

colloquium-journal

ISSN 2520-6990

Międzynarodowe czasopismo naukowe

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Medical sciences
Computer science
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Philological sciences

№14(279) 2026



colloquium-journal

ISSN 2520-6990

ISSN 2520-2480

Colloquium-journal №14 (279), 2026

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(Warszawa, Polska)

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COMPUTER SCIENCE

УДК 004.05

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МЕТОДИКА РАЗРАБОТКИ ЦИФРОВЫХ ОБРАЗОВАТЕЛЬНЫХ РЕСУРСОВ

Abdukodirova A.M.

METHODOLOGY OF DEVELOPING DIGITAL EDUCATIONAL RESOURCES

Аннотация.

В статье рассматриваются теоретические и практические аспекты методики разработки цифровых образовательных ресурсов (ЦОР) в условиях цифровизации образования. Анализируются основные этапы проектирования ЦОР, педагогические принципы их создания, требования к содержанию, структуре и функциональности. Особое внимание уделяется интеграции современных информационно-коммуникационных технологий в образовательный процесс, а также вопросам повышения эффективности обучения посредством цифровых ресурсов. Представлены ключевые подходы к оценке качества цифровых образовательных материалов и их педагогической эффективности.

Abstract.

This article examines the theoretical and practical aspects of digital educational resource (DER) development methodology in the context of digitalization of education. It analyzes the main stages of DER design, the pedagogical principles of their creation, and the requirements for content, structure, and functionality. Particular attention is paid to the integration of modern information and communication technologies into the educational process, as well as to improving the effectiveness of learning through digital resources. Key approaches to assessing the quality of digital educational materials and their pedagogical effectiveness are presented.

Ключевые слова: цифровые образовательные ресурсы, цифровизация образования, электронное обучение, педагогический дизайн, образовательные технологии, интерактивное обучение.

Keywords: digital educational resources, digitalization of education, e-learning, pedagogical design, educational technologies, interactive learning.

Современный этап развития системы образования характеризуется активным внедрением цифровых технологий в учебный процесс. Развитие информационного общества, расширение возможностей сети Интернет и распространение дистанционных форм обучения обусловили необходимость создания качественных цифровых образовательных ресурсов. Цифровые образовательные ресурсы выступают важнейшим инструментом организации учебной деятельности, обеспечивая доступность, интерактивность и вариативность образовательного процесса.

Актуальность исследования обусловлена возрастающей потребностью образовательных организаций в разработке эффективных цифровых ресурсов, соответствующих современным педагогическим и технологическим требованиям. При этом создание качественных ЦОР требует применения научно обоснованной методики, учитывающей как дидактические принципы, так и особенности цифровой среды.

Цель статьи заключается в исследовании методики разработки цифровых образовательных ресурсов и определении основных этапов их проектирования и внедрения в образовательный процесс.

Цифровые образовательные ресурсы представляют собой совокупность учебных материалов, представленных в цифровой форме и предназна-

ченных для организации образовательной деятельности с использованием информационно-коммуникационных технологий. К ЦОР относятся электронные учебники, мультимедийные презентации, интерактивные задания, обучающие платформы, виртуальные лаборатории, тестовые системы и другие цифровые средства обучения.

Основными характеристиками цифровых образовательных ресурсов являются:

- интерактивность;
- мультимедийность;
- адаптивность;
- доступность;
- вариативность представления информации;
- возможность автоматизированного контроля знаний.

Использование ЦОР способствует повышению мотивации обучающихся, индивидуализации обучения и развитию самостоятельной познавательной деятельности.

Разработка цифровых образовательных ресурсов должна осуществляться на основе комплекса педагогических, психологических и технологических принципов. К основным методологическим подходам относятся:

Системный подход

Системный подход предполагает рассмотрение ЦОР как целостной педагогической системы,

включающей цели обучения, содержание, методы, средства и формы контроля. Все элементы ресурса должны быть взаимосвязаны и ориентированы на достижение образовательных результатов.

Компетентностный подход

В основе разработки цифровых ресурсов лежит ориентация на формирование профессиональных и общекультурных компетенций обучающихся. Содержание ЦОР должно обеспечивать развитие практических навыков, критического мышления и способности к самостоятельному решению задач.

Личностно-ориентированный подход

Данный подход предполагает учет индивидуальных особенностей обучающихся, уровня их подготовки, темпа освоения материала и образовательных потребностей. Цифровые ресурсы должны обеспечивать возможность адаптации учебного процесса под конкретного пользователя.

Методика разработки ЦОР включает несколько взаимосвязанных этапов.

Аналитический этап

На данном этапе осуществляется:

- определение целей и задач ресурса;
- анализ целевой аудитории;
- изучение образовательных стандартов;
- выбор технологий и платформ разработки.

Особое значение имеет анализ потребностей обучающихся и преподавателей, поскольку именно он определяет функциональные возможности будущего ресурса.

Проектировочный этап

Проектирование включает разработку структуры ресурса, сценариев взаимодействия пользователя с системой, а также создание педагогического дизайна. На этом этапе определяются:

- логика представления материала;
- навигация;
- система контроля знаний;
- формы интерактивного взаимодействия.

Важным элементом является разработка интерфейса, который должен быть интуитивно понятным и удобным для пользователя.

Этап разработки контента

Создание контента предполагает подготовку текстовых, графических, аудио- и видеоматериалов. При разработке содержания необходимо соблюдать принципы научности, доступности, последовательности и наглядности.

Особое внимание уделяется мультимедийному сопровождению учебного материала, поскольку использование анимации, схем и интерактивных элементов способствует лучшему усвоению информации.

Технологический этап

На данном этапе осуществляется программная реализация ресурса, интеграция мультимедийных компонентов и настройка функциональных модулей. Для разработки могут использоваться различные программные средства и платформы дистанционного обучения.

Этап тестирования и внедрения

Перед внедрением ЦОР проводится тестирование его работоспособности, удобства использования и педагогической эффективности. Выявленные недостатки устраняются, после чего ресурс внедряется в образовательный процесс.

Эффективность ЦОР определяется соблюдением ряда требований.

Дидактические требования

ЦОР должны:

- соответствовать образовательным стандартам;
- обеспечивать логичность и последовательность обучения;
- способствовать развитию познавательной активности;
- поддерживать обратную связь.

Психолого-педагогические требования

При разработке ресурсов необходимо учитывать возрастные и психологические особенности обучающихся, обеспечивать комфортность восприятия информации и предотвращать когнитивную перегрузку.

Технические требования

Цифровые ресурсы должны обладать:

- стабильной работой;
- совместимостью с различными устройствами;
- высокой скоростью загрузки;
- информационной безопасностью.

Применение ЦОР в образовательном процессе обеспечивает ряд преимуществ:

1. Повышение доступности образования.
2. Индивидуализация обучения.
3. Возможность дистанционного взаимодействия.
4. Автоматизация контроля знаний.
5. Развитие цифровой компетентности обучающихся.
6. Повышение мотивации к обучению.

Кроме того, цифровые ресурсы позволяют организовать обучение в гибком формате и обеспечивают непрерывность образовательного процесса.

Несмотря на широкое распространение цифровых образовательных технологий, существуют определенные проблемы их разработки и внедрения. К ним относятся недостаточный уровень цифровой компетентности педагогов, нехватка качественного контента, технические ограничения и проблемы информационной безопасности.

Перспективы развития ЦОР связаны с использованием технологий искусственного интеллекта, адаптивного обучения, виртуальной и дополненной реальности. В будущем цифровые образовательные ресурсы будут становиться более персонализированными и интерактивными.

Таким образом, методика разработки цифровых образовательных ресурсов представляет собой сложный многоэтапный процесс, требующий учета педагогических, технологических и психологических аспектов. Эффективные ЦОР способны суще-

ственно повысить качество образования, обеспечить индивидуализацию обучения и расширить возможности образовательной среды.

Разработка цифровых ресурсов должна осуществляться на основе научно обоснованных подходов и современных образовательных технологий. В условиях цифровой трансформации образования создание качественных ЦОР становится одним из ключевых направлений развития образовательной системы.

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PEDAGOGICAL SCIENCES

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ADVANTAGES OF ORGANISING AUTONOMOUS LEARNING THROUGH WEB-QUEST PLATFORMS COMPARED WITH OTHER DIGITAL LEARNING ENVIRONMENTS

Abstract.

This study provides an empirical analysis of the pedagogical advantages of organising students' autonomous learning through Web-Quest technology in comparison with widely used digital platforms such as Moodle, Google Classroom, Coursera, and Edmodo. The research is based on a quasi-experimental mixed-methods design implemented over sixteen weeks across three higher education institutions. A total of 248 students of English philology and applied linguistics participated: an experimental Web-Quest group ($n = 124$) and four control groups ($n = 124$, with 31 students per group). Data were collected through pre- and post-tests, validated questionnaires, semi-structured interviews, and systematic classroom observation. Statistical analysis employed paired t -tests, one-way ANOVA with Bonferroni post-hoc comparisons, and Cohen's d effect sizes. Results show that the Web-Quest group achieved the highest autonomy score ($M = 4.42$; $SD = 0.51$), with statistically significant differences compared to Moodle (3.78), Coursera (3.86), Google Classroom (3.41), and Edmodo (3.29), $F(4, 243) = 27.84$; $p < .001$; $d = 1.14$. Gains were also evident in discourse competence, critical thinking, and collaborative performance. The scientific novelty of the study lies in being the first empirical work to compare Web-Quest technology with multiple platforms within a single methodological framework. The findings carry practical significance for English language teaching methodology and digital pedagogy.

Keywords: *Web-Quest technology; autonomous learning; digital pedagogy; learner autonomy; English language teaching methodology; comparative platform analysis; higher education; constructivist approach.*

INTRODUCTION

The reorganisation of contemporary higher education through digital infrastructure has fundamentally transformed the conditions of language learning. In the post-pandemic period, digital tools have shifted from a supplementary role to becoming a primary pedagogical instrument (Bond et al., 2021). Within this transformation, the question of how digital environments shape learners not merely as recipients of content but as autonomous epistemic subjects has emerged as one of the central methodological concerns of applied linguistics and digital pedagogy (Reinders & White, 2016).

Although platforms such as Moodle, Google Classroom, Edmodo, and Coursera have been widely implemented in higher education, their architectures are largely oriented towards content delivery and management. Web-Quest technology, proposed by Dodge in 1995 and methodologically refined in subsequent years (Dodge, 1995; March, 2003), aligns most closely with the epistemological foundations of autonomous learning theory.

At present, empirical studies comparing Web-Quest technology with other digital platforms within a unified methodological framework remain scarce. Existing work is largely descriptive and rarely combines effect-size statistics with qualitative analysis. This gap deprives teacher-methodologists of an evidence-based foundation for platform selection.

The aim of the study is to empirically compare the pedagogical effectiveness of Web-Quest technology in organising autonomous learning with that of Moodle, Google Classroom, Coursera, and Edmodo, and to identify the methodological factors that explain its advantages.

The research is guided by the following questions:

- To what extent does Web-Quest, in comparison with other platforms, foster learner autonomy, motivation, and interactivity?
- What differences emerge in discourse competence, critical thinking, and language skill development?
- Which design features of Web-Quest account for the observed effects?

The study draws on three theoretical traditions: Holec's (1981) concept of learner autonomy, Vygotsky's (1978) social-constructivist theory, and the inquiry-based Web-Quest model developed by Dodge and March. This framework allows for an explanation of how students learn language through active, collaborative, and meaningful task engagement.

An analysis of international research between 2020 and 2026 indicates that Moodle, although administratively efficient, has limitations in fostering active student engagement (Mpungose, 2020). Google Classroom is distinguished by interface simplicity but is weaker in supporting deep inquiry. Coursera excels in systematic content delivery but is criticised for high attrition rates (Reich, 2022). Edmodo encourages social interaction yet provides insufficient tools for academic discourse.

Recent studies on Web-Quest technology confirm its effectiveness in developing critical thinking, collaboration, and the ability to work with authentic resources (Aydın, 2020; Sari & Wahyudin, 2023). Nevertheless, a systematic comparative analysis of Web-Quest with multiple platforms has not yet been conducted.

METHODOLOGY

The study employs a quasi-experimental mixed-methods design. This design allows the effect of the

platform to be assessed while preserving the ecological validity of the higher education setting.

Two hundred and forty-eight second- and third-year undergraduate students participated ($M = 20.4$; SD

$= 1.3$). Baseline proficiency ranged between CEFR B1 and B2. Participants were distributed across five groups (Table 1). Baseline equivalence was confirmed by ANOVA: $F(4, 243) = 0.87$; $p = .483$.

Table 1.

Distribution of participants across experimental and control groups

Group	Platform	n	Mean age	Female (%)	CEFR level
EG	Web-Quest	124	20.3	63.7	B1–B2
CG1	Moodle	31	20.5	61.3	B1–B2
CG2	Google Classroom	31	20.6	64.5	B1–B2
CG3	Coursera	31	20.2	58.1	B1–B2
CG4	Edmodo	31	20.5	64.5	B1–B2

Across sixteen weeks, all groups followed the same topics, learning outcomes, and time allocation; only the digital platform served as the independent variable. In the Web-Quest group, each weekly task consisted of six structural components: introduction, task, resources, process, evaluation criteria, and conclusion.

Five types of data were collected: (1) a language test developed in line with CEFR descriptors ($\alpha = 0.87$); (2) an adapted version of Macaskill and Taylor's (2010) Learner Autonomy Inventory ($\alpha = 0.91$); (3) a 20-item motivation questionnaire based on Gardner's battery ($\alpha = 0.89$); (4) semi-structured interviews with eight students from each group; (5) systematic observation across twelve lessons per group.

Quantitative data were analysed using SPSS 28. Paired t-tests, one-way ANOVA, and Cohen's d effect sizes were applied. Qualitative data were analysed by two independent coders following Braun and Clarke's (2021) thematic analysis methodology (Cohen's $\kappa = 0.83$).

RESULTS

The Web-Quest group achieved significantly higher autonomy scores than all other groups ($M = 4.42$; $SD = 0.51$). ANOVA confirmed a statistically significant difference: $F(4, 243) = 27.84$; $p < .001$. Cohen's d ranged from 1.14 against Moodle to 1.84 against Edmodo, falling within the range of a large effect.

Table 2.

Post-test results on learner autonomy

Platform	Mean (M)	SD	95% CI	Cohen's d (vs WQ)
Web-Quest	4.42	0.51	[4.33; 4.51]	—
Moodle	3.78	0.62	[3.55; 4.01]	1.14
Google Classroom	3.41	0.68	[3.16; 3.66]	1.74
Coursera	3.86	0.59	[3.64; 4.08]	0.96
Edmodo	3.29	0.71	[3.03; 3.55]	1.84

Although improvement was observed across all groups, the magnitude of gains differed substantially. The Web-Quest group demonstrated the largest overall gain ($\Delta = 18.7$ points), followed by Coursera ($\Delta = 12.4$),

Moodle ($\Delta = 11.8$), Google Classroom ($\Delta = 9.7$), and Edmodo ($\Delta = 8.9$). The most pronounced differences were observed in productive skills — speaking ($\Delta = 20.1$) and writing ($\Delta = 19.4$).

Table 3.

Gain scores in language skills

Skill	Web-Quest	Moodle	Google Cl.	Coursera	Edmodo
Reading	17.6	13.4	11.2	14.8	9.7
Writing	19.4	11.9	9.5	12.3	8.4
Listening	17.7	11.1	10.0	13.6	9.2
Speaking	20.1	10.8	8.1	8.9	8.3
Overall	18.7	11.8	9.7	12.4	8.9

A systematic comparison across the eight pedagogical dimensions presented in Table 4 indicates that

Web-Quest holds a leading position on every dimension. The largest differences were recorded for autonomy, critical thinking, and discourse competence.

Table 4.

Multidimensional pedagogical evaluation of digital platforms (1–5 scale)

Pedagogical dimension	Web-Quest	Moodle	Google Cl.	Coursera	Edmodo
Autonomy	4.42	3.78	3.41	3.86	3.29
Motivation	4.51	3.62	3.55	3.71	3.48
Interactivity	4.38	3.21	3.84	2.96	4.02
Discourse competence	4.46	3.34	3.18	3.07	3.61
Collaborative learning	4.34	3.42	3.67	2.81	3.95
Digital assessment	4.12	4.05	3.78	3.92	3.51
Critical thinking	4.55	3.48	3.24	3.69	3.31
Language skills	4.47	3.59	3.32	3.74	3.27
Overall mean	4.41	3.56	3.50	3.47	3.56

Thematic analysis of the interview data identified four principal themes:

- Inquiry-driven engagement — the Web-Quest format transforms students into active inquiring subjects;
- Guided autonomy — the structured architecture does not constrain autonomy but provides confidence;
- Authentic discursive activity — tasks require students to use English in genuine academic contexts;
- Deep collaboration — Web-Quest tasks foster meaningful and sustained cooperation.

Systematic observation data confirm the quantitative and qualitative findings. In the Web-Quest group, average active engagement time per lesson reached 64.3 minutes, compared with 39.4 minutes in the Edmodo group. Independent inquiry episodes were observed approximately three times more frequently in the Web-Quest group than in any other group.

DISCUSSION

The empirical evidence demonstrates that Web-Quest technology yields quantitatively and qualitatively higher pedagogical outcomes than the comparator platforms. This advantage, however, should be interpreted not as an inherent property of the technology itself but as a consequence of the alignment between its pedagogical architecture and the theory of autonomous learning.

The findings align with the studies of Tafazoli (2021), Lee (2022), and Sari and Wahyudin (2023), while contributing a new methodological perspective through the simultaneous comparison of multiple platforms. Results for Coursera are consistent with the critiques of the MOOC paradigm offered by Reich (2022) and Castaño-Muñoz et al. (2022).

The study makes three methodological contributions: (1) a multi-platform comparative design; (2) triangulation of quantitative and qualitative data; (3) precise calculation of effect sizes.

For English language teaching methodology, the central implication is that platform selection should be regarded as a pedagogical rather than a technical decision. A task-management-oriented platform produces students who manage tasks; an inquiry-oriented platform cultivates students who inquire (Vygotsky, 1978).

Several limitations should be noted: the quasi-experimental design does not allow for fully randomised assignment; sixteen weeks is insufficient for evaluating long-term effects; and a sample drawn from three institutions limits the generalisability of the findings.

The scientific novelty of the study is reflected in the following contributions: (1) it is the first work to systematically compare Web-Quest technology with several widely used platforms within a single methodological framework; (2) an eight-dimensional analytical framework for evaluating digital platforms has been developed; (3) the concept of effectiveness in digital pedagogy is reinterpreted through the dichotomy of "design versus platform"; and (4) new empirical evidence is provided on the development of autonomy in English language teaching.

The findings are relevant to several stakeholder groups: for curriculum designers — an evidence-based foundation for platform selection; for language departments — recommendations for systematically integrating Web-Quest tasks into autonomous learning components; for teachers — a low-cost yet pedagogically effective design template; and for policymakers — a concrete instrument for fostering autonomy, critical thinking, and discursive competence.

CONCLUSION

The study has empirically demonstrated the pedagogical superiority of Web-Quest technology in organising autonomous learning across all principal dimensions — autonomy, motivation, interactivity, discourse competence, collaboration, digital assessment, critical thinking, and integrated language skills. The results indicate that it is the pedagogical architecture of digital platforms — not their technological sophistication — that determines their effectiveness in shaping autonomous learners. The systematic integration of Web-Quest technology within English language teaching methodology and digital pedagogy constitutes a methodologically grounded and practically feasible response to the most pressing challenges of contemporary higher education.

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THE IMPACT OF SOCIAL MEDIA ON LANGUAGE LEARNING

Abstract

This article examines the impact of social media on language learning and highlights its role in improving students' language skills in modern education. The study discusses how social media platforms contribute to vocabulary development, communication skills, motivation, and intercultural competence. The article also analyzes the advantages and disadvantages of using social media in English language learning. Furthermore, it explores different methods teachers and students can use to integrate social media into educational activities. The research concludes that social media can become an effective tool for language learning when used properly and responsibly.

Key words: social media, language learning, English language teaching, communication, technology, digital education.

Социальные сети, изучение языка, обучение английскому языку, коммуникация, технологии, цифровое образование.

Ijtimoiy tarmoqlar, til o'rganish, ingliz tilini o'qitish, kommunikatsiya, texnologiya, raqamli ta'lim.

INTRODUCTION

Modern technology has changed many aspects of human life, including education. One of the most influential technological developments of the 21st century is social media. Platforms such as Instagram, Telegram, YouTube, Facebook, and TikTok are widely used by young people around the world. Initially, social media was mainly created for communication and entertainment, but today it also plays an important role in education and language learning.

In recent years, many students have started using social media to improve their English language skills. Social media platforms provide access to authentic materials, real communication, and interactive learning opportunities. According to Lev Vygotsky, social interaction is an important factor in cognitive development and learning [1]. Social media creates opportunities for interaction and collaborative learning among language learners. Social media transforms language acquisition by replacing passive studying with active, immersive engagement. It provides global access to native speakers, real-time cultural exchange, and interactive feedback, making the learning process highly collaborative and dynamic. Social media causes a change in the student-instructor relationship. It consists of the teaching and learning processes that are oriented as a result of the use of tools such as written materials, graphic, visual, and audio-visual means, allowing comments, participation, and shared activities through social networks, as well as virtual learning communities, showing other related structured educational media. Furthermore, these technologies are now being integrated into learning platforms that are used by faculties and universities, offering society and education systems a wide range of possibilities resulting from the changes and flexibility required by the new teaching demands. The use of social media improves technologies in so much as to propose networks in which

various users can interact and share knowledge without the need for specific technical knowledge and without depending on webmasters for update advice and implementation.

Researchers also emphasize that technology increases students' motivation and participation in the learning process. Marc Prensky describes modern students as "digital natives" who are naturally connected to technology and digital communication [2]. Therefore, integrating social media into language education can make learning more effective and engaging. This article discusses the influence of social media on language learning, its advantages and disadvantages, and methods of using social media effectively in English language education.

The Role of Social Media in Language Learning

Social media has become one of the most accessible tools for language learners. Students can communicate with native speakers, watch educational videos, read authentic texts, and practice writing through online platforms. Unlike traditional classrooms, social media provides opportunities for continuous learning outside school hours. One of the main advantages of social media is exposure to authentic language. Students can hear natural pronunciation, learn informal expressions, and understand how language is used in real-life situations. Authentic communication helps learners improve listening and speaking skills more effectively. Stephen Krashen explains in his Input Hypothesis theory that language learners improve when they are exposed to meaningful and understandable input [3]. Social media platforms provide a large amount of authentic language input through videos, podcasts, comments, and online conversations.

In addition, social media encourages collaborative learning. Students can join online groups, participate in discussions, and share educational materials with others. These activities develop communication skills and increase learners' confidence. Another important as-

pect is flexibility. Learners can study anytime and anywhere using smartphones and internet access. This makes language learning more independent and personalized. Social media also helps students develop intercultural competence. By communicating with people

from different countries, learners become familiar with different cultures, traditions, and communication styles. Such experiences improve global awareness and tolerance.

Social media platforms	Language skills developed	Educational benefits	Possible challenges
Instagram	Vocabulary, reading, writing	Improves vocabulary through short posts, stories, and educational pages	Can distract students with entertainment content
YouTube	Listening, pronunciation, speaking	Provides authentic videos, tutorials, and pronunciation practice	Some materials may contain inaccurate information
Telegram	Writing, reading, communication	Allows group discussions, file sharing, and collaborative learning	Excessive use may reduce concentration
Tiktok	Listening, vocabulary	Short educational videos increase motivation and engagement	Content may focus more on entertainment than education
Facebook	Writing, communication	Encourages interaction with international learners and communities	Privacy and cybersecurity risks

Advantages of Social Media in Language Learning

Social media offers many benefits for foreign language learners. One major advantage is improving vocabulary. Students regularly encounter new words and expressions while watching videos, reading posts, or communicating online. Repeated exposure to vocabulary helps learners remember words more effectively.

Another benefit is the development of communication skills. Social media platforms allow students to practice writing comments, participating in chats, and speaking during video calls. These activities improve both written and spoken communication. Motivation is also an important factor. Traditional language learning methods sometimes become repetitive and boring for students. However, social media includes interactive and entertaining content that increases students' interest in learning. Educational videos, language challenges, and online discussions make learning more enjoyable. According to Henry Jenkins, participatory digital culture encourages active learning and creativity among students [4]. Social media motivates learners to create content, express opinions, and communicate actively.

Another advantage is access to free educational resources. Students can follow language teachers, educational channels, and online courses without spending large amounts of money. Platforms such as YouTube and Telegram contain thousands of free materials for learning English grammar, pronunciation, vocabulary, and speaking skills.

Furthermore, social media supports autonomous learning. Students can choose materials according to their interests and learning styles. This independence helps learners become more responsible for their education.

Disadvantages and Challenges

Despite its advantages, social media also has several disadvantages in language learning. One major

problem is distraction. Students may spend too much time on entertainment instead of educational activities. Excessive use of social media can reduce concentration and productivity. Another challenge is misinformation. Not all online materials are accurate or educationally reliable. Some videos or posts may contain grammatical mistakes, incorrect pronunciation, or misleading information. Therefore, students need guidance from teachers to choose trustworthy sources. Cybersecurity and privacy issues are also important concerns. Learners may face online bullying, scams, or privacy risks while using social media platforms. Teachers and parents should educate students about safe internet use.

Additionally, overdependence on technology may negatively affect traditional learning habits such as reading books or writing academically. Some students may become less interested in formal educational materials. Neil Postman warned that excessive dependence on technology could influence critical thinking and educational quality [5]. Therefore, social media should be used carefully and in balance with traditional teaching methods. Another challenge is unequal access to technology. Some students may not have stable internet connections or modern devices, which creates inequality in learning opportunities.

Methods of Using Social Media Effectively in Language Teaching

Teachers can use social media effectively in many ways. One useful method is creating online discussion groups where students can practice writing and exchange ideas in English. Telegram or Facebook groups can be used for sharing assignments, articles, and educational videos. Teachers may also encourage students to follow educational YouTube channels or English-speaking influencers. Watching authentic content improves listening skills and pronunciation.

Role-playing and speaking activities can also be organized through video communication platforms. Students may participate in online debates, interviews,

or presentations to improve speaking confidence. Another effective strategy is project-based learning through social media. Students can create blogs, podcasts, or short videos in English. Such activities improve creativity, digital literacy, and communication skills simultaneously. Social media can also support collaborative international projects. Learners from different countries can communicate online and exchange cultural experiences. These activities help students practice English in authentic situations and improve intercultural understanding.

However, teachers should provide clear rules and guidance when using social media in education. Educational goals should remain the main focus of classroom activities.

CONCLUSION

Social media has significantly influenced modern language learning. It provides learners with authentic materials, interactive communication, and flexible learning opportunities. Social media improves vocabulary, communication skills, motivation, and intercultural competence. Platforms such as YouTube, Telegram, Instagram, and TikTok have become important educational tools for English language learners. At the same time, social media also presents challenges such as distraction, misinformation, privacy risks, and technological inequality. Therefore, students and teachers should use these platforms responsibly and critically.

In today's digital world, social media is likely to become even more important in education. When combined with traditional teaching methods, social media

can greatly enhance foreign language learning and help students become more active, independent, and confident communicators.

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PSYCHOLOGICAL ASPECTS OF REPEATED IMPLANTATION FAILURE IN WOMEN UNDERGOING ASSISTED REPRODUCTIVE TECHNOLOGIES: A LITERATURE REVIEW

Abstract.

The article presents a review of current studies on the psychological aspects of repeated implantation failure in women undergoing assisted reproductive technologies. The aim of the study was to analyze the influence of anxiety, depression, and chronic stress on ART outcomes. Mechanisms of psychological adaptation and the effectiveness of psychosocial support were examined. The novelty of the review lies in the comprehensive analysis of current data on psychological distress in repeated implantation failure.

Keywords: *infertility, repeated implantation failure, assisted reproductive technologies, IVF, psychological stress, anxiety, depression.*

Infertility is currently recognized as one of the most significant medical, demographic, and social problems worldwide. According to international epidemiological data, infertility affects millions of couples of reproductive age and continues to demonstrate a growing prevalence in many countries [1]. Besides impairing reproductive function, infertility substantially influences psychological well-being, marital relationships, social adaptation, and overall quality of life [3; 10]. For many women, inability to conceive becomes a source of chronic emotional distress accompanied by feelings of inadequacy, anxiety, social isolation, and decreased self-esteem.

The development and widespread implementation of assisted reproductive technologies (ART), particularly in vitro fertilization (IVF), have significantly improved the treatment of infertility and expanded reproductive opportunities for couples experiencing conception difficulties. Despite continuous advances in reproductive medicine, implantation failure remains one of the major limitations affecting IVF success rates. Among ART-related complications, repeated implantation failure (RIF) represents one of the most challenging and controversial clinical conditions due to its multifactorial etiology and complex pathophysiological mechanisms [11].

Repeated implantation failure is commonly characterized by the absence of successful embryo implantation after several embryo transfers involving good-quality embryos. However, a universally accepted definition of RIF has not yet been fully established. The pathogenesis of repeated implantation failure includes multiple embryonic, uterine, immunological, endocrine, thrombophilic, genetic, and molecular factors influencing endometrial receptivity and embryo-endometrial interaction. Nevertheless, increasing evidence suggests that psychological and psychosocial factors may also play an important role in ART outcomes [17; 21].

Repeated unsuccessful IVF attempts are often associated with severe psycho-emotional disturbances. Women undergoing repeated ART failures frequently

experience chronic stress, anxiety disorders, depressive symptoms, emotional exhaustion, fear of future failures, and impaired quality of life [2; 11; 16]. The emotional burden becomes especially pronounced in patients with repeated implantation failure because each unsuccessful embryo transfer may reinforce psychological trauma and emotional instability.

Several studies have demonstrated that women with infertility exhibit significantly higher levels of psychological distress compared with fertile women [3; 30]. Volgsten et al. reported an increased prevalence of psychiatric disorders among infertile patients undergoing IVF treatment [30]. Similarly, Guo et al. identified high rates of anxiety and depression among women with repeated implantation failure and demonstrated a close association between emotional distress and impaired psychosocial functioning [11]. Ni et al. also showed that infertility-related stress negatively affects emotional well-being, interpersonal relationships, and fertility-related quality of life in women with repeated implantation failure [16].

Psychological stress associated with infertility may negatively influence not only emotional well-being but also reproductive outcomes. Chronic stress activates neuroendocrine pathways involving the hypothalamic-pituitary-adrenal axis, cortisol secretion, autonomic nervous system dysregulation, inflammatory cytokines, and immune responses [17; 21]. These mechanisms may impair endometrial receptivity, embryo implantation, and reproductive hormonal balance. Recent studies suggest that psycho-emotional disturbances may indirectly affect ART outcomes through behavioral, hormonal, and immunological pathways [13; 22].

Another important aspect of infertility-related distress is its influence on social adaptation and interpersonal relationships. Repeated treatment failures may contribute to marital dissatisfaction, emotional distancing between partners, sexual dysfunction, and social withdrawal [20; 28]. Infertile women often report feel-

ings of guilt, shame, loneliness, and fear of stigmatization, particularly in societies where motherhood remains strongly associated with female social identity [10]. Moreover, emotional exhaustion and persistent stress may lead to premature discontinuation of fertility treatment despite preserved reproductive potential [8].

In recent years, growing attention has been devoted to psychological resilience, coping strategies, and psychosocial adaptation in women undergoing ART treatment. Psychological resilience may reduce the severity of infertility-related distress and improve emotional adaptation during repeated IVF attempts [19]. Social support, partner support, effective communication with healthcare professionals, and individualized psychological counseling are increasingly recognized as essential components of comprehensive reproductive care [14; 18].

Modern reproductive medicine therefore emphasizes the importance of multidisciplinary and patient-centered approaches combining reproductive treatment with psychological support. Numerous studies demonstrate that psychological interventions, including cognitive behavioral therapy, stress management programs, relaxation techniques, mindfulness-based therapy, and psychosocial counseling, may improve emotional well-being and potentially contribute to better reproductive outcomes [5; 7].

Alongside clinical psychological research, psycho-pedagogical concepts related to adaptation, communication, and individualized support are becoming increasingly relevant in reproductive medicine. Certain approaches proposed by Usta-Azizova D.A. emphasize the importance of adaptive mechanisms, communicative competence, and individualized psychosocial interaction in emotionally stressful conditions [23–27]. These concepts may be useful for understanding psychological adaptation and supportive strategies in women experiencing repeated ART failures.

Thus, repeated implantation failure should be considered not only as a reproductive disorder but also as a significant psychological and social challenge requiring comprehensive multidisciplinary management. The increasing prevalence of psychological distress among women undergoing ART treatment highlights the necessity of integrating mental health assessment and psychosocial support into infertility care programs.

The following keywords and combinations were used during the literature search: “repeated implantation failure”, “infertility”, “assisted reproductive technologies”, “IVF”, “psychological stress”, “anxiety”, “depression”, “quality of life”, “psychological adaptation”, “psychological interventions”, “psychosocial support”, and “fertility-related stress”.

Selection criteria included:

- relevance to the topic of psychological aspects of repeated implantation failure;
- availability of full scientific text;
- publications in peer-reviewed journals;
- systematic reviews, meta-analyses, randomized clinical trials, observational studies, and review articles.

A total of 30 scientific sources were selected and analyzed. The analyzed publications included studies

devoted to infertility-related psychological distress, neuroendocrine stress mechanisms, psychosocial adaptation, resilience, quality of life, marital relationships, and the effectiveness of psychological interventions in women undergoing ART treatment [2; 5; 7; 11; 13; 16; 17; 19; 21].

Particular attention was paid to studies investigating the relationship between psycho-emotional factors and reproductive outcomes, as well as modern multidisciplinary and patient-centered approaches in reproductive medicine [12; 14; 18; 22].

The analysis of contemporary scientific literature demonstrated that repeated implantation failure (RIF) is associated with substantial psycho-emotional disturbances affecting psychological well-being, social adaptation, interpersonal relationships, and quality of life in women undergoing assisted reproductive technologies.

One of the most consistently reported findings was the high prevalence of anxiety among women experiencing repeated unsuccessful IVF attempts. According to Guo et al., patients with recurrent implantation failure demonstrated significantly elevated levels of both situational and chronic anxiety compared with infertile women without repeated implantation failure [11]. Anxiety symptoms were particularly pronounced during ovarian stimulation, embryo transfer procedures, and the waiting period preceding pregnancy testing. Persistent fear of another unsuccessful treatment cycle frequently resulted in chronic emotional tension, sleep disturbances, irritability, impaired concentration, and emotional instability.

The reviewed studies also demonstrated a high prevalence of depressive symptoms among infertile women with repeated implantation failure. Braverman et al. reported that infertility-related depression represents one of the most common psychological consequences of unsuccessful ART treatment and may range from mild emotional disturbances to severe depressive disorders requiring professional psychological or psychiatric support [2]. Similar findings were presented by Volgsten et al., who identified increased prevalence of psychiatric disorders among patients undergoing IVF treatment [30]. Women with repeated implantation failure frequently experienced hopelessness, decreased self-esteem, emotional exhaustion, social withdrawal, and feelings of inadequacy associated with repeated unsuccessful embryo transfers.

Another important finding identified in the analyzed literature was the significant negative impact of infertility-related stress on fertility-related quality of life. Ni et al. demonstrated that repeated implantation failure adversely affects emotional functioning, social activity, interpersonal communication, and psychosocial adaptation [16]. Women undergoing repeated ART failures often reported decreased life satisfaction, chronic emotional fatigue, reduced social interaction, and impaired sexual relationships [9]. The emotional burden became especially severe in women receiving prolonged infertility treatment over multiple IVF cycles.

Several studies additionally emphasized the influence of repeated implantation failure on marital and

partner relationships. Peterson et al. demonstrated that infertility-related stress may negatively affect emotional communication between partners and contribute to marital dissatisfaction and depressive symptoms within couples [20]. Verhaak et al. also reported that women undergoing IVF treatment frequently experience deterioration in marital satisfaction before and after treatment cycles due to emotional stress and uncertainty regarding treatment outcomes. Nevertheless, strong partner support and positive interpersonal relationships were identified as protective factors reducing psychological distress and improving emotional adaptation [14].

The reviewed literature demonstrated that chronic psychological stress associated with infertility may exert not only emotional but also physiological effects on reproductive processes. Omidifar et al. reported that chronic activation of the hypothalamic-pituitary-adrenal axis, increased cortisol secretion, autonomic nervous system dysregulation, inflammatory cytokine activation, and immune imbalance may negatively influence reproductive function and embryo implantation [17]. Rooney and Domar also emphasized that stress-related neuroendocrine disturbances may impair endometrial receptivity and indirectly reduce ART success rates [21]. Li et al., in a systematic review and meta-analysis, confirmed the association between infertility-related stress and unfavorable ART outcomes [13].

The analyzed studies further demonstrated that repeated implantation failure is frequently accompanied by impaired psychosocial adaptation and maladaptive coping mechanisms. Women experiencing repeated unsuccessful IVF attempts often reported feelings of guilt, shame, loneliness, fear of stigmatization, and social isolation [3, 10]. Emotional distress was particularly severe in societies where motherhood remains strongly associated with female identity and social expectations.

An important aspect identified in multiple studies was the role of psychological resilience and adaptive coping strategies. Peng et al. demonstrated considerable heterogeneity in psychological resilience among women with repeated implantation failure [19]. Patients with higher resilience levels and more effective coping mechanisms showed lower severity of anxiety and depressive symptoms, better emotional adaptation, and improved psychosocial functioning. Martins et al. additionally demonstrated that perceived social support significantly reduced infertility-related stress and improved emotional well-being [14].

The analysis of modern literature also demonstrated the effectiveness of psychological and psychosocial interventions in women undergoing ART treatment. Systematic reviews and meta-analyses showed that cognitive behavioral therapy, relaxation techniques, mindfulness-based interventions, stress management programs, group psychological support, and psychosocial counseling significantly reduced anxiety and depressive symptoms in infertile patients [5, 7, 18, 30]. Several studies additionally suggested that psychological support may improve treatment adherence and potentially increase pregnancy rates among women undergoing IVF treatment [4].

Particular attention in recent years has been directed toward patient-centered and multidisciplinary approaches in reproductive medicine. Pasch et al. reported that many infertile patients experience insufficient access to mental health services despite substantial psychological distress during fertility treatment [18]. These findings emphasize the necessity of integrating psychological assessment and counseling into routine ART programs.

The analyzed psycho-pedagogical works of Usta-Azizova D.A. additionally highlighted the importance of adaptive mechanisms, communication competence, individualized interaction, and psychosocial support in emotionally stressful situations [23–27]. These concepts may be applicable to reproductive medicine, particularly in the context of individualized psychological counseling and multidisciplinary support for women experiencing repeated implantation failure.

Overall, the reviewed literature demonstrates that repeated implantation failure represents not only a reproductive disorder but also a serious psychological and social challenge associated with anxiety, depression, chronic stress, impaired quality of life, maladaptive coping, and psychosocial dysfunction. The findings emphasize the importance of comprehensive psychological assessment and multidisciplinary support in women undergoing repeated ART failures.

The analyzed literature demonstrates that repeated implantation failure represents not only a reproductive problem but also a significant psychological and social challenge requiring comprehensive multidisciplinary management. Modern evidence increasingly confirms that psycho-emotional disturbances play an important role in the overall condition of women undergoing assisted reproductive technologies and may indirectly influence treatment outcomes.

One of the central findings identified in the reviewed studies is the high prevalence of anxiety and depressive disorders among women with repeated unsuccessful IVF attempts. Similar results have been consistently reported in both earlier and contemporary studies [2, 11, 30]. The chronic emotional burden associated with repeated implantation failure may lead to emotional exhaustion, impaired psychosocial adaptation, social isolation, and deterioration in quality of life. These findings confirm that infertility should be considered not only as a medical diagnosis but also as a condition with profound psychological consequences [3, 10].

An important aspect discussed in contemporary literature is the bidirectional relationship between psychological distress and reproductive outcomes. Chronic stress associated with infertility may activate neuroendocrine and immunological pathways capable of negatively affecting implantation processes and endometrial receptivity [13, 17, 21]. At the same time, repeated unsuccessful IVF attempts themselves further intensify emotional distress, creating a persistent vicious cycle between reproductive failure and psychological maladaptation. This interaction highlights the complexity of repeated implantation failure and supports the necessity for integrated reproductive and psychological care.

The reviewed studies also emphasize the considerable influence of psychosocial factors on women's emotional adaptation during ART treatment. Social support, partner relationships, emotional resilience, and adaptive coping strategies were identified as important protective factors reducing infertility-related stress [14, 19, 20]. Women with stronger psychosocial support systems generally demonstrated better emotional stability and improved adaptation to repeated treatment failures. These findings underline the importance of individualized psychological assessment in reproductive medicine.

Another important issue identified in the literature is the insufficient integration of mental health services into fertility treatment programs. Despite the high prevalence of anxiety, depression, and emotional distress among infertile patients, psychological counseling remains underutilized in many reproductive centers [18]. In clinical practice, primary attention is often focused on hormonal, embryological, and endometrial factors, while psychological well-being may receive limited consideration. However, growing evidence suggests that multidisciplinary patient-centered approaches may significantly improve emotional adaptation and treatment adherence.

Modern systematic reviews and meta-analyses demonstrate that psychological interventions, including cognitive behavioral therapy, stress management programs, mindfulness techniques, psychosocial counseling, and group support, may effectively reduce emotional distress in infertile women [5, 7, 22, 30]. Some studies additionally indicate a potential positive influence of psychological support on pregnancy outcomes and continuation of fertility treatment [4]. Nevertheless, further large-scale prospective studies are still required to clarify the direct relationship between psychological interventions and ART success rates.

The reviewed psycho-pedagogical concepts proposed by Usta-Azizova D.A. additionally emphasize the importance of adaptive mechanisms, communication competence, individualized interaction, and psychosocial support in emotionally stressful situations [23–27]. Although these studies are not directly devoted to reproductive medicine, their theoretical principles may be applicable to patient-centered counseling and psychological adaptation in women experiencing repeated implantation failure.

The findings of this review highlight the necessity of integrating psychological support into comprehensive infertility management programs. Early identification of anxiety, depressive symptoms, emotional exhaustion, and psychosocial maladaptation may contribute to improved quality of life, better treatment adherence, and more effective multidisciplinary reproductive care.

At the same time, several limitations should be acknowledged. The analyzed studies differed in diagnostic criteria for repeated implantation failure, psychological assessment methods, and study populations. In addition, many studies evaluated psychological outcomes using subjective self-report questionnaires, which may influence result interpretation. Further standardized multicenter studies are necessary to better

understand the complex relationship between psychological factors and implantation outcomes in ART programs.

Repeated implantation failure currently represents one of the most complex and insufficiently resolved problems in modern reproductive medicine. Beyond its clinical and embryological aspects, repeated unsuccessful assisted reproductive technology attempts exert a profound psychological, emotional, and social impact on women undergoing infertility treatment. The analyzed literature clearly demonstrates that repeated implantation failure is strongly associated with elevated levels of anxiety, depressive disorders, chronic psychological stress, emotional exhaustion, impaired psychosocial adaptation, reduced quality of life, and disturbances in interpersonal and marital relationships.

Women experiencing repeated unsuccessful embryo transfers frequently develop persistent fear of subsequent treatment failure, emotional instability, hopelessness, guilt, social withdrawal, and decreased self-esteem. Long-term infertility treatment combined with repeated emotional disappointment may significantly impair social functioning, professional activity, family relationships, and overall emotional well-being. In many cases, psychological distress associated with infertility becomes comparable to chronic somatic diseases in terms of its influence on quality of life and psychosocial functioning.

Contemporary evidence suggests that psychological stress may affect reproductive outcomes through multiple interconnected neuroendocrine, immunological, and behavioral mechanisms. Chronic activation of the hypothalamic-pituitary-adrenal axis, cortisol dysregulation, autonomic nervous system imbalance, inflammatory cytokine activation, and immune disturbances may negatively influence endometrial receptivity, embryo implantation, and hormonal regulation of reproductive processes [13, 17, 21]. At the same time, repeated implantation failure itself contributes to progressive psycho-emotional maladaptation, creating a persistent bidirectional relationship between reproductive dysfunction and psychological distress.

Modern multidisciplinary and patient-centered approaches in reproductive medicine increasingly recognize the importance of integrating psychological care into infertility treatment programs. Cognitive behavioral therapy, psychosocial counseling, mindfulness-based interventions, stress management programs, relaxation techniques, and group psychological support have demonstrated positive effects on emotional well-being, treatment adherence, and, in some studies, reproductive outcomes [4, 5, 7, 22, 30]. Nevertheless, psychological support services remain insufficiently integrated into routine clinical reproductive practice in many ART centers.

The psycho-pedagogical concepts proposed in the works of Usta-Azizova D.A. additionally highlight the significance of adaptive mechanisms, individualized interaction, communication competence, and psychosocial support in emotionally stressful conditions [23–27]. Although these studies are primarily devoted to psycho-pedagogical adaptation, their theoretical princi-

ples may be applicable to multidisciplinary patient-centered reproductive care and psychological counseling in women experiencing repeated implantation failure.

At the same time, currently available evidence remains heterogeneous due to differences in diagnostic criteria for repeated implantation failure, variability of psychological assessment methods, and diversity of study populations. Additional prospective multicenter studies are required to further clarify the complex relationship between psychological factors and ART outcomes and to develop standardized evidence-based approaches for psychological support in reproductive medicine.

Thus, repeated implantation failure should be regarded as a multidimensional reproductive condition requiring not only embryological, hormonal, and clinical management, but also comprehensive psychological and psychosocial support aimed at improving both reproductive success and emotional well-being in infertile women undergoing assisted reproductive technologies.

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<https://doi.org/10.5281/zenodo.20540816>

SOCIAL AND PEDAGOGICAL SIGNIFICANCE OF FETAL MACROSOMIA PREVENTION AS A FACTOR IN PRESERVING THE HEALTH OF THE YOUNGER GENERATION

Abstract.

The relevance of the topic “Social and Pedagogical Significance of Fetal Macrosomia Prevention as a Factor in Preserving the Health of the Younger Generation” is обусловлена the steady increase in the frequency of large fetal births and the growing number of pregnancy, childbirth, and perinatal complications associated with fetal macrosomia. According to modern studies, fetal macrosomia is associated with a high risk of obstetric and neonatal complications, including birth trauma, neonatal asphyxia, cesarean section, postpartum complications in mothers, as well as subsequent metabolic disorders in children (Beta et al., 2019; Mohammadbeigi et al., 2013; Pahlitzsch et al., 2019).

Keywords: fetal macrosomia, prevention, reproductive health, maternal health, neonatal health, younger generation, social pedagogy, healthy lifestyle, risk factors, pregnancy complications, perinatal outcomes, health preservation, pedagogical prevention, medical education, spiritual and moral education, public health, maternal and child health.

Fetal macrosomia remains one of the significant problems of modern obstetrics and perinatology due to its increasing prevalence and its negative impact on maternal and child health [1, 6]. Macrosomia is commonly defined as a fetal birth weight of 4000–4500 grams or more regardless of gestational age [6]. In recent decades, the frequency of fetal macrosomia has increased worldwide, which is associated with changes in lifestyle, growing rates of obesity, diabetes mellitus, metabolic disorders, and reduced physical activity among women of reproductive age [7, 8].

Numerous scientific studies indicate that fetal macrosomia is associated with serious maternal and neonatal complications [2, 4, 9]. Women giving birth to large infants have a higher risk of prolonged labor, cesarean section, postpartum hemorrhage, and birth trauma [2, 4]. At the same time, newborns with macrosomia are more likely to experience shoulder dystocia, respiratory disorders, hypoglycemia, neurological complications, and long-term metabolic diseases [7, 9]. According to Beta et al. and Pahlitzsch et al., fetal macrosomia significantly increases the likelihood of adverse perinatal outcomes and requires special preventive attention in obstetric practice [2, 9].

The development of fetal macrosomia is influenced by a wide range of medical and social factors. Among the main risk factors are maternal obesity, gestational diabetes mellitus, excessive weight gain during pregnancy, advanced maternal age, multiparity, genetic predisposition, and unhealthy nutrition [5, 7, 8, 11]. Researchers such as García-De la Torre et al., Moodley & Moodley, and Usta et al. emphasize that many of these factors are preventable and can be corrected through timely medical and educational interventions [5, 8, 11].

In this regard, the prevention of fetal macrosomia acquires not only medical but also social and pedagogical significance. Preservation of the health of the younger generation begins long before childbirth and includes the formation of reproductive culture, healthy

lifestyle skills, medical literacy, and responsible attitudes toward family planning and motherhood [13, 14]. Educational institutions, healthcare systems, and family environments play an important role in shaping health-related behavior among young people.

The social and pedagogical approach to prevention is aimed at increasing awareness among adolescents and future parents about reproductive health, balanced nutrition, physical activity, and the prevention of chronic diseases. Preventive education contributes to reducing modifiable risk factors and improving maternal and child health indicators [3, 10, 12]. In this context, the integration of medical knowledge with spiritual, moral, and cultural education becomes especially important.

The scientific works of Usta-Azizova D. A. highlight the importance of spiritual and moral education in the formation of responsible behavior, value orientations, and social responsibility among students and young people [13, 14]. The development of family values, health culture, and ethical responsibility can positively influence reproductive behavior and contribute to the birth of healthier future generations.

The purpose of this research is to study the social and pedagogical significance of fetal macrosomia prevention as an important factor in preserving maternal and child health, as well as strengthening the health potential of the younger generation through the development of preventive educational approaches, reproductive health awareness, and healthy lifestyle promotion.

The study was based on the analysis of modern scientific literature devoted to fetal macrosomia, its risk factors, maternal and neonatal outcomes, as well as the social and pedagogical aspects of disease prevention and reproductive health preservation. A comprehensive review of international and regional scientific publications published between 2013 and 2024 was conducted.

The materials of the study included scientific articles, systematic reviews, cohort and retrospective studies related to fetal macrosomia prevention, maternal and perinatal complications, reproductive health education, and the formation of healthy lifestyle behaviors among young people. Particular attention was paid to studies examining modifiable risk factors such as maternal obesity, gestational diabetes mellitus, nutrition, physical inactivity, and health literacy.

The methodological basis of the research included comparative analysis, synthesis of scientific data, systematization of literature sources, and interdisciplinary approaches combining medical, social, and pedagogical perspectives. The study also applied elements of content analysis to evaluate scientific findings concerning preventive strategies and educational interventions aimed at reducing the incidence of fetal macrosomia.

In addition, the research considered the role of spiritual and moral education in the development of responsible attitudes toward reproductive health, based on the scientific works of Usta-Azizova D. A.. The integration of pedagogical and medical approaches allowed for a broader understanding of fetal macrosomia prevention as a component of public health preservation and youth health promotion.

The collected materials were analyzed to identify the most significant medical, social, and behavioral factors influencing fetal macrosomia and to determine effective preventive measures aimed at improving maternal and neonatal health outcomes.

The analysis of modern scientific literature demonstrated that fetal macrosomia remains a significant medical and social problem due to its high prevalence and association with adverse maternal and neonatal outcomes [1, 2, 6, 7]. The reviewed studies confirmed that the incidence of fetal macrosomia has increased globally over recent decades, mainly because of the growing rates of obesity, gestational diabetes mellitus, metabolic disorders, and unhealthy lifestyle behaviors among women of reproductive age [5, 7, 8].

The findings revealed that the major risk factors for fetal macrosomia include excessive maternal body weight, diabetes during pregnancy, excessive gestational weight gain, multiparity, advanced maternal age, and genetic predisposition [5, 7, 8, 11]. Several studies also emphasized the influence of inadequate nutrition, low physical activity, and insufficient reproductive health awareness on the development of fetal overgrowth [8, 10].

The reviewed literature showed that fetal macrosomia significantly increases the risk of obstetric complications such as prolonged labor, cesarean delivery, postpartum hemorrhage, birth canal trauma, and shoulder dystocia [2, 4, 9]. Neonatal complications associated with macrosomia included respiratory distress, hypoglycemia, birth injuries, neurological disorders, and increased risk of obesity and metabolic syndrome later in life [2, 6, 9].

The study also demonstrated that early identification of risk factors and timely preventive interventions can considerably reduce unfavorable pregnancy and perinatal outcomes [3, 12]. Modern predictive models and screening approaches improve the possibility of

identifying women at high risk for fetal macrosomia during pregnancy and allow healthcare professionals to implement preventive measures at earlier stages [3].

From the social and pedagogical perspective, the results highlighted the importance of educational and preventive programs aimed at promoting healthy lifestyles, reproductive culture, and maternal health awareness among adolescents and young adults [13, 14]. Educational interventions focused on nutrition, physical activity, family planning, and prevention of chronic diseases were identified as effective tools for reducing modifiable risk factors related to fetal macrosomia [10, 12].

In addition, the analysis emphasized the role of spiritual and moral education in shaping responsible health behavior among young people. The scientific works of Usta-Azizova D. A. underline the importance of cultural values, ethical responsibility, and family-oriented education in strengthening reproductive health and preserving the well-being of future generations [13, 14].

Overall, the results indicate that fetal macrosomia prevention requires an interdisciplinary approach integrating medicine, pedagogy, and public health strategies [3, 6, 12]. Comprehensive preventive measures aimed at improving reproductive health literacy and healthy lifestyle behaviors can contribute significantly to preserving the health of mothers, children, and the younger generation as a whole [13, 14].

Educational technologies in women's health play an important role in the prevention of reproductive disorders and pregnancy complications, including fetal macrosomia [3, 5, 12]. Modern pedagogical approaches aimed at improving medical literacy among women and young people contribute to the formation of responsible attitudes toward reproductive health, healthy lifestyles, and disease prevention [13, 14].

The use of educational technologies includes health education programs, digital learning platforms, interactive seminars, counseling services, and community-based preventive interventions. These approaches help increase awareness about balanced nutrition, physical activity, weight control, diabetes prevention, and proper prenatal care, which are essential factors in reducing the risk of fetal macrosomia [5, 7, 10].

Particular attention is given to reproductive health education among adolescents and students, since the foundations of future maternal and child health are formed at a young age. Educational institutions and healthcare organizations play a key role in promoting preventive knowledge and healthy behavioral patterns [13, 14].

Modern educational technologies also facilitate interdisciplinary cooperation between healthcare professionals, teachers, psychologists, and social workers. Such collaboration strengthens preventive strategies and improves public awareness regarding maternal and neonatal health issues [3, 12].

In addition, spiritual and moral educational approaches contribute to the development of family values, social responsibility, and ethical attitudes toward motherhood and child health. According to the works of Usta-Azizova D. A., integrating cultural and moral

education into health promotion activities positively influences youth behavior and supports the preservation of the health of future generations [13, 14].

Digital medicine and telehealth technologies have become important components of modern healthcare systems and play a significant role in the prevention and early diagnosis of pregnancy complications, including fetal macrosomia [3, 12]. The integration of digital technologies into maternal healthcare improves access to medical services, enhances patient education, and supports continuous monitoring of pregnant women at risk.

Telemedicine platforms, mobile health applications, electronic medical records, and дистанционное консультирование allow healthcare professionals to monitor maternal weight gain, blood glucose levels, nutritional habits, and other important indicators associated with fetal growth [5, 7, 11]. Early identification of risk factors through digital monitoring contributes to timely preventive interventions and reduction of adverse maternal and neonatal outcomes [3, 12].

Digital educational resources also improve reproductive health literacy among women and young people. Online consultations, virtual educational programs, webinars, and mobile applications provide accessible information about healthy pregnancy, nutrition, physical activity, diabetes prevention, and prenatal care [10, 13]. These technologies are especially important for women living in remote or underserved areas where access to specialized healthcare services may be limited.

The use of telehealth technologies additionally strengthens interdisciplinary cooperation between obstetricians, endocrinologists, nutritionists, psychologists, and educators. Such collaboration contributes to comprehensive preventive care and improves the effectiveness of maternal and child health programs [3, 6, 12].

Furthermore, digital health technologies support social and pedagogical approaches aimed at promoting healthy lifestyles and responsible reproductive behavior among the younger generation [13, 14]. According to the scientific works of Usta-Azizova D. A. educational and moral development combined with modern healthcare technologies can significantly contribute to preserving public health and strengthening the well-being of future generations [13, 14].

The results of the present study confirm that fetal macrosomia remains an important medical, social, and pedagogical problem requiring comprehensive preventive approaches [1, 2, 6]. The increasing prevalence of fetal macrosomia worldwide is closely associated with changes in lifestyle, increasing rates of obesity, diabetes mellitus, poor nutrition, and insufficient physical activity among women of reproductive age [5, 7, 8].

The reviewed literature demonstrates that fetal macrosomia significantly increases the risk of adverse maternal and neonatal outcomes, including cesarean delivery, postpartum hemorrhage, birth trauma, neonatal respiratory disorders, and long-term metabolic complications in children [2, 4, 9]. These findings correspond with previous international studies emphasizing the necessity of early prevention and effective prenatal monitoring [3, 12].

An important finding of this study is that many risk factors associated with fetal macrosomia are modifiable [5, 11]. This indicates that preventive measures focused on improving reproductive health awareness, nutrition, weight control, and healthy lifestyle behaviors may substantially reduce the incidence of macrosomia and related complications. In this context, preventive education becomes an essential component of public health strategies.

The discussion also highlights the growing importance of social and pedagogical approaches in maternal and child health preservation. Educational technologies, reproductive health programs, and awareness campaigns contribute to the formation of responsible attitudes toward motherhood and healthy living among adolescents and young adults [13, 14]. The integration of pedagogical methods into healthcare practice improves health literacy and encourages preventive behavior before and during pregnancy.

Special attention should be given to the role of digital medicine and telehealth technologies in preventive healthcare [3, 12]. Digital monitoring systems, online consultations, and mobile health applications improve access to healthcare services and allow early identification of women at risk for fetal macrosomia. These technologies also facilitate interdisciplinary cooperation and increase the effectiveness of preventive interventions.

Furthermore, the study emphasizes the importance of spiritual and moral education in strengthening family values, social responsibility, and health culture among young people. The scientific works of Usta-Azizova D. A. underline that moral and cultural education positively influences reproductive behavior and contributes to preserving the health of future generations [13, 14].

Thus, fetal macrosomia prevention should be considered not only a medical issue but also a social and educational priority. Interdisciplinary cooperation between healthcare professionals, educators, and public health institutions is necessary for developing effective preventive strategies aimed at improving maternal and neonatal outcomes and preserving the health potential of society [3, 6, 12].

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TECHNICAL SCIENCES

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<https://doi.org/10.5281/zenodo.20540838>

МАТЕМАТИЧЕСКОЕ МОДЕЛИРОВАНИЕ ГИДРОГЕОЛОГИЧЕСКИХ ПРОЦЕССОВ НА ПОЛИГОНЕ ЦОМС ПО ДАННЫМ ОПЫТНЫХ ОТКАЧЕК

Zulkhummor Ergasheva, Dishod Nazaratiev

MATHEMATICAL MODELING OF HYDROGEOLOGICAL PROCESSES AT THE TsOMS SITE BASED ON PILOT DATA

Аннотация.

В статье представлены результаты математического моделирования гидрогеологических процессов по данным опытных откачек, выполненных на территории полигона Центральной опытно-мелиоративной станции (ЦОМС). Рассмотрены особенности литологического строения исследуемого участка, представленного многослойным водоносным комплексом, включающим покровные суглинки и супеси, песчаные отложения с включением гравия, а также галечниковые породы. На основе данных опытных откачек и режимных наблюдений выполнена схематизация гидрогеологических условий территории и построена численная модель фильтрационных процессов. Предварительная оценка коэффициентов фильтрации проведена с использованием программного обеспечения *AquiferTest*. В процессе калибровки модели осуществлено сопоставление фактических и расчетных уровней подземных вод с последующим уточнением фильтрационных параметров и водоотдачи водоносных горизонтов. Установлены основные закономерности формирования режима грунтовых вод и оценено влияние оросительно-дренажной сети и инфильтрационных потерь на гидрогеологические процессы исследуемой территории. Полученные результаты могут быть использованы при прогнозировании динамики подземных вод и управлении мелиоративным состоянием орошаемых земель.

Abstract.

This article presents the results of mathematical modeling of hydrogeological processes based on pumping tests conducted at the Central Experimental Reclamation Station (TsOMS) site. The lithological features of the study area, represented by a multilayered aquifer complex comprising cover loams and sandy loams, sandy sediments with gravel inclusions, and pebble rocks, are examined. Based on pumping tests and operational observations, the hydrogeological conditions of the area are schematized and a numerical model of filtration processes is constructed. A preliminary assessment of the filtration coefficients was performed using *AquiferTest* software. During the model calibration process, actual and calculated groundwater levels were compared, followed by refinement of the filtration parameters and water yield of aquifers. The key patterns in groundwater regime formation were established, and the impact of the irrigation and drainage network and infiltration losses on hydrogeological processes in the study area was assessed. The obtained results can be used to predict groundwater dynamics and manage the reclamation status of irrigated lands.

Ключевые слова: математическое моделирование, гидрогеологические процессы, опытные откачки, подземные воды, коэффициент фильтрации, водоносный горизонт, калибровка модели, фильтрационный поток, инфильтрационные потери, оросительно-дренажная сеть, ЦОМС.

Keywords: mathematical modeling, hydrogeological processes, pumping tests, groundwater, filtration coefficient, aquifer, model calibration, filtration flow, infiltration losses, irrigation and drainage network, centralized irrigation and drainage system.

Введение. В условиях интенсивного развития орошаемого земледелия и возрастающей нагрузки на водные ресурсы особую актуальность приобретает изучение гидрогеологических процессов, протекающих в пределах мелиоративных систем. Формирование режима подземных вод на орошаемых территориях зависит от комплекса природных и антропогенных факторов, включая литологическое строение пород, фильтрационные свойства водоносных горизонтов, инфильтрационные потери при

орошении, а также влияние оросительно-дренажной сети. Изменение гидродинамического режима подземных вод оказывает существенное влияние на мелиоративное состояние земель, развитие процессов вторичного засоления и эффективность водопользования [1].

Одним из наиболее эффективных методов изучения фильтрационных характеристик водоносных горизонтов являются опытные откачки, позволяющие определить коэффициенты фильтрации, параметры водоотдачи и особенности взаимодействия

между водоносными слоями [2, 3]. Современные методы математического моделирования и специализированные программные комплексы обеспечивают возможность более точной интерпретации результатов опытных работ и количественной оценки гидрогеологических процессов [4, 5].

Территория полигона Центральной опытно-мелиоративной станции (ЦОМС) характеризуется сложным многослойным литологическим строением и активным воздействием оросительно-дренажных систем на режим грунтовых вод. В данных условиях применение математического моделирования позволяет уточнить гидрогеологические параметры исследуемой территории, оценить закономерности фильтрационных процессов и определить влияние инфильтрационных потерь на формирование подземного стока [6, 7].

В настоящем исследовании выполнена схематизация гидрогеологических условий территории полигона ЦОМС, проведена предварительная оценка коэффициентов фильтрации по данным опытных откачек с использованием программного комплекса AquiferTest, а также разработана численная модель фильтрационных процессов [8]. В процессе калибровки модели осуществлено сопоставление фактических и расчетных уровней подземных вод с последующим уточнением гидрогеологических параметров водоносного комплекса [9, 10].

Целью исследования является оценка гидрогеологических параметров и закономерностей формирования режима подземных вод на территории полигона ЦОМС на основе данных опытных откачек и методов математического моделирования.

Полученные результаты могут быть использованы при прогнозировании динамики грунтовых вод и разработке мероприятий по повышению эффективности управления мелиоративным состоянием орошаемых земель.

Материалы и методы исследования. Материалами исследования послужили данные опытных откачек, выполненных на территории полигона Центральной опытно-мелиоративной станции (ЦОМС), а также результаты режимных наблюдений за уровнями подземных вод за 2019-2020 гг. Исследуемый участок характеризуется сложным литологическим строением и представлен трехслойным водоносным комплексом, включающим покровные супеси и суглинки мощностью 19-21 м, водоносный горизонт QIII_{sd}, сложенный песками с включением гравия мощностью до 60 м, а также нижележащий галечниковый горизонт QII_{ts} мощностью до 20 м.

Для оценки гидрогеологических параметров были проведены опытные откачки на скважинах 1цт глубиной 100 м и 1цс глубиной 50 м. Контроль изменения уровней подземных вод осуществлялся по наблюдательным скважинам 1т/1н (85 м), 2/1н (30 м), 2/2н (30 м), 2/3 (10 м) и 2/4 (10 м).

Предварительная обработка и интерпретация результатов опытных откачек выполнялась с использованием программного комплекса AquiferTest, на основе которого были определены коэффициенты фильтрации и параметры водоотдачи водоносных горизонтов. Для уточнения гидрогеологических параметров была разработана математическая модель фильтрационных процессов исследуемой территории.

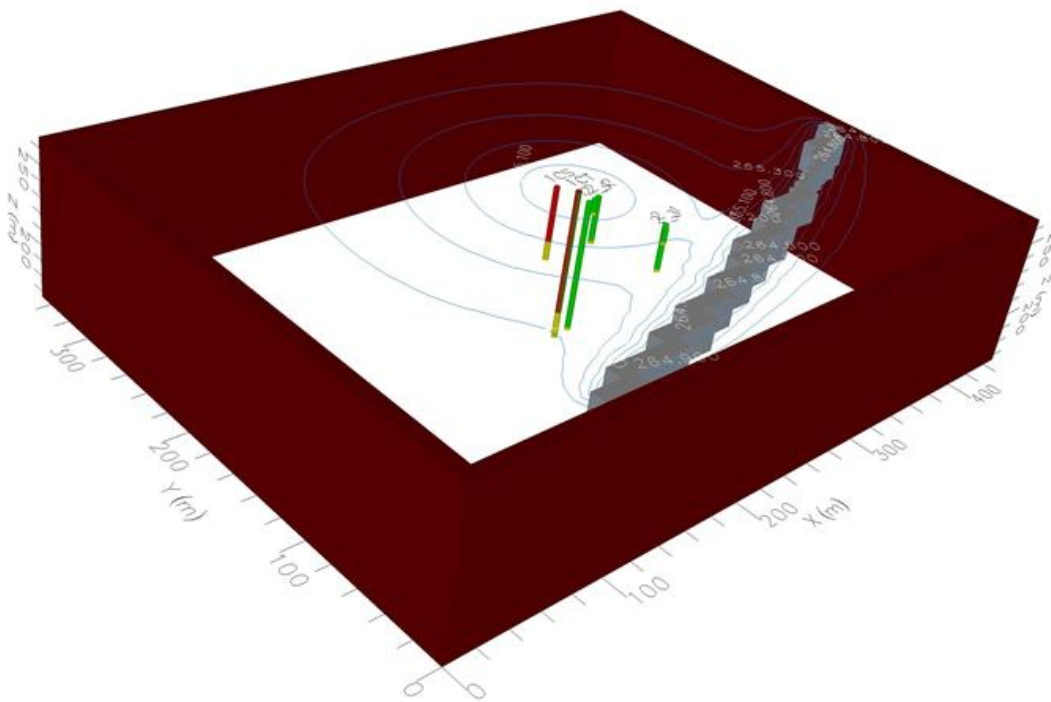


Рис. 1. Модель опытных откачек на полигоне ЦОМС

Схематизация области моделирования выполнена в виде трех модельных слоев, соответствующих литологическому строению участка. Первый

слой представлен покровными супесями и суглинками, второй - песчано-гравийными отложениями, третий - галечниковыми породами. По результатам

калибровки модели были приняты следующие значения коэффициентов фильтрации: для первого слоя - 0,03 м/сут, для второго слоя - 5 м/сут, для третьего слоя - 13 м/сут.

Начальные условия модели задавались на основании данных режимных наблюдений за уровнями грунтовых вод. Граничные условия были схематизированы с учетом направления движения потока подземных вод и влияния оросительно-дренажной сети. Каналы и дрены моделировались как граничные условия III рода, отражающие гидравлическую связь поверхностных водотоков с водоносным комплексом через слабопроницаемые покровные отложения.

Результаты исследования. В процессе математического моделирования выполнялось сопо-

ставление расчетных уровней подземных вод с фактическими данными опытных откачек, полученными по наблюдательным скважинам полигона ЦОМС. В ходе калибровки модели проводилась последовательная корректировка гидрогеологических параметров, включая коэффициенты фильтрации, параметры свободной и упругой водоотдачи, что позволило обеспечить минимальные отклонения между модельными и фактическими значениями уровней подземных вод.

Предварительная интерпретация результатов опытных откачек, выполненная в программе AquiferTest, позволила определить основные гидрогеологические параметры исследуемого водоносного комплекса (Рис. 2).

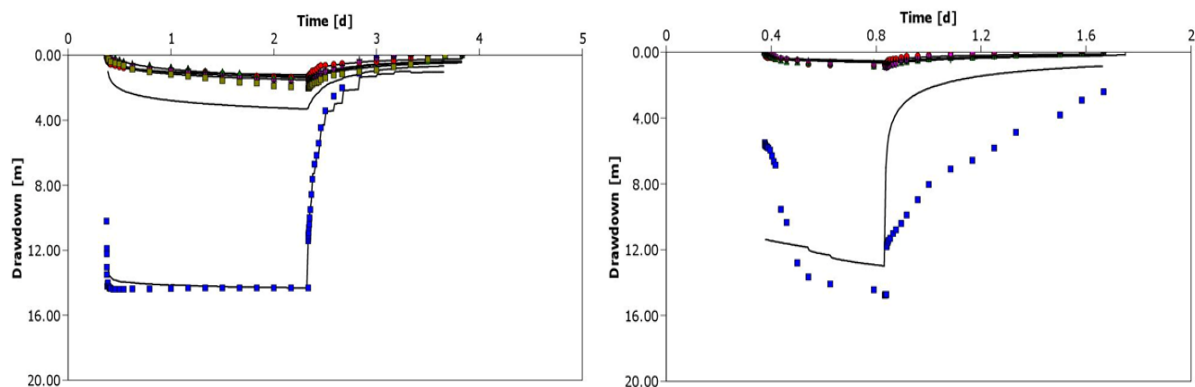
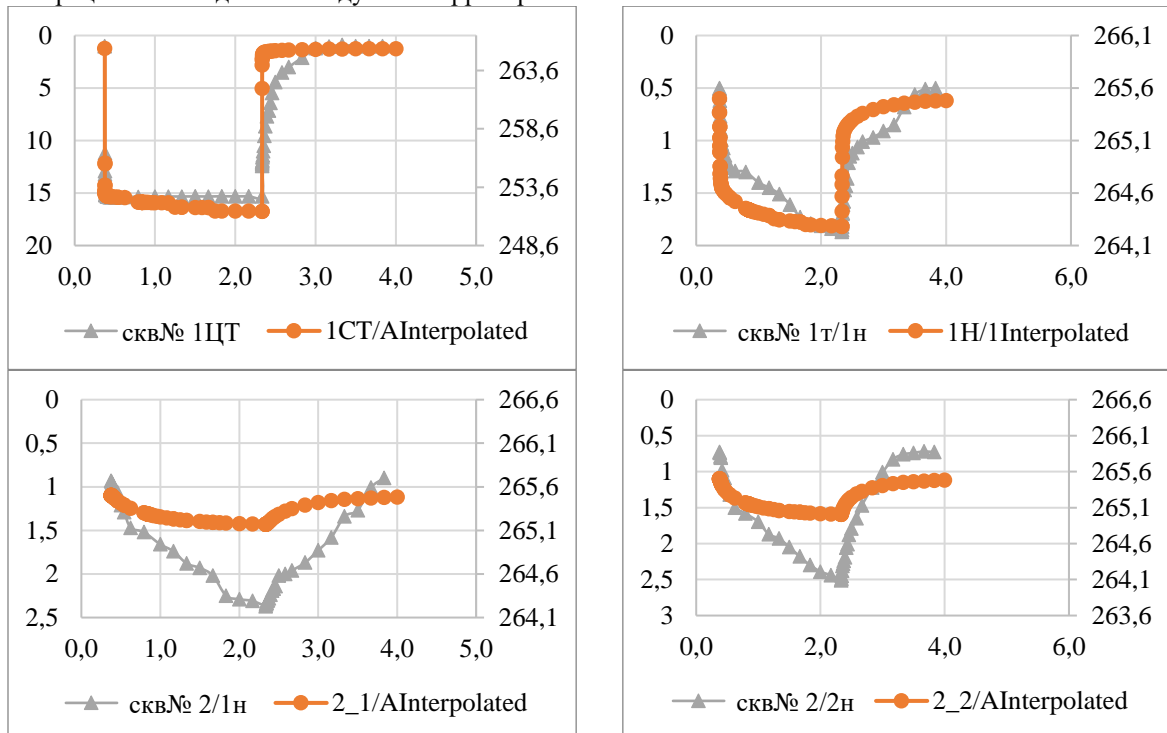


Рис. 2. Результаты интерпретации опытных откачек по скважинам 1ЦТ и 1ЦС в программе AquiferTest

Сравнительный анализ фактических и расчетных уровней показал удовлетворительную сходимость результатов моделирования с натурными данными опытных откачек. Это свидетельствует о корректности принятой схемы гидрогеологических условий и адекватности выбранных параметров фильтрационной модели исследуемой территории.

В процессе моделирования полученные значения уровней в скважинах сравнивались с фактическими данными откачек, при этом корректировались гидрогеологические параметры (коэффициенты фильтрации, свободная и упругая водоотдача) для достижения минимальных отклонений (Рис. 3).



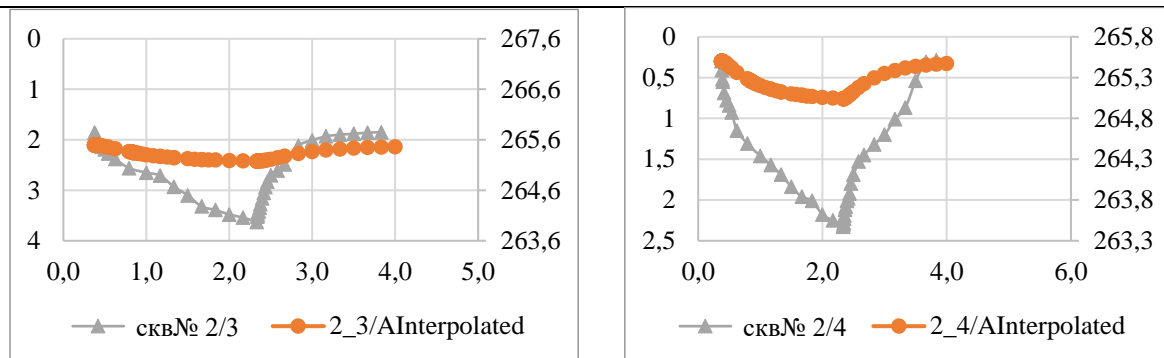


Рис. 3. Сравнительные графики фактических и модельных уровней при моделировании опытной откачки по скважине 1 цт.

По результатам калибровки модели были установлены следующие значения коэффициентов фильтрации: для первого слоя, представленного покровными супесями и суглинками, коэффициент фильтрации составил 0,03 м/сут; для второго слоя, сложенного песками с включением гравия, - 5 м/сут; для третьего слоя, представленного галечниковыми отложениями, - 13 м/сут. Полученные значения указывают на увеличение водопроницаемости пород с глубиной и отражают особенности гранулометрического состава водоносных горизонтов.

Начальные условия модели были заданы на основании режимных наблюдений за уровнями грунтовых вод по наблюдательным скважинам полигона ЦОМС за 2019-2020 гг. Граничные условия модели учитывали основные закономерности движения потока подземных вод. На северо-западной и юго-восточной границах были заданы условия изменяющегося напора, отражающие направление фильтрационного потока, тогда как с северной и южной сторон использовались непроницаемые границы.

Внутренними границами модели являлись оросительная и коллекторно-дренажная сети, оказывающие существенное влияние на формирование режима грунтовых вод. Каналы и дрены были заданы как граничные условия III рода, характеризующие гидравлическую связь поверхностных водотоков с водоносным комплексом через слабопроницаемые покровные отложения. Установлено, что совместное влияние оросительно-дренажной сети и инфильтрационных потерь с полей орошения является одним из основных режимобразующих факторов исследуемой территории.

Инфильтрационные потери задавались в размере 10 % от месячной водоподдачи на поля орошения с учетом структуры сельскохозяйственных культур и режима поливов. Результаты моделирования показали, что инфильтрационное питание оказывает существенное влияние на изменение уровня режима грунтовых вод и формирование фильтрационного потока в пределах верхнего водоносного горизонта.

Сетчатая модель исследуемого участка была представлена областью размером 9,0×4,65 км, дискретизированной на 160 строк и 304 столбца с шагом сетки 30 м, а на участках повышенной детализации - 15 м. По вертикали модель включала три

расчетных слоя, отражающих литологическое строение и гидрогеологические особенности территории. Применение данной модели позволило достоверно воспроизвести основные закономерности фильтрационных процессов и оценить влияние природных и антропогенных факторов на режим подземных вод полигона ЦОМС.

Закключение. В результате математического моделирования гидрогеологических процессов на полигоне ЦОМС были уточнены основные фильтрационные параметры исследуемого водоносного комплекса и установлены закономерности формирования режима подземных вод. Проведенная калибровка модели показала удовлетворительную сходимость расчетных и фактических уровней, что подтверждает корректность принятой схемы гидрогеологических условий и достоверность полученных результатов.

По данным интерпретации опытных откачек и численного моделирования установлено, что коэффициенты фильтрации составили: для покровных супесей и суглинков - 0,03 м/сут, для песчано-гравийных отложений - 5 м/сут, для галечниковых пород - 13 м/сут. Полученные значения свидетельствуют об увеличении водопроницаемости пород с глубиной и отражают особенности литологического строения исследуемой территории.

Результаты моделирования показали, что существенное влияние на формирование режима грунтовых вод оказывают оросительно-дренажная сеть и инфильтрационные потери с полей орошения. Установлено, что инфильтрационное питание и гидравлическая связь каналов и дрен с водоносным комплексом являются основными режимобразующими факторами территории полигона ЦОМС.

Разработанная математическая модель позволяет достоверно воспроизводить фильтрационные процессы исследуемого участка и может быть использована для прогнозирования динамики подземных вод, оценки мелиоративного состояния орошаемых земель и обоснования мероприятий по рациональному управлению водными ресурсами.

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ДВИГАТЕЛЬ НА СИЛЕ ЭНЕРГИИ ВСЕМИРНОГО ТЯГОТЕНИЯ ЗА СЧЕТ ЗАКОНОВ ФИЗИКИ И НИКАКОГО ВАМ ВЕЧНОГО ДВИГАТЕЛЯ.

Serbulenko V.N.

AN ENGINE POWERED BY UNIVERSAL GRAVITATIONAL ENERGY, USING THE LAWS OF PHYSICS, AND NO PERPETUAL MOTION MACHINE.

Аннотация:

Создание двигателя на силе энергии всемирного тяготения с помощью законов физики создает конкуренцию производству электроэнергии на не возобновляемых и возобновляемых источниках энергии. Применяя поочередно силу резонанса, силу энергии грузов и механизмов двигателя, силу энергии, накопленную демпферами резиновыми, синхронизируя время приложения усилий грузов благодаря механизмам блокировки подвижных кронштейнов с грузами на электричестве (главный вопрос в этом случае: А будет ли вырабатываться электроэнергия генератором больше, чем потребляться.), или с помощью связанного устройства механического типа в виде тяговых соединительных строп поворотных кругов с грузами для их плавного возвращения в исходное положение, избегая при этом динамических асинхронных колебаний и от резких воздействий противоположных грузов на ограничительные резиновые демпферы, уменьшение центробежных сил направленных перпендикулярно от оси вращения колеса при прохождении грузов в конце второго и начале третьего сегментов с помощью увеличения жесткости узлов и механизмов двигателя и силы энергии постоянных магнитов можем добиться кругового движения колеса. А это путь к созданию гибридной электростанции на силе энергии всемирного тяготения за счет законов физики работающей 24/7 в сочетании с грузовой электростанцией.

При дефиците электроэнергии в сети электростанция выдает генерацию в сеть.

При профиците заряжает грузовую электростанцию, поднимая грузы на высоту в исходное положение.

Abstract:

The creation of an engine powered by universal gravitational energy, using the laws of physics, creates competition for electricity generation from renewable and non-renewable energy sources. By alternately applying resonance force, the inertial force of the loads and engine mechanisms, and the energy stored in rubber dampers, synchronizing the timing of load application using locking mechanisms on movable brackets with electrically powered loads (the key question in this case is: Will the generator generate more electricity than it consumes?), or using a mechanical coupling device in the form of traction connecting slings of the turntables with loads for their smooth return to their original position, while avoiding dynamic asynchronous oscillations and the abrupt impact of opposing loads on the limiting rubber dampers. By reducing centrifugal forces directed perpendicular to the wheel's rotation axis as loads pass at the end of the second and beginning of the third segments, by increasing the rigidity of engine components and mechanisms and the energy of permanent magnets, we can achieve circular motion of the wheel. This is the path to creating a hybrid power plant powered by gravity, using the laws of physics, operating 24/7 in conjunction with a cargo power plant. When there's a power shortage in the grid, the power plant supplies power to the grid.

When there's a surplus, it charges the freight power plant, lifting the loads back to their original position.

Ключевые слова: движитель, двигатель, сила энергии всемирного тяготения, сила энергии грузов на подвижных кронштейнах и поворотных кругах, сила энергии постоянных магнитов, центробежные силы направленные перпендикулярно от оси вращения колеса, сила энергии, стопорное устройство электрическое с функцией плавного обратного хода кронштейна с грузом, связанное устройство механического типа в виде тяговых соединительных строп для функции плавного обратного хода поворотного круга с грузом, крепление тяговых строп связанного устройства, законы физики, гибридная электростанция, грузы, подвижные и неподвижные кронштейны, поворотные круги, сегменты колеса, оси подвижных кронштейнов, подвижных кругов и колеса, опорные оси подвижных кронштейнов и кругов, оси на краях неподвижных кронштейнов для крепления резиновых демпферов, ограничивающих ход подвижных кронштейнов и поворотных кругов с грузами демпферы резиновые поддерживающие и для передачи усилия от грузов на колесо, динамические асинхронные и синхронные колебания, синхронизация приложения усилий грузами на подвижных кронштейнах и поворотных кругах, противоположно расположенные грузы.

Key words: propeller, engine, force of gravity, force of energy of loads on movable brackets and turntables, force of energy of permanent magnets, centrifugal forces directed perpendicularly from the axis of rotation of the

wheel, force of inertia, electric locking device with the function of smooth return of the bracket with the load, mechanical connecting device in the form of traction connecting slings for the function of smooth return of the turntable with the load, fastening of traction slings of the connecting device, laws of physics, hybrid power plant, loads, movable and fixed brackets, turntables, wheel segments, axes of movable brackets, movable circles and wheels, support axes of movable brackets and circles, axes on the edges of fixed brackets for fastening rubber dampers that limit the travel of movable brackets and turntables with loads, rubber dampers supporting and for transmitting force from loads to the wheel, dynamic asynchronous and synchronous oscillations, synchronization of the application of forces by loads on movable brackets and turning circles, oppositely located loads.

Создавая движитель на силе энергии всемирного тяготения берегаем не возобновляемые источники энергии и улучшаем экологическую обстановку на планете Земля.

Вариант 1. Для обеспечения вращения колеса Рис.1 применяем два расположенных друг напротив друга груза, закрепленных на подвижных кронштейнах. Выше грузов на подвижных кронштейнах закреплены опорные оси. На оси каждого из кронштейнов устанавливаем стопорное устройство с функцией плавного обратного хода кронштейна с грузом. Большое количество грузов, расположенных по всему кругу не способствует работе двигателя. Увеличивается вес и инерционная составляющая колеса. А срабатывание активной нагрузки с эффектом резонанса и увеличением длины рычага воздействия на вращение колеса при повороте кронштейна с грузом за единицу времени с передачей энергии вращения через резиновый демпфер на колесо, когда направление движения колеса совпадает с направлением движения одного из грузов на кронштейне и увеличение рычага воздействия от груза на колесо не хватает для того, чтоб поддерживать вращение колеса. Наш двигатель останавливается. Доказано опытным путем на прототипе двигателя, работающего благодаря силе энергии всемирного тяготения и законам физики. Начало движения колеса. Кронштейн с грузом, находящийся в третьем сегменте находится в исходном положении, опорной осью кронштейн опирается на резиновый поддерживающий демпфер и заблокирован стопорным устройством. В таком положении самый маленький рычаг воздействия груза на колесо. Подвижный кронштейн с грузом в первом сегменте также находится в исходном положении, опирается опорной осью на поддерживающий резиновый демпфер но не заблокирован стопорным устройством. При вращении колеса расстояние между грузом и осью подвижного кронштейна по вертикали сокращается. За счет резинового поддерживающего демпфера, который толкает опорную ось подвижного кронштейна вперед, передавая дополнительную энергию на кронштейн с грузом кронштейн с грузом проворачивается по направлению движения колеса на своей оси до того момента, как опорная ось ударится в резиновый демпфер, посредством которого передаст усилие на колесо, которое продолжит вращение увеличив скорость. В этот момент срабатывает стопорное устройство кронштейна с грузом. Кронштейн с грузом фиксируется. В этом положении груз имеет самый большой рычаг воздействия на колесо. Второй кронштейн с грузом при блокировке первого постепенно разблокируется и под

собственным весом плавно возвращается в исходное положение навстречу движению колеса, при этом уменьшая величину сопротивления вращению колеса. Когда верхний подвижный кронштейн с грузом входит в первый сегмент круга до его срабатывания нижний подвижный кронштейн должен быть заблокирован, образовывать единое целое с колесом и своей инерционной составляющей помогать вращению колеса. Когда же верхний подвижный кронштейн с грузом повернется на своей оси. Направление его движения совпадет с направлением движения колеса и посредством опорной оси подвижного кронштейна будет передана энергия движения на колесо через резиновый демпфер, в этот самый момент должен быть разблокирован подвижный кронштейн с грузом, находящийся в третьем сегменте круга и с помощью функции плавного хода под действием силы энергии всемирного тяготения вернуться в исходное положение. Таким образом мы обеспечим круговое движение, используя силу энергии всемирного тяготения, силу энергии механизмов, явление резонанса, дисбаланс приложения усилий при изменении длины рычага воздействия с грузом на колесо, синхронизации прилагаемых усилий во времени, минимизация асинхронных колебаний противоположно расположенных грузов при срабатывании подвижных кронштейнов с грузами и их воздействие на резиновые демпферы. Для уменьшения негативного влияния центробежной силы, направленной перпендикулярно от оси вращения колеса в конце второго начале третьего сегментов увеличиваем жесткость узлов и механизмов двигателя а на краях подвижных кронштейнов и поворотных кругов с грузами устанавливаем постоянные магниты. На условной окружности, описываемой подвижным кронштейном и поворотным кругом с грузом устанавливаем постоянные магниты таким образом, чтоб они отталкивали магниты вверх, установленные на краях подвижных кронштейнов и поворотных кругов. Таким образом мы уменьшим центробежную составляющую, направленную перпендикулярно от оси вращения колеса. При прохождении подвижных магнитов над неподвижными магнитами в первоначальный момент будет создаваться небольшое торможение, а затем небольшой толчок по ходу движения и вверх. А созданного дисбаланса силы вращения хватит на покрытие затрат энергии для стопорного устройства с плавным возвращением груза в исходное состояние и вращения электрогенератора. Конструкцию и параметры колеса, грузов, подвижной и неподвижной частей кронштейнов, поворотных кругов, резиновые или пружинные демпферы определяют технические решения и

технико-экономические расчеты. И никакого Вам вечного двигателя.

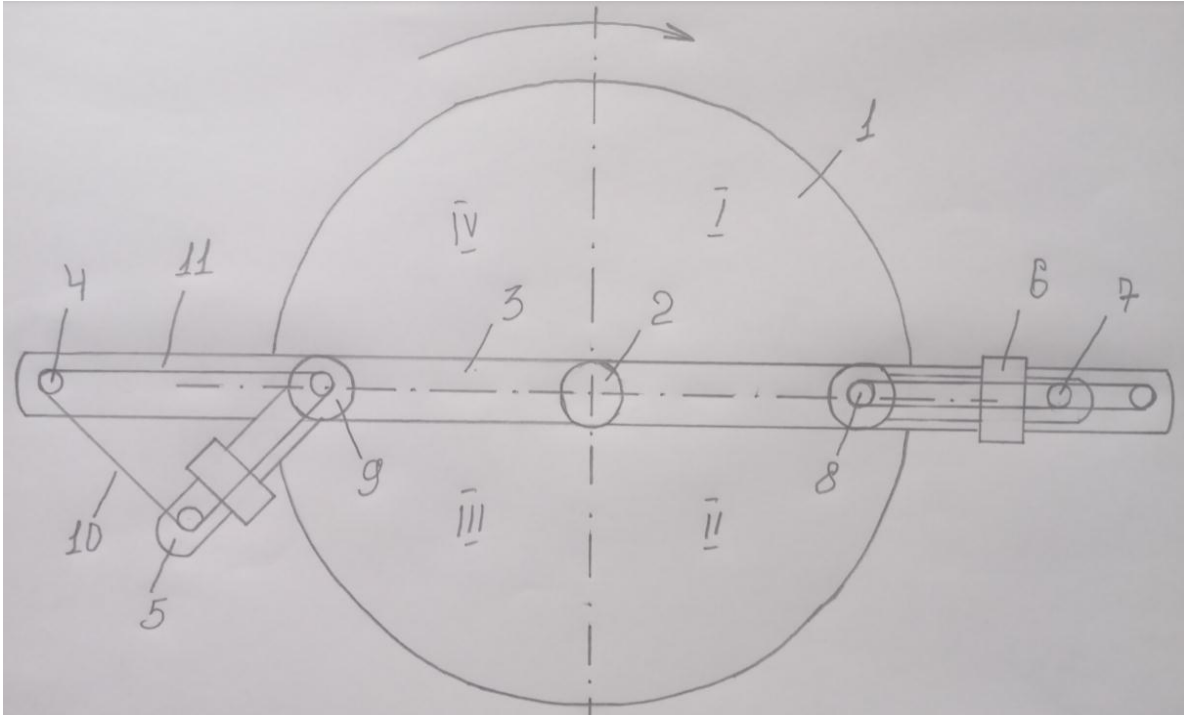


Рисунок 1. Двигатель на силе энергии всемирного тяготения за счет законов физики со стопорным устройством электрическое с функцией плавного обратного хода кронштейна с грузом.

1. Колесо.
2. Ось колеса.
3. Неподвижные кронштейны.
4. Оси на краях неподвижных кронштейнов для крепления резиновых демпферов.
5. Подвижный кронштейн.
6. Грузы.
7. Опорные оси подвижных кронштейнов.
8. Ось подвижного кронштейна.
9. Стопорное устройство электрическое с функцией плавного обратного хода кронштейна с грузом.
10. Ограничивающие ход подвижных кронштейнов с грузами демпферы резиновые поддерживающие.
11. Ограничивающие ход подвижных кронштейнов с грузами демпферы резиновые для передачи усилия от грузов на колесо.
12. I, II, III, IV – сегменты круга.
13. Стрелка – направление вращения колеса.

Вариант 2. Для обеспечения вращения колеса Рис.2 применяем два расположенных друг напротив друга грузы, закрепленных на поворотных кругах. Выше грузов на поворотных кругах закреплены опорные оси. На каждом из поворотных кругов закреплено по два соединительных стропа, которые из двух кругов образуют восьмерку тем самым обеспечивая противоположное направление вращения поворотных кругов с сохранением функции плавного прямого и обратного ходов поворотных кругов с грузами. Начало движения колеса. Поворотный круг с грузом, находящийся в третьем сегменте находится в рабочем положении, опорной

осью поворотного круга упирается в резиновый демпфер передавая усилие для кругового движения колеса. В таком положении самый большой рычаг воздействия груза на колесо. Поворотный круг с грузом в первом сегменте находится в исходном положении когда опорная ось поворотного круга поддерживается резиновым демпфером. В таком положении самый малый рычаг воздействия груза на колесо. При вращении колеса расстояние между грузом и осью поворотного круга по вертикали сокращается. За счет резинового поддерживающего демпфера, который толкает опорную ось поворотного круга вперед, передавая дополнительную энергию на круг с грузом нижний поворотный круг переходя в третий сегмент колеса начинает отклоняться в исходное положение. Тяговые стропы синхронизируют данные прямые и обратные вращения поворотных кругов с грузами, минимизируя антиколебательные процессы, приводящие к уменьшению скорости нашего колеса вплоть до его остановки. При этом нижний поворотный круг образует единое целое с колесом и своей инерционной составляющей помогает вращению колеса. Но при механическом соединении поворотных кругов посредством тяговых строп замедляется скорость прямого и обратного ходов поворотных кругов с грузами особенно в начальный момент, т.к. масса их одинаковая. А следовательно воздействие поворотного круга с грузом при прямом ходе на колесо через резиновый демпфер посредством опорной оси поворотного круга уменьшается. А значит мы теряем часть энергии, созданной эффектом резонанса.

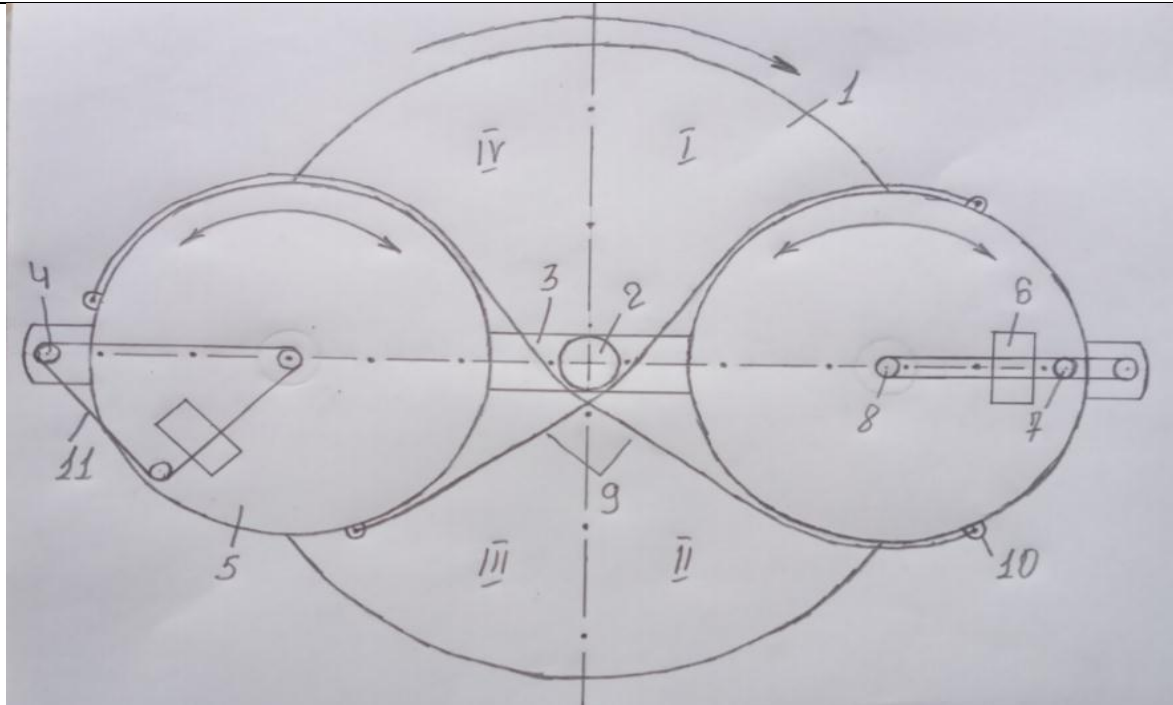


Рисунок 2. Двигатель на силе энергии всемирного тяготения за счет законов физики с механическим связным устройством поворотных кругов с грузами посредством соединительных строп.

1. Колесо.
2. Ось колеса.
3. Неподвижные кронштейны.
4. Оси на краях неподвижных кронштейнов для крепления резиновых демпферов.
5. Подвижные круги для грузов.
6. Грузы.
7. Опорные оси подвижных кругов.
8. Ось подвижного круга.
9. Связное устройство механическое в виде тяговых соединительных строп для функции плавного обратного хода поворотного круга с грузом.
10. Крепление строп механического связного устройства.
11. Ограничивающие ход подвижных кругов с грузами демпферы резиновые поддерживающие.
12. Ограничивающие ход подвижных кругов с грузами демпферы резиновые для передачи усилия от грузов на колесо.
13. I, II, III, IV – сегменты круга.

14. Стрелки – направление вращения колеса и поворотных кругов.

Полноценный прототип двигателя на силе энергии всемирного тяготения за счет законов физики не смог пока что создать для подтверждения своей теории, так как не имею возможности технической выполнить стопорное устройство с функцией плавного обратного хода кронштейна с грузом и нет постоянных магнитов, используемых в мотор-колесах. А прототип двигателя с связным устройством в виде тяговых строп не работает, т.к. считаю причина в слабом техническом исполнении.

Но тем не менее опыты с данным типом двигателя продолжаю.

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THE PROCESSING INDUSTRY OF RADIOACTIVE MATERIALS IN UKRAINE

Abstract.

The current states of the hazardous radioactive materials management system, as well the complex processing of solid radioactive waste at the Ukrainian nuclear power plants are reviewed. The main operating facilities of radioactive materials processing are presented. The technological advances and innovative ideas for the processing and disposal of radiation-hazardous materials are described. The main technical measures and priority issues regarding the improvement of radioactive materials management system at the Ukrainian nuclear power plants are defined.

Keywords: nuclear power plant, spent nuclear fuel, radioactive waste, management, processing, environment, nuclear safety, radiation safety.

The implementation of comprehensive solid radioactive waste processing at the nuclear power plants (NPPs) before the start of decommissioning stage is a cardinal solution for problem of overfilling the solid radioactive waste storage facilities. As a result, it is possible not only to reduce the initial volume of solid radioactive waste, but also to obtain the final processing product with characteristics that enable for the final disposal. The projects of today operating Ukrainian NPPs do not include the comprehensive approach to radioactive materials management [1]. However, the current legislation provides for the construction and commissioning of Complex for the Processing of Solid Radioactive Waste at the Ukrainian NPPs [2, 3].

The Complex for the Processing of Solid Radioactive Waste at the Zaporizhzhia NPP is designed for processing low activity level waste and partially intermediate activity level waste (up to 300 $\mu\text{Gy/h}$), and this is justified, since these waste categories include the largest amount of accumulated solid radioactive waste [4]. The Complex for the Processing of Solid Radioactive Waste was commissioned in 2017 and consists of the following main technological units:

burning of solid radioactive waste and flammable liquid radioactive waste (spent radioactively contaminated oil) with a capacity of 30 kg/h for solid radioactive waste and 12 kg/h for liquid radioactive waste; after burning of radioactive waste, an ash residue is obtained;

super-compactors for pressing solid radioactive waste, which are suitable for pressing by structure and composition (in particular, ash residue); the time of pressing process is regulated, the maximum pressing force is 1.500 t/s, the capacity is 8 barrels/h, the efficiency of volume reduction depends on the solid radioactive waste type; after pressing the barrels, the briquettes of appropriate height are obtained;

fragmentation of bulky and long-length solid radioactive waste with the possibility of redirection (if necessary) on the decontamination;

removing the solid radioactive waste from storage compartments.

The Complex for the Processing of Solid Radioactive Waste also includes a system of radiation and

chemical monitoring of emissions for control the content of radioactivity and chemically harmful substances in exhaust gases. The briquettes (pressed and placed in secondary packages) are the product of solid radioactive waste processing on the technological units of Complex for the Processing of Solid Radioactive Waste at the Zaporizhzhia NPP. It is advisable to provide the technological unit for cementing. It is necessary to analyze the compliance of final processing product with the acceptance criteria for disposal in the repository of the Production Complex «Vector».

The Complex for the Processing of Solid Radioactive Waste at the Rivne NPP is also designed for processing low activity level waste and partially intermediate activity level waste (up to 300 $\mu\text{Gy/h}$) [5]. The project envisages equipping the Complex for the Processing of Solid Radioactive Waste with the following technological units:

removing the solid radioactive waste from storage compartments;

sorting and fragmentation of solid radioactive waste;

super-compression of solid radioactive waste (due to the absence of technological unit for incineration, the flammable radioactive waste of organic origin will also be compressed);

processing of spent oil;

cementing of pressed briquettes;

metal decontamination.

The Complex for the Processing of Solid Radioactive Waste was commissioned in 2019. For obtain the final processing product, the technological unit for incineration is necessary, since cementing the organic (flammable) solid radioactive waste can create certain difficulties in disposal.

Construction of Complex for the Processing of Solid Radioactive Waste at the Khmelnytskyi NPP [6] and the South Ukraine NPP [7] is provided by the Law of Ukraine «On the National Targeted Environmental Program for Radioactive Waste Management» [3]. The design documentation for the construction of Complex for the Processing of Solid Radioactive Waste at the Khmelnytskyi NPP has undergone the comprehensive state examination, and as of 2026, the construction of

complex is ongoing. The Complex for the Processing of Solid Radioactive Waste includes the following technological units and systems:

- removing the solid radioactive waste from storage compartments;
- sorting and fragmentation of solid radioactive waste;
- incineration;
- pressing;
- cementing;
- activity measurement;
- metal decontamination;
- control and accounting of solid radioactive waste.

The project is planned to be implemented in two stages: the first is the commissioning of technological units for sorting and fragmentation, incineration, pressing and activity measurement; the second is the commissioning of technological unit for removing, cementing and metal decontamination.

The design documentation for the construction of Complex for the Processing of Solid Radioactive Waste at the South Ukraine NPP has undergone the comprehensive state examination and is being sent to finalization taking into account the expert comments. As of 2025, the decision to the start project implementation has not yet been made. The project is also planned to be implemented in two stages: the first is the commissioning of technological units and systems for sorting, pressing, drying, characterization (barrel measurement system); the second is the commissioning of technological units for incineration, ash residue melting, and emission control systems.

Today, radioactive waste management activities are crucial in terms of safe decommissioning of the Chernobyl NPP and the transformation of the Shelter object in accordance with the National Decommissioning Program.

All radioactive waste from the Chernobyl NPP is divided into 2 types:

- normal operational radioactive waste, which are generated as a result of the operational processes of power units;
- emergency radioactive waste, formed as a result of 1986 accident and its liquidation (including waste from the Shelter object).

According to the origin of radioactive waste, it is classified as follows:

- liquid radioactive waste and solid radioactive waste accumulated to date, which are located in the storage facilities available on the site;
- operational liquid radioactive waste and solid radioactive waste, which are generated during the maintenance of equipment that remaining in operation at the Chernobyl NPP units in the safe condition;
- liquid radioactive waste and solid radioactive waste of the Shelter object;
- liquid radioactive waste and solid radioactive waste, which are generated during the decommissioning work (in particular during the operation of radioactive waste management facilities);
- solid radioactive waste, which are generated during the work on the transformation of the Shelter object into an environmentally safe system.

At the Chernobyl NPP, all types of radioactive waste are present by activity: low activity level waste, intermediate activity level waste, and high activity level waste. This significantly complicates the waste management, as the entire management infrastructure must be able to characterize the radioactive waste by activity level and be adapted to work with high activity level waste. The projected volume of radioactive waste during the decommissioning of the Chernobyl NPP units and the transformation of the Shelter object into an environmentally safe system is 177.255 m³, which is approximately equal in volume to 70 Olympic swimming pools. The share of liquid radioactive waste is 36.148 m³, and solid radioactive waste is 141.107 m³.

In radioactive waste management activities, the Chernobyl NPP is guided by the principle of minimizing the amount of radioactive materials and radioactively contaminated territories. For realization this principle, the practice of maximum reuse of materials and their decontamination is used.

One of the urgent tasks facing the enterprise today is to create an integrated radioactive waste management system that would meet the conditions of the Chernobyl NPP.

At the Chernobyl NPP, there was the radioactive waste management system that was intended for the operating NPP. It is currently being transformed into the radioactive waste management system for the decommissioned NPP. For the first time, the strategy for creating an integrated radioactive waste management system at the Chernobyl NPP site was outlined in the Chernobyl NPP Decommissioning Plan, developed within the framework of the «TACIS» program in 1996. For ensure the process of power units decommissioning and radioactive waste management, the document defines the list and main characteristics of facilities that need to be built at the station site: the facility for collecting, transporting, cementing the liquid radioactive waste; the facility for collecting and processing the solid radioactive waste; a place for their disposal.

At the Chernobyl NPP site, the following main radioactive waste management facilities have been constructed and nowadays they are being commissioned:

- Plant for the Processing of Liquid Radioactive Waste;
- Industrial Complex for the Solid Radioactive Waste Management;
- Complex for Manufacturing Metal Barrels and Reinforced Concrete Containers for radioactive waste storage of the State Specialized Enterprise «Chernobyl NPP».

The Plant for the Processing of Liquid Radioactive Waste is designed for the processing of liquid radioactive substances accumulated at the Chernobyl NPP, as well as waste that will be generated during the decommissioning of power units № 1, 2 and 3 [8]. The Plant for the Processing of Liquid Radioactive Waste is responsible for the following functions:

- removing the accumulated waste from storage tanks using the special systems;
- transferring the extracted waste through pipelines to the technological units for processing;

pretreatment of waste to meet the requirements of subsequent stages of the technological process;

reduction of liquid radioactive waste volume by the concentration (evaporation) method;

producing the final processing product by the solidification (immobilization) of the pretreated waste with the help of cementation in the 200-liter metal barrels;

curing the barrels with the final product and placing them into the special transport packaging kits;

radiological monitoring of barrels and transport packaging kits;

control and return secondary liquid waste, purified technological environment and products of supply systems to the Chernobyl NPP facilities, subject to their compliance with the established standards.

The Plant for the Processing of Liquid Radioactive Waste processes three main output streams: evaporative concentrates; perlite-wash filter pulp; ion-exchange resins. The final product of liquid radioactive waste processing at the Plant for the Processing of Liquid Radioactive Waste is the cement compound, which consists of previously obtained waste (concentrated cube residue, dewatered resins and perlite pulp) and dry components (cement, lime, sand, additives). After mixing, the product is poured into the 200-liter barrels, which are hermetically sealed after curing. The final product must comply with the certain requirements regarding the radionuclide composition, partial and total activity, chemical and mechanical properties. **The 200-liter barrels with the cement mixture are packed at 4 pieces into the reinforced concrete container. The container with the processed liquid radioactive waste is sent for disposal to the specially equipped solid radioactive waste near-surface storage of the Production Complex «Vector».**

The Industrial Complex for the Solid Radioactive Waste Management is designed for the processing and conditioning of short-lived low activity level waste and intermediate activity level waste, accumulated in the solid radioactive waste storage during the operation of Chernobyl NPP units, as well as waste that will be generated during the decommissioning of power units № 1, 2, and 3. The Industrial Complex for the Solid Radioactive Waste Management design includes three plants:

Solid Radioactive Waste Removal Facility for solid radioactive waste all categories from the solid radioactive waste storage compartments; all operations for accessing to the compartments, removing, fragmenting, and loading the solid radioactive waste into containers are performed without direct personnel involvement, using the remotely controlled equipment; solid radioactive waste in sealed transport containers is delivered to the Plant for the Sorting and Processing of Solid Radioactive Waste;

Plant for the Sorting and Processing of Solid Radioactive Waste – plant for sorting of solid radioactive waste all categories and processing of low activity level waste and intermediate activity level waste; the Plant for the Sorting and Processing of Solid Radioactive Waste is provided with the systems and equipment for sorting, fragmenting, pressing, and packaging the waste, as well

as the technological units for incineration and cementation; technical maintenance areas, technological units for decontamination, sanitary checkpoints, and other auxiliary systems will be established;

Specially Engineered Near-Surface Disposal Facility for Solid Radioactive Waste – plant for processing and packaging of short-lived low activity level waste and intermediate activity level waste for the subsequent disposal; the long-lived low activity level waste, intermediate activity level waste and high activity level waste will be packaged and directed for the interim storage in the specially modified compartments of storage facility for liquid radioactive waste and solid radioactive waste at the Chernobyl NPP; a significant part of accumulated at the Chernobyl NPP waste originates from accidents, that is contains uranium and transuranic isotopes (alpha-active long-lived radionuclides), the permissible content of which for disposal in the near-surface repositories is strictly limited [9, 10].

With the object of obtaining the final processing product suitable for disposal in the Specially Engineered Near-Surface Disposal Facility, the special attention in the technological chain of solid radioactive waste management is given to the process of sorting based on the radiological characteristics. The project includes radiation monitoring of waste at the sorting tray and at the subsequent stages of radioactive waste management.

After processing, the waste is stored in the interim storage sites or transported to the Radioactive Waste Disposal Site «Buryakivka». Currently, 22.645 m³ of radioactive waste has accumulated in the Chernobyl NPP storage facilities, which is approximately equal in volume to 9 Olympic swimming pools. The share of liquid radioactive waste is 20.133 m³. The solid radioactive waste is located in:

solid radioactive waste storage – 2.502 m³;

high activity level waste open storage – 8 m³;

storage for liquid radioactive waste and solid radioactive waste – 2 m³.

The military aggression of the Russian Federation created unprecedented challenges for the nuclear and radiation safety in Ukraine [11]. Now, the physical protection of nuclear facilities and radioactive materials management infrastructure is a critical factor that must be integrated into all plans. Joint statements with the international partners and reports to the International Atomic Energy Agency now include an analysis of risks associated with the military actions. Thus, due to the occupation of Exclusion Zone by Russian forces, the State Nuclear Regulatory Inspectorate of Ukraine suspended License № OB001096 for the activity «processing and storage of Radioactive Waste» on April 26, 2022. However, after the deoccupation of industrial site, the license was reinstated (August 2022). Before resuming the full operation of the radioactive waste processing infrastructure, a number of measures were taken to ensure the safe and proper operation of equipment and systems involved in the radioactive waste processing technological process. The personnel successfully completed the final stage of physical work during the third stage of comprehensive «hot» tests for the Solid Radioactive Waste Removal Facility and

Plant for the Sorting and Processing of Solid Radioactive Waste.

Conclusions

The projects of today operating Ukrainian NPPs are characterized by the lack of modern high-tech approaches to spent nuclear fuel and radioactive waste management, and the resolution of these issues has been postponed indefinitely. This leads to the significant filling of storage facilities and risks for insufficient of storage capacities. However, the current legislation provides for the construction and commissioning of modern infrastructure. This would enable the production of finally treated product acceptable for the ultimate disposal in the near-surface repositories and ensure the processing of the bulk accumulated hazardous radioactive materials at the NPPs sites before their decommissioning.

In general, the radiation-hazardous materials management at the Ukrainian NPPs covers necessary activities related to the collection, transportation, processing, temporary storage and preparation for transfer to the special enterprises for long-term storage/disposal. The liquid radioactive waste and solid radioactive waste, generated during the operation of NPPs, are processed at the existing technological units and retained in the special storage facilities. **At the same time, some** radioactive materials from the Chernobyl NPP today remain in the reactor facilities undergoing the final decommissioning and conservation. Dismantling and management of graphite stacks is one of the most difficult tasks of the upcoming decommissioning phases. Scientific understanding of the properties and characteristics of hazardous radioactive materials is a prerequisite for the development of innovative technologies for the waste processing.

In Ukrainian nuclear power, the main technical measures as the following:

construction and commissioning of Complex for the Processing of Solid Radioactive Waste at the Khmelnytskyi NPP and South Ukraine NPP;

improvement of operating modes of radioactive materials processing facilities;

modernization of technological units for collection, transportation and storage of hazardous radioactive materials;

improvement of the radioactive materials accounting and control system;

decontamination of contaminated materials and their recycling;

application of modern technologies and means for decontamination.

Priority issues regarding the improvement of radioactive materials management system at the Ukrainian NPPs are:

implementation of technologies for liquid radioactive waste processing in order to obtain a product acceptable for disposal;

continuation of works on constructing the temporary light-type storage facility for storing containers with the conditioned radioactive waste at the Zaporizhzhya NPP (after its deoccupation);

implementation of measures on the transport and technological scheme for transfer radiation-hazardous materials from NPPs to the specialized enterprises.

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PHILOLOGICAL SCIENCES

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ORCID: 0009-0002-7419-0182

<https://doi.org/10.5281/zenodo.20540884>

INNOVATIVE CREATIVITY OF YOUNG ASHUGHS AND THE PRESERVATION OF TRADITIONAL SYMBOLS IN THE CONTEXT OF GLOBALIZATION

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INNOWACYJNA TWÓRCZOŚĆ MŁODYCH ASZUGÓW A ZACHOWANIE TRADYCYJNYCH SYMBOLI W KONTEKŚCIE GLOBALIZACJI

Abstract.

Azerbaijani ashugh art constitutes an essential component of the nation's rich musical and folkloric heritage, serving as a means of transmitting historical memory, spiritual and cultural values, and aesthetic thought from one generation to another. In the context of contemporary globalization processes, the preservation and sustainable development of this art form have emerged as significant cultural concerns. In recent years, the creative activities of young ashughs have increasingly been characterized by innovative approaches and the incorporation of modern modes of artistic expression. Influenced by digital technologies, social media platforms, and creative integration with diverse musical genres, ashugh art has acquired new forms of presentation and has become accessible to broader audiences.

At the same time, the fundamental elements of ashugh creativity—including traditional saz performance, the poetic forms of *qoşma* and epic narratives (*dastans*), folkloric sources, and symbolic-poetic motifs—continue to maintain their functionality and artistic significance. The creative practices of young ashughs clearly demonstrate a harmonious synthesis of tradition and innovation. On the one hand, classical symbols and traditional expressive forms contribute to the preservation of national and cultural identity; on the other hand, innovative creative methods facilitate the renewal of ashugh art in accordance with the demands of the contemporary era and enhance its relevance in modern cultural environments.

Consequently, the creative activities of young ashughs make a significant contribution both to the promotion of ashugh art within international cultural spaces and to the transmission of its national-spiritual essence and authentic characteristics to future generations.

Adnotacja.

Sztuka aszugaska Azerbejdżanu stanowi istotny element bogatego dziedzictwa muzycznego i folklorystycznego narodu, pełniąc funkcję przekazywania pamięci historycznej, wartości duchowych i kulturowych oraz myśli estetycznej z pokolenia na pokolenie. W warunkach współczesnych procesów globalizacyjnych zachowanie i zrównoważony rozwój tej formy sztuki stały się ważnym zagadnieniem kulturowym. W ostatnich latach działalność twórcza młodych aszugów coraz częściej charakteryzuje się innowacyjnymi podejściami oraz wykorzystaniem nowoczesnych środków wyrazu artystycznego. Pod wpływem technologii cyfrowych, mediów społecznościowych oraz twórczej integracji z różnorodnymi gatunkami muzycznymi sztuka aszugaska zyskała nowe formy prezentacji i stała się dostępna dla szerszego grona odbiorców.

Jednocześnie podstawowe elementy twórczości aszugskiej, takie jak tradycyjna gra na sazie, poetyckie formy *qoşma* i *dastany*, źródła folklorystyczne oraz symboliczno-poetyckie motywy, nadal zachowują swoją funkcjonalność i znaczenie artystyczne. Praktyka twórcza młodych aszugów wyraźnie ukazuje harmonijną syntezę tradycji i innowacji. Z jednej strony klasyczne symbole i tradycyjne formy ekspresji przyczyniają się do zachowania narodowej i kulturowej tożsamości, z drugiej zaś innowacyjne metody twórcze umożliwiają odnowę sztuki aszugskiej zgodnie z wymaganiami współczesnej epoki oraz zwiększają jej aktualność w nowoczesnym środowisku kulturowym.

W rezultacie działalność twórcza młodych aszugów wnosi istotny wkład zarówno w promocję sztuki aszugskiej na arenie międzynarodowej, jak i w przekazywanie jej narodowo-duchowej istoty oraz autentycznych cech przyszłym pokoleniom.

Keywords: ashugh art, innovative creativity, classical symbols, globalization, cultural identity, tradition and modernity.

Słowa kluczowe: sztuka aszugaska, twórczość innowacyjna, symbole klasyczne, globalizacja, tożsamość kulturowa, tradycja i nowoczesność.

Introduction

Azerbaijani ashugh art is one of the most significant elements of the nation's intangible cultural heritage, reflecting the historical memory, cultural identity, and oral literary traditions of the people. Transmitted from generation to generation through the master-apprentice tradition over centuries, this art form has functioned not only as a musical performance practice but also as an important vehicle for conveying social values, moral norms, and national-spiritual thought. Through poems, epics, and narratives performed with the accompaniment of the saz, ashughs have expressed the historical experiences, social life, and cultural worldview of the Azerbaijani people.

In the contemporary era, processes of globalization, rapid developments in communication technologies, and increasing cultural interaction have necessitated the adaptation of traditional arts to new social and cultural conditions. In this context, the preservation, revitalization, and transmission of Azerbaijani ashugh art to future generations have become important cultural priorities. The creative activities of young ashughs, in particular, play a decisive role in reshaping the relationship between tradition and modernity. While striving to preserve the classical ashugh repertoire, traditional saz performance practices, and symbolic-poetic elements, young artists simultaneously incorporate contemporary musical approaches, digital media environments, and new forms of artistic expression, thereby introducing innovative perspectives into ashugh art.

The impact of globalization on cultural diversity has been widely discussed in studies examining the transformation of traditional arts. These studies suggest that the sustainability of cultural heritage can only be achieved through a balanced integration of traditional values and innovative practices (Stokes, 2004; Nettl, 2005). Within this framework, the creativity of young ashughs contributes not only to the preservation of national cultural identity but also to maintaining the relevance and functionality of ashugh art within contemporary society.

The aim of this study is to examine the innovative creative practices of young ashughs in the context of globalization and to explore the ways in which traditional symbols are preserved in their artistic works. By evaluating the interaction between tradition and innovation, the study analyzes the contributions of young ashughs to the future development of Azerbaijani ashugh art.

Innovative Creativity. Innovative creativity refers to the process of preserving traditional elements within musical art while integrating them with new modes of expression and contemporary artistic approaches. The reinterpretation and presentation of folk music traditions in accordance with the aesthetic requirements of the modern era is of particular significance for the ashugh tradition. Globalization, rapid developments in information technologies, and the widespread use of digital media platforms have provided young ashughs with opportunities not only to preserve national and cultural heritage but also to introduce it to new and diverse audiences. This process contributes to

maintaining the vitality and contemporary relevance of ashugh art, while simultaneously increasing the interest of younger generations in this tradition and creating conditions for its recognition on an international scale (Stokes, 2004; Nettl, 2005).

Today, the integration of traditional repertoires with new musical styles and the utilization of diverse performance and presentation formats by young ashughs play a significant role in the development of the art form. In particular, the promotion of ashugh music through social media and digital platforms enables this tradition to reach wider audiences. At the same time, the academic study of music by young ashughs, including the acquisition of musical literacy, knowledge of music theory, and professional training, remains an important contemporary issue. The reconciliation of academic musical knowledge with the traditional master-apprentice system represents one of the key factors for the future development of ashugh art. Such an approach contributes both to the preservation of the national musical heritage and to its more professional representation within the framework of contemporary musical culture.

Furthermore, innovative creativity should not be understood merely as the adoption of technological advancements or modern performance techniques. Rather, it encompasses the reinterpretation of traditional artistic values within contemporary cultural contexts while preserving their authenticity. In this regard, young ashughs serve as cultural mediators who establish a dynamic balance between continuity and change. Through innovative creative practices, they ensure the sustainability of the ashugh tradition while simultaneously enhancing its adaptability to evolving social and cultural environments.

Technological Integration. Young ashughs make extensive use of technology as an integral component of their innovative creative practices. Contemporary ashughs increasingly benefit from digital platforms, which have become important channels for the dissemination and promotion of traditional ashugh art. Through platforms such as YouTube, Instagram, and TikTok, classical *qoshmas* and epic narratives (*dastans*) are made accessible to broader audiences beyond their traditional cultural environments (Feld, 2000). Today, a considerable number of young ashughs utilize digital media to increase audience engagement, expand their listener base, and enhance the visibility of their artistic activities. Young performers such as Ashugh Fezail, Ashugh Elmeddin Mammadli, Ashugh Nazim Gadabayli, Ashugh Shahriyar Karakhanli, Ashugh Shahmurad Injali, Ashugh Samir Jalaloglu, Ashugh Ruslan, Ashugh Shahin, Ashugh Joshgun Rahimov, Ashugh Asgar Osmanov, Ashugh Jeyhun, Ashugh Shohrat Kalbajarli, Ashugh Ali Zeynalabdinov, and Ashugh Togrul Ayrumelli actively employ TikTok and other social media platforms as tools for artistic communication and cultural dissemination.

Electronic Music Elements. The incorporation of electronic music elements into ashugh creativity has emerged as one of the most notable trends in the contemporary transformation and development of this

art form. Young ashughs increasingly combine traditional saz performance and vocal expression with electronic rhythms, studio effects, and digitally processed musical components, thereby creating new and distinctive modes of artistic presentation. This approach not only facilitates the adaptation of ashugh music to the preferences of contemporary audiences but also contributes to more dynamic and enriched performance practices.

The application of modern technologies expands the sonic possibilities of saz performance and enhances the emotional impact of musical expression through various sound-processing techniques. The use of electronic rhythms and digital music software introduces new layers of harmony and texture to traditional melodies, strengthening the integration of ashugh art with contemporary musical genres. This process is particularly significant in attracting younger audiences and presenting the national musical heritage in a manner that corresponds to the aesthetic expectations of the modern era.

At the same time, examples can be observed in which local musical traditions are preserved while being creatively combined with innovative elements. For instance, within the Gadabay ashugh tradition, the use of the garmon alongside the saz represents a noteworthy example of such synthesis. The accompaniment of the garmon enriches saz music with additional melodic and rhythmic dimensions, thereby enhancing the expressive power and artistic impact of performance. Such practices contribute not only to the preservation of regional characteristics within the ashugh tradition but also to maintaining its relevance within contemporary musical environments.

The integration of electronic musical elements and diverse instrumental resources into ashugh performance practices demonstrates the dynamic interaction between tradition and innovation. This process contributes both to the preservation of national cultural heritage and to the emergence of new forms of artistic expression that enable ashugh art to adapt to the realities of an increasingly globalized world.

Furthermore, technological integration should be viewed not merely as a process of modernization but also as a strategy for cultural sustainability. Digital technologies facilitate the documentation, archiving, and transmission of ashugh performances, ensuring their accessibility for future generations. In this respect, technology serves as an important instrument for safeguarding intangible cultural heritage while simultaneously creating new opportunities for intercultural dialogue and international cultural exchange.

Multimedia Applications. The application of multimedia tools in ashugh creativity has significantly expanded the possibilities for artistic presentation in the contemporary era. By integrating musical and visual elements, artists are able to create interactive presentations, stage performances, and digital projects that enrich the expressive potential of traditional ashugh art. This approach enables ashugh performance to evolve from a purely auditory experience into an artistic form that is simultaneously heard, observed,

and emotionally experienced through multiple sensory channels.

Through the use of modern technologies, saz performance, vocal expression, lighting effects, video projections, and digital animations can be combined within a single artistic composition. Such multimedia projects attract greater audience attention and enhance the emotional impact of performances. The incorporation of multimedia elements is particularly significant in large-scale concerts, international festivals, and cultural events, where ashugh art can be presented in a more contemporary and aesthetically sophisticated manner.

Interactive presentations also foster a closer relationship between performers and audiences. Through live streaming technologies, digital screens, and social media platforms, spectators are able to participate more actively in the performance process. This increased interaction facilitates the adaptation of ashugh art to contemporary communication environments and contributes to growing interest among younger generations.

The implementation of multimedia technologies is equally important for the preservation and promotion of national musical heritage. Through video archives, digital music projects, online databases, and documentary productions, ashugh art can be documented and transmitted to future generations in a more systematic and sustainable manner. Consequently, the use of multimedia tools demonstrates that traditional ashugh art has entered a new stage of development by adapting to the technological opportunities of the modern era. This approach enhances the global visibility of ashugh art and enables it to reach new and diverse audiences.

Furthermore, multimedia applications contribute to the formation of intercultural communication by presenting traditional artistic content through universally accessible visual and digital formats. As a result, ashugh art is increasingly positioned not only as a local cultural phenomenon but also as a component of the global cultural landscape.

Genre Fusion and New Performance Practices. One of the most notable characteristics of contemporary ashugh creativity is the fusion of traditional musical elements with various modern musical genres. Young ashughs increasingly combine classical musical motifs with pop, jazz, electronic music, and world music traditions, creating innovative artistic forms that appeal to contemporary audiences while preserving the essence of the ashugh tradition.

Rhythmic and Melodic Innovations. Traditional *qoshma* melodies are frequently adapted to contemporary rhythmic structures and musical arrangements. Through the incorporation of modern rhythmic patterns and harmonic textures, classical ashugh melodies acquire new expressive dimensions while maintaining their distinctive melodic identity. Such innovations facilitate the accessibility of ashugh music to broader audiences and strengthen its relevance within contemporary musical culture.

Hybrid Performances. Another important trend is the emergence of hybrid performances that combine

ashugh art with instrumental and vocal ensembles. In these performances, traditional saz accompaniment is integrated with a variety of musical instruments and ensemble configurations, resulting in richer musical textures and expanded performance possibilities. Such collaborations promote artistic experimentation and contribute to the diversification of performance practices within the ashugh tradition.

The fusion of genres and the development of new performance methods illustrate the dynamic relationship between continuity and transformation in contemporary ashugh art. While preserving its historical foundations and cultural authenticity, the tradition simultaneously embraces innovative forms of expression that enable it to respond to the aesthetic and cultural demands of an increasingly interconnected world.

Creative Interpretation. Creative interpretation constitutes one of the defining characteristics of contemporary ashugh creativity. During the performance of epic narratives (*dastans*) and *qoshmas*, young ashughs frequently employ improvisation and individual stylistic approaches, thereby enriching traditional forms with personal artistic expression (Bohlman, 2002). The incorporation of improvisational techniques allows performers to maintain the dynamic and living nature of the tradition while adapting their performances to contemporary cultural contexts and audience expectations.

This process contributes both to the preservation of traditional artistic values and to the continued relevance of ashugh art for modern audiences. Through creative interpretation, young ashughs ensure the continuity of cultural heritage while simultaneously fostering innovation within the tradition.

Renewal of Themes and Messages. Another significant aspect of innovative creativity among young ashughs is the renewal of thematic content and artistic messages. Contemporary ashughs increasingly address social, historical, and personal issues in newly composed *qoshmas* and poetic performances. While traditional folkloric motifs, symbols, and imagery continue to be preserved, they are often reinterpreted and adapted to contemporary social and cultural realities. The emergence of new themes reflects current social challenges, the life experiences of younger generations, and the cultural transformations associated with globalization (Ahmadov, 2012). As a result, ashugh art continues to function as a medium through which social concerns, cultural identities, and collective experiences are expressed and communicated. This thematic expansion enhances the relevance of the tradition and enables it to engage with contemporary audiences more effectively.

Outcomes of the Innovative Creativity of Young Ashughs

The innovative creative practices of young ashughs have generated several important outcomes for the development of ashugh art in the contemporary era.

Adaptation of the Art Form to Globalization

Young ashughs increasingly present their musical and poetic works at both national and international levels. Through participation in cultural festivals,

digital media platforms, and transnational artistic collaborations, ashugh art has gained greater visibility within global cultural spaces. This process facilitates intercultural dialogue while strengthening the international recognition of Azerbaijani cultural heritage.

Preservation of Classical Symbols and Traditional Elements

Despite the introduction of innovative approaches, fundamental elements of the ashugh tradition continue to be preserved. Traditional saz performance techniques, poetic forms, and structural characteristics of *qoshmas* remain central components of contemporary ashugh creativity. However, it may be observed that the traditional structure of epic narratives (*dastans*) is not always preserved in its entirety, often undergoing adaptation or modification in response to contemporary performance contexts and audience expectations.

Attraction of New Audiences.

The widespread use of social media platforms and contemporary modes of interpretation has significantly increased the interest of younger audiences in ashugh art. Digital communication technologies provide opportunities for broader public engagement and contribute to the revitalization of the tradition among younger generations. Consequently, ashugh art is no longer confined to traditional performance settings but has become increasingly integrated into modern cultural and media environments.

Application of Modern Technologies. The use of modern technologies occupies an important place within the innovative creativity of young ashughs. The development of digital media tools has created favorable conditions for introducing traditional ashugh art to new audiences and increasing its visibility on a broader scale. Platforms such as YouTube, Instagram, TikTok, and other social media networks enable young performers to present their creativity freely and to share classical examples of *qoshma*, *gerayli*, and *dastan* traditions in digital formats. Through these platforms, ashugh art has begun to attract attention not only within local communities but also among international audiences.

Modern technologies have also influenced the modes of presentation employed in ashugh music. Young ashughs increasingly combine traditional saz performance with electronic musical elements, studio effects, and digital sound technologies, thereby producing innovative interpretations of established artistic forms. This approach facilitates the adaptation of the ancient ashugh tradition to contemporary musical aesthetics while encouraging greater engagement from younger generations.

In addition, professional studio recordings, music videos, live broadcasts, and digital performance formats have expanded the aesthetic and communicative possibilities of ashugh art. These technological innovations allow performers to reach wider audiences and present their artistic works through diverse media channels.

Researchers have emphasized that the application of digital technologies plays a crucial role in the

preservation, documentation, and dissemination of folklore and musical traditions. This process enables traditional art forms to adapt to new modes of communication while maintaining their relevance within contemporary cultural environments (Feld, 2000). Consequently, modern technologies function not only as tools of artistic innovation but also as important mechanisms for safeguarding and transmitting intangible cultural heritage in the twenty-first century.

Genre Fusion and New Performance Practices.

While preserving the fundamental elements of the classical ashugh tradition, young ashughs increasingly integrate these elements with pop, jazz, and world music genres. This tendency contributes both to the sustainability of ashugh art under conditions of globalization and to the growing interest of younger generations in this cultural tradition (Bohlman, 2002). Within this framework, the dynamic relationship between tradition and innovation becomes clearly evident in contemporary ashugh creativity. Young performers maintain the essential characteristics of classical ashugh music while simultaneously developing new performance styles through the synthesis of traditional musical structures with elements drawn from diverse contemporary genres.

The integration of different musical genres into ashugh art creates opportunities for artistic development and renewal. In the context of globalization, the promotion and recognition of national musical heritage within international musical environments have become increasingly important. The adoption of new musical styles by young performers contributes not only to the preservation and continued vitality of ashugh art but also to enhancing its appeal among younger audiences.

At the same time, this process raises important questions concerning the preservation of traditional musical values. While innovative approaches are embraced, the poetic language, saz performance tradition, and national characteristics of ashugh art should remain protected. In this regard, the activities of young ashughs play a crucial role in ensuring the continuity of national cultural heritage and its transmission to future generations within a contemporary cultural framework.

The Introduction of New Themes. Drawing upon traditional motifs and folkloric foundations, young ashughs increasingly compose new *qoshmas* that address contemporary life, social issues, and personal experiences. This approach enables the preservation of classical symbols while simultaneously providing content that resonates with modern audiences (Ahmadov, 2012).

The thematic scope of contemporary ashugh creativity has expanded beyond conventional subjects to include issues such as globalization, migration, social transformation, environmental concerns, national identity, and the everyday experiences of younger generations. Through the incorporation of these themes, ashugh art continues to function as a living cultural practice capable of reflecting the realities and concerns of contemporary society.

Preservation of Classical Symbols

Saz Performance and Traditional Techniques

One of the most important aspects of preserving classical symbols within contemporary ashugh creativity is the maintenance of traditional saz performance techniques. Young ashughs continue to preserve the classical methods of saz playing, while traditional melodic and rhythmic structures remain largely intact. Through the master–apprentice tradition and mentorship practices, experienced ashughs transmit these techniques and performance principles to younger generations, thereby ensuring the continuity of the artistic tradition.

The preservation of solo saz accompaniment remains one of the distinctive features of ashugh performance practice. However, maintaining this tradition presents certain challenges in the contemporary musical environment. As Hasanov notes:

“Naturally, the tradition of accompanying oneself solely with the saz involves specific difficulties and responsibilities. In fact, some of the less favorable social attitudes toward this tradition are related to these challenges. Undoubtedly, in an era when audiences have become accustomed to richly orchestrated ensembles and instrumental groups, it is quite difficult to generate interest in musical performances accompanied only by the saz. Nevertheless, another important reality should be acknowledged. Throughout the history of ashugh art, there have been artists who succeeded in conveying the unique merits, value, and beauty of this tradition to audiences and demonstrated its artistic significance” (Hasanov, 2011, p. 14).

This observation highlights both the challenges and the enduring cultural significance of traditional saz performance. Despite the increasing influence of modern musical forms and technological innovations, the preservation of classical saz techniques continues to serve as a cornerstone of ashugh identity and artistic authenticity. Consequently, the transmission of these performance traditions remains essential for safeguarding the integrity and continuity of Azerbaijani ashugh art.

Preservation of Qoshma and Dastan Traditions.

Traditional *qoshma* and *dastan* forms continue to be preserved, at least partially, within the repertoires of young ashughs. Contemporary creative practices demonstrate respect for classical structures while maintaining the historical, spiritual, and aesthetic values embedded in the folk tradition (Gasimli, 2010). In recent years, a growing interest has emerged among young ashughs in learning and performing classical dastans. Within the framework of the “Let the Dastans Not Be Forgotten” project series conducted by the Azerbaijan National Academy of Sciences, Institute of Folklore, numerous dastans have been transcribed, documented, and published in audio format through the performances of young ashughs.

Epic narratives have been recorded and preserved through the performances of distinguished dastan performers such as Ashugh Nabi Nagiyev, Ashugh Nazim Guliyev, Ashugh Ramin Garayev, Ashugh Elmeddin Mammadli, Ashugh Togrul Ayrumelli, Ashugh Shaiq Injali, Ashugh Tabriz Valiyev, and

others. These initiatives play an important role in safeguarding the continuity of the dastan tradition and ensuring its transmission to future generations.

The preservation of dastan traditions extends beyond the maintenance of narrative structures; it also encompasses the transmission of cultural memory, collective identity, and traditional systems of knowledge. Through their performances, young ashughs contribute to the revitalization of epic traditions within contemporary cultural contexts while maintaining connections to their historical foundations.

Preservation of Symbolic and Poetic Elements.

The distinguished ethnomusicologist, performer, and composer A. J. Racy provides a profound interpretation of musical experience and offers important insights into the impact of music on human societies. His work emphasizes that musical traditions are closely associated with emotional intensity, inspiration, and ecstatic experience. In examining various dimensions of musical practice, Racy highlights fundamental learning processes, sources of artistic inspiration, the role of love poetry as a vehicle of ecstasy, relationships between performers and audiences, and the influence of technological mediation and globalization on musical traditions. Furthermore, he analyzes diverse world music and ecstatic traditions while evaluating the theoretical paradigms that shape ethnomusicological scholarship. In his influential work *Making Music in the Arab World*, Racy also offers extensive discussions of figurative language, symbolism, and metaphorical expression (Racy, 2003).

Contemporary ashughs play a significant role in preserving symbolic and poetic elements during performance. Figurative language, metaphors, symbolic imagery, and folkloric motifs continue to be maintained by young ashughs, thereby contributing to the preservation of national identity and cultural heritage. These poetic devices remain essential components of ashugh expression, enabling performers to communicate complex emotional, philosophical, and cultural meanings through artistic language.

Particularly within the Kazakh ashugh tradition, figurative language and metaphorical expressions are actively employed during the performance of *gingima* compositions. Through such practices, young performers sustain traditional modes of poetic creativity while adapting them to contemporary performance contexts. The continued use of symbolic and metaphorical language demonstrates the resilience of traditional aesthetic principles within modern ashugh creativity.

Conclusion

The activities of young ashughs contribute significantly both to the preservation of ashugh art and

to its enrichment through innovative approaches. While maintaining classical symbols, traditional performance techniques, and established poetic forms, they simultaneously introduce new creative methods and technological innovations that revitalize the tradition for contemporary audiences.

The integration of digital technologies, multimedia applications, genre fusion, and innovative thematic approaches has expanded the expressive possibilities of ashugh art without entirely abandoning its traditional foundations. Through these developments, young ashughs serve as important mediators between cultural continuity and artistic transformation.

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<https://doi.org/10.5281/zenodo.20540904>

CROSS-CULTURAL ASPECTS OF VERBAL COMMUNICATION IN ENGLISH AND AZERBAIJANI

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MIĘDZYKULTUROWE ASPEKTY KOMUNIKACJI WERBALNEJ W JĘZYKU ANGIELSKIM I AZERBEJDŻAŃSKIM

Abstract.

The present study investigates the cross-cultural aspects of verbal communication in English and Azerbaijani within the framework of pragmatics and sociolinguistics. The research analyzes communicative behavior, speech etiquette, and culturally determined linguistic patterns functioning in interpersonal discourse. Special attention is devoted to the comparative examination of communicative strategies and verbal interaction models in both languages.

The study is based on comparative, descriptive, and functional methods of linguistic analysis. The findings reveal that verbal communication is shaped by sociocultural values, national traditions, and pragmatic norms specific to each linguistic community. The research demonstrates that English and Azerbaijani communicative systems differ in the realization of speech acts, forms of address, and interactional strategies, while simultaneously reflecting universal principles of human communication. The article highlights the significance of intercultural competence and pragmatic appropriateness in effective communication processes.

Adnotacja.

Niniejsze badanie analizuje międzykulturowe aspekty komunikacji werbalnej w języku angielskim i azerskim w ramach pragmatyki oraz socjolingwistyki. W pracy omówiono zachowania komunikacyjne, etykietę językową oraz uwarunkowane kulturowo wzorce językowe funkcjonujące w dyskursie interpersonalnym. Szczególną uwagę poświęcono porównawczej analizie strategii komunikacyjnych oraz modeli interakcji werbalnej w obu językach.

Badanie opiera się na metodach porównawczej, opisowej i funkcjonalnej analizy językoznawczej. Wyniki wskazują, że komunikacja werbalna kształtowana jest przez wartości społeczno-kulturowe, tradycje narodowe oraz normy pragmatyczne właściwe dla każdej wspólnoty językowej. Analiza wykazuje, że angielski i azerski system komunikacyjny różni się pod względem realizacji aktów mowy, form adresatywnych oraz strategii interakcyjnych, jednocześnie odzwierciedlając uniwersalne zasady komunikacji międzyludzkiej. Artykuł podkreśla znaczenie kompetencji międzykulturowej oraz pragmatycznej adekwatności w procesach skutecznej komunikacji.

Keywords: *cross-cultural communication, verbal communication, pragmatics, sociolinguistics, communicative strategies, speech etiquette, intercultural competence, discourse, English language, Azerbaijani language*

Słowa kluczowe: *komunikacja międzykulturowa, komunikacja werbalna, pragmatyka, socjolingwistyka, strategie komunikacyjne, etykieta językowa, kompetencja międzykulturowa, dyskurs, język angielski, język azerski.*

Introduction.

In the contemporary era of globalization and intensive intercultural interaction, verbal communication has become one of the central objects of linguistic and sociocultural research. Communication is not limited to the transmission of information; it also reflects cultural identity, social relations, national traditions, and patterns of human behavior. Different linguistic communities develop specific communicative norms and speech strategies that shape interpersonal interaction within particular cultural environments. In this regard, the comparative investigation of verbal communication in different languages represents an important field of modern pragmatics, sociolinguistics, and intercultural communication studies.

English and Azerbaijani belong to different linguistic and cultural systems and demonstrate distinctive communicative models influenced by historical, social,

and cultural factors. English communicative behavior is often characterized by indirectness, individual orientation, and pragmatic flexibility, whereas Azerbaijani verbal interaction reflects collectivist traditions, emotional expressiveness, and respect-oriented speech etiquette. These differences are manifested in forms of address, greeting expressions, requests, apologies, gratitude formulas, and other communicative units functioning in everyday and institutional discourse.

The study of cross-cultural aspects of verbal communication contributes to the understanding of how language functions as a mechanism of cultural representation and interpersonal interaction. The analysis of communicative strategies and culturally conditioned speech behavior allows researchers to identify both universal and language-specific features of communication. Moreover, the increasing importance of interna-

tional relations, academic mobility, and multilingual interaction has intensified the necessity of developing intercultural communicative competence.

The present research aims to examine the linguistic and pragmatic characteristics of verbal communication in English and Azerbaijani through a comparative perspective. The study focuses on speech etiquette, communicative behavior, and culturally specific verbal strategies functioning in both languages. The research is based on comparative, descriptive, functional, and pragmatic methods of linguistic analysis. The findings of the study may contribute to the development of theoretical linguistics, intercultural communication, discourse analysis, and foreign language teaching methodology.

Theoretical and Cross-Cultural Foundations of Verbal Communication

Verbal communication constitutes one of the most essential forms of human interaction and plays a significant role in the formation of social relations, cultural identity, and intercultural understanding. In modern linguistic studies, communication is regarded not merely as a process of exchanging information, but also as a complex sociocultural phenomenon influenced by historical traditions, national mentality, and pragmatic conventions. Researchers emphasize that language reflects the worldview and behavioral norms of a particular society and therefore serves as an important indicator of cultural consciousness (Sapir, 1921). From this perspective, the study of cross-cultural communication allows scholars to investigate the relationship between language, culture, and communicative behavior in different linguistic communities.

The development of globalization, international cooperation, and multilingual interaction has intensified interest in intercultural communication studies. In contemporary society, representatives of different cultures frequently interact in academic, professional, political, and social environments, which increases the importance of understanding culturally specific communicative strategies. According to Hall, communicative patterns are strongly determined by cultural background, social traditions, and collective behavioral models (Hall, 1976). Consequently, speakers belonging to different linguistic communities may interpret communicative acts differently depending on their cultural expectations and pragmatic norms.

English and Azerbaijani verbal communication systems demonstrate both universal and culture-specific features of interpersonal interaction. English communicative behavior is generally characterized by indirectness, communicative tolerance, pragmatic flexibility, and individual orientation. English speakers often prefer indirect speech acts, especially in requests, suggestions, and criticism, in order to minimize communicative pressure and preserve personal autonomy (Brown & Levinson, 1987). Such expressions as “Could you possibly help me?” or “Would you mind closing the door?” demonstrate the tendency toward indirect and mitigated interaction in English discourse. These communicative strategies are associated with the cultural importance of personal space, individual rights,

and communicative neutrality within English-speaking societies.

Azerbaijani verbal communication, in contrast, reflects stronger emotional expressiveness, collectivist orientation, and respect-centered interactional norms. Azerbaijani speech etiquette is deeply connected with national traditions, hospitality culture, and social hierarchy. In Azerbaijani communicative practice, forms of address, greeting expressions, and politeness formulas frequently indicate interpersonal closeness, age differences, and social status. Respect toward elders and guests occupies a central position within Azerbaijani communicative culture, which is reflected in the use of honorific expressions and emotionally marked communicative forms. Researchers note that collectivist societies tend to prioritize interpersonal solidarity and emotional interaction over communicative neutrality (Hofstede, 2001). These observations are also supported by Shahbazlı, who emphasizes that politeness strategies in English and Azerbaijani are shaped by different cultural-pragmatic frameworks and sociolinguistic norms (Shahbazlı, 2024).

Speech etiquette represents another important component of cross-cultural verbal communication. Speech etiquette includes culturally accepted formulas and communicative conventions regulating interpersonal interaction in various communicative situations. Greeting expressions, apologies, gratitude formulas, invitations, compliments, and requests are closely connected with social norms and pragmatic expectations. Crystal states that speech etiquette functions as a mechanism of maintaining social harmony and communicative cooperation within society (Crystal, 2003). In English discourse, etiquette formulas are often concise, standardized, and pragmatically neutral, whereas Azerbaijani speech etiquette demonstrates higher emotionality and cultural symbolism.

The theory of speech acts developed by Austin and further elaborated by Searle explains that utterances perform functional actions in communication rather than serving only informative purposes (Searle, 1969). Requests, promises, apologies, compliments, and invitations function differently across cultures because communicative intentions are realized according to culturally specific pragmatic norms. For example, direct refusals may be considered pragmatically acceptable in some communicative environments but interpreted as impolite or inappropriate in others. English communicative culture often avoids categorical expressions and employs mitigating devices in order to soften communicative impact. Azerbaijani speakers, however, may rely more heavily on contextual understanding, emotional intonation, and culturally shared assumptions during verbal interaction.

An essential aspect of intercultural communication is communicative competence. Hymes introduced the concept of communicative competence to emphasize that effective communication requires not only grammatical knowledge but also sociocultural and pragmatic awareness (Hymes, 1972). Speakers must understand when, where, and how particular linguistic forms should be used in specific communicative con-

texts. The absence of intercultural communicative competence may result in misunderstanding, pragmatic failure, or communicative conflict. Consequently, the study of verbal communication strategies contributes significantly to language teaching methodology and intercultural education.

From a sociolinguistic perspective, communicative behavior is shaped by factors such as age, gender, profession, education, and social status. Different social groups develop distinct communicative norms and interactional styles that reflect collective identity and cultural values. In Azerbaijani society, communicative interaction often demonstrates a higher level of emotional involvement and solidarity-oriented behavior, while English-speaking societies may prioritize individual independence and communicative restraint. Such differences become especially visible in institutional communication, academic discourse, and everyday interpersonal interaction.

Discourse analysis also provides valuable insights into the structure and organization of verbal communication. Discourse is interpreted as language functioning within social and cultural context rather than isolated linguistic units. Fairclough argues that discourse reflects ideological structures and power relations existing within society (Fairclough, 1995). Therefore, communicative strategies used in English and Azerbaijani discourse may reveal cultural attitudes toward authority, social distance, and interpersonal relations. Comparative discourse analysis allows researchers to identify culturally marked communicative models and interpret their pragmatic functions within interaction.

The comparative analysis conducted in this study demonstrates that English and Azerbaijani communicative systems possess both universal and culturally specific characteristics. Both languages employ verbal communication as a means of maintaining social relations, expressing emotions, and organizing interpersonal interaction. However, the pragmatic realization of communicative intentions differs considerably depending on cultural context and national communicative traditions. English discourse generally demonstrates greater indirectness and communicative neutrality, whereas Azerbaijani verbal interaction reflects emotional expressiveness, collectivist orientation, and respect-based etiquette norms.

Conclusion.

The conducted research on the cross-cultural aspects of verbal communication in English and Azerbaijani has demonstrated that language functions not only as a means of information exchange but also as an important indicator of cultural identity, social relations, and national mentality. The comparative analysis of communicative behavior in both languages reveals that verbal interaction is deeply influenced by historical traditions, sociocultural norms, pragmatic conventions, and culturally determined models of communication. As a result, communicative strategies used by speakers of English and Azerbaijani reflect different approaches to interpersonal relations, speech etiquette, and social interaction.

The study has shown that English verbal communication is generally characterized by indirectness,

pragmatic flexibility, individual orientation, and a tendency toward maintaining personal space and communicative neutrality. In contrast, Azerbaijani communicative behavior demonstrates stronger emotional expressiveness, collectivist orientation, hospitality-based interaction, and respect-centered speech etiquette. These features are manifested in greeting expressions, forms of address, requests, apologies, gratitude formulas, conversational patterns, and other speech acts functioning in both formal and informal discourse.

The findings of the research also confirm that communicative behavior cannot be interpreted exclusively from a linguistic perspective, since language and culture exist in a close and inseparable relationship. Verbal communication reflects the worldview, moral values, social hierarchy, and behavioral norms of a particular linguistic community. Therefore, the successful interpretation of communicative acts requires an understanding of both linguistic structures and cultural context. The comparative examination of English and Azerbaijani communicative systems has allowed the identification of both universal and culture-specific characteristics of interpersonal interaction.

Furthermore, the study emphasizes the significance of intercultural communicative competence in the modern globalized world. In multilingual and multicultural environments, effective communication depends on the ability to recognize pragmatic distinctions, culturally marked expressions, and communicative expectations of different language communities. The lack of such competence may lead to misunderstanding, communicative failure, or pragmatic inadequacy during intercultural interaction.

In conclusion, the present research contributes to the development of comparative linguistics, pragmatics, sociolinguistics, discourse analysis, and intercultural communication studies. The results obtained in the article may be applied in foreign language teaching, translation studies, intercultural communication training, and further theoretical investigations related to communicative behavior and cultural linguistics. The research also creates a foundation for future studies devoted to the analysis of communication strategies in different linguistic and cultural contexts.

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COHERENCE AND LEGISLATIVE TEXTS

Abstract

The article deals with the concept of coherence. It writes about concept as a very multifaceted and complex phenomenon in modern philosophical and logical discussions. It is highlighted in the article that the correct application of this concept, especially in legal discourses and legislative texts, is one of the main factors determining the effectiveness of normative consistency and legal reasoning. Coherence is reported not to be limited only to linguistics and text structure, but is also associated with ensuring the meaning and logical connection between normative elements in the article.

Besides, the article states that the concept of coherence plays an important role in the analysis of legal texts and their correct interpretation. It is observed that in order to determine whether coherence exists, it is necessary to pay attention not only to the internal structure of the text, but also to its contextual framework. The constraint satisfaction model that was proposed by P. Thagard has been touched upon in the article too. It underlines that according to P. Thagard, coherence is formed by meeting a number of positive and negative constraints. Positive constraints reflect compatible relationships between elements, and negative constraints reflect contradictory relationships.

The article also analyzes the problem of coherence as the distribution of this set of elements in such a way that the maximum consistency between the accepted and rejected parts is achieved. It is reported in the article that if there is a positive relationship between two elements, they should either be accepted together or rejected together. If there is a negative relationship, only one can be accepted - the other must be rejected. This mechanism can be used as the main method for ensuring the logical integrity and expediency of the structure of legislative texts.

Key words: *legislation, legal discourse, coherence, text, structural-semantic, intelligible*

The statement of the problem.

The authors dealing with the problems of coherence of legislative texts reveal to comprehensively investigate coherence in the given texts.

Analysis of recent research and publications.

The parameters of legal discourse, its sphere of activity, subject and leading motive, communicative focus, i.e. regulation of social relations, and performativity have been studied by a number of linguists. Among the linguists are T.A. van Dijk, M.A.K. Halliday and R.Hasan, Z.Haris, E.Benvenist, N.E.Enkvist, V.V. Karasik, V.I. Prokhorov, V.B. Kashkin, Y.S.Stepanov, I.V.Palashkevskaya, A.V.Bogatyeyev, P.Tiersma, I.A.Borisova, R.Sagard, P.Gudrich, A.V.Chernyshev, I.E. Popova, O.A. Krapivkina, V.M.Boguslavski, I.S.Volskaya, A.A.Teleshev, K.M.Morin, A.Mammadov, F.Y.Veysalli, F.F. Jahangirov and others have sufficiently studied the topics of discourse, legal discourse, its means of expression, legislative texts, their structure, etc., and we have referred to their works and benefited from them studying the coherence of US legislative texts.

Task statement. The purpose of the article is to analyze the coherence of legislative texts.

Outline of the main material of the study.

The research proves that legislative texts have a number of functions. The most important of them is the realization of argumentation in legal texts. The role of

grammatical cohesion and coherence in the realization of argumentation in legislative texts is undeniable. Since legislative texts require accuracy, cohesion and coherence in properly organized legislative texts serve to ensure the credibility of legal justifications, the reliability and professionalism of the text, as well as to accurately prove and present claims with evidence. All this leads to the need to study the structural-semantic features of legislative texts within the framework of the modern paradigm of language description, using appropriate research methods. In our opinion, this proves the relevance of the topic.

Introduction

It should be noted that coherence is not only structural, but also contextual. Coherence is formed not only within the text, but also in the social, legal and historical context of that text. This feature is especially emphasized by Margolis: "Context is the main clue. If we are faced with a pattern of thought or behavior whose coherence is not clear, we look for the appropriate context to reveal the goals and intentions behind these elements". Margolis's opinion shows that when interpreting and applying legislative texts, the conditions in which the text was created, legal traditions, social relations and normative expectations should also be taken into account. This approach is especially important in US legislation, since the constitution and federal laws are based on multi-level and complex systems. In such a context, coherence is determined not only by logical

consistency, but also by the compatibility and connection of legal acts with other normative documents [1, p. 147].

Coherence is also part of logical reasoning. When interpreting legislative texts, legal actors – judges, lawyers and jurists – use coherence arguments to show why certain decisions are more reasonable than other alternatives. In this case, both normative coherence and purposive consequences are considered in context [2, pp. 534-537].

MAIN PART

DISCUSSIONS ABOUT THE PROBLEM

Among the various theoretical approaches to coherence, the theory of constraint satisfaction put forward by P. Sagard deserves special attention. According to P. Sagard, the coherence of a certain set of elements is measured by the degree to which the positive and negative constraints existing between these elements are satisfied. Here, "positive constraints" express mutual compatibility and support relationships between elements, while "negative constraints" indicate mutual contradiction and incompatibility [15, p. 17].

According to P. Thagard, the coherence problem is that the set of elements should be divided into two parts - accepted and rejected, in such a way that as a result of this division as many restrictions (positive or negative) as possible are provided. Thus, if there is a positive relationship between two elements, then for this relationship to be coherent, either both should be accepted or both should be rejected. If there is a negative relationship between these two elements, then only one of them should be accepted, and the other should be rejected [15, p. 43].

Politics can be broadly defined as "the whole complex of interactions between people living in society". However, more specifically, it is also expressed as "the art or science of government" or "the struggle of various interest groups or individuals for power and leadership" [17]. These aspects of meaning reflect two main areas of social life: on the one hand, the struggle between those who want to establish the dominance of power and those who oppose it, and on the other hand, the joint efforts of people and institutions in society to resolve conflicts of interest [3, p. 3]. Therefore, the study of political discourse reflects its multifaceted nature and covers a wide range of topics, approaching it with different analytical approaches.

Two main trends in political discourse analysis [16, p. 398] notes: the first is that political discourse itself is political, that is, that researchers are political actors by supporting or condemning ideologies (this approach is applied, for example, by researchers within the framework of critical discourse analysis; the second is to analyze political discourse simply as a type of discourse [16, pp. 398]. This study adopts the second approach and emphasizes objective analysis in the study of political discourse.

The study of political discourse also involves the interaction between language and ideology. Language is a tool that politicians use to establish power relations and to force others to accept their ideological representations. However, understanding political discourse re-

quires the analysis of various social, psychological, cultural, ideological and linguistic factors, since political actors use language to demonstrate their ideological positions. They express meanings through.

The ideological dimension of the language of political discourse is covered by critical linguistics and critical discourse analysis, which examine how language shapes social practices and how these practices maintain power relations [7, p. 19]. For example, how can language ideology be used to maintain and change power relations in social systems? In response to this question, [8, p. 5] suggest that language be considered an ideology: "Language is a system of categories and rules based on fundamental assumptions about the world."

Language choices and pragmatic influence are among the strategies that politicians use to assert their positions and to construct certain images and meanings. For example, P. Chilton and K. Schaffner [4, pp. 211] identify three main strategic functions of language: (1) coercion, (2) (de)legitimization, and (3) (de)representation. Through these strategies, politicians can strengthen their positions and construct images that support them.

These approaches are particularly relevant in the context of US legislation. Legislative processes in the US raise numerous issues related to the manipulation of political discourse and ideological representation. For example, in legislative debates, politicians seek to increase their political power by directing the discourse and aligning the audience with their ideological frameworks, rather than simply expressing their positions. The strategic use of language, the legitimization of discourse, and the representation of power are important factors in these processes.

In this context, the presentation and interpretation of actions and decisions in US law serve to preserve ideological principles and social roles. Also, any discussion or legislative decision does not end with its impact on the local audience; it can also be understood in a deeper sense in the wider community, when compared with previous speeches and when linked to the speeches of opponents. Coherence (consistency and internal consistency) acts as an important principle in legal thinking and in the justification of judicial decisions. Coherence contributes to the justification of legal decisions not only from a logical perspective, but also from a social, ethical, and epistemological perspective. For this reason, the following questions are of central importance in legal theory: Why is coherence considered valuable in the context of law? Why should coherence play a key role in the justification of judicial decisions?

These types of questions are called second-order questions, that is, they examine the arguments that can be presented for the application of coherence as a standard of legal reasoning. There are several main reasons for pursuing coherence in legal decision-making. These reasons can be broadly divided into three categories: epistemic reasons, practical reasons, and constitutive reasons [9, p. 56].

Epistemic reasons

The first and most important argument for the justification of coherence is put forward at the epistemological level. The correctness of a legal decision is often determined by the extent to which it is consistent with previous decisions and legal principles. If a decision is consistent with previous legal precedents and normative rules, this strengthens the conclusion that this decision is “closer to the truth” [5, p. 243]. Thus, coherence serves the systematic construction of legal knowledge and the stability of legal knowledge. The “constraint satisfaction” model proposed by P. Sagard also shows that an idea or decision is considered more reasonable and acceptable if it is logically and morally consistent with other elements [15, p. 125].

Practical reasons

The second group of reasons is of a practical nature. The application of the legal system is measured not only by theoretical consistency, but also by practical effectiveness. If there is inconsistency and contradiction between court decisions, this negatively affects legal stability and citizens' confidence in the law. Coherent legal decisions, on the other hand, create in citizens the impression that the legal system is fair and reliable. In addition, coherence allows lawyers and judges to demonstrate more structured and predictable approaches in the decision-making process [13, p. 74].

Constitutive reasons

The third group of reasons is constitutive, that is, related to the essence of law itself. Legal systems are not just a set of rules, but also integral structures formed on the basis of certain values and principles. Coherence serves to preserve this structure and maintain the internal logic of the system. In other words, the perception of the legal system as a coherent system in itself requires the preservation of this coherence in its legal decisions. In this regard, R. Dworkin, in his approach to “viewing law as a principle”, evaluates coherence as a central element of law [5, p. 143].

Coherence is not only an element of legal logic, but also one of the main guarantors of legal legitimacy, fairness and stability of the system. Coherent legal reasoning facilitates the adoption of decisions both at the intellectual and public levels and strengthens the normative force of law.

The coherence of the legal system is assessed as one of the main features of US legislative texts at the structural and content levels. Coherence here is not limited to ensuring normative consistency, but also serves to systematically and logically link legal concepts with each other. Thus, coherence is assessed as an “ideal feature” of law: “A fundamental but not absolute value in every legal system” [1, p. 369], and it occupies a central place in legal conceptual approaches in this field.

Within the coherence model, legal norms and terminological structures in US law reflect logically integrated conceptual relationships. These relationships play an important role in shaping the relationships between the main legal categories - liability, tort, contract, fairness, etc. Coherence ensures that the legal system as a whole makes sense and is intelligible - this is one of the main functional requirements of law [2, p. 179].

In the US legal system, coherence is also closely related to the concept of legitimacy. A high level of internal consistency of normative texts and laws gives the legal system a higher moral and public trust. Thus, a coherent legal system is considered to have greater moral authority than incoherent systems.

The application of coherence in US legislative texts contributes to the realization of legal values, including legal certainty. Legal certainty – the stability, predictability and transparency of law – is strengthened by easier memorization, application and compliance with legal norms in a coherent legal system.

At the level of conceptual relations, coherence acts as a guarantor of legal equality. This means that the same legal approach can be taken to similar legal situations only if the rules are applied consistently and systematically. At the same time, coherence creates the basis for legal processes and decisions to be more flexible and result-oriented by increasing the effectiveness and efficiency of law [14, p. 106]. However, in US legal literature, there are also cases where approaches aimed at coherence are met with critical views. In some cases, an excessive commitment to coherence can prevent progressive normative changes that respond to new legal needs. This can result in a conservative framework that may be at odds with the dynamism of the law.

Although the concept of coherence is of great importance in legal theory, there are also a number of valid criticisms directed against this concept. The initial point of criticism is that whether a legal system is coherent or not does not provide any information about the correctness or moral validity of the underlying principle or legal rationale. In other words, the coherence of a legal system does not mean that it is a “good” or “just” system. The second criticism is that there are no objectives and generally accepted criteria for determining the level of coherence of legal systems compared to each other. The concept of coherence is considered to be a property that varies in degrees, and therefore there are no normative rules that prove that one legal system is more coherent than another. At the same time, focusing only on coherence may be ineffective if there is no common agreement within society on the solution of legal problems or situations. In such cases, coherence may narrow legal discussions and ignore diverse perspectives. In addition, it is noted that a coherent legal system may have a number of additional negative consequences. For example, the desire to achieve complete coherence in the legal system may reduce the flexibility and adequacy of the system, as well as create obstacles to experimentation and innovation in the creation and development of law. It is noted that additional positive aspects, such as legal certainty, may exist not only in fully coherent systems, but also in partially or incoherent legal systems. At the same time, measures such as simplification of legislation to achieve coherence should not be implemented at the expense of the quality of legal acts and the realization of the main goals of the legal system.

Another criticism of coherence, which is of a general and methodological nature, is related to its terminological ambiguity. Although various legal theorists have tried to define coherence, it is emphasized that this

concept still remains “difficult to explain and vague”. According to Pethick, the ambiguity of the concept of coherence stems from the incorrect methodological approach to explaining its conceptual essence. Thus, the properties of objects considered coherent, such as a legal system – for example, intelligibility – are sometimes misinterpreted as properties of coherence itself.

According to A. S. Pigolkin’s approach, coherence simply means “staying together” or “standing together”. However, the numerous explanations presented in the literature are actually manifestations of coherence only in certain cases and do not fully express the general concept of coherence in legal theory [12, p. 27].

This methodologically incorrect approach can also be applied to categories of types of coherence (for example, normative coherence). These types actually only explain how different objects – for example, normative, principled or structural-level concepts – are coherent, but do not determine the general nature of coherence. In the context of these criticisms, it should be emphasized that although coherence in US legislative texts acts as one of the main structural principles both within legal texts and in their intersystemic relations, this approach should not be one-sidedly idealized. Although the coherent presentation of legal concepts creates normative stability and legal certainty, it can also slow down the development of law, prevent flexible legal regulation and complicate the adaptation of law to social realities.

Thus, in the framework of the dissertation, these critical approaches should also be taken into account when studying legal concepts and conceptual relationships in the coherence model, and along with the functional possibilities of coherence, its theoretical and practical limitations should also be analyzed. Coherence has a deeper meaning not only as internal consistency and compatibility, but also in terms of the integrity of the legal system and its compliance with normative principles. The practical definition of coherence is presented as follows, based on certain specific and verifiable criteria:

Legal norms should not contradict each other, that is, there should be internal consistency and coherence within the system;

Legal norms should be based on the same principle(s) or reasoning logic;

Legal norms should serve to implement those principles or logic. According to this model, normative coherence alone is not enough for a legal system to be considered coherent; at the same time, it is also important that legal norms work towards common goals and principles. In studies based on this definition, the concept of “full coherence” is also encountered, which implies the full fulfillment of all the mentioned criteria. However, the question of whether full coherence at this level is both possible and desirable is a subject of criticism.

In European Union law (and in the context of this model, parallel approaches can be found in US law) the concepts of both “consistency” and “coherence” are encountered. For example, Article 7 of the Treaty on Eu-

ropean Union mentions the need to ensure the consistency of policies and activities [10, p. 5]. However, neither the EU Treaties nor the US legislative texts make a clear distinction between these two concepts and their explanation is not given clearly.

In the context of the European Union’s Better Regulation policy, coherence is defined as “the assessment of how different activities work together, to what extent they are compatible or conflicting with each other”. This definition includes both approaches that create synergies and serve common goals, as well as situations that may lead to conflicts of objectives. This approach shows that coherence is not only related to internal structure, but also to legal objectives and principles.

CONCLUSION

Based on these definitions, in the context of the research work, in accordance with the coherence model in US law, it can be concluded that the conceptual stability of a legal system is closely related not only to the content of the norms, but also to the legal principles underlying them - for example, concepts such as constitutional values, legal equality, legal certainty. The coherence and interrelationship of legal concepts - for example, freedom and security, individual rights and the public good - should be assessed within the framework of coherence.

Legislation or legal discourse is a form of written communication represented by texts of the legal environment and various speech genres. Legal discourse is considered to be the main communicative unit of communication between representatives of the legal community.

In English, argumentation in legislative texts is realized through grammatical cohesive means.

Structural-semantic features of US legislative texts, their composition, structure, argumentation in legislative texts is realized through a number of grammatical means.

The issue of coherence in legislative texts is a very important issue and special attention should be paid to it when compiling texts of this type.

Coherence ensures that the legal system as a whole makes sense and is intelligible, which is one of the main functional requirements of law.

The role of grammatical cohesion in the implementation of argumentation in English legislative texts is decisive, since it supports the logical structure, clarity and persuasive force necessary for legal communication.

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Azerbaijan Republic, Baku<https://doi.org/10.5281/zenodo.20540940>**LANGUAGE, CULTURE, AND COMMUNICATION: A COMPARATIVE STUDY OF ENGLISH AND AZERBAIJANI****Sahila Mahili**Katedra Języków
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Republika Azerbejdżanu, Baku**JĘZYK, KULTURA I KOMUNIKACJA: STUDIUM PORÓWNAWCZE JĘZYKA ANGIELSKIEGO I AZERSKIEGO****Abstract.**

The present study examines the interrelationship between language, culture, and communication in English and Azerbaijani from comparative linguistic and sociocultural perspectives. Language is regarded not only as a system of communication but also as a reflection of cultural identity, national mentality, and social interaction. The research focuses on the analysis of communicative behavior, speech etiquette, and culturally specific linguistic patterns functioning in English and Azerbaijani discourse. Particular attention is devoted to the role of sociocultural norms and pragmatic conventions in shaping verbal communication strategies within different linguistic communities.

The study is based on comparative, descriptive, functional, and pragmatic methods of linguistic analysis. The research investigates communicative units such as greetings, requests, apologies, gratitude expressions, and forms of address that demonstrate both universal and culture-specific characteristics of interpersonal interaction. The findings reveal that English communicative behavior is generally characterized by indirectness, pragmatic flexibility, and individual orientation, whereas Azerbaijani verbal communication reflects emotional expressiveness, collectivist tendencies, and respect-oriented interactional norms.

The article emphasizes that successful intercultural communication requires not only linguistic competence but also an understanding of cultural and pragmatic distinctions between languages. The results of the research contribute to comparative linguistics, sociolinguistics, intercultural communication studies, discourse analysis, and foreign language teaching methodology.

Adnotacja.

Niniejsze badanie analizuje wzajemne relacje między językiem, kulturą i komunikacją w języku angielskim oraz azerskim z perspektywy językoznawstwa porównawczego i socjokulturowego. Język jest postrzegany nie tylko jako system komunikacji, lecz także jako odzwierciedlenie tożsamości kulturowej, mentalności narodowej oraz interakcji społecznych. Badanie koncentruje się na analizie zachowań komunikacyjnych, etykiety językowej oraz kulturowo uwarunkowanych wzorców językowych funkcjonujących w dyskursie angielskim i azerskim. Szczególną uwagę poświęcono roli norm socjokulturowych i konwencji pragmatycznych w kształtowaniu strategii komunikacji werbalnej w różnych wspólnotach językowych.

Badanie opiera się na metodach porównawczej, opisowej, funkcjonalnej oraz pragmatycznej analizy językoznawczej. Analizie poddano jednostki komunikacyjne, takie jak powitania, prośby, przeprosiny, wyrażenia wdzięczności oraz formy adresatywne, które ukazują zarówno uniwersalne, jak i kulturowo specyficzne cechy interakcji międzyludzkich. Wyniki badań wskazują, że angielski model komunikacji charakteryzuje się zazwyczaj pośredniością, pragmatyczną elastycznością i orientacją indywidualistyczną, podczas gdy azerska komunikacja werbalna odzwierciedla ekspresyjność emocjonalną, tendencje kolektywistyczne oraz normy interakcyjne oparte na szacunku.

Artykuł podkreśla, że skuteczna komunikacja międzykulturowa wymaga nie tylko kompetencji językowych, ale również zrozumienia kulturowych i pragmatycznych różnic między językami. Wyniki badań stanowią wkład w rozwój językoznawstwa porównawczego, socjolingwistyki, badań nad komunikacją międzykulturową, analizy dyskursu oraz metodyki nauczania języków obcych.

Keywords: language and culture, verbal communication, cross-cultural communication, pragmatics, sociolinguistics, communicative behavior, discourse analysis, intercultural competence, English language, Azerbaijani language

Słowa kluczowe: język i kultura, komunikacja werbalna, komunikacja międzykulturowa, pragmatyka, socjolingwistyka, zachowania komunikacyjne, analiza dyskursu, kompetencja międzykulturowa, język angielski, język azerski.

Introduction.

In contemporary linguistic scholarship, the correlation between language, culture, and communication occupies a central position within the fields of sociolinguistics, pragmatics, discourse analysis, and intercultural communication studies. Language is not merely a structural system of grammatical and lexical units; it also functions as a cultural and cognitive phenomenon reflecting the historical development, social values, national mentality, and communicative behavior of a particular linguistic community. Consequently, communication represents a multidimensional process through which cultural experience, social norms, and collective knowledge are transmitted and interpreted within society.

The intensification of globalization and intercultural interaction has significantly increased scholarly interest in comparative studies devoted to communicative behavior and culturally conditioned linguistic patterns. In multilingual and multicultural environments, successful communication depends not only on linguistic competence but also on the understanding of pragmatic conventions, sociocultural norms, and communicative expectations characteristic of different language communities. Therefore, the investigation of verbal communication from a cross-cultural perspective contributes to the identification of both universal and culture-specific mechanisms of interpersonal interaction.

English and Azerbaijani belong to different linguistic families and cultural traditions, which results in distinctive communicative systems and speech behavior models. English communicative culture is commonly associated with indirectness, pragmatic flexibility, communicative neutrality, and individual-oriented interaction. Azerbaijani verbal communication, by contrast, demonstrates stronger emotional expressiveness, collectivist orientation, hospitality-based interaction, and respect-centered speech etiquette. These distinctions are manifested in greeting formulas, forms of address, requests, apologies, gratitude expressions, and other communicative units functioning in interpersonal and institutional discourse.

The interrelation between language and culture has been emphasized by numerous scholars who argue that language reflects collective worldview and culturally specific patterns of social interaction. From this perspective, verbal communication should be interpreted within its sociocultural context rather than as an isolated linguistic phenomenon. Comparative analysis of communicative behavior enables researchers to examine how cultural values and pragmatic norms influence the realization of communicative intentions in different linguistic environments.

The present study aims to investigate the relationship between language, culture, and communication in English and Azerbaijani through comparative linguistic and sociocultural analysis. The research focuses on communicative behavior, speech etiquette, and culturally marked verbal strategies functioning in both languages. The methodological framework of the study is based on comparative, descriptive, functional, and pragmatic approaches to linguistic analysis. The findings of the research may contribute to the development

of comparative linguistics, sociolinguistics, pragmatics, intercultural communication studies, discourse analysis, and foreign language teaching methodology.

Comparative Analysis of Language, Culture, and Communication in English and Azerbaijani

Language and culture represent inseparable components of human communication and social interaction. In contemporary linguistics, language is interpreted not only as a system of grammatical and lexical structures but also as a cultural mechanism reflecting national identity, historical traditions, social values, and collective worldview. Communication functions as the principal means through which cultural knowledge and social experience are transmitted within society. According to Sapir, language and culture exist in a relationship of mutual influence, since linguistic structures reflect patterns of thought and behavioral norms characteristic of a particular community (Sapir, 1921). Consequently, verbal communication should be examined not only from a linguistic perspective but also within its sociocultural and pragmatic context.

The rapid development of globalization and international interaction has intensified scholarly interest in intercultural communication studies. In multilingual and multicultural environments, communication between representatives of different linguistic communities requires both linguistic competence and sociocultural awareness. Hall emphasizes that communicative behavior is strongly influenced by cultural background, social conventions, and collective behavioral models (Hall, 1976). Therefore, speakers belonging to different cultures may interpret identical communicative acts differently depending on their cultural expectations and pragmatic norms. Such distinctions frequently become a source of communicative misunderstanding during intercultural interaction.

English and Azerbaijani belong to different linguistic families and cultural traditions and therefore demonstrate distinctive communicative systems. English communicative culture is generally characterized by indirectness, communicative neutrality, pragmatic flexibility, and individual-oriented interaction. Brown and Levinson argue that English speakers frequently employ indirect speech acts and mitigating expressions in order to preserve interpersonal balance and minimize communicative pressure (Brown & Levinson, 1987). Requests such as "Could you help me?" or "Would you mind opening the window?" illustrate the tendency toward indirect and pragmatically softened communication in English discourse. Such communicative strategies are closely connected with the cultural importance of personal autonomy and individual rights within English-speaking societies.

Azerbaijani communicative behavior, by contrast, reflects stronger emotional expressiveness, collectivist orientation, hospitality traditions, and respect-centered speech etiquette. In Azerbaijani discourse, forms of address, greeting expressions, and communicative formulas frequently indicate social hierarchy, age differences, and interpersonal solidarity. Respect toward elders and guests occupies a central position within Azerbaijani communicative culture and significantly influences

verbal interaction. Similar conclusions are presented in the research conducted by Shahbazlı, who states that communicative politeness strategies in English and Azerbaijani are realized through different sociolinguistic and cultural mechanisms shaped by national communicative traditions (Shahbazlı, 2024).

Speech etiquette represents one of the most significant aspects of verbal communication and includes culturally accepted communicative formulas functioning in different social situations. Greeting expressions, apologies, gratitude formulas, invitations, compliments, and requests are shaped by sociocultural norms and pragmatic expectations. Crystal notes that speech etiquette functions as a mechanism for maintaining communicative harmony and regulating social relations within society (Crystal, 2003). In English communicative culture, etiquette formulas are often concise, neutral, and standardized, whereas Azerbaijani speech etiquette demonstrates stronger emotionality and symbolic cultural meaning. The use of honorific expressions and respectful forms of address occupies an important position within Azerbaijani communicative interaction.

The theory of speech acts developed by Austin and Searle explains that utterances perform functional and social actions in communication rather than serving exclusively informative purposes (Searle, 1969). Requests, apologies, promises, compliments, and refusals may differ considerably across cultures because communicative intentions are realized according to culturally specific pragmatic conventions. English speakers frequently employ indirect structures and mitigating devices to soften communicative impact and preserve interpersonal politeness. Azerbaijani speakers, however, tend to rely more heavily on contextual understanding, emotional intonation, and culturally shared assumptions during communication. These distinctions demonstrate the close relationship between language, culture, and communicative behavior.

An important aspect of intercultural communication is communicative competence. Hymes introduced this concept in order to emphasize that successful communication requires not only grammatical knowledge but also sociocultural and pragmatic awareness (Hymes, 1972). Speakers must understand when, where, and how particular linguistic forms should be used within specific communicative contexts. The absence of intercultural communicative competence may result in pragmatic failure, misunderstanding, or communicative conflict. Consequently, the study of language and culture plays a significant role in foreign language teaching methodology and intercultural communication training.

From a sociolinguistic perspective, communicative behavior is influenced by factors such as age, profession, gender, education, and social status. Different societies develop distinctive communicative norms and interactional styles reflecting collective identity and social organization. Hofstede argues that collectivist societies prioritize interpersonal solidarity and group-oriented interaction, whereas individualistic cultures emphasize communicative independence and personal autonomy (Hofstede, 2001). These distinctions become

particularly evident in the comparative analysis of English and Azerbaijani communicative systems. Azerbaijani communicative interaction demonstrates stronger emotional involvement and solidarity-oriented behavior, while English discourse tends to prioritize communicative restraint and interpersonal distance.

Discourse analysis also contributes to the understanding of verbal communication within sociocultural context. Fairclough emphasizes that discourse reflects ideological structures and power relations existing within society (Fairclough, 1995). Consequently, communicative strategies functioning in English and Azerbaijani discourse reveal different cultural attitudes toward authority, politeness, interpersonal relations, and social hierarchy. Comparative discourse analysis enables researchers to identify culturally marked communicative models and explain their pragmatic functions within interpersonal interaction.

The analysis conducted in the present study demonstrates that language, culture, and communication form an integrated system in which linguistic structures and communicative behavior are shaped by sociocultural values and pragmatic norms. Although English and Azerbaijani communicative systems share universal communicative functions, their interactional models and pragmatic realizations differ considerably according to cultural traditions and national mentality. Therefore, successful intercultural communication requires both linguistic competence and deep understanding of cultural and pragmatic distinctions between different linguistic communities.

Conclusion

The present study has demonstrated that language, culture, and communication constitute inseparable and mutually dependent components of human interaction. The comparative analysis of English and Azerbaijani verbal communication confirms that communicative behavior is shaped not only by linguistic structures but also by sociocultural values, historical traditions, pragmatic conventions, and national mentality. Consequently, language functions as a reflection of collective cultural consciousness and serves as a mechanism for the transmission of social norms and interpersonal relations within a particular linguistic community.

The research findings reveal that English communicative culture is generally characterized by indirectness, pragmatic flexibility, individual orientation, and communicative neutrality, whereas Azerbaijani verbal communication demonstrates stronger emotional expressiveness, collectivist tendencies, hospitality-based interaction, and respect-centered speech etiquette. These distinctions become evident in forms of address, greeting formulas, requests, apologies, gratitude expressions, and other speech acts functioning in both formal and informal discourse. At the same time, the study confirms the existence of universal communicative principles shared by both linguistic systems despite their structural and cultural differences.

The investigation further indicates that successful intercultural communication requires not only linguistic competence but also sociocultural and pragmatic

awareness. Misinterpretation of culturally marked communicative units may result in pragmatic failure, misunderstanding, or communicative conflict during intercultural interaction. Therefore, the development of intercultural communicative competence represents an essential component of modern language education and international communication.

From a theoretical perspective, the study contributes to the fields of comparative linguistics, sociolinguistics, pragmatics, discourse analysis, and intercultural communication studies. The comparative examination of English and Azerbaijani communicative systems provides a deeper understanding of culturally conditioned speech behavior and communicative strategies functioning within different linguistic communities. Furthermore, the results of the research may be applied in foreign language teaching methodology, translation studies, intercultural communication training, and further investigations devoted to language and culture in multilingual and multicultural contexts.

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ECONOMIC SCIENCES

УДК 347.232

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ДОГОВОР СОЦИАЛЬНОГО НАЙМА И ПРИВАТИЗАЦИЯ: ВОПРОСЫ ТЕОРИИ И ПРАКТИКИ

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SOCIAL EMPLOYMENT CONTRACT AND PRIVATIZATION: THEORY AND PRACTICE

Аннотация:

В статье рассматриваются исторические аспекты развития реализации конституционного права человека на жилье в виде предоставления жилья от государства в России, анализируется правовое регулирование договора социального найма и приватизации, исследуются проблемы и перспективы развития данной формы договора. Автором рассматривается сущность договора социального найма как способа приобретения имущества в собственность в России. Приводится оценка особенностей функционирования договоров социального найма и дальнейшей приватизации как отдельного института права. На основе изучения судебной практики и анализа российского законодательства делаются выводы о необходимости совершенствования правовой базы для эффективного развития института приватизации и предлагаются конкретные меры по оптимизации заключения договоров соцнайма.

Abstract:

The article examines the historical aspects of the development of the realization of the constitutional human right to housing in the form of housing from the state in Russia, analyzes the legal regulation of the contract of social hiring and privatization, examines the problems and prospects for the development of this form of contract. The author examines the essence of the social employment contract as a way of acquiring property in Russia. An assessment of the features of the functioning of social employment contracts and further privatization as a separate institution of law is given. Based on the study of judicial practice and analysis of Russian legislation, conclusions are drawn about the need to improve the legal framework for the effective development of the institution of privatization and specific measures are proposed to optimize the conclusion of social loan agreements.

Ключевые слова: договор социального найма, приватизация, жилищное право, закон**Keywords:** social employment contract, privatization, housing law, law.

В рамках рассматриваемой тематики, обратим внимание на то, что жилищные условия представляют собой одно из ключевых материальных оснований жизни человека. Так, согласно статье 40 Конституции Российской Федерации каждый человек, будь то гражданин или лицо, не имеющее гражданства, имеет право на жилище, и никто не может быть произвольно его лишен. Реализация данного конституционного права стала возможной благодаря введению в действие Жилищного кодекса Российской Федерации в 2005 году, где статья 49 определяет, что государство предоставляет гражданам жилые помещения на основании договора социального найма. Это означает, что нуждающиеся в жилье граждане, а также при подписании международного договора - иностранцы и лица без гражданства, при подписании соответствующего договора социального найма получают право на бессрочное проживание в предоставляемом государством жилье.

Договор социального найма представляет собой особую разновидность аренды, где арендодателем могут выступать только государственные публично-правовые образования (далее - ППО), такие, как Российская Федерация, ее субъекты или муниципалитеты. Конкретно выбор публично-правового образования, с которым будет заключаться договор соцнайма, зависит от того, из какого жилищного фонда предоставляется жилье (государства, субъекта или муниципалитета). Одним из значительных отличий договора социального найма от иных видов аренды является возможность приватизации, что подразумевает преобразование государственного жилья в частное. Эта возможность предоставляется арендатору с момента подписания договора и, конечно, имеет свои нюансы и ограничения.

Форма государственной помощи в виде предоставления жилья нуждающимся существовала еще до введения договоров социального найма - в СССР граждане получали жилье через специальные ордера, которые удостоверяли их право на прожива-

ние. Говоря об ордере - жилье также предоставлялось из государственной собственности, собственности субъектов и муниципалитетов, но конкретно она могла относиться, например, к заводам, предприятиям, воинским частям и т.п. Данные организации предоставляли ордера для проживания своим работникам по согласованию с местной администрацией. Касательно получателей ордера - ими могли быть все нуждающийся в улучшение жилищных условий граждане - малообеспеченные семьи, рабочие из других регионов, военнослужащие. При получении ордера на семью совершеннолетние ее члены должны были дать согласие на переселение в социальное жилье. В отличие от договора социального найма, ордер не давал возможности дальнейшего получения недвижимости в собственность, возможность приватизации возникла только с 1991 года. С введением договора социального найма в 2005 году система предоставления жилья была упрощена и более четко прописана в законодательных актах. Несмотря на это, в некоторых случаях люди продолжают проживать на основании ордеров, поскольку они по-прежнему имеют законную силу, но чтобы приватизировать жилье в любом случае придется сначала заключить указанный ранее договор.

Обратим внимание на суть договора социального найма, а именно, законодательно договор социального найма регулируется разделом III Жилищного кодекса РФ - регулируется кому какие объекты недвижимости предоставляются, какая должна быть форма договора соцнайма, какие у сторон договора возникают права и обязанности. Также в Гражданском кодексе РФ договору соц. Найма посвящена ст. 672, которая предписывает, что: «к отношениям, возникающим из договора применяются правила статей 674, 675, 678, 680, пунктов 1-3 статьи 685 ГК РФ». Также данные правоотношения регулируются различными нормативными актами Правительства РФ и министерств.

Напомним, что арендаторами по договору социального найма могут быть граждане, признанные нуждающимися в улучшении жилищных условий (с. 52 ЖК РФ). Главное основание постановки на такой учет - материальное - граждане, площадь жилья у которых на человека меньше учетной нормы в регионе, могут встать на учет. Например, в Ростовской области учетная норма составляет от 6 до 10 кв. м на человека, а минимальная площадь, предоставляемая одному человеку, составляет 33 кв. м.

Арендаторы по договору социального найма вполне могут иметь собственное жилье, но им его просто может не хватать по учетной норме площади (например, если много проживающих). Как было указано ранее, предоставить жилье гражданам ППО могут только из специально образованных жилищных фондов.

Обратиться за заключением договора соц. найма следует в специализированный орган муниципалитета. В Ростове-на-Дону, например, в каждом районе имеются отделения, занимающиеся ис-

ключительно вопросами в сфере соц найма и приватизации. Договор социального найма заключается на бессрочно, у арендаторов возникает обязанность следить за состоянием жилого помещения, своевременно уплачивать плату за жилье и коммунальные услуги, налог на недвижимость на жилье по договору не взимается. Жилец может свободно прописывать в помещении иных граждан, но стоит учитывать требования по учетной норме площади. Данное жилье можно даже субарендовать. Но все же без приватизации у жильцов имеется право только пользоваться помещением. И все же надо учитывать, что если жилье не устраивает арендаторов, они в любой момент могут воспользоваться правом обмена социального жилья на другое.

Кроме того, полагаем необходимым проанализировать приватизацию на основании договора социального найма, но все же стоит упомянуть, что в РФ законодательство предоставляет множество вариантов для приобретения государственного имущества. В частности, приватизация на основании договора соц. найма регулируется ФЗ № 1541-1 "О приватизации жилищного фонда в Российской Федерации". По нему у арендаторов появляется исключительная возможность приобретения в собственность жилья, являющегося объектом их договора социального найма. Жилье передается бесплатно, без проведения торгов, что и является реализацией конституционного права граждан на жилье.

Также, рассмотрим особенности регулирования договора социального найма и приватизации. В каждом правоотношении есть свои особенности и казусы, и предоставление социального жилья не является исключением.

Однако правила могут иметь свои особенности, как, например, возможность приватизации для гражданина может использоваться лишь единожды - далее человек не будет являться нуждающимся в улучшении жилищных условий. Однако, если несовершеннолетним была получена доля приватизированной квартиры, в совершеннолетнем возрасте гражданин вновь имеет право на приватизацию нового жилья. Иначе восстановить право приватизации жилья по договору социального найма закон и судебная практика не предусматривают. Например, даже вернув приватизированную квартиру обратно в государственную собственность, гражданин не восстановит себе право на приватизацию другой собственности.

Если гражданин не имеет возможности проживать в социальной квартире (например, находится в армии, за границей, в местах заключения) или имеет возможность, но фактически там не живет, то в любом случае при приватизации он получит свою долю собственности в помещении на основании того, что был там прописан.

Если гражданин не имеет возможности бесплатно приватизировать жилое помещение по договору социального найма, то он всегда может приобрести его возмездно - на основании 178-ФЗ "О приватизации государственного и муниципального имущества" - единственное, гражданин будет иметь

возможность получить жилье только по результатам торгов с другими покупателями.

На основании ФЗ "О приватизации жилищного фонда в Российской Федерации" комнаты в общежитиях, служебных домах, аварийных домах, жилье в закрытых военных городах приватизации не принадлежат. Но по практике в данном запрете имеется исключение - комнаты в общежитиях, которые стали государственной собственностью. Такие комнаты свободно подлежат приватизации.

Стоит упомянуть, что владение собственностью, объемы которого могут в разы превышать потребность гражданина в жилищных условиях - законом не прописано как основание в отказе в приватизации.

Также следует упомянуть нюанс процесса приватизации, который был найден Автором по запросу клиента - гражданин, ранее приватизировавший жилье, хотел бы также приватизировать комнату в бывшем общежитии Ростсельмаша. По закону гражданин имеет право прописать в данную комнату близких родственников (супругу, детей и родителей), на которых не распространяется требование об учетной норме площади. Затем близкие родственники, которые ранее не пользовались правом приватизации, могут приватизировать данную комнату на основании собственной прописки для последующей ее, например, продажи. Единственным минусом для клиента будет являться то, что он не сможет получить даже долю от комнаты, но зато она бесплатно перейдет близким родственникам.

Таким образом, на основании вышеуказанного можно сделать вывод о том, что Жилищная политика в области социального найма и приватизации постоянно развивается, и различная судебная практика помогает формировать ясное понимание механизмов правового регулирования в этой сфере. Важно учитывать все нюансы, поскольку процесс приватизации может оказаться сложным и потребовать внимательного изучения законодательства. Построению целостной системы нормативно-правового регулирования значительно поспособствовало издание уточняющего Постановления правительства РФ.

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MEDICAL SCIENCES

UDC 618.17-008.6:616.8-009.836

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INFLUENCE OF SLEEP DISORDERS ON THE MENSTRUAL CYCLE

Abstract.

The article examines the impact of sleep disorders on the menstrual cycle and reproductive health of a woman. The physiology of sleep is characterized, the role of circadian rhythms and melatonin in the regulation of hormonal processes is described. The mechanisms of regulation of the menstrual cycle are highlighted and the factors determining its variability are determined. It has been shown that chronic lack of sleep and irregular sleep disrupt the function of the hypothalamic-pituitary-ovarian axis, reduce the level of melatonin and increase the secretion of cortisol, which negatively affects the synthesis of sex hormones. Clinical manifestations of hormonal imbalance caused by lack of sleep are described: ovulation disorders, changes in cycle length, dysmenorrhea, and exacerbation of premenstrual syndrome. It was concluded that quality and sufficient sleep is an important condition for the stable functioning of the reproductive system, and its violation should be taken into account in the diagnosis and correction of menstrual cycle disorders.

Key words: sleep, sleep disorders, menstrual cycle, circadian rhythms, melatonin, cortisol, hormonal balance, reproductive health, ovulation, hypothalamic-pituitary-ovarian axis.

Introduction. Sleep disorders have become one of the characteristic problems of modern times. Chronic stress, accelerated pace of life, long-term use of gadgets and lack of physical activity - all this gradually destroys the normal rest regime. Meanwhile, sleep is a fundamental physiological need: it is during sleep that the body restores its functions and maintains homeostasis. Its systematic violation affects not only the well-being, but also the regulation of hormonal processes, on which the work of many body systems depends.

The female reproductive system is particularly vulnerable to any changes — both external and internal. The menstrual cycle is supported by the subtle interaction of hormones, primarily estrogen and progesterone, with the participation of the hypothalamic-pituitary system. Even minor failures in this mechanism can change the length of the cycle, suppress ovulation or cause other functional disorders [2].

Sleep directly affects the hormonal balance — in particular, through the regulation of melatonin secretion. Insufficient duration of night rest, its low quality or interruption disrupts circadian rhythms, and this, in turn, affects the synthesis of hormones and the functioning of the reproductive system in general [7].

The relevance of the topic is determined by the fact that more and more women face sleep disorders, against the background of which menstrual cycle disorders develop. The study of this relationship is an important step towards understanding the mechanisms of reproductive disorders and the formation of effective approaches to their prevention and correction.

Results

Sleep is a natural physiological process, without which the full recovery of the body is impossible. Outwardly, it looks like a state of rest: consciousness, motor activity, reaction to stimuli decrease. However, in fact, it is at this time that intensive internal work takes place — the body restores physical and mental functions, maintains metabolic and hormonal balance, thermal balance, and immune protection [3].

There are two main phases of sleep: slow (non-REM) and fast (REM). During slow sleep, the body recovers physically — the heart rate slows down, blood pressure and body temperature decrease. Rapid sleep, on the contrary, is accompanied by increased brain activity: during this period, dreams occur and memory consolidation takes place. During the night, these phases regularly alternate, forming a complete cycle [9].

An important role in the regulation of sleep is played by circadian rhythms — biological processes with an approximately 24-hour periodicity, tied to the change of light and darkness. The central hormone of this system is melatonin, which is synthesized by the pineal gland mainly at night. It contributes to falling asleep and maintaining a normal daily rhythm, and its production is inhibited even by slight lighting [1].

Sleep directly affects the work of the endocrine system. Secretion of growth hormone occurs mainly in the first hours after falling asleep - in the phase of deep sleep, while thyroid hormones are secreted late at night. Melatonin, in turn, reduces the excitatory effect of the

suprachiasmatic nucleus, contributing to the transition of the body to a state of rest [2].

Chronic lack of sleep, irregular sleep and frequent night awakenings disrupt this coordinated mechanism. The consequences can be diverse: disruptions in the work of the endocrine system, increased stress levels, metabolic disorders, weakening of immunity. For women, this is of particular importance, since hormonal balance is the basis of reproductive health [9].

Sleep disturbances, chronic lack of sleep and frequent night awakenings have a negative impact on the functional state of the body. Studies show that insufficient sleep can lead to changes in the work of the endocrine system, increased stress levels, metabolic disorders, and weakening of the immune system. In addition, sleep is an important factor in maintaining hormonal balance, which is of particular importance for a woman's reproductive health [1].

Experimental studies on animals have shown that long-term sleep deprivation causes serious metabolic disorders, exhaustion of the body and deterioration of the general physiological state. This confirms the importance of sleep for the normal functioning of all body systems and maintaining human health [2].

The menstrual cycle is a complex physiological process based on the coordinated interaction of the hypothalamus, pituitary gland, and ovaries. Normally, its duration is 24-38 days, menstrual bleeding lasts 4.5-8 days, and blood loss in the range of 5-80 ml is considered physiological. At the same time, cycle parameters are affected by age, lifestyle, stress level and sleep quality. The most stable cycles are in women aged 20 to 40 [5].

The cycle consists of two main phases: follicular and luteal, which in the mucous membrane of the uterus correspond to the proliferative and secretory phases of the endometrium. The variability of the cycle is determined primarily by the duration of the follicular phase, while the luteal phase remains relatively stable [5].

Sleep plays a significant role in this process. It is during night rest that the normal functioning of the neuroendocrine system is maintained, on which the hormonal regulation of the cycle depends. Sleep disturbances, chronic sleep deficits, or shifts in circadian rhythms affect the secretion of melatonin, cortisol, and gonadotropic hormones. This can suppress ovulation, alter the length of the follicular phase, and eventually lead to irregular periods. Therefore, a full-fledged sleep is not just a condition of good health, but an important factor in maintaining a stable cycle and normal hormonal function [3].

Systematic lack of sleep and sleep disturbances gradually undermine the work of the endocrine, nervous and reproductive systems. Under conditions of chronic lack of sleep in the body, the production of melatonin decreases, instead, the level of cortisol increases. This hormone, released in excessive amounts, suppresses the function of the hypothalamic-pituitary-ovarian axis — the key regulatory system of the menstrual cycle. The result of such changes is often ovulation disorders, fluctuations in cycle length and irregular menstruation [4].

At the same time, the secretion of estrogen and progesterone is disturbed. Hormonal imbalance arising against this background is clinically manifested by exacerbation of symptoms of premenstrual syndrome, dysmenorrhea, emotional lability and general deterioration of well-being [6, 8]. According to research, women with chronic sleep disorders are significantly more likely to have reproductive health problems than those who observe a stable rest regime [3].

The negative consequences of prolonged lack of sleep are not limited to the reproductive sphere. Lack of sleep is accompanied by a decrease in cognitive functions, chronic fatigue, metabolic disorders and immunosuppression. In the long run, such conditions can contribute to the development of endocrine pathology and significantly reduce the quality of life [10].

Therefore, a full-fledged sleep is not just a physiological need, but a necessary condition for maintaining hormonal homeostasis and normal reproductive function. Adherence to the sleep regime and timely prevention of its violations are of direct importance for women's health in general and the stability of the menstrual cycle in particular.

Conclusions. The conducted analysis proves that sleep is not only a physiological need of the body, but also an active regulator of the hormonal balance and reproductive function of a woman. The normal course of the menstrual cycle depends on the coordinated work of the hypothalamic-pituitary-ovarian axis, which in turn is sensitive to the quality and duration of night rest.

Chronic lack of sleep and disruption of circadian rhythms lead to a decrease in the level of melatonin and excessive secretion of cortisol, which destabilizes the production of gonadotropic hormones, estrogen and progesterone. The clinical consequences of such changes are ovulation disorders, irregular menstruation, exacerbation of premenstrual syndrome and dysmenorrhea.

Therefore, a full-fledged sleep should be considered as one of the key factors in maintaining a woman's reproductive health. Prevention of sleep disorders and correction of the rest regime should be an integral part of the approach to the treatment and prevention of functional disorders of the menstrual cycle.

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EGG FREEZING: MEDICAL AND ETHICAL ASPECTS

Abstract.

Cryopreservation of oocytes is a modern and promising method of preserving female fertility, which is widely used in reproductive medicine. Thanks to the development of vitrification technology, the efficiency of egg freezing and their survival after thawing have significantly increased, which has contributed to the spread of this method in clinical practice. Cryopreservation is used both in patients with oncological diseases to preserve reproductive function before treatment, and in women who postpone motherhood for social or personal reasons.

The article discusses the indications, effectiveness, risks and ethical aspects of cryopreservation of oocytes. Current data on the safety and prospects of using the method in reproductive medicine are analyzed.

Key words: *cryopreservation of oocytes, fertility, vitrification, reproductive medicine, oncofertility, ethics, delayed motherhood.*

Introduction. Modern reproductive medicine is actively developing, offering new opportunities for preserving women's fertility. One of the most significant achievements of recent decades has been oocyte cryopreservation — a method of freezing and long-term storage of female germ cells with subsequent use in assisted reproductive technology programs. The advent of vitrification technology significantly increased survival of oocytes after thawing and improved pregnancy outcomes [1].

Initially, egg freezing was used mainly in women with oncological diseases before gonadotoxic chemotherapy or radiation therapy. Subsequently, the procedure gained popularity among healthy women who seek to delay childbearing for career, social, or personal reasons [2].

According to the data of modern research, the effectiveness of cryopreservation largely depends on the age of the woman at the time of oocyte collection. The best results are obtained in patients younger than 35–37 years old [3].

Along with its medical benefits, the method raises significant ethical debates. Issues of procedure availability, social inequality, commercialization of reproductive technologies, and psychological pressure on women remain relevant [4].

Results

Cryopreservation of oocytes is based on the technology of rapid freezing - vitrification. Unlike slow freezing, vitrification avoids the formation of intracellular ice crystals, which can damage the structure of the oocyte [1].

The main medical indications for egg freezing are:

- oncological diseases before chemotherapy;
- endometriosis;
- premature exhaustion of the ovaries;

- genetic diseases with the risk of early loss of fertility;

- social postponement of motherhood [2].

An important factor in the success of the procedure is the patient's age. It has been proven that in women younger than 35 years, the frequency of successful fertilization and child birth after using frozen oocytes is significantly higher [3].

According to modern research, cryopreservation of approximately 15–20 mature oocytes is considered optimal for increasing the chances of future pregnancy [5]. It should be noted that the effectiveness of cryopreservation of oocytes largely depends not only on the age of the patient, but also on the quality of the obtained oocytes, ovarian reserve and the number of stimulation cycles. According to modern research, with age, not only the number of oocytes decreases, but also their genetic quality, which directly affects the frequency of successful fertilization and embryo implantation. That is why the majority of international recommendations emphasize the feasibility of cryopreservation before the patient turns 35 [3].

An important achievement of modern reproductive medicine was the improvement of vitrification methods. Compared to traditional slow freezing, vitrification provides a significantly higher survival rate of oocytes after thawing. This is because ultra-fast freezing prevents the formation of ice crystals inside the cell and reduces the risk of damage to cellular structures. As a result, survival rates of oocytes after thawing can exceed 90% [1].

The procedure includes hormonal stimulation of the ovaries, puncture of the follicles and subsequent freezing of the obtained eggs.

Despite the relative safety of the method, certain complications are possible:

- ovarian hyperstimulation syndrome;

- bleeding;
- infectious complications;
- psychological stress [6].

Modern studies show that children born after the use of cryopreserved oocytes do not have an increased risk of congenital anomalies compared to natural conception [7].

A separate direction is oncofertility — preservation of reproductive function in patients with malignant neoplasms. For many women of reproductive age, the possibility of having a child after completion of treatment is an important component of psychological rehabilitation [8].

For many women, the procedure is not only a medical method of preserving fertility, but also a way to reduce anxiety associated with the fear of losing reproductive function. This especially applies to patients with oncological diseases, for whom the possibility of future motherhood often plays an important role in maintaining the psychological state during treatment [8].

At the same time, experts emphasize that egg freezing does not guarantee pregnancy in the future. Despite the high survival rates of oocytes after thawing, the effectiveness of the program depends on many factors, including the state of the endometrium, concomitant gynecological diseases and the quality of the partner's sperm. That is why it is extremely important to properly advise patients about the real possibilities and limitations of the procedure [5].

The popularization of egg freezing has caused active debate about the ethical aspects of the procedure. One of the key issues is the commercialization of reproductive medicine. In many countries, the procedure is expensive and inaccessible to a large part of the population, which creates social inequality in access to reproductive technologies [4].

Also controversial is the use of so-called "social egg freezing", when women delay motherhood due to studies, careers or lack of a partner. Some researchers consider this a manifestation of a woman's reproductive autonomy, while others emphasize the risk of forming a false sense of "guaranteed fertility" [9].

The patient's informed consent is important. The doctor must explain in detail:

- probability of successful pregnancy;
- influence of age on efficiency;
- possible risks;
- financial expenses;
- the absence of an absolute guarantee of the birth of a child [5].

Ethical difficulties also arise regarding the long-term storage of oocytes and their further fate in the event of the patient's death or refusal to use biomaterial. Legislative regulation of these issues differs significantly in different countries [4].

Some large companies offer workers compensation for egg freezing costs as a social bonus. On the one hand, this expands the opportunities of women, and on the other hand, it can form a hidden social pressure to postpone motherhood for the sake of professional activity [10].

Modern ethical committees emphasize that cryopreservation of oocytes is an ethically permissible procedure provided that the patient is fully informed and the principles of autonomy and voluntariness are observed [5].

Conclusions. Egg freezing is an important achievement of modern reproductive medicine, which allows preserving a woman's fertility in conditions of medical or social factors. The use of vitrification technology significantly improved the efficiency and safety of the procedure.

The best results of cryopreservation are observed in women of young reproductive age. The method is widely used in patients with oncological diseases and in cases of delayed motherhood.

Along with the medical advantages, egg freezing is accompanied by a number of ethical problems related to the availability of the procedure, the commercialization of reproductive technologies, and the need to fully inform patients about the real chances of a successful pregnancy.

The further development of assisted reproductive technologies requires not only the improvement of medical approaches, but also the formation of clear ethical and legal norms in the field of reproductive medicine.

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THE EFFECT OF ORAL GLUCOSE-LOWERING DRUGS ON SERUM URIC ACID LEVELS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

Abstract

Hyperuricemia is a common metabolic disorder in patients with type 2 diabetes mellitus (T2DM) and is associated with an increased risk of cardiovascular and renal complications. The coexistence of T2DM and disorders of uric acid metabolism underscores the need for a comprehensive therapeutic approach that considers not only glycemic control but also the metabolic effects of glucose-lowering agents on serum uric acid (SUA) levels. This review analyzes recent English-language publications from the past five years, including systematic reviews, meta-analyses, and randomized controlled trials investigating the effects of oral glucose-lowering agents on serum uric acid levels in patients with T2DM.

Keywords: T2DM, hyperuricemia, glucose-lowering agents, SUA, SGLT2 inhibitors, metformin, DPP-4, TZDs, GLP-1 Ras, sulfonylureas, AGIs, α -glucosidase inhibitors.

Introduction. Type 2 diabetes mellitus is a chronic endocrine and metabolic disorder that is commonly associated with hyperuricemia, a condition increasingly recognized as an independent risk factor for cardiovascular disease and chronic kidney disease. Elevated serum uric acid levels in patients with T2DM are closely linked to insulin resistance and compensatory hyperinsulinemia, which impair renal urate excretion and establish a pathophysiological connection between disturbances in glucose and purine metabolism [1]. Hyperuricemia is highly prevalent among patients with T2DM and insulin resistance and may result from both increased uric acid production and reduced renal clearance. Insulin resistance enhances urate reabsorption in the proximal renal tubules, thereby contributing to sustained elevations in SUA and reinforcing the metabolic interplay between T2DM and purine metabolism. In recent years, growing attention has been directed toward the pleiotropic effects of glucose-lowering agents, particularly their potential influence on uric acid metabolism. Accumulating evidence suggests that different classes of antidiabetic drugs exert heterogeneous effects on SUA levels through multiple mechanisms, including modulation of renal tubular urate transporters, improvements in insulin sensitivity, body weight reduction, and alterations in inflammatory pathways. Importantly, certain glucose-lowering therapies appear to affect SUA levels independently of their glycemic effects, which has significant clinical implications for individualized treatment selection in patients with T2DM and coexisting hyperuricemia. Therefore, evaluation of oral glucose-lowering agents from an evidence-based medicine perspective is essential.

Sodium-glucose cotransporter-2 (SGLT2) inhibitors

They are the most effective oral antihyperglycemic agents for T2DM, acting through inhibition of renal glucose reabsorption and induction of glycosuria.

Beyond glycemic control, they consistently reduce serum uric acid levels, providing additional cardiometabolic benefits. This effect is mediated by increased urinary glucose excretion, which enhances uricosuria via competition at renal tubular transporters, particularly URAT1, leading to increased renal uric acid elimination independently of glycemic improvement. Meta-analyses of large randomized controlled trials confirm a consistent reduction in SUA (≈ 0.5 – 0.8 mg/dL), while mechanistic studies demonstrate increased urinary urate excretion with dapagliflozin and empagliflozin, supporting a direct renal effect. Clinically, SGLT2 inhibitors provide a stable urate-lowering benefit, particularly relevant in patients with T2DM, hyperuricemia, and high cardiovascular risk [2,3].

Metformin

Metformin is the first-line pharmacological therapy for T2DM due to its well-established efficacy in lowering blood glucose, favorable safety profile, and cost-effectiveness. Some studies demonstrate a slight reduction in serum uric acid levels, which is likely mediated by improved insulin sensitivity, subsequently decreasing urate reabsorption in the proximal renal tubules. Additionally, a possible indirect effect through improvement of the metabolic profile, including reduced inflammation and correction of lipid metabolism, has been suggested [4]. Despite this, the urate-lowering effect of metformin remains significantly weaker compared to SGLT2 inhibitors, although it may still have clinical relevance in patients with early hyperuricemia. Most contemporary systematic reviews and meta-analyses confirm the absence of a pronounced effect of metformin on serum uric acid levels [5].

Dipeptidyl peptidase-4 (DPP-4)

The effect of this class of glucose-lowering drugs on urate levels is heterogeneous. Evidence from observational cohorts suggests a modest reduction in SUA,

although results vary between agents. Linagliptin appears to be associated with urate reduction, whereas sitagliptin and alogliptin demonstrate neutral or inconsistent effects. The mechanism is not fully established and is likely indirect, potentially involving improvements in glycemic control, insulin sensitivity, and systemic inflammation rather than direct renal transporter modulation [6,7].

Thiazolidinediones (TZDs) as PPAR γ agonists, improve insulin sensitivity and may contribute to a reduction in serum uric acid levels, particularly in patients with elevated baseline urate concentrations. Proposed mechanisms include enhanced insulin action as well as increased urate solubility in urine due to higher urinary pH. Clinical studies of pioglitazone and other agents demonstrate a mild to moderate decrease in serum urate; however, the evidence is limited and primarily derived from small-scale cohorts. Their clinical use is constrained by potential adverse effects, including fluid retention, weight gain, and cardiovascular risk considerations, which necessitates individualized therapeutic decision-making [8].

GLP-1 receptor agonists (GLP-1 RAs) are a class of incretin-based antihyperglycemic medications. Agents of this class (liraglutide, semaglutide, and dulaglutide) do not have a significant direct effect on uric acid (UA) levels; however, they demonstrate beneficial effects on body weight reduction, appetite suppression, and overall cardiometabolic outcomes [9]. The likely mechanism involves indirect improvement of insulin sensitivity, reduction of systemic inflammation, and decrease in visceral adiposity, which in turn may reduce renal urate reabsorption. GLP-1 receptor agonists can be considered adjunctive agents in the comprehensive management of serum uric acid levels, particularly in patients with T2DM and obesity, where simultaneous improvements in weight, glycemic control, and cardiometabolic profile are achieved [9,10].

Sulfonylurea derivatives and α -glucosidase inhibitors. In most studies, sulfonylurea derivatives (glimepiride, gliclazide) had no statistically significant effect on uric acid levels; on the contrary, they may contribute to hyperuricemia [5]. Similarly, α -glucosidase inhibitors, particularly acarbose, have not

demonstrated a significant effect on purine metabolism [11].

Conclusion. Thus, the selection of glucose-lowering therapy in patients with type 2 diabetes mellitus and hyperuricemia should be based on an evidence-based evaluation of the effects of antidiabetic agents on serum uric acid levels, while simultaneously considering their glycemic efficacy, cardiometabolic profile, and safety. The greatest clinical benefit in controlling uric acid levels and reducing the risk of associated complications may be achieved with SGLT2 inhibitors, whereas other drug classes should be used with consideration of individual patient characteristics.

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MODERN STRATEGIES FOR PREGNANCY MANAGEMENT IN WOMEN WITH EPILEPSY

Abstract

Epilepsy is a chronic neurological disorder characterized by a predisposition to recurrent seizures and poses a particular threat during pregnancy, as it may lead to maternal injuries, fetal distress, preterm birth, and obstetric complications. The management of pregnancy in women with epilepsy requires a careful balance between seizure control and minimization of the teratogenic risks associated with antiseizure therapy. Modern strategies include preconception counseling, optimization of treatment regimens, preferential use of monotherapy at the lowest effective doses, and avoidance of high-risk medications, particularly valproate. Special importance is attached to the individualized selection of antiseizure medications with consideration of their teratogenic profile and pharmacokinetic changes during pregnancy. Dose adjustments of lamotrigine and levetiracetam, regular therapeutic drug monitoring, as well as periconceptional folic acid supplementation are important components of safe pregnancy management. Multidisciplinary collaboration among neurologists, obstetricians-gynecologists, and neonatologists helps minimize risks and ensure optimal outcomes for both mother and child.

Key words: *epilepsy, pregnancy, antiseizure medications, teratogenicity, lamotrigine, levetiracetam, valproate.*

Introduction. Epilepsy is one of the most common chronic neurological disorders, affecting approximately 0.5–1% of the world's population, and is of particular medical importance in women of reproductive age. About 50% of patients with epilepsy are women of childbearing age who are planning pregnancy or are already pregnant [1]. The coexistence of epilepsy and pregnancy presents a complex clinical challenge, as it requires both stable seizure control and maximal reduction of the teratogenic risks associated with antiseizure therapy.

Uncontrolled seizures, especially generalized tonic-clonic seizures, pose a serious threat to both the mother and the fetus. They may lead to hypoxia, trauma, placental abruption, preterm birth, and intrauterine fetal death [2, 9]. At the same time, many antiseizure medications (ASMs) have significant teratogenic effects, increasing the risk of congenital malformations, cognitive impairment, and other adverse perinatal outcomes.

Most adverse outcomes in pregnant women with epilepsy are associated not with epilepsy itself, but with the potential teratogenicity of certain antiseizure drugs, particularly valproate. In modern obstetrics and neurology, the main priority is achieving an optimal balance between effective seizure control and fetal safety. This requires an individualized, multidisciplinary approach that includes preconception counseling, rational selection of therapy, regular pharmacokinetic monitoring, psychological support, and comprehensive follow-up throughout the entire gestational and postpartum periods.

The relevance of this topic is обусловлена the increasing number of women with epilepsy planning motherhood, the emergence of new antiseizure medications, the accumulation of data from large

international registries (EURAP, MONEAD), and the development of updated international guidelines for the management of such patients. Despite significant progress, many issues remain unresolved, particularly optimal strategies for personalized therapy, monitoring, and long-term developmental outcomes in children.

The aim of this study was to analyze and summarize modern strategies for pregnancy management in women with epilepsy based on data from international registries, clinical studies, and recommendations of leading professional societies.

Materials and Methods. A systematic search of the scientific literature was conducted using the PubMed, Medline, Cochrane Library, Scopus, and Google Scholar databases. The keywords and search combinations included: "epilepsy and pregnancy", "antiseizure medications", "lamotrigine", "levetiracetam", "valproate", "preconception counseling", "pregnancy registry", "MONEAD", "EURAP", "teratogenicity", "postpartum management", "breastfeeding", and "folic acid supplementation".

Presentation of the Main Material. Currently, the most evidence-based and clinically significant issue is the increased risk of congenital malformations associated with the use of valproate. This drug is associated with a high incidence of neural tube defects (spina bifida), congenital heart defects, orofacial clefts, as well as significant cognitive impairment and autism spectrum disorders in children exposed in utero [3].

Therefore, international guidelines (AAN, AES, ILAE, SMFM) strictly limit the use of valproate in women of childbearing age and classify it as a medication that should be avoided during pregnancy, except in cases of extreme clinical necessity when no other drug provides adequate seizure control [4].

Valproate is considered the most teratogenic among all modern antiseizure medications. The risk of major congenital malformations associated with its use reaches 10–11%, which is 2–4 times higher than in the general population. Moreover, even in the absence of major structural anomalies, children frequently demonstrate reduced intelligence quotient (IQ), impaired language development, and behavioral disorders. For this reason, modern strategies for pregnancy management in women with epilepsy begin with the earliest possible optimization of therapy during the preconception counseling stage, with a mandatory aim of discontinuing or replacing valproate with safer alternatives whenever possible.

The first and most important step in safe management is preconception counseling, which allows optimization of therapy before pregnancy occurs. At this stage, the type of epilepsy, duration of remission, seizure frequency, treatment efficacy, and the feasibility of switching to monotherapy are evaluated. Monotherapy is considered the safest option because polytherapy increases the risk of teratogenicity proportionally to the number of drugs used and their doses [5]. Lamotrigine and levetiracetam are regarded as the safest medications for pregnant women, as they demonstrate the lowest rates of major congenital malformations according to data from large pregnancy registries, particularly EURAP [6].

Lamotrigine is one of the most frequently prescribed medications for women planning pregnancy because it has demonstrated a favorable safety profile. However, its pharmacokinetics undergo substantial changes during pregnancy: due to enhanced hepatic metabolism and increased clearance, blood concentrations of lamotrigine may decrease by 60–70%, creating a risk of seizure recurrence [7]. This necessitates regular therapeutic drug monitoring and individualized dose adjustments. Similar pharmacokinetic changes are observed with levetiracetam, although the reduction in concentration is often less pronounced than with lamotrigine [8]. Carbamazepine, which was long considered a drug of choice, also remains an available option; however, it is associated with a higher risk of congenital malformations compared with lamotrigine and levetiracetam, and its use requires monitoring of liver function and hematopoiesis [6].

Special attention is paid to the prenatal prevention of neural tube defects. It is known that some antiseizure medications, especially valproate and carbamazepine, reduce blood folate levels, thereby increasing the risk of severe congenital anomalies. Therefore, women with epilepsy are recommended to take higher doses of folic acid (up to 4–5 mg/day) even before conception, although the evidence regarding the optimal dosage remains under discussion [10].

Pregnancy is accompanied by significant physiological changes — including increased plasma volume, enhanced glomerular filtration, alterations in hormonal status, and hepatic metabolism — all of which affect the concentrations of many antiseizure medications [11]. These changes are most pronounced during the third trimester; therefore, monitoring

therapeutic drug levels during this period is critical. Regular laboratory monitoring helps prevent dangerous fluctuations in drug concentrations and maintain stable seizure control, which is the cornerstone of safe pregnancy management [12].

During labor, women with epilepsy are advised to continue antiseizure therapy without interruption. Labor usually proceeds normally; however, the risk of seizures may increase due to physical and emotional stress. Epidural analgesia is considered safe and is even recommended because it reduces pain intensity and minimizes physiological triggers that may provoke seizures [13]. In the postpartum period, pharmacokinetics rapidly return to pre-pregnancy levels; therefore, doses of medications that were increased during pregnancy should be gradually reduced to avoid toxicity [14].

Breastfeeding is an important component of early motherhood, and most antiseizure medications are compatible with lactation. In some cases, lamotrigine may pass into breast milk in significant concentrations; however, numerous studies indicate its overall safety provided that the newborn is appropriately monitored [15]. Levetiracetam is also considered compatible with breastfeeding, and clinically significant adverse effects in infants are rare [16].

An extremely important aspect of postpartum management is the prevention of seizure recurrence, as hormonal fluctuations, sleep deprivation, and stress may provoke exacerbation of epilepsy. Studies emphasize that early return to pre-pregnancy doses of antiseizure medications is often necessary to prevent toxicity, but this requires careful clinical monitoring to avoid inadequate seizure control [14]. The first weeks after childbirth are considered particularly vulnerable, necessitating active communication between the patient and healthcare professionals for prompt response to any changes in disease course.

The management of women with epilepsy also includes assessment of mental health, since the postpartum period is frequently accompanied by increased anxiety, depressive symptoms, and emotional instability. Psychoemotional status may influence seizure frequency; therefore, integration of psychological support is an essential component of comprehensive therapy. A number of studies demonstrate that structured support programs combining educational interventions, psychological assistance, and counseling significantly improve treatment outcomes and quality of life in postpartum women [4, 15].

Particular attention is paid to infant care safety in mothers with epilepsy. Although most women are fully capable of performing maternal responsibilities, recommendations include simple preventive measures such as avoiding bathing the baby without assistance, using changing tables with protective rails, and avoiding carrying the infant at heights in cases of risk of sudden seizures. These measures are not intended to restrict the mother but rather to provide additional protection for the newborn. Their effectiveness has been repeatedly emphasized in modern clinical reviews

devoted to safe motherhood in women with chronic neurological disorders [16, 25].

Personalized medicine is playing an increasingly important role in the management of women with epilepsy. Consideration of genetic variants, pharmacogenetic characteristics, and individual responses to drug metabolites is gradually being integrated into clinical practice to optimize treatment [17, 18]. The use of data from large pregnancy registries is particularly relevant, as it allows prediction of risks and refinement of therapeutic strategies [7]. Current recommendations of the International League Against Epilepsy place considerable emphasis on individualized risk-benefit assessment, regular review of therapy, close collaboration between neurologists and obstetrician-gynecologists, and structured counseling for women [19].

The issue of long-term development in children exposed in utero to antiseizure medications is gaining increasing importance. Although lamotrigine and levetiracetam are considered the safest options, research is ongoing, as certain subtle cognitive or behavioral changes may become apparent later in life [20]. In contrast, valproate consistently demonstrates an increased risk of cognitive delay and autism spectrum disorders, which explains its minimal use in this patient population [3, 21].

New antiseizure medications, including brivaracetam and eslicarbazepine, are considered potentially promising in terms of safety; however, they cannot yet be recommended as first-line agents because of the limited evidence regarding their effects on the fetus [22]. Therefore, the treatment strategy for pregnant women with epilepsy is always based on a balance of evidence, individual patient characteristics, and the clinical experience of specialists.

A comprehensive approach also includes psychosocial support for women, since emotional factors, stress, and sleep deprivation may significantly affect seizure control. Therefore, patients are advised to maintain a regular sleep schedule, avoid excessive fatigue, and receive adequate informational support from healthcare professionals [23]. Educational programs for women concerning the specific features of pregnancy in epilepsy, self-monitoring, seizure diary maintenance, and timely medical consultation are also of considerable importance [24]. Owing to a comprehensive and personalized approach, most women with epilepsy can successfully carry a pregnancy and give birth to a healthy child without significant complications [25].

Conclusion. The management of pregnancy in women with epilepsy requires an individualized and well-coordinated approach that combines effective seizure control with maximal reduction of teratogenic risks. Preconception planning, rational selection of antiseizure medications, preference for monotherapy, adequate folic acid supplementation, and careful monitoring of drug concentrations in the blood are the key elements of safe management. During pregnancy, dynamic dose adjustment, close collaboration between neurologists and obstetrician-gynecologists, and prevention of potential seizure triggers are essential.

Under conditions of modern, personalized management, most women with epilepsy can successfully carry and deliver a healthy child, while a comprehensive approach minimizes risks for both the mother and the fetus.

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РЕГЕНЕРАТИВНА ГІНЕКОЛОГІЯ: ВИКОРИСТАННЯ МЕЗЕНХІМАЛЬНИХ СТОВБУРОВИХ КЛІТИН (ОГЛЯДОВА СТАТТЯ)

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REGENERATIVE GYNECOLOGY: THE USE OF MESENCHYMAL STEM CELLS (REVIEW ARTICLE)

Анотація.

Регенеративна гінекологія є одним із найбільш перспективних напрямів сучасної медицини, що поєднує клітинні технології, тканинну інженерію та молекулярну біологію. Особливий інтерес становлять мезенхімальні стовбурові клітини (МСК), здатні до самооновлення, диференціювання та імуномодулюючої дії [1,2]. У гінекології МСК досліджуються як потенційний метод лікування синдрому Ашермана, передчасної недостатності яєчників, ендометріальної атрофії, пролапсу тазових органів та інших патологій [3,4]. Метою огляду є аналіз сучасних даних щодо джерел отримання МСК, механізмів їх дії та клінічного застосування у регенеративній гінекології [5].

Abstract.

Regenerative gynecology is one of the most promising fields in modern medicine, combining cell technologies, tissue engineering, and molecular biology. Of particular interest are mesenchymal stem cells (MSCs), which are capable of self-renewal, differentiation, and immunomodulatory action [1,2]. In gynecology, MSCs are being studied as a potential treatment for Asherman's syndrome, premature ovarian failure, endometrial atrophy, pelvic organ prolapse, and other pathologies [3,4]. The aim of this review is to analyze current data on sources of MSCs, their mechanisms of action, and clinical applications in regenerative gynecology [5].

Ключові слова: мезенхімальні стовбурові клітини, регенеративна медицина, гінекологія, ендометрій, передчасна недостатність яєчників, тканинна інженерія.

Keywords: mesenchymal stem cells, regenerative medicine, gynecology, endometrium, premature ovarian failure, tissue engineering.

Вступ. Регенеративна медицина базується на концепції відновлення структури та функції пошкоджених тканин за допомогою клітинних технологій, біоматеріалів і факторів росту [1]. У гінекології цей напрям набув особливого значення через обмеженість традиційних методів лікування хронічних дегенеративних і рубцевих процесів ендометрію та яєчників [2]. Мезенхімальні стовбурові клітини є мультипотентними клітинами, які можуть виділяти цитокіни, фактори росту та екзосоми, стимулюючи ангиогенез і репарацію тканин [3]. Найчастіше джерелами МСК є кістковий мозок, жирова тканина, пуповинна кров, амніотична оболонка та менструальна кров [4].

Біологічні властивості мезенхімальних стовбурових клітин. МСК характеризуються високою проліферативною активністю та здатністю диференціюватися у клітини мезодермального походження [5]. Відповідно до критеріїв International Society for Cellular Therapy, МСК повинні експресувати CD73, CD90 та CD105 і не експресувати CD34, CD45 та HLA-DR [6]. Значна увага приділяється їх паракринному ефекту, оскільки терапевтичний результат часто обумовлений не прямим диференціюванням, а секрецією біологічно активних речовин

[7]. МСК здатні пригнічувати прозапальні цитокіни, зменшувати апоптоз та стимулювати васкуляризацію тканин [8].

Джерела мезенхімальних стовбурових клітин у гінекології. Кістковомозкові МСК є найбільш дослідженим типом клітин, однак їх отримання є інвазивним [9]. МСК жирової тканини характеризуються високою доступністю та значною проліферативною здатністю [10]. Пуповинні та плацентарні МСК мають низьку імуногенність і високий регенераторний потенціал [11]. Особливий інтерес викликають стовбурові клітини менструальної крові, оскільки вони легко отримуються та мають високу здатність до регенерації ендометрію [12].

Використання МСК при патології ендометрію. Одним із найважливіших напрямів є лікування синдрому Ашермана та тонкого ендометрію [13]. Ці стани супроводжуються фіброзом, порушенням васкуляризації та безпліддям [14]. Дослідження показали, що введення МСК сприяє потовщенню ендометрію, збільшенню експресії VEGF та покращенню рецептивності ендометрію [15]. У клінічних дослідженнях після трансплантації МСК спостерігалось відновлення менструальної функції та настання вагітності у частини пацієток [16].

МСК та передчасна недостатність яєчників. Передчасна недостатність яєчників є важливою причиною жіночого безпліддя та ендокринних порушень [17]. Експериментальні роботи демонструють, що МСК можуть знижувати апоптоз гранульозних клітин, стимулювати фолікулогенез та покращувати гормональний профіль [18]. Введення МСК асоціюється зі зростанням рівня естрадіолу та зниженням рівня ФСГ [19]. Окремі клінічні дослідження повідомляють про відновлення овуляції та можливість досягнення вагітності після клітинної терапії [20].

Регенеративні технології при пролапсі тазових органів. Традиційне хірургічне лікування пролапсу тазових органів часто супроводжується рецидивами та ускладненнями, пов'язаними з імплантацією синтетичних матеріалів [21]. Використання МСК у поєднанні з біоматеріалами розглядається як перспективний метод стимуляції ремоделювання сполучної тканини [22]. Експериментальні моделі демонструють посилення синтезу колагену та покращення міцності тканин тазового дна [23].

МСК у лікуванні урогенітальних і постпроменевих ушкоджень. МСК активно досліджуються при атрофічних змінах урогенітального тракту та постпроменевих ушкодженнях [24]. Завдяки проти-запальним та антифібротичним властивостям вони можуть покращувати загоєння тканин після променевої терапії [25]. В експериментальних роботах показано зменшення фіброзу та покращення мікроциркуляції після застосування МСК [26].

Проблеми та перспективи застосування. Незважаючи на значний потенціал, застосування МСК має низку обмежень [27]. Серед основних проблем виділяють ризик неконтрольованої диференціації, потенційний онкогенний ефект, відсутність стандартизації методів культивування та складність оцінки довготривалої безпеки [28]. Важливим напрямом сучасних досліджень є використання екзосом МСК, які можуть забезпечувати терапевтичний ефект без трансплантації живих клітин [29]. Також перспективним є поєднання клітинної терапії з 3D-біодруктом і тканинною інженерією [30].

Висновки. Мезенхімальні стовбурові клітини є перспективним інструментом регенеративної гінекології завдяки здатності стимулювати репарацію тканин, ангиогенез та імунотуляцію [1,3]. Найбільш перспективними напрямками є лікування синдрому Ашермана, передчасної недостатності яєчників та патології ендометрія [13,17]. Попри обнадійливі результати, широке клінічне застосування МСК потребує проведення масштабних рандомізованих досліджень, стандартизації методів та оцінки віддаленої безпеки [27,28].

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Colloquium-journal №14 (279), 2026

Część 1

(Warszawa, Polska)

ISSN 2520-6990

ISSN 2520-2480

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