Supplementary materials

A: PRISMA-ScR Checklist figure from Tricco et al. [19]

Table. PRISMA-ScR Checklist

Section	Item	PRISMA-ScR Checklist Item
Title	1	Identify the report as a scoping review.
Abstract		
Structured summary	2	Provide a structured summary that includes (as applicable) background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.
Introduction		
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.
Methods		
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).
Summary measures	13	Not applicable for scoping reviews.
Synthesis of results	14	Describe the methods of handling and summarizing the data that were charted.
Risk of bias across studies	15	Not applicable for scoping reviews.
Additional analyses	16	Not applicable for scoping reviews.
Results		
Selection of sources of evidence	17	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.
Characteristics of sources of evidence	18	For each source of evidence, present characteristics for which data were charted and provide the citations.
Critical appraisal within sources of evidence	19	If done, present data on critical appraisal of included sources of evidence (see item 12).
Results of individual sources of evidence	20	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.
Synthesis of results	21	Summarize and/or present the charting results as they relate to the review questions and objectives.
Risk of bias across studies	22	Not applicable for scoping reviews.
Additional analyses	23	Not applicable for scoping reviews.
Discussion		
Summary of evidence	24	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.
Limitations	25	Discuss the limitations of the scoping review process.
Conclusions	26	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.
Funding	27	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.
† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.
§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy documents).

B: Final search strategies

Table 1. Database(s): 1) Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations and Daily 1946 to June 16, 2022.

#	Searches	Results
1	Menstrual cycle/ or follicular phase/ or luteal phase/	20,267
2	Ovulation/ or Ovulation Detection/	22,210
3	((menstrual or luteal or mid-luteal or midluteal or follicular) adj3 (cycle* or phase* or subphase*)).tw,kf.	35,570
4	(ovulation or ovulatory or ovulating).tw,kf.	39,020
5	or/1-4	79,468
6	Saliva/	45,378
7	Urine/	37,978
8	Menstrual Cycle/ur or Ovulation/ur	152
9	((urine or urinary or saliva or salivary) adj10 (sample* or sampling or test* or assay* or immunoassay* or measur* or specimen* or detect*)).tw,kf.	169,497
10	or/6-9	225,763
11	Luteinizing Hormone/ or Estradiol/ or Progesterone/	154,135
12	(Estradiol or oestradiol or progesterone).tw,kf.	164,329
13	(lutein* hormone* or lh).tw,kf.	69,830
14	((ovarian or sex) adj2 (hormone* or steroid*)).tw,kf.	44,746
15	((urinary or salivary) adj2 (hormone* or steroid*)).tw,kf.	2,669
16	or/11-15	276,396
17	5 and 10 and 16	1,622
18	limit 17 to yr="1999 - 2022"	816

Table 2. Database(s): 2) Embase 1974 to 2022 June 16.

#	Searches	Results
1	Menstrual cycle/ or follicular phase/ or luteal phase/	49,124
2	Ovulation/ or ovulation detection/	26,671
3	((menstrual or luteal or mid-luteal or midluteal or follicular) adj3 (cycle* or phase* or subphase*)).tw,kf.	44,325
4	(ovulation or ovulatory or ovulating).tw,kf.	44,980
5	or/1-4	103,232
6	Saliva analysis/ or saliva/	48,751
7	Urine/	113,458
8	((urine or urinary or saliva or salivary) adj10 (sample* or sampling or test* or assay* or immunoassay* or measur* or specimen* or detect*)).tw,kf.	226,666
9	or/6-8	324,203
10	Luteinizing hormone/ or estradiol/ or progesterone/	228,840
11	(estradiol or oestradiol or progesterone).tw,kf.	194,697
12	(lutein* hormone* or lh).tw,kf.	86,288
13	((ovarian or sex) adj2 (hormone* or steroid*)).tw,kf.	53,544
14	((urinary or salivary) adj2 (hormone* or steroid*)).tw,kf.	2,657
15	or/10-14	353,335
16	5 and 9 and 15	1,915
17	limit 16 to yr="1999 - 2022"	1,113

Table 3. Database(s): 3) CINAHL Plus with Full Text

#	Query	Limiters/Expanders	Results
S1	(MH "Menstrual Cycle") OR (MH "Follicular Phase") OR (MH "Luteal Phase")	Search modes - Find all my search terms	3,694
S2	(MH "Ovulation") OR (MH "Ovulation Detection")	Search modes - Find all my search terms	1,215
S3	TI (((menstrual or luteal or mid-luteal or midluteal or follicular) N3 (cycle* or phase* or subphase*))) OR AB (((menstrual or luteal or mid-luteal or midluteal or follicular) N3 (cycle* or phase* or subphase*)))	Search modes - Find all my search terms	5,128
S4	TI ((ovulation or ovulatory or ovulating)) OR AB ((ovulation or ovulatory or ovulating))	Search modes - Find all my search terms	2,933
S5	S1 OR S2 OR S3 OR S4	Search modes - Find all my search terms	9,211
S6	(MH "Saliva")	Search modes - Find all my search terms	8,987
S7	(MH "Urine")	Search modes - Find all my search terms	2,524
S8	TI (((urine or urinary or saliva or salivary) N10 (sample* or sampling or test* or assay* or immunoassay* or measur* or specimen* or detect*))) OR AB (((urine or urinary or saliva or salivary) N10 (sample* or sampling or test* or assay* or immunoassay* or measur* or specimen* or detect*)))	Search modes - Find all my search terms	26,475
S9	S6 OR S7 OR S8	Search modes - Find all my search terms	33,340
S10	(MH "Luteinizing Hormone") OR (MH "Estradiol") OR (MH "Progesterone")	Search modes - Find all my search terms	10,264
S11	TI ((estradiol or oestradiol or progesterone)) OR AB ((estradiol or oestradiol or progesterone))	Search modes - Find all my search terms	12,063
S12	TI (("lutein* hormone*" or lh)) OR AB (("lutein* hormone*" or lh))	Search modes - Find all my search terms	3,729
S13	TI (((ovarian or sex) N2 (hormone* or steroid*))) OR AB (((ovarian or sex) N2 (hormone* or steroid*)))	Search modes - Find all my search terms	5,077
S14	TI (((urinary or salivary) N2 (hormone* or steroid*))) OR AB (((urinary or salivary) N2 (hormone* or steroid*)))	Search modes - Find all my search terms	337
S15	S10 OR S11 OR S12 OR S13 OR S14	Search modes - Find all my search terms	22,354
S16	S5 AND S9 AND S15	Search modes - Find all my search terms	219
S17	S5 AND S9 AND S15	Limiters - Published Date: 19990101-20221231 Search modes - Find all my search terms	195

Database(s): 4) SCOPUS

((TITLE-ABS-KEY (((*menstrual* OR *luteal* OR *mid-luteal* OR *midluteal* OR *follicular*) W/3 (*cycle** OR *phase** OR *subphase**))) OR TITLE-ABS-KEY ((*ovulation* OR *ovulatory* OR *ovulating*)))) AND (TITLE-ABS-KEY (((*urine* OR *urinary* OR *saliva* OR *salivary*) W/10 (*sample** OR *sampling* OR *test** OR *assay** OR *immunoassay** OR *measur** OR *specimen** OR *detect**)))) AND ((TITLE-ABS-KEY ((*estradiol* OR *oestradiol* OR *progesterone*)) OR TITLE-ABS-KEY ((*"lutein* hormone*"* OR *lh*)) OR TITLE-ABS-KEY (((*ovarian* OR *sex*) W/2 (*hormone** OR *steroid**))) OR TITLE-ABS-KEY (((*urinary* OR *salivary*) W/2 (*hormone** OR *steroid**))))) AND (LIMIT-TO (PUBYEAR, *2022*) OR LIMIT-TO (PUBYEAR, *2021*) OR LIMIT-TO (PUBYEAR, *2020*) OR LIMIT-TO (PUBYEAR, *2019*) OR LIMIT-TO (PUBYEAR, *2018*) OR LIMIT-TO (PUBYEAR, *2017*) OR LIMIT-TO (PUBYEAR, *2016*) OR LIMIT-TO (PUBYEAR, *2015*) OR LIMIT-TO (PUBYEAR, *2014*) OR LIMIT-TO (PUBYEAR, *2013*) OR LIMIT-TO (PUBYEAR, *2012*) OR LIMIT-TO (PUBYEAR, *2011*) OR LIMIT-TO (PUBYEAR, *2010*) OR LIMIT-TO (PUBYEAR, *2009*) OR LIMIT-TO (PUBYEAR, *2008*) OR LIMIT-TO (PUBYEAR, *2007*) OR LIMIT-TO (PUBYEAR, *2006*) OR LIMIT-TO (PUBYEAR, *2005*) OR LIMIT-TO (PUBYEAR, *2004*) OR LIMIT-TO (PUBYEAR, *2003*) OR LIMIT-TO (PUBYEAR, *2002*) OR LIMIT-TO (PUBYEAR, *2001*) OR LIMIT-TO (PUBYEAR, *2000*) OR LIMIT-TO (PUBYEAR, *1999*))

Database(s): 5) PROQUEST DISSERTATIONS

(noft((((menstrual OR luteal OR mid-luteal OR midluteal OR follicular) NEAR/3 (cycle* OR phase* OR subphase*))) OR noft((ovulation OR ovulatory OR ovulating))) AND noft((((urine OR urinary OR saliva OR salivary) NEAR/10 (sample* OR sampling OR test* OR assay* OR immunoassay* OR measur* OR specimen* OR detect*))) AND (noft((estradiol OR oestradiol OR progesterone)) OR noft(("lutein* hormone*" OR lh)) OR noft(((ovarian OR sex) NEAR/2 (hormone* OR steroid*))) OR noft(((urinary OR salivary) NEAR/2 (hormone* OR steroid*))))

Limited to 1999 – 2022

Table 4. Database(s): 6) CENTRAL (Cochrane Library)

ID	Search	Hits
#1	MeSH descriptor: [Menstrual Cycle] this term only	870
#2	MeSH descriptor: [Follicular Phase] this term only	332
#3	MeSH descriptor: [Luteal Phase] this term only	563
#4	(((menstrual or luteal or mid-luteal or midluteal or follicular) NEAR/3 (cycle* or phase* or subphase*))):ti,ab,kw	7695
#5	((ovulation or ovulatory or ovulating)):ti,ab,kw	5,949
#6	#1 or #2 or #3 or #4 or #5 Limits: Clinical Trials, 1999-2022	9,867
#7	MeSH descriptor: [Saliva] this term only	2,872
#8	MeSH descriptor: [Urine] this term only	665
#9	MeSH descriptor: [Menstrual Cycle] this term only and with qualifier(s): [urine - UR]	7
#10	MeSH descriptor: [Ovulation] this term only and with qualifier(s): [urine - UR]	465
#11	(((urine or urinary or saliva or salivary) NEAR/10 (sample* o sampling or test* or assay* or immunoassay* or measur* or specimen* or detect*))):ti,ab,kw	29,150
#12	#7 or #8 or #9 or #10 or #11 Limits: Clinical Trials, 1999-2022	25,483
#13	MeSH descriptor: [Luteinizing Hormone] this term only	1,658
#14	MeSH descriptor: [Estradiol] this term only	4,440
#15	MeSH descriptor: [Progesterone] this term only	1,943
#16	((estradiol or oestradiol or progesterone)):ti,ab,kw	17,060
#17	(("lutein* hormone*" or lh)):ti,ab,kw	7,041
#18	(((ovarian or sex) NEAR/2 (hormone* or steroid*))):ti,ab,kw	3,243
#19	(((urinary or salivary) NEAR/2 (hormone* or steroid*))):ti,ab	211
#20	#13 or #14 or #15 or #16 or #17 or #18 or #19 Limits: Clinical Trials, 1999-2022	17,934
#21	#6 and #12 and #20	197

C: Additional Inclusion Criteria & Rationale

Inclusion Criteria	Rationale
Studies need to identify menstrual cycle phase(s) via hormones measured.	Ensure that all studies would be specific to the review questions.
Participants were to be "healthy" and free from chronic conditions or habits that are known to impact menstrual cycle health.	Reduce variability on the menstrual cycle due to external conditions.
Sample age range extended beyond the 18 to 40 years.	Age range was to define menstrual status and not restricted to age. Studies were included so long as it stated the sample was premenopausal and fit the remaining inclusion criterion.
Hormone quantification could not be transformed and must be reported as raw, arithmetic means, medians, or ranges.	Transformed or visual presentation of values require interpretation and further analyses, which are not suitable for this type of review. It further reduces the ability compare salivary and urinary means, medians and hormone ranges.
Studies had to be specifically about characteristics on the menstrual cycle or speaking on methods (saliva or urine) to measure menstrual cycle phases.	Many papers lacked the depth required to address the review questions when not focused on menstrual cycle characteristics or methodology.

D: Data extraction instrument

Citation	Authors	Title	Publication Year	States Comparable to serum	Reference	Page #	Origin of country sample	Sample size (recruited)

Sample size (analyzed)	Inclusion	Exclusion	Demographics	Menstrual cycle phase definitions	Urine or Saliva test method	Assay type	Hormones measured

Sensitivity	Specificity	Intra-assay CV	Inter-assay CV	Phase reported	Hormone Quantification	Units	Converted units

E: Saliva and urine compared to serum with references

Table 5. Salivary estradiol and progesterone and urinary LH hormone assay comparisons to serum where applicable.

Urinary LH Assays		
Study	**Comparable to Serum**	**Page Number (Citation if applicable)**
Blackwell, 2012	Not reported	-
Bouchard, 2021	Yes	1349*
Cole, 2009	Not reported	-
Ecochard, 2000	Not reported	-
Ecochard, 2013	Not reported	-
Ghazeeri, 2000	Yes	321*
Johnson, 2015	Yes	1100
Williams, 2006	Not reported	-
Salivary Assays			
Study	**Hormone(s) Tested**	**Comparable to Serum**	**Page Number (Citation if applicable)**
Barrett, 2006	E2, P4	Not reported	-
Barrett, 2013	E2, P4	Not reported	-
Chatterton, 2005	E2, P4	Yes	77
Gann, 2001	E2, P4	Yes	61
Ishikawa, 2002	P4	Yes	32-33*
Korot'ko, 2002	E2, P4	Yes	376*
Rowe, 2013	P4	Not reported	-
Vitzthum, 2002	P4	Not reported	-

" – " not applicable; *reference cited in text.