

How do coaches and female athletes experience different aspects regarding participation, development, and performance in female sports?

- and what impact does the sex data gap in sports science have on these perceptions and their coaching practices?

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## Summary

The goal of this reflexive thematic analysis study was to investigate the various aspects related to participation, development, and performance in female sports, as well as exploring how the sex data gap affects different perceptions and coaching practices within female sports. Previous research in this area has mostly used quantitative methods to examine the extent of this data gap, showing that only 4-13% of all studies have focused on female athletes only. This study takes a qualitative approach with the help of a literature search to explore more nuanced of the research questions. By conducting interviews with top- and recreational-level coaches, and former elite athletes, the study will provide insight into the challenges and opportunities female athletes face today, and how coaching practices and general attitudes affect their daily training. Furthermore, the study will highlight how the lack of research impacts the current knowledge of coaches and female athletes, as well as how this can contribute to reinforcing existing disparities in sports. The study's findings will be able to inform future research and help develop practices and policies that improve and support female athletes in their sports careers.

## Sammendrag

Målet med dette refleksive tematiske analyse studiet var å undersøke de ulike sidene relatert til deltagelse, utvikling og prestasjon innen kvinneidrett, samt utforske hvordan mangel på idrettsforskning rettet mot kvinnelige utøvere påvirker de ulike oppfatningene, samt trener praksiser. Tidligere forskning har vært på området har for det meste tatt i bruk kvantitative metoder for å utforske omfanget av denne mangelen på forskningsdata og viser til at 4-13% av all forskning er blitt gjort på kvinnelige utøvere. Denne studien har som mål å gå kvalitativt til verks ved hjelp av litteratur søk på fagfeltet, for å utforske de mer nyanserte perspektivene knyttet til deltakelse, utvikling og prestasjon innen kvinneidrett. Ved å gjennomføre intervjuer med trenere på topp- og bredde nivå, samt tidligere utøvere på toppnivå vil studien gi innsikt i utfordringene og mulighetene kvinnelige utøvere møter i dag, og hvordan trenerpraksiser og generelle holdninger påvirker deres treningshverdag. Videre vil studien belyse hvordan mangel på forskning påvirker kunnskapsgrunnlaget som trenere og utøvere har, og hvordan dette kan bidra til å forsterke eksisterende ulikheter i idretten. Studiens funn vil kunne informere fremtidig forskning og bidra til å utvikle praksiser og politikk som fremmer utvikling og støtter kvinnelige utøvere i deres idrettskarrierer.

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## 1. Theoretical framework

In today's world, sports play a societal role that extends beyond physical activity and entertainment, it has become a powerful vehicle for promoting social change, mirroring societal values, and providing a platform for addressing social issues (Eigenschenk et al., 2019; Spaaij, 2009). This multifaceted role of sports can be looked at through various levels, including health and well-being, social inclusion and integration, economic impact, and the challenges and opportunities it presents in the pursuit of equality between biological sexes (Elliott-Sale et al., 2021; Forsyth & Roberts, 2018).

The health benefits of sports are well-recognized and widely promoted. Engaging in sports is associated with improved physical health, including better cardiovascular fitness, muscle strength, and mental health (Malm et al., 2019; Oja et al., 2015). Participation in sports has also been linked to mental health benefits, such as reduced symptoms of depression and anxiety, improved mood, and enhanced self-esteem (Malm et al., 2019; Morgan et al., 2013). By promoting a physical fitness culture, sports play a crucial role in combating the global rise in sedentary lifestyles and associated health problems like obesity and diabetes (Malm et al., 2019; Morgan et al., 2013; Oja et al., 2015).

Despite these benefits, the world of sports has challenges, particularly regarding gender equality. Historically, sports have been male dominated, with female athletes facing significant barriers to participation, recognition, and equality (Cowley et al., 2021; Scraton et al., 2018). Although there have been considerable improvements over the last seven decades, with more females participating in sports and being recognised for their achievements in sports, disparities still exist (Cowley et al., 2021). These include unequal pay, less media coverage, and underrepresentation in leadership roles within sports organisations (Cowley et al., 2021). Addressing these disparities is crucial for the future development of sports and for ensuring that they continue to play a positive role in society (Cowley et al., 2021; Scraton et al., 2018):

### 1.1.1 Historical perspective on female athletes

The early days of female athletes in modern sports began in the 1960s. At the Tokyo Olympics in 1964, they were given permission to participate in team sports competitions. Three years later in 1967, Kathrine Switzer ran her iconic race in the Boston Marathon Pieper (Pieper & Krieger, 2023, pp. 2-4; Senne, 2016; Switzer, 2017). The development of legal reforms and famous sport figures served as a source of inspiration for subsequent generations of female athletes, motivating them to take on barriers in the realm of athletics (Pieper & Krieger, 2023, pp. 2-4; Senne, 2016; Switzer, 2017). During the later part of the 20th century, female athletes gradually achieved more equality in sports, demonstrating exceptional performance in disciplines traditionally associated with females and entering domains that were previously dominated by men (Messner, 1988). By the end of the millennium, there was a significant surge in female involvement in competitive sports, resulting in numerous female athletes gaining widespread recognition for their accomplishments (Cowley et al., 2021; Curran et al., 2019; Scraton et al., 2018). In 2014 female ski jumping were introduced at the Winter Olympics, despite male having participated since 1924 (Andersen & Loland, 2017).

The female exposure through media initiatives such as Nike's "Dream Crazier" campaign and the French Football Federation's 2023 World Cup promotion "Orange" has been enhanced, aiming to engage more young female athletes in sports (LaVoi & Baeth, 2018). Despite these efforts, there are still obstacles to overcome as female athletes are still largely coached by male coaches and a majority of leaders in their sports organizations are male (Norman, 2016). The research from Gosai et al. (2022); Meier (2015) and LaVoi and Baeth (2018) suggests that female athletes are more likely to pursue coaching positions if they experience female role models during their active years.

The number of empirical studies on female athletic performances do not align with the increasing rate of female participation and accomplishments (Curran et al., 2019; Laxdal, 2023). This lack in data affects female athletes, as approaches designed from male athletes doesn't always suit female athletes, considering important biological, psychological, and social aspects that are specific to females (Forsyth & Roberts, 2018, pp. 1-6; Pitchers &

Elliot-Sale, 2019). Consequently, there is a need for more targeted studies to properly support female athletes.

## 1.2 Biopsychosocial factors in sports

The biopsychosocial model profoundly influences the intricate landscape of sports, integrating biological, psychological, and social factors to understand athletic performance comprehensively (John et al., 2020). This model acknowledges the significant differences and complexities introduced by the biological sexes, offering a nuanced lens through which we can examine the development and performance of athletes (Elliott-Sale et al., 2021; Forsyth & Roberts, 2018; Hyde, 2005).

### Biological differences and their impact

Central to discussing biological factors in female sports are the role of the menstrual cycles effect on female hormones such as oestrogen and progesterone (Forsyth & Roberts, 2018, p. 4; Hackney, 2023, pp. 114-118; Hyde, 2005). During their 28-days menstrual cycle, these hormones can fluctuate significantly (Hackney, 2023, p. 114; McNulty et al., 2020). The key phases of the menstrual cycle are divided into the follicular-, ovulation and luteal phase, all which have a distinctive effect on female hormones (Hackney, 2023, p. 114; McNulty et al., 2020). Through the research of McNulty et al. (2020) we see that both oestrogen levels and progesterone levels are low in the early follicular stage of the menstrual cycle, which indicate that exercise performance “...might be trivially reduced during the early follicular phase of the menstrual cycle when compared with all other menstrual cycle phases” McNulty et al. (2020). In the later stages of the menstrual cycle both the oestrogen levels and progesterone levels increase, possibly affecting the athlete’s physical performance, indicating that monitoring and evaluating the individual athlete’s menstrual cycle is optimal at the elite level of sports (McNulty et al., 2020)

Monitoring of the menstrual cycle can increase the likelihood of revealing overtraining or malnourishment as the irregular menstruation or the absence of it is associated with increase chance of injuries through insufficient training, energy deficiency and (Hackney, 2023, pp. 303-304)



Nutritional requirements and recovery protocols offer clear examples of how biopsychosocial factors interlink. Nutritional needs can vary significantly across different phases of the menstrual cycle, and customised nutrition plans are critical for optimising performance and managing menstruation related factors (Forsyth & Roberts, 2018, p. 52).

## Psychological Attributes Across Female Athletes

The evolving field of sports science promotes personalised athlete development, acknowledging that biological differences influence these psychological aspects, affecting the effectiveness of various coaching strategies (Davis et al., 2018; Forsyth et al., 2022; Gosai et al., 2022). This evolution underlines the importance of a holistic view of athletes, where physiological aspects play a crucial role in performance. Mental and emotional well-being is as critical as physical preparedness (Rice et al., 2016). This suggests that coaches need to try to support their athletes comprehensively when it comes to factors such as private matters, general exhaustion, the specific phase of the menstrual cycle, and even the type of sportswear that is being used (Forsyth et al., 2022; Krumer, 2023; McNulty et al., 2020; Pitchers & Elliot-Sale, 2019). Athletic performance's mental and emotional facets are as crucial as the physical components (Rice et al., 2016). It appears ideal for coaches to receive training to provide support that surrounds the physical domain and their athletes' mental and emotional well-being (Rice et al., 2016).

## Social factors

The social aspects of the biopsychosocial model refer to the external conditions and influences that affect athletes' functioning and performance (John et al., 2020). This includes the existing support system, general life stress, and the influence of media in shaping perceptions of athletic talents and values (Norman, 2015). Additionally, the coach-athlete relationship shapes an athlete's performance and mindset, by guidance and motivation vital (Côté et al., 1995). Family situations can further influence athletes by offering support systems or presenting challenges through conflicting responsibilities or general life stress.

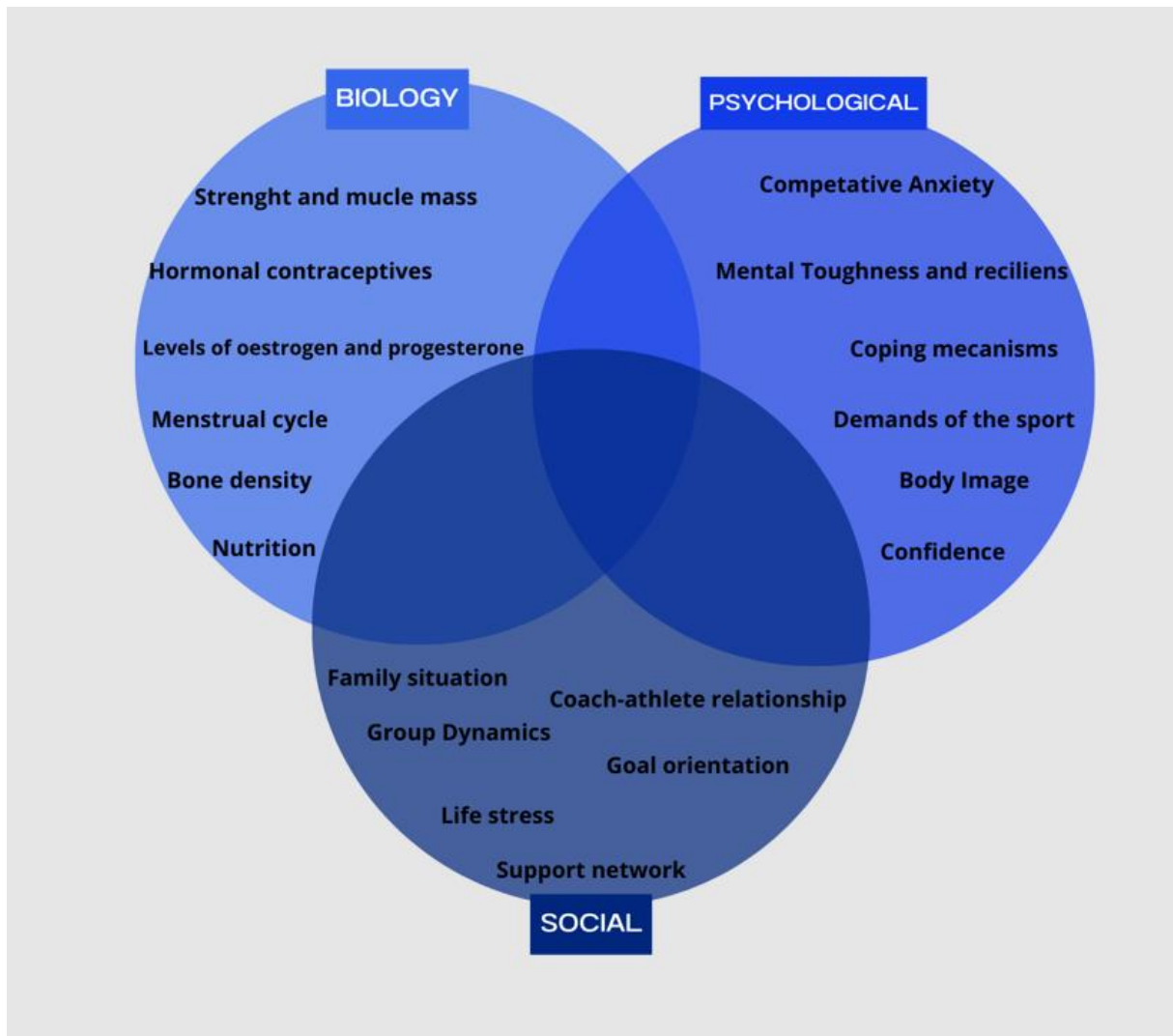


Figure 1: The Biopsychosocial factors affecting female athletes illustrated in a VENN diagram.

The holistic view of the biopsychosocial model in female sports demands an integrated understanding of how these factors affect female athletes' health, well-being and performance (John et al., 2020; Wiese-Bjornstal, 2010). This comprehensive approach is essential when addressing female-specific injuries, the Female Athlete triad, and the complex interaction of pregnancy with athletic performance (Forsyth & Roberts, 2018, p. 77; Norman, 2015). By examining these issues through the biopsychosocial lens, one can appreciate the multifaceted natures of female athletic participation and the need for supportive, individualised care and policy development (Forsyth & Roberts, 2018, p. 77).

## 1.3 The coach-athlete relationship

Athletes' development and well-being are heavily affected by their coaches, from a young age to the senior level; having a good relationship between the athlete and the coach is vital (Côté et al., 1995). Similarly, the development of coaches involves a symbolic relationship, which differs from one individual to another in how it functions (Forsyth & Roberts, 2018, pp. 177-179). Coaches often experience growth in both personal and professional aspects when adapting to the varying needs and challenges presented by athletes (Jones et al., 2004, pp. 77-78). Coaches form their coaching approach to better suit the individual, seeing as there is no one correct way of coaching (Forsyth & Roberts, 2018, pp. 177-179). The coach and the athlete rely on each other to get the best out of themselves as an individual and a team (Côté et al., 1995). Coaching can be viewed and understood in many ways, using various approaches and perspectives, but the primary focus should be on the development of the athlete and the coach (Côté & Gilbert, 2009). Athletes often look to their coaches for guidance, support, and motivation, shaping their athletic journey (Côté & Gilbert, 2009; Gosai et al., 2022; Martens & Vealey, 2023, p. 31). This multifaced relationship is essential to the athlete's psychological well-being, influencing their approach to challenges, setbacks, and successes (Davis et al., 2018; Norman, 2015). The ideal athlete-coach relationship fosters open communication, mutual respect, and trust, allowing athletes to express concerns and receive constructive feedback (Davis et al., 2018; Norman, 2015).

### 1.3.1 Academic coaching

There has been a shift in the coaching paradigm last couple of decades as more academic coaches see more success compared to the former athletes who previously have been given preference in regards of coaching positions (LaVoi & Baeth, 2018; Rynne, 2014). The impact of sports science, psychology, and analytics have become more prominent in athletics, facilitating an environment where coaches with specialised academic backgrounds flourishes (Rynne, 2014). Academic coaches bring a unique perspective to the coaching dynamic as they possess a deep understanding of human physiology, biomechanics, and sports psychology, allowing them to tailor training programs to suit the individual needs of the athletes (Rynne, 2014). Coaches and athletes now engage in more open dialogue, with coaches serving as mentors rather than authoritative figures (Fiore et al., 2008; López de Subijana et al., 2021).

This shift has fostered an improvement culture, where coaches and athletes are encouraged to explore new ideas and techniques to enhance performance (López de Subijana et al., 2021; McGee & DeFreese, 2019).

Overall, while the traditional athlete-turned-coach model still holds sway in many sports, the increasing presence of academic coaches signals a positive evolution in the coach-athlete relationship, one that focuses on innovation, collaboration, and holistic athlete development (Rynne, 2014). As the sporting landscape evolves, we will likely see further expansion and specialisation within the coaching ranks, ultimately benefiting athletes and the sporting community (Rynne, 2014).

### 1.3.2 Coaching through a biological lens

In sports coaching, the aspects of female-specific subjects form a complex narrative and demands the coaches to be knowledgeable in this area (Norman, 2016). This underscores the evolution of sports: coaching from a “one-shoe-fits-all approach to a more tailored approach that recognises and addresses the distinct needs of female athletes (Gosai et al., 2022).

Considering the biological factors of female sports, may reveal significant variances in the needs of individual athletes, forcing coaches to adapt their approaches to cater to individual needs, enhancing athlete performance effectively (Forsyth & Roberts, 2018; Gosai et al., 2022; Norman, 2016).

Norman (2016) and Forsyth and Roberts (2018) identify several key areas where differences between female athletes manifest, including preferences in coaching styles, reactions to competitive stress and overall confidence levels. These insights align with the broader recognition of female-specific subjects, emphasising the need for nuanced coaching methods designed with female athletes in mind (Norman, 2016). This focus highlights the varied ways in which female athletes perceive and react to the challenges presented by the sports environment, including aspects such as competitive anxiety responses, confidence, preferences in coach styles, coping reactions, goal orientation and encounter stressors (Forsyth & Roberts, 2018; Hackney, 2023).

Integrating this knowledge into the fabric of the coach-athlete relationship may enhance our understanding of the importance of adapting coaching practices. Building on what was said in

chapter 2.2, the biological differences between female athletes, in terms of hormonal fluctuations and their impact on performance and injury risk, may necessitate a tailored approach to training and recovery (Engseth et al., 2022; Forsyth et al., 2022). The fluctuation can give female athletes a higher risk of ACL injuries due to increased elasticity in the knee joint during the different phases of the menstrual cycle (Hackney, 2023, p. 177; Herzberg et al.; Herzberg et al., 2017; Zazulak et al., 2006). Similarly, the psychological and social challenges, often unique to female athletes, such as body image issues and societal pressures, demand a coaching environment that is supportive and understanding (Norman, 2016). The academic insights provided by researchers such as Norman (2016) and Forsyth and Roberts (2018) suggest a potential benefit of having a coaching approach finely attuned to the nuances of female-specific needs.

### 1.3.3 Same-sex mentorship

Norman (2016) encourages coaches not to approach the coach-athlete relationship in a “gender-blind” manner and suggests that there can be a case for female athletes to have a female coach who can mentor them. The likelihood of female athletes pursuing a coaching career is massively enhanced when experiencing female coaches during their athletic careers (Curran et al., 2019; Meier, 2015; Norman, 2015). This visibility of female leadership may help promote opportunities for female athletes, in addition to aid managing societal pressure while performing at an elite level (LaVoi & Dutove, 2012). Female athletes mentored by female coaches may have an advantage from a more nuanced understanding and appreciation for biopsychosocial challenges (see chapter 1.2) facing them in their sports endeavours and daily lives (Norman, 2015)

The menstrual cycle can significantly impact the athlete, and a female coach who likely has a firsthand understanding of these dynamics can implement different adjustments to ensure better that the athlete's training and competition plans are optimised (Forsyth et al., 2022). Considering that female athletes are subject to specific injuries at higher rates than their male counterparts, primarily due to anatomical, hormonal, and biomechanical differences, adjustments and approaches based on biological and individual needs are vital in the aim for a longevity sports career (Sallis et al., 2001). This demands a decent understanding of female biology, and even though a female coach will have their own experiences to draw from, it is not enough, as they may see their own experiences as the norm (Brown & Knight, 2022).

Improving on this demands the presence of relevant knowledge and research data focusing on female athletes.

## 1.4 The sex data gap

The Sex Data Gap is the outcome of only 4–13% of all sports science studies featuring only biological female athletes (Elliott-Sale et al., 2021; Laxdal, 2023; Smith et al., 2022). The lack of data on gender impacts female athletes' health and performance, making it difficult to establish training programs, dietary recommendations, and medical procedures specifically for them (Cowley et al., 2021; Elliott-Sale et al., 2021; Laxdal, 2023). Female athletes are more prone to injury and have different hormonal profiles than male athletes (Hackney, 2023, p. 170). Particularly when it comes to the macro- and micronutrient requirements as well as the impact of the menstrual cycle on recovery and metabolism, their dietary needs can vary substantially (Hackney, 2023, pp. 260-263).

The area of sports science are trying to catch up in order to generate and apply new study findings through collaborative efforts between researchers, coaches, and sports organizations (Laxdal, 2023). As the sports industry continues to evolve, it is imperative to guarantee that female athletes receive the same level of scientific attention as their biological counterparts (Laxdal, 2023). This could potentially provide advantages for female athletes and contribute to a broader and more varied body of research in the field of sports science.

Efforts to bridge the gender data gap in sports science are becoming more prevalent through various means, such as research studies and the establishment of dedicated research groups. These initiatives aim to integrate biological considerations in study designs, promote research on female athletes in sports, and encourage a more inclusive approach to scientific investigation. The impact of researching female athletes' specific needs is becoming increasingly recognisable, through the development of sports equipment designed to prevent injuries among female athletes, such as the NIKE *Cyclone 360* football boots (Adivi, 2024). Researchers and coaches can gather more precise data by adopting tailored approaches and technologies to meet the athletes individual needs, influencing training regimens, recovery protocols, and performance strategies.

## 1.5 Purpose of the thesis

In recent years, the literature has begun to acknowledge the existence of the “Sex Data Gap” in sports research, which have led to a significant increase of research on female athletes. These changes are crucial for advancing female sports and ensuring that research and practices are inclusive and representative to female athletes. However, most of these studies are primarily quantitative studies that have researched participation ratios, many of them being classified as second-rate (McNulty et al., 2020). While these are essential aspects to fill the gap, a substantial area of research remains less explored: the lived experiences of those directly involved in female sports.

This qualitative study explores how the “Sex Data Gap” is perceived by coaches and former female athletes themselves and how they experience the different aspects regarding participation, development, and performance in female sports. This perspective is crucial for a holistic understanding of the issue. By focusing on the experiences and different perspectives of female athletes and coaches, this study aims to provide a unique.

Furthermore, the purpose of this study is not just to document and analyse the experiences of female athletes and coaches but also to contribute to a more fair and informed approach to sports research and policymaking. By bringing to light the voices and experiences of those directly affected, this study aims to advocate for changes that will bridge the “Sex Data Gap”, leading to a more inclusive and fairer sports environment for all.

## 2.0 Methodology

This master`s thesis constitutes a component of the doctoral research undertaken at the University of Agder, within the Faculty of Health and Sport Science, Department of Sport Science and Physical Education, under the guidance of the research initiative *FIDES* (Female Inclusion and Development). This thesis explores the experiences of elite-level coaches, recreational-level coaches, and former female athletes across eight sports disciplines in a Norwegian context.

### 2.1 Research Design

The first phase of this thesis involved a systematic literature review using SPORTSDiscus (EBSCOhost). The aim of this search was to find articles relevant to the research question while revealing existing gaps in the research field. The selected literature had to meet specific criteria: it needed to be peer-reviewed, written in English, relevant to the research question, accessible in full text, and focused on female athletes in organised sports.

In the second and main phase of this thesis, Braun and Clarke (2022) reflexive thematic analysis was utilised. This qualitative approach is known for its flexibility in detecting and analysing patterns in data, as emphasised by Braun and Clarke (2006); (2022).

The research design was cross-sectional, with all data collected and interviews conducted between September 2023 and December 2023. The analysis took place between February 2024 and April 2024.

#### 2.1.1 Literature search

In preparation for employing Reflexive Thematic Analysis in this study, a literature search was conducted at the project's beginning. This was to reduce the unintentional inclusion of pre-existing theoretical assumptions and concepts in the analysis, as advised by. (Braun & Clarke, 2022, p. 261). The literature search was completed on September 17<sup>th</sup>, 2023, resulting in 3664 findings. The comprehensive search strategy employed within SPORTDiscus is detailed in the table presented below:



	#	Query	Limiters/Expanders	Results
Females	S1	female or women or woman or females		240,118
Athletes, players,	S2	(players or athletes) OR gymnasts OR skiers OR golfers OR (footballers or soccer players or football players) OR handball players OR swimmers OR biathletes OR weightlifters OR cyclists OR snowboarders OR surfers OR alpine skiers OR triathletes OR track and field athletes OR cross-country skiers		539,427
Sports	S3	sports OR sport		957,947
S4	S4	basketball OR gymnastics OR skiing OR swimming OR badminton OR handball OR (football or soccer) OR volleyball OR biathlon OR weightlifting OR golf OR cycling OR cross-country skiing OR track and field OR alpine skiing OR triathlon OR snowboarding		637,339
Athletes, players, or sports	S5	S2 OR S3 OR S4		1,445,724
Coaching	S6	coaching OR coach		165,616
Combined	S7	S1 AND S5 AND S6		14,994
Limits:	S8	S1 AND S5 AND S6	Limiters – Peer Reviewed; Language: English	3,664

*Table 1: Example of the complete search strategy*

## 2.1.2 Literature Selection Process

The search gave a substantial collection of academic literature, which was screened using EndNote and Rayyan. The primary aim of this screening was to eliminate duplicated literature and filter it in alignment with the research objectives. EndNote, a prominent reference management software developed by Clarivate Analytics in the USA, was selected due to the author's proficiency with the program and its effectiveness in de-duplication (Bramer et al., 2016). In the initial phase of data screening, EndNote played an essential role by identifying and removing duplicate literature, thus reducing the initial total of 3664 by 674. This significant reduction streamlined the workload and enhanced the efficiency of the literature review process, sticking to the methodologies recommended by Bramer et al. (2016); Braun and Clarke (2022).

Given the time-consuming work of screening 2990 articles alone, Rayyan, a web-based tool developed in Qatar, was selected for a systematic and controlled literature review. Rayyan was preferred because it is freely available and has been demonstrated to reduce the time required for systematic literature reviews by up to 40% compared to alternative tools (Ouzzani et al., 2016). Following the de-duplication process, each paper underwent a screening based on the content of their titles and abstracts. This screening aimed to identify literature closely related to the thesis's thematic focus and research questions. Following the initial screening process, 209 papers were selected for the next step of the search process. These papers underwent a detailed evaluation to determine their relevance for inclusion in this thesis's theoretical framework.

Upon thorough review, 138 papers were identified as relevant and valuable contributions to the thesis's theoretical framework. Notably, 17 of these selected papers were previously included in the author's EndNote library, highlighting the author's prior engagement with relevant literature in the field. Further details are illustrated in the *Prisma Flow* diagram provided below:

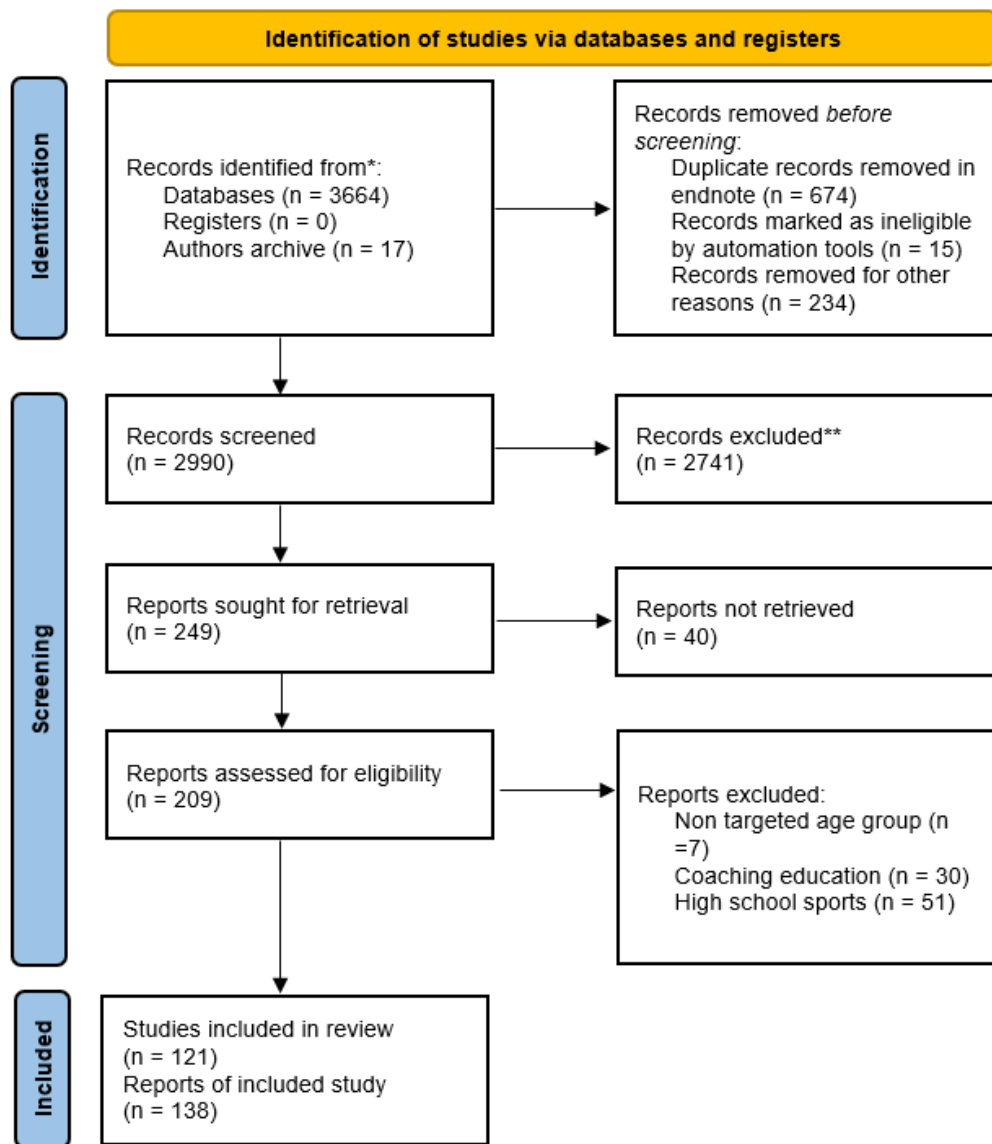


Figure 2: PRISMA Flow chart of literature selection.

## 2.2 Data collection - Recruitment of informants

Leveraging the extensive networks from the supervisors and the PhD candidate, a list of potential participants was compiled, representing a diverse range of eight distinct sports, including cross-country skiing, alpine skiing, track and field, gymnastics, cycling, handball, football, and swimming. This selection process was strategic, ensuring a wide range of experience and perspectives for the project, reflecting the sport's most popular among female athletes in Norway (NIF, 2023). To finalise the list of potential participants, the snowball sampling approach leveraged the network of previously gathered participants as an untapped

resource (Patton, 2014). This approach involved the initial informants recommending additional participants, allowing the project to tap into a more comprehensive network of individuals connected to the sports coaching community. The criteria for informant inclusion were discussed to ensure a comprehensive and inclusive approach, emphasising a need for different levels of coaching (professional and recreational) and experience. This inclusivity was central to the project's aim of capturing a wide range of experiences and perspectives in female sports.

<b>Group Number</b>	<b>Participant Category</b>	<b>Description</b>
1	Eight Retired Biological Female Elite Athletes	Participants who were elite athletes at one time in their career
2	Eight Top Elite Coaches in Female Sports	Active coaches of high-level female sports
3	Eight Coaches Representing Recreational Level	Active coaches involved in recreational female sports

*Table 2: Description of the different categories of participants for this thesis.*

Finally, a timeline was drafted for recruiting informants and conducting interviews, considering logistical aspects such as availability, geographical locations, and the need for ethical clearance.

### 2.2.1 Data Collection Methods – Semi-structured Interviews

To gather the qualitative data, semi-structured interviews were conducted following a systematic approach, which included coding in NVivo 14 (Lumivero, Denver, CO, USA) and analysis using a reflexive thematic analysis approach. The participants comprised of sports coaches and former female athletes, ensuring a complete perspective covering leadership and participant viewpoints (Seidman, 2006, p. 50). The interviews were audio recorded, lasting approximately an hour, and was transcribed verbatim by the interviewer, adhering to strict anonymisation protocols to maintain the confidentiality of the participants (Sutton & Austin, 2015). The transcripts served as the primary data source for subsequent analysis.

NVivo 14 was used as it is a qualitative data analysis software program, known for efficiently handling and organising complex datasets (Jackson et al., 2019, pp. 6-9; Welsh, 2002). The coding process was divided into two stages, guided by the principles of reflexive thematic analysis as outlined by (Braun & Clarke, 2006; 2022). Initially, each transcript was sifted through, with segments of text marked with initial codes. These codes, generated inductively, reflected specific ideas, concepts or experiences articulated by the participants. This inductive approach allowed themes to emerge organically from the data, ensuring that the analysis remained grounded in the participant's perspectives without being constrained by preexisting theoretical frameworks or categories (Braun & Clarke, 2022; Byrne, 2022). This method was particularly suited to the exploratory nature of our study, aiming to capture the depth and complexity of experiences conveyed in the interviews.

The study progressed to the focused coding stage after completing the initial coding. Here, the initial codes are carefully reviewed and refined, with similar codes grouped to form broader categories (Braun & Clarke, 2022, pp. 68-72; Jackson et al., 2019, pp. 106-110). This stage was essential for synthesising and integrating the data, enabling the identification of recurring patterns and overarching themes. The repeated nature of this process fostered self-reflection, constant comparison and improvement for a comprehensive understanding of the data (Braun & Clarke, 2022; Byrne, 2022).

## 2.3 Data Analysis procedure

The data analysis for this thesis was centred on a qualitative reflexive thematic analysis of the 24 semi-structured in-debt interviews conducted with a diverse group of sports professionals, including coaches and former athletes. This approach was in line with Braun and Clarke's reflexive thematic analysis framework (2006, 2002), which provides a flexible yet precise method for identifying, analysing, and reporting patterns within the qualitative data. RTA consists of 6 steps that are crucial to follow as you search for meaningful themes within the data:

1. Familiarizing Yourself with Your Data
2. Generating Initial Codes
3. Searching for Themes
4. Reviewing Themes

5. Defining and Naming Themes
6. Producing the Report

All 24 Interviews were transcribed verbatim to ensure accuracy in capturing the participant's words and expressions (Braun & Clarke, 2022; Brinkmann & Kvale, 2018). This transcript process was crucial for maintaining the integrity of the data and providing a solid foundation for subsequent analysis (Brinkmann & Kvale, 2018). Each transcript was read multiple times to gain an in-depth understanding of the content and context of the interviews.

### 2.3.1 Getting familiar with the data

To get familiar with the data collected from the interview transcripts, the author read and re-read the 24 interviews, noting possible patterns, attempting to understand the world that the informants were trying to describe and attempting to understand why they might be trying to make sense of things in the way they are describing (Braun & Clarke, 2006; Braun & Clarke, 2022, pp. 43-45; Byrne, 2022; Maguire & Delahunt, 2017). During this process, the author adopted a reflexive stance, acknowledging his subjectivity and preconceptions while remaining open to the different viewpoints and interpretations presented by the participants. While engaging in reflexivity, the author delved deeper into the participants' reactions and responses to the data during the initial stages. This introspective process involved questioning the emotional and cognitive reactions evoked by the participants' narratives and critically examining the potential influences of personal experiences and biases on understanding the data (Braun & Clarke, 2022, p. 44).

### 2.3.2 Generating Initial Codes

Generating codes from the interviews is a more systematic way of engaging in the collected data. In this part of the process, segments deemed relevant to the study's aim were tagged with an appropriate code (Braun & Clarke, 2022, p. 53; Byrne, 2022; Maguire & Delahunt, 2017). Some segments were given different codes as they were interpreted with different meanings from them. In this part, it was important that the codes only conveyed one meaning so they did not become too broad (Braun & Clarke, 2022, p. 54). NVivo 14 (Lumivero, Denver, CO, USA) was utilised to facilitate the coding process, which enabled the creation of independent files for each transcript and provided a systematic data organisation (Jackson et

al., 2019, pp. 12-21). By importing the transcripts into NVivo, the author could easily navigate the data, identify relevant segments, and apply codes inductively based on emerging patterns and themes (Braun & Clarke, 2022, p. 54). This process was quite time-consuming as this was the first time the author had coded, and they needed to gain experience. After an evaluation, the codes from the first eight transcribed interviews were suboptimal for the aim of this thesis and, therefore, had to be redone to ensure a higher quality of extracted data. This decision was made as the codes lacked depth and description and mainly consisted of one word; they resembled themes more than the codes. After this minor setback, the coding process went forward as the author knew what to include and avoid when writing codes. At the end of the final coding phases, 575 codes were produced from the interviews.

### 2.3.3 Searching for Themes.

Following the coding process, the search for themes began, and the codes with shared meaning were collapsed into themes that could aid in answering the research questions (Braun & Clarke, 2006; 2022; Byrne, 2022). Some codes were promoted as themes and sub-themes, representing an overarching narrative within the data (Byrne, 2022; Maguire & Delahunt, 2017). *Coach athlete communication*, and *understanding and knowledge of female-specific subjects* were some of these over-arching codes, as they communicated meaning that could be used to better answer the research questions (Braun & Clarke, 2022; Byrne, 2022). Through the struggle of not interpreting descriptions as themes, the author navigated the complexity of reflexive thematic analysis by distinguishing between data description and data interpretation (Braun & Clarke, 2022; Byrne, 2022). This ensured that the themes were not merely superficial descriptions of the data but represented a deeper relationship between the codes. This step initially resulted in 5 themes, but as some of the themes were less relevant to the scope of the thesis, 3 themes were produced, with sub-themes included:

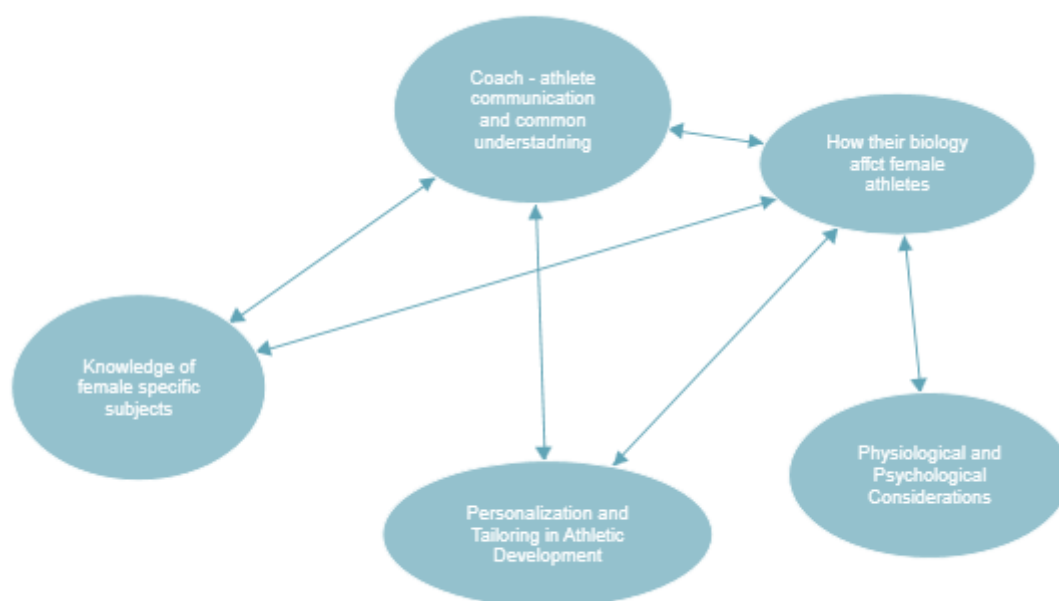


Figure 3: Is the first draft of the 5 themes visualised, and how they connected to each other within the research question.

### 2.3.4 Reviewing the themes.

The initial themes and sub-themes underwent a lengthy reflexive process at this stage. This process focused on evaluating the themes' relevance and capacity to convey meaningful insights related to the thesis. Key questions inspired by Byrne (2022) and Maguire and Delahunt (2017) guided this evaluation: *What depth and quality do these themes offer? Are they directly valuable and applicable to the objectives of this thesis, or do they need more data support?*

This process made some themes into sub-themes as they added more to certain themes than they could stand on their own. This led to examining the relationship between themes and sub-themes and how they formed a coherent narrative aligned with the research questions. The themes that failed to meet these criteria were either refined for clarity and relevance or discarded as they could not be substantiated with sufficient evidence from the data (Braun & Clarke, 2022; Byrne, 2022; Maguire & Delahunt, 2017).



### 2.3.5 Defining the Themes.

Each theme and sub-theme were carefully named in this step to capture its essence while simultaneously describing its scope of the research. The naming process was important as it helped to clearly define and distinguish each theme (Byrne, 2022). The coded data was thoroughly reviewed to ensure that each theme provided a coherent narrative from the participants. This review involved revisiting the data extracts associated with each code to verify that they supported the overarching narrative of the theme and were relevant to the research questions. The process of defining the themes proved to be a lot more intricate than the author had imagined as differentiating between the naming the themes after their content and not their summary.

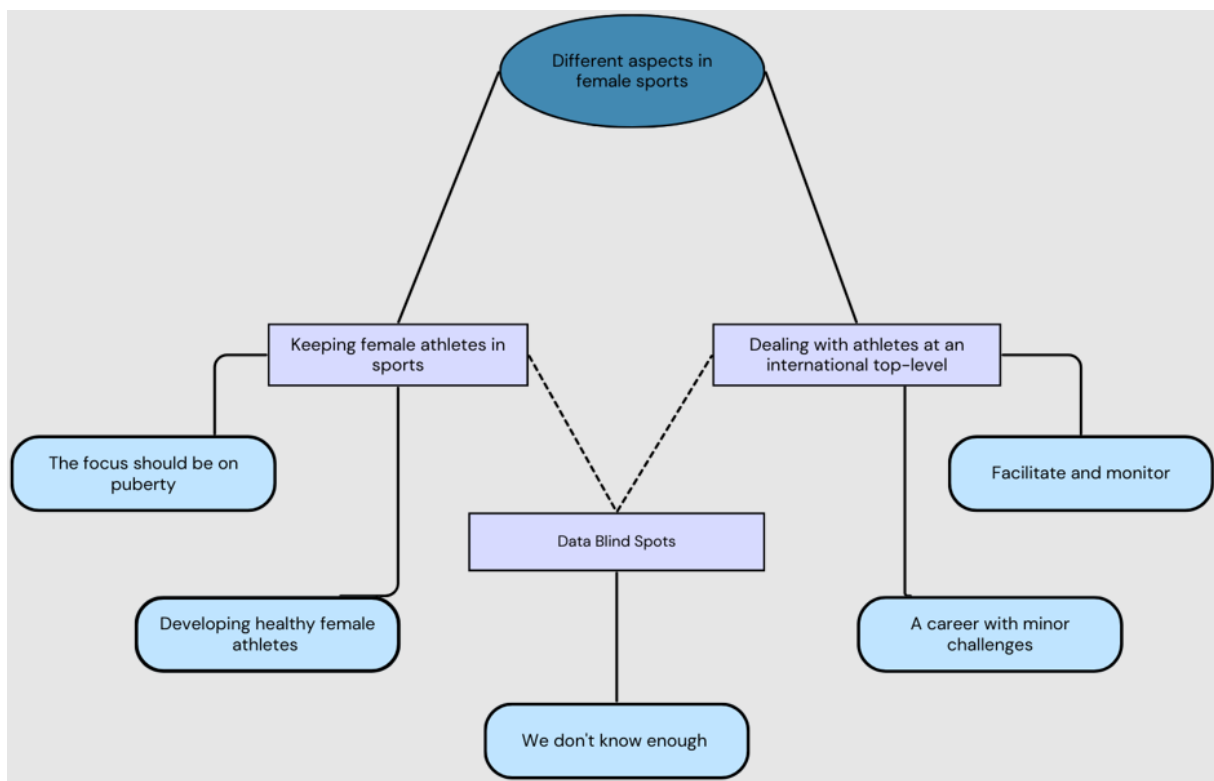


Figure 4: The full thematic map for this thesis, showing how the themes related to the research question

### 2.3.6 Producing the report

After completing the previous steps, the generated themes were structured into a coherent thematic map to illustrate how the themes and sub-themes combine. This final step laid the groundworks for the rest of this thesis, resulting in the construction of the thesis article (see page 37).

## 2.4 Ethics

Ethical considerations were prioritised throughout the different phases of this research, from collecting data from the interviews to managing participant information and responses.

Adhering to the guidelines by Brinkmann and Kvale (2018), this project upholds the standards of ethical conduct in qualitative research.

At the beginning of the thesis process, it was essential to obtain ethical clearance. The application was submitted and approved by the Norwegian Center for Research Data and The Ethical Committee for Health and Sports Science at the University of Agder (see appendix 1 and 2). This approval ensured that the research design met the ethical standards for research involving human subjects, participant recruitment, data collection methods, and data analysis procedures.

As the data used in this thesis is secondary, the risk of ruining the confidentiality between the interviewer and the informants is slim. However, as a safety measure, all the information regarding age, gender identification, merits, and club history was omitted or not included in the data coding and analysis. This was done as the author believed including this information could risk breaching the anonymity and confidentiality of the informants.

In addition to these measures, pseudonyms or participant codes were implemented to refer to individuals mentioned in the data. By assigning pseudonyms, the identity of the informants was further protected, ensuring that their contributions to the research remained anonymous throughout the analysis and reporting process.

In sharing the interview transcripts, access was strictly restricted to individuals on a need-to-know basis, comprising only those directly involved in the data analysis process. This limitation ensured confidentiality and privacy were upheld, minimising the risk of unauthorised access or disclosure. The individuals granted access to the transcripts were carefully selected based on their role in the research project (one PhD- candidate, one master student and two bachelor students). They were provided with clear guidelines and instructions regarding the handling and storing the data to prevent any breach of confidentiality.

## 3.0 Method discussion

### 3.1 The research design

This study's literature search was conducted independently due to the thesis's focus. Despite the lack of direct supervision, I employed systematic search strategies across multiple databases, using a broad range of keywords to ensure comprehensive coverage of relevant literature.

### 3.2 The collection of data and participants

Data collection was conducted through semi-structured interviews, either in person or via Zoom (Zoom Video Communication, San Jose, CA, USA). Participants received the interview guide (see appendix 3 and 4) beforehand to facilitate a more prepared and insightful discussion. While this preparation aimed to enhance data richness, it might have limited spontaneity in responses. Balancing this, the flexibility of semi-structured interviews allowed participants to elaborate on their experiences deeply.

However, this choice of preparation may have limited the spontaneity of the participants answers, as they might have prepared their answers on beforehand to adhere closely to the guides outlined topics and questions. This can have hindered the emergence of unplanned insights that might have proven relevant for this thesis.

Nevertheless, by providing the participants with interview guide in advance, this allowed the participants to reflect on their career, facilitating a more complete view of their experiences in female sports covering the entire spectrum, from recreational to elite levels. This comprehensive approach is justified as the foundation of elite sports often begins at the recreational level. Thus, recruiting participants from these categories was deemed appropriate. Providing the participants with an interview guide in advance allowed them to reflect on their entire career in female sports, from recreational to elite levels. This comprehensive approach is justified since the foundation of elite sports often begins at the recreational level.

### 3.3 Analysis method

Reflexive Thematic Analysis was chosen as the ideal qualitative framework for this thesis, but other methods were considered in the process. Other than TA, grounded theory was considered to offer unique insights into the complexities of the collected data.

#### Reflexive Thematic Analysis

Reflexive Thematic Analysis was chosen due to its flexible approach to generate patterns in qualitative data as this was relevant for this study's aim to seek to understand the multifaceted experiences of female athletes and coaches in female sports (Braun & Clarke, 2022, pp. 9-10). Reflexive Thematic Analysis can accommodate different data types and perspectives, ensuring that all relevant aspects of the participant's experiences are captured and analysed (Braun & Clarke, 2006). While Reflexive Thematic Analysis offers numerous advantages for this study, its potential shortcomings in this specific context must be considered. As Reflexive Thematic Analysis involves categorising data into themes, the researcher risks oversimplifying complex narratives (Braun & Clarke, 2022, pp. 260-265). In the context of this study, there is a risk of losing or underrepresenting some subtleties and complexities in this thematic framework as the author has little experience in the field. To improve on the limited experience, the author emerged himself in the literature of Braun and Clarke (2022); Byrne (2022); Maguire and Delahunt (2017) to follow their guidelines for using thematic analysis.

#### Grounded Theory:

Developed by Glaser and Strauss in the 1960s, grounded theory does well in theory construction based on data (Glaser & Strauss, 2006). This inductive method is advantageous for a study on experiences in female sports for several reasons. Grounded Theory's approach of creating theories from the ground up suits this study's objective to develop insights and theories specific to the participant's experiences (Glaser & Strauss, 2006, p. 256). This is important in areas where existing theories may not be ideal. Moreover, the inductive nature of Grounded Theory, which begins with specific observations and progresses to broader

generalisations, grounds the study deeply in the participant's personal stories (Charmaz, 2014, p. 136). This process facilitates the natural emergence of authentic insights, which is essential for accurately capturing diverse and individual experiences without the limitations of pre-existing theories (Charmaz, 2014, p. 136).

Despite its numerous strengths, Grounded Theory has limitations that must be considered in qualitative studies. Grounded Theory is an exhaustive process which demands substantial time and effort from researchers (Hussein et al., 2014). Unexperienced researchers, in particular, may find themselves overwhelmed by the coding process, as it can be time-consuming and difficult to rise above the detail to see the bigger picture (Myers, 2019, p. 134). Hussein et al. (2014) highlight that Grounded Theory often uses lower-level theories, and finetuning these theories towards central categories may require months of dedicated effort.

For exploring diverse perspectives and experiences within female sports, the exhaustive nature of Grounded Theory could unintentionally lead to overlooking the unique aspects within individual narratives (Hussein et al., 2014). These personal stories are pivotal for a comprehensive understanding of these experiences, and failing to capture them entirely could result in a less nuanced interpretation (Glaser & Strauss, 2006, p. 249; Hussein et al., 2014). While Grounded Theory offers valuable insights, its application in this context demands careful consideration and a balanced approach to ensure that the richness of each story is represented correctly.

### 3.4 The Ethics

A central aspect of the ethical approach was obtaining informed consent from all participants. Before conducting interviews, each participant was provided with detailed information about the study's objectives, their involvement, and assurances of confidentiality and anonymity (De nasjonale forsknings komiteene, 2021, 16.12). They were informed of their right to withdraw from the study at any point without repercussions (Orb et al., 2001).

Maintaining the confidentiality and anonymity of participants was crucial throughout the thesis. All identifying information was removed from the interview transcripts, and any

potentially identifiable information was carefully altered or omitted (Clive Seale et al., 2007; Patton, 2002, pp. 407-412). This included the data storage and handling procedures were carefully established and followed by NSD guidelines (see appendix 2) to ensure the secure storage of participant information and its access solely by the researchers (De nasjonale forsknings komiteene, 2021, 16.12). Recognising the potential for sensitive topics to emerge during interviews, especially in the context of sports coaching, the interviewer was prepared to handle such situations with care and sensitivity. Participants were reassured of their autonomy throughout the interview process, with the option to skip any question or terminate the interview at their discretion (Patton, 2002, pp. 408-415).

In the reflexive thematic analysis, following (Braun & Clarke, 2006; 2022), ethical considerations were carefully observed in the interpretation of the data. This involved a keen awareness of the potential biases and preconceptions of the research and a commitment to representing the participants and views, which was maintained throughout the analysis.

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## Presentation of article

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*How do coaches and female athletes experience different aspects regarding participation, development, and performance in female sports?*

*- and what impact does the sex data gap in sports science have on these perceptions and their coaching practices?*

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## Abstract

The goal of this reflexive thematic analysis study was to investigate the various aspects related to participation, development, and performance in female sports, as well as exploring how the sex data gap affects different perceptions and coaching practices within female sports. The participants of this study were coaches at the elite level in female sports (n=8), coaches at the recreational level in female sports (n=8), and former female athletes (n=8). Previous research in this area has mostly used quantitative methods to examine the extent of this data gap, showing that only 4-13% of all studies have focused on female athletes only. This study takes a qualitative approach to explore more nuanced of the research questions. By conducting interviews with top- and recreational-level coaches, and former elite athletes, the study will provide insight into the challenges and opportunities female athletes face today, and how coaching practices and general attitudes affect their daily training. Furthermore, the study will highlight how the lack of research impacts the current knowledge of coaches and female athletes, as well as how this can contribute to reinforcing existing disparities in sports. The study's findings will be able to inform future research and help develop practices and policies that improve and support female athletes and coaches in their sports careers.

Keywords: coaching practises, female athletes, reflexive thematic analysis, sex data gap

## List of Abbreviations

<b>Abbreviation</b>	<b>Definition</b>	<b>Page</b>
A-BT	Recreational coach in alpine skiing	52
A-TT	Elite coach in alpine skiing	47
A-TU	Former elite athlete in alpine skiing	52
F-BT	Recreational coach in football	48
F-TT	Elite coach in football	50
F-TU	Former elite athlete in football	55
Fri-TT	Elite coach in track and field	46
Fri-TU	Former elite athlete in track and field	48
H-BT	Recreational coach in handball	47
H-TT	Elite coach in handball	51
H-TU	Former elite athlete in handball	45
L-BT	Recreational level coach in cross-country skiing	48
L-TT	Elite level coach in cross-country skiing	55
L-TU	Former elite athlete in cross-country skiing	51
Svø-TT	Elite coach in swimming	44
Svø-TU	Former elite athlete in swimming	52
Syk-BT	Recreational coach in cycling	47
Syk-TT	Elite level coach in cycling	56
Syk-TU	Former elite athlete in cycling	44
T-BT	Recreational coach in gymnastics	45

*Table 3: Abbreviations and descriptions of the participants, with page references*

## Introduction

In this modern day, sports have a more significant influence on society beyond serving as a means of physical exercise and entertainment. Sports can function as a platform for advancing social change by addressing issues related to physical and mental well-being, combating inactive lifestyles, and promoting fairness and justice in society (Eigenschenk et al., 2019; Spaaij, 2009). Nevertheless, the participation of women in sports has traditionally been lower compared to male athletes, but it has gradually caught up in recent years due to the modernization of sports.

During the 1960s, female athletes were prohibited from participating in many sporting events, some tried to compete, but were forcibly removed from the competitions (Switzer, 2017). Following that, female athletes have achieved notable progress in both their participation rates and performance levels, primarily as a result of legislative actions such as Title IX, combined with the relentless efforts of female athletes who have successfully overcome obstacles in the field of sport (Pieper & Krieger, 2023, pp. 2-4). These barriers refer to limitations such as the ability to participate in the same Olympic sports as male athletes and a lack of representation in administrative roles within sports (Andersen & Loland, 2017). Today, female participation in elite sports has reached its pinnacle following more than seven decades of progress. In the Tokyo 2021 Olympics, there was a notable achievement as nearly half (49%) of all participants were female athletes (Cowley et al., 2021).

Conversely, research by Bakken (2019) indicates a consistent decline in female participation in recreational sports and a rise in adolescent athletes discontinuing their involvement. This tendency can be explained by the lack of thorough research on female athletes, as most current studies in the field of sports science primarily concentrate on male athletes. As a result, there is a greater probability of ignoring the distinct characteristics associated with women in athletics (Norman, 2016). Although there has been considerable research in sports science since the start of the century comparing male and female athletes, there has been less emphasis on examining the distinct elements exclusive to females. Nevertheless, subsequent studies have emphasised the importance of assessing individual variations within the biological sex. (Forsyth & Roberts, 2018; Hackney, 2023; Norman, 2016).

Monitoring and evaluating the multiple aspects of an athlete's health and fitness can reduce the probability of insufficient training and injuries, thereby establishing an efficient approach to tracking athletic development (Hackney, 2023). Much of the latest research on the female-

specific subject indicates that the effect of the menstrual cycle is beneficial to track, as its variable changes can cause different responses to exercise and fatigue (Hackney, 2023; McNulty et al., 2020). These variables can be irregular menstruation and absence of menstruation associated with adverse health outcomes, energy deficiency, and increased risk of injury (Hackney, 2023, pp. 303-304). Furthermore, variations in the menstrual cycle can directly influence an athlete's performance levels. Studies suggest that exercise performance may be slightly reduced during the early follicular phase of the menstrual cycle (McNulty et al., 2020). Monitoring the menstrual cycle might vary in terms of the techniques' duration, intricacy, expense, and invasiveness. The methods used can vary from clinical evaluations to practical and non-intrusive methodologies (Hackney, 2023, p. 305).

Quantitative data indicate that just 4–13% of all accessible sports science research is conducted on female athletes; as a result, the term "Sex Data Gap" has come to be a fitting designation for the research gap (Cowley et al., 2021; Laxdal, 2023; McNulty et al., 2020). While there is a steady increase of studies done on female athletes with female authors, Laxdal (2023) points out that: “*one should not just wait passively for academia to catch up*”, as most studies have shown the disparities between research on biological males and biological females. However, they are primarily quantitative studies that have researched participation ratios, many of them being classified as second-rate (McNulty et al., 2020). While these are essential aspects, a substantial area of research remains less explored: the lived experiences of those directly involved *in female sports*. This qualitative study explores how the “Sex Data Gap” is perceived by coaches and former female athletes themselves and how they experience the different aspects regarding participation, development, and performance in female sports. By shifting the focus from purely statistical analyses to a more narrative-driven exploration, this thesis aims to uncover how the data gap affects the day-to-day experiences regarding participation, performance, and professional development within the sporting environment. By combining the perspectives of coaches on different levels and former athletes, this study seeks to uncover the different aspects that affect both coaches and athletes in female sports as it is a cease research field and has the possibility of guiding both future research in female sports and creating change in coaching educational programs. The complex and diverse connection between athletes and coaches significantly influences their growth and achievement from youth to senior levels (Côté et al., 1995; Gosai et al., 2022). The relationship between athletes and coaches is influenced by their interactions, which leads to personal growth for both parties. This dynamic can offer valuable insights into



many aspects of female athletes in sports (Gosai et al., 2022). Coaches can customise their strategies to meet the specific needs of each athlete, enabling them to develop emotionally and professionally (Forsyth & Roberts, 2018; Norman, 2016). The ideal characteristics for these interactions are transparent communication, reciprocal admiration, and confidence, which allow athletes to express their worries and ambitions openly (Davis et al., 2018; Norman, 2015).

Over the past two decades, the coaching paradigm has changed, and among successful coaches, academic backgrounds have increased significantly more than only professional sports experience (Rynne, 2014). This change results from increasingly integrating sports analytics, psychology, and science into coaching techniques (Rynne, 2014). Certain academic coaches possess sufficient knowledge of biology and psychology to effectively modify their athletes' training routines (LaVoi & Baeth, 2018; Rynne, 2014). This evolution makes the demand for more knowledge and understanding of the individual needs of female athletes more evident, as coaching must adapt to these specific factors. This understanding is essential for optimising development from an early age, increasing performance and addressing competitive stress and confidence differently (Forsyth & Roberts, 2018; López de Subijana et al., 2021; McGee & DeFreese, 2019; Norman, 2015).

## Method

### Participants and study design

For this thesis, a total of twenty-four individuals were recruited, each of whom represented a different position within Norwegian female sports: elite coaches, recreational coaches, and eight former elite female athletes. It was due to their involvement in some of the most popular sports among female athletes in Norway that they were selected for this research.

Additionally, their experience and role in relation to the research field were taken into consideration. They were recruited through the network of the Faculty of Health and Sport Science at the University of Agder. They represented a variety of sports, including cross-country skiing, alpine skiing, track and field, gymnastics, cycling, handball, football, and swimming. These sports were chosen as they had high participation numbers among female athletes (NIF, 2023, p. 24)

<b>Group Number</b>	<b>Participant Category</b>	<b>Description</b>
1	Retired Biological Female Elite Athletes	Participants who were elite athletes at one time in their career
2	Top Elite Coaches in Female Sports	Active coaches of high-level female sports
3	Coaches Representing Recreational Level	Active coaches involved in recreational female sports

*Table 4: Description of the different categories of participants for this thesis.*

The participants were contacted through email. Upon expressing interest in the study, they were provided with a consent form compliant with NSD guidelines (see appendix 2). To safeguard their anonymity, only the project manager had knowledge of their identities. Access to their interview data was limited to three individuals: the author of this master's thesis and two bachelor students. Additionally, to further protect privacy, any references to personal achievements and merits were redacted from the transcribed data to prevent potential breaches of confidentiality.

## Study design

As this thesis is exploring the aspects regarding participation, development, and performance in female sports, the interpretive nature of reflexive thematic analysis was applied (Braun & Clarke, 2006; Braun & Clarke, 2022), as the studies used a qualitative approach where the data was collected through semi-structured interviews were seen as the ideal method (Brinkmann & Kvale, 2018). The choice of methodological approach allowed for a more in-depth analysis of how the participants experienced these different aspects.

## Interview guide

The interview guide for this thesis was developed to ensure comprehensive exploration of the experiences of the female athletes and coaches. Drawing on existing literature relevant to female sports, the guide included open-ended questions designed to bring out detailed, reflective responses from the participants. Topics covered included personal and professional experiences in sports, considerations taken to female-specific factors, their view on the current state of female-specific knowledge within sports and challenges faced (see appendix 3 and 4).

## Data analysis

This thesis employed a qualitative reflective theme analysis of 24 semi-structured in-depth interviews with coaches and past athletes. This study utilised Braun and Clarke's reflexive theme analysis framework (2006, 2002), a flexible and rigorous methodology for identifying, assessing, and documenting patterns in qualitative data. The chosen methodological approach allowed for a reflective examination of the participants' perspectives, enhancing the understanding of their experiences and perceptions. The interviews were transcribed verbatim, following the guidelines of Braun and Clarke (2022) and Brinkmann and Kvale (2018). Reflexive thematic analysis was used to explore the different perceptions the participants had regarding the status of female specific knowledge within sports.

To analyse generic themes, the qualitative coding software program *NVivo* 14 (Lumivero, Denver, CO, USA) was utilised for organising and developing codes from the collected interview data. The six steps of Braun and Clarke (2022) was followed with a reflexive

approach as every single step of the analysis were reevaluated by the author to prevent reflect on underlying biases. The generating of codes and themes were exclusively conducted by the author, with the project manager reviewing the codes and themes enhance and validate the analysis, while also highlighting any deficiencies in the process. This resulted in the labelling of the following three themes: a) *Keeping female athletes in sports* b) *Dealing with athletes at an international top-level* and c) *Data Blind Spots*, with five sub-themes connected to them: aa) *The focus should be on puberty*, ab) *Developing healthy female athletes*, ba) *Facilitate and monitor*, bb) *Less is More*, and ca) *we don't know enough*

## Findings

The reflexive thematic analysis revealed multiple themes that helped enhance the comprehension of various aspects of participation, development, and performance in female sports, alongside the effect of the sex data gap. Initially, the theme of cultivating a culture of participation among female athletes was prevalent. Both coaches and athletes deliberated on their perceptions of the current state of their sports and identified several changes needed to better the sport. Through completing the last steps of RTA, the themes: a) *Keeping female athletes in sports*, b) *Dealing with athletes at an international top-level*, and c) *Sex data gap* (see Figure 2) was produced as they capture the different aspects affecting coaches and athletes in female sports related to the research questions.

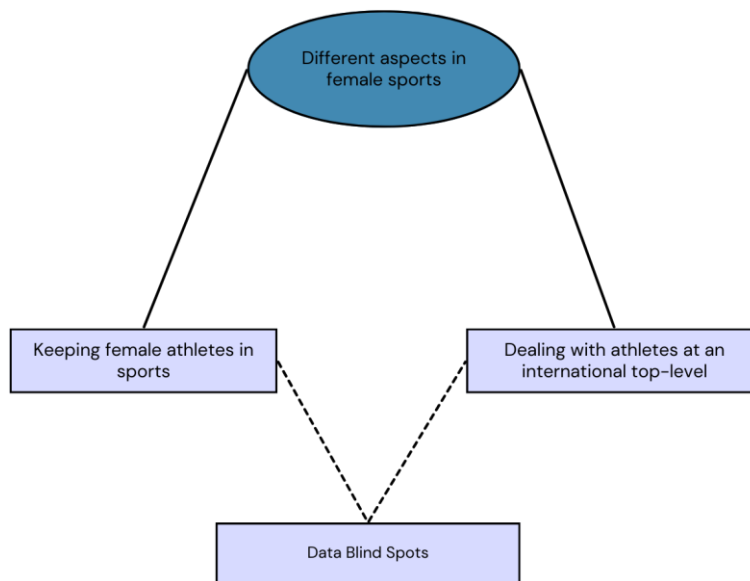


Figure 4: Thematic map the full thematic map for this thesis, showing how the themes related to the research questions.

## Keeping female athletes in sports

The first themes tell what most of the participants agree should be the foundation goal for female sports and development. Keeping female athletes participating in different sports throughout their life, as the focus on longevity fosters a healthy approach to exercise and overall well-being. The sub-themes of focusing on the age of puberty for the athletes, combined with developing healthy female athletes were referenced several times throughout the interviews (see figure 5).

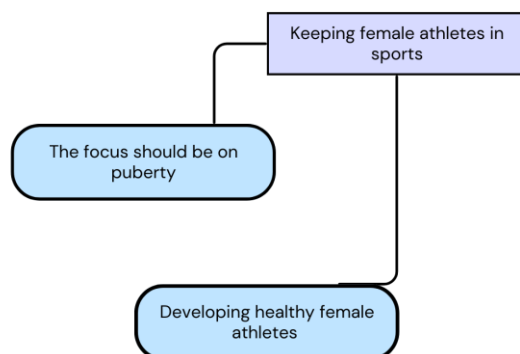


Figure 5 showing the sub-themes connected to the theme of keeping female athletes participating in sports.

### The focus should be on puberty

Several participants discussed the initial phases of a female athlete's career, spanning both elite and recreational levels, acknowledging the well-recognised high dropout rates among young female athletes. Various recommendations were cited throughout the interviews, with many considering the changes during adolescence as a key stage in an athlete's career trajectory. The consensus among the participants is that biological factors differences can lead to demotivation as athletes are affected by growth hormones. This influence constitutes an initial factor that can contribute to the high dropout rates observed among young athletes. When asked what the focus for educating coaches within female sports should be, Syk-TU expressed her wish for it to be more knowledge oriented towards specific issues related to puberty:

*"The main focus should be on puberty and on the specific issues that are relevant only to women and girls. What can be done for injury prevention and how can we tailor training in relation to competition formats, and not least hormonal fluctuations and menstruation. "*

Svø-tt elaborated further on his experiences of coaches' knowledge of female specific-factors

and how his opinion is that coaches need teach and communicate to young female athletes what kind of changes they will face during puberty:

*"This matter of coaching and communicating with girls requires qualities that understand why a girl who almost continues and might increase training, can still experience stagnation, and these discussions are frequent in Norwegian swimming. How we should communicate these things with girls in puberty, and we also know that the dropout rate is very high at this age with girls. We see in swimming that there is an enormous dropout, especially among the girls."*

Earlier in his interview, Svø-TT referenced how other countries follow their athletes for a longer time during their adolescents ages, facilitating a stronger relationship between coach and athlete, were its easier to gradually transition into harder training regimes, suited to the athlete:

*"You have a Russian model where the coach often follows the athletes from when they are young all the way until they retire, whereas in Norway it's more common to divide into groups, so that one moves up with age. Therefore, coaches often don't see these transitions in the athletes as clearly. This follows biological age, but it actually has nothing to do with the athletes' development."*

H-TU illustrated of how the transitional period to a new level in sports may be challenging for a young athlete, and that joining a new environment with new coaches could be a hard transition:

*"It was a difficult period, like you go from being perhaps the best in age-specific competition to joining the first team and being the worst there, so it's a new position to be in.."*

T-BT admits seeing that the total increase in training load and performance focus can be too much for some athletes and that this is in some part the cause of the dropout happening during the high school years:

*“If I think about all sports in general, but maybe especially in very technical sports, it requires quite a lot of training to keep up. If you aim to improve, excel, or whatever goal you have in mind, it demands considerable training. In gymnastics, we know that most people last through high school at best and then they're done. (...) What we usually do is just add more and more, and I also know personally that this isn't really the right way to approach it.»*

Fri-TT emphasised the different questions one needs to ask oneself when it comes to coaching and developing young athletes whether it is on a recreational level or elite, as the number of factors affecting athletes in the adolescent age can vary drastically from individual to individual:

*“I would want to focus primarily on the period from 15-16 years old to 25-26 years old. What should we do then? How do we facilitate that? And are there things we're doing today that we could challenge or do differently?”*

The foundational groundwork being done during the adolescent age of athlete's shapes how they thrive in the realm of sports, whether they participate for their enjoyment of recreational sports or if they aim to achieve accolades of higher performance within elite sports. The participants all consider these formidable years as key to fostering and increasing participation amongst young athletes, but how the world of sports aim to develop athletes should vary based on their individual needs and ability.

## Developing healthy female athletes

This sub-theme considers how trying to develop female athletes safely and effectively presents certain challenges, as identified by several participants during their interviews. Addressing the female-specific factors in sports necessitates an understanding that fosters a safe environment for development (see Figure 4). Participants observed that variables such as the menstrual cycle significantly influence athletic performance and development. H-BT talked about her experiences on how coaches take into consideration the menstrual cycle of their athletes during training and competition:



*“It's definitely not being considered. It's not talked about. I don't discuss menstruation with my female athletes on a general basis either.”*

Conversely, Syk-BT discussed the focus given to the impact of the menstrual cycle on their athlete's performance, emphasising the importance of adjusting the training load to align with each athlete's condition on any given day:

*"On a day when someone is feeling a bit off because they have their period, we take that into account. Okay, then maybe we shouldn't push so hard in training. Instead, prioritise a more relaxed intensity. And in some periods when there are restrictions and they last a bit longer, we also need to think more about this. Because there's a lot happening in the body. And there's a lot of awareness that should be raised."*

As athletes progress into their late teenage years, managing their training load alongside their individual needs correctly to avoid injuries becomes essential. When being asked about the what considerations they take, A-TT expressed a belief that there is significant potential for improvements in the methods used in coaching young female athletes:

*"I believe that I have something to say about being able to absorb and optimize training better, and perhaps avoid certain injuries. And I do notice in our sport the advantage of avoiding an ACL injury. This can be especially career-threatening at the younger levels with such injuries, which occur more frequently among young girls."*

Regarding the high school years, some female athletes in Norway attend Sport Academy High School, where they can specialise in their preferred sport. In these instances, the training load for the athletes can increase substantially, as they often have organised training every day at school and then have more training later that day. When being asked the same question, H-BT expressed her concern with these athletes being pushed too hard, resulting in a higher occurrence of injuries, thus resulting in more dropouts:

*"Yes, it's hard to say, but I think maybe this is one of the years we should be most considerate because we have a lot of injuries and many quit during high school, when the training load and overall load are higher."*

As some female athletes are more prone to injuries than others and Fri-TU elaborated her concern about the lack guidelines relating to what is important to prioritise for young female athletes. When being asked how they deal with injuries such as stress fractures and ACL-injuries:

*"We have no guidelines on what is especially important for young girls to consider when starting strength training and so forth, (...) girls tend to have an increase in fat percentage and become weaker relative to their body size. This makes the path to overload injuries and acute injuries much shorter than for boys. This is what I mean by female-specific injuries. And the occurrence is much higher for most injuries among girls."*

Like Fri-TU, L-BT expressed how there are insufficient approaches within sports regarding knowledge of considerations to take related to female athletes. When reflecting on how she vies the level of knowledge among coaches related to female-specific factors, she says:

*"There is also insufficient follow-up on teaching knowledge during puberty, girls are not motorically robust enough when they come out of puberty and therefore have a much higher risk of injury and struggle more with learning new techniques from a motor skills standpoint. So I'm very curious about this age group. What can be taught to the athletes so that they make better and smarter choices in the future?"*

In his interview, when asked about his experience with their handling of female-specific injuries, F-BT referenced some of the new preventative measures being implemented in football today.

*"There have been many more injury-prevention exercises. We've included them as part of our warm-up or cool-down, both in and out of season, in recent years. Not specifically because we are women, but because it's generally sensible."*

Whether young athletes aspire to attain elite status at the senior level or derive satisfaction from recreational sports, the values of Norwegian sports are to foster sustainable and longevity participation to ensure the health and well-being of the athletes. Most participants highlighted during their interviews that having foundational knowledge to facilitate healthy development is essential for increasing female participation and improving the world of female sports.

## Dealing with athletes at an international top-level

While intertwined with development in sports, the elite aspect of female sports has vastly different demands, as high performance is the end goal for both coaches and athletes. The elite world of sports is brutal, where every advantage can separate competitive success from failure. As this theme was created, the participants started to separate more distinctly, as the Elite coaches and former athletes were more aware of the fact that one must facilitate high performance and that the fewer issues an athlete must consider in training and competitive preparation, the more time and energy one can spend on achieving high-level performance. So, the second theme of this thesis is how to deal with athletes at an international top level, as most participants referenced different aspects that influence female athletes at an elite level (see Figure 6).

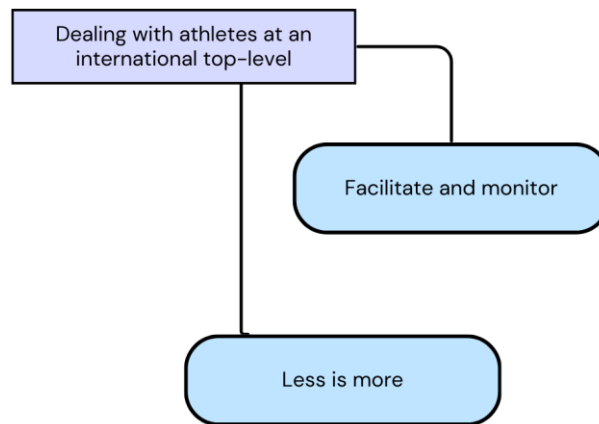


Figure 6: Shows the map of themes related to the aspects of development and performance within female sports.

### Facilitate and monitor

The first sub-theme references how the participants emphasised the importance of monitoring the athletes and facilitating one's ability to compete among the best in the world in their sport. At the highest level, every aspect of training and competition preparation must be as close to perfect as possible; there is no room for factors such as the menstrual cycle to dictate whether the athlete can give 100% effort while competing. This applies to individual and team sports, where each athlete is recognised by their team, and accommodating multiple individuals during competition and training poses significant challenges. When asked about his experiences related to how coaches take the menstrual cycle into account when coaching female athletes, F-TT referenced how other teams do in comparison of how they do it:

*"The best clubs in Europe monitor their players' menstrual cycles. (...) Our medical apparatus doesn't have that capacity, so we choose a different strategy in addressing the issue, which is to educate our players."*

He elaborated on how these factors affect team training and how the challenges with monitoring come when one athlete might have other needs than the team to optimise her

performance levels:

*"How does it affect team training, if we call it that? Not much, precisely because we are a team. You can't optimise solely based on physical parameters for each individual player, when your end product is the team's performance. This means that even though a player might have needed, on that particular day, to train less in isolation, she must participate in what the team does together. Otherwise, the others won't fully benefit from the training. So if I understand you correctly, the common sessions you have on the soccer field, everyone should participate, unless there's something particularly special."*

When asked the same question, H-TT emphasised that there is not always room at the elite level in their sport to take special consideration to certain female-specific factors:

*"One must train a lot to be the best at the level I coach, and that involves a kind of robustness, or at least mental robustness, that one should have when dealing with athletes at an international top level. So, you don't just train to train, but you train to be the best. Then it's not so much about the joy of the activity, but about pushing. You have to push through when you're tired, and when you're in top form, you have to push yourself to reach higher and higher levels."*

He got support from his colleague within the sport, H-BT, who, when explaining what the content of coaching education should be, talked about how to develop mental toughness among female athletes to prepare them for the professional level:

*"We need to know more about what we need to do to develop stronger minds in these women, who can endure more in the coming years. Because there will be a lot of that if we are to live a life in elite sports. So that's where, I believe the main focus should lie."*

Several participants found that pushing the athletes either towards greatness or ruins. This is sometimes a delicate balance as L-TU emphasised, the importance of quality surpasses the focus on quantity:

*"I think it's important to challenge a bit and find out what is optimal when you're at the world's top level, because it's not just about getting 'as much as possible,' but rather getting 'as right as possible.'"*

Contributing to the aspect of getting things right F-TT continued to talk about how in his coaching practices, they try to educate athletes to understand their own body:

*"So we provide them with knowledge about how their cycle affects their bodies, and how they themselves need to consider this in relation to nutrition, training, and recovery. Thus, they monitor their own cycle. And then there is a dialogue between the player and the physiotherapist, physical training, regarding the adjustments required in the training process."*

Knowing what the body is telling you is crucial in sports, especially when your sport is has a higher occurrence of injuries in general. A-BT referenced this in her interview, where she explains how female athletes might be more vulnerable due to the nature of the sport:

*"For women, or rather girls, they often end up in outer positions, that is, out of balance, and then are more vulnerable to impact injuries, especially in the knee. How can we prevent this or make them more resilient? I struggle to provide my athletes with the adjustments they need in this area."*

Understanding the signals an athlete's body provides is crucial, not only for optimising peak performance but also for preventing serious injuries. Several participants agreed that comprehensive knowledge of the challenges that might face female athletes is vital for their performance.

## Less is more

During the interviews with the female athletes, many did not have significant issues with female-specific factors such as the menstrual cycle during their career. Some referenced how

other teammates had issues with their cycle, but these elite athletes did not. When asked how she experienced her coaches considering her menstrual cycle in the training regime, A-Tu captured how she did not have many issues:

*"Fortunately, I didn't have major challenges related to menstruation, but there are many who do. And some have it so bad, like pains and poor sleep. Especially having a lot of back pain, which is an extreme strain to sleep on, and then it hasn't worked out so well for skiing. But I don't have any other experience with it than what I've talked about."*

Svø-TU shared her similar experiences when being asked about it. She explains how she only had minor issues during her career and reflects on how it may have played to her advantage:

*"I've had a very nice career with minor challenges, and I see that it has helped me a lot to get to where I am now, so for my part, no major challenges, but I would perhaps have liked to see better adaptations. Or more focus on injury prevention, maybe even more focus on strength training during the puberty years to be more robust."*

Fri-Tu elaborated on her experience regarding this theme, as she felt that many of the athletes who succeed don't have a whole lot of challenges regarding their menstrual cycle:

*"My experience is that those who don't have significant challenges with menstruation go furthest in sports, and then there's something we're doing wrong or not well enough. We don't want it to be like that, because as I see it, it's a completely random factor."*

Conversely, H-TU referenced instances where she experienced issues regarding her menstrual cycle, and the responses from her coaches did not show an understanding of her troubles:

*"I once went to a regular coach and said that I had terrible back pain due to my period, and that was the one experience like that, you know. I didn't get any response to that, so to speak. It was just like, 'Okay, but good to know, continue.'"*

L-tu could elaborated on the challenges she faced during her career in regards to her menstrual cycle or the absence of her case:

*"Yeah, or in a way my challenge was that I started taking birth control pills when I was 20. And then I gradually lost my period. So for me, it was kind of challenging to figure out why that happened, whether it was due to training or the birth control pills."*

Syk-TU illustrated how she genuinely experienced significant issues that derailed her career in combination with coaches who either did not know better or pushed her too hard against the warning signs from her body:

*"I mentioned that I hadn't had my period for extended periods, and my coaches said that was okay because then we didn't need to consider it. So we didn't talk more about it. I was told that it was not common to bleed when you were training so much. When I then had major problems with a lot of stress fractures, eating disorders, they said I should go to the doctor, this isn't something we can help you with.."*

The participants all viewed the menstrual cycle as essential in dealing with female athletes, as it is a constant variable to consider when attempting to optimise for peak performance in sports. Many reference the gap in knowledge regarding female-specific factors as one of the major obstacles for improving the development of female sport.



## Data Blind Spots

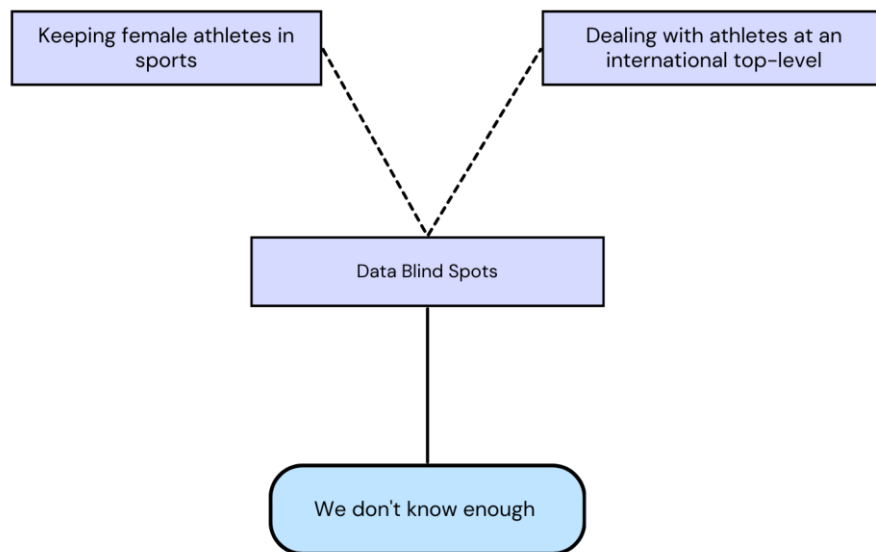


Figure 7: Thematic map showing the connection of the between the themes and the final sub-theme.

### We don't know enough

The last emerging theme is the lack of knowledge regarding female-specific factors, which is the most apparent. Whether asked directly or not, every participant referenced experiencing a lack of knowledge regarding female-specific factors within sports. Several participants expressed frustration that they wanted to make changes to improve female sports, but the knowledge available to make an impact was not there for them. Others elaborated on their encounter with others who did not prioritise these factors. Fri-TT recalled his experiences through a lengthy career and how the topic surrounding female athletes has shifted during his time as a coach:

*"I think historically it's been inadequate. I'm old enough to have been around during a period when it was being discussed: how much should women train compared to men? This evolved into the notion that women should train the same way as men, before it developed into discussions about whether there are things that should lead us to train women differently than men."*

As of the status in today's world of sports, L-TT reflected on his experiences with the general level of knowledge within sports while referencing the sex data gap:

*"I believe that most people know something, but I think there's too little knowledge out there.*

*The knowledge that exists is a bit like what the average person knows. It's not surprising either, because not much research has been done on how girls should perform in elite sports."*

When being asked how she rated her coaches knowledge of female specific factors, F-TU emphasised how the lack of tailoring training exercises towards females felt for her, as the technical aspects of her sport as designed towards male athletes:

*"When I was active, the knowledge wasn't really there at all. All the technical analyses and exercises we did were designed for men and then applied to us. So, I don't really know how relevant these were for us.*

Conversely, Syk-TT rated the level of knowledge among coaches as better than F-TU. He talks about how there are coaches with knowledge at a higher level than he has:

*"I speak with many coaches across the country, especially those who coach female athletes, and I find that their level of knowledge is significantly higher than mine, so it's a bit hard to pinpoint exactly where things stand. But I think the level is too low compared to my potential.  
I don't really know where to get the knowledge"*

L-BT further elaborated on how he believes that the low level of knowledge can be linked to the availability of the knowledge, as many coaches want to learn more on these factors, but can find relevant literature:

*"The knowledge level among coaches is too low, but in my experience, this can just as well be linked to the availability of knowledge. I feel that many coaches are curious about how they can learn to become better acquainted with knowledge."*

## Discussion

The present study aims to a) *to explore how do coaches and female athletes experience different aspects regarding participation, development, and performance in female sports,* and b) *what impact does the sex data gap in sports science have on these perceptions and their coaching practices.*

The findings generated through the reflexive thematic analysis suggest three prominent themes: *keeping female athletes in sports, dealing with athletes at an international top level,* and *the sex data gap* (see figure 4, page 25). These themes illustrate the multifaceted nature of female sports in a Norwegian context. Each theme tackles its own aspect of female sports while still being intertwined with the other themes, painting a complete picture of the different aspects.

### Keeping female athletes in sports

In accordance with Bakken (2019) and Forsyth and Roberts (2018), many participants highlighted the significance of improving female sports participation at an elite and recreational level. The groundwork being laid in understanding how puberty affects adolescent athletes has been recognised repeatedly as one of the most prominent challenges facing female athletes. Athletes and coaches have distinct obstacles due to the significant physiological changes throughout puberty and the heightened demands of daily living.

During her interview, Syk-tu emphasised the need to focus on the female-specific occurring during puberty and how managing these changes and challenges can increase the likelihood of female athletes staying in sports for a longer time through injury prevention and overall well-being. Both McNulty et al. (2020) and Hackney (2023) indicate that the fluctuation of the menstrual cycle is one of the most impactful factors to consider regarding adolescent female athletes, as the different phases change their hormone levels, affecting their energy output, their bodily functions and overall performance.

Svø-TT emphasised the advantages of a shared understanding between coaches and athletes regarding these issues, and how this can encourage open communication and a trusting environment, leading to effective coaching. The literature from Davis et al. (2018) and Forsyth et al. (2022) supports this view, emphasising its importance to encouraging female participation.

However, this is reliant on coaches being willing to seek knowledge to self-educate and making themselves more comfortable with this topic. Some participants expressed discomfort with these factors with athletes, with H-BT highlighting the challenges of addressing menstruation with her athletes. Fri-TU shared her frustration over the lack of guidance for training young female athletes, mainly related to strength training. She noted teaching young female athletes' proper strength training will have a preventative effect as muscular strength plays a role in injury prevention (Malm et al., 2019; Sallis et al., 2001).

Coaches and sports organisations must adopt strategies that encourage both enjoyment and personal growth during adolescence to promote participation among female athletes. Svø-TT examines the impact of emphasising performance and highlights the correlation between the stagnation of female athletes during adolescence and the significant rate of dropout (Forsyth & Roberts, 2018, p. 13; Norman, 2016).

## Dealing with athletes at an international top-level

One of the most nuanced themes that emerged from this study involves dealing with international top-level athletes. The stakes are significantly higher than at the recreation level, demanding more resources and knowledge to accommodate athletes' biological needs. Recent trends in optimising performance among elite female athletes show a growing presence of academic based knowledge influencing different approaches (LaVoi & Baeth, 2018; Rynne, 2014). F-TT referenced this shift by highlighting how the football world has begun monitoring female athletes' menstrual cycles to optimise their training and identify potential underlying issues. This is primarily implemented during training, as it is challenging to show causation for players who seem fit, as their team relies on them.

However, participants agree on the benefits of tailoring training to the menstrual cycles of female athletes. Forsyth Forsyth and Roberts (2018) and Hackney (2023) argue that such consideration can prevent injuries while also enhancing the athletes over all-well-being by addressing their psychological needs during challenging periods. Yet, the link between

maximising performance and acknowledging athletes individual needs becomes clear at the elite level, where there is little room to “ease up”. The top levels of sports demand continuous pushing of boundaries. H-TT recognised this delicate balance, emphasising that elite sports require a different level of commitment compared to recreational sports, where there are more room for flexibility. H-BT adds to this, expressing the importance of developing mental toughness in female athletes who are aiming to reach the top.

Coaches must possess the ability to maintain a balance between motivating and attentively listening to their athletes, as stated by Gosai et al. (2022) and Norman (2016). Creating an environment with honest communication and feedback, is essential for personal and athletic growth. Furthermore, understanding the unique psychological and physiological aspects of female athletes facilitates more tailored and effective coaching strategies, allowing them to thrive in a competitive context.

Nevertheless, this illustrates the inherent blindness of elite sports, which often prioritize immediate success at the expense of long-term sustainability. Hackney (2023); Herzberg et al. (2017); Zazulak et al. (2006) have demonstrated that menstrual cycles might affect knee joint flexibility in female athletes, increasing the likelihood of ACL injury. A-BT emphasized the difficulties involved in preventing such injuries, emphasizing the issue of balancing between pushing players and safeguarding their physical well-being. This emphasizes the necessity for sports programs to acknowledge the long-lasting benefits of preserving athletes' physical health, rather than compromising their well-being in the pursuit of success. Advocating for monitoring the different factors affecting female athletes, facilitating the improvement of female of sports (Hackney, 2023, p. 17).

In the interviews with the former athletes, an interesting sub-theme emerged regarding the impact of female-specific issues on their careers. Many noted experiencing few issues during their professional years, allowing them to easier tailor their training. A-TU reflected on her absence of menstrual-related challenges in her career but acknowledged that she knew many athletes who had significant struggles. Svø-TU reported the same, as she believed that this lack of issues contributed to her reaching the elite level. This aligns with the research of Elliott-Sale et al. (2021) and McNulty et al. (2020), which indicates that the hormonal fluctuation with the menstrual cycle can negatively affect exercise performance. As a result, athletes who experience menstrual issues may be at an disadvantage during competition, encountering more physical strain (Elliott-Sale et al., 2021; McNulty et al., 2020). Fri-Tu

highlighted this disparity, suggesting that athletes without significant challenges often progress further in sport, emphasising how she felt that this wasn't fair as it is a factor athletes have no control over. That being said, some individuals' athletes do possess a more advantageous foundation that contributes to their success in sports. This is no different in female sports as some athletes are genetically less likely to encounter female specific challenges, facilitating a higher level of sport-achievements. This is just a part of life; some people have a different starting point than others indicating that success in sports more attainable for them. Nevertheless, this doesn't mean that the field of sports research should not strive to address these differences, as the sports is a multifaceted domain that encompasses not just achievements but also the enhancement within health.

Conversely, L-Tu experienced significant female-specific complication, losing her menstrual cycle at the early age of 20. She struggled to understand whether the loss was due to the use of hormonal contraceptives or overtraining. Forsyth and Roberts (2018, pp. 21-22) emphasise that menstrual disturbance can be linked to low energy availability and exercise-related factors, potentially causing injuries and impairing performance in strength, endurance and speed (Elliott-Sale et al., 2021). Recognizing and addressing these signals is crucial not only for athletes' performance but also for their overall quality of life. Syk-TU noted in her interview that her coaches dismissed her concerns throughout her career. Despite her body's warning signs, she felt she was not taken seriously, with coaches perceiving menstrual absence as a benefit to training rather than an indicator of underlying health issues.

## Data Blind Spots

The second research question of this thesis aimed to explore the impact of the sex data gap in the field of female sports, as the gap of in research has been well documented in the last decade (Curran et al., 2019; Elliott-Sale et al., 2021; Laxdal, 2023; McNulty et al., 2020). During the interviews all participants referenced either a lack of knowledge in the field or difficulty finding available research to educate themselves. Fri-TT reflected on the evolution of female sports during his tenure, observing how the approach to training female athletes has shifted—from treating them differently than male athletes, to training them in the same way, and now recognizing and focusing on their unique differences to make a positive impact. This view is supported by Gosai et al. (2022) and Norman (2016) who emphasise that there is a need to consider the biological sex of the athletes within sports.

T-BT and Syk-TT observed a general lack of quality knowledge within Norwegian sports, particularly in addressing female-specific factors in sports. This gap often leaves sports professionals at a loss, highlighting an area for improvement in the training and athlete management. Norman (2015) underscores the importance for female athletes to have coaches who genuinely understand and know their athletes' needs to tailor their coaching styles to fit their needs. This need for specificity is further echoed by F-TU, who reflected on her frustrations with tactical analysis and training exercises being designed for male athletes. Conversely, L-TT elaborates about how his extensive network of knowledgeable resources, ranging from fellow coaches, to field experts at *Olympiatoppen*, significantly aids him in designing different strategies to meet the needs of his athletes. However, this support isn't universally accessible, as L-BT, one of the participants noted difficulties in finding relevant information for self-education. He also observed that many coaches who exhibit a genuine desire to stay informed struggled with finding relevant information. This contrast suggests that information is more readily available and easier to obtain at the elite level due to the significantly greater resources accessible for education on topics specific to female athletes, leading to the recreational field being unprepared to handle female specific-issues.

## Limitations and future directions

The results of this study should be viewed with these limitations in mind. The study was done in a Norwegian context, questioning its applicability to other sport cultures. The recruitment of the participants did not focus on having a connection between the participants besides their involvement within the eight sports represented. The participants had no prior relationship, meaning their perspectives did not necessarily reflect shared experiences. This may have resulted in a fragmented understanding of the challenges and the gaps of knowledge related to the study. Future research could benefit from a more interconnected sample group, to provide deeper insights into shared experiences, covering the different aspects within a sports team, organisation, or sports club.

## Conclusion

This thesis researched the different aspects of participation, development, and performance in female sports, while looking at how the sex data gap impacts these perceptions and their coaching practices. By a qualitative approach of reflexive thematic analysis, this study provides an insight into the state of female sports today. A better understanding of the female-specific factors that change during puberty could facilitate an increase in more young female athletes participating in sports and participating longer.

Through the results of the study, the author suggest that the impact of the gap of research related to female athletes is significant, as it affects every single aspect touched upon during the interview process: The different aspects of increasing participation, developing healthy athletes and optimising performance, all hinges on having relevant and updated research available for both coaches and athletes to improve female sports. The results show a clear connection between fostering participation, meeting individual needs among female at the recreational level and developing higher performance at the elite level, but there is a desperate need for more available knowledge. The author of this thesis suggest a more knowledge based approach in the coaching education programs for the recreational level with emphasis and female specific factors. This can lay the foundation for a more healthy developmental focus in female sports, educating coaches and athletes fostering an environment that

This is to better educate every female athlete participating in female sports and their coaches, as there is a significant higher amount of participants at the recreational level in Norway, thereby increasing the amount of female individuals being educated, possibly.

## Disclosure statement

No potential conflict of interest was reported by the author.



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## Appendix 1

Ethical Approval of Research Project from the Ethical Committee for Health and Sport Sciences Faculty at the University of Agder (FEK)

**PROTOKOLL FRA FORSKNINGSETISK KOMITÈ**

Dato: 27/02/2023

Arkivsak: 23/02830

Protokollfører: Berit Birkeland

**Status av kunnskap og erfaring til trenere som trener kvinnelige idrettsutøvere: Hvor skal vi begynne? - phd - Bård Erlend Solstad**

Søknad godkjennes

## Appendix 2

### Information about the Research Project and Consent Registration Form

# Meldeskjema

**Referansenummer**

557936

## Hvilke personopplysninger skal du behandle?

---

- Stemme på lydopptak

## Prosjektinformasjon

---

**Tittel**

Status of knowledge and experience of coaches coaching female athletes: Where should we start?

**Sammendrag**

Dette er et introduserende prosjekt som skal være med å legge til grunn hvilket behov som er blant trenere og ledere i idretten for å utvikle et trenerutdanningsprogram med kvinnelige utøvere i sentrum.

**Hva er formålet med behandlingen av personopplysninger?**

Personopplysningene skal bli behandlet anonymt og kan ikke bli sporet tilbake til deltakerne.

**Dersom personopplysningene skal behandles til flere formål, beskriv hvilke**

Opplysningene skal kun behandles for dette prosjektet.

**Prosjektbeskrivelse**

[Project decription ÅA 15.05.23.pdf](#)

**Ekstern finansiering**

Ikke utfyllt

**Type prosjekt**

Forsknings-/dr.gradsprosjekt

## Behandlingsansvar

---

**Behandlingsansvarlig institusjon**

Universitetet i Agder / Fakultet for helse- og idrettsvitenskap / Institutt for idrettsvitenskap og kroppsøving

**Prosjektansvarlig**

Ådne Ausland, adne\_ausland@outlook.com, tlf: 41269624

**Er behandlingsansvaret delt med flere institusjoner?**

Nei

## Utvalg 1

---

**Beskriv utvalget**

Erfarne trenere og ledere som jobber/har jobbet med kvinnelige utøvere på junior og senior nivå.

**Beskriv hvordan du finner frem til eller kontakter utvalget**

Aktuelle deltakere vil bli kontaktet via telefon og e-post.

**Aldersgruppe**

20 - 70

**Hvilke personopplysninger vil bli behandlet om utvalg {{i}}? 1**

- Stemme på lydopptak

## Hvordan innhentes opplysningene om utvalg 1?

### Personlig intervju

**Vedlegg**

[Intervjuguide 2 trenere sikt.pdf](#)

## Lovlig grunnlag for å behandle alminnelige personopplysninger

Samtykke (Personvernforordningen art. 6 nr. 1 bokstav a)

## Informasjon til utvalg 1

### Mottar utvalget informasjon om behandlingen av personopplysningene?

Ja

### Hvordan mottar utvalget informasjon om behandlingen?

Skriftlig (papir eller elektronisk)

### Informasjonsskriv

[Samtykkeskjema 1b trenere.pdf](#)

## Utvalg 2

---

### Beskriv utvalget

Tidligere kvinnelige utøvere som har vært på toppnivå i sin idrett.

### Beskriv hvordan du finner frem til eller kontakter utvalget

Rekrutering skjer gjennom direkte kontakt via telefon eller mail.

### Aldersgruppe

20 - 50

### Hvilke personopplysninger vil bli behandlet om utvalg {{i}}? 2

- Stemme på lydopptak

## Hvordan innhentes opplysningene om utvalg 2?

### Personlig intervju

#### Vedlegg

[Intervjuguide 2 tid.utøvere\\_sikt.pdf](#)

## Lovlig grunnlag for å behandle alminnelige personopplysninger

Samtykke (Personvernforordningen art. 6 nr. 1 bokstav a)

## Informasjon til utvalg 2

### Mottar utvalget informasjon om behandlingen av personopplysningene?

Ja

### Hvordan mottar utvalget informasjon om behandlingen?

Skriftlig (papir eller elektronisk)

### Informasjonsskriv

[Samtykkeskjema 1b tid.utøvere.pdf](#)

## Tredjepersoner

---

### Innhenter prosjektet informasjon om tredjepersoner?

Nei

## Dokumentasjon

---

### Hvordan dokumenteres samtykkene?

- Elektronisk (e-post, e-skjema, digital signatur)
- Manuelt (papir)

### Hvordan kan samtykket trekkes tilbake?

Det er frivillig å delta i prosjektet. Hvis man velger å delta, kan man når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle personopplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for deltakerne hvis du ikke vil delta eller senere velger å trekke deg.

### Hvordan kan de registrerte få innsyn, rettet eller slettet personopplysninger om seg selv?

Deltakerne vil få innsyn i hvilke opplysninger vi behandler, og å få utlevert en kopi av opplysningene. Deretter får deltakerne muligheten til å: - Få rettet opplysninger om deltakeren som er feil eller misvisende - Få slettet personopplysninger - Sendte klage til Datatilsynet om behandling av personopplysningene

#### **Totalt antall registrerte i prosjektet**

1-99

## Tillatelser

---

#### **Vil noen av de følgende godkjenninger eller tillatelser innhentes?**

- Annen godkjenning

#### **Annen godkjenning**

Etisk godkjenning av forskningsprosjekt ved Fakultet for helse- og idrettsvitenskap ved Universitetet i Agder. Vedlegg for godkjenning vil bli vedlagt så fort den er klar (15. februar)

## Sikkerhetstiltak

---

#### **Vil personopplysningene lagres atskilt fra øvrige data?**

Ja

#### **Hvilke tekniske og fysiske tiltak sikrer personopplysningene?**

- Fortløpende anonymisering

#### **Hvor blir personopplysningene behandlet?**

- Mobile enheter
- Fysisk isolert maskinvare

#### **Hvem har tilgang til personopplysningene?**

- Prosjektansvarlig
- Interne medarbeidere

#### **Overføres personopplysninger til et tredjeland?**

Nei

## Avslutning

---

#### **Prosjektperiode**

06.03.2023 - 30.06.2023

#### **Hva skjer med dataene ved prosjektslutt?**

Data anonymiseres (sletter/omskriver personopplysningene)

#### **Hvilke anonymiseringstiltak vil bli foretatt?**

- Personidentifiserbare opplysninger fjernes, omskrives eller grovkategoriseres
- Lyd- eller bildeopptak slettes

#### **Vil enkeltpersoner kunne gjenkjennes i publikasjon?**

Nei

## Tilleggsopplysninger

---

Søknad fra fakultetets etiske komite vil bli vedlagt så fort vi har fått det godkjent. Prosjektet endres fra fokusgruppeintervjuer til dybdeintervjuer. Det vil bli gjennomført dybdeintervjuer av trenere på topp og breddenivå, i tillegg til tidligere utøvere over 18 år.



## Appendix 3

### Interview Guide - Athletes

**Intervjuguide til deltakere:** Spørsmålene i dybdeintervjuet vil bli delt ut på forhånd, og deltakerne må signere på samtykkeerklæringen før intervjuene startes.

***INTRO:** Velkommen. Vi har et mål om å utvikle en trenerutdanning med kvinnelige utøvere i sentrum. For å utvikle en slik trenerutdanning på best mulig måte har vi et behov for å vite litt mer om dine erfaringer som tidligere toppidrettsutøver. Jeg stiller spørsmålene slik at du kan svare på hvert spørsmål, før vi oppsummerer:*

- **Først starter vi med noen grunnleggende spørsmål:**

- Hvor gammel er du?
- Hvor mange år var du aktiv toppidrettsutøver?
- Hvor gammel var du når du startet?
- Hvilket nivå konkurrerte du på? /evt det høyeste nivået du har konkurrert på
- Hvilken idrett konkurrerte du primært i?

- **Nå ønsker jeg at vi kan snakke mer om dine erfaringer som toppidrettsutøver?**

- Opplever du/har du erfart at er det noen forskjeller mellom treningsinnhold mellom kvinner og menn?
- Opplever du/har du erfart at er det noen forskjeller mellom trenerrollen for kvinnelige versus mannlige utøvere?
- Hva er dine inntrykk av kunnskapsnivået og tilpasningsevnen (hvordan trenere legger til rette for) blant trenere for kvinnespesifikke temaer?
  - Menstruasjonssyklus
  - Svangerskap
  - Kvinnerelaterte skader (tretthetsbrudd, ACL, etc.)
  - Kommunikasjon
  - Samfunnspress/kroppspress
- Hva er dine kilder til kunnskap på kvinnespesifikke temaer?
  - Tilgjengelighet

- **Nå ønsker jeg å høre mer om dine relasjoner med signifikante andre i din idrettssatsing?**
  - Hvordan vil du beskrive forholdet ditt til treneren(e) din(e)?
    - Kommunikasjon
    - Oppfølging
    - Tilpassing
    - Sammenligninger
  - Hvordan snakket du om menstruasjon, selvfølelse og andre «tabu-belagte» temaer med din trener / dine trenere?
  - Hvordan opplevde du støtten og forståelsen fra din trener når du hadde motgang?
  - Hvordan opplevde du støtte og relasjonene med dine lagvenninner?
    - Kommunikasjon
    - Oppfølging
    - Sammenligninger
  - Når du opplevde utfordringer, hvem snakket du med?
    - Hvordan støttet de deg?
    - Hvorfor gikk du til vedkommende, fremfor andre?

*Vi planlegger nå å utvikle et trenerutdanningsprogram med kvinnelige utøvere i sentrum, det skal ha et holistisk perspektiv og vil forhåpentligvis føre til at flere kvinnelige utøvere deltar, utvikler seg og kan få ut sitt potensiale innen sin idrett.*

- **Så vil jeg høre hva tankene dine om den planlagte trenerutdanningen**
  - Hva er spesielt viktig å ha fokus på når man utvikler en trenerutdanning med kvinnelige utøvere i sentrum?
  - Hvilke temaer ville du inkludert? Og hvorfor?
  - Hvordan bør dette temaet bli presentert for best mulig utfall?
    - Innhold
    - Læringsmetoder (MOD)
    - Teori/praksis
    - Oppfølging
    - Innhold

- Hvor stort mener du behovet for å etablere et trenerutdanningsprogram som tar for seg spesifikt kvinnelige idrettsutøvere er?
  
- **Er det noe mer du ønsker å fortelle meg i forhold til det vi har snakket om?**
- Andre erfaringer?
- Noe dere ikke har fått sagt?

*Om det er noe du kommer på i etterkant av intervjuet er dere velkommen til å ta kontakt med meg.*

## Appendix 4

### Interview Guide - Coaches

**Intervjuguide til deltakere:** Spørsmålene i dybdeintervjuet vil bli delt ut på forhånd, og deltakerne må signere på samtykkeerklæringen før intervjuene startes.

***INTRO:** Velkommen. Vi har et mål om å utvikle en trenerutdanning med kvinnelige utøvere i sentrum. For å utvikle en slik trenerutdanning på best mulig måte har vi et behov for å vite litt mer om dine erfaringer som tidligere toppidrettsutøver. Jeg stiller spørsmålene slik at du kan svare på hvert spørsmål, før vi oppsummerer:*

- **Først starter vi med noen grunnleggende spørsmål:**

- Hvor gammel er du?
- Hvor mange år var du aktiv toppidrettsutøver?
- Hvor gammel var du når du startet?
- Hvilket nivå konkurrerte du på? /evt det høyeste nivået du har konkurrert på
- Hvilken idrett konkurrerte du primært i?

- **Nå ønsker jeg at vi kan snakke mer om dine erfaringer som toppidrettsutøver?**

- Opplever du/har du erfart at er det noen forskjeller mellom treningsinnhold mellom kvinner og menn?
- Opplever du/har du erfart at er det noen forskjeller mellom trenerrollen for kvinnelige versus mannlige utøvere?
- Hva er dine inntrykk av kunnskapsnivået og tilpasningsevnen (hvordan trenere legger til rette for) blant trenere for kvinnespesifikke temaer?
  - Menstruasjonsyklus
  - Svangerskap
  - Kvinnerelaterte skader (tretthetsbrudd, ACL, etc.)
  - Kommunikasjon
  - Samfunnspress/kroppspress
- Hva er dine kilder til kunnskap på kvinnespesifikke temaer?
  - Tilgjengelighet

- **Nå ønsker jeg å høre mer om dine relasjoner med signifikante andre i din idrettssatsing?**
  - Hvordan vil du beskrive forholdet ditt til treneren(e) din(e)?
    - Kommunikasjon
    - Oppfølging
    - Tilpassing
    - Sammenligninger
  - Hvordan snakket du om menstruasjon, selvfølelse og andre «tabu-belagte» temaer med din trener / dine trenere?
  - Hvordan opplevde du støtten og forståelsen fra din trener når du hadde motgang?
  - Hvordan opplevde du støtte og relasjonene med dine lagvenninner?
    - Kommunikasjon
    - Oppfølging
    - Sammenligninger
  - Når du opplevde utfordringer, hvem snakket du med?
    - Hvordan støttet de deg?
    - Hvorfor gikk du til vedkommende, fremfor andre?

*Vi planlegger nå å utvikle et trenerutdanningsprogram med kvinnelige utøvere i sentrum, det skal ha et holistisk perspektiv og vil forhåpentligvis føre til at flere kvinnelige utøvere deltar, utvikler seg og kan få ut sitt potensiale innen sin idrett.*

- **Så vil jeg høre hva tankene dine om den planlagte trenerutdanningen**
  - Hva er spesielt viktig å ha fokus på når man utvikler en trenerutdanning med kvinnelige utøvere i sentrum?
  - Hvilke temaer ville du inkludert? Og hvorfor?
  - Hvordan bør dette temaet bli presentert for best mulig utfall?
    - Innhold
    - Læringsmetoder (MOD)
    - Teori/praksis
    - Oppfølging
    - Innhold

- Hvor stort mener du behovet for å etablere et trenerutdanningsprogram som tar for seg spesifikt kvinnelige idrettsutøvere er?
  
- **Er det noe mer du ønsker å fortelle meg i forhold til det vi har snakket om?**
- Andre erfaringer?
- Noe dere ikke har fått sagt?

*Om det er noe du kommer på i etterkant av intervjuet er dere velkommen til å ta kontakt med meg.*



## Appendix 5

## Vil du delta i forskningsprosjektet

### *Trenerutdanning med kvinnelige utøvere i sentrum*

Vi ønsker å invitere deg til å delta i et forskningsprosjekt som fokuserer på utformingen av et trenerutdanningsprogram med kvinnelige utøvere i sentrum. Hensikten med dette prosjektet er å øke forståelsen for hvilke komponenter et slikt program bør inneholde, samt å identifisere de viktigste prioriteringene i utviklingsprosessen. I denne teksten vil vi gi deg informasjon om prosjektets hensikt og hva det vil innebære for deg som deltaker.

#### **Hvem er ansvarlig for forskningsprosjektet?**

De ansvarlige er forskere ved Institutt for idrettsvitenskap og kroppsøving ved Universitetet i Agder

#### **Hvorfor får du spørsmål om å delta?**

Du blir forespurt om å delta i dette forskningsprosjektet da vi trenger kunnskap om dine erfaringer og behov som tidligere kvinnelig toppidrettsutøver for derigjennom å kunne utvikle en best mulig trenerutdanning for å trene jenter/kvinner.

#### **Hva innebærer det for deg å delta?**

Deltakelse i dette prosjektet innebærer å ta del i et dybdeintervju med varighet på 60-90 minutter. Spørsmålene vil bli delt ut på forhånd og intervjuene vil bli gjennomført digitalt eller fysisk med lydopptak.

#### **Det er frivillig å delta**

Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

#### **Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?**

Lydopptakene vil bli gjort om til tekst rett i etterkant av intervjuet, i denne prosessen skjer anonymiseringen av dataene. De uidentifiserbare dataene vil bli lagret og analysert.

#### **Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger**

Opplysningene vi får gjennom dybdeintervjuene vil bli anonymisert og vi vil kun bruke responsene til formålene vi har fortalt om i dette skrevet. Vi behandler opplysningene i samsvar med personvernregelverket.

- Alle anonymiserte data vil bli lagret og analysert.
- Kun prosjektledere og prosjektansvarlig vil ha tilgang til dataen fra intervjuene.
- Informasjon som eventuelt blir publisert fra din deltakelse vil IKKE være mulig å spore tilbake til deg.

#### **Dine rettigheter - Så lenge du kan identifiseres i datamaterialet, har du rett til:**

- Innsyn i hvilke opplysninger vi behandler om deg, og å få utlevert en kopi av opplysningene
- Å få rettet opplysninger om deg som er feil eller misvisende
- Å få slettet personopplysninger om deg
- Å sende klage til Datatilsynet om behandling av dine personopplysninger

#### **Hva gir oss rett til å behandle personopplysninger om deg?**

Ingen personopplysninger vil bli lagret eller behandlet i dette prosjektet, da lydfilene blir anonymisert til tekst i etterkant av intervjuene og lydfilene vil bli slettet.

**Hvor kan jeg finne ut mer?**

Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

- Ådne Ausland, prosjektansvarlig, PhD-kandidat, epost ([adne\\_ausland@outlook.com](mailto:adne_ausland@outlook.com)) eller på telefon: +4741269624
- Monica Klungland Torstveit, prosjektleder, Professor, epost ([monica.k.torstveit@uia.no](mailto:monica.k.torstveit@uia.no)) eller på telefon: +4738141831
- Bård Erlend Solstad, prosjekt co-leder, Førsteamanuensis epost ([bard.e.solstad@uia.no](mailto:bard.e.solstad@uia.no)) eller på telefon: +4790114208
- Johanne W. Lavold, Protection officer, Mail ([Johanne.lavold@uia.no](mailto:Johanne.lavold@uia.no)), Telephone: +4738141328
- The Norwegian Centre for Research Data, Mail: ([personverntjenester@nsd.no](mailto:personverntjenester@nsd.no)), Telephone: +4753211500

Med vennlig hilsen Ådne Ausland

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Jeg har mottatt og forstått informasjon om prosjektet *tittel* og har fått anledning til å stille spørsmål.  
Jeg samtykker til:

- å delta i dette prosjektet
- å ha lydopptak av dybdeintervjuene (blir slettet så fort de er gjort om til tekst)

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet

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(Prosjektdeltaker, dato)

Appendix 6

## Vil du delta i forskningsprosjektet

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