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DIFFERENTIATED APPROACHES TO THE MANAGEMENT OF PREGNANCY AND CHILDBIRTH WITH PREMATURE DISCHARGE OF AMNIOTIC FLUID

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Summary.

Today, preterm birth remains one of the most significant medical and social challenges in maternal and child healthcare. According to the World Health Organization (WHO), «…70% of early neonatal deaths and 65-75% of infant deaths are due to premature babies…» The global preterm birth rate ranges from 5% to 15% of all pregnancies, with this indicator showing consistent annual increase.

The purpose of the study: *improvement of the differential approach to pregnancy and delivery management based on hormonal, microbiological, immunological and ultrasonographic changes in cases of preterm premature rupture of membranes (PPROM).*

The object of the study *was 177 pregnant women observed at the Bukhara Regional Perinatal Center. The investigation was conducted in two phases. Phase I (2020-2021) involved retrospective analysis of medical records from 157 pregnant women with PPROM at the city maternity complex. Phase II (2022) prospectively examined 177 pregnant women: Group 1 comprised 107 women with PPROM and subsequent delivery; Group 2 included 30 women with PPROM and pregnancy continuation; the control group consisted of 40 healthy pregnant women.*

The principles of bioethics, approved by the Scientific Council of Bukhara State Medical Institute, are preserved and upheld in full compliance.

The statistical software package Statgraphics (Stadia version) and the Statsoft Inc. 99, USA computer statistical program were used in the work. To compare the significance of differences in the results in the studied groups, Student's t-test and paired t-test were used. Differences were considered significant at a 5% significance level according to the Student's table ($p<0.05$, i.e., 95% probability of the event).

The study was conducted in accordance with the research plan of the Bukhara State Medical Institute within the framework of the topic «Early detection and diagnosis of pathological factors affecting the health of the population of the Bukhara region in the post-COVID-19 period, as well as the development of new methods of treatment and prevention (2022-2026)».

Result. *The age range of participants was 19 to 39 years, with mean age 27.5 ± 5.45 years. Analysis of residence distribution revealed 46.4% urban and 53.6% rural dwellers. By social status, 56.69% were homemakers, 35.67% were employed, and 7.64% were students. Primigravida accounted for 43.4% of cases, secundigravida for 28.7%, and multigravida (third or more pregnancy) for 28%. Delivery occurred at 36-37 weeks in 54.14% of cases, at 34-35 weeks in 40.76%, and before 34 weeks in 5.10%, with mean gestational age at delivery of 34.96 ± 0.2 weeks.*

Conclusion. *Ultrasonographic assessment demonstrated cervical shortening by factors of 1.3 and 1.2 in the main and comparison groups respectively versus controls ($p<0.05$). The amniotic fluid index measured 56.9 ± 4.03 mm in the delivery group, 79.3 ± 6.73 mm in the pregnancy continuation group, and 151.1 ± 12.64 mm in controls. The single vertical pocket measurements were 17.5 ± 0.89 mm (delivery group) and 38.9 ± 0.69 mm (pregnancy continuation group), representing 2.3-fold and 1.5-fold reductions versus controls (60.3 ± 1.73 mm; $p<0.05$).*

Keywords: *Pregnancy and Childbirth; Preterm Premature Rupture of Membranes; Hormonal Changes; Microbiological Studies; Immunological Changes.*

Introduction

Today, preterm birth remains one of the most significant medical and social challenges in maternal and child health [1-3]. According to the World Health Organization (WHO), «… 70% of early neonatal deaths and 65-75% of infant deaths are due to premature babies …» The global preterm birth rate ranges from 5% to 15% of all pregnancies, with this indicator showing consistent annual increase [4,5]. About 15 million babies are born prematurely in the world. [6-9]. Approximately 15 million infants are born preterm worldwide [6-9], with about one million annual deaths attributable to prematurity complications [10,11]. Perinatal mortality rates are 33-fold higher in preterm versus term deliveries [12].

Global studies demonstrate that the high prevalence of preterm birth and associated perinatal mortality necessitate development of improved early diagnostic and therapeutic approaches [13]. International research prioritizes enhancement of diagnostic methods, treatment protocols, and preventive strategies for pregnancy complications, including early identification of preterm birth risk [14,15]. Consequently, several critical research priorities emerge: identification of preterm birth risk factors; characterization of intestinal and vaginal microbiota in pregnancy; evaluation of adverse pregnancy outcomes; assessment of genetic predisposition to preterm delivery; determination of biochemical and immunological diagnostic markers; identification of preterm birth predictors; analysis of specific biochemical and hormonal parameters in blood and saliva; evaluation of hemostatic alterations in high-risk pregnancies; and development of evidence-based management algorithms with targeted therapeutic and preventive measures [16-18].

International studies report that vaginal microbiota alterations in 40-60% of pregnant women contribute to cervical pathology, subsequently leading to chorioamnionitis, microbial invasion of the amniotic cavity, and amniotic fluid contamination [19,20]. Clinical data indicate that 37% of

women experience spontaneous labor onset within 12 hours of preterm premature rupture of membranes (PPROM), 66% within 24 hours, and 84% within 48 hours, while only 16-21% achieve pregnancy prolongation after PPROM [21,22].

PPROM represents one of the most critical challenges in contemporary obstetrics due to its substantial impact on perinatal and infant morbidity and mortality. As a major fetal and maternal risk factor, PPROM requires particular attention in both preterm and term pregnancies [23-25]. Current research emphasizes the importance of elucidating the pathogenesis of preterm birth to enable more effective targeted therapies. Significant scientific investigations into PPROM have been conducted by researchers across CIS countries [26-29].

Therefore, developing more accurate prediction models for preterm birth risk using specific objective parameters remains an urgent priority. Given these considerations, implementing high-quality, rational, and pathophysiologically grounded strategies for diagnosis, monitoring, and prevention in high-risk pregnancies represents a crucial healthcare imperative.

The principles of bioethics, approved by the Scientific Council of Bukhara State Medical Institute, are preserved and upheld in full compliance.

The statistical software package Statgraphics (Stadia version) and the Statsoft Inc. 99, USA computer statistical program were used in the work. To compare the significance of differences in the results in the studied groups, Student's t-test and paired t-test were used. Differences were considered significant at a 5% significance level according to the Student's table ($p<0.05$, i.e., 95% probability of the event).

The study was conducted in accordance with the research plan of the Bukhara State Medical Institute within the framework of the topic «Early detection and diagnosis of pathological factors affecting the health of the population of the Bukhara region in the post-COVID-19 period, as well as the development of new methods of treatment and prevention (2022-2026)».

The purpose of the study: improvement of the differential approach to the management of pregnancy and childbirth based on hormonal, microbiological, immunological and ultrasonographic changes in preterm premature rupture of membranes (PPROM).

The object of the study was 177 pregnant women under observation at the Bukhara Regional Perinatal Center. The investigation was conducted in two phases. Phase I (2020-2021) comprised retrospective analysis of medical records from 157 pregnant women with PPROM at the city maternity complex. Phase II (2022) involved prospective evaluation of 177 pregnant women: Group 1 included 107 women with PPROM and subsequent delivery; Group 2 comprised 30 women with PPROM and pregnancy continuation; the control group consisted of 40 healthy pregnant women.

Result. Maternal age ranged from 19 to 39 years (mean 27.5 ± 5.45 years); residential distribution showed 46.4% urban and 53.6% rural inhabitants; occupational status revealed 56.69% homemakers, 35.67% employed individuals, and 7.64% students.

Parity distribution indicated 43.4% primigravida (n=68), 28.7% secundigravida (n=45), and 28% multigravida (third or subsequent pregnancy, n=44). Gestational age at delivery was distributed as follows: 54.14% at 36-37 weeks, 40.76% at 34-35 weeks, and 5.10% before 34 weeks, with mean delivery timing of 34.96 ± 0.2 weeks (Figure 1).

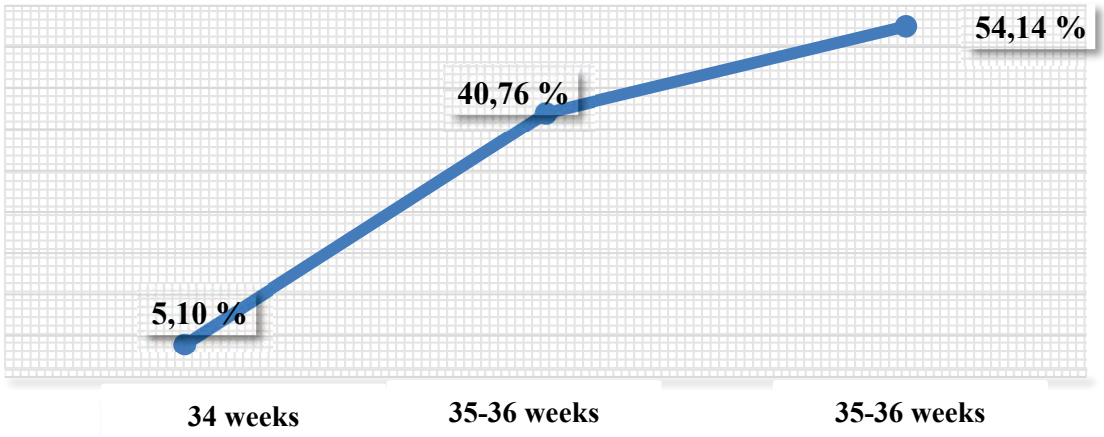

Figure 1. Distribution of patients by delivery time

Retrospective analysis of gynecological history revealed 13.37% with induced abortions (8.28% with one abortion, 5.09% with ≥2 abortions). Spontaneous first-trimester pregnancy loss was reported in 7.0% (n=11), while antenatal fetal death occurred in 2.0% (n=3). Perinatal complications were observed in 2.54% (n=4) of deliveries before 34 weeks (Figure 2)..

Evaluation of gynecological comorbidities identified inflammatory conditions in 46 PPROM cases: bacterial vaginosis (25.48%) and chronic adnexitis (12.74%). Additional findings included ovarian cysts (5.7%, n=9), cervical ectopia (11.46%, n=18), and infertility (7.6%, n=12) (Figure 3).

Uterine fibroids and endometriosis were present in 6.37% and 9.55% of cases respectively. These gynecological conditions represented significant risk factors for preterm premature rupture of membranes (PPROM). The study confirmed that the aforementioned gynecological pathologies, particularly pelvic inflammatory disease and bacterial vaginosis, may predispose to PPROM.

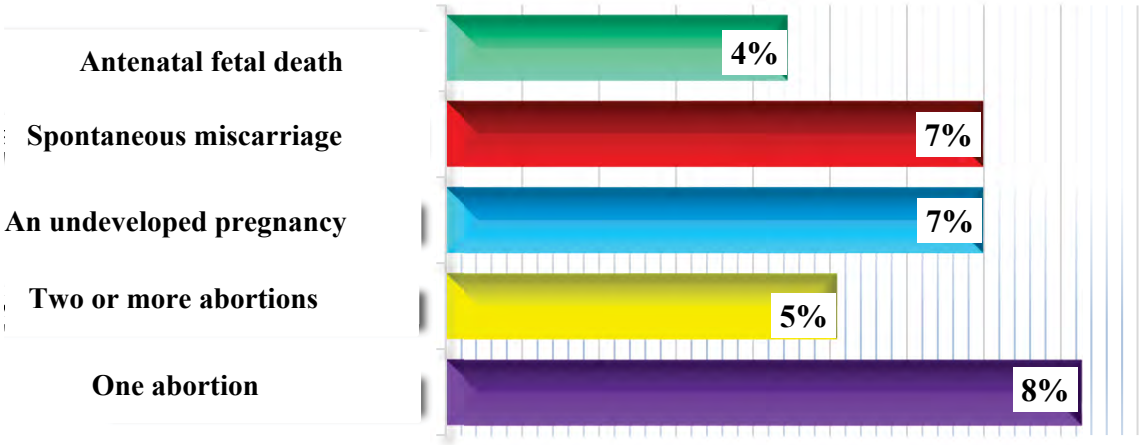

Figure 2. Patient distribution by abortion history

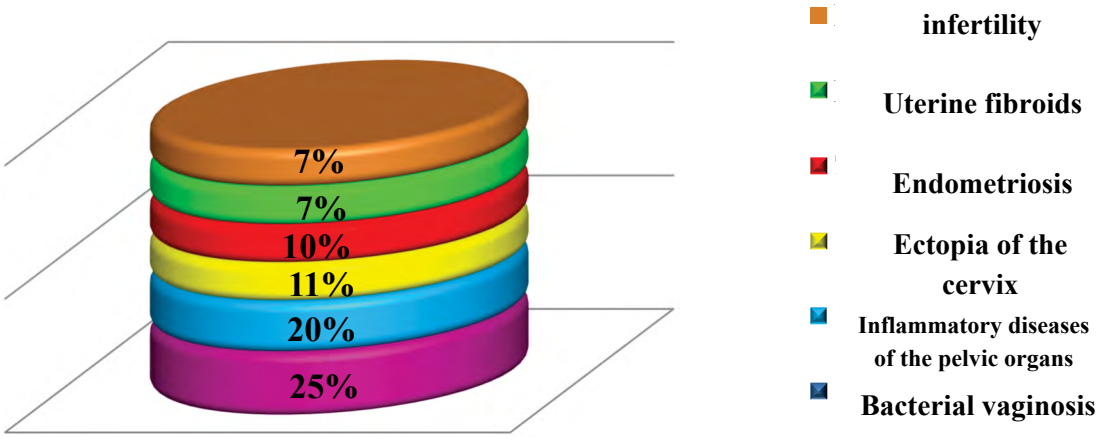

Figure 3. The prevalence of gynecological pathologies

Among somatic comorbidities in women with PPROM, anemia of varying severity demonstrated the highest prevalence at 52.2% (Figure 4).

The pathophysiological consequences of anemia in pregnancy include hypoxic damage to vital organs (kidneys, gastrointestinal tract), resulting in immune system alterations, secondary microbial proliferation, inflammatory responses, hypercoagulability, and endocrine dysfunction. These systemic changes may precipitate pregnancy complications including PPROM.

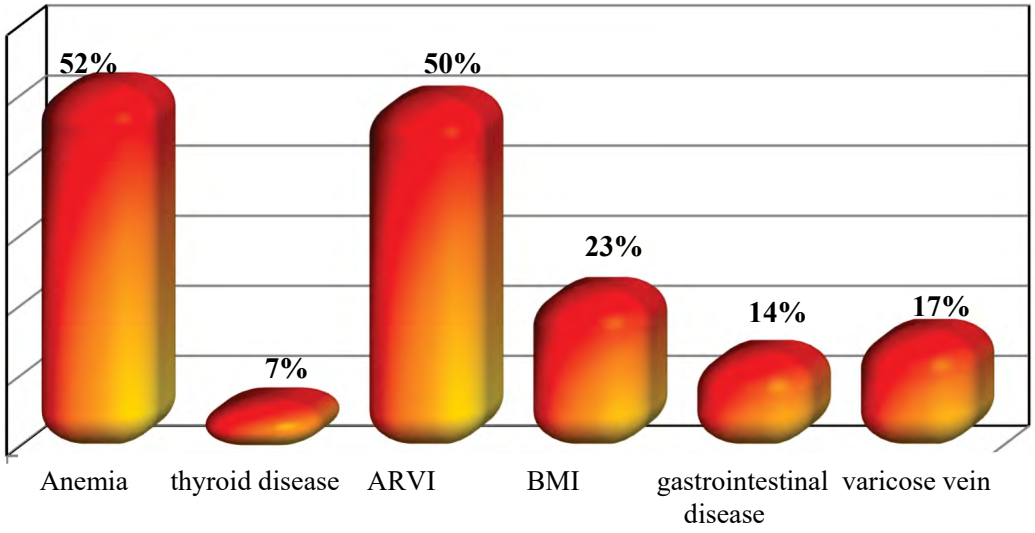

Figure 4. Frequency distribution of somatic diseases in the retrospective cohort (%)

Additional somatic conditions included: acute respiratory viral infections (ARVI) in 50.3% (n=79); thyroid disorders (autoimmune thyroiditis, diffuse goiter) in 7.18% (n=10); urinary tract infections in 23% (n=36); and varicose veins in 17.2% (n=27). These conditions were shown to significantly compromise maternal immune

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status. Specifically, urinary tract infections and venous insufficiency were identified as clinically relevant risk factors for PPROM in our study population.

Retrospective evaluation of pregnancy complications revealed: first-trimester nausea/vomiting (30.5%); hypertensive disorders (10%) (Figure 5). Notably, threatened abortion (17%) and preterm labor (34%) were frequently documented, with uterine hypertonicity representing a potential mechanistic link to subsequent PPROM development.

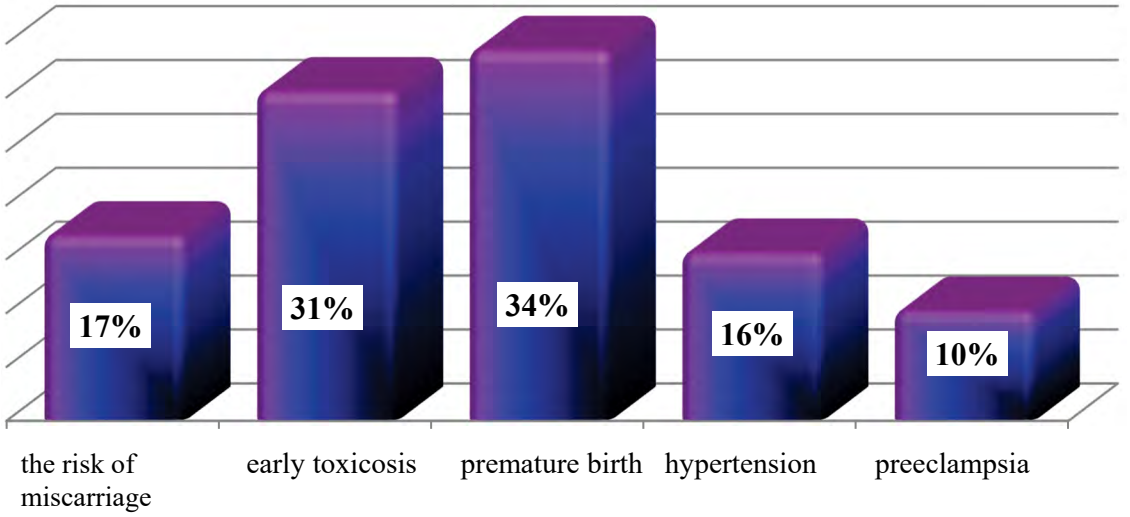

Figure 5. The course of pregnancy in the retrospective group

Natural vaginal delivery occurred in 106 pregnant women (67.52% of the cohort), including 27 cases with labor induction (17.2%), while cesarean section was performed in 51 women (32.5%). Chorioamnionitis represented the most frequent complication in the retrospective group, observed in 18 patients (11.4%) across antepartum, intrapartum and postpartum periods. Postpartum septic endometritis developed in 4 cases (2.5%) (Figure 6).

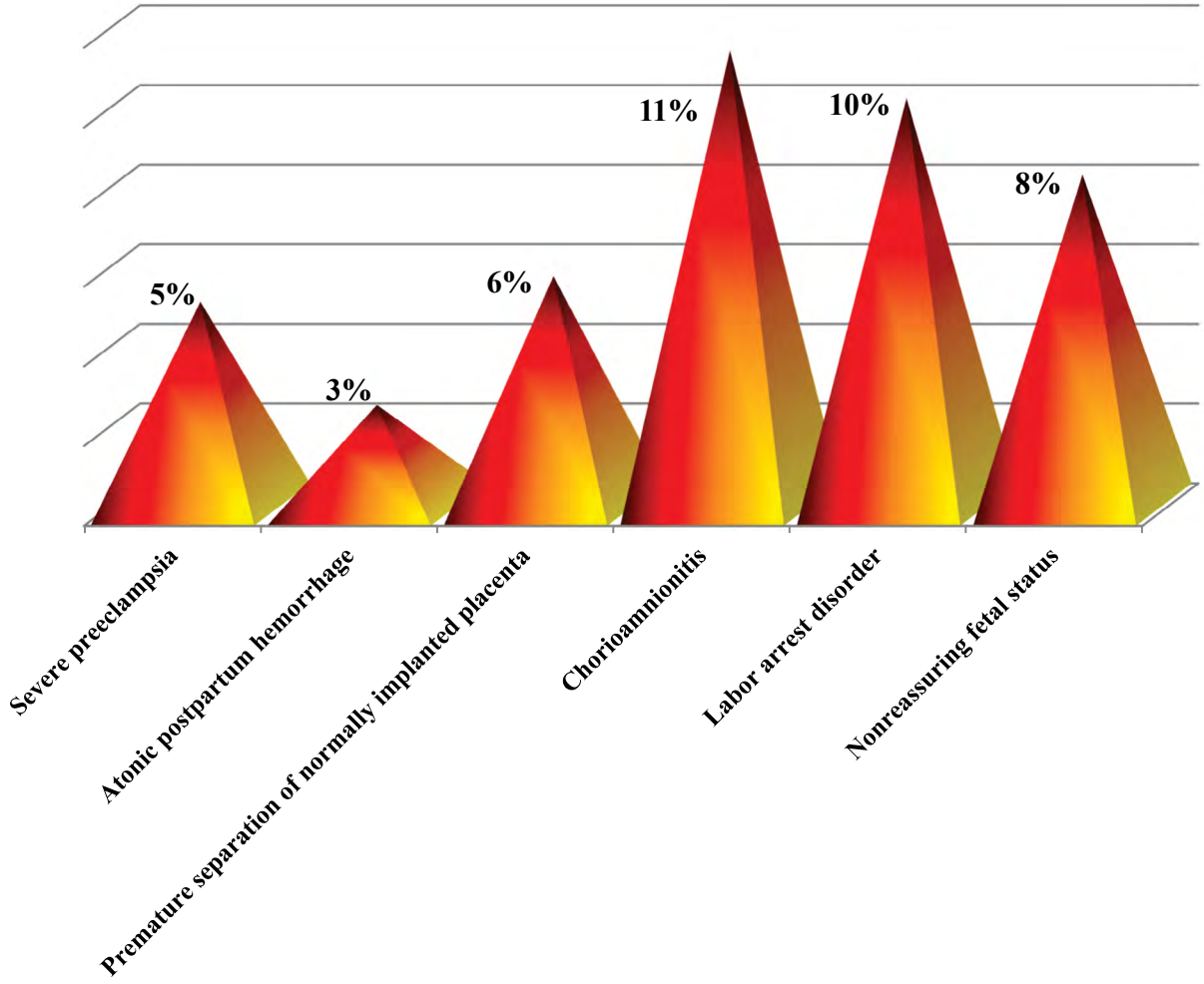

Figure 6. Complications in the third trimester and early postpartum period in the retrospective group

The analysis identified several predominant risk factors for preterm premature rupture of membranes (PPROM): hypoxic conditions (anemia of various etiologies); pre-existing or pregnancy-associated somatic diseases (chronic pyelonephritis, chronic gastritis, varicose veins); reproductive tract inflammatory conditions (chronic adnexitis, cervical pathology, colpitis, vaginal dysbiosis).

The study included comprehensive analysis of clinical and laboratory parameters in women with PPROM, along with evaluation of pregnancy and delivery management outcomes.

As part of the dissertation research, comparative analysis of complete blood count parameters revealed statistically significant differences in hemoglobin, erythrocyte, leukocyte and platelet levels between Groups 1 and 2 compared to controls (Table 1).

Analysis revealed that neutrophil counts increased 1.4-fold and 1.2-fold in pregnant women with preterm premature rupture of membranes (PPROM) compared to controls, while lymphocyte counts decreased 1.9-fold and 1.5-fold respectively. Furthermore, erythrocyte sedimentation rate (ESR) showed 1.5-fold and 1.4-fold elevations in Groups 1 and 2 versus controls, despite remaining within reference ranges ($p<0.001$). These leukogram alterations with stable white blood cell counts represent reactive neutrophilia, typically observed in bacterial infections, hypoxic states, and hypercoagulable conditions.

Immunological assessment included quantification of IgM, IgA, and IgG levels (Table 2). IgA concentrations decreased by 2.69 mg/L in Group 1 and 5.09 mg/L in Group 3. The most pronounced intergroup difference occurred between Groups 1 and 2 ($p<0.01$), suggesting immune system activation following PPROM, given IgA's crucial role in mucosal immunity and local immune defense

Table 1

The complete blood count results across study groups

Indicator	Group 1 (n=107)	Group 2 (n=30)	Group 3 (n=40)
	M±m	M±m	M±m
Hemoglobin, g/dL	87,63±1,51**^	91,80±1,15**∞	103,53±1,45
Erythrocytes, *1012/L	2,85±0,04*^	3,17±0,04*∞	3,92±0,05
Hematocrit, %	30,50±0,32*^	32,93±0,93*^∞	34,65±0,61
Leukocyte,*109/L	7,93±0,12*^	7,75±0,17*∞	7,90±0,19
Neutrophil	6,14±0,08*^	5,56±0,07*∞	4,1±0,07
Lymphocyte	1,99±0,04**^	2,5±0,04*∞	3,8±0,05
Thrombocyte,*109/L	192,84±1,94*^	194,17±2,34*∞	194,8±2,44
ESR, mm/h	13,67±0,28**^	12,67±0,75**∞	8,83±0,68

*Note: * – significance of differences between Groups 1-2 and controls (*p<0.05, **p<0.01), ^ – significance of differences between Group 2 indicators (^p<0.05), ∞ – significance of differences between Group 1 indicators (∞p<0.05).*

Table 2

Comparative analysis of the level of immunoglobulins in the examined groups

Indicator	Group 1 (n=107)	Group 2 (n=30)	Group 3 (n=40)
	M±m	M±m	M±m
Ig A	2,69±0,05**^	3,92±0,09**∞∞	5,09±0,10
Ig M	10,19±0,04***^^	8,54±0,07**∞∞	4,16±0,10
Ig G	19,79±0,39***^^	16,48±0,65**∞∞	10,51±0,34

*Note: * – significance of differences between Groups 1-2 and controls (**p<0.01, ***p<0.001), ^ – significance of differences between Group 2 indicators (^p<0.05, ^^p<0.01), ∞ – significance of differences between Group 1 indicators (∞p<0.01).*

Detailed evaluation of IgM demonstrated increases from 10.19 mg/L in Group 1 to 8.54 mg/L in Group 3, with significant intergroup variation ($p<0.001$). This IgM elevation likely reflects primary immune response to infectious agents or inflammatory processes associated with PPROM.

The most substantial alteration was observed in IgG levels, which increased from 19.79 mg/L in Group 1 to 10.51 mg/L in Group 3, with statistically significant differences between all groups ($p<0.01$). Elevated IgG, as the principal component of humoral immunity, may reflect either prolonged immune system activation or dysregulation of immune mechanisms under the stress of PPROM.

Consequently, quantitative IgG analysis represents an important tool for obstetricians in evaluating immune status and potential infection-related risks during pregnancy. This approach enables mitigation of maternal and fetal health risks through timely, evidence-based clinical decisions that may reduce PPROM likelihood.

The prospective study implemented a diagnostic algorithm for PPROM assessment and pregnancy management, incorporating binary logistic regression to enhance prediction accuracy. This algorithm evaluates cervical microbiota, hormonal profiles, and pathogen-specific antibodies.

Microbiological analysis employed polymerase chain reaction (PCR) methodology for high-sensitivity detection of pathogenic and opportunistic microorganisms. Specimens collected from the posterior vaginal fornix and cervical canal using sterile probes were processed with Femoflor-16 reagents on a DT-96 analyzer. Vaginal microbiota composition was categorized as: normocenosis

(>80% *Lactobacillus spp.*), moderate dysbiosis (20-80% *Lactobacillus spp.*), or severe dysbiosis (<20% *Lactobacillus spp.*). Group-specific distributions of these categories are presented in Table 3

Table 3

Cervical Lactobacillus spp. distribution according to vaginal biocenosis parameters in pregnant women

Indicators	Group 1 (n=107)		Group 2 (n=30)		Group 3 (n=40)	
	abs	%	abs	%	abs	%
Normocenosis ((>80% Lactobacillus spp.)	5	4,7	9	30,7	33	82,5
Moderate dysbiosis (20-80% Lactobacillus spp.)	14	13,1	15	50	7	17,5
Severe dysbiosis (<20% Lactobacillus spp.)	88	82,2	6	19,3	0	0

In Group 1 (main study group), severe dysbiosis was observed in 82.2% of patients (n=88). Severe dysbiosis prevalence was significantly lower in Group 2 (19.3%, n=6) and absent in Group 3 (0%). The dysbiosis severity in Group 1 demonstrated statistically significant elevation compared to other groups. Moderate dysbiosis was identified in 13.1% of Group 1 patients (n=14), exceeding the rates in Group 2 (50%) and Group 3 (17.5%). Normocenosis was present in 4.7% of Group 1 (n=5), 30.7% of Group 2 (n=15), and 82.5% of Group 3 (n=33). These findings demonstrate pronounced vaginal biocenosis disruption in the primary study group, suggesting additional pathophysiological mechanisms contributing to pregnancy complications beyond microbial imbalance alone.

Evaluation of endometrial microbiota involved quantification of total bacterial load, Lactobacillus abundance, and their proportional relationship with 23 opportunistic microbial species. This comprehensive analysis enabled classification of microbial flora states according to standardized criteria, ranging from complete normocenosis to clinically significant dysbiosis. Detailed results are presented in Table 4

Table 4

Quantitative and qualitative microbial profiles across study groups

Microorganisms	Group 1 (n=107)		Group 2 (n=30)		Group 3 (n=40)		p1	p2	p3
	abs	%	abs	%	abs	%			
Lactobacillus spp.	5	4,7	15	50	33	82,5	<0,001	<0,001	0,546
Enterobacterium spp.	29	27,1	9	30,0	12	30,0	0,504	0,727	0,766
Streptococcus spp.	24	22,4	12	36,7	14	35,0	0,114	0,121	0,885
Staphylococcus spp.	26	24,3	10	30,0	10	25,0	0,527	0,930	0,642
Gardnerella vaginalis + Prevotella bivia + Porphyromonas spp.	34	31,8	2	6,6	1	2,5	0,002	<0,001	0,836
Eubacterium spp.	32	29,9	3	10	1	2,5	0,009	<0,001	0,394
Sneathia spp. +leptotrichia spp. + Fusobacterium spp.	28	26,2	3	10	0	0,0	0,022	<0,001	0,098
Megasphaera spp. +Veillonellaspp. +Dialister spp.	35	32,7	14	46,6	17	42,5	0,281	0,269	0,944
Lachnobacterium spp. + Clostridium spp.	24	22,4	2	6,6	1	2,5	0,017	0,004	0,836
Mobiluncus spp. +Corinebarterium spp.	21	19,6	3	10	1	2,5	0,093	0,010	0,394
Peptostreptococcus spp.	27	25,2	5	16,7	4	10,0	0,327	0,044	0,410
Atopobium vaginae	38	35,5	5	16,7	2	5,0	0,049	<0,001	0,107
Mycoplasma hominis	45	42,1	3	10,0	4	10,0	0,001	<0,001	1,000
Ureaplasma spp.	48	44,9	6	20,0	5	12,5	0,014	<0,001	0,394
Candida spp.	49	45,8	17	56,7	18	45,0	0,292	0,931	0,334
Mycoplasma genitalium	31	29,0	3	10	1	2,5	0,012	0,001	0,394

Note: Intergroup comparisons (I vs II, I vs III, II vs III) showed statistically significant differences by Student's t-test

In Group 1, *Lactobacillus spp*. were identified in 4.7% of patients (n=5). These microorganisms serve as key indicators of vaginal eubiosis, maintaining acidic pH and inhibiting pathogenic colonization. Detection rates were significantly higher in Group 2 (50%, n=15) and Group 3 (82.5%, n=33), reflecting comparatively healthier microbiota versus Group 1 (p<0.001).

Enterobacterium spp. were isolated from 27.1% of Group 1 patients (n=29), with comparable prevalence in Group 2 (30%, n=9) and Group 3 (30%, n=12). While potentially pathogenic, these organisms demonstrated no statistically significant intergroup variation (p>0.05), suggesting stable colonization patterns across cohorts..

Gardnerella vaginalis, *Prevotella bivia* and *Porphyromonas spp.* were significantly more prevalent in Group 1 (31.8%, n=34) versus Group 2 (6.6%) and Group 3 (2.5%). These microorganisms are established biomarkers of bacterial vaginosis, associated with microbiota

disruption and reproductive complications. Statistical analysis revealed significant differences (p=0.002 and p<0.001) with elevated odds ratios (OR=13.51 and 18.16), indicating substantial risk association for Group 1.

This analysis underscores the critical importance of comprehensive qualitative and quantitative evaluation of microbial flora, enabling prediction of potential pathologies through biocenosis alterations. Real-time PCR detected bacterial vaginosis in 82.2% of pregnant women with preterm premature rupture of membranes (PPROM), while normocenosis was observed in 80.5% of women with uncomplicated pregnancies. These findings demonstrate the high diagnostic value of real-time PCR for genital tract microbiota assessment, highlighting: the necessity of bacterial vaginosis identification; its association with preterm birth; and the importance of early microbial normalization during pregnancy.

Immunological analysis revealed decreased IgA levels in PPROM cases (inverse moderate correlation: r= –0.65), reflecting compromised mucosal protection. Reduced IgA levels were associated with increased inflammatory activity (inverse mean correlation: r = –0.65). IgM levels demonstrated a significant increase in the setting of PPROM, representing a primary response to infectious processes (direct strong correlation: r =+0.78). Similarly, IgG levels were elevated in PPROM cases, consistent with this immunoglobulin's role in providing sustained immunological protection, with increased levels indicating heightened inflammatory stress (direct strong correlation: r = +0.72). Quantitative analysis of pathogen-specific IgG antibodies revealed that elevated titers against *Gardnerella vaginalis*, *Prevotella bivia*, and *Porphyromonas spp.* were associated with enhanced immune activation (direct average correlation: r =+0.58) and correlated with increased risk of PPROM.

The concurrent elevation of IgG and IgM in PPROM cases signifies active immune response against infection and inflammation. IgG patterns particularly reflect sustained immune system adaptation, making immunoglobulin profiling crucial for PPROM diagnosis and management.

Ultrasonographic assessment of amniotic fluid volume employed both amniotic fluid index (AFI) and single vertical pocket measurements. AFI values were significantly reduced in Group 1 (56.9 ± 4.03 mm) and Group 2 (79.3 ± 6.73 mm) compared to controls (151.1 ± 12.64 mm), representing 1.3-fold and 2.6-fold decreases respectively. Standard AFI calculation involves summation of fluid measurements from four uterine quadrants, with normal range 50-240 mm (oligohydramnios <50 mm; polyhydramnios >240 mm). In PPROM cases with subsequent delivery, mean AFI was 56.9 ± 4.03 mm (Table5). Given AFI limitations in multiple gestations, single vertical pocket measurement (normal range: 20-80 mm) provides complementary diagnostic information.

Table 5

The size of the largest vertical pocket and amniotic index in the examined groups

Indicator	Group 1 (n=107)	Group 2 (n=30)	Group 3 (n=40)
	M±m	M±m	M±m
Amniotic Fluid Index (mm)	56,9±4,03***^^	79,3±6,73***∞∞	151,1±12,64
The size of the largest vertical pocket (mm)	17,5±0,89***^^^	38,9±0,69**∞∞∞	60,3±1,73

*Note: * – indicates a statistically significant difference between Groups 1-2 and controls (*p < 0.01); ^ – indicates a statistically significant difference within Group 2 (^^p < 0.01); ∞ – indicates a statistically significant difference within Group 1 (∞∞p < 0.01).*

In Group 1 pregnant women, the measured parameter (17.5 ± 0.89 mm) showed a 2.2-fold and 3.4-fold reduction compared to Groups 2 (38.9 ± 0.69 mm) and 3 (60.3 ± 1.73 mm), respectively. These findings suggest that reduced amniotic fluid volume may represent a significant contributing factor to labor initiation. Cervical biophysical assessment was performed via transvaginal ultrasonography (Table 6).

Table 6

Assessment of the length of the cervix in the examined groups

Indicator	Group 1 (n=107)	Group 2 (n=30)	Group 3 (n=40)
	M±m	M±m	M±m
Length of the cervix (mm)	28,1±1,81**^^	34,2±1,41**∞∞	40,0 ±2,15

*Note: * – significance of the difference between Groups 1-2 and controls (* – p<0.01), ^ – significance of the difference between the indicators of Group 2 (^^- p<0.01),∞- significance of the difference between the indicators of Group 1 (∞∞- p<0.01).*

Cervical length measurements demonstrated that in Group 1 patients, the cervical length ranged from 18 to 34 mm, with a mean measurement of 28.1 ± 1.81 mm. It was observed that in more than 50% of cases, specifically in 54 patients, the cervical length measured less than 30 mm. In contrast, pregnant women of Group 2 showed a mean cervical length of 34.2 ± 1.41 mm following premature rupture of membranes, with the majority of measurements exceeding 30 mm and only two cases measuring 28 mm (p<0.05). Comparative analysis revealed that cervical length measurements in Groups 1 and 2 were 1.4 times and 1.1 times shorter, respectively, than those observed in the control group, which had a mean cervical length of 40.0 ± 2.15 mm.

The study demonstrated that the presence of somatic and gynecological comorbidities significantly influences pregnancy and delivery outcomes in patients with premature rupture of membranes. Anemia, infections, and chronic inflammatory conditions play a key role in the development of complications such as premature rupture

of membranes, increased risk of preterm birth, and higher cesarean section rates. These findings underscore the importance of a comprehensive approach to pregnancy management in high-risk women, including early diagnosis and correction of concomitant diseases, as well as optimal timing of labor induction. Further research in this field will contribute to the development of more effective preventive and therapeutic strategies, ultimately improving perinatal outcomes.

Conclusion

1. Based on retrospective analysis, the principal risk factors for premature rupture of membranes are anemia (52%), urinary tract infection (23%), varicose veins (17%), pelvic inflammatory disease (20%), bacterial vaginosis (25%), and cervical ectopia (18%). A history of multiple pregnancies (25%) and the number of previous induced abortions (21%) also had a negative impact.

2. Serum progesterone levels in pregnant women with premature rupture of membranes and delivery were reduced 1.1-fold compared with the comparison and control groups, whereas estrogen levels were increased 1.3-fold. This finding highlights the important role of steroid hormones in the labor process. Serum immunoglobulin A (IgA) levels were decreased 1.8-fold and 1.3-fold in the main and comparison groups, respectively, compared with controls. Immunoglobulin M (IgM) and immunoglobulin G (IgG) levels were reduced 2.4-, 2.0-, and 1.8-fold, and 1.5-fold, respectively, indicating an immune response to pathogenic microflora ($p < 0.001$).

3. Vaginal microbiota assessment using the Femoflor-16 test in pregnant women with premature rupture of membranes revealed vaginal dysbiosis in 82.2% of cases in the main group and in 31% of cases in the comparison group, with a predominance of pathogenic and opportunistic microorganisms. A reduction in *Lactobacillus spp.* in the cervix and vagina was observed. Associations of obligate and facultative anaerobes and fungal pathogens predominated, with *Eubacterium spp.* detected in 62.5% and *Peptostreptococcus spp.* in 67.5% of cases. Polymicrobial combinations of *Mobiluncus spp.* + *Candida spp.* + *Corynebacterium spp.* occurred 2.1-fold and 1.5-fold more frequently in the main and comparison groups, respectively, than in the control group ($p < 0.001$).

4. Ultrasound evaluation of cervical length in pregnant women with premature rupture of membranes revealed shortening by 1.3-fold and 1.2-fold in the main and comparison groups, respectively, compared with the control group ($p < 0.05$). The amniotic fluid index was 56.9 ± 4.03 mm in the main group, 79.3 ± 6.73 mm in the comparison group, and 151.1 ± 12.64 mm in controls. The maximum vertical pocket measured 17.5 ± 0.89 mm in women with premature rupture of membranes and delivery, 38.9 ± 0.69 mm in the preserved pregnancy group, representing a 2.3-fold and 1.5-fold reduction, respectively, compared with the control group (60.3 ± 1.73 mm) ($p < 0.05$).

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ДИФЕРЕНЦІЙОВАНІ ПІДХОДИ ДО ВЕДЕННЯ ВАГІТНОСТІ ТА ПОЛОГІВ ПРИ ПЕРЕДЧАСНОМУ ВИЛИТТІ ПЛОДОВИХ ВОД

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Резюме.

На сьогоднішній день передчасні пологи залишаються однією з найважливіших медичних і соціальних проблем в області охорони здоров'я матері і дитини. За даними Всесвітньої організації охорони здоров'я (ВООЗ), «…70% випадків ранньої неонатальної смертності і 65-75% випадків дитячої смертності пов'язані з передчасними пологами…». Глобальний рівень передчасних пологів становить від 5% до 15% від усіх вагітностей, причому цей показник щорічно стабільно зростає.

Мета дослідження: вдосконалення диференційованого підходу до ведення вагітності та пологів на основі гормональних, мікробіологічних, імунологічних та ультразвукових змін у випадках передчасного розриву плодових оболонок (ПРПО).

Об'єктом дослідження стали 177 вагітних жінок, які спостерігалися в Бухарському обласному перинатальному центрі. Дослідження проводилося у два етапи. Етап I (2020-2021 рр.) передбачав ретроспективний аналіз медичних карт 157 вагітних жінок з ПРПО у міському пологовому комплексі. Етап II (2022 р.) передбачав проспективне обстеження 177 вагітних жінок: до групи 1 увійшли 107 жінок з ПРПО і подальшими пологами; група 2 включала 30 жінок з ПРПО і продовженням вагітності; контрольна група складалася з 40 здорових вагітних жінок.

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Принципи біоетики, затверджені Вченою радою Бухарського державного медичного інституту, збережені та підтримуються у повній відповідності.

У роботі використали пакет статистичних програм Statgraphics (версія Stadia) та комп'ютерну статистичну програму Statsoft Inc. 99, USA. Для порівняння значущості відмінностей результатів у досліджуваних групах використовували t-критерій Стьюдента та парний t-тест. Відмінності вважалися достовірними при 5% рівні значущості за таблицею Стьюдента ($p<0,05$, тобто 95% ймовірність події).

Дослідження проведено відповідно до плану науково-дослідних робіт Бухарського державного медичного інституту в рамках теми «Раннє виявлення та діагностика патологічних факторів, що впливають на здоров'я населення Бухарської області в пост COVID-19 період, а також розробка нових методів лікування та профілактики (2022-2026 роки)».

Результати. Віковий діапазон учасниць становив від 19 до 39 років, середній вік – 27,5 ± 5,45 років. Аналіз розподілу за місцем проживання показав, що 46,4% проживали в містах, а 53,6% – у сільській місцевості. За соціальним статусом 56,69% були домогосподарками, 35,67% працювали, а 7,64% були студентками. Первістки становили 43,4% випадків, другоплідні – 28,7%, а багатоплідні (третя або більше вагітності) – 28%. Пологи відбулися на 36-37 тижні в 54,14% випадків, на 34-35 тижні в 40,76% випадків і до 34 тижнів в 5,10% випадків, при цьому середній гестаційний вік при пологах становив 34,96 ± 0,2 тижні.

Висновок. Ультразвукове дослідження показало скорочення шийки матки в 1,3 і 1,2 рази в основній і порівняльній групах відповідно порівняно з контрольною групою ($p < 0,05$). Індекс амніотичної рідини становив 56,9 ± 4,03 мм у групі пологів, 79,3 ± 6,73 мм у групі продовження вагітності та 151,1 ± 12,64 мм у контрольній групі. Розміри одинарної вертикальної кишені становили 17,5 ± 0,89 мм (група пологів) і 38,9 ± 0,69 мм (група продовження вагітності), що в 2,3 і 1,5 рази менше, ніж у контрольної групи (60,3 ± 1,73 мм; $p<0,05$).

Ключові слова: вагітність і пологи; передчасний розрив плодових оболонок; гормональні зміни; мікробіологічні дослідження; імунологічні зміни.

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