

Supplementary Table S1 The included sources and the number of the included questions from each source

Source code	Source name	Legible MCQs	Reviewed MCQs
1	Symonds IM, Arulkumaran S, Symonds EM. Essential Obstetrics and Gynecology. Edinburgh, Scotland: Churchill Livingstone/Elsevier; 2013	125	50
2	Symonds IM, Arulkumaran S. Essential Obstetrics and Gynecology. Edinburgh, Scotland: Churchill Livingstone/Elsevier; 2020	125	50
3	Pfeifer SM. NMS Obstetrics and Gynecology. Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2012	182	50
4	Miller ES, Lee C. DeJa Review: Obstetrics and Gynecology. New York, NY: McGraw-Hill Medical; 2011	103	50
5	Callahan TL, Caughey AB. Blueprints Obstetrics & Gynecology. Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2012	128	50
6	Sakshi A. Pre NEET Obstetrics and Gynecology. Ch1. New Delhi, India: Jaypee Brothers Pvt. Ltd.; 2013	291	100
7	https://quizlet.com/87747992/ob-gyn-questions-flash-cards/#	150	50
8	Ratha C, Gupta J. SBAs and EMQs for MRCOG II - Addressing the new Exam Format. New York, NY: Springer; 2016	464	100
9	Sizer A, Balachandar C, Biswas N, et al. "Part 2 MRCOG Single Best Answer Questions." Bridgewater, NJ: Wiley-Blackwell; 2016	400	100
10	Sizer A, Balachandar C, Biswas N, et al. "Part 2 MRCOG: 500 EMQs and SBAS." Bridgewater, NJ: Wiley-Blackwell; 2019	250	100
11	Schneider KM, Patrick SK. PreTest Obstetrics and Gynecology: PreTest self-assessment and review. New York, NY: McGraw-Hill Medical; 2012	502	100
12	Bhojani P. Smart Study Series: Obstetrics & Gynecology - E-Book. New Delhi, India: Elsevier; 2014	329	100
13	Casanova R. Shelf-life Obstetrics and Gynecology. Philadelphia, PA: Wolters Kluwer; 2015	484	100
14	https://www.academia.edu/14752796/Gynecology_and_Obstetrics_MCQ_revision	226	100
15	Arnold KC, Flint CJ. Obstetrics Essentials: a question-based review. Switzerland AG; Springer; 2017	757	150
16	https://www.scribd.com/doc/133022756/Obstetric-Gynecology-MCQs	926	150
17	Phelan ST. Lange Q & A Obstetrics & Gynecology. New York, NY; McGraw-Hill Medical; 2011	1,053	200
18	Beckmann CRB, et al. Obstetrics and Gynecology. Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2014	1,288	200
19	Werner C, Richardson D, Chang S, et al. Williams Gynecology Study Guide. New York, NY: McGraw-Hill Professional Publishing; 2016	1,536	250
20	Horsager R et al. Williams Obstetrics Study Guide. New York, NY: McGraw-Hill Professional Publishing; 2015	1,876	250

Abbreviation: MCQ, multiple-choice question.

Note: Legible questions means the MCQs in each source.

Sources: • Study book-related MCQs are resources coded: 1, 2, 3, 18, 19, and 20. • Review book-related MCQs are resources coded: 4, 5, and 6. • Self-assessment books are resources coded: 8, 9, 10, 11, 12, 13, 15, and 17. • Online shared MCQs are resources coded: 7, 14, and 16.

Supplementary Table S2 The compiled checklist of the criteria of possible violations which was used in the MCQs review process^a

Violation no.	MCQs violation criteria
	Structural violations “flaws”
V1	The item is not conclusive (the item in simple MCQ or the Lead-in of contextual MCQ, must contain the problem in a question [preferred] or a complete sentence; rather than, a partial statement)
V2	The item is not typical SBA type (the item must be typical SBA type; rather than, disguised True & False (TF) type (series of true/false statements), or contain wording as what is the correct, the wrong answer’)
V3	The item is not focused (the main single idea should be located in the stem or item statement, focus on one aspect of a concept/disease/condition, with short options)
V4	The item is not clearly expressed (the question/statement is worded and structured in a clear way “no jargon” and can be answered without reading the options [cover rule])
V5	All the options are not uniform (all the options must be uniform in length, and grammatical construction)
V6	All the options are not homogenous (all the options must be homogenous [same domain: diagnosis, therapy, organs, investigations ...])
V7	All the options are not plausible (all the options must be plausible [believable to the students within the question context])
	Test wiseness violations “flaws”
V8	There is clang (there should be no clang [repetition] between the stem and options, whether visible, or in synonymous terms)
V9	There is clue (there should be no clueing that help to locate the answer; or eliminate any option [grammar, syntax or meaning])
V10	There is convergence (the correct answer known by different combinations of multiple components as the writers tend to use part of or all the correct answers more frequently across all options)
V11	There is absolute or vague terms (there should be no absolute (almost, never, all, only) or some vague terms as, [sometimes, usually, seldom, frequent])
V12	There is crowded key option (there should be no crowded options, [longer, or with more details that cue the answer])
	Irrelevant difficulty violations “flaws”
V13	The item is overloaded with information (the item must provide the “essentially-needed-to-answer” information, no excessive, irrelevant details or tricky points)
V14	The item is not stated positively (the terms as “not, except, incorrect” poorly assess actual knowledge. If negative is a must as in contraindications or complications, put it very clearly in the stem, to be visibly, boldfaced, and highlighted)
V15	The options are not arranged in order (the options should be arranged in order [alphabetical, chronological or logical])
V16	The options have numerical Inconsistency (the numeric options should be consistent)
V17	The options have overlap (there should be no overlap between the options)
V18	The options have ambiguity (options must contain no confusing statements, new terms, tricky antagonism, nor unjustifiable negative choices)
V19	There is “all of the above” or “none of the above” (there should be no “all of the above” or “none of the above”)
V20	The options have “Complex choices” (there should be no “complex choices” as “A and B; A, C not B” or K type MCQ types)

Abbreviations: MCQ, multiple-choice question; SBA, single-best answer; V, violation.

^aThis checklist was compiled from the references ^{4, 13, 18, 19, and 20} and was used in MCQ reviewing.

Supplementary Table S3 Review of the published studies about test banks, as well as, the current study, showing the distribution of the item-writing violations^a

Current study	Ellsworth et al ¹⁵	Hansen and Dexter ¹⁶	Tarrant et al ¹³	Garrison et al ²⁶	Ibbett and Wheldon ²⁹
Options are not in Order (61%)	Grammatical errors (31%)	The stem is not positive (19%)	Negative worded stem (7%)	None of the above (18%)	All of the above, none of the above (31%)
Item is not focused (18)	Most of item in stem (13)	None of the above (16)	Implausible distractors (6.6)	All of the above (14)	Numerical order (31)
Item is not typical SBA type (16)	Avoid negatives (8)	Emphasize negative wording (10)	Gratuitous information in stem (6)	The stem is not positive (12)	Pairs of options (11)
Options are not uniform (15)	All of the above (7)	Single clearly formulated problem. (10)	Extra or no correct answer (5.6)	Single clear problem in the stem (12)	Implausible distractors (8)
Item is not clear (14)	Clues to correct answer (5)	All of the above.(9)	Longest option is correct (4.8)	Absolute terms in the options (9)	Inconsistent length of distractors (6)
Item is not positively (14)	None of the above (5)	Clue to the correct answer (7)	Logical cues in stem (4.6)	Plausible options (9)	Similar words in stem and distractors (5)
All of the above none of the above (13)	Specific determiners (4)	Detailed correct answer (6)	Word repeats in stem and key (4)	Correct answer is more detailed (7)	Unfortunate coincidence (5)
Options are not homogenous (13)	Definite problem m stem (3)	Distractors are plausible (4)	Unfocused stem (3)	Emphasize negative wording (6)	Grammatically incorrect stem and distractors (2)
Item is overloaded (10)	Same-length options (3)	No grammatical consistency (4)	True/false question (2.8)	Similar words in stem and distractors (5)	Specific determiners (1)
Crowded key option (10)	Plausible options (2)	Absolute terms in the distractors (4)	Use of all of the above (2)	Main idea put in the stem.(3)	

Abbreviation: SBA, single-best answer.

^aThis review table was compiled to help the authors of the current study in making comparison and writing the discussion. It will help the readers to conceptualize the role of different violations.