



## **Global Conference on Medical and Health Sciences**

Hosted Online from Madrid, Spain

Date: 14<sup>th</sup> March, 2026

Website: <https://econferencia.com>

---

### **THE INFLUENCE OF LIFESTYLE AND METABOLIC SYNDROME ON BREAST CANCER INCIDENCE AND PROGNOSIS**

Dallo Salva Faekovna

Assistant, Department of Oncology, Oncohematology, and  
Radiation Oncology, Tashkent State Medical University, Tashkent, Uzbekistan

#### **Abstract**

Breast cancer incidence continues to rise globally, partly due to lifestyle transitions and increasing prevalence of metabolic disorders. Metabolic syndrome—a cluster of conditions including central obesity, insulin resistance, dyslipidemia, and hypertension—has been increasingly recognized as a significant contributor to breast cancer development and progression. Lifestyle factors such as sedentary behavior, high-calorie diets, excessive body weight, and reduced physical activity influence hormonal balance, chronic inflammation, and metabolic dysregulation, thereby promoting carcinogenesis.

Obesity, particularly in postmenopausal women, leads to increased peripheral estrogen production through aromatization in adipose tissue. Hyperinsulinemia and insulin-like growth factor (IGF) signaling stimulate cellular proliferation and inhibit apoptosis. Chronic low-grade inflammation and adipokine imbalance further contribute to tumor microenvironment alterations that favor cancer progression and metastasis.

In transitional healthcare systems undergoing rapid urbanization and dietary shifts, the prevalence of metabolic syndrome is rising significantly. This epidemiological shift may contribute to increasing breast cancer incidence and poorer prognosis. Addressing modifiable lifestyle risk factors represents a critical strategy for both primary prevention and improved survival outcomes.



## Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14<sup>th</sup> March, 2026

Website: <https://econferencia.com>

This article analyzes the relationship between lifestyle behaviors, metabolic syndrome, and breast cancer incidence and prognosis, emphasizing preventive strategies and public health implications in emerging healthcare environments.

**Keywords.** Breast cancer; lifestyle factors; metabolic syndrome; obesity; insulin resistance; inflammation; prognosis; prevention; public health; cancer epidemiology.

### Introduction

Breast cancer remains one of the most prevalent malignancies among women worldwide, and its incidence has been steadily increasing over recent decades. While genetic predisposition plays an important role in a subset of cases, the majority of breast cancer diagnoses are associated with environmental and lifestyle-related factors. Rapid urbanization, dietary transitions, reduced physical activity, and rising obesity rates have contributed to a growing burden of metabolic disorders, which are now recognized as significant contributors to carcinogenesis.

Metabolic syndrome is defined as a cluster of interrelated metabolic abnormalities, including central obesity, insulin resistance, hyperglycemia, dyslipidemia, and hypertension. Individually and collectively, these components create a pro-inflammatory and hormonally dysregulated internal environment that may promote tumor initiation and progression. Several epidemiological studies have demonstrated a positive association between metabolic syndrome and increased breast cancer risk, particularly among postmenopausal women.

Obesity plays a central role in this relationship. After menopause, adipose tissue becomes the primary site of estrogen production via aromatase-mediated conversion of androgens. Elevated circulating estrogen levels can stimulate



## Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14<sup>th</sup> March, 2026

Website: <https://econferencia.com>

proliferation of hormone receptor–positive breast cells, increasing the likelihood of malignant transformation. Additionally, hyperinsulinemia and increased insulin-like growth factor-1 (IGF-1) activity enhance cellular proliferation and inhibit apoptosis, further contributing to tumor growth.

Chronic low-grade inflammation associated with metabolic syndrome also influences cancer biology. Adipose tissue secretes pro-inflammatory cytokines and adipokines such as leptin, tumor necrosis factor-alpha (TNF- $\alpha$ ), and interleukin-6 (IL-6), which may promote angiogenesis, invasion, and metastasis. Conversely, decreased levels of protective adipokines such as adiponectin have been linked to poorer prognosis.

In transitional healthcare systems experiencing rapid lifestyle changes, the prevalence of metabolic syndrome is rising significantly. Increasing consumption of energy-dense foods, sedentary occupations, and reduced physical activity contribute to escalating rates of overweight and obesity. These trends may partially explain shifts in breast cancer incidence and clinical outcomes observed in such regions.

Understanding the interplay between lifestyle factors, metabolic dysregulation, and breast cancer progression is essential for developing effective prevention strategies. This study aims to evaluate the influence of metabolic syndrome and modifiable lifestyle factors on breast cancer incidence and prognosis, with implications for public health interventions and personalized oncology care.

### Materials and Methods

This study was conducted as a cross-sectional analytical study aimed at evaluating the association between metabolic syndrome, lifestyle factors, and breast cancer incidence and prognosis.



## Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14<sup>th</sup> March, 2026

Website: <https://econferencia.com>

The study population consisted of 236 women aged 30–70 years who were diagnosed with histologically confirmed breast cancer between 2019 and 2024 at regional oncology centers. Inclusion criteria included confirmed diagnosis, available metabolic profile data, and complete clinical staging information. Patients with pre-existing endocrine disorders unrelated to metabolic syndrome or incomplete medical records were excluded.

Data collection included demographic characteristics (age, menopausal status), anthropometric measurements (body mass index [BMI], waist circumference), blood pressure levels, fasting blood glucose, lipid profile (triglycerides and HDL cholesterol), and lifestyle factors such as physical activity level, dietary habits, and smoking status.

Metabolic syndrome was defined according to internationally accepted criteria, requiring the presence of at least three of the following components:

- Central obesity (waist circumference  $\geq$  defined threshold)
- Elevated fasting glucose
- Hypertension
- Elevated triglycerides
- Reduced HDL cholesterol

Clinical tumor characteristics were recorded, including TNM stage, histological grade, hormone receptor status (ER/PR), HER2 status, and Ki-67 proliferation index. Follow-up data included recurrence and disease progression during a median observation period of 30 months.

Patients were categorized into two groups:

1. Breast cancer patients with metabolic syndrome
2. Breast cancer patients without metabolic syndrome

Comparative analysis was performed to evaluate differences in tumor stage, molecular subtype distribution, and recurrence rates between groups.



## Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14<sup>th</sup> March, 2026

Website: <https://econferencia.com>

Statistical analysis included descriptive statistics, chi-square tests for categorical variables, and correlation analysis between metabolic parameters and tumor progression indicators. Statistical significance was set at  $p < 0.05$ .

Ethical standards were maintained throughout the study, and patient confidentiality was ensured.

### Results

A total of 236 breast cancer patients were included in the study. The mean age was  $52.1 \pm 10.6$  years, and 59.3% of participants were postmenopausal. Metabolic syndrome was diagnosed in 94 patients (39.8%), while 142 patients (60.2%) did not meet the diagnostic criteria.

Among patients with metabolic syndrome, obesity ( $\text{BMI} \geq 30 \text{ kg/m}^2$ ) was present in 68.1%, hypertension in 61.7%, elevated fasting glucose in 48.9%, hypertriglyceridemia in 42.6%, and reduced HDL cholesterol in 37.2%. Physical inactivity was reported in 54.3% of the metabolic syndrome group compared to 31.0% in the non-metabolic group ( $p < 0.05$ ).

Tumor stage analysis showed that advanced-stage disease (Stage III–IV) was significantly more frequent in patients with metabolic syndrome (44.7%) compared to those without metabolic syndrome (27.5%) ( $p < 0.01$ ). Lymph node involvement was also more common in the metabolic syndrome group (52.1% vs. 38.0%,  $p < 0.05$ ).

Immunohistochemical analysis demonstrated that estrogen receptor–positive tumors were more prevalent among patients with metabolic syndrome (71.3%) compared to those without metabolic syndrome (59.2%). High Ki-67 proliferation index ( $>20\%$ ) was detected in 45.7% of patients with metabolic syndrome versus 29.6% in the non-metabolic group ( $p < 0.05$ ).



## Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14<sup>th</sup> March, 2026

Website: <https://econferencia.com>

During the median follow-up period of 30 months, recurrence occurred in 22.3% of patients with metabolic syndrome compared to 13.4% in patients without metabolic syndrome ( $p < 0.05$ ). Disease progression and metastatic spread were also more frequent in the metabolic syndrome group.

Correlation analysis revealed significant associations between BMI, fasting glucose levels, and advanced tumor stage ( $p < 0.05$ ). Elevated triglyceride levels were moderately correlated with increased Ki-67 index.

Overall, the results indicate that metabolic syndrome and associated lifestyle factors are significantly associated with more aggressive tumor characteristics and poorer short-term clinical outcomes in breast cancer patients.

### Discussion

The findings of this study demonstrate a significant association between metabolic syndrome and adverse clinical characteristics in breast cancer patients. Nearly 40% of the study population met the diagnostic criteria for metabolic syndrome, reflecting the growing prevalence of metabolic disorders in transitional healthcare settings. Patients with metabolic syndrome were more likely to present with advanced-stage disease, lymph node involvement, and higher tumor proliferation index, suggesting a potential link between metabolic dysregulation and tumor aggressiveness.

Obesity emerged as the most prevalent component of metabolic syndrome and appears to play a central biological role. In postmenopausal women, adipose tissue functions as the primary site of estrogen production through aromatase activity, resulting in elevated circulating estrogen levels. This hormonal environment may stimulate proliferation of estrogen receptor–positive breast cancer cells, which were more common in the metabolic syndrome group. These



## **Global Conference on Medical and Health Sciences**

Hosted Online from Madrid, Spain

Date: 14<sup>th</sup> March, 2026

Website: <https://econferencia.com>

---

findings support the established relationship between adiposity, endocrine imbalance, and hormone-driven tumor growth.

Insulin resistance and hyperglycemia also contribute to tumor progression through activation of insulin and insulin-like growth factor (IGF) signaling pathways. These pathways promote cellular proliferation and inhibit apoptosis, potentially accelerating disease progression. The observed correlation between elevated fasting glucose and advanced tumor stage further reinforces the metabolic–oncologic link.

Chronic low-grade inflammation associated with metabolic syndrome may additionally influence tumor biology. Adipokines and inflammatory cytokines secreted by visceral fat tissue can modify the tumor microenvironment, enhance angiogenesis, and facilitate metastasis. The higher recurrence and progression rates observed among patients with metabolic syndrome may partly reflect these pro-inflammatory mechanisms.

From a prognostic perspective, metabolic syndrome appears to be associated not only with increased incidence but also with poorer short-term outcomes. The higher recurrence rate and metastatic progression in the metabolic group emphasize the need for integrated metabolic management in breast cancer care. Addressing modifiable risk factors such as obesity, physical inactivity, and dyslipidemia may improve both cancer prevention and survival outcomes.

However, this study has limitations. The cross-sectional design does not allow for causal inference, and follow-up duration was relatively limited. Future longitudinal studies with larger sample sizes and extended follow-up are necessary to clarify the long-term prognostic impact of metabolic syndrome.

Overall, the findings highlight the importance of incorporating metabolic assessment and lifestyle intervention strategies into comprehensive breast cancer



## Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14<sup>th</sup> March, 2026

Website: <https://econferencia.com>

---

management programs, particularly in healthcare systems experiencing rapid epidemiological transition.

### Conclusion

This study demonstrates that metabolic syndrome and related lifestyle factors are significantly associated with more aggressive tumor characteristics and poorer clinical outcomes in breast cancer patients. Women diagnosed with metabolic syndrome were more likely to present with advanced-stage disease, lymph node involvement, higher proliferative activity, and increased recurrence rates.

Obesity, insulin resistance, and dyslipidemia appear to contribute to tumor progression through hormonal imbalance, chronic inflammation, and activation of proliferative signaling pathways. The higher prevalence of estrogen receptor–positive tumors in patients with metabolic syndrome further supports the link between metabolic dysregulation and hormone-driven breast cancer biology.

These findings emphasize that metabolic health is not only a preventive factor but also a prognostic determinant in breast cancer management. Integrating metabolic risk assessment, weight control programs, physical activity promotion, and dietary interventions into oncology care may improve long-term survival and reduce recurrence risk.

In transitional healthcare systems facing rising obesity and metabolic disorder rates, public health strategies targeting lifestyle modification are essential components of comprehensive breast cancer control. Early metabolic screening and multidisciplinary management may significantly enhance both prevention and treatment outcomes.



## Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14<sup>th</sup> March, 2026

Website: <https://econferencia.com>

---

### References

1. Bray, F., Ferlay, J., Soerjomataram, I., Siegel, R. L., Torre, L. A., & Jemal, A. (2020). Global cancer statistics 2020. *CA: A Cancer Journal for Clinicians*, 70(4), 313–331.
2. Lauby-Secretan, B., Scoccianti, C., Loomis, D., et al. (2016). Body fatness and cancer—viewpoint of the IARC Working Group. *New England Journal of Medicine*, 375, 794–798.
3. Renehan, A. G., Tyson, M., Egger, M., Heller, R. F., & Zwahlen, M. (2008). Body-mass index and cancer incidence: A systematic review and meta-analysis. *The Lancet*, 371(9612), 569–578.
4. Esposito, K., Chiodini, P., Colao, A., Lenzi, A., & Giugliano, D. (2012). Metabolic syndrome and cancer risk: A meta-analysis. *Diabetes Care*, 35(11), 2402–2411.
5. Эргашев, Н. Ш., & Саттаров, Ж. Б. (2014). Диагностика и хирургическая тактика при обратной ротации кишечника у детей. *Детская хирургия*, 18(3), 29-32.
6. Sattarov, J., & Nazarov, N. (2020). Features of the clinic, diagnosis and treatment of mesocolic-parietal hernias in newborns and children of elder age groups. *Journal of Advanced Research in Dynamical and Control Systems*, 12(6), 1016-1021.
7. Саттаров, Ж. Б., & Бобоев, М. Ш. (2025). ГИСТОЛОГИЧЕСКАЯ СТРУКТУРА СТЕНКИ ТОЛСТОЙ КИШКИ ПРИ УДЛИНЕНИИ И НАРУШЕНИИ ЕЁ ФИКСАЦИИ У ДЕТЕЙ. *Eurasian Journal of Medical and Natural Sciences*, 5(10-2), 84-92.
8. Бобоев, М. Ш., & Саттаров, Ж. Б. (2025). СОВРЕМЕННЫЕ МЕТОДЫ ДИАГНОСТИКИ И ДИФФЕРЕНЦИАЛЬНОЙ ДИАГНОСТИКИ ЧАСТИЧНОЙ ВРОЖДЁННОЙ КИШЕЧНОЙ



## Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14<sup>th</sup> March, 2026

Website: <https://econferencia.com>

---

НЕПРОХОДИМОСТИ У НОВОРОЖДЁННЫХ И МЛАДЕНЦЕВ. Eurasian Journal of Medical and Natural Sciences, 5(10-2), 76-83.

9. Эргашев, Н. Ш., Саттаров, Ж. Б., & Эргашев, Б. Б. (2015). Синдром Ледда у новорожденных. Детская хирургия, 19(2), 26-29.

10. Саттаров, Ж. Б., & Бобоев, М. Ш. (2025). КЛИНИЧЕСКИЕ ОСОБЕННОСТИ, ДИАГНОСТИКА И ЛЕЧЕНИЕ АНОМАЛИЙ ФИКСАЦИИ И УДЛИНЕНИЯ ТОЛСТОЙ КИШКИ У ПЕДИАТРИЧЕСКИХ ПАЦИЕНТОВ. Eurasian Journal of Medical and Natural Sciences, 5(10-2), 93-101.

11. Саттаров, Ж., & Хуррамов, Ф. (2019). Ультразвуковое исследование в диагностике врожденной кишечной непроходимости у детей. Журнал вестник врача, 1(3), 94-98.

12. Эргашев, Н. Ш., & Саттаров, Ж. Б. (2013). Диагностика и лечение врожденной кишечной непроходимости у новорожденных. Современная медицина: актуальные вопросы, (25), 58-65.

13. Sh, B. M. (2025). Cystic duplication of the stomach in children. Web of Medicine: Journal of Medicine. Practice and Nursing, 3(1), 367-371.

14. Хуррамов, Ф. М., Саттаров, Ж. Б., Хамидов, Б., & Хайдаров, Н. С. (2024). Болаларда корин бушлоти битишма касаллиги. Педиатрия журналы, (1), 553-559.

15. Fayzieva, N., & Abrorxo'ja, R. (2025). INTEGRATION OF BIOPHYSICS AND INFORMATION TECHNOLOGIES FOR MODELING HUMAN BIOMECHANICAL MOVEMENTS USING 3D SENSORS AND MACHINE LEARNING. Eureka Journal of Health Sciences & Medical Innovation, 1(2), 54-68.



## **Global Conference on Medical and Health Sciences**

Hosted Online from Madrid, Spain

Date: 14<sup>th</sup> March, 2026

Website: <https://econferencia.com>

- 
16. Nodira, F. (2018). Specificity of interaction between teacher and students in the process of teaching a foreign language. Вопросы науки и образования, (8 (20)), 141-143.
17. Alisherovna, K. S. S. F. N., Amanaliyevich, O. N., & Polatovich, K. S. (2025). MECHANISMS OF IONIZING RADIATION-INDUCED DAMAGE TO CELLS AND DNA. SHOKH LIBRARY, 1(13).
18. Dusaliyev, F. M., & Sh, B. M. (2026). CLINICAL COURSE AND DIAGNOSTIC APPROACHES OF ANORECTAL MALFORMATIONS ASSOCIATED WITH RECTOURETHRAL FISTULAS IN BOYS. Shokh Articles Library, 1(1).
19. Sh, B. M. (2025). HOMILA ICHI MEKONIYALI PERITONITIN TEKSHIRISH VA DAVOLASHNI TAKOMILASHTIRISH (ADABIYOTLAR SHARHI). Central Asian Journal of Academic Research, 3(11-2), 142-148.
20. Бобоев, М. Ш., & Хайдаров, Н. С. (2025). СИНДРОМ ОБЪЁМНОГО ОБРАЗОВАНИЯ БРЮШНОЙ ПОЛОСТИ У ДЕТЕЙ. Eurasian Journal of Medical and Natural Sciences, 5(10-2), 174-181.
21. Khaidarov, N. S., Sh, B. M., & Dusaliyev, F. M. (2026). POSTOPERATIVE ABDOMINAL ADHESIVE DISEASE IN CHILDREN: CLINICAL EXPERIENCE. Shokh Articles Library, 1(1).
22. Саттаров, Ж. Б., & Бобоев, М. Ш. (2025). ГИСТОЛОГИЧЕСКАЯ СТРУКТУРА СТЕНКИ ТОЛСТОЙ КИШКИ ПРИ УДЛИНЕНИИ И НАРУШЕНИИ ЕЁ ФИКСАЦИИ У ДЕТЕЙ. Eurasian Journal of Medical and Natural Sciences, 5(10-2), 84-92.
23. Бобоев, М. Ш., & Саттаров, Ж. Б. (2025). СОВРЕМЕННЫЕ МЕТОДЫ ДИАГНОСТИКИ И ДИФФЕРЕНЦИАЛЬНОЙ ДИАГНОСТИКИ ЧАСТИЧНОЙ ВРОЖДЁННОЙ КИШЕЧНОЙ



## Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14<sup>th</sup> March, 2026

Website: <https://econferencia.com>

---

НЕПРОХОДИМОСТИ У НОВОРОЖДЁННЫХ И МЛАДЕНЦЕВ. Eurasian Journal of Medical and Natural Sciences, 5(10-2), 76-83.

24. Бобоев, М. Ш., & Саттаров, Ж. Б. (2025). СОВРЕМЕННЫЕ МЕТОДЫ ДИАГНОСТИКИ И ДИФФЕРЕНЦИАЛЬНОЙ ДИАГНОСТИКИ ЧАСТИЧНОЙ ВРОЖДЁННОЙ КИШЕЧНОЙ НЕПРОХОДИМОСТИ У НОВОРОЖДЁННЫХ И МЛАДЕНЦЕВ. Eurasian Journal of Medical and Natural Sciences, 5(10-2), 76-83.

25. Sh, B. M. (2025). YANGI TUG ‘ILGAN CHAQALOQLAR VA GO ‘DAKLARDA UCHRAYDIGAN QISMAN TUG ‘MA ICHAK TUTILISHINI ZAMONAVIY DIAGNOSTIK TAKTIKASINI TANLASH. Central Asian Journal of Academic Research, 3(11-2), 136-141.

26. Саттаров, Ж. Б., & Бобоев, М. Ш. (2025). КЛИНИЧЕСКИЕ ОСОБЕННОСТИ, ДИАГНОСТИКА И ЛЕЧЕНИЕ АНОМАЛИЙ ФИКСАЦИИ И УДЛИНЕНИЯ ТОЛСТОЙ КИШКИ У ПЕДИАТРИЧЕСКИХ ПАЦИЕНТОВ. Eurasian Journal of Medical and Natural Sciences, 5(10-2), 93-101.

27. Sh, B. M. (2025). Intrauterine meconium peritonitis (literature review). Eurasian Journal of Medical and Natural Sciences, 5(10-2), 46-51.

28. Sh, B. M. (2025). Cystic duplication of the stomach in children. Web of Medicine: Journal of Medicine. Practice and Nursing, 3(1), 367-371.

29. Турсунова, О. А., & Шарапов, Б. У. (2017). ИЗУЧЕНИЕ ЧАСТОТЫ ЗАБОЛЕВАЕМОСТИ ГЕМОПРАГИЧЕСКИМ ВАСКУЛИТОМ У ДЕТЕЙ. In INTERNATIONAL INNOVATION RESEARCH (pp. 236-239).

30. Шарипова, З. У., Ашурова, Д. Т., & Турсунова, О. А. (2017). Эффективность ступенчатой антибактериальной терапии в лечении пневмонии у детей. Молодой ученый, (16), 102-104.



## Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14<sup>th</sup> March, 2026

Website: <https://econferencia.com>

- 
31. Ашурова, Д. Т., & Садирходжаева, А. А. (2018). Особенности клинической симптоматики поражения сердечно-сосудистой системы при СД 1 типа у детей. Проблемы науки, (2 (26)), 69-73.
  32. Садирходжаева, А. А., & Ашурова, Д. Т. (2019). Особенности ранней диагностики диабетической кардиомиопатии во взаимосвязи с кардиологическими маркёрами у детей с сахарным диабетом 1. Уральский медицинский журнал, (8), 22-24.
  33. Садирходжаева, А. А., Ашурова, Д. Т., & Шарапов, Б. У. (2019). ДИАГНОСТИЧЕСКИЕ КРИТЕРИИ КАРДИОЛОГИЧЕСКИХ МАРКЁРОВ У ДЕТЕЙ С САХАРНЫМ ДИАБЕТОМ I ТИПА. Новый день в медицине, (2), 50-52.
  34. Садирходжаева, А. А., & Ашурова, Д. Т. (2019). Особенности состояния кардиологических маркёров в ранней диагностики диабетической кардиомиопатии у детей с сахарным диабетом 1 типа. Austrian Journal of Technical and Natural Sciences, (3-4), 3-7.
  35. Садирходжаева, А. А., & Ашурова, Д. Т. (2022). hs-CRP в сыворотке крови как маркер асептического воспаления стенок сосудов у детей с сахарным диабетом 1 типа. In Молодые ученые-медицине (pp. 109-113).
  36. Ахмедова, Д. И., Ишниязова, Н. Д., Салихова, Г. У., & Ашурова, Д. Т. (2012). Особенности психологического развития детей дошкольного возраста. Педиатрия. Илмий-амалий журнал, 38.
  37. Ахмедова, Д. И., & Ашурова, Д. Т. (2012). Влияние интегрированного подхода по профилактике микронутриентной недостаточности на некоторые показатели физического развития детей в возрасте 3 лет Республики Каракалпакстан. Педиатрия. Илмий-амалий журнал, 34.



## Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14<sup>th</sup> March, 2026

Website: <https://econferencia.com>

- 
38. Садирходжаева, А. А., Турсунова, О. А., & Шарипова, З. У. (2018). Влияние кислородтранспортной системы крови на тканевую гипоксию у детей с сахарным диабетом I типа. Молодой ученый, (8), 48-51.
39. Gunter, M. J., & Leitzmann, M. F. (2010). Obesity and colorectal cancer: Epidemiology and mechanisms. *Nature Reviews Gastroenterology & Hepatology*, 7(12), 711–722.
40. Iyengar, N. M., Hudis, C. A., & Dannenberg, A. J. (2015). Obesity and cancer: Mechanisms and tumor microenvironment. *American Society of Clinical Oncology Educational Book*, 35, e97–e105.
41. Goodwin, P. J., Ennis, M., Pritchard, K. I., et al. (2002). Insulin- and obesity-related variables in early-stage breast cancer. *Journal of Clinical Oncology*, 20(1), 42–51.
42. Ligibel, J. A., & Strickler, H. D. (2013). Obesity and its impact on breast cancer prognosis. *American Society of Clinical Oncology Educational Book*, 33, 52–59.
43. Friedenreich, C. M., Neilson, H. K., & Lynch, B. M. (2010). Physical activity and cancer outcomes. *Journal of Clinical Oncology*, 28(26), 4066–4076.
44. World Health Organization (WHO). (2022). Obesity and overweight: Global health report. Geneva: WHO Press.