saying, even if you leave the club, you can have access to the data, you can use the data, publish data, right off the bat, to protect him. Because it was ridiculous otherwise. But that insight doesn't really exist in many clubs.' (P3) |
| 50. | 'We had a big group, with probably ten or twelve different scientific researchers from different fields, and we had education every week and we discussed our own progress, our pitfalls, our positive sides, suggestions for others. That was really useful as well in my opinion. So, every week, one or two hours a week, just to evaluate and discuss every project. And that gave me a lot of good ideas, to include in my own research. So, if you stick ten smart heads together, you might create some good thoughts on performing research in the future.' (P2) |
| 51. | 'Because a PhD has a lot of downsides, again a rejection, again a wrong interpretation of the data, again a manuscript that had major revisions but got rejected afterwards, again congresses in corona-time that just don't go on … But if you stick your heads together and just discuss those downsides and positive sides, that might be really useful.' (P2) |

A clinician-researcher and young scholar (P2) stressed the importance of 'insight in the ethical way of things' when creating opportunities for young scholars, and warned against research for the sake of research:

> You cannot just only say: 'I want to do research as quick as possible and get the highest paper with the best impact-factor' but also think of sustainable quality research … (P2)

Several participants mentioned lack of sustainable employment and funding as a problem, creating 'considerable stress and lack of certainty about the long-term job and continuity' (P1), as quote 47 (Table 6) illustrates. Research in this field ('arthritis') seems to struggle for funding compared to other fields like cancer (Table 6, quote 48). However, protected employment seems not enough; financial and collegial support for relevant research, with continued access to data after employment, should be cemented in employment contracts (Table 6, quote 49).

In addition to mentoring, participants discussed personal growth when well-organised research teams created opportunities for structured education, for discussing ideas (Table 6, quote 50), and for sharing the struggles of being a young scholar (Table 6, quote 51). Participants emphasised structured education programmes for young scholars.

One participant urged education on 'the rules and the processes of research.' (P4). Although important, this element is often missing in education; 'that a lot of people, despite the fact that they have PhDs, still don't understand the research process, is fascinating to me.' (P4). Participant 2 agreed, advocating for a structured education programme: 'We had like a course of two weeks on biomedical statistics, but to be honest, how can you learn biomedical statistics in two weeks?' (P2). Another participant advocated for 'having the right people in the right positions to educate the team' on more field-specific knowledge and skills (P5).

In sum, creating opportunities for young scholars to learn, teach, and lead even large-scale studies in well-supported teams, resonated with participants. Participants agreed that stable and sustainable research environments are key for supporting young scholars' development into independent researchers.

## Discussion

The findings of this study show that, for higher quality research in the field of primary cam morphology and its natural history, research communities should: partner with athletes/patients; foster collaboration; pursue open science; champion equity, diversity and inclusion, and nurture young scholars (Figure 3). Informed by the INQUIRE framework, these action-inviting themes provide important insights for higher quality research—more value, less waste—on primary cam morphology and its natural history, including hip-disease consequences.

**Figure 3.** **Action-inviting themes to inform higher quality research on primary cam morphology and its natural history.**

High quality research on primary cam morphology and its natural history is ultimately aimed at benefitting athletes/patients. It is therefore important to keep their preferences, experiences and needs at the centre of research (Figure 3). This approach to research in the field of primary cam morphology and its natural history is supported by the results of the Oxford Consensus Study[12,13]: athletes/patients should be 'in charge as partners with power—exerting some control over all decisions'.[13]

## Summary of findings and implications for research and practice

Our first theme echoed that authentic patient and public involvement (PPI) in research—partnering with athletes/patients—could facilitate more relevant, safer, and more ethical research.[51] Patient-centred research could help to identify unmet needs and gaps for research communities to prioritise—research questions that are relevant to athletes/patients with primary cam morphology or a related hip disease. These include qualitative research to explore experiences, preferences, and perspectives. It goes without saying that athlete/patient-centred research must be safe and ethical. In the context of primary cam morphology and its natural history, this means, for example, avoiding radiographs when researching aetiology in maturing athletes, protecting participants' personal information, prioritising general and research-specific ethics and integrity, and valuing methodological rigour.

A haphazard approach to language (including terminology and definitions) could confuse patients.[52] This gap was addressed when the research community agreed on primary cam morphology terminology, definitions, taxonomy, and imaging outcomes for research.[12] The YAHiR Collaborative and others are working to implement this agreement and to address areas of tension and dissent. This will take time; many clinicians and researchers still use cam 'lesion', 'deformity' or 'impingement' instead of the agreed 'morphology'.[5,12] With athletes/patients as partners, research communities would likely be more inclined to prioritise clear and non-threatening language when stakeholders communicate about the morphology and its hip-disease consequences.

Second, high-performing research teams should collaborate with one another—a key INQUIRE element of high-quality research.[14] Such collaborations could catalyse, among other benefits, larger data sets (through well-planned multi-centre research projects on primary cam morphology aetiology and prognosis, for example), increased methodological rigour (by involving, for example, methodologists and specialist radiologists from the outset), and better framing of research questions to secure wider buy-in (of football club managers, for example). Professor Trish Greenhalgh shared '3 tips for authentic research collaboration from interdisciplinary health research' in Session 4 of the 2022 *Oxford Young Athlete's Hip Symposium*: 'build relationships and trust', 'foster tolerance of uncertainty', and 'harness conflict productively'.[53]

Third, the research community should pursue open science. Participants emphasised access for everyone to as much information as possible—including protocols, datasets, and summaries of results in non-scientific language. Several participants discussed 'extortionate' costs of open access publishing and warned against predatory and low-quality open access journals. These problems are not unique to the hip-and-groin research field. With an estimated annual turnover of $2 billion, the open access publishing model has become the 'mainstream approach to delivering scientific knowledge with Article Processing Charges as driving force'.[54] Predatory journals and publishers, a problem in all research fields,[55] were defined as 'entities that prioritize self-interest at the expense of scholarship and are characterized by false or misleading information, deviation from best editorial and publication practices, a lack of transparency, and/or the use of aggressive and indiscriminate solicitation practices'.[56] This consensus definition is likely to contribute to a coordinated strategy aimed at eradicating the plague of predatory journal and publishers.

Fourth, high-quality research on primary cam morphology champions EDI. An EDI-conscious research community at each stage of the research process, would be more aware of possible blind spots, including a tokenistic, tick-box approach to EDI.[57] Similar to other research fields, there is a lack of diversity and inclusion in sport and exercise medicine, science and rehabilitation in general, but specifically Black female athletes.[58–60] Other fields have prioritised efforts to improve EDI, including in academia[61] and nursing.[62] An EDI lens should not only inform research populations but also research teams. Our findings suggest such a research community would likely (1) prioritise more diverse research populations and research teams with an immediate focus on girls and women, and the Global South (diversity); (2) secure access to equal and fair opportunities to minoritised individuals and populations (equity); and (3) emphasise inclusion as 'a sense of belonging: feeling respected, valued, and seen for who we are as individuals'.[63]

Finally, participants in this study emphasised young scholars, in high-quality research, should be nurtured. This echoed the move away from an 'unhealthy reliance on impact factors' to assessing scientific research quality,[64] to rather focus on nurturing and mentoring the next generation of scholars.[65] They are carefully mentored, share, and learn together, benefit from opportunities created by their mentors and seniors, and thrive when employed with funding—creating a stable and sustainable research environment.

## Comparison to the research quality literature

The findings of this study, informed by the six dimensions and two promotors of the INQUIRE framework, are consistent with current trends in assessing research. However, what research quality in health care is, also depends on context and research type. The INQUIRE framework's dimensions—minimisation of bias, precision, and generalisability—illuminate a predominantly positivist lens to assessing research quality. For example, we don't trust results of cohort studies plagued by researcher bias and imprecision. 'Confirmability', 'credibility', and 'transferability', on the other hand, are concepts for defining and investigating rigorous qualitative research.[66–68] A carefully constructed conceptual framework for research quality in health care can inform efforts to improve research in a specific field. A new, more inclusive framework could, for example, be the catalyst to moving a field beyond the 'impact-factor-is-king' approach to assessing research quality, to embracing a more contemporary approach. In this study, our analysis started with the INQUIRE framework but also explored research quality beyond the positivist frame of enquiry.

Despite worldwide quests, a uniform approach to describing and assessing research quality and impact is still contested. The 2014 'Increasing Value, Reducing Waste' series in *The Lancet*[69–74] spotlighted waste in biomedical research and made 17 recommendations to increase research value, addressed to five main stakeholders—funders, regulators, journals, academic institutions, and researchers. The authors of this series formed an alliance (the Reduced Research Waste and Reward Diligence [REWARD] campaign),[75] emphasising five principles—several echoed in our findings—to maximise research potential, including (1) the right research priorities; (2) robust research design, conduct and analysis; (3) regulation and management that are proportionate to risks; (4) access to all information on research methods and findings; and (5) complete and usable reports of research. However, a follow-up article in 2016, providing an overview of the effects of *The Lancet*'s Series and REWARD campaign, concluded that, overall, and despite early corrective actions by some stakeholder groups, further work was needed to increase research value.[11] Six years later, the tide continues to turn against research waste and, importantly, the narrow notion that high quality research and impact can only be 'measured with a number'.[65,76]

The findings of this study resonate with the key quality concepts of the *Agreement on Reforming Research Assessment* [4]. This agreement emphasises research (quality) assessment based primarily on qualitative judgement and more-inclusive assessment systems.[76] Commendably, this agreement was co-produced 'bottom-up' by research stakeholders from 350 research organisations and 40 countries as 'an exercise of consensus', based on a 'common vision, and shared responsibility and direction.'.[77] This inclusive approach is a foundation to collaborate—a call for collective action. To date (31 July 2023) and supported by the *Coalition for Advancing Research Assessment* initiative,[78] 608 organisations worldwide have signed the agreement.[79] Others have paved the way for this approach, notedly in the transdisciplinary research context,[80] and patient-orientated academic clinical research' (the INQUIRE framework described earlier).[14]

Belcher *et al.* (2016) proposed a framework of four main principles when assessing research quality in transdisciplinary research.[80] These principles are (1) relevance (the importance, significance, and usefulness of the research problem, objectives, processes, and findings to the problem context); (2) credibility (the research findings are robust, and the sources of knowledge are dependable. This includes a clear demonstration of the adequacy of the data and the methods used to procure the data including clearly presented and logical interpretation of findings); (3) legitimacy (the research process is perceived as fair and ethical, including ethical and fair representation of all involved, and the appropriate and genuine inclusion and consideration of diverse participants, values, interests, and perspectives); and (4) effectiveness (the research generates knowledge and stimulates actions that address the problem and contribute to solutions and innovations).

In sum, there are no shortage of research quality frameworks; however, how these frameworks are applied to inform research practice depends on several factors, including context. Nevertheless, there seems to be a world-wide movement towards a more qualitative assessment of research quality.

## Strengths and limitations

To our knowledge, this is the first study in the hip-and-groin research field exploring research stakeholders' perspectives on research quality. In light of these efforts to articulate research quality, limitations of this study deserve particular attention. Although our aim was to explore (describe and understand) perspectives on research quality of a diverse

---

[4] Work on this Agreement, drafted by Science Europe, the European University Association, and Dr Karen Stroobants, supported by the European Commission, started in January 2022. This agreement '… set a shared direction for changes in assessment practices for research, researchers, and research performing organisations, with the goal to maximise the quality and impact of research. It includes principles, commitments, and timeframes for reforms and lays out principles for a Coalition of organisations willing to work together in implementing the changes.' - https://www.scienceeurope.org/our-resources/agreement-reforming-research-assessment/

stakeholder group (rather than a deep case-by-case phenomenological analysis of a smaller homogenous group) the study population could have been even more diverse—we did not, for example, recruit any participants from the Global South or Black female athletes. This was perhaps a blind spot – patients, particularly in this research field, are *not only* middle-aged white males. Participants from the Global South at the intersection of race and gender, compared to their white Global North counterparts, would likely have different perspectives on participation and access to three-dimensional imaging, for example.

Although the data in this study provided a rich and complex picture of a diverse group of participants' experiences and perspectives on research in the field of primary cam morphology and its natural history, it did not aim to completely capture the phenomenon under scrutiny.[81] Our interviewees emphasised language and communication about the morphology, referring to 'inflammatory' language, for example. What 'inflammatory' is, however, depends on the hearer. Research communities might therefore choose to adopt a more flexible approach to defining 'inflammatory' language. We need more research on the perspectives and needs of subgroups living with primary cam morphology and its hip disease consequences, focussing on women, adolescents and the Global South. Village-born Kenyan long-distance runners who pad 25 miles a day barefoot, for example, or youngsters playing football for many hours per week in rural villages in South Africa: do they develop primary cam morphology or its hip disease consequences? what are their challenges, priorities and concerns? These and other gaps in current research should be addressed by the YAHiR Collaborative and collaborators.

The research team reflected on two aspects of our sampling strategy. First, the structured variation approach to sampling (informed by the 'closeness continuum') resulted in breadth, rather than individual depth, of perspectives. However, our purpose was not an in-depth phenomenological analysis; we were interested in multiple perspectives on research quality from a diverse stakeholder group. Second, the role of prior relationships between researchers and some participants. The familiar nature of some 'acquaintance interviews' might have shaped the data gathered during this study.[42] For example:

> *… But you know better than anybody*, that some of the athletes may feel that osteoarthritis in 10 years' time is much less important than what their pain-and-function is the season. (P15)

Starting the sentence with 'you know better than anyone', the participant aligned himself with the lead investigator and interviewer, drawing upon their shared knowledge. The participant was still the interviewee, but it could be seen that he also invoked the professional relationship with the lead investigator.[42] Some participants might have assumed the lead investigator knew the answer anyway, limiting the extent to which the interviewee elaborated on their responses. For that reason, we had a third person (SMA) present during the interview allowing the lead investigator the opportunity to ask, for example: 'For SMA's benefit, could you just explain why?'

Finally, we briefly mention critical orientations like power and equity. Epistemologically, were our orientation more 'critical theory' than pragmatism-informed interpretivist, we would have paused to unpack these constructs more.

## Conclusion

Exploring stakeholders' perspectives on research quality through an established research quality framework (INQUIRE) illuminated areas for immediate action in the research field of primary cam morphology and its natural history. Research communities in this field should: partner with athletes/patients; collaborate authentically with one another; champion equity, diversity, and inclusion; pursue open science, and nurture young scholars. Such an approach would ultimately benefit athletes and patients.

The findings of this study could inform concrete actions by research communities to pursue higher quality research—more research value and less waste—in the field of primary cam morphology and its natural history. Although the five action-inviting themes reflect contemporary trends in research, and could therefore be transferable to other areas of research, their practical application remains context- and field-specific.

## Ethical approval

Ethical approval was received from the University of Oxford's Medical Sciences Interdivisional Research Ethics Committee (Project ID R66281) and Qatar University Institutional Review Board (QU-IRB 1239-EA/20) prior to conducting the study.

## Data availability statement

The research team carefully considered open access to all research data (transcribed interviews). However, we decided not to publish the transcribed interviews in an open access repository for three main reasons: First, the hip-and-groin in athletes research field is small. The research field on femoroacetabular impingement syndrome and related bony morphologies in athletes is even smaller. Our research participants - 15 elite athletes, coaches, clinicians and researchers in this small field - could therefore be easily identified even with complete anonymization of interview transcripts. Second, although verbal informed consent was recorded as part of each interview, we did not seek explicit informed consent from participants to *publish* de-identified transcripts nor did me get University of Oxford Institutional Review Board permission to do so. Finally, to help the reader and support our research findings, we provide very extensive quotations to underpin our study results (in the manuscript text but also as results tables). Upon reasonable request (e.g. for peer review or further research), the research team would consider to provide full access to the data (transcribed interviews). Such requests should be directed to the corresponding author: Dr HP Dijkstra.

Informed consent by research participants: Due to COVID-19 restrictions at the time, all interviews were conducted online and recorded after obtaining (and recording) verbal informed consent at the beginning of each interview. This process was clearly outlined in our Ethical Approval documents and approved by the University of Oxford's Medical Sciences Interdivisional Research Ethics Committee and the Qatar University Institutional Review Board as detailed above.

## Acknowledgement

This manuscript has been published as Chapter 6 (*More value and less waste in research on primary cam morphology and its natural history: a qualitative interview study of stakeholders' perspectives*) of the lead author's DPhil Evidence-Based Health Care thesis: *Improving research quality on primary cam morphology.* The full thesis can be accessed here (Oxford University Research Archive): https://ora.ox.ac.uk/objects/uuid:288081e3-b59b-4488-af49-45a510a76dfc

## References

1. Dijkstra HP, Ardern CL, Serner A, *et al.*: **Primary cam morphology; bump, burden or bog-standard? A concept analysis.** *Br. J. Sports Med.* 2021; **55**: 1212–1221.
PubMed Abstract | Publisher Full Text | Free Full Text
2. Siebenrock KA, Behning A, Mamisch TC, *et al.*: **Growth Plate Alteration Precedes Cam-type Deformity in Elite Basketball Players.** *Clin. Orthop. Relat. Res.* 2013; **471**: 1084–1091.
PubMed Abstract | Publisher Full Text | Free Full Text
3. Siebenrock KA, Kaschka I, Frauchiger L, *et al.*: **Prevalence of Cam-Type Deformity and Hip Pain in Elite Ice Hockey Players Before and After the End of Growth.** *Am. J. Sports Med.* 2013; **41**: 2308–2313.
PubMed Abstract | Publisher Full Text
4. Palmer A, Fernquest S, Gimpel M, *et al.*: **Physical activity during adolescence and the development of cam morphology: a cross-sectional cohort study of 210 individuals.** *Br. J. Sports Med.* 2018; **52**: 601–610.
PubMed Abstract | Publisher Full Text | Free Full Text
5. Griffin DR, Dickenson EJ, O'Donnell J, *et al.*: **The Warwick Agreement on femoroacetabular impingement syndrome (FAI syndrome): an international consensus statement.** *Br. J. Sports Med.* 2016; **50**: 1169–1176.
PubMed Abstract | Publisher Full Text
6. Agricola R, Heijboer MP, Bierma-Zeinstra SMA, *et al.*: **Cam impingement causes osteoarthritis of the hip: a nationwide prospective cohort study (CHECK).** *Ann. Rheum. Dis.* 2013; **72**: 918–923.
PubMed Abstract | Publisher Full Text
7. Glyn-Jones S, Palmer AJR, Agricola R, *et al.*: **Osteoarthritis.** *Lancet.* 2015; **386**: 376–387.
Publisher Full Text
8. Agricola R, Waarsing JH, Arden NK, *et al.*: **Cam impingement of the hip—a risk factor for hip osteoarthritis.** *Nat. Rev. Rheumatol.* 2013; **9**: 630–634.
PubMed Abstract | Publisher Full Text
9. Nicholls AS, Kiran A, Pollard TCB, *et al.*: **The association between hip morphology parameters and nineteen-year risk of end-stage osteoarthritis of the hip: A nested case-control study.** *Arthritis Rheum.* 2011; **63**: 3392–3400.
PubMed Abstract | Publisher Full Text | Free Full Text
10. Dickenson E, Wall PDH, Robinson B, *et al.*: **Prevalence of cam hip shape morphology: a systematic review.** *Osteoarthr. Cartil.* 2016; **24**: 949–961.
PubMed Abstract | Publisher Full Text
11. Moher D, Glasziou P, Chalmers I, *et al.*: **Increasing value and reducing waste in biomedical research: who's listening?** *Lancet.* 2016; **387**: 1573–1586.
PubMed Abstract | Publisher Full Text
12. Dijkstra HP, Auliffe SM, Ardern CL, *et al.*: **Oxford consensus on primary cam morphology and femoroacetabular impingement syndrome: part 1—definitions, terminology, taxonomy and imaging outcomes.** *Br. J. Sports Med.* 2022; **57**: 325–341.
PubMed Abstract | Publisher Full Text | Free Full Text
13. Dijkstra HP, Auliffe SM, Ardern CL, *et al.*: **Oxford consensus on primary cam morphology and femoroacetabular impingement syndrome: part 2—research priorities on conditions affecting the young person's hip.** *Br. J. Sports Med.* 2022; **57**: 342–358.
PubMed Abstract | Publisher Full Text | Free Full Text
14. von Niederhäusern B, Guyatt GH, Briel M, *et al.*: **Academic response to improving value and reducing waste: A comprehensive framework for INcreasing QUality In patient-oriented academic clinical REsearch (INQUIRE).** *PLoS Med.* 2018; **15**: e1002580.
PubMed Abstract | Publisher Full Text | Free Full Text
15. Sandelowski M: **Whatever happened to qualitative description?** *Res. Nurs. Health.* 2000; **23**: 334–340.
PubMed Abstract | Publisher Full Text
16. Sandelowski M: **What's in a name? Qualitative description revisited.** *Res. Nurs. Health.* 2010; **33**: 77–84.
PubMed Abstract | Publisher Full Text
17. Thorne S, Kirkham SR, MacDonald-Emes J: **Interpretive description: A noncategorical qualitative alternative for developing nursing knowledge.** *Res. Nurs. Health.* 1997; **20**: 169–177.
PubMed Abstract | Publisher Full Text
18. Thorne S: **Interpretive description.**Beck CT, editor. *Routledge International Handbook of Qualitative Nursing Research.* 2013; 295–306. (accessed 11 Jan 2023).
Reference Source
19. Thorne S: **Beyond theming: Making qualitative studies matter.** *Nurs. Inq.* 2020; **27**: e12343.
PubMed Abstract | Publisher Full Text
20. Thorne S: *Interpretive Description.* Routledge; 2016.
Publisher Full Text
21. Hunt MR: **Strengths and Challenges in the Use of Interpretive Description: Reflections Arising From a Study of the Moral Experience of Health Professionals in Humanitarian Work.**

*Qual. Health Res.* 2009; **19**: 1284–1292.
PubMed Abstract | Publisher Full Text

22. Thompson Burdine J, Thorne S, Sandhu G: **Interpretive description: A flexible qualitative methodology for medical education research.** *Med. Educ.* 2021; **55**: 336–343.
PubMed Abstract | Publisher Full Text

23. Teodoro IPP, Rebouças V d CF, Thorne SE, *et al.*: **Interpretive description: a viable methodological approach for nursing research.** *Escola Anna Nery.* 2018; **22**.
Publisher Full Text

24. Bradshaw C, Atkinson S, Doody O: **Employing a Qualitative Description Approach in Health Care Research. *Global Qualitative.*** *Nurs. Res.* 2017; **4**.
PubMed Abstract | Publisher Full Text | Free Full Text

25. Olsen NR, Bradley P, Lomborg K, *et al.*: **Evidence based practice in clinical physiotherapy education: a qualitative interpretive description.** *BMC Med. Educ.* 2013; **13**: 52.
PubMed Abstract | Publisher Full Text | Free Full Text

26. Lasiuk GC, Comeau T, Newburn-Cook C: **Unexpected: an interpretive description of parental traumas' associated with preterm birth.** *BMC Pregnancy Childbirth.* 2013; **13**: S13.
PubMed Abstract | Publisher Full Text | Free Full Text

27. O'Brien BC, Harris IB, Beckman TJ, *et al.*: **Standards for Reporting Qualitative Research: A Synthesis of Recommendations.** *Acad. Med.* 2014; **89**: 1245–1251.
Publisher Full Text

28. Castillo-Montoya M: **Preparing for Interview Research: The Interview Protocol Refinement Framework.** *Qual. Rep.* 2016; **21**: 811–831.
Publisher Full Text

29. Stevenson J, Tong A, Campbell KL, *et al.*: **Perspectives of healthcare providers on the nutritional management of patients on haemodialysis in Australia: an interview study.** *BMJ Open.* 2018; **8**: e020023.
PubMed Abstract | Publisher Full Text | Free Full Text

30. Needham RD, de Loë RC: **The Policy Delphi: Purpose, Structure, and Application.** *Can. Geogr.* 1990; **34**: 133–142.
Publisher Full Text

31. Phillippi J, Lauderdale J: **A Guide to Field Notes for Qualitative Research: Context and Conversation.** *Qual. Health Res.* 2018; **28**: 381–388.
PubMed Abstract | Publisher Full Text

32. Fereday J, Muir-Cochrane E: **Demonstrating Rigor Using Thematic Analysis: A Hybrid Approach of Inductive and Deductive Coding and Theme Development.** *Int. J. Qual. Methods.* 2006; **5**: 80–92.
Publisher Full Text

33. Braun V, Clarke V: **Using thematic analysis in psychology.** *Qual. Res. Psychol.* 2006; **3**: 77–101.
Publisher Full Text

34. Braun V, Clarke V: **Can I use TA? Should I use TA? Should I not use TA? Comparing reflexive thematic analysis and other pattern-based qualitative analytic approaches.** *Couns. Psychother. Res.* 2021; **21**: 37–47.
Publisher Full Text

35. Braun V, Clarke V: **One size fits all? What counts as quality practice in (reflexive) thematic analysis?** *Qual. Res. Psychol.* 2021; **18**: 328–352.
Publisher Full Text

36. Mays N, Pope C: **Assessing quality in qualitative research.** *BMJ.* 2000; **320**: 50–52.
PubMed Abstract | Publisher Full Text | Free Full Text

37. Thorne S, Kirkham SR, O'Flynn-Magee K: **The Analytic Challenge in Interpretive Description.** *Int. J. Qual. Methods.* 2004; **3**: 1–11.
Publisher Full Text

38. Gough B, Madill A: **Subjectivity in psychological science: from problem to prospect.** *Psychol. Methods.* 2012; **17**: 374–384.
PubMed Abstract | Publisher Full Text

39. Olmos-Vega FM, Stalmeijer RE, Varpio L, *et al.*: **A practical guide to reflexivity in qualitative research: AMEE Guide No. 149.** *Med. Teach.* 2022; **45**: 241–251.
PubMed Abstract | Publisher Full Text

40. Wilson C, Janes G, Williams J: **Identity, positionality and reflexivity: relevance and application to research paramedics.** *Br. Paramed. J.* 2022; **7**: 43–49.
PubMed Abstract | Publisher Full Text | Free Full Text

41. Fitzgerald A: **Professional identity: A concept analysis.** *Nurs. Forum.* 2020; **55**: 447–472.
Publisher Full Text

42. Garton S, Copland F: **'I like this interview; I get cakes and cats!': the effect of prior relationships on interview talk.** *Qual. Res.* 2010; **10**: 533–551.
Publisher Full Text

43. Owton H, Allen-Collinson J: **Close But Not Too Close: Friendship as Method (ology) in Ethnographic Research Encounters.** *J. Contemp. Ethnogr.* 2014; **43**: 283–305.
Publisher Full Text

44. Blackman S, Commane G: **Double Reflexivity: The Politics of Friendship, Fieldwork and Representation within Ethnographic Studies of Young People.**Heath S, Walker C, editors. *Innovations in Youth Research.* London: Palgrave Macmillan UK; 2012; pp. 229–47.
Publisher Full Text

45. Agricola R, Heijboer MP, Ginai AZ, *et al.*: **A Cam Deformity Is Gradually Acquired During Skeletal Maturation in Adolescent and Young Male Soccer Players: A Prospective Study With Minimum 2-Year Follow-up.** *Am. J. Sports Med.* 2014; **42**: 798–806.
PubMed Abstract | Publisher Full Text

46. Van Klij P, Heijboer MP, Ginai AZ, *et al.*: **Cam morphology in young male football players mostly develops before proximal femoral growth plate closure: a prospective study with 5-yearfollow-up.** *Br. J. Sports Med.* 2019; **53**: 532–538.
PubMed Abstract | Publisher Full Text

47. Fernquest S, Palmer A, Gimpel M, *et al.*: **A longitudinal cohort study of adolescent elite footballers and controls investigating the development of cam morphology.** *Sci. Rep.* 2021; **11**: 18567.
PubMed Abstract | Publisher Full Text | Free Full Text

48. Healy CC, Welchert AJ: **Mentoring Relations: A Definition to Advance Research and Practice.** *Educ. Res.* 1990; **19**: 17–21.
Publisher Full Text

49. Chopra V, Arora VM, Saint S: **Will You Be My Mentor?—Four Archetypes to Help Mentees Succeed in Academic Medicine.** *JAMA Intern. Med.* 2018; **178**: 175–176.
PubMed Abstract | Publisher Full Text

50. Palmer C: *Becoming a great mentor.* American Psychological Association. (accessed 25 Feb 2023).
Reference Source

51. Modigh A, Sampaio F, Moberg L, *et al.*: **The impact of patient and public involvement in health research versus healthcare: A scoping review of reviews.** *Health Policy.* 2021; **125**: 1208–1221.
PubMed Abstract | Publisher Full Text

52. Nickel B, Barratt A, Copp T, *et al.*: **Words do matter: a systematic review on how different terminology for the same condition influences management preferences.** *BMJ Open.* 2017; **7**: e014129.
PubMed Abstract | Publisher Full Text | Free Full Text

53. Professor Karim Khan (he/him) k2 [@KarimKhan_IMHA]: **Top 3 tips for authentic collaboration by Professor @trishgreenhalgh: "there should be a bit of discomfort—if it's not present you have a false consensus".** 2022. (accessed 3 Mar 2023). Twitter.
Reference Source | Reference Source

54. Zhang L, Wei Y, Huang Y, *et al.*: **Should open access lead to closed research? The trends towards paying to perform research.** *Scientometrics.* 2022; **127**: 7653–7679.
Publisher Full Text

55. (New) List of Predatory Journals - 2023: **Open access journals.** 2020. (accessed 18 Feb 2023).
Reference Source

56. Grudniewicz A, Moher D, Cobey KD, *et al.*: **Predatory journals: no definition, no defence.** *Nature.* 2019; **576**: 210–212.
PubMed Abstract | Publisher Full Text

57. Ruzycki SM, Ahmed SB: **Equity, diversity and inclusion are foundational research skills.** *Nat. Hum. Behav.* 2022; **6**: 910–912.
PubMed Abstract | Publisher Full Text | Free Full Text

58. Hayes V, Donovan JO: **Women in Sports and Exercise Medicine: where are we now?** *Br. J. Sports Med.* 21 February 2023; **57**: 498–499. Published Online First.
PubMed Abstract | Publisher Full Text

59. Memon AR, Ahmed I, Ghaffar N, *et al.*: **Where are female editors from low-income and middle-income countries? A comprehensive assessment of gender, geographical distribution and country's income group of editorial boards of top-ranked rehabilitation and sports science journals.** *Br. J. Sports Med.* 2022; **56**: 458–468.
PubMed Abstract | Publisher Full Text

60. Mkumbuzi NS, Chibhabha F, Zondi PC: **Out of sight, out of mind: the invisibility of female African athletes in sports and exercise medicine research.** *Br. J. Sports Med.* 2021; **55**: 1183–1184.
PubMed Abstract | Publisher Full Text

61. Dewidar O, Elmestekawy N, Welch V: **Improving equity, diversity, and inclusion in academia.** *Res. Integr. Peer Rev.* 2022; **7**: 4.
PubMed Abstract | Publisher Full Text | Free Full Text

62. Schmidt BJ, MacWilliams BR, Neal-Boylan L: **Becoming Inclusive: A Code of Conduct for Inclusion and Diversity.** *J. Prof. Nurs.* 2017; **33**: 102–107.
PubMed Abstract | Publisher Full Text

63. Miller FA, Katz JH: **Inclusion: The HOW for organizational breakthrough.** Rothwell WJ, Stavros JM, Sullivan RL, *et al.*, editors. *Practicing Organization Development: A Guide for Leading Change.* 3rd Edition. San Francisco: Pfeiffer|Wiley; 2010; pp. 436–45.

64. **Not-so-deep impact.** *Nature.* 2005; **435**: 1003–1004.
**PubMed Abstract** | **Publisher Full Text**

65. **Support Europe's bold vision for responsible research assessment.** *Nature.* 2022; **607**: 636–636.
**PubMed Abstract** | **Publisher Full Text**

66. Frambach JM, van der Vleuten CPM, Durning SJ: **AM Last Page: Quality Criteria in Qualitative and Quantitative Research.** *Acad. Med.* 2013; **88**: 552.
**PubMed Abstract** | **Publisher Full Text**

67. Baillie L: **Promoting and evaluating scientific rigour in qualitative research.** *Nurs. Stand.* 2015; **29**: 36–42.
**PubMed Abstract** | **Publisher Full Text**

68. Treharne G, Riggs D: **Ensuring Quality in Qualitative Research.** Rohleder P, Lyons AC, editors. *Qualitative Research in Clinical and Health Psychology.* Houndmills, Basingstoke, Hampshire; New York, NY: Palgrave Macmillan; 2015; pp. 57–73.
**Publisher Full Text**

69. Salman RA-S, Beller E, Kagan J, *et al.*: **Increasing value and reducing waste in biomedical research regulation and management.** *Lancet.* 2014; **383**: 176–185.
**PubMed Abstract** | **Publisher Full Text** | **Free Full Text**

70. Chalmers I, Bracken MB, Djulbegovic B, *et al.*: **How to increase value and reduce waste when research priorities are set.** *Lancet.* 2014; **383**: 156–165.
**Publisher Full Text**

71. Chan A-W, Song F, Vickers A, *et al.*: **Increasing value and reducing waste: addressing inaccessible research.** *Lancet.* 2014; **383**: 257–266.
**PubMed Abstract** | **Publisher Full Text** | **Free Full Text**

72. Glasziou P, Altman DG, Bossuyt P, *et al.*: **Reducing waste from incomplete or unusable reports of biomedical research.** *Lancet.* 2014; **383**: 267–276.
**Publisher Full Text**

73. Ioannidis JPA, Greenland S, Hlatky MA, *et al.*: **Increasing value and reducing waste in research design, conduct, and analysis.** *Lancet.* 2014; **383**: 166–175.
**PubMed Abstract** | **Publisher Full Text** | **Free Full Text**

74. Macleod MR, Michie S, Roberts I, *et al.*: **Biomedical research: increasing value, reducing waste.** *Lancet.* 2014; **383**: 101–104.
**Publisher Full Text**

75. The Lancet Campaigns: Efficiency|Statement: (accessed 6 Aug 2022).
**Reference Source**

76. Agreement on Reforming Research Assessment: **European University Association.** 2022. (accessed 28 Jul 2022).
**Reference Source**

77. #RiDaysEU|European initiative for reforming research assessment: 2022. (accessed 19 Jan 2023).
**Reference Source**

78. *COARA - Coalition for Advancing Research Assessment.* COARA; (accessed 19 Jan 2023).
**Reference Source**

79. Signatories: **CoARA.** (accessed 24 Aug 2023).
**Reference Source**

80. Belcher BM, Rasmussen KE, Kemshaw MR, *et al.*: **Defining and assessing research quality in a transdisciplinary context.** *Res. Eval.* 2016; **25**: 1–17.
**Publisher Full Text**

81. Tracy SJ: **Qualitative Quality: Eight "Big-Tent" Criteria for Excellent Qualitative Research.** *Qual. Inq.* 2010; **16**: 837–851.
**Publisher Full Text**

# Open Peer Review

## Current Peer Review Status: ✗ ?

**Version 1**

Reviewer Report 20 December 2024

https://doi.org/10.5256/f1000research.169926.r344630

?

**Jinchi Tang**
Erasmus MC University Medical Center Rotterdam, Rotterdam, The Netherlands

The current study explored stakeholder perspectives on research quality in primary cam morphology and its natural history using the INQUIRE framework, identifying five actionable themes: partnering with athletes/patients, fostering authentic collaboration, championing equity, promoting open science, and nurturing young scholars. These findings contribute significantly to advancing the field by offering concrete recommendations to enhance research relevance, inclusivity, and impact while reducing waste.
This study presents a meaningful contribution to the readership. However, some issues require attention and further work. Please find below a summary of suggestions for each section of the manuscript.
**Abstract:**
- Background: “Experts agreed on key elements for primary cam morphology and a prioritised research agenda for the field.”□
Improved: "Experts have reached consensus on key elements of primary cam morphology and established a prioritized research agenda for the field."
- Background: There is not a clear transition from discussing the general condition to the specific focus of the study. A sentence may be added to explain why this research is critical at this time.
- Aim: The aim is not a complete sentence. It could be reframed to directly state the study’s purpose, e.g., "This study aims to investigate stakeholders' perspectives on high-quality research within the field of primary cam morphology to identify areas of research value and potential waste."
- Method: Provide more information about the sample, such as specifying the geographic scope of the research, if applicable.
**Introduction:**
- P1: Maybe add a sentence about the broader impact of primary cam morphology on public health to justify the importance of the research.
- P1: While the introduction discusses the condition, it could more directly tie these details to the necessity for further research. For example, explain why gaps in research exist despite the high prevalence of the condition.
- P2: You only mentioned the research gap, but what are current studies on primary cam

morphology aiming to achieve?

**Aim:**

- P1: *"This study aimed to explore research quality on primary cam morphology and its natural history..."*

The use of "explore" could be more specific. What aspects of research quality are being examined? Is the study evaluating methods, outcomes, participant satisfaction, or something else? Can you specify which elements of research quality are being addressed to provide a clearer picture of the study's objectives.

**Methods:**

Although the methods section is well-structured, consider whether the report should follow certain standardized criteria to make it more robust, such as the Consolidated Criteria for Reporting Qualitative Research (COREQ) or Standards for Reporting Qualitative Research (SRQR).

***Ontological and epistemological orientation, and study design:***

- P1: The use of specialized terminology (e.g., "ontological and epistemological orientation") is appropriate for the audience but could benefit from brief definitions or explanations for clarity.
- P1&P2: Maintain consistent terminology, especially when referring to the research approach (e.g., "interpretative" vs. "interpretive").

***Instrument Development:***

- P1: Can you add more details of the piloting process of the interview guide? Who was involved in the pilot testing? What changes were made as a result of this testing? Specify any adaptations made to the interview guide based on feedback from the piloting process or during the actual data collection phase.
- P2: "This framework was a useful..."

Improved: "The INQUIRE framework was a useful..."

***Sample:***

- P1: How was the number of stakeholders in each group determined? Was it random?
- P2: Provide more context or a brief explanation of the "closeness continuum" model to help readers understand why it is particularly suited to your study. This could include its advantages over other models.

***Data Collection:***

- P1: Since most participants had multiple roles (e.g., researcher, clinician, and parent), could these overlapping roles have influenced the data and interpretations?

***Analysis:***

- P3: SMA and JB are mentioned in the coding process, but how were disagreements or differences in coding resolved? Was there a specific process for reconciliation?
- P4: Expand on the transition from "domain summary codes" to "fully realized themes." This is an important methodological step that could benefit from more concrete examples to show how it was achieved.

***Research Team and Reflexivity:***

- How exactly was reflexivity operationalized? For example, were there formal steps or reflective practices (e.g., journaling, team discussions) to identify and address biases?
- Can you provide more specific instances where reflexivity influenced decisions during the study (e.g., changes in coding, themes, or interpretation)?

**Results:**

***Theme 1:***

- Can you explore whether there were disagreements or variations in perspectives among stakeholders? For instance, did clinicians and athletes/patients view partnerships differently?

***Theme 2:***

- Maybe expand on why collaboration is challenging. For example, discuss logistical, financial, or cultural barriers that prevent multi-center studies.
- What are the barriers to meaningful data sharing? (e.g., Table 3, quote 19). Is it a lack of standardization, infrastructure, or trust among research centers?

***Theme 4:***

- Maybe elaborate on the lack of representation in existing studies and how it affects the generalizability of findings. For example: "The absence of research on athletes from the Global South limits our understanding of how genetic variation or socio-environmental factors influence primary cam morphology."

**Discussion:**

***Summary of Findings and Implications for Research and Practice:***

- This section could be more impactful by directly stating how these findings advance the field or address specific gaps identified earlier in the document.
- The summary is somewhat lengthy. Consider focusing more on implications, such as explicit, actionable recommendations for each finding. For example:

Theme1: Encourage collaboration with patient advocates to develop non-inflammatory language guidelines.

***Comparison to the Research Quality Literature:***

- Can you briefly explain the unique contributions of each framework to the field of primary cam morphology research? For example, how does Belcher et al.'s framework address gaps in the INQUIRE model?
- Can you discuss the global applicability of these frameworks? How can they be adapted for underrepresented populations or resource-limited settings?

**Is the work clearly and accurately presented and does it cite the current literature?**

Yes

**Is the study design appropriate and is the work technically sound?**

Yes

**Are sufficient details of methods and analysis provided to allow replication by others?**

Yes

**If applicable, is the statistical analysis and its interpretation appropriate?**

Not applicable

**Are all the source data underlying the results available to ensure full reproducibility?**

Partly

**Are the conclusions drawn adequately supported by the results?**

Yes

***Competing Interests:*** No competing interests were disclosed.

***Reviewer Expertise:*** Orthopedics, hip morphology, cam morphology

**I confirm that I have read this submission and believe that I have an appropriate level of**

**expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.**

Reviewer Report 21 November 2024

https://doi.org/10.5256/f1000research.169926.r341285

✗ **Samantha Bunzli**
[1] Griffith University and Royal Brisbane and Women's Hospital, Brisbane, Australia
[2] School of Health Sciences and Social Work, Griffith University, Nathan, Queensland, Australia

This qualitative study explored the perspectives of clinician-researchers, parents, patients and sports coaches on research quality in the field of primary cam morphology. I think the rationale for this study is good. I have some overall comments related to the study methods, interpretations of results and structure of the manuscript.

Methods:
I understand that the interview guide was flexible, however I have queries about how the example questions provided in Figure 2 were selected. For example, the question about clinician-researcher perspectives on 'spinning of results' could be leading and open to social desirability bias – would we expect any of the participants to perceive this as acceptable? Would it not have been relevant to ask the clinician-researchers "How can we improve research quality in the field?"

Following on from this comment, the authors acknowledge the pre-existing relationship between the interviewer and some of the participants and consider the potential impact of this in the limitations. However, I would like to see a discussion around the potential for social desirability bias in the participants responses.

The authors acknowledge that their participants lacked diversity, and I note that only 5/15 participants were women. Why wasn't a better attempt to include more diverse voices in this project? This seems to me in direct contrast with findings presented in Theme 4.

The methodology is detailed and the inclusion of specific examples throughout (e.g. how reflexivity was enacted) can be helpful for readers less familiar with qualitative research.

However, this manuscript is very long. As a qualitative researcher, I can appreciate that, in general, manuscripts of qualitative studies benefit from a more generous word count than that of quantitative studies, however the discussion section of this manuscript alone is >2000 words. The authors present data in Theme 3 from participants suggesting that the: "average clinician 'doesn't really read research papers'". I would speculate that the length of this article may act as a barrier to access for some readers. I believe it would be possible to shorten this manuscript without losing richness.

Results:
There is some detail in the results section which I believe would be better placed in the discussion. For example, the results section for Theme 5 opens with a description of existing mentorship frameworks.

I like the inclusion of Figure 3. I suggest that the quote for Theme 5 could be replaced with a more meaningful (actionable) quote.

Discussion:
I think there is an opportunity to discuss the problem of gender bias in orthopaedics more broadly. For example, data in US shows 7.4% of practicing orthopaedic surgeons are female. In the field of orthopaedic research, a 2024 systematic review by Sonnier et al. showed that among studies involving athletes, 19.9% of studies included women in the authorship team; 21.5% of studies had a woman first author and 16.7% had a woman as senior author. Studies which included women in the author team were significantly more likely to isolate female athlete participants.

Might the authors like to comment on the specific need to nurture young scholars who represent voices other than that of men from WEIRD (Western, Educated, Industrialized, Rich, and Democratic) backgrounds?

Relevant to discussion related to patient-centred research, I would like to see a discussion around the contribution that qualitative research (such as this study!) can make in the field. Given the field of orthopaedics has traditionally been dominated by researcher-driven priorities and positivist research paradigms, it would be relevant to reflect on the value of building capacity among junior researchers in consumer-engaged, qualitative approaches.

On the topic of qualitative research – I find it noteworthy that the authors decided not to provide access to transcribed interviews despite their recommendations around open access in Theme 3. Perhaps in the main text, the authors could acknowledge the ethical considerations around the sharing of qualitative data.

**Is the work clearly and accurately presented and does it cite the current literature?**
Partly

**Is the study design appropriate and is the work technically sound?**
Partly

**Are sufficient details of methods and analysis provided to allow replication by others?**
Yes

**If applicable, is the statistical analysis and its interpretation appropriate?**
Not applicable

**Are all the source data underlying the results available to ensure full reproducibility?**
Yes

**Are the conclusions drawn adequately supported by the results?**
Partly

***Competing Interests:*** No competing interests were disclosed.

***Reviewer Expertise:*** Musculoskeletal pain; Qualitative research; Equity

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.**