

Menstrual Health Literacy and Turning Toward the Taboo: Coaches' Concerns and
Experiences as They Make Sense of a Female Athlete Physiology Educational Intervention

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Abstract

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Female athletes are increasingly seeking knowledge and support from coaches around the menstrual cycle as it relates to health and performance in sport. Yet few coaches feel equipped to provide this support due to low levels of knowledge around female-specific physiology, communication barriers, and lack of access to female-specific health education. This study qualitatively examined how male and female coaches of female athletes aged 15+ responded to an online education series on supporting female athlete health and performance. Coaches were encouraged to actively apply their learning in their coaching by sharing supplemental handouts and discussing menstrual cycle health with athletes. Coaches then shared their concerns and experiences through surveys (n = 21) and interviews (n = 5). Analysis revealed that (1) coaches were surprised to learn that menstrual cycle health and symptom management is a significant concern for female athletes, (2) coaches had concerns that discussing menstrual cycle health might violate social norms,

gender roles, and/or exceed the scope of their leadership responsibilities, and (3) coaches needed support in translating menstrual cycle health learning into their work with female athletes. Additionally, female coaches (i.e., those with lived experience with the menstrual cycle) were more likely to implement menstrual cycle health awareness in their coaching, as they were better able to relate to female athletes' concerns and experiences with the menstrual cycle in sport. However, even female coaches needed translational support to navigate the social stigma associated with the menstrual cycle. In summary, a working model was co-constructed with coaches to guide education for coaches of female athletes and support coaches in translating female athlete physiology learning into practice.

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Coaches are crucial in shaping athlete experiences in sport (McCleery & Burton, 2023). Through the behaviors they model, the messages they convey, and the culture they shape, coaches can have lifelong impacts on athletes. But a coach's impact on athlete health, well-being, and performance is not always positive (Kerr et al., 2020). Athlete experiences depend on the knowledge, attitudes, and behaviors of the coach (Li et al., 2024).

Increasingly, female athletes are seeking knowledge and support from coaches around the female hormonal cycle— i.e., the menstrual cycle (MC)—as it relates to health and performance in sport (Gopalan et al., 2024). Studies also indicate that MC health education is critical to supporting sport participation in girls and young women (Akanzum & Pienaaah, 2023; Long et al., 2022). Female athletes report that the physiological changes associated with the MC impact their availability to train and compete (Carmichael et al., 2021); their rate of recovery from training (Bruinvels, 2022); and their psychological and emotional well-being (Findlay et al., 2020). These impacts are such that in 2024, Team USA female athletes ranked MC-related concerns as the #1 sport performance topic about which they want to learn (see McCleery et al., 2024). Most critically, female athletes desire supportive team cultures, where they feel safe to openly discuss, and functionally address, MC-related symptoms and concerns with their coaches and support staff (van den Berg & Doyle-Baker, 2025). Coaches, however, feel ill-equipped to provide this support to female athletes due to low levels of knowledge around female-specific physiology (Brown & Knight, 2022) and social discomfort in discussing a “taboo” topic (von Rosen et al., 2022).

Several studies have pointed to the need for MC health education for coaches of female athletes (Clarke et al., 2021, 2024; Forsyth et al., 2023; van den Berg & Doyle-Baker, 2025). Questions remain, however, around how education should be designed, as the social

discomfort associated with the MC, combined with coach-athlete communication barriers, create complex conditions for coaches' learning. This complexity can be seen in coaches' discrepant attitudes around implementing MC health in sport. For example, Clarke et al. (2021) and Hyde and Zip (2024) found that coaches desire MC health education to help them better support female athletes. Yet, Laske et al. (2024) found that coaches' "communication willingness" around the MC depended on the coach's gender, sport affiliation, and perception of cycle-related performance changes. Additionally, Höök et al. (2021) found that some coaches doubt the significance of MC-related impacts on female athletes and, paradoxically, feel that attention to MC health may compromise athlete performance.

These findings suggest that female athlete coach education is needed not only to increase coaches' knowledge around the *science* of female physiology, but also to "bridge the divide" between coaches and athletes (Bergström et al., 2023). While previous studies have pointed to areas of developmental need for coaches, only one known study has tested how coaches responded to female athlete education (Clarke et al., 2024), and no known studies have examined coaches' attitudes around, and experiences with, translating their learning into practice.

In this study, I combine concerns and sensemaking theories to examine how coaches interpret and make meaning of a female athlete physiology educational intervention. I utilize the Concerns Based Adoption Model's Stages of Concern diagnostic tool (Hall, 1979) to examine coaches' concerns around translating their learning into practice. Additionally, I examine coaches' physiological experiences learning about, and discussing, socially stigmatized content.

In this study, I sought answers to the following research questions:

- What concerns do coaches have around implementing female-specific health awareness in their work with female athletes?
- How do coaches make sense of female-specific physiology and menstrual health awareness in sport?
- How do coaches' concerns influence their sensemaking process?

Terms and Definitions

Throughout this study, I use the terms “female” and “woman” to refer to an athlete’s sex, as these are the terms used in cited literature. I acknowledge that individuals’ language preferences to describe their sex or gender identity may vary from the terms used in empirical literature. I also acknowledge that these binary terms are imperfect and fail to recognize the true biological evolution of our human population, a population which includes a spectrum of sex differences. Though imperfect, I use these terms because they are the terms used in associated research, and because they allow me to discuss longstanding inequity in medical, exercise, and sport science research.

As I discuss female physiology, I use the terms “endocrine” and “hormone” synonymously. These terms refer to the human endocrine system—the system through which hormones act as biochemical messengers, sending signals to orchestrate how a human functions, feels, and performs (Haus, 2007). As will be discussed, endocrine/hormone health is critical to the health of all other physiological systems in the human body (Hiller-Sturmhöfel & Bartke, 1998).

And finally, I use the terms “female hormonal cycle” and “menstrual cycle” (MC), synonymously. These terms refer to a complete 28–35-day hormone cycle, which is described in detail in the Background section. As I discuss female athletes’ experience in sport, I use the term “menstrual health”. This term is meant to holistically encompass a

female athlete's physical, psychological, and social-emotional well-being in relation to her hormone cycle, or menstrual cycle. More specifically, menstrual health includes an athlete's ability to *identify* signs of endocrine distress through measuring MC rhythms and the ability to functionally manage symptoms and impacts of the hormonal cycle.

Identities and Positions That Shaped This Work

There are four identities I bring to this work that informed how this intervention was designed and how the findings were interpreted and co-constructed with participants: physiologist, coach, educator, and female athlete. Three of these identities coalesced in a unique way in my 30s, when I was deeply immersed in the bike racing community. At that point in my life, I had completed two degrees in exercise and sport science (physiologist), I was racing at the elite level, and I was coaching female athletes in varying categories. (Bike racing is organized hierarchically by categories or “cats”; Cat 4 denotes beginner level and Cat 1 denotes elite level. Racers earn category upgrades through point accrual, i.e., podium finishes.)

During these years in the cycling community, I began detecting troubling trends. For example, I noticed young female racers would break into the scene as Cat 4s, quickly upgrade to Cat 3 or even 2, and then mysteriously plateau—or worse, begin to backslide. This trend didn't seem to apply to the men's field. At first my awareness of this trend was subtle. But then a poignant moment occurred that set off the alarm bells in my physiologist/coach mind. I was chatting with a fellow competitor after we'd finished a race, and she was noticeably confused and distraught after a string of bad performances. She was backsliding. As she tried to make sense of her performance deterioration, she said to me, “My coach just doesn't know why I'm not getting faster.”

And there were more troubling trends. I witnessed several female teammates/friends and a former partner get diagnosed with Graves', Hashimoto's, or some other thyroid or "auto-immune" disease—which I came to understand was a bucket term doctors were using when they couldn't explain to their patient why their body was attacking itself. My friends' diagnoses had subtle variations, but one striking commonality: their doctors had no answers as to what may have caused the sudden onset of their life-altering disease and no suitable treatment options to offer.

As I observed my friends navigating these heartbreaking and confusing health diagnoses, I began looking for answers their doctors couldn't provide. I didn't find the answers I was seeking, but I did learn that thyroid disease is "extremely common in women" (Redmond, 2004). I learned that women are four times more likely than men to suffer from auto-immune diseases (National Institutes of Health, 2024; Voskuhl, 2011), and twice as likely to experience depression and anxiety (Pavlidis et al., 2022). And I learned that women are far more susceptible to Alzheimer's, dementia, and other neurodegenerative diseases (Mosconi et al., 2018) and, when compared to men, women with neurodegenerative disease experience more severe and precipitous declines (Filon et al., 2016; Pinho-Gomes et al., 2022). Yet, we have no answers around these vexing statistics, because research in women's health lags far behind research supporting men's health (Nature, 2023).

Throughout my years of coaching, I kept trying to find answers. I started experimenting with how I coached female clients. I began screening new female clients for menstrual health, which led to more "a-ha" moments. One woman in her early thirties informed me that she had not had a menstrual cycle (MC) for years. Yet, she was unaware that this was a problem, as her doctor had reassured her that it was "normal" for "active women" to have an irregular MC. Other women had been prescribed oral contraceptives to

“regulate” their MC, so they didn’t even *know* what their cycle rhythms were anymore, as contraceptives create a false bleed which masks symptoms of MC dysfunction (Cheng et al., 2021). As I slowly put the pieces together through the years, the nature of my work changed. Performance coaching evolved into health coaching.

Fortunately, things took a positive turn in 2016 when Stacy Sims, a physiologist from Stanford, released a book on female-specific physiology which described how hormone fluctuations can impact female athletes. With Sims’ book as guidance, I began adapting my own (and willing clients’) training around MC hormone rhythms. I learned I needed to dial back and rest around Day 14, which was when a spike in luteinizing hormone made my legs feel like they’d been filled with lead. I learned to load heavy in Days 2-12, when my legs felt like pistons. More and more, I moved away from the rigid training models I’d learned through my exercise science degrees because, as Sims put it, those models were “designed by men, for men”.

Another step forward occurred in 2018, when Margo Mountjoy and colleagues from the biomedical field introduced a new term: Relative Energy Deficiency in Sport (REDs). At last, we had a model to understand that MC health is connected to the health of *every other* physiological system in the human body. These contributions from researchers like Drs. Mountjoy and Sims revolutionized the biomedical field’s understanding of female athlete physiology. Yet translation lags. Coaches, doctors, and practitioners—the people *working with* female athletes every day—are still unaware of REDs, MC health, and the impacts that the hormonal cycle can have on female athletes.

This study is about bridging biomedical research with coaches’ everyday practices in ways that support the health, well-being, and performance of women and girls. But this work was informed as much by lived experiences as it was by studying biomedical research.

In designing this study, I drew from my “lived expertise” as a female athlete, physiologist, and coach because—in the world of sport science—the lived experiences of athletes offer equal value to that of “scientific expertise” (Thornton & Richards, 2023).

As I work to bridge biomedical science with the everyday work of coaches, I tie in a fourth identity: the educator. Here, I draw from years of observing coaches in the classroom respond to content which is socially sensitive, gendered, and disruptive to the traditional sport norms to which they are accustomed. Through those observations, I learned that simply giving coaches the physiology content is not enough; rather, coaches need support in translating the science into the dynamic, demanding, and unpredictable world of coaching and into a sport ecosystem that was designed for male bodies.

Background

The Menstrual Cycle: A Vital Sign of Overall Health

The menstrual cycle has been deemed a “vital sign” of overall female health and well-being (Henkel, 2019) and a “navigational beacon” for healthy development of young female athletes (Harber, 2011). A healthy menstrual cycle ranges from 28-35 days. Prolonged MC rhythms extending beyond 35 days often indicate “low energy availability” or LEA. That is, the athlete is in a state of caloric deficit, which can lead to a cascade of harm throughout the body. Extreme cases of LEA often result in complete loss of the menstrual cycle. Female athletes who are knowledgeable about MC health can use their cycle rhythms to monitor their health, well-being, and readiness to perform in sport (Hunter & Smith, 2024).

Menstrual Cycle Phases, Symptoms, and Impacts to Sport Performance

A complete menstrual cycle occurs over 28-35 days and includes two phases: the follicular/ low hormone phase and the luteal/ high hormone phase (Sims & Heather, 2018).

Fluctuations in hormone levels can impact several factors associated with human and sport performance, including thermoregulation, recovery rate, neuromuscular control (i.e., reaction time, balance, etc.), how fuel is stored and metabolized, and more (Smith & Orr, 2022).

Female Athletes' Perceptions and Experiences with the Menstrual Cycle

Female athletes report that the hormone shifts accompanying the MC impact both their availability to train and compete (Armour et al., 2020) and their psychological and emotional well-being (Brown et al., 2021). Athletes report myriad MC-related symptoms that impact their experiences in sport and in life, including severe pain, stomach cramps, low mood state and anxiety, tiredness/fatigue, gastrointestinal distress, and slowed rate of recovery from training (Bruinvels et al. 2020; McNamara et al., 2022). Female athletes also report that the shifts between hormone phases impact physical and psychological aspects of their sport performance (Ekenros, 2022; Ergin & Kartal, 2020).

Notably, the impacts and symptoms associated with the female hormonal are highly individualized (Dam et al., 2022; Meignié et al., 2021). Practically speaking, the individualized nature of the MC means that open, healthy communication between athletes and coaches is an important element to athletes feeling supported around menstrual health, as every individual athlete will have unique experiences and support needs with regard to managing MC symptoms and impacts (Bruinvels, 2022). Yet, female athletes are reluctant to seek help around MC-related concerns due to social discomfort, lack of communication and support from coaches, and low levels of knowledge on the topic (Brown & Knight, 2022; Larsen et al., 2020).

Menstrual Health Literacy: Universally Low

Despite the impacts that the female hormonal cycle can have on the lived experiences of girls and women, menstrual health literacy is low worldwide (Holmes et al., 2021). This is rooted in several factors, including absence of menstrual health curriculum in medical schools (Atlas, 2024) and school health classes (King, 2024a), as well as the pervasive stigma, or “taboo”, associated with the menstrual cycle, which creates reluctance to discuss menstrual health (Verhoef et al., 2021). Negative views of the menstrual cycle are, in fact, “ubiquitous throughout the world” (Fahs, 2020, p. 12). According to Olson (2022), “menstrual stigma is so pervasive and deeply embedded that it remains largely invisible ... impacting all spheres of women’s lives including their health, education, economic opportunities, and participation in public and social life” (p. 3).

Low literacy around female endocrine and MC health harms women throughout their lifespan, as it precludes women from:

- navigating healthy pregnancy and post-partum (Kilfoyle et al., 2016),
- managing symptoms of perimenopause and menopause (Atlas, 2024; Mosconi, 2024), and, critically,
- supporting healthy aging of the female brain (Filon et al., 2016; Mosconi et al., 2021, 2025; Pinho-Gomes et al., 2022).

The harms of low menstrual health literacy can be particularly consequential for adolescent girls, as they are in a critical stage of body, brain, and social-emotional development (Oleka, 2019).

Avoidance of School, Sport, and Social Settings

A robust body of research indicates that menstrual cycle symptoms, disorders, and body-related embarrassment lead girls and young women to avoid school, sport, physical activity, and social settings (Bruinvels et al., 2020; Carmichael et al., 2021; Sabiston et al.,

2022; Schoep et al., 2019; Vani et al., 2020). Gopalan et al. (2024) reviewed 25 studies on the impact of symptoms, experiences, and perceptions of the menstrual cycle on cyclically menstruating individuals. Their review found 19 sub-themes of physical, psychological and social impacts that lead girls to avoid school, sport, and social life, including:

- pain and discomfort,
- fear, anxiety, and embarrassment due to visible symptoms,
- fear of being “found out” as menstruating individuals, particularly by male peers,
- low mood or motivation,
- misconceptions that physical activity worsens symptoms, and
- belief that the menstrual cycle is a “time of weakness”.

Long et al. (2022) and Roux et al. (2023) found that low menstrual health literacy was a root cause of absenteeism from school and sport, as girls lack basic knowledge about their own bodies, as well as strategies to manage MC-related symptoms.

The flip side is this: Studies that have tested MC health education in schools have shown that increasing MC health literacy supports girls’ physical and mental wellbeing by reducing stress and improving feelings of self-efficacy (Hossenbaccus et al., 2021; Long, et al., 2022). Studies also suggest that menstrual health education has a destigmatizing effect (Van Lonkhuijzen et al., 2023) and diminishes girls’ and women’s feelings of social isolation (Larsen et al., 2022).

Menstrual Health in Sport: Heightened Risk and Increased Consequences

Athletes are at heightened risk of compromised endocrine health because of the sustained physical and psychological demands that sport training and competition place on the body (Fontana et al., 2022). *Female* athletes face several additional challenges, including the following:

- Menstrual health literacy is low across all sport populations, including female athletes, coaches, and sport medicine specialists (Anderson et al., 2025; McGawley et al., 2023),
- Physicians are uninformed, or misinformed, about female-specific endocrine health, which leaves cases of menstrual dysfunction undetected, undiagnosed or misdiagnosed, and untreated (Ackerman & Misra, 2018; Cheng et al., 2021; Verhoef et al., 2021), and
- Social discomfort creates barriers to open communication, leaving female athletes feeling unsafe to seek support around menstrual health (Majumder et al., 2022; Marais et al., 2022; Schofield et al., 2022).

Additionally, predominant sport training models were designed by and for men, and thus, often misalign with the health and performance needs of female athletes (James et al., 2023; Nimphius, 2019).

She Was The Fastest Girl in America, Until...: A Case Study in Menstrual Health

Stories of health deterioration in female athletes rarely make it into public view. But in 2019, the runner Mary Cain bravely came forward to share her story of psychological and emotional abuse from her coaches with the Nike/Oregon Running Project, the most elite running program in the United States. In a November 7, 2019 interview with *The New York Times*, Cain shared about the incessant pressure she faced from her male coaches to reach an arbitrarily prescribed “goal weight”. As Cain followed her coaches’ prescribed training plan, she pushed her body into a severe state of undernourishment and physiological distress, lost her menstrual cycle for three years, incurred multiple stress fractures, and saw her performance precipitously declining. During this time, her psychological and emotional well-being deteriorated to the point of self-harm and suicidal ideations. Despite Cain’s

visible decline and requests for nutritional support, her coaches remained cemented in the belief that weight loss was the solution to her decline in performance.

The Cascading Harms of Menstrual Health Dysfunction

Deterioration of menstrual health is common in female athletes and, as it did for Mary Cain, can result in “debilitating” effects to overall health and performance (Taim et al., 2023; Vogel et al., 2023). Menstrual dysfunction can occur for several reasons, including excessive training load; low carbohydrate availability (i.e., insufficient intake of carbohydrate-rich foods); low ferritin (stored iron); excessive psychological distress; and low energy availability (i.e., the athlete is expending more energy than they are consuming) (Fontana, 2022; Logue et al., 2020). Often, menstrual dysfunction is rooted in a combination of the above factors, a condition summarized as Relative Energy Deficiency in Sport or “REDs”. REDs, when left untreated, can negatively impact physiological functioning throughout the entire body, including impaired cardiovascular function, immune function, bone health, metabolic function, gastrointestinal health, and social-emotional well-being (Ihalainen et al., 2024; Mountjoy et al., 2023). REDs also impairs human and sport performance, including decreasing muscle strength, glycogen stores (the stored form of carbohydrate), aerobic capacity, coordination and judgement, and motivation to train. Additionally, REDs increases susceptibility to injury and heightens risk of anxiety and depression (Mountjoy et al., 2023).

Mary Cain’s story, and her experience with REDs, illustrate three dimensions of risk that female athletes face: (1) Sport training systems were designed by and for men (Cowley, 2021) and thus can misalign with the physiological needs of female athletes, (2) coaches’ lack knowledge about female-specific health and physiology, and thus fail to recognize when an athlete’s health is compromised, and (3) the field of coaching remains an ungoverned

profession, where no training is required of those in positions of power and authority (Fawver et al., 2020; Taylor & Nash, 2023).

The Harms of an Ungoverned System

Despite being the largest sport market in the world, the United States ranks lowest among peer countries in federal support and regulation around youth sport. The United States also lacks basic safeguards—such as mandated coach training—to ensure youth athlete safety and well-being. In fact, sport remains the only youth and young adult-serving space in the United States that does not require training for the adults in charge (Olson, 2025). This is in contrast to peer countries such as Canada, France, Australia, and the United Kingdom—all of which govern youth sport at the national level and promote sport as a tool for fostering health, well-being, and economic and social development (Aspen institute, 2025). Within an ungoverned ecosystem, most United States coaches lack education in coach-specific domains (Taylor et al., 2016; Hedlund et al., 2018); as a result, threats to child, adolescent, and young adult safety are not uncommon in sport (Mountjoy et al., 2015). Those threats include:

- overuse injuries that limit or prematurely foreclose athletes' participation in sport (Adirim & Cheng, 2003; Dalton, 1992; Dobberstein, 2007; Friesen et al., 2018; Stein & Micheli, 2010; Trojner & Kelc, 2023),
- psychological and emotional harms (Bisset et al., 2020; Pensgaard et al., 2018; Swigonski et al., 2014; Taylor et al., 2022),
- abuse and harassment (Azzi, 2021; Cain, 2019; King et al., 2022; Mountjoy, 2016; Tuakli-Wosornu, 2022),
- sexual assault and violence (Gibbons & Campbell, 2002; Johansson & Lundqvist, 2017; Kim, 2024; Mountjoy, 2019; Reel & Crouch, 2019; Uyehara, 2025), and

- wrongful death (Capacchione, 2019; King-White & Andrews, 2021; Sollestre, 2019).

Without training, even well-meaning coaches can cause unintentional harm, as they are often thrust into leadership and decision-making roles without training or preparation (Vogel et al., 2023). When coaches *are* trained, however, the result is positive outcomes for athletes (Jones et al., 2024). For example, the Aspen Institute (2023) found that athletes who play for trained coaches have higher levels of motivation, satisfaction, and continued participation. Additionally, in a review and meta-analysis of coach education effectiveness, Li et al. (2024) found that coach education improves athlete experiences by increasing coaches' knowledge *and* by shifting coach attitudes and behaviors. Li and colleagues' findings—that coach education can change coaches' attitudes and behaviors—are crucially relevant to this study's goals, as increasing female-specific health literacy will require not only increasing coaches' knowledge of female physiology; it will also require shifting attitudes and norms of silence around menstrual health.

Next Steps: Examining Coaches' Responses to Female Athlete Education

Female athletes feel a general lack of support around their health and performance in relation to the MC (von Rosen et al., 2022). Increasingly, athletes desire education to understand MC symptom management, fueling around the MC, and how (or if) to adapt training around the MC. In fact, in a recent survey, Team USA female athletes from a range of sports ranked MC-related support as the #1 sport performance topic about which they want to learn (McCleery et al., 2024). Most crucially, female athletes desire sport cultures where they feel safe to openly discuss, and functionally address, MC-related symptoms and concerns with their coaches and support staff (van den Berg & Doyle-Baker, 2025).

Despite athletes' desire for education and support around MC health, coaches often underestimate, or are entirely unaware of, the impact that hormone fluctuations have on

female athletes' daily experiences, well-being, and availability to train and compete (Majumder et al., 2022; Stratham, 2020). Additionally, male coaches perceive menstrual dysfunction as unharmful, or less harmful, to overall health than do female coaches (Kroshus et al., 2014). Coaches' behaviors can also misalign with athletes' needs. For example, it is common for coaches in collegiate and elite sport settings to collect athletes' menstrual cycle tracking data through "wellness" questionnaires (Moore, 2025). Yet coaches fail to communicate with athletes how, or even if, that data is being used to adapt or modify training. This behavior is problematic for several reasons: (1) It strains coach-athlete relationships, as athletes feel coaches are collecting their personal health data simply "for the sake of it" (McHaffie, 2022), (2) most coaches are untrained in appropriate and ethical use of sport science data (Rauff et al., 2022), and (3) this practice dismisses athletes' foremost concern, which is to feel supported by their coaches (Donnelly et al., 2024; van den Berg & Doyle-Baker, 2025).

Coaches also illustrate varying attitudes around implementing MC health in their coaching. For example, in 2021, Clarke et al. found that male coaches desire education to understand several MC-related topics, including medical and dietary considerations; impacts to training and performance; how to manage and adapt training around the MC; psychological and emotional impacts of hormone fluctuations; and strategies for recognition and referral in cases of compromised MC health. Yet in 2024, Clarke et al. ran a follow-up study that offered a free, online "short course" for coaches of female athletes. In their follow-up, Clarke suggested that specialized outreach may be needed to recruit male coaches, as their study had a low participation from male coaches. Additionally, while Zipp and Hyde (2024) found that coaches want MC health education to better support female

athletes, Höök et al. (2021) found that some coaches doubt the importance of the topic, while others feel that prioritizing MC health may compromise athletes' peak performance.

To better understand the root of these discrepancies, we must better understand coaches' concerns and experiences with female athlete education. Only one known study has tested coaches' knowledge acquisition after female athlete education (Clarke et al., 2024). No known studies have examined coaches' concerns and experiences translating learning into practice.

In this study, I examine coaches' concerns around, and reactions to, a female athlete physiology educational intervention. I give attention to coaches' willingness to apply their learning by discussing menstrual health with their female athletes, colleagues, or a trusted conversation partner. I employ a conceptual framework which bridges the current literature in MC health with concerns and sensemaking theories. Additionally, I examine coaches' physiological responses to the learning content, as the MC is known to create social discomfort, and social discomfort can create barriers to learning. This conceptual framework, and the theoretical groundings shaping this work, are discussed next.

Theoretical Groundings

This study utilizes the Concerns Based Adoption Model's Stages of Concern (SoC) diagnostic tool and sensemaking theory to form a conceptual framework. Combined, sensemaking and the SoC tool were used to examine how coaches interpreted and made meaning of the educational intervention, including how (or if) they translated the learning into practice. Below, I provide a broad overview of each theory, including how each has been utilized in education.

The Concerns Based Adoption Model

The Concerns Based Adoption Model (CBAM) has been used extensively in K-12 and higher education to both understand and facilitate learning and change (Hao & Lee, 2015; Sanders & Ngxola, 2009). Hall describes CBAM as a framework that “describes, explains, and predicts probable behaviors throughout the change process” (1977, p. 46). CBAM evolved from Frances Fuller's original work in concerns theory, which examined teachers' behaviors during change initiatives (Fuller, 1969). Fuller found that when teachers were tasked with implementing new curriculum in their classrooms, their concerns around the change process depended on their level of teaching experience. Fuller's findings organized teachers' concerns into three stages: self-concerns; task and management concerns; and concerns around impact to students. Subsequent research in concerns theory determined that these varying stages of concern are not exclusive to teachers—these are, in fact, a common human response to change (Anderson, 1997). These seminal works raised awareness that change can be *facilitated* by acknowledging individual learner's concerns.

CBAM is grounded in several assumptions (Hall, 1977):

- Change is a process, not an event.
- Change is driven by individuals.

- How people experience change is highly individual.
- Personal growth and development is an inherent component of the change process.
- Change can be supported and facilitated.

CBAM includes three diagnostic tools: Stages of Concern (SoC), Levels of Use, and Innovation Configurations, which can be used collectively or as individual diagnostic tools (Hall, 1979). This work will utilize the Stages of Concern tool (see Figure 2.1) which is the most heavily used of the three tools (Hall & Ford, 2011).

Figure 2.1

The Concerns Based Adoption Model Stages of Concern Diagnostic Tool (Hall, 1979)

Stages of Concern		Expressions of Concern
"Impact"	6	I have some ideas about something that would work even better.
	5	I would like to coordinate my effort with others, to maximize the innovation's effect.
	4	How is my use affecting my students?
"Task"	3	I seem to be spending all my time getting materials ready.
"Self"	2	How will using it affect me?
	1	I would like to know more about it.
"Unconcerned"	0	I am not concerned about it.

Note. This study utilized the Stages of Concern tool, in conjunction with sensemaking theory, to examine coaches' concerns around implementing female-specific health awareness in their coaching.

SoC has been used as both a quantitative and qualitative research tool to measure educators' attitudes toward implementing an array of innovations, including

- use of computers in the classroom (Brzycki & Dudt, 2005; Dobbs, 2004; Donovan et al, 2007; Mills & Tincher, 2003; Newhouse, 2001; Ward et al., 2002),
- use of e-learning and flipped classrooms (Hao & Lee, 2016; Min, 2017),
- integration of learning management systems (Lochner et al., 2015), and the

- integration of new math curriculum (Christou et al., 2004).

SoC has also been used to measure educators' responses to new teaching styles and strategies (Lueddeke, 1997; Vaughan, 2002); teachers as change agents (Davis & Roblyer, 2005; Finley & Hartman, 2004; Lochner et al., 2015); and faculty developers as change facilitators (Evans & Chauvin, 1993; Roach et al., 2009).

SoC has been adapted to accommodate various research designs, with some studies deploying a single, open-ended concerns question, and others utilizing a tightly structured Likert scale questionnaire (Olson et al., 2020). This study utilizes written, open-ended concerns statements to examine coaches' concerns at two points in their sensemaking process.

Sensemaking Theory

Sensemaking is the process through which we understand, interpret, and assign meaning to new information or events. Sensemaking has implications for how we design education, as it serves as a lens for understanding how individuals receive, interpret, and act upon educational experiences (Johnson & Kruse, 2019). Sensemaking also has unique value as a learning *strategy*, as the process of sensemaking allows learners to connect with new information in ways that feel relevant and meaningful to them (Koretsky et al., 2018; Shulman & Sweitzer 2018). Additionally, infusing sensemaking into learning experiences can support development of equity-oriented leadership skills (Ancona, 2012), which is a central goal of this intervention and research.

History of Use and Core Tenets

Sensemaking theory has been used in a variety of contexts to examine and understand

- human perception and behavior (Ganon-Shilon & Schechter, 2017; Louis, 2009; Reid, 2021; Schechter et al., 2018; Sleegers et al., 2009).

- organizational learning and development (Calvard, 2016; Mokher et al., 2020; Tenkasi & Boland, 1993; Thomas et al., 2001),
- collective action in crisis response (Dailey & Starbird, 2015; Maitlis & Sonenshein, 2010), and
- leadership development (Grisoni & Beeby, 2007; Kjellström et al., 2020; Snowden & Rancati, 2021).

Additionally, sensemaking has been used in education contexts to examine

- educational leadership behaviors (Rigby 2015; Spillane, 2002), and
- how the process of sensemaking can facilitate learning (Coburn, 2005; Dervin, 1998; Fitzgerald & Palincsar, 2019; Koretsky et al., 2018; Zhang & Soergel, 2014).

The social psychologist Karl Weick was the first to introduce sensemaking as an organized framework for understanding individual and collective human behavior. Weick (1995) shared several core tenets of sensemaking theory:

- Sensemaking is about *identity*. It is about who we know ourselves to be in relation to our surrounding communities.
- Sensemaking is both *ongoing* and *retrospective*. We shape new learning and life experiences into meaningful patterns based on our memory of prior lived experiences.
- Sensemaking is both an *individual and social* process. We are driven by our personal needs, motivations, and concerns.
- Sensemaking is *contextual*. The time, place, and people around us all influence how we derive meaning and take action.

Sensemaking Through Frames of Mind

This study draws most heavily from Klein and colleagues (2007, 2023) who describe sensemaking as a process influenced by “frames of mind” (Klein et al., 2007). The concept of frames of mind was formally introduced into Western literature by the sociologist Erving Goffman (1986). According to Goffman, frames of mind are existing mental models, or schemes, that influence how we receive and interpret information. Frames of mind are a coalescence of our cultural roots, educational background, identity, and personal beliefs and values (Brown et al., 2008; Weick et al., 2005). Frames of mind are also highly influenced by our surrounding context, including the time, place, and people with whom we spend our time (Helms et al., 2010).

Importantly, frames of mind are not static. Frames can be swapped out, added to, and refined (Klein et al., 2007). Through education and training, one can expand the “repertoire” of frames they have available from which to select, as well as the “range and richness” of their frames (Klein et al., 2023, p.7). What Klein and colleagues are describing here in theoretical terms is described in neuroscience literature as the process of building new “neural networks” or “neural pathways” in the brain (Eliasmith, 2013). However one chooses to describe it, the outcome is more agile thinking and greater capacity to problem-solve (Ludvik, 2023)—critical capabilities for those serving in leadership positions such as coaching.

Notably, though, this process of building new pathways in the brain requires that a learner can access the executive function regions of their brain—regions which are bypassed if they are feeling a threat of social disconnection (Caine & Caine, 2011). This is a consideration to which I will return when I introduce this study’s conceptual framework, a framework which integrates the physiology and neuroscience of human learning. First, though, I share a brief history of how frames of mind have influenced women athletes.

Framing Effects in Women's Sport

Frames of mind exist on both an individual and societal level, and they are shaped by the context and people around us, both organically and strategically (Starbird, 2023). Over time, certain ideas and beliefs can become embedded in collective consciousness—a phenomenon which Nelson (1997) terms “framing effects”. Historically, messaging around women’s bodies, health, and physical capabilities has been delivered through a deficit frame, portraying women as weak, fragile, and inferior to men. These framing efforts were, at least in part, strategically propagated to force women to conform to societal norms of femininity, restricting them to an isolated life in the home as caregivers (Todd, 1998).

Deficit frames around women’s bodies and capabilities were largely propagated by physicians. Doctors regularly prescribed bed rest for menstruating women to “protect” their health and reproductive function. Doctors discouraged education for women, arguing that the intellectual demands of education would be too much for menstruating women and therefore harmful to their children (Jacobi, 1877). Common belief spread throughout society that a woman’s ovaries would fall out with physical exertion, therefore forcing women to restrict physical activity and engagement in public life (Clarke, 1873).

When examining this troubling history, it can be difficult to disentangle intentional deficit-framing efforts from general lack of knowledge around women’s health and physiology. But that is, in fact, part of the point. With low health literacy comes vulnerability to misconceptions, misunderstandings, and confusion. Even women themselves can become confused about their own bodies, especially when their doctors are ill-informed and misinformed about female endocrine function and menstrual health, a problem which persists today (Atlas, 2024; King, 2024b).

It is reasonable, given the residual harms of deficit framing, that female athletes and their coaches may approach conversations around menstrual health with caution, even skepticism. Increasing female-specific health literacy will require going beyond increasing education access—it will also require healing the harms of deficit framing; pushing against the taboo frame and norms of silence around menstrual health; and, for some, building entirely new frames that bring female-specific health into consciousness.

In the section to follow, I introduce and break down this study's conceptual framework, which aims to serve as a diagnostic tool for examining coaches' concerns and learning needs around female-specific physiology.

A Conceptual Framework for Examining Coaches' Sensemaking

Here, I introduce a framework to examine and understand how an individual coach makes sense of female-specific physiology. This framework draws heavily from the work of Klein and colleagues, who emphasize that sensemaking is “motivated by a person's goals” (2007, p. 151). That is, a person's sensemaking is motivated by their concerns. Additionally, a person's concerns impact their internal biochemistry, brain function, and therefore, their *ability* to learn. With these connections in mind, this framework blends concerns and sensemaking theories while integrating considerations around the physiology and neuroscience of human learning.

In broad strokes, the framework acknowledges that: (1) sensemaking is a process of change; (2) the barriers a coach experiences will depend on their concerns and sensemaking stage, and, therefore, (3) coaches will benefit from strategies and support that correspond with their concerns and sensemaking stages.

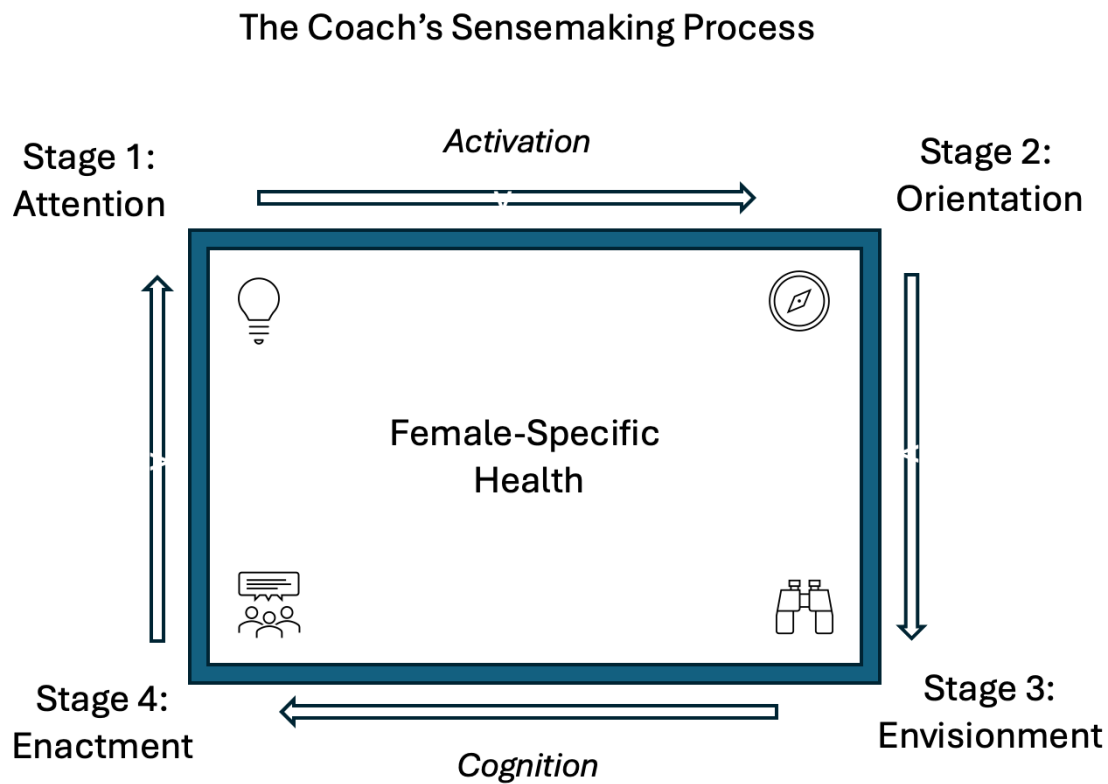
This framework centers the beliefs above, as well as the following tenets drawn from Klein and colleagues' work in sensemaking (2006-2023):

- Sensemaking is a “motivated, continuous effort” (2006a, p. 71).
- Sensemaking is a process through which one “anticipates the future” (2007, p. 120) with particular attention directed toward “problem detection” (2007, p. 117).
- Sensemaking is not about accuracy of information; rather, it is about finding “congruence” between new information and existing frames of mind (2007, p. 120).
- Sensemaking is a process which enables us to “muster resources, anticipate difficulties, notice problems, and realize concerns” (2006a, p. 72).
- Sensemaking “makes action possible” (2006a, p. 72). As educators, we can use sensemaking to support learners in achieving a “functional understanding” (2007, p. 120) of how to apply their learning.

This framework, illustrated in Figure 2.2 breaks a coach’s sensemaking around female-specific health into four stages, beginning with attention and progressing clockwise to orientation, envisionment and finally, enactment.

Figure 2.2

A Conceptual Framework for Examining an Individual Coach's Sensemaking Process



In entirety, this framework represents a coach's sensemaking process around female-specific health. This process includes a coach's thoughts, emotions, concerns, and level of readiness to safely and appropriately enact, or apply, female-specific health awareness in their coaching.

Through my educator lens, I see a coach's sensemaking as a process that can be developed. The aim is to support the coach in progressing through the entire sensemaking process, enabling them to arrive at the enactment stage prepared to apply female-specific health knowledge in ways that support the health, well-being, and performance of female athletes. Of course, there are barriers anticipated with each stage; these barriers are

highlighted below, drawing connections to the background literature, the two theories in use, and to human physiology and neuroscience.

Stage 1: Attention

First, a coach's attention must be activated and their concern registered. This can be challenging for several reasons: (1) There is no centralized, efficient channel of communication for reaching coaches, as coaching in the United States remains ungoverned and unregulated—in other words, it is a challenge to even get the information before their eyes; (2) coaches are a population whose time, energy, and resources are already stretched thinly, as many coaches are serving in a volunteer capacity; and (3) we are trying to engage coaches in a topic (female health) which is known to be “invisible” (Cowley et al., 2021), and therefore often disregarded, dismissed, or seen as insignificant. Additionally, we must capture and retain a coach's attention within a fiercely competitive “attention economy”, where human attention is pulled in all directions (Atchley & Lane, 2014; Lembke, 2021). Therefore, to even get a coach in the door we must offer education that is relevant to their interests, goals, and concerns (Livingston & Cummings-Clay, 2023).

Assuming we have captured a coach's attention, the next step is to trigger their sensemaking and elicit their interest in learning about female-specific physiology. Sensemaking is triggered when a person experiences a sense of surprise (Weick, 1995) or a “moment of untruth” (Klein, 2007, p. 136). For coaches of female athletes, the moment of untruth is expected when they first learn that exercise and sport science research has primarily been conducted on men, by men (James et al., 2023). Here, coaches may begin to question if their “frames were flawed” (Klein et al., 2007, p. 136) as they learn that the sport systems that they thought were designed for *everyone* were, in fact, designed for men.

Feelings of surprise activate one's sense of alertness. This is because the brain is being flooded with dopamine—a neurochemical which greatly enhances attention and memory storage (Duszkiewicz et al., 2019). In other words, triggering surprise for a learner can be the metaphorical equivalent of an assertive yank on the fishing line to “hook” a fish which has just started to bite. To hook a learner, however, the learner must feel psychologically safe to engage in the content, which segues to Stage 2.

Stage 2: Orientation

In Stage 2, coaches are orienting themselves to see how, or if, they fit within the social and cultural context of the learning taking place. This stage is highly driven by self-focused concerns, as the coach may be asking themselves:

- Is it *safe* for me to engage in this taboo topic?
- Is it *my role* to discuss menstrual health with female athletes?
- Do I have the *time, energy, and interest* to commit to this learning?

During orientation, the coach has begun to fit new “data” (i.e., information) into their existing frames of mind (Starbird, 2023). In other words, they are testing the information to see if it is “congruent” with their existing values, beliefs, norms, and sense of identity (Klein, 2007, p. 120). This stage can be tenuous. Sensemakers are already in a vigilant state of “problem detection” (Klein et al., 2006a, p. 120) which can create tension as they grapple with the universal taboo associated with the menstrual cycle (Chrisler, 2013).

To progress through the orientation stage, coaches will need reassurance that it is safe and within the scope of their leadership role to engage in the learning (Carmeli & Gittell, 2009; Edmonson, 1999). This is necessary because humans are physiologically hard-wired to honor social norms and avoid social disconnection (Lam et al., 2021; Ratey & Manning, 2014). For coaches to engage in learning about socially stigmatized content, they

are facing risk of embarrassment, shame, and social awkwardness—all emotions of social disconnect (Gilbert, 2022). These emotions can also impair learning. In fact, even perceived social disconnect can impair one’s ability to access the executive function regions of the brain which enable planning, problem solving, and agile thinking to occur (Cacioppo & Hawkley, 2009).

In addition to navigating social concerns, coaches may also be weighing practical considerations, such as whether they have the time, energy, and available resources to engage in the learning. These practical concerns are described by Klein and colleagues (2007) as the sensemaker’s stance, i.e., their “current workload, fatigue level, and commitment to an activity” (p. 134). For coaches, who are often serving in unpaid or underpaid roles (Aspen Institute, 2022), we can expect that their time, energy, and available resources will be limited.

Stage 3: Envisionment

In Stage 3, a coach begins looking ahead to envision, and perhaps discuss with others, how they might implement menstrual health awareness into their coaching. This stage is important because translating classroom learning into practice requires planning and preparation (Foley, 2013; Thomas, 2007). Importantly, this stage is not about piling on excessive science content (Roux, 2023); rather, it is about encouraging coaches to contextualize the content (Van Oers, 1998)—that is, to consider how applying their learning might look, and feel, in their real-world coaching context (Lakoff, 2014; Roumell, 2019). Through contextualization, a coach can “anticipate difficulties and muster resources” (Klein, 2006a, p. 72; Mahan & Stein, 2014). This step is crucial, as the difficulties a coach faces, and the support resources they have available, will vary with their sport culture, social context, as well as a myriad of other factors.

Envisioning how to contextualize learning is a highly cognitive process. It requires planning, problem solving, and—for coaches of *female* athletes—thinking outside traditional sport norms. In other words, for a coach to successfully progress through the environment stage, their concerns around the risks of social disconnect caused by discussing a socially taboo topic need to have been appeased enough that they can fully engage the problem-solving regions of the brain. Once a coach does access these brain regions, they can begin trying out new frames of mind to consider alternatives to today’s male-centered sport norms (Chong & Druckman, 2007; Klein et al., 2023).

As coaches envision and try out new ways of thinking, they may need guardrails to support their envisionment of safe, ethical implementation of menstrual health awareness. As an example, a guardrail coaches need to be made aware of is that—though many feel compelled to collect athletes’ menstrual cycle tracking data (Moore, 2025) to find “answers”—collecting personal health data simply “for the sake of it” is frustrating to female athletes (McHaffie et al., 2022, p. 637) and harmful to coach-athlete relationships. Additionally, this practice raises ethical and liability concerns, as most coaches are untrained in appropriate use of sport science and health data (Rauff et al., 2022).

Notably, attention to these, and other, frustrations female athletes face in sport requires a coach to evolve beyond self-concern and into an impact-concern orientation. A coach must be able to consider their *athletes’* needs, concerns, and experiences. Coaches also need to be made aware that athletes’ needs and perspectives often differ from those of the coach (McCleery, 2024).

Stage 4: Enactment

By Stage 4, the coach is ready to apply their learning in context. Having envisioned and prepared for this stage, they have a “functional understanding” (Klein, 2007, p. 120) of

how to safely, and appropriately, incorporate menstrual health awareness in ways that align with the needs of female athletes. They have anticipated difficulties and devised strategies for mitigating those challenges. They have mustered support, which may come through an athletic trainer, fellow coaches, a third-party expert, or team captains. Rallying this support is crucial for coaches, as applying any new learning is difficult work (Dobbs Daniel, 1987), but particularly so in this context, as it necessitates that coaches and athletes adopt new routines and social norms (Haskell, 2000).

In summary, sensemaking for coaches working with female athletes is a process that can be developed. The process has emotional, psychological, and highly cognitive components. Coaches will face different challenges at each stage in their sensemaking process, and the nature of those challenges will influence their internal biochemistry, brain function, and therefore, their motivation to apply their learning. Coach education must go beyond delivering the science of female physiology. It must also attend to coaches' need to assess their knowledge; contextualize their learning; anticipate challenges; and to plan and prepare for translating their learning in ways that align with the needs of female athletes.

Methods

Overview

This study was designed through a relativist ontology and subjectivist epistemology—the beliefs that multiple realities can co-exist (Denzin & Lincoln, 2005) and that individuals filter and make sense of information through their prior lived experiences, surrounding context, and emotional state. My intent was to better understand how the social, historical, and cultural context of coaches’ lives influenced how they made sense of implementing female-specific health awareness in sport. In pursuit of that aim, I utilized qualitative design, as qualitative inquiry provides a pathway for understanding individuals’ perceptions and experiences within complex social environments (Smith & Sparkes, 2014). Qualitative inquiry is also best suited for exploring the nature of invisibility (Erickson, 1985), which is a word used to describe problematic mindsets around women’s experiences and needs in sport (Cowley et al., 2021).

Research Questions

This study sought answers to the following research questions:

- What concerns do coaches have around implementing female-specific health awareness in their work with female athletes?
- How do coaches make sense of female-specific physiology and menstrual health awareness in sport?
- How do coaches’ concerns influence their sensemaking process?

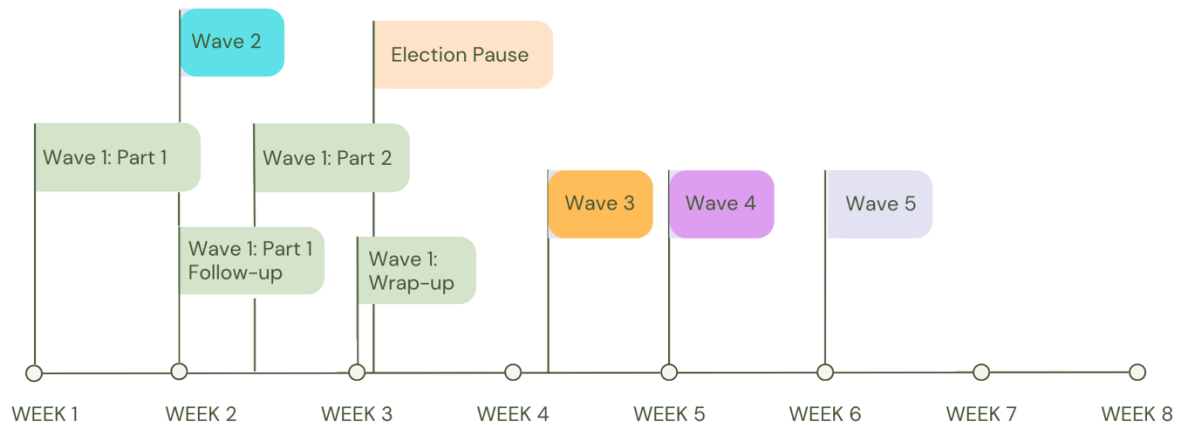
Participant Sample

Inclusion criteria for this research were broad, as my aim was to attract a large and diverse sample of male and female coaches, from a range of sports and varying educational backgrounds. Any coach working with female athletes aged 15+ (i.e., menstruating age) was

encouraged to participate. Sport administrative leaders were also encouraged to participate, as administrators often oversee coach development.

Participant Recruitment

It was anticipated that recruiting coaches for this research would be difficult for several reasons: First, there is no efficient mechanism for identifying and connecting with this population; second, coaches are often juggling multiple jobs and demands, and thus have limited time and capacity; and third, I was asking participants to engage in content that people are reluctant to consider and discuss. To overcome these barriers to recruitment, I utilized a combination of convenience and snowball sampling. I began by inviting approximately 30 known contacts from the collegiate and high school athletics space. Professional contacts were all former participants of coach development courses hosted by the University of Washington's Center for Leadership in Athletics (CLA). These initial known contacts were encouraged to share the invitation with fellow coaches in their network, which initiated the snowball sample. Snowball sampling is known to be an effective strategy for recruiting difficult to reach populations (Noy, 2008). This study's combination of convenience and snowball sampling resulted in five waves of participants over two months' time, as illustrated in Figure 3.1. A total of 41 coaches opted in to this intervention and associated research; of those, 32 coaches were recruited via snowball sampling.

Figure 3.1*Data Collection Timeline via Snowball Sampling*

Note. Snowball sampling was used to collect data from five waves of participants.

Participants were encouraged to move through the learning series in approximately two weeks' time. A 10-day pause was implemented in the days around the United States presidential election, as it was anticipated that distraction from the election could reduce participation.

Opt-In Process

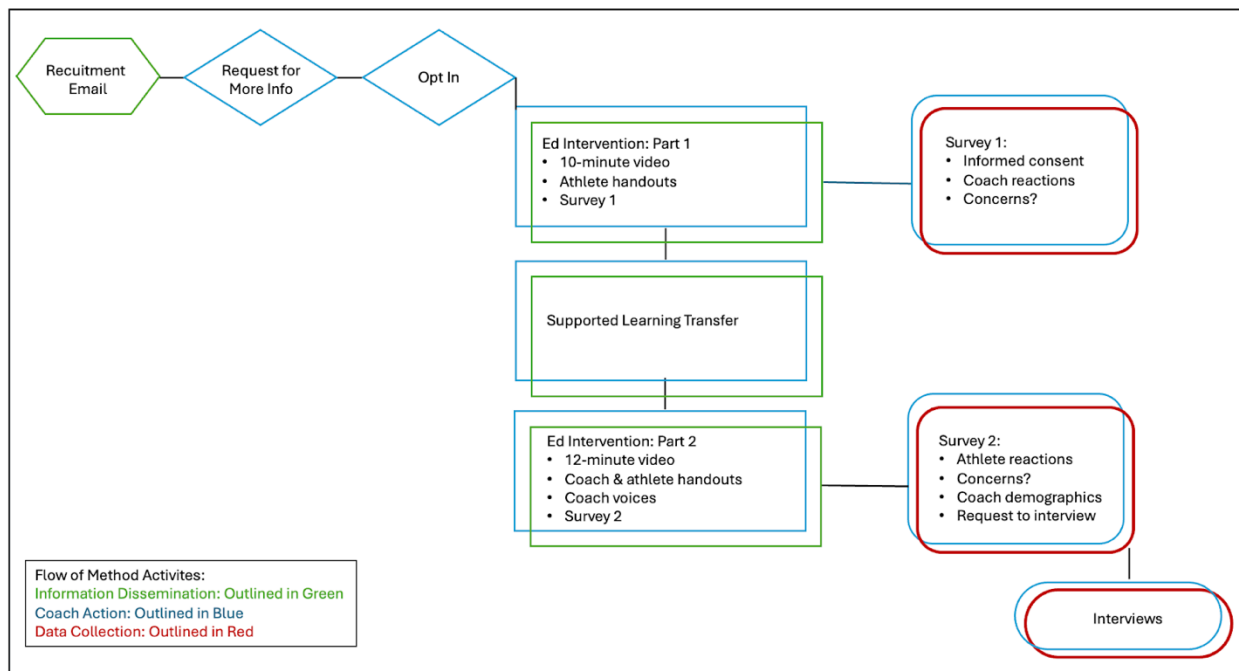
A recruitment flyer was disseminated via email inviting coaches and sport administrative leaders to participate in a "Female Athlete Health and Performance Education Series" (see Appendix A). Participants were required to opt-in to the education series and associated research through two distinct steps: first, by requesting a "more information" email which provided details about the education series curriculum, time commitment and action steps involved, and directions for opting in; then, after having reviewed that informational email, participants were required to opt in to the research by providing their email contact and e-signature. Qualtrics software was utilized to collect

email contacts and e-signatures, and to provide informed consent prior to data collection (see Appendix B).

Educational Intervention Design

Overview

The intervention was broken into two parts and spread over two weeks' time. Learning materials were available asynchronously, giving coaches flexibility to view videos and supplemental handouts at their convenience. Parts 1 and 2 both included an educational video (see Appendix C), handouts to support transfer of learning, and a survey sent out through Qualtrics which served as a metacognitive learning reflection and a form of data collection. Figure 3.2 illustrates the flow of method activities, beginning with participant recruitment and culminating in one-on-one interviews. Method activities are color coded to distinguish between information dissemination (outlined in green), action required of participating coaches (outlined in blue), and data collection (outlined in red).

Figure 3.2*Flow of Method Activities*

Note. Flow of method activities, including participant recruitment and opt-in, two-part educational intervention, and data collection through written surveys and interviews.

Curriculum Design and Content Curation

This study's educational intervention drew from scholarly work in the biomedical fields (Mountjoy et al., 2023; Taim et al., 2023); health literacy (McGawley et al. 2023); and educational leadership (McCleery et al., 2024). The work of McCleery and colleagues' (2024) Female Athlete Voice Project and Stanford University's Female Athlete Translational Research (FASTR) Program (2024) were highlighted in the intervention's teachings and supplemental handouts, as the work of these scholars is oriented toward translating biomedical science into practice. That is, these resources are particularly helpful in supporting coaches and sport practitioners in understanding how to *translate* dense biomedical research in their daily work with female athletes. The Stanford FASTR resources

were shared as supplemental handouts for study participants; coaches were encouraged to share these resources with their female athletes and fellow coaches.

Figure 3.3

Research and Scholarly Work Incorporated into the Educational Intervention

Scholarly Work Used to Design the Educational Intervention

McCleery, J., Diamond, E., Kelly, R., Li, L., Ackerman, K. E., Adams, W. M., & Kraus, E. (2024). Centering the female athlete voice in a sports science research agenda: a modified Delphi survey with Team USA athletes. *British Journal of Sports Medicine*, 58(19), 1107-1114.

McGawley, K., Sargent, D., Noordhof, D., Badenhorst, C. E., Julian, R., & Govus, A. D. (2023). Improving menstrual health literacy in sport. *Journal of science and medicine in sport*, 26(7), 351-357.

Mountjoy, M., Ackerman, K. E., Bailey, D. M., Burke, L. M., Constantini, N., Hackney, A. C., ... & Erdener, U. (2023). 2023 International Olympic Committee's (IOC) consensus statement on relative energy deficiency in sport (REDs). *British journal of sports medicine*, 57(17), 1073-1098.

Stanford University. (2024). Female Athlete Science and Translational Research (FASTR).
<https://fastr.stanford.edu/education/>

Taim, B. C., Ó Catháin, C., Renard, M., Elliott-Sale, K. J., Madigan, S., & Ní Chéilleachair, N. (2023). The prevalence of menstrual cycle disorders and menstrual cycle-related symptoms in female athletes: a systematic literature review. *Sports Medicine*, 53(10), 1963-1984.

Note. This study's educational intervention was designed using scholarly work from various research spaces, including the biomedical field, health literacy, and educational leadership. The work of McCleery and colleagues (2024) and Stanford University's Female Athlete Translational Research (FASTR) Program (2024) were highlighted in the intervention's teachings and supplemental handouts.

The McCleery et al. (2024) Female Athlete Voice Project (Figure 3.4) was shared with coaches during the intervention to illustrate that female athletes ranked menstrual cycle-related sport performance topics in their top concerns. Notice in Figure 3.4 that menstrual cycle-related topics rank #1 and #5 on female athletes' list of sport science topics about which they most want to learn.

Figure 3.4*Results Table from the McCleery et al. (2024) Female Athlete Voice Project study*

Topic name	Topic description	Agreement rating* (mean±SD)
Menstrual cycle symptoms	How the symptoms before, during and after the bleeding phase of a menstrual cycle impact training and performance.	4.58±0.74
Recovery	The impact of female physiology, including menstrual cycle, on the recovery process and the effectiveness of various recovery modalities and approaches, including passive recovery and sleep.	4.58±0.59
Birth control	The short-term and long-term effects of specific types of birth control options, including different oral hormonal contraceptive pills, intrauterine devices, the patch, etc on health, performance and well-being.	4.55±0.89
Mental health	Tools, strategies and interventions that support and strengthen mental skills, training and performance for female athletes with or without potential mental health diagnoses (eg, anxiety, depression, eating disorder, obsessive compulsive disorder and post-traumatic stress disorder).	4.50±0.55
Fueling and the menstrual cycle	How best to fuel at different stages of the menstrual cycle to enhance performance, health and well-being.	4.43±0.74
Fueling and hydration	Sport-specific fueling, supplementation and hydration strategies (timing, macro/micronutrients) while travelling and during different stages of training (in competition, out of competition) and competition (precompetition, during and postcompetition).	4.43±0.67
Physiology and performance	Strategies for optimising training and using sports performance testing that incorporates female physiology to attain peak physical performance over the course of a season and athletic career.	4.33±0.72
Mental health and sports performance	Understanding similarities and differences between sports performance support and mental health support and how, when and where to seek care for each.	4.30±0.84
Team dynamics	The impact of team dynamics and interpersonal relationships between and among athletes, coaches and support staff on performance, physical and mental health and well-being.	4.25±0.86
Low energy availability and REDs	The symptoms and potential health and performance consequences of low energy availability, which is when the body does not have enough calorie intake to account for exercise and the caloric needs of daily life. (This can be inadvertent from an eating disorder or disordered eating, aka REDs or female athlete triad.)	4.15±0.82
Institutionalised sexism	The impacts of institutionalised sexism and/or male-dominated coaching and support staff on female athlete mental health and performance.	4.13±0.98
Pregnancy and postpartum	Training, performance, physical health and mental health considerations during pregnancy and postpartum return to sport.	4.13±1.00
Injury management	Effective strategies for female athletes to decrease injury and reinjury risk and safely return to play postinjury (including those related to fueling, physical and mental training and rehabilitation).	4.13±0.75
Strength training	Female-specific and individualised strength training considerations to optimise performance and reduce injury risk in female athletes.	4.05±0.84

*Agreement rating on a Likert scale, with 1 indicating strongly disagree and 5 indicating strongly agree.
REDs, relative energy deficiency in sport.

Note. McCleery and colleagues were the first to co-construct a research and translational agenda with female athletes in their 2024 study, “Centering the female athlete voice in a sports science research agenda: a modified Delphi survey with Team USA athletes”.

McCleery et al.’s work positioned female athletes as experts on their own bodies, health, performance, and well-being. The results table above (sourced from McCleery et al. paper) was shared with coaches in Part 1 of this study’s educational intervention to illustrate that menstrual cycle related topics are a foremost concern for female athletes from a range of sports (see rank #1 and #5).

Below, I provide a snapshot of the intervention's design and curriculum. Copies of all intervention materials, including written communication with coaches, links to educational videos, Qualtrics surveys, and supplemental handouts can be found in Appendices B-E.

Part 1: The Science of Female-Specific Health and Performance

- Purpose: Introduce the role of endocrine health as a critical aspect of female health and performance; introduce common mindsets associated with female-specific health; share a snapshot of female athletes' perspectives; encourage sensemaking through discussion and sharing of information.
- Format: Email dissemination of a 10-minute educational video (see Appendix C), athlete and coach handouts, and link to a metacognitive learning reflection.
- Content: Causes and indicators of endocrine dysfunction; history and context surrounding female-specific health (e.g., inequity in research; stigma and silence associated with the topic); McCleery and colleagues' (2024) Female Athlete Voice Project to share athlete perspectives; the coaches' role in supporting female athlete health and performance.
- Data collection via Qualtrics:
 - Informed consent; e-signature to authorize data collection
 - What stood out to you from the first video?
 - What (if any) concerns do you have as you consider applying menstrual health awareness into your coaching practice?

Supported Learning Transfer

In between Parts 1 and 2, I followed up with coaches to provide supplemental handouts, key reminders, and encouragement to discuss and apply their learning. Emails

were crafted with the aim of creating a sense of support and connectedness among learners and to help coaches narrow their focus around doable next steps to apply their learning.

Part 2: Coach Voices, Mindsets, and Challenges

- Purpose: Illustrate connections between female endocrine function and sport performance; help coaches feel a sense of community and connectedness in their efforts to support female athletes; encourage sensemaking and reflection around frames of mind
- Format: Email dissemination of a 12-minute educational video; supportive handouts for female athletes and coaches; metacognitive learning reflection
- Content: The menstrual cycle phases and how they can impact sport performance; challenges associated with supporting female-specific health and performance; coach voices video (Daniel, 2022); guidance for supporting athlete attunement
- Data collection:
 - What stood out to you from the second video?
 - How did people respond when you shared the information?
 - What (if any) additional concerns surfaced for you?
 - Coach demographics
 - Request to interview

Research Design

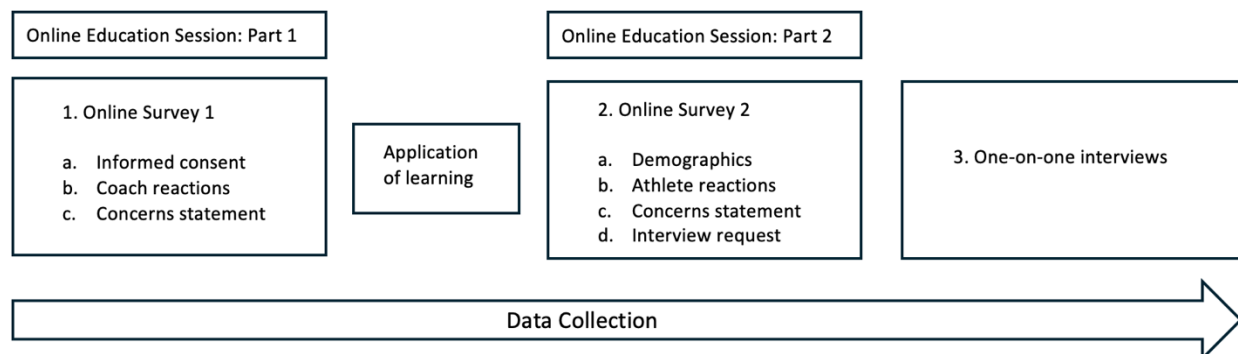
I drew from the qualitative traditions of phenomenological analysis (Smith et al., 1999) and Kathy Charmaz's constructivist grounded theory (2014) in the research design. Through phenomenological analysis (which centers participants' descriptions of their experiences) my aim was to highlight the voices and needs of coaches, which is crucially important to this work, as coaches are the people on the ground working day-to-day with

female athletes. Additionally, though, I wanted to explore beyond coaches' every day, conscious thought. I also wanted to, in the words of Charmaz: "locate participants' meanings and actions within larger social structures of which they may be unaware" (2014, p. 241).

In pursuit of that aim, I integrated constructivist grounded theory, which assumes that meaning, knowledge, and theory are co-constructed by researchers and participants (Charmaz, 2015). This interpretive, co-constructivist approach was appropriate given the interventionist nature of this study. Participants were interacting with, and responding to, my pedagogical beliefs and positions, content curation, delivery, tone, and framing of the content. Additionally, during interviews, I engaged with participants through my identities as a physiologist, female athlete, coach, and educator; thus, data and meaning were co-constructed through these interactions. In blending a phenomenological and constructivist approach, my aim was to create "use-inspired" research and to "provide guidance on social practice and action" (Tracy, 2024, p. 210). That is, my aim was to create practical research that could provide guidance for coaches of female athletes.

Data Collection

Data collection was completed in three sequential stages (Figure 3.5), first through online surveys conducted during the intervention, followed by a one-on-one interview after the intervention was complete.

Figure 3.5*The Three Sequential Stages of Data Collection***Written Surveys**

Surveys were distributed via email and conducted with Qualtrics software during Parts 1 and 2 of the intervention (see Appendix B). Surveys were also used to provide informed consent, to collect e-signatures, to collect demographics, and to request voluntary interview participation.

Through surveys, my goal was to encourage coaches across varying identities, backgrounds, and contexts to engage in the research by offering an accessible, time-efficient feedback format. Surveys were designed to be completed in under five minutes, a detail which was communicated to coaches. I also shared with coaches that their feedback was valued, appreciated, and would be used to inform future coach development courses. That is, I openly shared with coaches about the co-constructionist approach to this research. My aim was for participants to feel involved, valued, and safe to share openly and freely.

Interviews

Participants who completed Survey 2 were invited to voluntarily participate in a one-on-one interview conducted via Zoom (see Appendix B: Request to Interview). Interviews

were audio recorded and transcribed verbatim. Sample interview questions can be found in Appendix G.

Through interviews, my aim was to collect thick data (Geertz, 2008) to gain a deep understanding of coaches' concerns and experiences. I wanted to see how (or if) multiple realities surfaced in coaches' interpretations of, and experiences with, this intervention's content. Additionally, I wanted to draw out elements of coaches' lived experiences that lie below the surface of everyday thought and conversation. It was during interviews and subsequent analysis that I relied heavily on Charmaz's interpretive, co-constructivist approach to grounded theory. Charmaz shares that, within lived experiences, "much remains tacit; much remains silent" (2014, p. 241).

With the aim of extracting this tacit knowledge within coaches, I utilized a semi-structured, open-ended (Gall et al., 2003) interview format. This approach allowed participants to self-navigate (Braun & Clarke, 2013) toward topics most significant to their concerns and experiences. During interview conversations, I was also applying my interpretive lenses, asking coaches probing follow-up questions (Gratton & Jones, 2004) through my various identities. For example, if a female coach self-navigated toward sharing about her former experiences as an athlete, I asked follow-up questions through my identity as a female athlete. Through these interactions, data and meaning were being co-constructed between the participant and me.

Throughout interviews, I relied on reflexive note taking (Finlay & Gough, 2008) and subsequent analytic memos. Later, these notes were foundational to my constructivist-grounded theory approach to analysis.

Analysis

Analysis was iterative and interpretive and blended deductive and inductive methods. Broadly speaking, I looked to identify each coach's (1) stage of concern; (2) sensemaking stage (i.e., attention, orientation, envisionment, or enactment); and (3) any social or contextual factors influencing the coach's stage of concern and sensemaking process.

Throughout analysis, I used my interview notes and analytic memos as an "interactive space" for working with the data, new ideas, emerging themes, and "hunches" (Charmaz, 2014, p. 162). I frequently returned to the data for constant comparative analysis (Glaser, 1965), using notes and memos as tools to identify, develop, and refine themes and emergent theory.

Categorizing Coaches' Concerns

I began with deductive analysis of surveys to identify each participant's stage of concern using CBAM's Stages of Concern tool (Figure 3.6). For example, if a coach was questioning how implementing menstrual health awareness would affect them personally, that was categorized as a "self" concern. Or, if a coach shared concerns around their athletes' needs and experiences, that was categorized as an "impact" concern.

Figure 3.6

The Concerns Based Adoption Model's Stages of Concern Diagnostic Tool (Hall, 1979)

Stages of Concern		Expressions of Concern
"Impact"	6	I have some ideas about something that would work even better.
	5	I would like to coordinate my effort with others, to maximize the innovation's effect.
	4	How is my use affecting my students?
"Task"	3	I seem to be spending all my time getting materials ready.
"Self"	2	How will using it affect me?
	1	I would like to know more about it.
"Unconcerned"	0	I am not concerned about it.

Note. Coaches' concerns were deductively analyzed using the Stages of Concern rating scale.

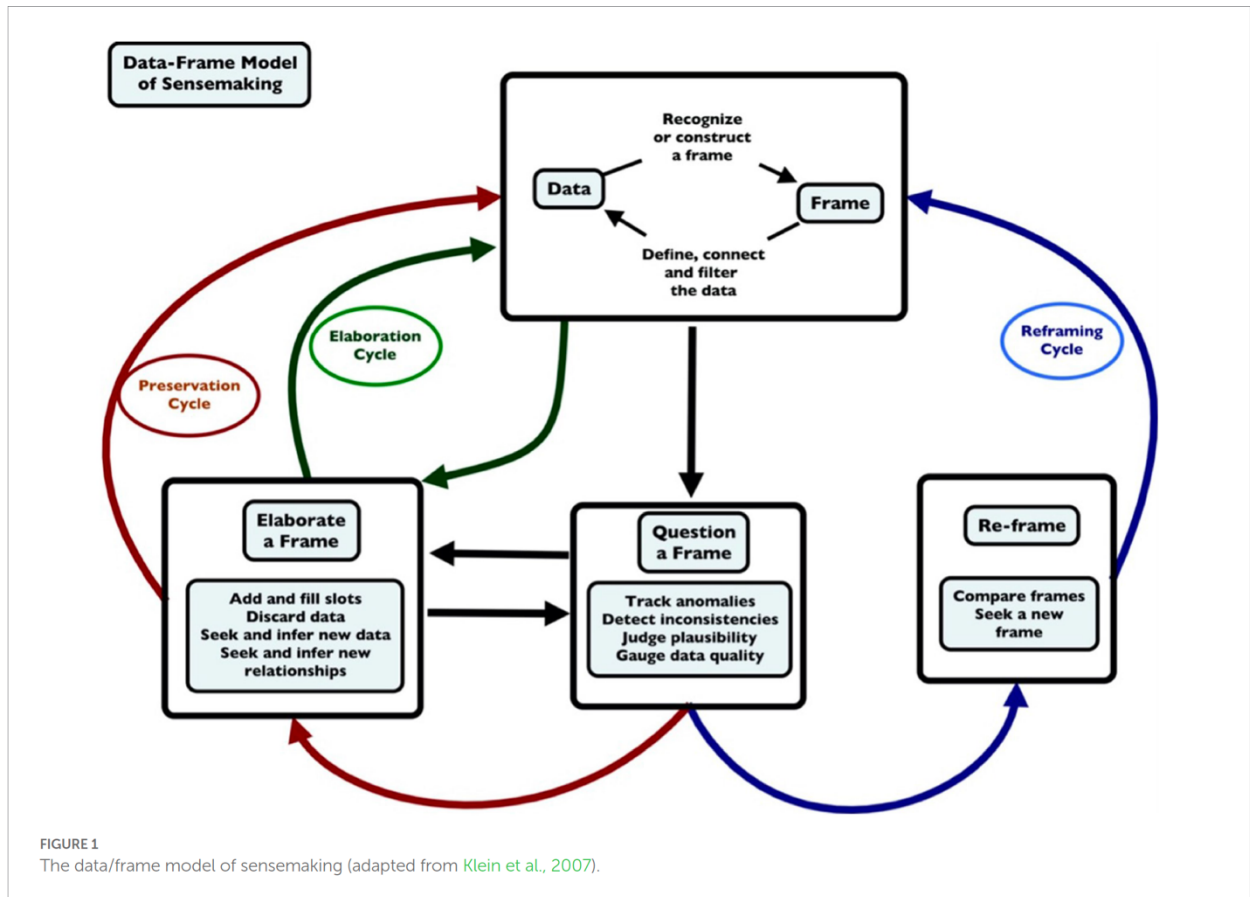
As data accrued, I incorporated reflective thematic analysis (Braun & Clarke, 2022) to categorize themes that emerged in coaches' concerns. Additionally, I used comparative analysis to look for "divergent or competing" patterns within coaches' concerns (Stratton, 2024, p. 78). For example, I looked to see if diverging patterns emerged between a coach's concern stage in relation to their sex identity and/or their sport affiliation.

Categorizing Coaches' Sensemaking Stage

I used a combination of deductive and inductive methods to examine and analyze coaches' sensemaking process. Early in analysis, I referred to Klein et al.'s (2023) Data-Frame model of sensemaking (Figure 3.7) to broadly categorize each coach's sensemaking stage as preserving/elaborating, questioning, or reframing.

Figure 3.7

Klein et al.'s (2023) Data-Frame Model of Sensemaking



Note. Early in data analysis, I referred to the data-frame model to categorize each coach's sensemaking stage as preserving/elaborating, questioning, or reframing.

Broadly speaking, I defined these stages as

- **Preserving/elaborating:** the coach was adhering to traditional sport norms that dismiss female-specific health needs.
- **Questioning:** the coach was considering implementing female-specific health awareness into their coaching, though they were not yet convinced that this step

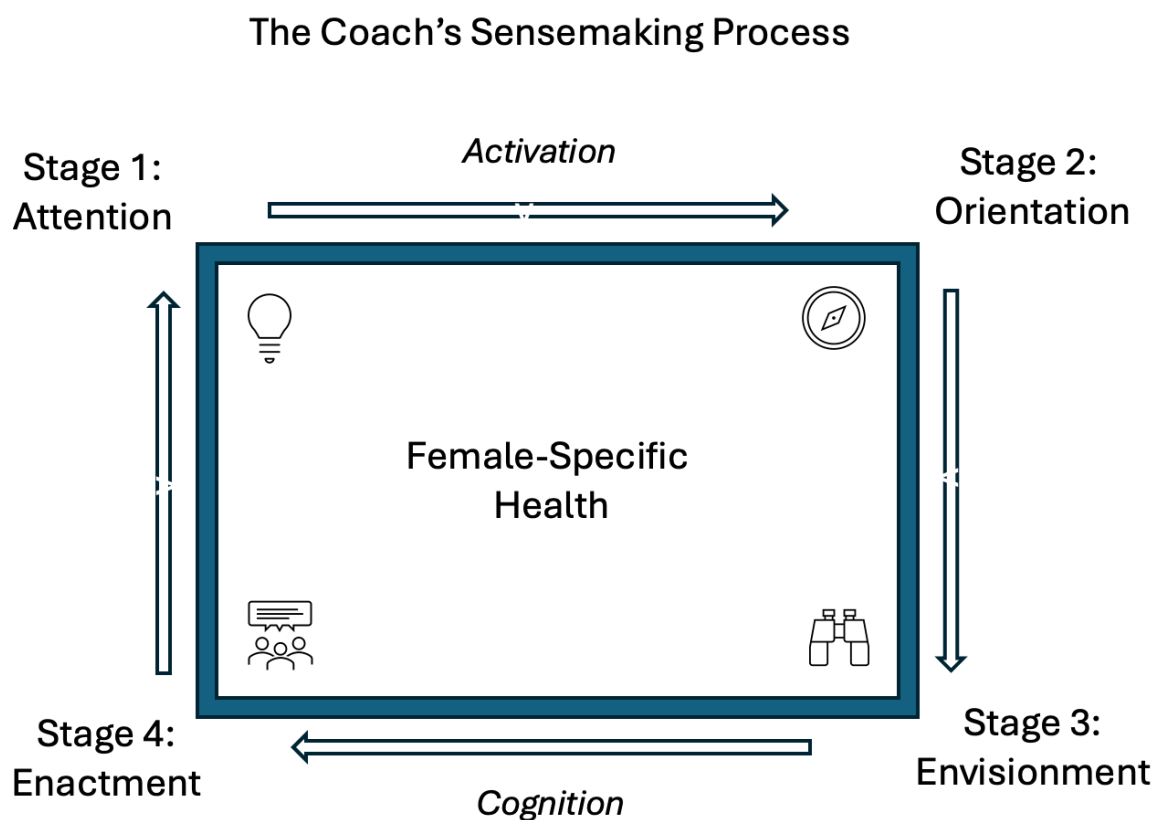
was appropriate. This often meant the coach was seeking additional information or questioning if they would face push-back from athletes or the surrounding community.

- **Reframing:** the coach was actively implementing female-specific health awareness into their coaching.

During interviews, as themes and theory began to emerge from the data, I evolved these broad sensemaking categories to align with what I was finding in the data. This iterative process led to the creation of my conceptual framework (Figure 3.8) and to an “increasingly analytic” approach to working with the data (Charmaz, 2014, p. 165).

Figure 3.8 (repeated from Figure 2.2)

A Conceptual Framework for Analyzing an Individual Coach’s Sensemaking Process



Note. This framework, which evolved out of Klein et al.'s (2007, 2023) data-frame model of sensemaking, was used in the later stages of analysis to closely diagnose each coach's sensemaking process around female-specific health and physiology.

Using this framework, I began categorizing each coach's sensemaking as attention, orientation, envisionment, or enactment—stages which factor in the coach's concerns, behaviors, and, in some cases, their physiological responses. For example, if a coach expressed anxiety and unwillingness to discuss menstrual health due to social stigma, they were categorized as being in the orientation stage. That is, the coach was contemplating their position and role within the social and cultural context of the learning content. Or, if a coach shared that their athletes responded positively to the athlete handouts shared as part of the intervention, that coach was categorized as being in the enactment stage. That is, the coach was actively transferring their learning into their coaching practice.

Rigor

To ensure reflexivity and rigor throughout this iterative process, I continued returning to the data well in the writing process to re-examine and refine themes and emerging theory, look for outliers, and make comparisons across and between the data through constant comparative analysis. I shared emergent themes and theory with a critical friend (Smith & McGannon, 2018) to check and challenge my interpretations of the data. Additionally, once themes and new theory were coherently developed, I conducted member checks (Tracy, 2010) with interview participants to check my interpretations.

Findings

Forty-one male and female coaches from a mix of power and endurance sports opted into this educational intervention and research. All participants were coaching female athletes aged 15+. Twenty-one participants completed Survey 1; ten completed Survey 2; and five volunteered to interview. My initial aim was to stratify the interview sample with an equal mix of male and female coaches from a mix of endurance and non-endurance sports. However, only female participants volunteered to interview. Additionally, the volunteer interview sample was weighted toward endurance sport coaches (whose sport affiliations are shared in Table 1).

Coach demographics (e.g., gender identity, sport affiliation, age of athlete population, and years coaching) were collected only in Survey 2. However, coaches often self-disclosed demographic information in Survey 1 as part of their concerns reflection (e.g., coaches' reactions and concerns were often connected to their gender identity and/or their sport affiliation). Demographic information is shared in the findings when it is known. Findings are organized by survey themes, which are shared next, followed by interview narratives.

Surveys

Three themes emerged within survey responses: (1) coaches' surprise regarding female athletes' needs and concerns related to the menstrual cycle (MC) in sport, (2) coaches' personal concerns that implementing MC health awareness might violate social norms, gender roles, or leadership scope, and (3) coaches' need for support in discussing and implementing MC health awareness in their work with female athletes.

Theme 1: Surprise: This is important to female athletes?

Survey Prompt: "What stood out to you from Part 1's video?"

Coaches were surprised to learn that the impacts of the MC are a primary concern for female athletes. Many coaches were surprised by the McCleery et al. (2024) findings that Team USA female athletes from a range of sports ranked MC symptom management and fueling around the MC as the #1 and #5 sport science topics about which they most wanted to learn. Coaches expressed surprise by athletes' high level of *interest* in the topic, with one coach stating, "I was surprised that female athletes most want to know about menstrual health." There was also surprise expressed that athletes feel significantly *impacted* by menstrual cycle symptoms, with another coach stating, "I was surprised to learn that so many athletes are experiencing these symptoms." A third coach shared, "I was surprised to know that many female athletes want to know about how to cope with their menstrual cycle." Another coach was particularly surprised that low MC health literacy extends into elite (Olympic) sport settings, as elite sport environments often have higher levels of education and support resources for athletes:

What stood out to me was that Olympic athletes listed learning about the impact of the menstrual cycle on their performance as the highest priority. I think that demonstrates the lack of information that has been available to even the best female athletes. It surprised me because so much performance data is collected on top tier athletes and so you would expect that the data about the impact of their menstrual cycles would be available to them.

Several coaches reflected on their own, or coaches' collective, lack of awareness that MC-related concerns were common for female athletes. One coach stated, "I was surprised that female athletes most want to know about MC health. Apparently it's more common than I thought." Another shared, "I am surprised REDs isn't talked about more often. It

should be one of the first talks coaches have with their athletes”. Another reflected on not having “engaged more with this information” when she wrote:

I am surprised that I hadn't engaged with this information more as a coach. There have been moments in my career where it has come up and I can recall telling my teams that loss of MC is not normal and can be a red flag. However, I really didn't seek out more information about the impact of the MC on other areas of sport performance. I am interested in and curious to learn more.

Some coaches were surprised and incredulous that symptoms of the MC impact female athletes in sports other than endurance sports.

I was surprised to know that so many athletes are experiencing these symptoms. I coach a sport that is not an endurance sport, and I wonder if less of the players I interact with deal with this or if it's because they aren't sharing it with me.

Another coach expressed similar confusion: “I know the main studies have been on endurance athletes (runners) but I would be interested if research starts to look at other sports.”

These coaches may have been reflecting on a statistic shared early in Part 1’s video, that 44% of female high school runners surveyed believed that complete loss of the menstrual cycle was a normal part of sport training. Importantly though, findings from the McCleery et al. (2024) Female Athlete Voice Project were shared minutes later in the video *specifically* to illustrate that female athletes from a *range* of sports rank MC symptom management as a primary concern and area of learning interest.

Theme 2: Social Norms, Gender Roles, and Scope of Practice: Is this my role?

Survey Prompt: “What (if any) concerns do you have about implementing menstrual health awareness in your coaching?”

Many coaches expressed concerns that openly discussing MC health might violate social norms, gender roles, or the boundaries of their leadership responsibilities. Here, a male ultimate frisbee coach shared how he felt “anxious” that discussing menstrual health might negatively impact his relationship with his female athletes:

I am a man and while I am becoming more comfortable with this subject, through education and consumption of resources, I am anxious about how comfortable my team would be with discussing the subject with me. I am close with the players I coach, we commonly discuss other health issues like more traditional injuries, again though, I am unsure how they would feel discussing this with me.

Another male coach expressed concern that his athletes’ “perspectives” of him might change if he discussed menstrual health, “As a male, I am concerned because I don’t want my female athletes to have a changed perspective on me.” Male coaches also felt concerned about pushback from the surrounding community. Here, a male volleyball coach who was also a health and physical education teacher shared concerns about reactions and “pushback” from the broader community:

My main concern is that I will get pushback from parents and other community members. I will be teaching this content in health and PE classes where there are many genders present. I anticipate some resistance from the male members of the cohort.

These concerns about negative reactions from mixed-gender communities were shared by another participant, though this coach’s concerns were centered about negative impact to the girls in the community:

Many of the female athletes in our sport play on mixed gender teams, partly by choice and partly because there just aren't enough female athletes to form enough

girls-only teams. I wonder how to best present this information. While it could be beneficial for the boys to be aware, a mixed setting might be too embarrassing for the girls at their current ages.

Concerns around social norms and gender roles were not exclusive to male coaches, however. One female coach simply shared that “no one at my school talks about this”, regardless of their sex or gender identity. Another female coach for high school girls’ rowing felt it was important to debunk any misconceptions that only males feel uncomfortable discussing the menstrual cycle: “There's going to be this biased assumption of like, yeah, women are, you know, killing it. And I guarantee that's not the case. Plenty of females are not going to talk about this.”

One female coach stood apart from other survey respondents in her comfort with the topic: “I am a woman and the mother of two adolescent girls. I am not embarrassed or uncomfortable with any of these topics”, though she did express concerns that “other coaches” may not be equipped to discuss menstrual health: “But I do wonder if other coaches with different skill sets or backgrounds would effectively deliver this message”.

A particularly notable comment around gender norms came from a female volleyball coach and HPE (Health and Physical Education) teacher. Here, she expressed concern for her male colleagues, noting how they might be seen as “creepy” if they discussed menstrual health with female athletes or students:

I really feel for male colleagues, because there's this fear that you'll be seen as creepy, or like invasive, or like meddling too much with female athletes. As teachers and coaches, it's kind of drilled into you, like, don't overstep your boundaries, don't touch athletes too much. You've got to be really careful. And I think for male

colleagues especially, there can be a fear that they will be considered crossing a boundary if they talk about menstruation.

This coach's comment, that teachers and coaches must be "really careful", illuminates the weight of some coaches' concerns, and how those heavy concerns might create barriers to implementing female-specific health awareness in sport.

While most coaches' concerns centered around identity, social norms, and gender roles, one coach was concerned that athlete education around menstrual health might lead to athletes making "excuses" about their performance:

The topic is something that my athletes talk about with me mostly on bad days when they feel like they can't perform. While I think this topic should be an open topic to discuss, I don't want athletes to think they should be using it as excuses in their performance.

Theme 3: The Need for Support

In varying ways, coaches expressed a need for continued or more expansive support in learning about, and applying, MC health awareness with their teams. Several coaches expressed a need to connect with and learn from fellow coaches, especially in regard to overcoming fears of violating social norms. One coach shared, "I liked seeing another coach (Broderick) and how he feels about this information and his approach. More examples like that would be helpful in future videos." This coach was responding to the "coach voices" component of Part 2's video, in which a male coach, Broderick, shared about his experiences learning about and then discussing menstrual health with his female athletes. Other study participants also found Broderick's story helpful, with one coach stating, "It's helpful to see somebody else struggling through those same points." Coaches shared that seeing and

hearing another coach's "struggle" helped them to feel "less alone" in the challenges and discomforts that accompany implementing menstrual health awareness in sport.

Coaches also expressed a need for tangible resources, particularly around guiding healthy communication with female athletes. Some coaches expressed this need for support resources through appreciation (which they delivered through the "additional feedback" component of the surveys). Examples included, "I'm looking forward to more handouts." and "I appreciate the handouts." Interviewees also expressed appreciation for support resources: "The handouts were super helpful." "I like how the handouts were accessible for the athletes". "It was nice to have handouts to post for the athletes." One survey respondent, on the other hand, expressed in their concerns statement that the intervention's handouts were insufficient for the level of support they needed, "Honestly, I was expecting more handouts that I could share with my female athletes."

Whether expressed through concern or through appreciation, these responses indicate that coaches need support resources to guide their efforts in applying menstrual health awareness in their work with female athletes.

I Lived It, Let's Talk About It: Lived Experience as a Differentiator

Five female coaches stood apart in this study's findings in several ways:

1. All were familiar with the concept of MC health in sport through former lived experiences *as female athletes*.
2. All were anchored in concern for the health and well-being of their athletes.
3. Each implemented MC health awareness in their coaching during the intervention.
4. Each had established some level of community support.

5. These five female coaches were the only study participants to volunteer to interview. These factors differentiating the '*I Lived It*' coaches from other study participants are illustrated in Table 4.1.

Table 4.1

Factors Distinguishing the 'I Lived It' Study Participants

Main Group (n = 16): <i>Surprised and Disoriented</i>	Interviewees (n = 5): <i>I Lived It, Let's Talk About It</i>
Mix of male and female coaches from power and endurance sports	All female (two high school x-country/track; two high school rowing; one middle/high school volleyball)
Survey-only participants (opted out of interview)	Volunteered to interview/ open to discussing lived experiences
Expressed surprise by female athletes' needs and concerns around MC-related topics	Illustrated familiarity with MC health in sport through lived experiences as coaches <i>and</i> as female athletes
Questioned relevance of MC-related impacts to athletes in their sport	Reported having discussed MC health with female athletes
Expressed concerns about social norms, gender roles, and/or the bounds of their leadership responsibility	Expressed concern for athletes' holistic health and well-being
Indicated that self and identity-related concerns created barriers to applying MC health awareness in their coaching	Reported nascent or established support systems
Expressed need for additional support	

The '*I Lived It*' coaches' former experiences as female athletes deeply influenced how they made sense of this intervention, as becomes apparent through their narratives. Four of their stories, which were selected for having been richest in depth and detail, are shared here.

Coach Jackie and The Battle with Fertility: "I felt like I was wronged."

Coach Jackie came from a background in public health and had been coaching girls' rowing for over 15 years. Jackie was actively implementing MC health awareness in her

coaching; however, as she highlights in her story below, the process she went through increasing her female-specific literacy and comfort in discussing menstrual health had been developed over multiple years.

In Coach Jackie's story, notice how she shifted between multiple sets of "shoes"—in one moment she would be in the shoes of her former athlete self, many years prior; then, on a dime, she would shift into her coaching shoes of today, or even into the shoes of the female athletes she supports. Jackie began by sharing that she had not learned about female-specific health in school. She then quickly pivoted into her leadership shoes of today, expressing concern that girls must navigate the same gaps in health education that she experienced years ago:

I didn't learn it in public school. I mean, I work at an independent school, and I think they spend one day on it. And that's not enough, because one, if you miss that day, you're screwed. And also, if you're uncomfortable on that day, you're also screwed.

Jackie then went on to describe how limitations in doctors' knowledge left her feeling confused and dismissed. Here, Jackie is back in the shoes of her younger self, sitting in her doctor's office: "My doctors never talked about it. Like never. Like nothing. No education on menstruation. What regular menstruation looked like."

Some may wonder what Coach Jackie meant by saying "what regular menstruation looked like". This comment is crucially important when considering female athlete health, as many female athletes are unable to distinguish between "normal" menstrual cycle rhythms and rhythms that are indicative of endocrine (i.e., hormone) dysfunction. For example, as shared in the background section, many female athletes believe that complete loss of their menstrual cycle is a normal part of sport training. As Coach Jackie shared, though, girls are not taught what "regular menstruation looks like", which can leave girls unable to monitor

their own health. Here, Jackie described having been unable to monitor her own health as a young female athlete:

When I went through an eating disorder, I had no idea. And like when I was doing lightweight rowing, I had no idea of the problems, of what was happening to my body as a result of those...you know...that time period. So I feel like there was a disservice to me by a lot of people who were in my life who were trusted authorities.

Later, Jackie elaborated on this “disservice” to girls and women through a different lens—that of a woman in her 30s trying to start a family. “I didn't get pregnant for years because I literally thought that you could only get pregnant when your period started. I was 35. Okay? I didn't get pregnant until 38.”

But then Jackie went on to describe a turning point in her life. As she struggled to get pregnant and was unable to find answers from her doctors, she began a quest to find her own answers:

I got educated because I was trying to get pregnant. And I needed to figure out what the hell was going on with my body. And then I started reading, and I started learning. But it was tough because, you know, not a lot of literature.

Jackie's reference to “not a lot of literature” highlights how difficult it can be for girls and women to access female-specific health information, largely because research in women's-specific health lags far behind research in men's health. Here, Jackie described how she felt “wronged” by the lack of access to female-specific health information and how that feeling has shaped her beliefs around educating girls and women:

My belief system about the need to educate young women changed in a huge way when I struggled to get pregnant. I feel like I was wronged. I feel like there was a wrong committed against me that nobody educated me.

As our conversation carried on, Jackie continued to connect her experiences of having been “wronged” to the ways she wants to make things right for the high school girls she coaches today. Here, Coach Jackie reflected on the boundaries and scope of her leadership role:

I don't talk about fertility with the 14- to 18-year-olds I coach. That's not my role. But I do feel like my role is to provide them with the information so that they can feel more powerful in their own bodies. That's what changed. I wanted them to feel knowledgeable so that they could feel powerful.

Notice how Jackie connected feeling “knowledgeable” with feeling “powerful” in one’s own body. To Coach Jackie, increasing access to female-specific health education is essential for girls and women to feel healthy and powerful and to have agency over their own body. In Jackie’s final quote, she summarized her beliefs and the sense of responsibility she feels to share menstrual health education with her athletes:

This is about giving the athlete power, knowledge, agency over all of this. If I coached males, and I found out there was something in their health profile that I needed to tell them so that they could have some agency and awareness, I would 100% teach that. Give them the information.

Coach Chelsea, whom we meet next, also shared this belief in “giving them the information”. And, like Coach Jackie, Chelsea’s beliefs had been shaped by her own experiences as a female athlete.

Coach Chelsea and The Toxic Team Environment: “I had no support from my coaches.”

Coach Chelsea, a X-country and track coach in her late 20s, brought a bright, enthusiastic energy to our interview. Her love for the sport of running, and for coaching developing runners, emanated throughout our conversation. Under the surface, however,

Chelsea had a painful history in team sport. Earlier in her life, as a Division I collegiate runner, Chelsea had been immersed in a competitive, toxic team environment. She described having had “no support from coaches” when it came to preserving health. She also described an underlying, unspoken knowing that most of the women on her running team had completely lost their menstrual cycle. Here, Chelsea alluded to the norm of silence around menstrual health that persisted among team members, coaches, and support staff:

I didn't know. And no one was really telling me. I didn't really have a lot of support from my coaches. It wasn't something that people talked about. I'm sure I wasn't the only one that was experiencing these things, but it just, unfortunately, wasn't something you felt like you could talk about with your teammates.

Chelsea's mention of “these things” was in reference to eating disorders, stress fractures, and overuse injuries, all of which she said were common on her team. Chelsea left collegiate running her junior year because of the toxic team environment. She did later return to the sport, however, and when she did, she was determined to find information to help her make sense of her collegiate experiences. Here, Chelsea shared about the initial steps she took to fill the gaps in her education around female-specific health:

To be honest, I just kind of sought out a lot of answers on my own to figure out what was happening. Like, why was I getting stress fractures? And why my teammates had eating disorders. And like, what was the right way to eat? So, I just kind of started like listening to podcasts and finding answers on my own.

Chelsea just touched on a differentiating factor that surfaced in the experiences of the younger coaches in this study: access to podcasts. Two of the younger coach interviewees, both in their 20s, shared that hearing a podcast discuss menstrual health in female athletes was a turning point in their lives. Importantly, though, these two coaches

noted that it was hearing a relatable *story* from a fellow female athlete was the turning point in how they made sense of their body and health. These two young coaches also shared that hearing about other athletes' struggles were reassuring because they eased feelings of isolation and confusion.

Today, Coach Chelsea infuses an array of educational experiences and routines for her athletes. She noted that coaches' involvement in educating female athletes was necessary because health support was absent in other spaces. Here, she shared concerns around limitations in medical care available for female athletes: "Getting athletes to the right doctors is a challenge" ... "many doctors aren't aware of runner-specific or female athlete specific concerns" ... and "many doctors won't flag ferritin if it's low, which is very concerning for endurance athletes, because they don't understand the issues."

Chelsea shared that helping her athletes to better "understand the issues" required a multi-dimensional approach of providing athletes with education, relatable stories, team routines, and consistent reinforcement. Here, she described one routine her team has found helpful: "We do training logs, and it's all anchored to racing. For the female athletes, it's a great time to note when you're getting your period ... note those symptoms and things like that." "Over the course of the season, all the little things that we do every day, and the reinforcements really help them be self-aware." Coach Chelsea also emphasized that female athletes need to hear positive messaging around health and relationship to food frequently and from varying voices:

I've really worked hard to create a good support system of people that are not me to help support my athletes. We have a registered dietitian. There's a runner that comes and talks to our team every single year. That's been really awesome especially

because the kids get it year to year. So it's like, yes, they hear the same presentation.

But they need to hear it every single time.

Notice Chelsea's final line, that athletes need to hear positive messaging around health and nutrition "every single time".

Next, we shift to the story of Coach Sabrina, who, unlike Coach Chelsea, was in a nascent stage in developing routines and comfort around discussing menstrual health.

Coach Sabrina and Double-Leg Stress Fractures: "I had that."

Coach Sabrina, also a high school running coach, shared immediately that she was not yet comfortable discussing menstrual health. Yet, she felt a sense of responsibility to take part in this intervention, to continue learning, and to try sharing menstrual health information with her female athletes.

Early in our conversation, I asked Sabrina about her initial reactions to the intervention's educational videos. She replied by saying: "I had that." Unclear what she was referring to, I gently probed further to understand what "that" was. I eventually understood that Sabrina was referring to Relative Energy Deficiency in Sport and complete loss of the menstrual cycle. I could sense from Sabrina that the educational content had surfaced painful memories for her, and that I needed to approach our conversation with an extra degree of care. Sabrina remained reserved throughout our interview, but she did share a bit of her history as a high school runner decades prior:

In high school, I had lost my menstrual cycle for a year or two. And at the time it really wasn't ... it was like ... oh, well, you know, your body is trying to learn its routine. I wasn't aware. I didn't know. I just thought my injuries were because I pushed myself so hard.

Sabrina was referring to injuries that had taken her out of her junior year of running. She shared further:

I had some shin splints that got so bad. We went into the doctors. I had stress fractures in both of my legs. I lost my junior year of cross country because of my stress fractures. And so even today that was hurtful. That's hurtful.

I asked Sabrina about what it felt like to share the intervention's supplemental handouts with her athletes. She responded, first, by acknowledging that, though she had expected pushback from sport administration or parents, she had been surprised that her athletic director encouraged her to discuss the information with her team.

I talked to our athletic director, and he was on board. And I asked, do I need to get permission from the parents? And he's like, well, if we have sex ed at school, that kind of falls into part of that, so I don't feel like you need any parental consent. Just have, you know, a good conversation.

The support that Coach Sabrina felt from her athletic leadership helped her take the next step in having a conversation with her team. Here, Coach Sabrina alluded to the anxiety she experienced as she prepared for that team conversation:

I am not somebody who could get up and just speak in front of people. I need to have my script. I need to practice. I tell my runners, I have the best conversations with them when I'm out on a run. Then I come over and I face them, and my mind goes blank.

Coach Sabrina pushed through her discomfort, however, and her conversation with her team had an unexpected result:

I was nervous and they could tell I was nervous. Our athletic trainer happened to be in the weight room. She's a female, so I didn't ask her to leave. I just let her listen in.

I shut the door, and we had a conversation. She kind of walked over and was listening to what I was saying, and then, at the end of it, I asked her if she had anything that she wanted to add, because, to my knowledge, this was the first conversation that was had at our school about menstrual cycles. So then first, she goes, I want to applaud your coach for even talking about this topic, because it's not a topic coaches are comfortable talking about. And then she had a lot more knowledge than I did. So she just went into it. She talked about REDs. She talked about their eating, sleeping. She talked about a lot of stuff, and since then she and I have collaborated, but I want to be more comfortable.

Sabrina's story illustrates how, for many coaches, feeling supported and validated are crucial elements to sustaining the effort required to push against social norms. Coach Sabrina ended our conversation with this: "The athletes, they need to know their body. They need to know eating properly, sleeping ... everything that affects them."

Coach Caitlin and Her "Suspicion" That "Something Was Missing"

Coach Caitlin, a middle and high school volleyball coach, brought a multi-dimensional perspective as a coach, health and physical education teacher, and former elite level volleyball athlete. Despite having a degree in physical education, Caitlin did not learn about female-specific or menstrual health until many years into her teaching and coaching career. Here, Caitlin described the gut feeling she had in the early years of her career that she was "missing something" with regard to supporting the health and performance of girls and women:

I've been a teacher for 11 years now, in PE. I've been a coach in the community and in schools for that whole time as well. And I've always been an advocate for gender equity in sport. And I think I've always known that we weren't giving girls a fair shake

at, I don't know, at life, or the competition of sport. And I think I always knew that we were capable of more. But we were missing something.

Caitlin went on to describe the moment when she was able to grab hold of the “something” that had been missing—during a professional development seminar on how teachers could support the health and well-being of female and non-binary athletes. Here, Caitlin described how things began to “click” for her in that moment:

That was when things really clicked and I was like, oh my gosh, we're not doing universal design for learning when it comes to gender equity in sport. At all. Not even close. And it felt really good to kind of know that my suspicion that I've had all my life, really that it was true. And that there were things that we could do.

Caitlin was particularly concerned about the harms of low health literacy on adolescent girls going through puberty. When I asked Caitlin how we could support girls going through this developmental stage, she shared about routines she had implemented with her students and athletes:

So I do this both in PE classes and with the teams that I coach. I would chat about menstruation with the whole group, including all genders. You can't separate them, and I would usually do it in relation to like a strength and conditioning unit, or just at the beginning of the season. And talk a lot about how important it is to know your own body, and know your own strengths and weaknesses, and know your own trends.

Similar to Sabrina, the running coach, Caitlin emphasized that athlete education needed to be accompanied with routines and reinforcement. Here, she described a reflection process she had created to help her students develop awareness and attunement to their bodies' needs:

And then I made this paper journal, and I made one for menstruators and one for other athletes, and they could choose which one they wanted to do. I never mandated that all menstruators track their cycle. And my question was, what did you learn about yourself during that process? And that was the only question I posed, and they would write a little bit about it.

Coach Caitlin shared how her athletes and students had come to rely on journaling as an essential “outlet”:

They were making those connections, which I found really interesting. And a lot of them were like, I need to do my journal today, because if I don't do my journal... they found it very important to get that out, it was an outlet in some way. And that journal was really critical for their mindset going into the class or going into the game.

Coach Caitlin also discussed how she had infused messages about menstrual health into larger lessons about holistic well-being and that this worked even in mixed-gender settings:

And then for the people who weren't menstruating, they were still doing the tracking journal. Like sleep was a huge piece that I found a lot of the young people didn't realize was lacking for them. It was interesting seeing what the athletes would piece together. But it ended up being more holistic, and more about overall health and wellness, both mental and physical, for everybody.

Like all the female coaches who volunteered to interview, Coach Caitlin's approach to implementing menstrual health awareness had been developed over time. Caitlin shared that, through that developmental process, she learned that “small” things can have a big impact in creating psychological and emotional safety for girls:

The small things that I learned, like just opening channels of communication so they can express a little bit about how they're feeling. Really simple stuff that's not that hard. Like, when you're going on a field trip, tell the class where the bathrooms are going to be, or when the bathroom breaks will be. It's not hard.

As our conversation came to a close, Coach Caitlin echoed what many other coaches in this study expressed in varying ways, that feeling community connection and support provides motivation to begin, or continue, the work of increasing menstrual health literacy: “I was excited when you launched this because every time this topic comes up, I think, I need to be doing more of this. And that's super important. More people need to be doing this.”

A Process of Development: Coaches' Key Takeaways

The crucial takeaways from these women's stories are that female-specific health literacy improves over time, that comfort discussing menstrual health requires patience and practice, and that support systems must be developed and refined. I asked these coaches what they had learned through their experiences discussing menstrual health with female athletes that they thought would be helpful for other coaches to know and hear. Here's what they shared:

Begin with Small Groups

I think the next step for a coach who's new to this would be to talk to the team captains. Sit down and share the handouts with them and talk about why it matters. And then collect feedback from that small group. Ask them, “How do we do this in a way that's comfortable for the team?” That allows the coach to get some comfort before they talk to the entire team.

Be Careful with Timing and Cultivate Trust with Athletes

I learned that this is not the topic I'm bringing out in week one. I need to build trust with the athletes. I need to feel that I have enough social capital with whoever I'm coaching. And they need to know that I am coming from a place of compassionate concern.

Allocate Team Time

"You have to share this information with student-athletes at practices, that's super important."

Start Soft

"They can get overloaded early. So it's important to kind of start soft."

Find that "Uncomfortable Edge"

There's a real balance between knowing when to push it and knowing when somebody's not ready. So I think meeting people where they're at is really important. Finding that uncomfortable edge and pushing it a tiny bit. So maybe they're not ready to go 100 miles an hour, but maybe we can push it just a little bit and be like, ok, if you're ever curious, or you ever want to talk about it more, let me know and we can revisit it.

Provide Frequent, Small Doses of Information

"I learned that it can't just be one time ... like, here's the information, and then never talk about it again. You have to follow up. It's better if it's smaller doses of information shared more frequently."

I would try to make this information more common by sharing it daily or weekly.

There's a lot of information and it's hard to understand in one sitting. Giving athletes/coaches weekly information or talking about it on a daily basis (in terms of

fueling properly, sleeping, etc.) it will hopefully make the information more digestible.

Normalize the Conversation Through “Repeated Exposure”

I think the more we can get other people to talk about it rather than just one person on the staff it's helpful, because then the girls start talking about it. But I also think it's that repeated exposure. Because it sends off a little light bulb like, oh, ok, this does affect performance every day. So I think getting more comfortable just comes down to talking about it more.

Reflect and Refine

“It's a multi-year thing. I feel like I'm finally getting to the point where we do have some really good systems in place.”

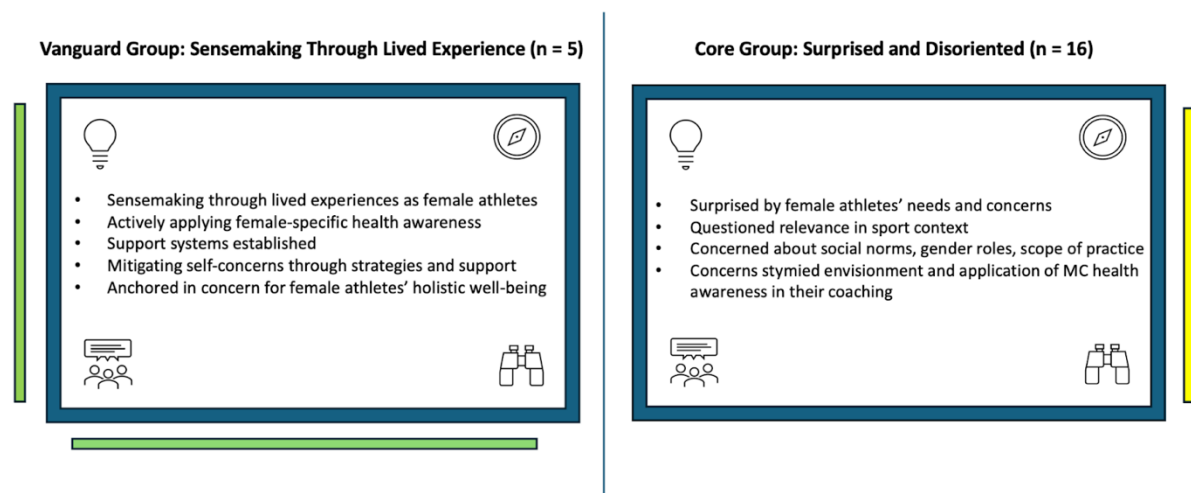
Discussion

This study examined how coaches responded to a two-part, online educational intervention on supporting female athlete health and performance. Coaches were encouraged to apply their learning during the two-week intervention, as my aim was to understand how coaches felt about moving beyond passive learning (i.e. consumption of videos) and into active application of female athlete physiology content (i.e., sharing information with athletes or engaging in content discussion with fellow coaches or a trusted partner).

Two groups emerged in the data which were differentiated by lived experiences with menstrual health in sport. These two groups are compared in Figure 5.1.

Figure 5.1

Group Comparison of Coach Participants



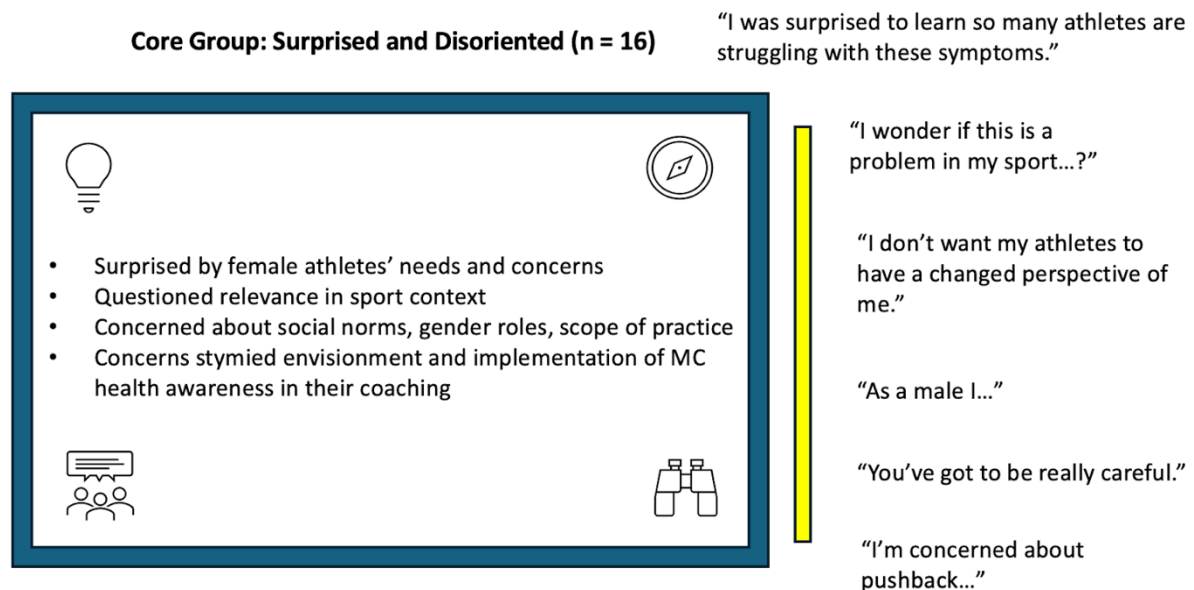
Note. Two groups emerged in this study which were differentiated by lived experience—and challenges—with the MC in sport. The Vanguard Group (left, Figure 5.1) were the only coaches to report having translated their learning into practice, which is indicated by the green lines. In contrast, the Core Group (right, Figure 5.1) faced barriers to translating learning into practice, which is indicated by the yellow line.

The Vanguard Group (left, Figure 5.1) was comprised of five female coaches, all of whom made sense of this intervention's learning through their former experiences as female athletes, which helped them to relate to the experiences of their female athletes. These five female coaches were the only participants to report having discussed menstrual cycle (MC) health with their athletes during the intervention.

In contrast, the majority of coaches (right, Figure 5.1), were surprised to learn that MC symptoms are a concern for female athletes. Additionally, these coaches expressed multiple concerns which they felt acted as barriers to discussing MC health with athletes. I explicate on their concerns and experiences next.

Core Group: The Surprised and Disoriented (n = 16)

The majority of participants (n = 16), a mix of male and female coaches, were surprised by the McCleery et al. (2024) study which illustrated that managing MC symptoms in sport is a primary concern for female athletes (e.g., "I was surprised to learn so many athletes are struggling with these symptoms"). Several coaches also questioned the relevance of MC health in "their" sport, seemingly under the impression that only female athletes in endurance sports experience symptoms of the MC. Additionally, these coaches expressed concerns that discussing MC health might violate social norms, gender roles, and/or exceed the scope of their leadership responsibilities—concerns which they felt created barriers to their discussing MC health with their female athletes. Figure 5.2 provides sample quotes from coaches in the Surprised and Disoriented group who struggled to envision applying MC health awareness in their coaching.

Figure 5.2*Example Quotes of Coaches' Reactions and Concerns*

Note. Coaches in the Surprised and Disoriented group struggled to envision implementing MC health awareness in their coaching. This disruption to their sensemaking process is indicated by the yellow line to the right of Figure 5.2.

A Glimpse into Coach-Athlete Perception Gaps

Coaches' sense of surprise that MC symptom management is a primary concern for female athletes illuminates a disconnect between athletes' concerns and coaches' awareness of athletes' concerns. Perception gaps between coaches and athletes, in fact, are common in sport (Jowett & Ntoumanis, 2004). These gaps strain coach-athlete relationships, as they create a divide between athletes' needs and experiences and coaches' perceptions and behaviors (Sousa et al., 2008). Indeed, Höök et al. (2021) found that coach-athlete perception gaps around the MC "hinder" female athletes' experiences in sport, and thus need attention in coach education. One example of coaches' behaviors misaligning with athletes' needs has been noted in elite sport settings, where coaches often collect athletes'

MC tracking data (Moore, 2025) while failing to communicate with athletes on how, or if, that data will be used to adapt training. Female athletes have expressed frustration around this practice, as they feel coaches are collecting their data simply “for the sake of it” (McHaffie, 2022). This practice also misaligns with female athletes’ need to feel supported by their coaches and to feel safe to discuss their concerns and experiences related to the MC in sport (van den Berg & Doyle-Baker, 2025).

Coach-athlete perception gaps—specifically, coaches lacking awareness around female athletes’ experiences with MC symptoms—may be especially harmful with adolescent female athletes. Adolescent girls are particularly vulnerable to the fear, anxiety, and embarrassment that accompanies the experience of the MC (Sabiston et al., 2022). In addition to facing the social stigma associated with MC, girls in puberty must learn how to manage an *entirely new* biological experience—often with little or no support or education around symptom management. Additionally, as noted by Gopalan et al. (2024), adolescent girls are particularly reluctant to seek help around MC-related concerns, as they fear being “found out” as menstruating individuals. These factors may contribute to the disproportionate loss of girls from sport, who drop out at twice the rate of boys (Women’s Sports Foundation, 2025).

Narrowing Perception Gaps: The Need to Contextualize Learning

In addition to their surprise, coaches also questioned the relevance of MC health in their context (e.g., “I wonder if this is a problem for athletes in my sport.”). This finding suggests that coaches need opportunities to see how the science of female physiology (e.g., endocrinology, MC phases, etc.) applies to their sport and with their athlete demographic. That is, coaches need to contextualize the learning. Contextualization is a crucial step in supporting coaches in translating learning into practice. This step can be supported by

pairing science learning with athlete stories, narratives, and case studies within varying sport contexts, as case studies have been shown to facilitate learning application (Bonney, 2015). This need for learners to connect science learning to human stories was noted by Roux et al. (2023) who found that teachers, nurses, and students found a school-based MC health intervention to be of limited value, as the content was “overly scientific” and thus too difficult for students to relate to. In addition to increasing relatability, inviting learners to contextualize their learning also heightens attention and engagement (Rathburn, 2015) as learners feel that they are *part of* the learning experience, which is essential for adult learners (Sogunro, 2015).

A Threat Response? Social Norms and Gender Roles as Barriers to Implementation

Most participants expressed reluctance to implement female-specific health awareness in their coaching due to concerns that discussing MC health might violate social norms, gender roles, or exceed the scope of their leadership responsibility. Male coaches in particular shared concerns that violating gender norms may negatively impact coach-athlete relations (e.g., “I don’t want my athletes to have a changed perspective of me”). Even female coaches expressed concern for their male coach colleagues, indicating that male coaches may be viewed as “creepy” for discussing MC health. These findings align with those of Höök et al. (2021) who found that male coaches feel that discussing the MC is outside their comfort zone.

These findings suggest that coaches may be experiencing a threat response in the brain as they contemplate discussing the MC—which is recognized as a universally “taboo” topic (Fahs, 2020; Olson, 2022). This is of crucial significance when considering female athlete coach education, because a threat response impairs executive function in the brain, and thus, impacts coaches’ willingness to engage and their capacity to learn (Imad, 2022;

Levy & Schiller, 2021). In fact, even *perceived* social disconnection (e.g., through violating gender norms) can impair executive function in the brain and evoke behaviors of avoidance (Cacioppo & Hawkley, 2009). In this study, for example, no male coaches reported having discussed MC health with female athletes. One male coach simply stated, “I watched your first video and I am dropping out of your study”. These findings align with those of Clarke et al. (2024) who found that male coaches were difficult to recruit for female athlete physiology education.

Mitigating The Threat Response: Naming and Normalizing Discomfort

For coaches who are experiencing a threat response in the brain, mitigating that response and establishing coaches’ sense of psychological safety is an essential first step to coaches’ engaging in the learning content (Kahn, 1990; Edmonson et al., 2004). One step toward establishing psychological safety with learners is for educators to explicitly name—and thus begin to normalize—the discomfort associated with the MC. This technique, known as “affect labeling” (Lieberman et al., 2007) can reduce the intensity of unpleasant emotions, support emotion regulation, and help coaches feel less alone in their emotions (Koole, 2009). Additionally, as noted by Clarke et al. (2024), specialized recruitment efforts may be needed to “target and encourage” men to participate in female athlete coach education.

The Need for Policy Support

A final theme that surfaced in coaches’ survey responses were concerns that discussing menstrual health with female athletes may stretch outside the scope of their leadership responsibilities (e.g., “I’m concerned about pushback from the broader community.” and “You’ve got to be really careful.”). This aligns with the findings of Clarke et al. (2021), which indicated that coaches desire guidelines for discussing MC health with

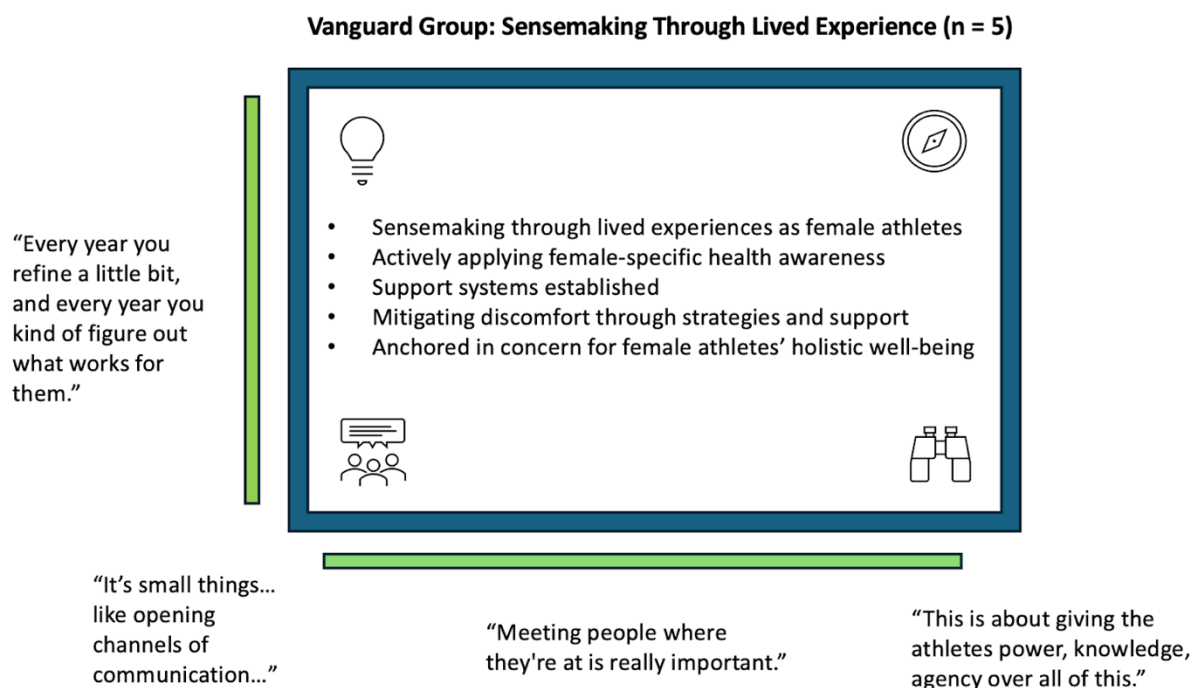
athletes, structured guidance to determine when and how to refer athletes to specialized care, and policy support to know the scope of their roles. Though coaches can play an important role in supporting female athletes' MC health, it is crucial to acknowledge that increasing MC health literacy more broadly will require policy support and curricular changes in school-based health classes and medical schools.

Vanguard Group: Sensemaking Through Lived Experience (n = 5)

Five female coaches, all of whom were former female athletes, made sense of this intervention through their lived experiences—and challenges—with MC health as athletes. By connecting MC health learning to their prior experiences as athletes, these coaches were able to relate to the concerns and experiences of female athletes. Sample quotes from this coach group are illustrated in Figure 5.3.

Figure 5.3

Coaches Who Made Sense of Menstrual Health in Sport Through Lived Experience



Note. The Sensemaking Through Lived Experience coaches actively applied MC health awareness in their coaching and were even taking steps to reflect and refine their practice. This translation of learning into practice is noted by the green lines in Figure 5.3.

These five female coaches were the only study participants to report having discussed MC health with their athletes during the intervention. These coaches were not immune to the social discomfort associated with discussing the MC, though they had developed strategies and support to mitigate that discomfort. Most notably, these coaches were grounded in concern for the health and well-being of their female athletes, which evoked a sense of responsibility to ensure athletes were informed and empowered to manage MC related symptoms and concerns.

Envisioning the Learning in Context

By connecting to their lived experiences, these coaches were able to contextualize learning about MC health and envision how to apply female-specific health awareness in their unique leadership landscape. For example, Coach Caitlin, the volleyball coach and health/ PE teacher working with adolescent female athletes, discussed how “the small things” make a big difference in reassuring adolescent girls, like ensuring the athletes know the bathroom locations during away games and field trips, and keeping “open channels of communication” so girls feel safe to seek help when struggling with MC symptoms. Coach Chelsea, on the other hand, was able to envision how MC health applied in a different context—in the world of competitive running, where athletes face the body-related pressure of achieving an optimal power-to-weight ratio. In this context, Coach Chelsea felt that athletes needed to hear from outside experts (e.g., “I’ve developed a great support

team.”) such as nutritionists and fellow female athletes who were navigating similar performance pressures.

Importantly, these coaches who implemented MC health awareness in their coaching were not immune to the social discomfort associated with discussing the MC (e.g., “I’ve learned this is not the topic I’m discussing on day one, I need to develop trust first.”). However, their concern for the health and well-being of their athletes was a more pressing concern (e.g., “This is about giving the athletes power, knowledge, agency over all of this.”). Further, their concern for their athletes’ well-being motivated their efforts to develop their own support systems. For example, Coach Sabrina, who disclosed that she was still quite uncomfortable discussing the MC, found community support through her athletic director and athletic trainer. These coaches’ stories—specifically, their process of developing their MC health literacy and comfort in discussing the topic—illustrates how sensemaking around MC health is a developmental process, even for female coaches. Though male coaches will not have personal lived experience to support their sensemaking around MC health in sport, coach educators can support male coaches in contextualizing their learning by pairing physiology content with athletes’ stories and case studies. Additionally, male coaches in particular may benefit from hearing the voices of fellow male coaches who have implemented MC health awareness into the work with female athletes.

Limitations

This intervention was designed and formatted to be accessible for busy coaches from any geographical location. Though highly accessible, this design offered limited support as learners attempted to translate their learning into practice. For example, though coaches were encouraged to discuss the intervention’s MC health handouts with fellow coaches or a trusted partner, learners may need more structured facilitation and sequenced guidance to

support their early conversations around socially sensitive content. Additionally, this intervention was offered over a short period of time (2 weeks). Coaches may need a longer period of time to process content and envision how to apply it within their coaching landscape. Future research is needed to explore how coaches respond to varying learning formats, course lengths, and implementation strategies.

Finally, this intervention having been hosted by a female coach and athlete may have influenced coaches' experiences with the learning either positively (e.g., female coaches may have felt increased relatability through common lived experiences) or negatively (e.g., coaches who hold a different gender identity or sport connection may prefer to hear from coaches who share those identities). Efforts were made to address this limitation by including a male coach's voice and experiences in the intervention's curriculum; however, male coaches may need opportunities to process and discuss MC health learning with peers who share similar challenges and experiences to their own.

Implications for Researchers: Exploring Translational Support Needs

Findings from this study reinforce that coaches' sensemaking is a process that can be developed. Future research is needed in several areas to further understand how to increase coaches' knowledge of female-specific physiology, their comfort in discussing MC health, and what support coaches need to translate learning into practice. Suggested research topics and questions include:

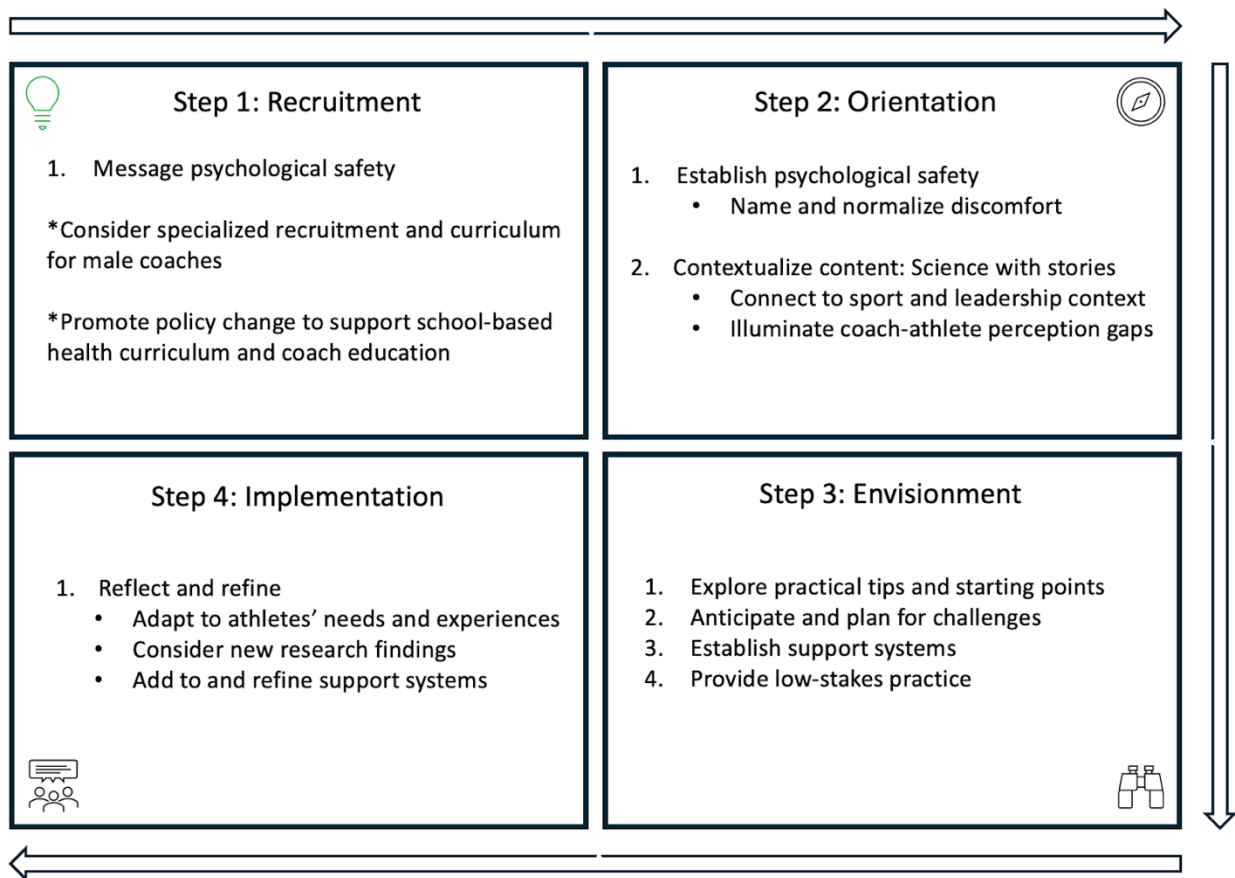
- Course duration: *How much time do coaches need to gain familiarity and comfort with the science of female athlete physiology, to envision learning application, and to garner support before translating learning into practice?*

- Learning mode (i.e., in-person vs. online; formal vs. informal): *How do varying learning modes and formats support coaches in gaining comfort discussing MC health with athletes?*
- Contextualizing the learning: *How do coaches' learning and support needs vary with sport affiliation and the developmental stage of their athlete population?*
- Foundational coach development needs: Importantly, researchers and coach educators will benefit from seeing female athlete physiology training as a topic nested within a broader array of coach development needs. That is, coaches may need foundational coach training in order to fully benefit from coach education around female athlete physiology. For example—given coaches' concerns around discussing MC health with athletes—coaches may need precursory training in topics such as healthy coach-athlete communication; team culture-building; establishing spaces of psychological safety; and cultivating trust with athletes in order to feel prepared to discuss the socially stigmatized content of MC health. Thus, research is needed to explore how foundational coach education supports coaches' sensemaking and enables coaches to skillfully navigate MC health conversations with female athletes.

Practical Applications: A Coach Development Model for Coaches of Female Athletes

To guide future work, I developed a working model for coach education for coaches of female athletes (Figure 5.4). This model is an extension of the conceptual framework used in this study and draws from this study's findings as well as from my experiences as a coach educator having observed coaches as they learned about, and applied, female athlete physiology in their coaching for the first time. This model provides general suggestions for supporting coaches through each stage of their sensemaking, as it is expected that coaches

will have varying concerns—and thus varying support needs—throughout each stage of their sensemaking process.

Figure 5.4*A Model for Female Athlete Physiology Coach Development***Step 1: Recruitment**

With the known taboo associated with the MC, recruitment efforts should message psychological safety within the learning environment so that coaches feel safe to engage in socially sensitive content. Specialized recruitment and curriculum might be necessary to engage male coaches, whose learning needs may vary, as they cannot relate to lived experiences with the MC. Further, promotion of policy that centralizes and regulates coach education is needed to support coaches and to ensure athletes' health and safety.

Step 2: Orientation

As coaches engage in female physiology education, they will need to orient themselves within the social and cultural context of the content. In other words, coaches

will need to see and feel that supporting female-athlete health and performance requires more than learning science; it requires negotiating issues of identity and social norms, which for many, creates discomfort. Social discomfort may evoke a threat response in the brain which could lead to behaviors of avoidance (i.e. attrition and/or decreased engagement). Coach educators can begin to mitigate social discomfort through affect labeling—i.e., explicitly naming the social stigma and discomfort associated with the MC. Affect labeling supports emotion regulation and helps learners feel less isolated in feelings of social discomfort.

Coaches who feel psychological safety and remain engaged will then need opportunities to contextualize the learning to see how it is relevant to their leadership context. This can be supported through pairing science content with athlete stories and case studies from varying sport contexts. Pairing the science with stories is also necessary to make coaches aware of the perception gaps that exist between athletes' needs and experiences and coaches' perceptions and behaviors. Coaches who are aware of perception gaps will be better equipped to envision implementation of the learning in ways that align with the needs of female athletes.

Step 3: Envisionment

As noted in this and several other studies, coaches desire practical tips to guide implementation of MC health awareness with female athletes. Here, I suggest that coaches hearing the stories and experiences of fellow coaches may be particularly advantageous. In particular, coaches may benefit from hearing the stories of fellow coaches who have developed support systems that helped them navigate the social discomfort associated with discussing MC health. Importantly though, coaches will need tips and strategies that align with the development needs of their unique athlete population. For example, coaches

working with adolescent athletes may benefit from hearing the voice of Coach Caitlin in this study, who discussed how “the small things” like “opening channels of communication” are essential for adolescent girls to feel safe in seeking help around MC-related concerns; whereas coaches in elite level sport environments will need to hear from coaches navigating more performance-oriented concerns, such as how to support athletes who are negotiating body-related performance pressure.

As coaches envision implementation, they will need opportunities to anticipate and plan for challenges. This step is critical, as coaches will need to mentally “try out” strategies for mitigating the inevitable challenges that accompany translation of learning. This step may also help coaches begin to develop necessary support systems, as support is crucial in sustaining efforts of change. During envisionment, coaches may also benefit from low-stakes practice opportunities to build confidence and skillfulness in discussing MC health (e.g., with fellow coaches) before engaging in more high stakes conversation with athletes.

Step 4: Implementation

Finally, coaches must be encouraged to invite—and respond to—female athletes’ needs and perspectives as they implement female-specific health awareness in sport. Inviting athletes to share their experiences and perspectives cultivates coach-athlete trust, which is essential in supporting female athletes’ health, well-being, and performance. Here, coaches may again benefit from hearing from fellow coaches who have implemented MC health in practice and refined their routines in response to athletes’ needs and experiences. For example, Coach Chelsea, the high school running coach, offered valuable perspectives around how supporting female athletes is an ongoing and developmental process and a process which necessitates inviting and responding to athletes’ perspectives. It is only

through listening and responding to the needs of female athletes themselves that we will shape sport systems that are equitable and healthy for women and girls in sport.

In summary, this model offers a starting point for designing female athlete coach education with awareness of coaches' concerns. It is expected that coaches will have varying concerns—and thus varying support needs—throughout each stage of their sensemaking process as they learn about, and apply, female-specific health awareness in sport. Further investigation and application of this model is needed to test specific learning supports in each stage; to examine the impacts on varying coach populations; and to deepen our understanding of additional motivations and barriers coaches face.

Conclusion

Coaches serve a crucial role in supporting the health and performance of female athletes. This study provided evidence that coaches' sensemaking around implementing female-specific health awareness in sport is a process that can be developed. For coach developers, the aim is to support coaches in progressing through the entire sensemaking process, enabling them to implement female-specific health knowledge in ways that align with the needs of female athletes. This investigation suggests that coach education must go beyond simply supplying coaches with the science of female athlete physiology; coaches also need support in navigating concerns around social norms, gender roles, and scope of practice. Additionally, coach education must be designed with awareness of the vast variation in individuals' lived experiences with the menstrual cycle; it is expected that coaches who have not lived with the MC may need additional time and support to gain familiarity and comfort with female physiology content. Finally, this study benefitted from a co-constructivist research approach—coaches both with and without lived experience with

the MC offered valuable insight into coaches' learning and support needs as they translate female athlete physiology learning into practice.

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Appendix A

Participant Recruitment Emails

Recruitment Email and Flyer

Participate in UW's Female Athlete Coach Education Series
Learn how coaches can support the health and performance of women and girls in sport

Did you know?

Most sport training models were designed for male physiology—this is because exercise and sport science research has primarily been conducted on men, by men.

This can be harmful for female athletes, whose bodies are physiologically different from male bodies.

We believe that coaches can have lifelong impact not only on athletes' performance, but also on their attitudes around health. Through our messaging, modeling, and the information we share, coaches can support athletes in feeling and performing at their best.

This Autumn, the University of Washington Center for Leadership in Athletics is offering a free, virtual education series on how coaches can support the health and performance of female athletes. This series will cover:

- Female athlete physiology and menstrual cycle health awareness
- The coach's role in supporting female athlete health
- Resources and strategies for applying learning

We are recruiting current coaches of female athletes aged 15+. We welcome coaches from any sport, and with any level of coaching experience. Coaches who identify as female, male, and non-binary are encouraged to participate.

If you would like to learn more, confirm your interest **here** and more information will be emailed to you.

SHARE:



Join Our Email List




Participate in UW's Female Athlete Coaching Education Series

Learn how coaches can support the health and performance of women and girls in sport.

To learn more, confirm your interest here!

W

Did you know?

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If you would like to learn more, confirm your interest below and more information will be emailed to you.

Confirm Your Interest

W

CENTER FOR LEADERSHIP IN ATHLETICS

UNIVERSITY of WASHINGTON

The [Center for Leadership in Athletics](#) develops effective leaders and leadership practices that maximize the positive, educational impact of athletics. If you have any news to share with the Center, please send a message to uwcla@uw.edu.

UW Center for Leadership in Athletics | uwcla.uw.edu





University of Washington Center for Leadership in Athletics | College of Education Box 353600
| Seattle, WA 98195 US

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More Information and Opt-In Email

Hello Sport Leaders:

We are inviting coaches and leaders in sport to participate in a *Female Athlete Health and Performance* education series. This 2-part, virtual series is part of a research project funded by the University of Washington's Center for Leadership in Athletics. Current coaches, administrative leaders, and sports medicine staff are welcomed to participate. Your involvement will support the CLA's work in designing education programs that emphasize healthy, equitable spaces for women and girls in sport.

Topics Covered:

- Female athlete physiology, including menstrual health awareness in sport
- Common health concerns that impair female athlete well-being and performance
- Leadership and communication strategies for supporting female athletes

What to Expect:

This virtual education series is broken into two parts and is designed to be completed over 1-2 weeks. Total time commitment is 1-2 hours. As a participant, you will be asked to:

- Watch two ~10-minute educational videos
- Complete two 3-question written surveys to share your reactions to the learning (estimated time: ~5 minutes per survey)
- Engage in a 40-50-minute, one-on-one Zoom interview at the end of the series to share about your experiences

As part of this series, you will be encouraged to share or discuss what you learn with female athletes, fellow coaches, parents, or other leaders in sport. To support those conversations, we will provide you with handouts and additional resources on female athlete health, well-being, and nutrition.

To participate in the *Female Athlete* education series, [click here to opt in](#). Educational materials will be sent to you via email from the researcher's address: medaniel@uw.edu.

Thank you for the work you do to support female athletes!

SHARE  Join Our Email List 

Greetings Sport Leaders:

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Topics Covered:

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To participate in the Female Athlete education series, [click here to opt in](#). Educational materials will be sent to you via email from the researcher's address: madeline@uw.edu.

Thank you for the work you do to support female athletes!



The Center for Leadership in Athletics develops effective leaders and leadership practices that maximize the positive, educational impact of athletics. If you have any news to share with the Center, please send a message to uwccla@uw.edu.

UW Center for Leadership in Athletics | uwccla.uw.edu



University of Washington Center for Leadership in Athletics |
College of Education Box 353600 | Seattle, WA 98195 US
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Appendix B Qualtrics Surveys

Request for More Information

https://uwashington.qualtrics.com/jfe/form/SV_0obAqqGL8XUpmKy

☐ Q2

Skip to

Invalid logic

Hello Coach!

The University of Washington Center for Leadership in Athletics is offering a free, 2-part virtual education series for coaches of female athletes. Estimated time commitment is ~1-2 hours.

By sharing your email address, you are opting in to receiving additional information about this education series.

☐ ★ I would like to receive additional information about the Female Athlete Coach-Ed series. My email address is:

☐ I DO NOT wish to receive additional information.

Opt-In

https://uwashington.qualtrics.com/jfe/form/SV_54NScReZsldZK86

☐ Q1

Skip to

End of Survey if I DO NOT wish to participat... Is Selected

By sharing your email address below, you are **OPTING IN** to participating in the Female Athlete Coach-Ed series. Your email address will not be shared with any third parties.

☐ ★ I am **OPTING IN** to participating in the Female Athlete Coach-Ed series. My email address is:

☐ I DO NOT wish to participate in the Female Athlete Coach-Ed series.

Part 1 Survey

https://uwashington.qualtrics.com/jfe/form/SV_ebXTbxaUIRQhh8g

Informed Consent



Intro



Hello Coach!

The University of Washington Center for Leadership in Athletics is working to understand the concerns and experiences of coaches of female athletes. We are asking coaches who participate in the Female Athlete Coach-Ed series to share about their experiences in two surveys. Estimated time commitment is 5-10 minutes.

Before you begin this anonymous survey, we would like to get your consent for participation. Here are some things you need to know:

Informed Consent



Skip to

End of Survey if OPT OUT (I DO NOT wish to t... Is Selected

WHAT WILL HAPPEN WITH YOUR DATA:

Your privacy and data security are our top priorities. All information we collect in this study will be strictly confidential and used solely for research purposes. Your individual responses and data will NOT be shared with your school district, athletic director, or any other third parties. We do NOT use this information for any type of work performance evaluation. All data will be anonymized and aggregated for analysis, ensuring that NO individual coach can be identified in our research findings or publications. This means that your answers to questions on this survey will NOT be examined separately and will NOT be linked to you personally.

VOLUNTARY PARTICIPATION:

Your participation in this study is voluntary. If you decide to take part in this study, you will be asked to e-sign the consent form. After you e-sign the consent form, you are still free to withdraw at any time and need not give a reason. Withdrawing from this study will not affect the relationship you have, if any, with the researcher. Any partial submissions will be kept or discarded at the discretion of the research team. Questions about this survey can be directed to the UW CLA at medaniel@uw.edu.

- ☐ By checking this box and e-signing this form, I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason.
- ☐ OPT OUT (I DO NOT wish to take part in the survey mentioned above.)

Learning and Sensemaking

Resonance

What stood out to you from Part 1's video? And why?

Open-Ended Concerns

☐ Open-ended concerns

...

What, if any, concerns do you have as you consider sharing this information with female athletes and/or their supporters?

Feedback

Feedback

Is there any other feedback you would like to share with us about Part 1 of this education series?

Part 2 Survey

https://uwashington.qualtrics.com/jfe/form/SV_5tiQjZRfs6h0cia

Learning and Sensemaking

Reactions



What stood out to you from Part 2's video? And why?

Athlete Reactions

Athlete reactions

How did people react when you shared your learning / supplemental handouts on menstrual health?

Open-Ended Concerns

☐ Concerns Part 2



What (if any) concerns surfaced for you after having discussed this content with others?

Coach Demographics

▼ Coach Demographics

Demographics



Please tell us about your sport landscape and coach identity:

What sport do you coach?

What age/level female athletes do you coach?

Do you identify as female, male, or non-binary?

How long have you been coaching female athletes?

Request to Interview

▼ Interview opt-in

☐ Interview

...

▼  Skip to

End of Survey if NO, I am not interesting in... Is Selected

Are you open to participating in a ~45-60-minute virtual interview to share more about your experiences with this education series?

- ☐ YES, I am open to participating in an interview.
- ☐ NO, I am not interesting in participating in an interview.

Q7



Please share an email address where we can reach you to schedule a virtual, one-on-one interview at a time that is convenient for you.

(If you do not want your email address linked to the information you shared in this survey, please go to this [separate survey](#) to share your email.)

Appendix C

Intervention Videos

Part 1

<https://www.youtube.com/watch?v=KXx1WZV2BjM>

Part 2

<https://youtu.be/-XRTpUoml1I>

IAL Alumni Voices

<https://youtu.be/UgMvvHyezio>

Appendix D

Intervention Emails to Coaches

Part 1

Hello Coaches and Sport Leaders,

Thank you for being part of the CLA's *Female Athlete Health and Performance* education series. Your involvement in this series supports our ongoing efforts to shape leadership education that emphasizes healthy, equitable spaces for women and girls in sport.

Over the next week, I will share two more emails which will include:

- Links to educational videos
- Surveys to gather your reactions to the learning
- Supplemental handouts
- Encouragement to support your learning!

Our collective goal in this work is to increase female-specific health literacy and to “normalize” conversations around female-specific health. To move us toward that goal, you will be asked to share what you learn with female athletes. If you're not currently in a position to share with athletes—or perhaps you need more time to develop comfort with the content—consider sharing and discussing with a fellow coach, friend, or partner at home. Just getting the conversation started is an important step!

When you're ready, begin by viewing [Part 1's video](#).

After viewing, please share your immediate reactions to the learning by completing [this survey](#).

I'll follow up in a few days with handouts that can be shared with female athletes and/or their supporters. In the meantime, be thinking about who you may want to discuss or share this content with.

Warmly,

Marsa

Female Athlete Ed Series: Part 1 Inbox x**Marsa Daniel** <medaniel@uw.edu>

12:30 PM (22 minutes ago)



to me, bcc: jack.kennedy, bcc: mwescliff, bcc: kevin.tellez.106, bcc: b209719, bcc: sophia.herscu, bcc: alberghinima, bcc: Benitaki, bcc: Kroling96, bcc: Ambler, bcc: leosonnev ▾

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In a few days, I’ll follow up with handouts that can be shared with female athletes and/or their supporters. In the meantime, be thinking about who you may want to discuss or share this content with.

Warmly,

Part 1: Follow-Up

Hello Coaches and Sport Leaders,

We hope you've all had an opportunity to reflect on Part 1's video and begin to think about how we can work together to increase MC health literacy amongst female athletes. Attached, you'll find an athlete handout that can be used to support your efforts in getting this information out to female athletes. This handout is meant to be an accessible resource that coaches and sport leaders can use to introduce athletes to the concept of MC health, *and* as an ongoing reminder tool that athletes can return to as they develop skillful attunement to their own health.

Throughout my years of supporting female athletes and their coaches, I've observed vast variations in coaches' comfort levels with the topic of MC health. Athletes, too, will feel varying levels of comfort and familiarity, with many of them having never heard of the concept. I share this so that you know: if you're feeling discomfort, you are not alone! And, if your athletes initially seem uncomfortable, that, too, is not uncommon. Familiarity and comfort do increase over time. Discussing this information is an important step toward increasing comfort.

Below are a few of the ways that coaches have shared this information with female athletes. These options can help you scale your next step around what feels most fitting for your comfort level and context:

- Post the resource in a team space for athletes to reference on their own time when they have questions or concerns
- Share the handout with a team captain, or trusted team leader, who can then share the information with younger/newer athletes
- Or, perhaps you want to start by first discussing the handout with fellow coaches or a trusted female in your life

Choose what feels right and fitting for your situation and context.

For many athletes and coaches—as they begin thinking more about MC health— that sparks curiosity and concerns around nutrition. In a few days, I will share a nutrition handout, as well as Part 2's video.

If you haven't already, please share your feedback from Part 1 of this series in [Survey 1](#) (estimated time: 5 minutes).

Thank you all for investing this time in supporting female athletes!

Female Athlete Ed Series: Part 1 Handout Trash x**Marsa Daniel** <medaniel@uw.edu>

Tue, Dec 10, 12:34 PM (22 hours ago)



to me, bcc: jack.kennedy, bcc: mwescliff, bcc: kevin.tellez.106, bcc: b209719, bcc: sophia.herscu, bcc: alberghinima, bcc: Benitaki, bcc: Kroling96, bcc: Ambler, bcc: leosonneveldt, bcc: Caseyb97, bcc: ▾

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Warmly,

Part 2

Hello Sport Leaders,

Thanks to everyone who shared feedback in the first survey. Your perspectives are incredibly valuable as we continue to shape coach and athlete education. There's still time to [share your reactions to Part 1](#) if you haven't yet.

Two questions/concerns that surfaced in the first survey responses:

"What's the right age to begin sharing this information with female athletes?"

We recommend ~15-16 (or any point thereafter). This allows girls to begin monitoring early and increases the likelihood that athletes (and parents) can identify "primary amenorrhea", which means they never even *begin* their MC due to nutritional deficiencies.

"What's the best way to share this information?" "Do I include parents?" "Can I share this in mixed sex and gender communities?"

There's no one "right" way to go about this work. The *best* way will depend on your social context; on the relationships you've established with your athletes; and on the level of support you feel from administrative leadership (and perhaps parents). I encourage you to discuss options with leadership, fellow coaches, or even trusted team captains/seasoned leaders.

If one rule applies to all, it is this: when trust has been established within the community, that facilitates the ease and success of these conversations.

In [Part 2's video](#) you'll meet Broderick, who is a male-identifying coach who discusses MC health in a mixed sex and gender setting. This approach has worked for Broderick, whereas other coaches have found smaller group conversations or peer-directed learning to be more fitting for their context (e.g., older, seasoned athletes share the handouts and facilitate the conversations). However you decide to move ahead, we've shared two handouts meant to support you and your athletes in taking the next steps. Attached you will find:

1. Stanford FASTER's nutrition handout. This can be shared with athletes or posted in a team training area. As mentioned last week, when athletes begin thinking about MC health, expect they will have questions about nutrition.
2. Key takeaways and reminders for coaches/leaders.

I cannot promise that initial conversations around MC health will be easy or comfortable. I can promise, however, that they will be *easier* when we focus on the key takeaways listed on the handout.

After viewing Part 2's video, please share your feedback in [Part 2's survey](#). Finally, if you know other coaches or leaders who might benefit from this education series, [please share this link](#) where they can opt-in to receive more information. And finally, the high-note ending: here's the short video of [interviews with our awesome CLA alumni](#) who are out there doing this work alongside you!

Warmly,

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Warmly,

Appendix E Supplemental Handouts

Part 1

Athlete Handout: MC Health

Menstrual Cycle Health Awareness in Sport

A regular menstrual cycle is positive feedback from your body that you are likely receiving the nourishment you need to feel and perform at your best in your sport (and in life!).

REGULAR MENSTRUAL CYCLE

- 1 First period before age 15
- 2 Menstrual cycles of 21-45 days
- 3 Menstrual bleeding of 2-7 days
- 4 Irregular cycles for the first 1-2 years

- Monitor your menstrual cycle rhythms through your own journaling or through phone apps such as “Clue”.
- Tune in to how you *feel*: Healthy athletes feel strong, powerful, upbeat, and energetic most days.

IRREGULAR MENSTRUAL CYCLE

- 1 No period by age 15
- 2 Very heavy, painful, or light periods
- 3 Menstrual cycles of <21 or >45 days
- 4 Bleeding lasting <2 or >7 days

Graphics: Stanford FASTER educational handouts: <https://fastr.stanford.edu/education/fastr-educational-graphics/>

- If you are not having a menstrual cycle, or if the gap between your cycles is more than 45 days, you are likely not receiving the nutrition you need to feel and perform your best. Athletes need a balanced diet of carbohydrate, protein, and healthy fats.
- If menstrual pain or cycle irregularity is affecting you in your sport or daily life, consult with your doctor.



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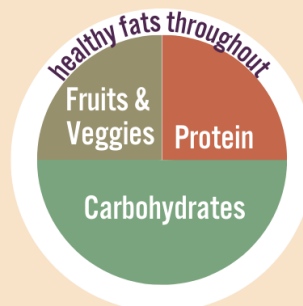
Athlete Handout: Daily Nutrition

FAST ALL ABOUT: DAILY NUTRITION NEEDS

Focus on building a well balanced “performance plate”  rather than counting calories

Each section may shift based on training volume

ie. when endurance training load is lower, carbs may shift down to 1/3 of the plate



Aim for **3 meals** and **2-3 snacks** every day!

TIPS FOR AVOIDING UNDERFUELING

- 1 Listen to your hunger cues even if it's not a time you'd typically eat
- 2 Consider a protein rich snack before bedtime like yogurt and granola
- 3 Plan ahead! Pack high quality snacks and meals for busy days at work or school



DAILY MACRONUTRIENT GUIDELINES



PROTEIN

ROLE IN THE BODY

- Build and maintain skeletal muscle
- Form the base of hormones and enzymes essential to the body's function

RECOMMENDATIONS

- Spread out throughout the day
- 1.2-2.0 grams of protein per kg of bodyweight

HEALTHY FATS

ROLE IN THE BODY

- Helps maintain sufficient energy availability and hormone health
- Prevent deficiencies in essential fatty acids & fat soluble vitamins (A, D, E, & K)

RECOMMENDATIONS

- Female athletes should get 20-30% of their daily energy intake from fat
- Include omega-3 fatty acids to support health and performance

CARBS

ROLE IN THE BODY

- Supports bone health
- Supports endurance performance as primary source of energy during activity

RECOMMENDATIONS

- Carb needs are high for endurance athletes
- 7-10 grams of carbs per kg of bodyweight

Part 2***Coach Handout: Key Takeaways***

Our Role as Coaches of Female Athletes:

Inform:

- Share resources
- Discuss common myths (loss of the MC is not normal, or healthy)
- Help athletes understand that MC health is connected to overall health and performance

Normalize:

- When coaches talk about menstrual cycle health, athletes will begin to feel more comfortable
- Allow space for athletes to learn from and support one another

Reinforce:

- Use language that reinforces healthy relationships with food and body: words like health, strength, and power
- Support athletes in developing “attunement” to their health and well-being
- Build a list of referral resources

Athlete and Physician Handout: IOC REDs Clinical Assessment Tool

IOC REDs CAT2

International Olympic Committee (IOC) Relative Energy Deficiency in Sport (REDs) Clinical Assessment Tool Version 2 (IOC REDs CAT2)



For use by medical professional only

Name: _____ Date: _____ Examiner: _____

What is the IOC REDs CAT2?

The IOC REDs CAT2 is a clinical assessment tool for the evaluation of athletes/active individuals suspected of having problematic low energy availability (LEA) leading to REDs and for guiding the determination of level of sport participation. The IOC REDs CAT2 is designed for use by athlete health and performance teams, led by a physician, in the clinical evaluation and management of athletes with this syndrome. The IOC REDs CAT2 is based on the 2023 IOC REDs Consensus Statement¹, replacing the original RED-S CAT². For more details on the development, underpinning science, and validation process, please see the IOC REDs CAT publication in the 2023 British Journal of Sports Medicine (BJSM) REDs dedicated edition³.

This tool may be freely copied and translated in its current form for use by the athlete health and performance team. We encourage sports organisations, as well as sports medicine physicians to implement the various steps of the tool into their athlete health screening, diagnosis, and treatment policies. Alterations to the tool or reproduction for publication purposes require permission from the IOC and BJSM.

Note: The diagnosis of REDs is a medical diagnosis to be made by a sports medicine physician. Clinical treatment of athletes with REDs should be implemented by an experienced, multidisciplinary athlete health and performance team.

What is REDs?

REDs is defined as:

A syndrome of impaired physiological and/or psychological functioning experienced by female and male athletes that is caused by exposure to problematic (prolonged and/or severe) low energy availability. The detrimental outcomes include but are not limited to decreases in metabolic function, reproductive function, musculoskeletal health, immunity, glycogen synthesis, cardiovascular and haematological health, which can all individually and synergistically lead to impaired well-being, increased injury risk, and decreased sports performance¹.

The cause of REDs is the clinical syndrome that results from exposure to problematic LEA where an individual's dietary energy intake is insufficient to support the energy expenditure required for health, function, and daily living once the cost of exercise and sporting activities is taken into account.

The formula representing this is:

$$EA = \frac{\text{energy intake (EI) (kcal)} - \text{exercise energy expenditure (EEE) (kcal)}}{\text{body mass (kg)}} \text{ per day}^{-1}$$

REDs Health Conceptual Model

The potential health consequences of REDs are depicted in the REDs health conceptual model. Psychological problems can be both the result of and/or the cause of REDs (*)

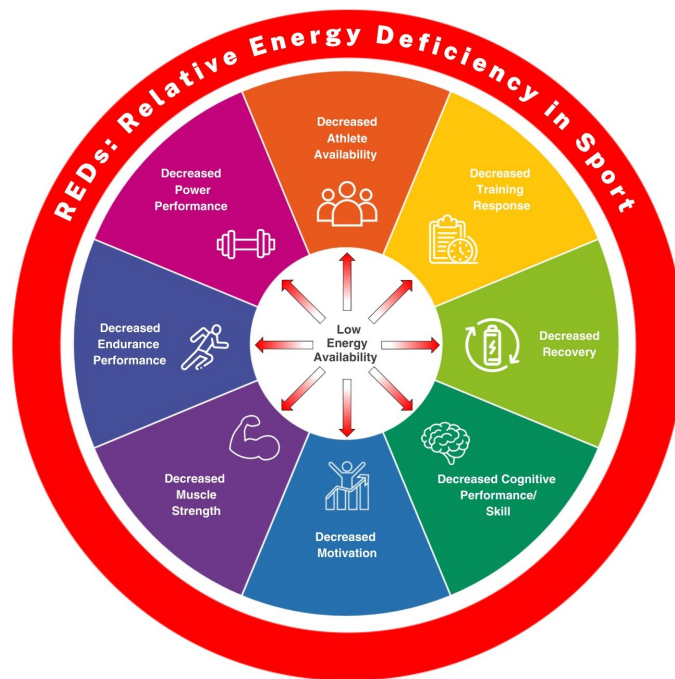


REDs Health Conceptual Model

The effects of LEA exist on a continuum. While some level of exposure to LEA is mild and transient, termed adaptable LEA (arrow depicted in white), problematic LEA is associated with a variety of adverse REDs outcomes (arrow depicted in red).

REDs Performance Conceptual Model

REDs may also affect athlete sports performance. The potential effects of REDs on sports performance are illustrated in the following model:



REDs Performance Conceptual Model

The effects of LEA exist on a continuum. While some level of exposure to LEA is mild and transient, termed adaptable LEA (arrow depicted in white), problematic LEA is associated with a variety of adverse REDs outcomes (arrow depicted in red).

Appendix F

Interview Questions and Aims

Table 1
Interview Questions and Aims

Interview Question	Aim
How did you decide to start coaching female athletes?	Signal Psychological Safety Activate Identity
Take me back to the moment when you shared information on MC health with female athletes: How would you describe that experience? Did any concerns surface for you during or after that experience?	Extract Lived Experience/Perceptions
What do you remember most from the two videos? Why did that stand out to you?	Identify Sensemaking Catalysts and Learning Facilitators
How would you describe your mindset around MC health awareness before this education series? Now let's fast-forward to today: How would you describe your mindset around MC health awareness today, after having participated in the series? What changed for you? How might that show up in your coaching or leadership in the future?	Extract Perceptions of the Learning Experience Identify Frames of Mind
What kind of mindset do you think female athletes need to buy into, or prioritize, MC health? What do female athletes need from us as coaches/leaders to cultivate a mindset that values MC health?	Explore Leadership Identity Identify Frames of Mind
What do you need as a coach/leader to create those factors you just listed for the athletes you coach?	Explore Social Context Identify Support Needs
Is there anything else you'd like to share with me about your experience with this education series or the things we discussed today?	Anchor identification Appreciative inquiry High note ending
What are three core values that show up in your coaching/leadership practice that you're most proud of?	

Appendix G

Human Subjects Approval



DETERMINATION OF EXEMPT STATUS

September 23, 2024

Dear Marsa E Daniel:

On 9/23/2024, the University of Washington Human Subjects Division (HSD) reviewed the following application:

Type of Review:	Modification / Update
Title of Study:	Coaches perceived roles in supporting MC health literacy in female athletes
Investigator:	Marsa E Daniel
IRB ID:	STUDY00019697 MOD00020307
Funding:	None

Exempt Status

HSD determined that your proposed activity is human subjects research that qualifies for exempt status (Category 2). This determination may or may not be based on the Limited IRB Review process.

Appendix G
Human Subjects Approval

