# Menstrual Cycle, Hormonal Contraceptives and Pelvic Floor Dysfunction in Ladies Gaelic Football and Camogie: Prevalence of Use, Side-effects and Perceived Symptomology

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# Menstrual cycle, hormonal contraceptives, and pelvic floor dysfunction in ladies Gaelic football and Camogie: prevalence of use, side-effects, and perceived symptomology

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**ABSTRACT**

This study investigated the prevalence of hormonal contraceptive (HC) use and perceived side-effects, menstrual cycle (MC)-related symptoms and perceived influences on performance, and pelvic floor dysfunction (PFD) screening items among female athletes in ladies Gaelic football and camogie. An anonymous online survey was completed by 455 athletes currently competing in these sports in Ireland. Participants provided information on demographics, sport participation, MC characteristics, HC use, perceived symptomatology, and PFD screening items. In this cohort, 51.7% of respondents were current HC users, with the oral contraceptive pill being the most commonly reported HC type (69.2%). Among HC users, 62.0% self-reported negative side effects with fatigue (37.2%) and mood changes (35.0%) the most prevalent. Of the non-HC users, 97.7% self-reported MC-related symptoms, with abdominal cramping (84.0%) and fatigue (82.2%) being the most prevalent. Pelvic floor dysfunction-related symptoms were also common, with urinary urgency (47.8%), genital pain (44.3%) the most experienced. These findings demonstrate a notable prevalence of HC use, MC-related symptoms, and PFD symptoms in this population. This study may provide a rationale for increased education and support for female athletes, coaches, and volunteers in Gaelic games regarding these health issues, as well as the development of individualised strategies for managing symptoms. Future research should focus on PFD in Gaelic Games athletes, incorporating objective measures and exploring interventions to mitigate these issues.

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**KEYWORDS**
Gaelic games; female athlete; pelvic floor dysfunction

## Introduction

Gaelic Games, the national sports of Ireland, encompass Gaelic football, ladies' football, hurling, camogie (kuh·mow·gee), rounders, and handball. Ladies' football and camogie are female-only sports; both are invasion games played between two teams of 15 players, with camogie distinguished by the use of sticks. These sports resemble other invasion games by combining offensive and defensive strategies and are characterised by high-intensity, intermittent match play (Malone et al. 2023; Duggan et al. 2024). Despite their amateur status, players compete at two distinct levels: club (non-elite) and intercounty (elite). Intercounty players are club athletes identified as high performers and selected to represent their county at the elite level. Although still amateur, these elite teams often commit to demanding weekly training schedules that include multiple pitch- and gym-based sessions in addition to regular match play (Duggan et al. 2020).

The menstrual cycle (MC) is a complex biological process characterised by the cyclical fluctuation of ovarian hormones, primarily oestrogen and progesterone, in females of reproductive age who are not using hormonal contraceptives (HCs) or exogenous hormones, spanning from menarche to menopause. It has been hypothesised, based on a mechanistic understanding of the actions of ovarian sex hormones, that these hormonal fluctuations during specific phases of the MC, such as the early follicular phase or pre-menstrual phase, may negatively impact athletic performance (Carmichael et al. 2021). However, current evidence does not substantiate this hypothesis (McNulty et al. 2020; Colenso-Semple et al. 2023). Despite empirical evidence suggesting that MC phase does not significantly influence objective performance measures, the lived experiences of female athletes present a contrasting narrative. A substantial proportion of female athletes report negative MC-related symptoms, such as abdominal cramping, fatigue, mood changes, and back pain (Martin et al. 2018; Nolan et al. 2023; Brown et al. 2024). Additionally, many athletes (50.0–84.6%) perceive

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these symptoms to adversely affect their athletic performance (Carmichael et al. 2021). Athletes are more likely to perceive a negative impact on their performance during the early follicular and late luteal phases, which coincides with higher reports of symptoms (Brown et al. 2021; Carmichael et al. 2021). This perceived symptomology and its impact on performance are marked by significant individual variability. To comprehensively understand the potential influences of MC phase on athletic performance, it is essential to adopt a biopsychosocial perspective, considering both physiological parameters and the lived experiences of athletes. Given the risk of MC dysfunction among female athletes, which may present in many ways including irregular menses, heavy menstrual bleeding, it is important to gather epidemiological data on MC dysfunction to safeguard both athletic performance and long-term health (Gimunová et al. 2022). Symptoms often associated with pelvic floor dysfunction (PFD) such as urinary incontinence have also been noted as potential symptoms of MC dysfunction (Mountjoy et al. 2023).

Hormonal contraceptives involve the administration of exogenous hormones that disrupt the endocrine regulation of the female reproductive system, primarily by downregulating the secretion of endogenous gonadal hormones (Elliott-Sale et al. 2020). Hormonal contraceptives are widely utilised by a sizeable percentage of individuals in both the general population (~28–43%) (Cea-Soriano et al. 2014; United Nations, Department of Economic and Social Affairs, Population Division 2019) and athletic populations (~40–51%) (Martin et al. 2018; Nolan et al. 2023). There are multiple motivations for the use of HCs including pregnancy prevention, managing MC-related symptoms and to control or adjust when bleeding occurs (Cheng et al. 2021). These contraceptives are categorised based on their constituent hormones: combined HCs contain both oestrogenic and progestin components, while others consist solely of a progestin component. The delivery methods for HCs include injections, transdermal patches, intrauterine devices, arm implants, and vaginal rings, with the oral contraceptive pill (OCP) being the most prevalent method among young women in general and athletic populations (Daniels and Abma 2020; Flood et al. 2024).

Combined OCPs, the most common form, can be classified as monophasic (consistent dosage), biphasic (two dosage levels), or triphasic (three dosage levels), based on the variation in the dosage of exogenous hormones throughout the OCP cycle. Additionally, OCPs are often categorised by 'generation,' which refers to the specific form of progestin used. Ethinyl oestradiol, the most commonly used oestrogenic component in OCPs, differs chemically and molecularly from 17 beta oestradiol, a bioidentical hormone. This distinction may be relevant when hypothesising the potential influences that HCs may have on athletic performance, negative side-effects, and adaptive responses to exercise training. A sizeable portion (~40%) of athletes report negative side effects (e.g., mood changes) of HC use (Martin et al. 2018). Current evidence suggests that OCPs do not significantly influence adaptations related to hypertrophy, power, or strength (Nolan et al., 2024). However, further research is necessary to fully elucidate the potential influences of HCs on longer term (>16 weeks) chronic adaptations to exercise training.

The pelvic floor consists of muscles and connective tissue which support the bladder, bowel, and uterus (Donnelly and Moore 2023). Symptoms of PFD are highly prevalent in female athletes (including nulliparous women), with athletes reporting experiences of urinary incontinence, i.e., 'leaking' (19–88%), anal incontinence (12–17%), pain during sex (63.5%), vaginal bulge (42%), and chronic pelvic pain (9%) (Culleton-Quinn et al. 2022; Rodríguez-Longobardo et al. 2024; Bosch-Donate et al. 2024; McCarthy-Ryan et al. 2024). Post-partum athletes (Donnelly and Moore 2023) and those competing in high-impact sports display higher prevalences of PFD (Nygaard and Shaw 2016).

Pelvic floor dysfunction has a meaningful impact on athletes, leading to emotional and social stress, modification of training, limited fluid intake, use of pads/tampons, and even premature retirement (Culleton-Quinn et al. 2022; Johnston et al. 2023; Bosch-Donate et al. 2024). Symptoms of PFD may be alleviated through interventions such as pelvic floor muscle training (Rodríguez-Longobardo *et al*., 2024). Despite its high prevalence and substantial impact, both athlete and coach knowledge relating to PFD is generally poor (Bosch-Donate et al. 2024). As an illustrative example, a significant proportion of female strength athletes self-reported being unaware of pelvic floor muscles (20.6%) or pelvic floor muscle training (42.8%) (Skaug et al. 2022).

This study aimed to investigate the prevalence of HC use, HC- and MC-related negative side effects and perceived performance effects, and the prevalence of PFD symptoms in ladies Gaelic football and camogie athletes currently competing on the island of Ireland. Ladies Gaelic games are understudied in the context of empirical research, and this study aims to provide important descriptive data to inform future research directions and policies. Female athletes in Gaelic games may be significantly impacted by MC symptoms, hormonal contraception-related negative side effects, and pelvic floor considerations, yet these topics have received little attention in this sporting context. Understanding the prevalence and nature of

these experiences in Ladies Gaelic football and camogie can inform targeted education and support – especially as these sports in Ireland rely on volunteer coaching staff, and resources are limited. By contextualising female health within Gaelic games, our study aims to highlight specific needs and prompt evidence-based strategies to enhance athletes' performance, health, and well-being.

## Methods

### Experimental approach

Ethical approval was granted by the DCU School of Health and Human Performance local research ethics committee . No validated questionnaires for MC- and HC-related investigations in athletes exist, thus the survey in this study was adapted from previously used questionnaires in this research domain (Martin et al. 2018; Heyward et al. 2024). Screening items related to PFD were sourced from the PDF-sentinel, a screening-tool developed through international Delphi consensus (Giagio et al. 2023). The final questionnaire (available at osf.io) included questions which examined self-reported demographics, sport participation, MC characteristics, HC use, MC/HC-related perceived symptomology and influence on athletic performance, and PFD screening items. Questions consisted of single-, and multiple-choice items, and open-ended questions. The draft survey was reviewed and pilot-tested by a small group of female Gaelic games athletes ($n = 5$) to improve clarity and face validity. No alterations were made to the questionnaire following piloting. The online survey was administered via Google Forms, with data collection lasting for a period of 1 month from 14 February 2024. All participants provided informed consent electronically at the start of the survey by affirming a consent statement.

### Participants

Self-identifying adult ladies Gaelic football and camogie athletes ($N = 455$) volunteered to complete an anonymous online survey circulated through professional networks and social media platforms. The inclusion criteria were; ≥18 years, currently competing in either ladies Gaelic football or camogie. Two participants were excluded as they were not currently competing in either ladies Gaelic football or camogie. Two further participants self-reported having no experience of a MC and were, therefore, excluded from the majority of the analysis (with the exception of age, stature, and body mass). Therefore, the sample entered for analysis regarding MC/HC characteristics and PFD was $n = 451$. Using a sample size calculator (Raosoft.com) with a 5% error margin, 95% confidence interval, population size of 30,000 (based on rough estimation of 1000 clubs, each with ~30 senior players), and 50% response distribution, the recommended sample size was 380, which was exceeded in this study.

### Data analysis

Data were retrieved from Google Forms (Google LLC 2024) and visually inspected in Microsoft Excel (Microsoft Corporation 2021. Statistical analysis was performed in R (V4.3.1; R Core Team 2023) using the tidy verse package (Wickham et al. 2019). Descriptive statistics (i.e., mean, *SD*, and frequency analysis) were used to display participant characteristics and responses to survey questions providing ordinal data. Athletes were categorised by their sport (Gaelic football, camogie, or both) and level (club or intercounty) for data representation purposes. Following completion of data collection and analysis, there has been a call within sport and exercise sciences to adopt the International Federation of Gynecology and Obstetrics (FIGO) updated terminology relating to abnormal uterine bleeding (Munro et al. 2022; Oleka et al. 2024). Considering this, the updated terminology is presented alongside the now outdated terminology used in the questionnaire. Additionally, data relating to Menometrorrhagia has been removed as it is now an obsolete term.

This study was grounded in a descriptive research paradigm (Thomlison 2001), and therefore, the decision was taken not to conduct inferential statistics. The primary objective of this research is an exploratory analysis to document and describe the patterns and frequencies of specific health-related characteristics within a defined population. This descriptive research paradigm emphasises the observation and description of phenomena, including the collection of empirical data to establish facts about the prevalence and symptomatology associated with hormonal contraceptive use, MC effects and PFD. This aligns with the principle of empiricism that prioritises observable, empirical evidence as the foundation of knowledge. It was agreed by the authors that descriptive statistics as presented provide a comprehensive overview of the data without the need for inferential techniques. This focus ensures that the results accurately reflect the real-world conditions of the study population without introducing potential biases or assumptions inherent in inferential methods (Sand 2022).

The aim is to present a clear and precise picture of the current state, detailing observable phenomena. The

authors felt there was not a sufficiently strong theoretical basis or a-priori hypothesis to justify inferential statistics in the scope of this study but have provided the full raw dataset to facilitate this should another research group see fit to do so (available at osf.io).

## Results

### Participant characteristics

Participant characteristics are detailed in Table 1. Participants were predominantly (99.7%) Caucasian (white Irish/other white background). Camogie-only was the most prominent code played by respondents (50.6%) followed by Gaelic football (26.5%) and dual-player, i.e., plays both codes (22.9%). For non-HC, including non-hormonal IUD users (n = 217), the self-reported average MC length was 28.6 ± 6.3 days and average menstruation (bleeding) length was 5.0 ± 1.1 days.

### HC Use

A total of 51.7% of respondents were currently using HC with the OCP being the most common form used (69.2% of HC users), followed by the implant (13.7%), intrauterine system (13.7%), transdermal patch (2.1%), and the injection (1.3%). A total of 62.0% of HC users self-reported negative side effects (Table 2) with the most common being tiredness (37.2%), mood changes (35.0%), and bloating (29.1%). A total of 31.6% of HC users perceived their use to have an influence on athletic performance. Full details of symptomology and perceived influences are displayed in Table 2.

### Menstrual cycle (non-HC and non-hormonal IUD users)

Ninety-seven-point seven percent of respondents self-reported negative symptoms related to the MC, with the most common being abdominal cramping (84.0%), tiredness (82.2%), bloating (71.2%), and irritability (71.2%). Eighty-five-point seven percent of respondents perceived their MC to have an influence on their athletic performance, with the majority (59.0%) reporting a negative influence. Symptom severity was self-reported to be highest during the luteal (51.2%) and bleeding (44.7%) phases. Menorrhagia [Heavy Menstrual Bleeding] (12.4%) and oligomenorrhea [AUB-infrequent] (11.1%) were the most prevalent self-reported menstrual dysfunctions. Seven percent of respondents used non-hormonal intrauterine devices. Full details of symptomology and perceived influences are displayed in Table 3.

### Pelvic floor dysfunction

Perceived symptoms of PFD were present in this cohort (Figure 1), with participants self-reporting experience of urinary urgency (47.8%), genital pain (44.3%), urinary leakage (36.8%), anal incontinence (17.5%), and vaginal bulge (11.3%).

## Discussion

This is the first study to investigate the prevalence of hormonal contraceptive use, perceived MC- and HC-related symptomatology and PFD symptoms in Gaelic games. Over half of respondents self-reported current use of HC with a high proportion (62.0%) self-reporting perceived HC-related negative side-effects. Almost all non-HC users (99.7%) self-reported perceived menstrual-related symptoms. The most common self-reported menstrual dysfunctions were heavy menstrual bleeding (12.4%) and AUB-infrequent (11.1%), yet less than one-fifth of these self-reported dysfunctions were confirmed by a doctor. These findings are broadly in line with previous findings from other sports and geographical locations (Martin et al. 2018; Kiemle-Gabbay et al.

**Table 1.** Respondent self-reported characteristics and menstrual status overview.

| | Whole Group | Gaelic Football | | Dual Player | | Camogie | |
|---|---|---|---|---|---|---|---|
| Current highest playing level | Overall | Club Level | Inter-County | Club Level | Inter-County | Club Level | Inter-County |
| N | 453 | 101 | 19 | 71 | 33 | 159 | 70 |
| Age (Yrs) | 23.6 ±5.4 | 24.6 ±5.4 | 23.2 ±4.1 | 22.9 ±4.8 | 21.2 ±3.6 | 24.2 ±6.3 | 22.8 ±4.5 |
| Stature (m) | 1.65 ±0.13 | 1.67 ±0.15 | 1.66 ±0.11 | 1.65 ±0.16 | 1.64 ±0.13 | 1.69 ±0.08 | 1.65 ±0.13 |
| Body Mass (kg) | 68.17 ±11.20 | 67.12 ±8.35 | 70.45 ±18.81 | 68.00 ±13.11 | 68.90 ±15.71 | 64.74 ±10.15 | 68.89 ±15.33 |
| Self-Reported Menstrual Cycle Duration (Days) ($n$ = 217) | 28.6 ±6.3 | 28.6 ±4.9 | 28.6 ±1.8 | 28.5 ±7.4 | 27.5 ±8.2 | 28.0 ±6.4 | 31.1 ±5.4 |
| Self-Reported Menstruation Length (Days) ($n$ = 217) | 5.0 ±1.1 | 4.8 ±1.0 | 4.1 ±1.0 | 5.1 ±1.3 | 4.8 ±0.9 | 5.2 ±1.1 | 5.0 ±0.9 |
| Prevalence of HC Use (n [%]) | 234 [52] | 53 [53] | 9 [47] | 38 [54] | 12 [36] | 79 [50] | 43 [61] |
| Prevalence of Non-Hormonal IUD (n) | 7 | 1 | 0 | 0 | 1 | 4 | 1 |

**Table 2.** Perceived effects of contraceptives in HC users ($n = 234$).

| *Do you perceive your use of hormonal contraceptives to have an influence on your athletic performance?* | Frequency (n) | Percentage (%) |
|---|---|---|
| Yes | 74 | 31.6 |
| No | 160 | 68.4 |
| ***How would you describe your perceived influence of your hormonal contraceptive use on your athletic performance?*** | | |
| My hormonal contraceptive use does not impact my athletic performance | 107 | 45.7 |
| My hormonal contraceptive use both positively and negatively impacts my athletic performance | 75 | 32.1 |
| My hormonal contraceptive use negatively impacts my athletic performance | 32 | 13.7 |
| My hormonal contraceptive use positively impacts my athletic performance | 20 | 8.5 |
| ***Do you get negative side effects (or symptoms) because of using your contraceptive?*** | | |
| Yes | 145 | 62.0 |
| No | 89 | 38.0 |
| **Perceived Self-Reported Negative Side Effects** | | |
| Tiredness/Fatigue/Lethargy | 87 | 37.2 |
| Mood Changes | 82 | 35.0 |
| Bloating | 68 | 29.1 |
| Abdominal Cramping | 57 | 24.4 |
| Irritability | 54 | 23.1 |
| Headache/Migraine | 42 | 17.9 |
| Increased Appetite | 41 | 17.5 |
| Poor Skin/Skin Outbreaks | 34 | 14.5 |
| Sore Breasts | 32 | 13.7 |
| Back Pain | 23 | 9.8 |
| Diarrhoea/Digestive Issues | 22 | 9.4 |
| Dizziness/Light-headed | 21 | 9.0 |
| Flustered/Inability to Concentrate or Focus | 20 | 8.5 |
| Sleep Disturbances | 19 | 8.1 |
| Muscle Ache | 18 | 7.7 |
| Hot Flushes/Increased Sweating | 17 | 7.3 |
| Nausea/Sickness/Vomiting | 17 | 7.3 |
| Irregular Bleeding/ Spotting | 11 | 4.7 |
| Constipation | 7 | 3.0 |
| Leg Discomfort | 7 | 3.0 |
| Decreased Appetite | 4 | 1.7 |
| Lack of Coordination | 3 | 1.3 |
| Weight Gain | 3 | 1.3 |
| Reduced Sex Drive | 2 | 0.8 |
| Increased Anxiety | 1 | 0.4 |
| Increased Discharge | 1 | 0.4 |
| Ovulation Pain | 1 | 0.4 |
| Vaginal Dryness | 1 | 0.4 |

2024). The occurrence of several PFD-related symptoms including urinary incontinence and vaginal pain were self-reported by a considerable proportion of respondents.

Perceived MC-related symptoms self-reported by non-HC users are similar to previous findings (Martin et al. 2018; Nolan et al. 2023) with the abdominal cramping (84%), fatigue (82.2%), bloating (71.2%), and mood changes (71.2%) being the most commonly self-reported. Symptoms were self-reported as most prevalent during the luteal (51.2%) and bleeding phases (44.7%). It should be noted as the questionnaire did not specify a timeframe for symptoms (e.g., asking simply 'Do you get side effects or symptoms during your menstrual cycle?'), it may overestimate symptom prevalence and limits its ability to report intra-cycle variability in perceived side-effects. While there is no strong evidence to suggest that the MC has a significant effect on athletic performance (Colenso-Semple et al. 2023), a high proportion of respondents in the present study (85.7%) perceived their MC to influence their athletic performance, with 59% perceiving negative impacts, and 28.6% perceiving both negative and positive impacts on their performance. It should be noted that much of the existing research investigating the influence of the MC on athletic performance is arguably of low quality, often characterised by small sample sizes and significant methodological issues, such as inadequate controls and the absence of blood sample verification for hormonal status (McNulty et al. 2020). These limitations impede the ability to draw definitive conclusions at present. The MC is commonly framed in a negative perspective in respect to athletic performance, yet a considerable proportion of respondents (~30%) self-reported perceived positive impacts of the MC on their performance. This paradox between the objective empirical data and the perceptions of athletes presents a challenge for applied practitioners. Whilst practitioners should be aware of the lived experiences of female athletes relating to MC symptomatology and perceived influence on performance, they must also be cognisant that meaningful inter- and intra-individual variability

**Table 3.** Perceived effects of the menstrual cycle in naturally menstruating females (n = 217).

| Do you perceive your menstrual cycle to have an influence on your sporting/athletic performance? | Frequency (n) | Percentage (%) |
|---|---|---|
| Yes | 186 | 85.7 |
| No | 31 | 14.3 |
| **How would you describe your perceived influence of your menstrual cycle on your athletic performance?** | | |
| My menstrual cycle negatively impacts my athletic performance | 128 | 59.0 |
| My menstrual cycle both positively and negatively impacts my athletic performance | 62 | 28.6 |
| My menstrual cycle does not impact my athletic performance | 24 | 11.1 |
| My menstrual cycle positively impacts my athletic performance | 3 | 1.4 |
| **Do you get side effects (or symptoms) during your menstrual cycle?** | | |
| Yes | 212 | 97.7 |
| No | 5 | 2.3 |
| **If you experience symptoms related to your menstrual cycle, at which point of your menstrual cycle are these symptoms most prevalent?** | | |
| In the phase preceding the onset of my bleeding phase/period (i.e., the luteal phase) | 111 | 51.2 |
| During my bleeding phase (period) | 97 | 44.7 |
| In the ~10 day phase following the cessation of my bleeding phase (i.e., the follicular phase) | 7 | 3.2 |
| Does not experience symptoms | 2 | 0.9 |
| **Perceived Symptoms** | | |
| Abdominal Cramping | 184 | 84.0 |
| Tiredness/Fatigue/Lethargy | 180 | 82.2 |
| Bloating | 156 | 71.2 |
| Mood Changes | 156 | 71.2 |
| Irritability | 135 | 61.6 |
| Poor Skin/Skin Outbreaks | 122 | 55.7 |
| Back Pain | 116 | 53.0 |
| Increased Appetite | 106 | 48.4 |
| Sore Breasts | 99 | 45.2 |
| Diarrhoea/Digestive Issues | 92 | 42.0 |
| Headache/Migraine | 88 | 40.2 |
| Muscle Ache | 57 | 26.0 |
| Hot Flushes/Increased Sweating | 52 | 23.7 |
| Sleep Disturbances | 50 | 22.8 |
| Nausea/Sickness/Vomiting | 47 | 21.5 |
| Dizziness/Light-headed | 45 | 20.5 |
| Flustered/Inability to Concentrate or Focus | 38 | 17.4 |
| Constipation | 33 | 15.1 |
| Leg Discomfort | 32 | 14.6 |
| Decreased Appetite | 26 | 11.9 |
| Lack of Coordination | 16 | 7.3 |
| Proctalgia | 2 | 0.9 |
| **Self-Reported Menstrual Dysfunction** | | |
| Menorrhagia (Heavy Menstrual Bleeding; $n = 5$ confirmed by doctor) | 27 | 12.4 |
| Oligomenorrhea (AUB-infrequent; $n = 4$ confirmed by doctor) | 24 | 11.1 |
| Amenorrhea ($n = 1$ confirmed by doctor) | 7 | 3.2 |
| Metrorrhagia (Intermenstrual Bleeding; $n = 2$ confirmed by doctor) | 6 | 2.8 |
| Polymenorrhea (AUB-frequent) | 3 | 1.4 |
| Endometriosis ($n = 3$ confirmed by doctor) | 3 | 1.4 |
| Polycystic ovary syndrome (PCOS; $n = 1$ confirmed by doctor) | 1 | 0.5 |
| Adenomyosis ($n = 1$ confirmed by doctor) | 1 | 0.5 |

exists (Brown et al. 2021; Kiemle-Gabbay et al. 2024). Therefore, a personalised approach is most appropriate when developing MC-related management strategies (Lebrun et al. 2020). In applied practice, longitudinal menstrual symptom tracking in athletes may be warranted. Prospective monitoring (e.g., daily symptom diaries over several cycles) would allow researchers and practitioners to identify patterns (if any) and discern which symptoms may be cycle related. Such data, triangulated with objective performance and physiological measures, may provide insightful data to inform practice on an individual level. Additionally, those with apparent menstrual dysfunction may require additional and differing support than their naturally menstruating counterparts. Athletes with menstrual dysfunction – especially heavy or irregular bleeding – may be prone to greater fatigue, iron loss, and logistical constraints and thus need individualised medical oversight and flexible training loads that extend beyond the standard support given to peers who do not have dysfunction.

The prevalence of HC use in this study of Gaelic games athletes (51.7%) are similar to previous findings in various sports (49.5%) (Martin et al. 2018). The majority of HC users (62.0%) self-reported perceived negative side-effects of HC use, with fatigue (37.2%) and mood changes (35.0%) the most commonly self-reported negative side-effects. Consistent with the findings related to the MC in this study, the

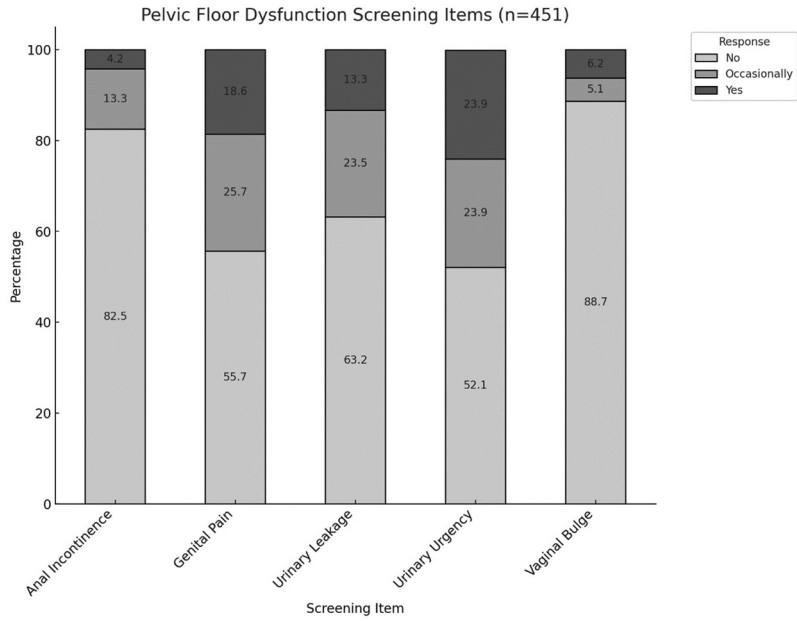


**Figure 1.** Prevalence of self-reported pelvic floor dysfunction screening items.

experiences of HC users also present a paradox. Approximately one-third (31.6%) of respondents perceive that their use of HC influences their athletic performance. This presents an interesting finding in the context of the current body of evidence that OCP has minimal effects on athletic performance (Elliott-Sale et al. 2020). Again, the majority of literature to date investigating this relationship is of low to moderate quality and further research is required to full elucidate the influence of HC use on performance. Additionally, it is worth noting that nearly all existing performance studies on HC's have focused on combined oral pills, with long-acting methods (IUD, implant, etc.) largely under-represented (Flood et al. 2024). Considering the widespread use of HC in athletic populations and potential associated negative side effects, it may be prudent for medical staff to be aware of athletes' use of HC's, but not necessarily to directly monitor usage. Instead, the focus should be on education – ensuring athletes know that if they experience negative side effects, they can consult with her doctor to explore alternative options. In practice, the goal is that athletes experience minimal side effects; a high burden of side effects may indicate a given HC method is not optimal for that individual, and alternative formulations or methods could be considered in consultation with her doctor. It is advisable for practitioners to remain aware of emerging evidence and best practice guidelines related to hormonal contraceptive use in sports. It is also important to recognise that the motivation behind hormonal contraceptive use is personal and often multifaceted, which must be considered if discussing this topic with athletes.

Conceivably, the most novel and impactful findings from an applied perspective of the present study relate the experience of PFD symptoms self-reported by the respondents. Pelvic floor dysfunction is often highlighted as an issue for post-partum athletes, yet a considerable proportion of respondents in this study self-reported experiences of PFD symptoms, with urinary urgency (47.8%), genital pain (43.4%), and urinary incontinence (36.8%) the most commonly occurring symptoms. This study did not gather data on whether respondents had previous childbirth experience. However, considering the mean age of respondents (23.6 years) and the average age of first-time mothers in Ireland (31.5 years) (Irish Central Statistics Office 2023), it can be reasonably inferred that most respondents have likely not yet given birth. Urinary incontinence has been documented as a prevalent issue across various female sports and athletic populations (Mahoney et al. 2023). Despite its commonality, urinary incontinence remains a potentially taboo issue within sport, often leading to embarrassment among athletes who may not be aware of its prevalence (Teixeira et al. 2018; Mahoney et al. 2023). This lack of awareness may exacerbate potential stigma, causing athletes to silently withdraw from sport or physical activity altogether (Bonaldi et al. 2023). Although direct evidence linking urinary incontinence to the higher dropout rates of females in sports is lacking, it is plausible that this condition contributes to the phenomenon given that approximately half of athletes who

experienced PFD symptoms report cessation of exercise due to symptoms (Dakic et al. 2023). Therefore, it is desirable for coaches and practitioners to recognise the impact of this issue, as early identification and support may prevent athletes from disengaging. Athletes experiencing symptoms of PFD should be encouraged to seek consultation with medical professionals who can provide a comprehensive assessment and recommend appropriate interventions to alleviate these symptoms. Interventions which improve pelvic floor muscle strength are effective in reducing urine leakage (SMD = −1.13) in female athletes (Rodríguez-Longobardo et al. 2024). Practitioners should create an environment in which athletes are aware of symptoms of PFD and are comfortable discussing any considerations with appropriate medical support staff.

This study has some limitations that should be acknowledged. First, the study relied on self-reported data collected via online questionnaires, which may lead to some bias and inaccuracies in responses. The study did not collect information on participants' childbirth history, which could have provided valuable context for interpreting PFD symptoms. Additionally, only a small number of self-reported menstrual dysfunctions ($n = 10$) was confirmed by a medical doctor.

This study highlights the prevalence of HC use, MC-related symptoms, and PFD among female athletes in Gaelic games. The findings suggest a need for increased education and support for female athletes, coaches, and other support staff regarding these health considerations, as well as the development of individualised strategies for managing symptoms. In the context of Gaelic games, many teams rely on volunteer or part-time coaches and staff, which can make extensive monitoring programs unrealistic. Therefore, an effective approach may be to empower the athletes themselves through education. By improving athletes' knowledge and encouraging them to track their symptoms, we give them autonomy to more effectively manage these considerations, with practitioners acting as supportive resources rather than primary overseers. Prior to implementing any intervention, practitioners and athletes should monitor symptoms and other objective measures over multiple cycles to confirm patterns and ensure that management strategies target true MC-related issues. Future research should focus further on PFD in Gaelic games athletes, employing longitudinal studies that incorporate objective measures and clinical assessment. Investigating the potential role of PFD in female athlete dropout rates and exploring interventions to mitigate these considerations would also be valuable areas for future research. Overall, a multidisciplinary approach that integrates physiological, psychological, and sociocultural factors will be essential for advancing our understanding of these complex issues and improving support for female athletes in Gaelic games.

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## Data and code availability statement

The full dataset and code used in this study, allowing for replication and secondary analysis are available via Open Science Framework (osf.io)

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