TUS Technological University of the Shannon: Midlands Midwest
Ollscoil Teicneolaíochta na Sionainne: Lár Tíre Iarthar Láir

TUS Research

Menstrual Dysfunction in Athletes: A Systematic Literature Review

Bernadette Cherianne Taim, Ciarán Ó Catháin, Michèle Renard, Niamh Ní Chéilleachair

Department of Sport and Health Sciences, Technological University of the Shannon: Midlands Midwest
SHE Research Group, Technological University of the Shannon: Midlands Midwest

INTRODUCTION

Menstrual dysfunction (MD) is typically presented as one or more of abnormalities associated with the cycle **regularity, duration, flow and pain**[1]

MD in athletes is largely a physiological manifestation of **low energy availability**, often associated with stress, weight loss and/or excessive exercise[2]

All forms of MD can have **adverse implications** on athletes' health, injury risk and performance[3]

However, there is currently **no published systematic review** that provides a comprehensive review of the literature pertaining to MD in female athletes

AIMS

Investigate the prevalence of MD and dysmenorrhea in athletes

Clarify assessment tools and definitions of MD to inform athlete monitoring and screening practices

METHODS

ELIGIBILITY CRITERIA FORMULATED USING PICOS

Population
Competitive female athletes of reproductive age
Not using hormonal contraception

Comparison
Age groups (adolescents and adults)
Sports

Outcomes
Primary: Prevalence of MD in athletes
Secondary: Method used to identify MD

Study Design
Original research which provides:
- Quantitative prevalence of MD
- Type and definition of MD
- Assessment method used to identify MD

Note: No specific intervention

METHODOLOGICAL QUALITY ASSESSMENT

Mixed Methods Appraisal Tool[4]

Rate *'yes', 'no',* or *'unable to determine'* for each criterion

PRELIMINARY DATA SYNTHESIS

Pooled prevalence calculated only if MD definitions used across studies are consistent with experts/ACOG

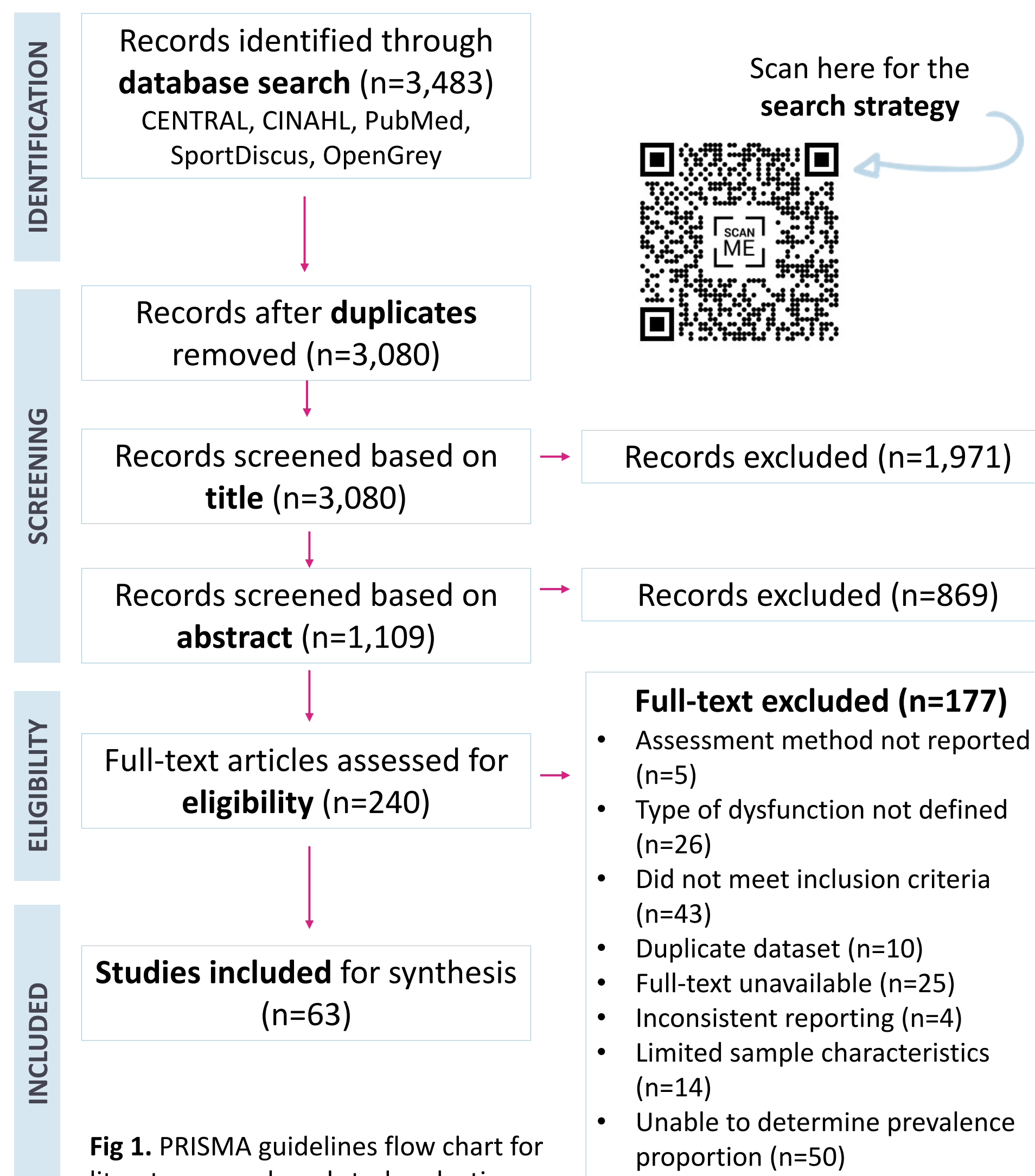**Narrative synthesis** of findings on MD definitions and assessment tools

SPORT HEALTH EXERCISE
@BCherianneTaim
0000-0003-3565-1869

Review protocol registered in PROSPERO: CRD42021268757

LITERATURE SEARCH AND STUDY SELECTION

Fig 1. PRISMA guidelines flow chart for literature search and study selection

Scan here for the **search strategy**

IDENTIFICATION: Records identified through **database search** (n=3,483) CENTRAL, CINAHL, PubMed, SportDiscus, OpenGrey

SCREENING: Records after **duplicates** removed (n=3,080)

Records screened based on **title** (n=3,080) → Records excluded (n=1,971)

Records screened based on **abstract** (n=1,109) → Records excluded (n=869)

ELIGIBILITY: Full-text articles assessed for **eligibility** (n=240)

Full-text excluded (n=177)
- Assessment method not reported (n=5)
- Type of dysfunction not defined (n=26)
- Did not meet inclusion criteria (n=43)
- Duplicate dataset (n=10)
- Full-text unavailable (n=25)
- Inconsistent reporting (n=4)
- Limited sample characteristics (n=14)
- Unable to determine prevalence proportion (n=50)

INCLUDED: **Studies included** for synthesis (n=63)

RESULTS

STUDY CHARACTERISTICS

63 STUDIES — Cross-sectional (n=55), Longitudinal (n=8) Published 1981 - 2021

6706 ATHLETES — *Average age:* 20.1 ± 3.7 y
Adolescent (≤18 y): 16.3 ± 0.9 y
Adult (>18 y): 22.1 ± 3.1 y

31 SPORTS — Collegiate, international, interscholastic, national, regional, state, league levels

PREVALENCE OF MENSTRUAL DYSFUNCTION

Dysfunction	Avg (%)	Range (%)
Dysmenorrhea	38.8	16.8 – 67.9
Premenstrual Syndrome	29.0	8.6 – 59.6
Oligomenorrhea	22.7	12.7 – 34.6
Secondary Amenorrhea	16.5	0 – 61.5
Heavy Menstrual Bleeding	14.3	9.0 - 21.5
Primary Amenorrhea	5.9	0 – 22.1
Premenstrual Dysphoric Disorder	5.4	1.3 – 13.3

DEFINITIONS OF MENSTRUAL DYSFUNCTION

Lack uniformity in definitions used

Differences in cycle duration, age thresholds and terminologies (e.g., cycles/months/days)

MENSTRUAL DYSFUNCTION ASSESSMENT TOOL

84.1% Questionnaires
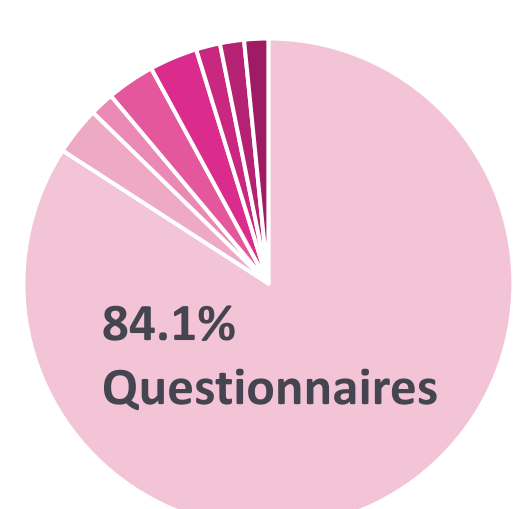
84.1% of studies (n=53) used non-validated, self-developed questionnaires

Others
Interview, daily logs, LEAF-Q, daily urine samples, blood serum analysis, transvaginal exam, medical/gynaecological examination

Fig 2. Distribution of MD assessment methods

DISCUSSION & IMPLICATIONS

PRELIMINARY FINDINGS

Menstrual abnormalities associated with **cycle pain and frequency** are the most prevalent MD in female athletes

Athletes should track their menstrual cycles, log associated symptoms and its impact on training. Abnormalities in cycle frequency (e.g., oligomenorrhea) should be addressed promptly and coping mechanisms explored.

Findings are not readily interpretable or comparable due to **heterogeneity in definitions used** across studies

Definitions of MD consistent with standards of practice[5] should be adopted.

Prevalence of MD in included studies were mainly **self-reported** through the use of **non-validated questionnaires**

To assess menstrual function and establish menstrual cycle phases, methods aligned with standards of practice[5] should be used.
A standardised questionnaire validated for exploring menstrual disturbances in athletes specifically should be considered.

FUTURE STUDIES

Explore the menstrual profiles of female athletes using evidence-based, biochemical markers over a longitudinal period.

Examine the influence of the menstrual cycle and its associated symptoms on training and recovery.

Explore the relationships between the menstrual cycle, training load and athlete wellbeing

ACKNOWLEDGEMENTS

REFERENCES

[1]Siddiqui, N., & Pitkin, J. (2007). Menstrual disturbances. Obstetrics, Gynaecology & Reproductive Medicine, 17(5), 154–162.
[2]Ackerman, K. E., & Misra, M. (2018). Amenorrhoea in adolescent female athletes. The Lancet Child & Adolescent Health, 2(9), 677–688.
[3]Ackerman, K. E et al. (2019). Low energy availability surrogates correlate with health and performance consequences of Relative Energy Deficiency in Sport. British Journal of Sports Medicine, 53(10), 628–633.
[4]Hong QN et al. Mixed Methods Appraisal Tool (MMAT), version 2018. Registration of Copyright (#1148552), Canadian Intellectual Property Office, Industry Canada.
[5]Eliott-Sale KJ et al. (2021) Methodological Considerations for Studies in Sport and Exercise Science with Women as Participants: A Working Guide for Standards of Practice for Research on Women. Sports Med. 2021 May;51(5):843-861.

TUS Technological University of the Shannon: Midlands Midwest
Ollscoil Teicneolaíochta na Sionainne: Lár Tíre Iarthar Láir

TUS Research