

Under-Nourished and Overlooked:
Public Health's Opportunity to Support Women and Girls in Sport

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Positionality.

I am a white, cisgender, heterosexual, straight-sized, currently able-bodied female U.S. citizen with a wide array of experiences related to sport, including gymnastics, ballet, soccer, swimming, yoga, running, hiking, triathlon, and lacrosse. I have neither felt excluded from athletics – related to my body size, gender, or anything else – nor have I encountered any financial barriers from participating in sport. Apart from one verbally and emotionally abusive coach, sports have been a source of empowerment, community, and joy in my life. This constellation of unearned privileges gives me an inherently narrow lens, and I am keenly aware that my background is not representative of all female athletes. I am committed to keeping my positionality front of mind and engaging in conversations and movements to advance equity in sport. For me, this includes reading books and listening to podcasts by female athletes with social locations different from my own, as well as citing their scholarship, honoring their feedback, considering the role of structural bias and social inequity, and working in solidarity to dismantle systemic oppression in the world of sport and beyond.

Introduction.

Despite eating disorders, disordered eating, body image disturbances, and hormonal imbalances engulfing women and girls in sport, public health has failed to respond (Ackerman et al., 2020; Austin et al., 2019; Fleshman, 2023). The pervasiveness of these issues points to a societal disease in which body shame, dieting, and over-exercising proliferate as normative, especially for athletes. Further, widespread ignorance in the field of public health and beyond gestures to a sporting culture historically defined and governed by men whose institutions, curricula, policies, and norms systematically undervalue women's health (Ackerman et al., 2020;

Austin et al., 2019; Coelho et al., 2014; Fleshman, 2023; Haslam et al., 2021; Miller et al., 2012; Verhoef et al., 2021). Integrating these conditions and their etiologies into public health discourse is crucial for defending women’s health across the lifespan, especially skeletal and reproductive functioning. This paper will situate the intersection of eating disorders, disordered eating, body image, and hormonal health among female athletes as a public health issue by reviewing the literature to define the health problem, considering the role of structural bias and social inequity, identifying relevant systems and stakeholders, and proposing opportunities for health promotion.

Review of the Literature.

Both eating disorders and disordered eating involve maladaptive eating behaviors to varying degrees – such as restricting the amount or type of food eaten, experiencing fear or shame around eating, dieting, skipping meals, fasting, bingeing, purging, and/or engaging in compensatory behaviors like over-exercise or laxative use – with young cisgender female athletes arising as a particularly vulnerable group (Sutton, 2017). Indeed, a 2018 systematic review found that the global prevalence of eating disorders more than doubled from 3.5% in 2000-2006 to 7.8% in 2013-2018, identifying both women and adolescents as high-risk demographics (Galmiche et al., 2018). Notably, these statistics do not include disordered eating, defined as maladaptive eating behaviors that do not fit the diagnostic criterion for an eating disorder, which affects an estimated 22.36% of children and adolescents worldwide, with a higher rate of 30.03% among girls compared to 16.98% among boys (López-Gil et al., 2023). They also fail to capture the increases observed during the COVID-19 pandemic: one study found that the “proportion of emergency department visits with eating disorders doubled among adolescent females” from 2019 to 2022, while another analyzed 5.2 million electronic health

records to identify that the incidence rate of eating disorders was 15.3% higher among female patients in 2020 compared to previous years – naming adolescence as an especially vulnerable stage (Radhakrishnan et al., 2022; Taquet et al., 2021).

While data in the context of sport varies, female athlete populations consistently emerge with higher rates of maladaptive eating than their non-athlete peers (Sutton, 2017). Eating disorder prevalence estimates as a whole range from 6% to 45% among athletes compared to 3% to 15% among non-athletes (Haslam et al., 2021). In the high school setting, “female athletes have a prevalence of eating disorders ranging from 14% to 32% compared with 0.5% to 5% in general high school females” and a prevalence of disordered eating of 50% “as opposed to 25% in the general high school population” (Knapp et al., 2014). Similarly, an estimated 6% to 45% of collegiate female athletes experience eating disorders “compared [to] 5% to 9% reported in the general [college] population” with disordered eating prevalence ranging from 20% to 62% “compared [to] 9% of the general adult population” (Knapp et al., 2014).

Given that eating disorder and disordered eating behaviors often develop in an effort to alter physical appearance, they very commonly co-occur with body image disturbances. Research exploring body image among female athletes reveals a discouraging reality. One study, for instance, identified “that 24.2% of Division I female athletes and 30.7% of Division III female athletes were either very dissatisfied or mostly dissatisfied with their overall appearance” (Kato et al., 2011). Other research “tells us that the majority of female collegiate athletes are unhappy with their bodies, and 90 percent of those feel they need to lose weight, an average of thirteen pounds” (Fleshman, 2023, p. 81). For female athletes, this discontent may relate to aesthetics as well as performance, as many face implicit and explicit pressures to manipulate their bodies for their sport. Former pro-runner Lauren Fleshman puts it like this: “Not only are

[female athletes] subjected to the cultural forces that associate Western beauty standards with personal worth, [but] there is an even tighter standard within sports: an ideal weight, an ideal body shape, one that almost nobody achieves without harming themselves” (Fleshman, 2023, p. 83). Many coaches and athletic departments, for instance, use body composition testing to track the “weight, body fat, and muscle mass” of their athletes, creating a “strong focus on manipulating energy and nutrient intake for the purposes of making weight, manipulating body composition, and improving athletic performance” (Kuzma, 2023; Haslam et al., 2021). By conflating weight and body composition with performance, as well as contributing to the myth that athleticism looks muscular and lean, these practices likely fuel the inequitable burden of eating disorders, disordered eating, and body dissatisfaction among female athletes compared to their male and non-athlete peers. Social media also plays a role: girls may be more likely than boys to be exposed to photos, videos, and other online content that “promote[s] slimness as an ideal form of beauty,” with popular hashtags like #Fitspo or #Fitspiration “endors[ing] problematic attitudes towards fitness, body image, and restrictive eating in pursuit of a fit-and-thin body ideal” (Zhang et al., 2021; Alberga et al., 2018).

Numerous studies confirm that disordered eating, eating disorders, and body image challenges undermine both physical and mental health. While symptoms and sequelae vary by athlete and type of maladaptive eating behavior(s), they often include anxiety, irritability, social isolation, decreased performance and energy levels, gastrointestinal distress, menstrual irregularities, compromised bone mineral density, stress fractures, recurring injuries, dehydration, malnutrition, and/or hair loss (Coelho et al., 2014; Knapp et al., 2014; Mountjoy et al., 2018). Hormonal health is particularly salient in the context of sport, as menstrual disturbances very commonly co-occur with disordered eating and eating disorders while silently

enveloping female athletes: among women who exercise regularly, an estimated 50% exhibit oligomenorrhea, or menstrual irregularities, and about 30% experience secondary functional hypothalamic amenorrhea (FHA), or the absence of at least three consecutive menstrual cycles post-menarche (Meczekalski et al., 2014; De Souza et al., 2009). The estimated prevalence of secondary FHA among women participating in sports emphasizing leanness, such as running, gymnastics, or dance, jumps to an astonishing 69% (Nazem & Ackerman, 2012). By contrast, the American Society of Reproductive Medicine estimates that secondary FHA impacts just 3% to 5% of the broader population of adult women in the United States (Meczekalski et al., 2014). Prevalence estimates for primary FHA, “a delay in the age of menarche (no menses by age 15 years in the presence of normal secondary sexual development or within 5 years after breast development if that occurs before the age of 10 years)” vary but still disproportionately impact female athletes compared to their non-athlete peers (Nazem & Ackerman, 2012). Illuminating that hormonal disturbances are a common reality for female athletes, Gimunová et al. (2022) reviewed the literature for available data on primary FHA, secondary FHA, and oligomenorrhea. The table below offers a snapshot of mean prevalence estimates by sport (Gimunová et al., 2022).

Sport	Primary FHA Prevalence	Secondary FHA Prevalence	Oligomenorrhea Prevalence
Rhythmic Gymnastics	24.48%	30.61%	43.59%
Artistic Gymnastics	8.33%	23.67%	31.17%
Soccer	20%	5%	15%
Swimming	19%	8.73%	22.45%
Cycling	n/a	55.6%	5.60%
Triathlon	n/a	40%	n/a
Boxing	n/a	n/a	54.6%
Volleyball	0%	20.55%	11.1%
Ice Hockey	15%	n/a	71.5%
Running	11.4%	17.17%	24.48%
Lightweight Rowers	n/a	n/a	83.3%

Notably, many female athletes who present with primary FHA, secondary FHA, or oligomenorrhea receive a prescription for an oral contraceptive pill (OCP), which neither treats nor addresses the underlying etiologies of under-eating, over-exercise, and/or psychological stress (Gordon et al., 2017). Compared to a healthy menstrual cycle, which involves over twenty endogenous hormones, OCPs administer only one or two of these hormones exogenously: estrogen, progestin, or both (Cooper et al., 2022). As such, neither OCPs nor related synthetic hormonal therapies replace the benefits of natural, regular menstrual cycles. The Endocrine Society Clinical Practice Guidelines agree: “We suggest against patients with FHA using OCPs for the sole purpose of regaining menses” (Gordon et al., 2017). Since OCPs induce a withdrawal bleed, they may artificially deflate prevalence estimates of menstrual irregularities among female athletes who erroneously assume a balanced hormonal profile.

Adverse health outcomes related to prolonged menstrual disruptions extend far beyond the reproductive system, perhaps most notably catalyzing premature osteopenia and osteoporosis (Meczekalski et al., 2014). Numerous studies distinguish oligomenorrhea and FHA as risk factors for stress fractures and low bone mineral density (BMD), primarily related to insufficient endogenous estrogen production, with one group of researchers identifying a 4.5 times higher injury rate and significantly lower BMD among female endurance athletes with FHA compared to their menstruating peers (Heikura et al., 2018). Another study identified that “nearly half [of female distance runners] had a history of amenorrhea (absence of periods) or other menstrual dysfunction, and a shocking 42 percent had low bone density” (Fleshman, 2023, p. 49). Given that adult women experience osteopenia and osteoporosis at a rate four times higher than men and that “approximately 40% to 60% of adult bone mass is accrued during the adolescent years,” developing public health programming and interventions to prevent hormonal disturbances

among young female athletes is essential for addressing this disparity (Alswat et al., 2017; Golden et al., 2014). Crucially, just as OCPs do not resolve the root cause of hormonal imbalances, they also fail to protect optimal bone mineral density. The Endocrine Society Clinical Practice Guidelines writes: “We suggest educating patients regarding the fact that OCPs may mask the return of spontaneous menses and that bone loss may continue, particularly if patients maintain an energy deficit” (Gordon et al., 2017).

Despite the well-established pervasiveness and consequences of menstrual irregularities in the world of sport, awareness among female athletes and those entrusted to care for their bodies remains alarmingly low. Indeed, female athletes report a “normalization [of] amenorrhea by doctors, coaches, and other athletes” that leads them to perceive missing menstrual cycles as “a normal phenomenon, a sign of fitness” (Verhoef et al., 2021). 35% of exercising Australian women believe menstrual dysfunction as “normal” for athletes and 45% do not believe that amenorrhea impacts bone health, while 44% of adolescent female athletes “answered that losing their period was a normal response to a high level of training” (Miller et al., 2012; Armento et al., 2021). In the absence of thoughtful and far-reaching interventions, the bodies and minds of female athletes who believe their menstrual disturbances to be ordinary will continue to pay the price for related sequelae, as well as detrimental underlying behaviors such as disordered eating and excessive training.

While upstream determinants of eating disorders, disordered eating, body image distress, and hormonal imbalances among female athletes remain open to debate, potentially modifiable risk factors include sexism in sport, lack of knowledge or inability to meet nutritional needs, narrow cultural norms around what an athlete “should” look like, coaches weighing or performing body composition tests on their athletes, conflation of weight and/or body

composition with performance, and/or sport-specific expectations and cultural messaging that encourage restriction, rigidity, perfectionism, and control around food and exercise.

Structural Bias and Social Inequity.

Multidisciplinary disregard of eating disorders and disordered eating illuminates structural bias that keeps these conditions under-studied, under-acknowledged, and under-funded. Although eating disorders cost the United States approximately \$64.8 billion every year, “federal research funding for eating disorders amounts to a small fraction of funding allotted to other serious illnesses,” with the National Institute of Health’s 2017 funding “for Alzheimer’s disease at approximately \$239 per affected individual, autism at \$109, and schizophrenia at \$69,” compared to just “\$1 per affected individual” for eating disorders (Deloitte Access Economics, 2020; Austin et al., 2019). Furthermore, neither the Center for Disease Control nor “federal public health officials collected nationally representative data on eating disorders among young people” from 2013 to the time of this writing, in 2023 (Gaffney, 2021). Bryn Austin, “a professor and director of the Strategic Training Initiative for the Prevention of Eating Disorders at Harvard T.H. Chan School of Public Health” calls the dearth of equitable funding and consistent data a “real gap in our public health systems” that positions those at risk for or currently experiencing eating disorders and disordered eating at a distinct disadvantage (Gaffney, 2021).

Female athletes with eating disorders and disordered eating whose social location does not align with the “skinny, white, affluent girls” stereotype bear the brunt of such inequities (Sonneville & Lipson, 2018). While multiple studies have identified a higher risk of eating disorders and disordered eating among marginalized populations, such as racial and sexual minorities, “there are significant racial disparities in the onset, diagnosis, and treatment of eating

disorders” that overwhelmingly burden non-white and other marginalized groups (Calzo et al. 2017; Kwan et al. 2018; Gaffney, 2021). Such discrimination means that older athletes, “higher-weight individuals, racial/ethnic minorities, those from socioeconomically disadvantaged backgrounds,” non-straight people, and/or those with disabilities “may not recognize their need for treatment, may not be properly screened for eating disorders, and/or may not be referred to treatment” (Sonneville & Lipson, 2018). Left unaddressed, the narrow, exclusionary perceptions of who does (and who does not) experience eating disorders and disordered eating allow them to persist, unacknowledged and unseen, especially among those assumed not to suffer or be at risk.

Similar disparities, exclusion, and inequities exist in the world of sport. One team of researchers reviewed three major sports and exercise medicine journals to find that women are consistently and “significantly under-represented,” with 61% of participants across 1,382 studies being male (Costello et al., 2014). This inequality fluctuates by topic. A scoping review by Patel et al. (2021), for instance, identified 250 studies related to “high-dose exercise-induced cardiac outcomes” to find that, relative to males, “the overall mean percentage of females recruited was 18.2%” (Patel et al., 2021). The same motif lurks onto fields, tracks, trails, and courts, with girls “dropping out of sports at twice the rate of their male peers by age fourteen, and over half leav[ing] sports completely by age seventeen” (Fleshman, 2023, p. 13). A report by the Women’s Sports Foundation explores reasons for this, as well as the fact only 36.4% of girls are “currently playing sports” compared to 45.6% of boys, including “gendered cultural norms” that favor boys as more athletic and “a lack of female [representation] on...coaching staff and in other prominent administrative roles within sport organizations” that “espouse messages to girls that they do not belong in sport” (Zarrett, 2020). Indeed, “women’s sports receive around 1% of sponsor investments and less than 10% of media coverage compared to men’s sports,” highlighting the

gender-based discrimination ubiquitous in sport in no uncertain terms (*Watch to Change: Equal Support for Women's Sports*, 2023).

Alongside the physical and mental demands of their sport, then, female athletes are forced to contend with structural bias and social inequity that privilege their male peers – which intensify for those holding intersecting marginalized identities. These injustices may pervade their very bodies and minds, manifesting as disordered eating behaviors, body image distress, and menstrual irregularities. Situating such maladies as embodiments of gender-based oppression is not new: in 1993, “feminist theorist Susan Bordo argued that U.S. girls’ and young women’s eating problems are ultimately a product of growing up in a patriarchal culture – particularly one that places paramount importance on physical appearance while simultaneously defining normative femininity in terms of thinness and bodily control” (Beccia et al., 2022). Sporting contexts that conflate performance with weight, normalize disordered eating behaviors, and dismiss hormonal disturbances as ordinary only aggravate this harmful phenomenon. In short, the time for public health to engage with these issues and develop meaningful interventions to safeguard female athletes is long overdue.

Relevant Systems and Stakeholders.

Alongside the field of public health, systems and stakeholders responsible for protecting the mental and physical health of female athletes span coaches, parents, medical providers, trainers, administrative bodies in sport and sports medicine, athletic departments, and beyond. Among these, coaches and the institutions that govern them are uniquely positioned to champion healthier relationships with food, body, and sport among female athletes of all levels.

Coaches. Holding enormous influence over female athletes, coaches hold the potential to either perpetuate or prevent eating disorders, disordered eating, body image disturbances, and hormonal imbalances on their teams. Unfortunately, many remain ignorant of these topics and unprepared to address them in meaningful, effective ways. One study, for instance, found that “more than 60% of elite [female] athletes from leanness focused and nonleanness focused sports report... pressure from coaches concerning body shape,” while another interviewed eight female athletes on national teams to find that “all...recalled specific negative comments that [their coaches] made about their bodies” (Kong & Harris, 2014; Wilson & Kerr, 2021). Many athletes – including Kara Goucher, former pro-runner, and Christine Sinclair, the world’s all-time leading career goal scorer in soccer – have shared stories of themselves or their teammates hiding food from coaches who attempted to control what and how much their athletes ate (Cain, 2019; Sinclair & Brunt, 2022). These pressures extend beyond the highest levels of sport: collegiate female athletes from the University of Oregon, Wesleyan University, and the University of Colorado, for instance, have spoken out about coaching staff fostering a pro-eating disorder environment through fixation on diet, weight, and body fat percentage (Kuzma, 2023). As former pro-runner Lauren Fleshman (2019) puts it:

Coaches are the ones with the power. They bear the responsibility for creating an environment that prioritizes health over performance. If coaches are found to create or contribute to a culture of negative body image or eating disorders, they are committing abuse, and they should be fired.

Even if coaches are aware of the proliferation of eating disorders, disordered eating, body image challenges, and/or hormonal disturbances among female athletes, they likely remain unequipped to prevent, identify, and manage them on their teams. By and large, “eating disorders in sport is

not a regular or mandatory topic at coaching clinics, and it's not part of the annual coach training" (Steil, 2021). The same holds true for mental health as a whole: among youth coaches, "only 18%...reported feeling highly confident in their ability to link athletes to mental health resources," while 67% expressed interest in gaining education on this issue (Anderson-Butcher & Bates, 2022). Further, knowing how to discuss socially taboo topics like menstruation may be uncomfortable for coaches, especially those who identify as male. This is especially concerning given that the National Collegiate Athletic Association (NCAA) reports a male head coach for over half (58.7%) of collegiate women's teams (NCAA, 2022). The Aspen Institute's Project Play records an even wider disparity at the youth level, with 74% of coaches as male for teams across genders (Anderson-Butcher & Bates, 2022). Despite these limitations and shortcomings, the assumption that coaches care for the mental, physical, and emotional well-being of their athletes designates them as a fundamental group to include in conversations, efforts, and interventions toward health promotion.

Governing Bodies. Governing bodies in sport at all levels – including sport-specific, state, national, and beyond – are widely neglecting the issues of eating disorders, disordered eating, body image disturbances, and hormonal imbalances among the female athletes under their jurisdiction. Two organizations, the National Collegiate Athletic Association (national) and the Oregon School Activities Association (state) provide case studies to illustrate this disappointing reality.

The National Collegiate Athletic Association (NCAA) is a nonprofit organization that manages athletics across 1,098 colleges and universities in the United States and Puerto Rico, spanning 102 athletic conferences with nearly 500,000 student-athletes (*What is the NCAA?*, 2023). NCAA members – including coaches, college presidents, athletic directors, and other

faculty – serve on committees to “propose rules and policies surrounding college sports,” “ultimately decid[ing] which rules to adopt...and implement,” while employees at “the NCAA’s Indianapolis headquarters interpret and support member legislation, run all championships, and manage programs that benefit student-athletes” (*What is the NCAA?*, 2023). Policies, protocols, and procedures extend across a broad array of topics, such as listing banned substances like stimulants and narcotics, establishing Concussion Safety Protocol Management, and outlining eligibility requirements for those participating in college-level sport (NCAA.com, 2023).

While the NCAA website provides fact sheets and blog posts on topics like disordered eating, eating disorders, body image, and amenorrhea, they lack any formal guidance, policy, or training for preventing or handling these issues in any significant way. Lauren Fleshman (2023) summarizes NCAA’s posture toward eating disorders like this:

When it comes to addressing the largest threat to athlete mental health that disproportionately affects women, the disease that destroys major organs and body systems, depletes bones, and has the highest mortality rate of all mental health disorders, the NCAA takes a libertarian approach: Coaches can do something to prevent and manage them, or not, and they aren’t held responsible either way. Compare this to the fact that the NCAA, when confronted with concussion research and potential liability, created research-backed and strictly enforce checklists and policies for head injuries that all programs must adhere to (p. 56).

Indeed, although searching ‘eating disorder’ on the NCAA website brings forward 113 results, none of the top three acknowledge the NCAA as holding any responsibility around or ownership of this pressing issue. The first yields a 2014 blog concluding that “athletics departments are encouraged to develop a treatment protocol for student-athletes with eating disorders,” the

second provides downloadable fact sheets on energy availability and orthorexia nervosa from 2016, and the third links to a 2014 blog declaring that “stakeholders in the collegiate athletic community play key roles in the prevention of disordered eating in athletes” (Thompson, 2014; *Disordered Eating*, 2016; Voelker, 2014). At the time of this writing, then, the top three ‘eating disorder’ search results are at least seven years old and fail to provide tangible, standardized guidance for preventing or navigating eating disorders among female athletes. Searching ‘body image’ provides an impressive 1,830 links but similarly falls flat. While two of the top three results review programs that seem to nurture positive body image among female collegiate athletes, one (Bodies in Motion) occurred in 2017 with results published in a closed access peer-reviewed 2019 empirical evaluation (Voelker et al.) and the other (The Female Athlete Body Project) ran from 2012 to 2017 (Stewart et al., 2015). The third links to one of the previously mentioned 2014 blog posts that overviews eating disorders. Search results for ‘amenorrhea’ include three 2014 blog posts that reference the topic followed by a broken link posted in 2021. These resources not only place the onus on website visitors to intentionally seek them out, but they also lack concrete tools and guidance for a curious coach, athletic director, athlete, or other stakeholder to take meaningful action. Taken together, the NCAA’s laissez-faire stance on these pervasive issues directly contradicts the heart of their mission to “keep college athletes safe,” “working hard to protect them physically and mentally” (*Mission and Priorities*, 2021).

The Oregon School Activities Association (OSAA) functions similarly to the NCAA at a smaller scale, holding jurisdiction over 295 high schools in the state of Oregon. Alongside “standard[izing] rules of eligibility and competition,” the non-profit, board-governed organization determines training requirements for high school coaches across the state (*About the OSAA*, 2023). OSAA’s required certifications and courses for coaches, summarized below, have

no reference to eating disorders, disordered eating, body image, or hormonal health (*OSAA Information and Resources for Coaches, 2023*):

Course	Frequency	Sport
NFHS Fundamentals of Coaching	Once	All
Concussion Recognition & Management	Annually	All
Heat Illness Prevention	Every 4 years	All (annually for football)
Anabolic Steroids and Performance – Enhancing Substances	Every 4 years	All
Interrupting and Preventing Discriminatory Acts Training	Once	All
Racial Equity Training	Optional	n/a
Spirit Safety Clinic	Annually	Cheerleading, dance, and drill team
OSAA Football Certification	Annually	Football
Sudden Cardiac Arrest	Annually	Football
NFHS Football Tackling	Annually	Football
First Aid	Optional	Varies by district/school

Although equipping coaches to prevent and identify conditions like sudden cardiac arrest (SCA), and heat illness holds great importance, their relative burden pales in comparison to that of disordered eating and eating disorders. Approximately 0.31 per 100,000 female high school athletes will experience SCA, while high school athletes of all genders experience heat illness at an estimated rate of 1.6 times per 100,000 games or practices (Toresdahl et al., 2014; Yard et al., 2010). Meanwhile, the prevalence of eating disorders among female high school athletes ranges from 14% to 32%, with disordered eating impacting 50% (Knapp et al., 2014). Even so, the OSAA lacks substantial policies and resources around this issue. Reminiscent of the NCAA, searching ‘eating disorder,’ ‘body image,’ or ‘amenorrhea’ on the OSAA website leads to a handful of related blogs and handouts (*Oregon School Activities Association, 2023*). A School Sports Pre-Participation Examination Medical History form, for instance, includes one yes/no question related to eating disorders (“Have you ever had an eating disorder?”) and three related to menstrual health (“Have you ever had a menstrual period?”, “How old were you when you had your first menstrual period?”, and “How many periods have you had in the last 12 months?”)

– with no concrete resources or support for those struggling (*History Form*, 2017). Another link leads to an OSAA Equity and Diversity Newsletter from March 2022 with a vague encouragement to coaches to “discuss the connection between sport and women’s health and fitness and foster discussion about the correlation between athletic participation, women’s health risk and prevention of disease” (Pennepacker, 2022). Other than sweeping generalizations, such as “coaches should not pressure female student-athletes to conform to a certain body image or physique,” the newsletter offers no tangible guidelines for facilitating effective discussions, identifying at-risk athletes, or seeking further training (Pennepacker, 2022).

Taken together, both the NCAA and OSAA overlook the reality of eating disorders, disordered eating, body image distress, and hormonal disturbances in the world of sport. Resources on these issues are neither comprehensive nor readily available, and relevant policies and programming are notably absent. Both institutions are responsible for championing the mental, emotional, and physical health of female athletes under their jurisdiction – which should include the development and implementation of interventions that protect female athletes, as well as educate and regulate the people and institutions who oversee them.

Opportunity for Health Promotion.

The well-established burden of eating disorders, disordered eating, body image disturbances, and hormonal imbalances among female athletes demands health promotion strategies that acknowledge structural biases and social inequities, while engaging relevant systems and stakeholders. Given their extensive power and reach, governing bodies in sport like the NCAA and OSAA are uniquely positioned to spearhead such efforts. By collaborating with public health professionals, these institutions should develop and require annual training for all

coaches who work with female athletes. Spending hours with their team during practices and games, coaches are well-placed to support the mental, physical, and emotional health of female athletes. They may be among the first to spot early signs of disordered eating or eating disorders – such as weight changes, increased irritability or fatigue, and/or decreased performance and endurance – and they are leaders who help define their team’s culture and norms. By requiring a course or certification for coaches around how to navigate and prevent eating disorders, disordered eating, body image disturbances, and hormonal imbalances, the NCAA and OSAA can harness this potential and generate widespread healing change.

This approach echoes recommendations in the body of literature that emphasize education as a powerful tool for the prevention of eating disorders among girls and women in sport (Coelho et al., 2014; Ackerman et al., 2020). Coaches need not be experts on these topics; rather, “they just need to know enough to recognize the warning signs, know when to act, and know where to turn” (Steil, 2021). As one team of researchers wrote, “educational initiatives should underscore the positive aspects of energy, namely, that food is fuel; and fuel is needed for performance,” as well as “positive communication around menstrual cycles and body image; appreciation of athletes/sports at higher risk; and best practices pertaining to body composition/weight assessment protocols” (Ackerman et al., 2020). The aim of such programming should include eliminating “unhealthy coaching and nutrition practices,” as well as “toxic training environments featuring abusive body shaming,” that allow eating disorders, disordered eating, body image distress, and hormonal disturbances to proliferate as normative (Ackerman et al., 2020).

Effective trainings must also explicitly name the structural biases and social inequities at play, while highlighting that eating disorders, disordered eating, body image disturbances, and

hormonal imbalances impact athletes of all social locations – and that those who hold marginalized identities may be especially at risk (Calzo et al. 2017; Kwan et al. 2018; Gaffney, 2021). Coaches should be encouraged to reflect on and identify their own biases around gender, age, weight, size, race, socioeconomic status, and/or sexuality – as well as how these relate to institutional and systemic oppression – to cultivate a team environment that welcomes female athletes of all backgrounds and body types. Coaches may be aware, for instance, to avoid body shaming, but they may not understand how complimenting an athlete’s physique or referencing an “ideal” performance weight may also cause harm. Such comments, even if well-intentioned, reinforce the assumption that athleticism is tied to appearance, directing an athlete’s attention toward her own body and, by extension, how she might manipulate her food or exercise to achieve a certain weight, body fat percentage, or aesthetic.

Educating coaches to celebrate the athletic potential of girls and women of all body types is especially important during puberty, when weight gain, increases in body fat percentage, and even temporary plateaus or decreases in athletic performance are normal, healthy, and expected (Coelho et al., 2014; Fleshman, 2023). Coaches must nurture self-compassion and patience among their female athletes going through puberty, affirming “that [these young women] actually *need* to allow this plateau to happen, that it is a true rite of passage that should be welcomed, because they will never reach their ultimate potential without it” (Fleshman, 2023, p. 95). Required trainings should equip coaches with basic body literacy around menstrual health, including the understanding that missing periods and/or delayed menarche are warning signs of under-eating, over-training, or psychological stress that demand attention and care from a qualified medical professional – not normal occurrences to dismiss or ignore (Gordon et al., 2017). Learning how to speak openly and tactfully about puberty and menstruation combats the

patriarchal stigma of female physiology in the world of sport and beyond, encouraging young athletes to nourish and embrace their changing bodies rather than fear and resist them.

While advising athletes on what and how much to eat falls beyond a coach's scope, they should learn how to discuss nutrition safely and recognize early warning signs of disordered eating, eating disorders, and undernutrition. Coaches should discourage their teams from dieting and restrictive eating of any kind, as well as recognize buzz words like cheat meal, clean eating, good food, bad food, and detox that may indicate or precipitate unhealthy relationships with food. This matters for athletes of all ages, but particularly for adolescents: "Teenage dieting is the usual antecedent to anorexia and bulimia nervosa. In prospective studies, dieting has been associated with a fivefold to 18-fold increased risk of developing an eating disorder" (Findlay, 2021). Coaches should also emphasize that shame, guilt, anxiety, and fear have no place on a healthy plate, pointing their athletes toward nutrition professionals who practice from weight-inclusive and anti-diet frameworks like Intuitive Eating for further support (Tribole & Resch, 2020). The training should outline red flags of disordered eating, eating disorders, and under-eating – including perfectionism, drive for thinness and/or muscularity, training above and beyond what is required, stress fractures, recurrent injuries, rapid weight changes, dizziness, lightheadedness, and/or mood swings – and direct coaches toward local resources and referral networks for athletes who are struggling (Mountjoy et al., 2018). Evaluating the coach's learning experience at the end of the training, as well as collecting their remaining question(s), will enable governing bodies to better understand coaches' needs and update the curriculum for the following year.

Annual training requirements will allow coaches to re-engage with these topics, empowering them as agents of change to protect female athletes against eating disorders,

disordered eating, body image disturbances, and hormonal imbalances that jeopardize both athletic potential and optimal health. While this offers a promising first step, the NCAA and OSAA should also work to integrate a system of accountability in which athletes and other stakeholders can report coaches whose words and/or behaviors create unhealthy environments related to food, body, and sport. Further, they should develop specific policies for determining when an athlete is too physically and/or mentally compromised to participate in her sport, as well as when she can safely return to play. In a cultural moment when eating disorders, disordered eating, body image distress, and menstrual irregularities envelop girls and women in sport, such health promotion strategies are vital for enhancing their mental and physical health across the lifespan – in the world of athletics and beyond.

Conclusion.

Participation in sport can generate self-esteem, community, enjoyment, and strength – but the predominance of eating disorders, disordered eating, body shame, and hormonal imbalances among female athletes threatens to undermine these benefits. As current systems and stakeholders overwhelmingly disregard these matters, developing relevant health promotion strategies can narrow this pressing gap. One particularly compelling opportunity for public health professionals is partnering with governing bodies in sport, such as the National Collegiate Athletic Association and Oregon School Activities Association, to create annual training requirements for coaches to learn how to build a team culture that nurtures positive relationships with food, body, and sport; how to recognize when a female athlete needs further support; and how to connect her with appropriate resources and referral networks. Mobilizing the field of public health to take the lead in thoughtfully preventing and addressing these issues holds great

potential, moving us closer to a reality in which women and girls of all social locations are empowered to engage in sport, nourished and embraced.

Citations.

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