ONMedU, Department of Obstetrics and Gynecology. Practical lesson No. 4. «Measurement and evolution of the dimensions of the female pelvis».

MINISTRY OF HEALTH OF UKRAINE

ODESA NATIONAL MEDICAL UNIVERSITY

Faculty international

Department of Obstetrics and Gynecology

CONFIRMED by
Vice-rector for scientific and pedagogical work
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METHODOLOGICAL RECOMMENDATIONS FOR THE PRACTICALLESSON FROM ELECTIVE DISCIPLINE

Faculty international, 5th year

Elective discipline «SIMULATION TRAINING IN OBSTETRICS AND GYNECOLOGY».

Practical lesson No. 4. «Measurement and evolution of the dimensions of the female pelvis».

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Approved

Meeting of the Department of Obstetrics and Gynecology
Odessa National Medical University

Protocol No. 1 of August 29, 2024.

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Practical lesson №4

Topic:"Measurement and evalution of the dimensions of the female pelvis"

Aims: To systematize and deepen knowledge regarding the measurement and assessment of the size of the female pelvis (external and internal pelvimetry). It is essential to understand the importance of this knowledge for pregnancy, the prognosis of the course of childbirth in women, and the health of infants. Additionally, this practical training aims to engage higher education students in analytical activities and encourage independent problem-solving while evaluating the level of knowledge acquisition.

The main objectives of this practical training are: To foster cognitive activity and independence, enabling students to creatively apply the lecture material.
To deepen and consolidate the knowledge acquired during the study of this topic.
To promote the development of creative thinking, allowing students to logically express and substantiate their ideas, actively listen to one another, and engage in constructive criticism.
Higher education students should be familiar with the algorithm of pelviometry (both external and internal), understand the normal dimensions of the large and small female pelvis, the plane of the small pelvis, additional dimensions of the female pelvis, and the methods of measuring true conjugacy. They must also comprehend the significance of these measurements for predicting childbirth outcomes in women.

Basic concepts:

- external pelviometry
- internal pelviometry
- normal sizes of the large and small female pelvis
- pelvic plane
- additional sizes of the female pelvis
- methods for measurement true conjugate

Equipment: Professional algorithms, structural and logical diagrams, tables, models, videos, results of laboratory and instrumental studies, case studies, patients, medical histories.

Training time: 4 hours.

1. **Organizational activities (greetings, attendance check, announcing the topic, stating the lesson's purpose, motivating higher education students to engage with the topic).**

For obstetric purposes, the female pelvis is divided into two sections. The boundary between these sections runs along the innominate line (linea innominata). The large pelvis is laterally bounded by the wings of the iliac bones and posteriorly by the spine, with no anterior wall.

The pelvis is formed anteriorly by the pubic bone branches and symphysis, laterally by the parts of the bones making up the acetabulum, the bodies, and tubercles of the ischia, and posteriorly by the sacrum and coccyx.

In the practice of obstetricians and gynecologists, it is of utmost importance to accurately measure and assess the dimensions of the large and small female pelvis, both externally and internally (pelviometry). Additional measurements of the female pelvis and true conjugation are crucial, as these data play a significant role in determining fetal presentation, the biomechanics of labor, the course of labor, clinical fetal-pelvic ratios, the postpartum health of the woman and child, and their long-term prognosis for health.

2. Control of fundamental knowledge (written assignments, written tests, online tests, in-person questioning on essential terminology, etc.).

Requirements for the theoretical preparedness of higher education students to participate in practical classes.

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Knowledge requirements:
-Communication and clinical examination skills.
-Ability to determine the necessary clinical, laboratory, and instrumental tests and evaluate their results.
-Responsibility and consistency in work.
-A tolerant attitude towards pregnant women.
-Accountability for the correctness of professional actions.

List of didactic units:
-External pelviometry.

-Internal pelviometry.
-Normal dimensions of the large and small female pelvis.
-Pelvic plane.
-Additional dimensions of the female pelvis.
-Methods for measuring the true conjugate.

3. Test questions to assess basic knowledge on the lesson topic.
Questions:

- What is external pelviometry?
- Explain internal pelviometry.
- Describe the normal dimensions of the large and small female pelvis.
- Define the pelvic plane.
- How are additional dimensions of the female pelvis measured?
- Explain the methods for measuring the true conjugate.

Typical tasks:

1. Calculate the size of the true (obstetric) conjugate (considering the Solovyov index) when the external conjugate is 20 cm and the circumference of the wrist joint is 14 cm.

   Answer: The size of the true (obstetric) conjugate is 11 cm.

2. Determine the size of the true (obstetric) conjugate (considering the Solovyov index) when the external conjugate is 20 cm and the circumference of the wrist joint is 12.5 cm.
   Answer: The size of the true (obstetric) conjugate is 12 cm

Test tasks:

Name the entities between which a diagonal conjugate is defined:
A. Middle of the lower margin of the symphysis and apex of the coccyx.
B. Midpoint of the superior outer margin of the symphysis and supracondylar fossa.
C. The lower edge of the pubic symphysis and the sacral capitulum.
D. Middle of the upper-outer margin of the symphysis and apex of the coccyx.
E. Middle of the lower margin of the symphysis and supracondylar fossa.

2. One of the pelvic planes is bounded posteriorly by the junction of the 2nd and 3rd sacral vertebrae, anteriorly by the middle of the inner surface of the pubic symphysis, and laterally by the middle of the acetabulum.
Name this plane:
A. The plane of entry into the pelvis.
B. The plane of the wide part of the pelvic cavity.
C. The plane of the narrow part of the pelvic cavity.
D. The plane of the pelvic outlet.
E. The leading axis of the pelvis.
3. One of the pelvic planes is bounded posteriorly by the apex of the coccygeal cyst, anteriorly by the lower edge of the pubic arch, and laterally by the gluteal tuberosities.
Name this plane:
A. The plane of entry into the pelvis.
B. The plane of the wide part of the pelvic cavity.
C. The plane of the narrow part of the pelvic cavity.
D. The plane of the pelvic outlet.
E. The leading axis of the pelvis.
4. One of the pelvic planes is bounded posteriorly by the sacral cape, anteriorly by the iliac crests and the upper edge of the pubic symphysis, and laterally by the lin. terminalis.
Name this plane:
A. The plane of entry into the pelvis.
B. The plane of the wide part of the pelvic cavity.
C. The plane of the narrow part of the pelvic cavity.
D. The plane of the pelvic outlet.
E. The leading axis of the pelvis.

5One of the pelvic planes is bounded posteriorly by the sacroiliac joint, anteriorly by the lower edge of the pubic symphysis, and laterally by the ischial bone ostiums.
Name this plane:
A. The plane of entry into the pelvis.
B. The plane of the wide part of the pelvic cavity.
C. The plane of the narrow part of the pelvic cavity.
D. The plane of the pelvic outlet.
E. The leading axis of the pelvis.

6. What is the Solovyov Index?
A. Radiocarpal joint circumvention.
B. The plane of entry into the pelvis.
C. The leading axis of the pelvis.
D. Diagonal conjugate.
E. Lateral conjugate.
7. The dimensions of the Michalis rhombus are normally equal:
A. 12 x 12 cm.
B. 10 x 12 cm.
C. 11 x 10 cm.
D. 14 x 14 cm.
E. 8 x 9 cm.
8. What are the normal dimensions of the external conjugate (conjugata externa)?
A. 20-21 cm.
B. 17-18 cm.
C. 25-26 cm.
D. 30-31 cm.
E. 23-24 cm.
1-C, 2-B, 3-D, 4-A, 5-C, 6-A, 7-C, 8-A

4. Discussion of theoretical issues (in form of answering questions, engaging in debates, participating in discussions, presentations, writing abstracts, discussing reports and abstracts, and reviewing students' answers.)

External pelviometry

Methodology:

Prepare the patient for examination: explain to the patient the need for the procedure and obtain permission to perform it. Gather all necessary equipment for the examination, including a tazometer and a centimeter tape. Perform external pelviometry as follows:

- Position the patient on the examination table on her back with her legs extended and brought together.
- Place the buttons of the pelviometer branches on both anterior-upper iliac bones (D. spinae = 25-26 cm).
- Position the buttons of both branches of the tazometer on the farthest points of the iliac crests (D. cristae = 28-29 cm).
- Place the pelviometer on the greater trochanter of the femur (D. trochanterica = 31-32 cm).
- Have the patient lie on her left side with her left leg bent at the knee.

- Measure the distance from the most protruding point of the symphysis to the fossa on the back located between the spinous process of the V lumbar and I sacral vertebrae (C. externa = 20-21 cm).
- Measure the circumference of the radiocarpal joint using a centimeter tape (Solovyov index).

Internal pelviometry:

- Position the patient on a gynecological chair.
- Wear sterile gloves.
- Cleanse the external genitalia with a 0.5% alcohol solution of chlorhexidine.
- Gently part the labia majora with two fingers of the left hand, then insert the examining second and third fingers of the right hand into the vagina.
- Locate the point on your hand where the lower edge of the symphysis meets your finger and measure the distance from this point to the tip of the finger that has reached the promontory (C. diagonalis ≥ 12.5-13 cm) using a tazometer or centimeter tape.
- Remove your gloves and dispose of them in a disinfectant.
- Calculate the size of the true conjugate C. verae = C. externa - 9 cm. C. vera = C. diagonalis - 1.5-2 cm.

Basic pelvic dimensions

Transverse dimensions:

- Distantia spinarum: the distance between the anterior-upper iliac spines is 25-26 cm.
- Distantia cristarum: the distance between the most distant points of the iliac crests is 28-29 cm.
- Distantia trochanterica: the distance between the large femoral condyles is 30-31 cm.

Straight size:

- Conjugata externa (external conjugate): the distance from the middle of the upper-outer edge of the symphysis to the supracondylar fossa is 20 cm. To measure this, place the woman on her side; the leg lying below should be bent at the hip and knee joints, while the other leg is extended. One end of the tazometer should be placed in the middle of the upper-outer edge of the symphysis, and the other end is pressed against the supracondylar fossa,

which is located between the spinous processes of the fifth lumbar vertebra and the first sacral vertebra.

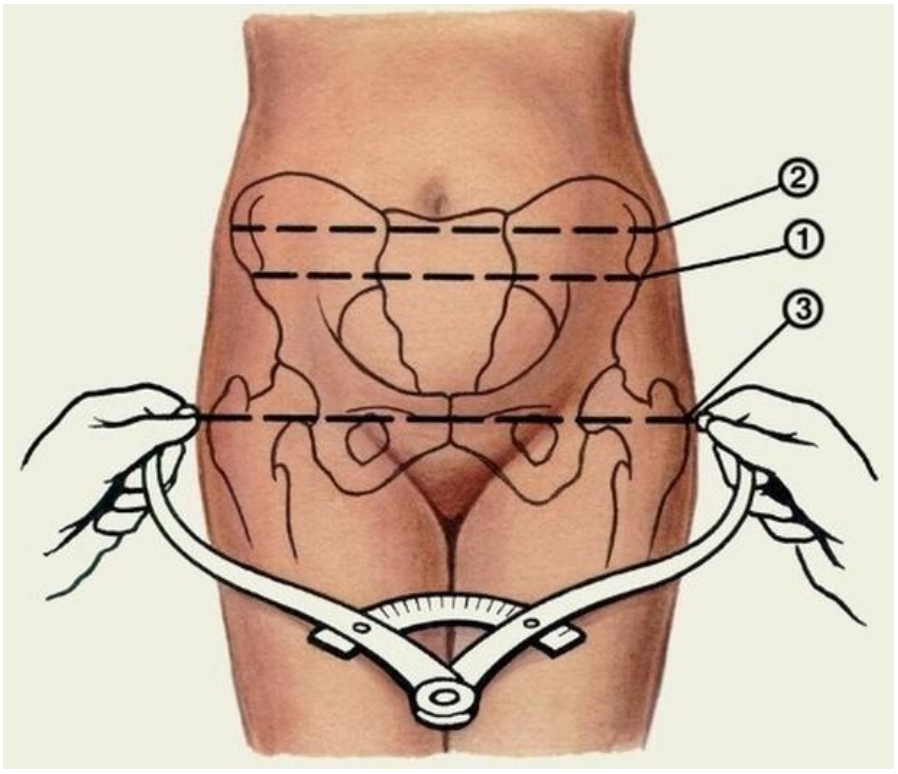

Figure. Measurement of the transverse dimensions of the pelvis:

1 - distantia spinarum (25-26 cm), 2 - distantia cristarum (28-29 cm), 3 - distantia trochanterica 30-31 cm).

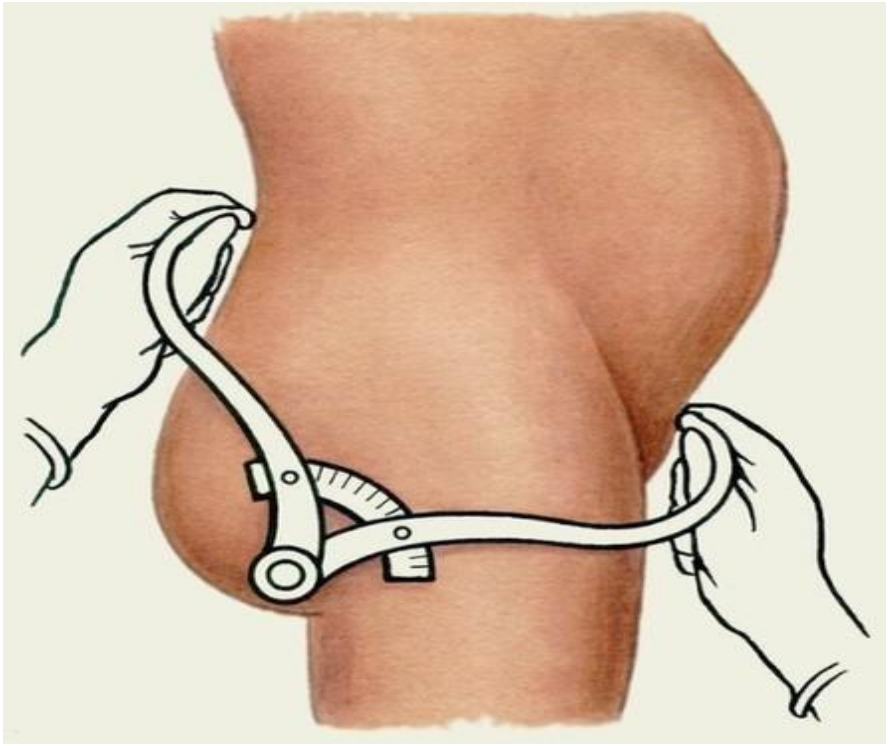

Fig. Measurement of the straight pelvic size - conjugata externa (external conjugate) 20-21 cm.

Additional pelvic dimensions

1. Lateral conjugates (Kerner's) - the distance from the anterior superior (spina iliaca superioris) to the posterior superior (spina iliaca posterioris) iliac crest. Normally, it is 14.5-15 cm. In a narrow pelvis, it decreases to 13.5 cm or more. It's not just the absolute value that's important, but also the equality of the measurements on both sides. A difference of more than 1 cm indicates pelvic asymmetry.

2. Oblique conjugates are the distance between the right anterolateral pelvis and the left posterolateral pelvis, and vice versa. Normally, these dimensions are the same and equal to 20-21 cm. A difference of more than 1 cm indicates an asymmetrical pelvis.

3) Height of the pubic symphysis - measured between its upper and lower edges. Normally, it is 5-6 cm. The higher the pubic symphysis, the smaller the true conjugate. The pubic angle is 90-100°.

4)The distance between the ischial tuberosity and the pubic symphysis. If it is 11.5 cm or more, you should expect a protracted labor.

5) The circumference of the pelvis is measured with a centimeter tape in the supine position, passing it under the sacrum, through the wings of the hip bones, and along

the anterior surface of the pubic symphysis. The normal value is 85 cm. A decrease in this measurement indicates a narrowing of the pelvis.

6) The straight dimension of the plane of exit from the pelvis is from the top of the coccyx to the lower edge of the symphysis; it is 9.5 cm. When the fetus passes through the pelvis, the coccyx moves posteriorly by 1.5-2 cm, and the straight size increases to 11-11.5 cm.

7) The transverse dimension of the plane of exit from the pelvis is between the inner surfaces of the ischial tuberosities. During measurement, 9.5 cm is obtained, and 1-1.5 cm is added to account for tissue thickness. The normal value is 11 cm.

8) The Michaelis rhombus is bounded by four points:
Above: supracoccygeal fossa (fossa under the spinous process of the V sacral vertebra)
Below: the top of the coccyx (beginning of the gluteal fold)
On the sides: depressions located above the posterior-upper auricles of the iliac wings. With a normal pelvic structure and size, the rhombus has the correct shape. The vertical dimension is 11 cm (which corresponds to the size of a normal conjugate), and the transverse dimension is 9-10 cm. The vertical dimension of the Michaelis diamond is approximately equal to the true conjugate (Tridentine conjugate), and the height of the upper triangle is 3-3.5 cm.

9) Diagonal conjugate - the distance from the lower edge of the pubic symphysis to the sacral capitulum. Normally, it is 12.5-13 cm. To measure it, perform a vaginal examination. If the sacral capitulum is not reached, the diagonal conjugate is considered normal. During the examination, the index and middle fingers move along the sacrum to the sacral capitulum. The tip of the middle finger is fixed on its top, and the edge of the palm rests on the lower edge of the symphysis. The point where the doctor's hand touches the lower edge of the symphysis is marked with the finger of the other hand. After removing the fingers from the vagina, measure the distance from the top of the middle finger to the marked point where the palm's edge touched the lower edge of the symphysis using a pelviometer or centimeter tape.

Fig. Measurement of a diagonal conjugate.

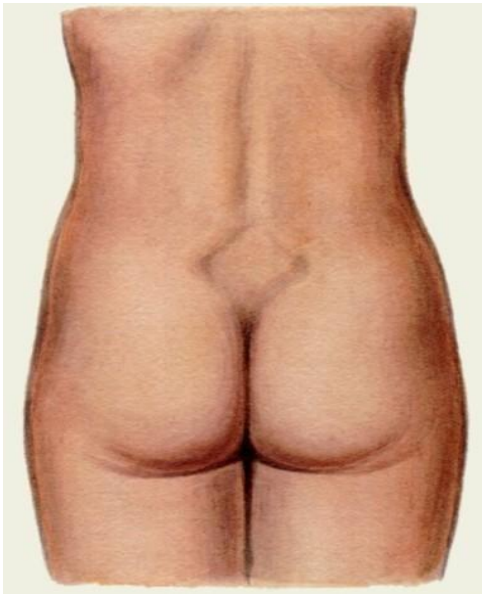

Fig. An overview of a section of the Michaelis rhombus. Normally, the rhombus is symmetrical, regular in shape, with a vertical dimension of approximately 11 cm and a transverse dimension of 10 cm.

Table. Planes and sizes of small pelvis.

Pelvic Plane	Sizes, cm		
	Straight	Transverse	Oblique
Pelvic inlet plane	11	13	12
Wide pelvic plane	12,5	12,5	~ 13
Narrow pelvic plane	11	10,5	–
Pelvic outlet	9,5-11,5	11	–

A true conjugate.

The true conjugate is the primary measurement of the female pelvis and is a crucial factor in choosing the appropriate delivery method. The true conjugate (also known as the obstetric conjugate or conjugata vera) represents the straight measurement of the plane of entry into the pelvis. It extends from the sacral promontory to the most prominent point on the inner surface of the pubic symphysis. Normally it measures 11 cm.

The diagonal conjugate is the distance from the lower edge of the pubic symphysis to the sacral promontory. Normally it measures 12.5-13 cm.

The external conjugate represents the distance from the supracoccygeal fossa to the upper edge of the pubic symphysis. Normally it measures 20-21 cm. The Solovyov index refers to the circumference of the wrist joint.

Methods for determining the true conjugate:

Method 1: Based on the external conjugate. A subtraction of either 8 cm, 9 cm, or 10 cm from the external conjugate is performed depending on the value of the Solovyov index.

- If the Solovyov index is less than 14 cm, subtract 8 cm from the external conjugate.

- If the Solovyov index falls between 14 and 16 cm, subtract 9 cm from the external conjugate.
- If the Solovyov index is greater than 16 cm, subtract 10 cm from the external conjugate.

Method 2: Based on the diagonal conjugate. A subtraction of either 1.5 cm or 2 cm from the diagonal conjugate is performed, depending on the value of the Solovyov index.

- If the Solovyov index is less than 14 cm, subtract 1.5 cm from the diagonal conjugate.
- If the Solovyov index falls between 14 and 16 cm, subtract 1.5 cm from the diagonal conjugate.
- If the Solovyov index is greater than 16 cm, subtract 2 cm from the diagonal conjugate.

5. Topics for Reports and Abstracts (students may also use didactic visual materials such as tables, codagrams, slides, drawings, diagrams, etc. in reports, abstracts, or analytical reviews):

1. Technique of External and Internal Pelviometry in Pregnant Women during Stimulation Training.
2. Algorithm for Measuring Additional Pelvic Dimensions and Identifying Cases When It Is Necessary.
3. Planes and dimensions of the pelvis.
4. Determination of the true conjugate by various methods: Using the Diagonal Conjugate, Outer Conjugate, and the Michaelis Rhombus (its vertical size as the Tridondine conjugate).

Summarizing the Results.

Higher education students should master external pelviometry, internal pelviometry, understand the normal dimensions of the large and small female pelvis, be familiar with the pelvic planes, and know how to measure additional dimensions of the female pelvis and the true conjugate.

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Criteria for assessing learning outcomes

Current control: oral questioning, assessment of communication skills during a role-play, solving situational clinical tasks, assessment of activity in the classroom.

Final control: credit.

Assessment of current learning activities in a practical class:

1. Assessment of theoretical knowledge on the topic in the class:
   - Methods: questionnaire, case study, clinical problem solving
   - maximum grade - 5, minimum grade - 3, unsatisfactory grade - 2.

2. Assessment of work with Patients:

Methods:

Assessment of: a) Communication skills during interactions with the patient. b) The correctness of appointments and the evaluation of laboratory and instrumental studies before solving a situational problem. c) Ability to perform external pelviometry, internal pelviometry, knowledge of the normal dimensions of the large and small female pelvis, understanding of the pelvic planes, and ability to measure additional dimensions of the female pelvis and the true conjugate.

Maximum grade: 5, minimum grade: 3, unsatisfactory grade: 2.

The grade for each practical lesson is the arithmetic mean of all components and can only have an integer value (5, 4, 3, 2), which is rounded according to statistical methods.

Criteria for the current assessment in the practical class

"5"	The applicant demonstrates a strong command of the material, actively engages in discussions and the resolution of situational clinical problems, and exhibits confidence in practical skills when examining patients and interpreting clinical, laboratory, and instrumental research data. Additionally, the applicant effectively expresses their opinions on the class topic and demonstrates clinical thinking.
"4"	The applicant has a strong grasp of the material, actively participates in discussions, and contributes to the resolution of situational clinical problems. They demonstrate practical skills during patient examinations and the interpretation of clinical, laboratory, and instrumental research data, albeit with occasional errors. Additionally, the applicant effectively expresses their opinions on the class topic and displays clinical thinking.

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"3"	The applicant lacks a solid understanding of the material and struggles to confidently engage in discussions and solve situational clinical problems. They exhibit notable errors in practical skills during patient examinations and the interpretation of clinical, laboratory, and instrumental research data.
"2"	The applicant lacks knowledge of the material, does not engage in discussions or participate in solving situational clinical problems, and fails to demonstrate practical skills during patient examinations or the interpretation of clinical, laboratory, and instrumental research data.

An applicant is eligible to take the test if they have met the curriculum requirements and have received a minimum score of 3.00 for their current academic activities.

Credit

Upon completion of the course, a final test is administered. Only students with no academic debts and an average grade point of at least 3.00 are permitted to participate in the final assessment. When the course culminates in a test, the average score for current academic performance is computed. This average is calculated by finding the arithmetic mean of all grades received on a traditional scale, which is then rounded to two decimal places and converted to a 200-point system. The average current grade is recorded in the relevant documentation, which is subsequently converted to a 200-point scale, and students are assigned grades on a pass or fail basis:

- "Passed" is given to students who have completed the curriculum, have no academic debts, and have demonstrated a high level of competence (creative).
- "Not enrolled" is assigned to students who have not fulfilled the curriculum, have academic debts (with a grade point average below 3.0 and/or absences from classes), and exhibit a low level of competence (receptive and productive).

Literature

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Additional

1. Diagnosis of obstetric and gynaecological endocrine pathology: [a textbook for interns and doctors attending postgraduate medical schools of the Ministry of Health of Ukraine] / edited by V.K. Likhachev; V.K. Likhachev, L.M. Dobrovolska, O.O. Taranovska, et al: Maksymenko E.V. Publisher, 2019. 174 p.

1. Zaporozhan V.M. Simulation medicine. Experience. Achievements. Prospects: practical guide / V.M. Zaporozhan, O.O. Tarabrin - Sumy: University. Book, 2018. 240 p.
2. Order of the Ministry of Health of Ukraine of 15.07.2011 No. 417 "On the Organisation of Outpatient Obstetric and Gynaecological Care in Ukraine".

Online sources for preparation:

1. https://www.cochrane.org/
2. https://www.ebcog.org/
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