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PROSPECTS FOR DEVELOPING AN INTEGRATIVE CANCER PATIENT REHABILITATION MODEL: A LITERATURE REVIEW

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ABSTRACT

Relevance: *Despite significant progress in diagnosing and treating oncological diseases, rehabilitation remains poorly integrated into comprehensive patient care. As the number of cancer survivors increases, the development of personalized and multidisciplinary rehabilitation models becomes especially important to ensure sustainable recovery and improved quality of life.*

The study aimed to *examine scientific studies analyzing modern approaches to cancer patient rehabilitation and to develop an integrative model that ensures a personalized and multidisciplinary approach to recovery.*

Methods: *A literature review was conducted using the Scopus, Web of Science, PubMed, Google Scholar, and ScienceDirect databases for publications from 2015 to 2024. Inclusion criteria: publications in Russian and English considering the physical, psychological, nutritional, social, and telemedicine rehabilitation of cancer patients. Exclusion criteria: case reports and clinical symptoms or complications not related to rehabilitation. A total of 94 publications were selected, of which 42 were included in the analysis.*

Results: *The State Strategy of Kazakhstan for 2023-2027 declares the introduction of an integrated approach to oncological rehabilitation; however, problems of standardization, staff shortages, and accessibility of services remain. The approaches of Germany, the United States, and Japan are described, and various models are illustrated. Six key components of the integrative model are identified: physical activity, psychological support, nursing support, pelvic and sexual rehabilitation, telemedicine, and nutritional support.*

Conclusion: *Integrating multidisciplinary cancer rehabilitation into the healthcare system is essential for improving quality of life, reducing disability, and enhancing the social adaptation of cancer patients. Adapting international practices to the national context will help improve the effectiveness of rehabilitation programs in Kazakhstan.*

Keywords: *cancer rehabilitation, multidisciplinary approach, quality of life, cancer survivors, telemedicine.*

Introduction: Cancer is the leading cause of death worldwide. According to WHO, more than 19 million new cases of malignant neoplasms are registered annually, and more than 10 million people die from cancer [1]. According to GLOBOCAN 2022, a significant increase in cancer incidence and mortality is projected worldwide in 2050 (Figure 1) [2].

In recent years, oncological diseases have remained a key health problem both in Kazakhstan and worldwide. Over the past 20 years, cancer incidence in Kazakhstan has increased by 25%, while mortality has decreased by 33%. Similar trends are observed in OECD countries, but 5-year survival rates in these countries remain significantly higher. Today, oncological diseases occupy the 7th place in the structure of all diseases in Kazakhstan, and mortality from them is second only to diseases of the circulatory system, occupying the 2nd place. More than 205 thousand patients with oncological diseases are under dynamic observation in the country, with more than 37 thousand new cases detected annually. In first place is breast cancer (13.2%); in second place is lung cancer (10.0%), in third place is colorectal cancer (9.3%), in fourth place is stomach cancer (7.4%) in terms of incidence, and women get sick more often than men, which is associated with the leading position of breast cancer. The 5-year survival rate continues to increase, amounting to 55.3% in 2022, but the target level (60%) has not been achieved. A decrease in the proportion of advanced stages (III–IV) and an increase in early detection rates (from 27.1% in 2019 to 29.0% in 2022) demonstrate success in the fight against cancer in Kazakhstan [3].

In recent decades, the number of patients successfully completing primary treatment has increased significantly due to improvements in early diagnosis and treatment of oncological diseases [4]. However, this progress is accompanied by new challenges: more than half of the patients are of working age (55.8%) [3], which leads to the need for their rehabilitation to return to a full life. Cancer is becoming not only a medical but also a socioeconomic problem: long-term rehabilitation and support for these patients is critical to reducing disability, improving their quality of life, and reducing the burden on the healthcare system [5].

Modern treatment methods allow achieving survival, but rehabilitation remains a poorly integrated component of oncological care [6]. Onco-rehabilitation is an active process aimed at restoring functions, reducing disability, and improving the quality of life of patients who have undergone oncological treatment. In developed countries (USA,

Germany, Sweden, Japan), rehabilitation is the standard of oncological care, while in Eastern Europe, Asia, and Africa, this component is often overlooked. In particular, low-resource countries face several barriers to providing cancer rehabilitation and care for survivors [7, 8]. Oncological patients encounter such problems as asthenia, lymphedema, pain syndrome, depression, cognitive impairment, and social isolation. Without systemic rehabilitation, patients often lose their ability to work and experience a deterioration in their psychoemotional state [6, 7]. International and regional studies confirm that multi-level rehabilitation significantly improves the quality of life and psychological state of patients, reduces the risk of relapse and hospitalization [5, 9].

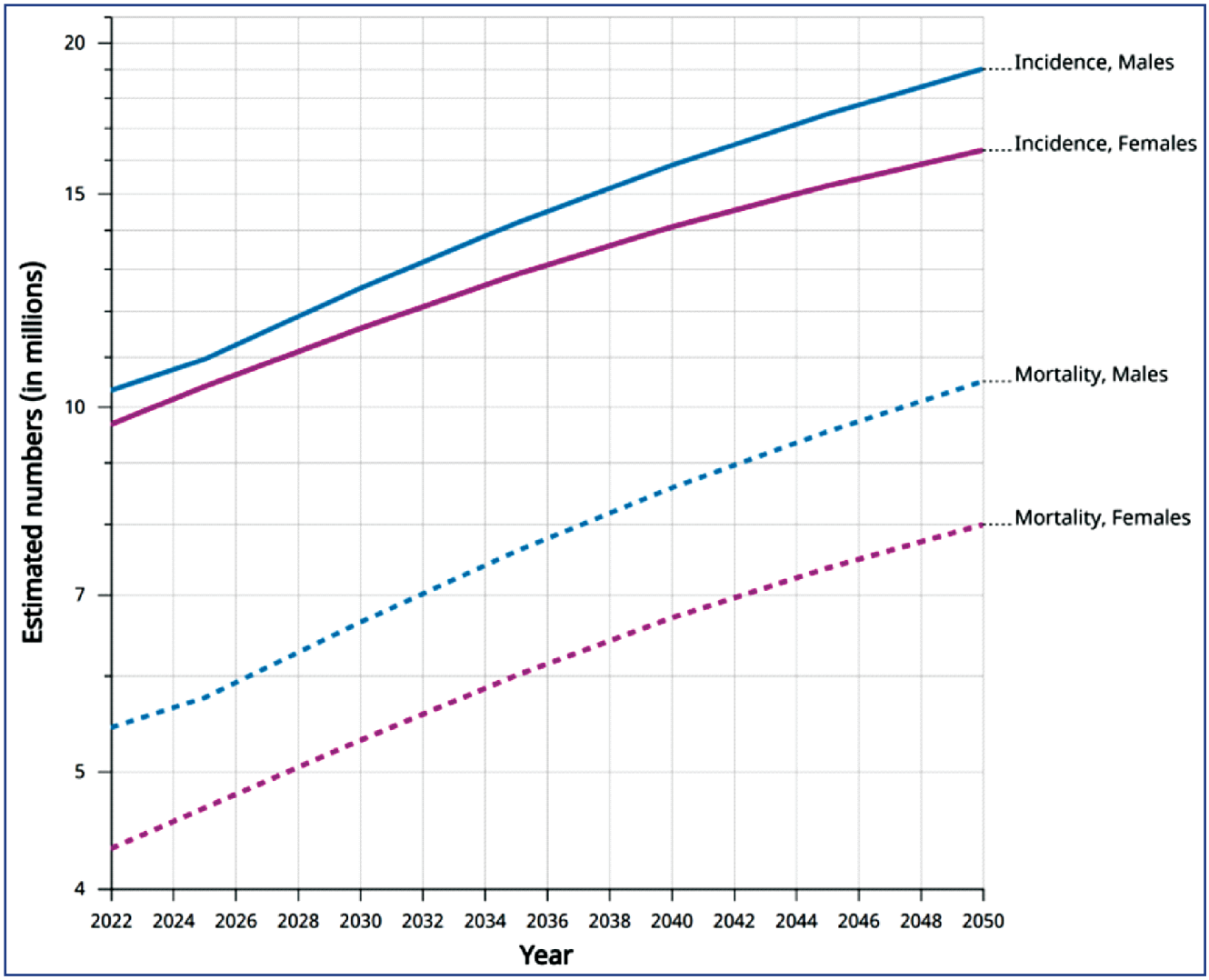

Figure 1 – Dynamics of growth in cancer incidence and mortality in the world from 2022 to 2050, men and women, age (0-85+) [2]

This indicates the need to introduce an integrated approach that includes medical, psychological, and social support, adapted to national realities [10]. In Kazakhstan, this area is given strategic importance. In the Comprehensive Plan to Combat Cancer for 2023–2027, rehabilitation is included as a mandatory element of the system. The implementation of the Comprehensive Plan of Measures to Combat Cancer contributed to a 15% reduction in mortality from malignant neoplasms: from 78.1 per 100 thousand population in 2018 to 66.8 per 100 thousand population in 2022. This trend is observed in all regions of Kazakhstan [3].

With the increasing number of surviving patients, the issues of assessing their rehabilitation needs and developing an effective rehabilitation model are becoming strategically important. Targeted study of these aspects will not only meet the current needs of patients, but also provide the national health care system with an effective tool for their rehabilitation [11].

The national significance of this problem is also due to the limited research on the rehabilitation needs of surviving patients. In the context of an increase in the number of survivors and a rejuvenation of the age composition of patients, it is necessary to develop a comprehensive approach to their rehabilitation, taking into account medical, psychological, and social aspects. This will improve the quality of life of patients, reduce disability, and return

them to an active life, which has both social and economic significance [12].

Regional characteristics such as access to health services, socioeconomic factors, and cultural differences can have a significant impact on the needs of cancer patients. It is necessary to study the unmet needs of cancer patients, as it is unclear how these issues are addressed [13].

Thus, the study aimed at identifying the needs of cancer patients and developing an integrated rehabilitation model is a timely and important step in strengthening the healthcare system of Kazakhstan [3].

The study aimed to examine scientific studies analyzing modern approaches to cancer patient rehabilitation and to develop an integrative model that ensures a personalized and multidisciplinary approach to recovery.

Materials and methods: The review included publications in Russian and English in the Scopus, Web of Science, PubMed, Science Direct, and Google Scholar databases. The search depth was 10 years, from 2015 to 2024. Published articles were classified according to their general topics and summarized. Literature sources contained reports on randomized and cohort studies, meta-analyses, and systematic reviews. Inclusion criteria: publications related to physical, psychological, nutritional, social, and telemedicine rehabilitation of cancer patients. The following were excluded: case reports, clinical symptoms, and complications not related to rehabilitation. A total of 94 publications were selected, of which 42 were included in the analysis. The data was structured according to rehabilitation components.

Results: Oncological diseases remain one of the leading causes of morbidity and mortality in the world, including the Republic of Kazakhstan. In response to these challenges, the Government of Kazakhstan approved a Comprehensive Plan to Combat Cancer for 2023-2027, aimed at improving the diagnosis, treatment, and rehabilitation of patients. Particular attention is paid to the implementation of a comprehensive approach to rehabilitation, which includes physical activity, psychological support, and nutritional therapy [3].

In the context of Kazakhstan, the adaptation of such models requires taking into account the infrastructural, personnel, and socio-cultural realities. Key problems hindering the development of oncological rehabilitation have been identified:

– lack of standards and protocols for rehabilitation components;

– limited access to rehabilitation services in the regions;

– lack of trained personnel, especially in the area of psychoemotional and nutritional support;

weak integration of telemedicine into practical healthcare.

A positive aspect is the existence of a state strategy that provides for the introduction of rehabilitation as a mandatory stage of oncology care. This creates a window of opportunity for the development of a national model based on an analysis of best practices [3].

Exercise is an effective strategy to improve the quality of life and physical fitness in breast cancer survivors. Study results further support the need to incorporate supervised clinical exercise programs into the treatment and care of patients with cancer [14]. Pulmonary rehabilitation performed after surgery significantly improved exercise capacity at 6 months in patients who underwent lung resection; it also significantly reduced the decline in exercise capacity observed at 1 month after surgery [15]. Pelvic floor rehabilitation has shown positive effects in patients with colorectal cancer, but there is a lack of uniform standards for pelvic floor rehabilitation interventions in patients with colorectal cancer [16]. International guidelines and cancer associations recommend a multidisciplinary approach to lung cancer care. A multidisciplinary team can significantly improve treatment decision making and patient coordination by placing different physicians and other health care professionals “in the same room” to jointly decide on the best possible treatment [17]. Those most in need of information support are young people, ethnic minorities, less educated people, and rural residents experiencing financial difficulties [18]. The need to improve the quality of life dictates the need to develop and systematically advance complex therapy for cancer patients [9].

International experience shows that effective oncological rehabilitation is based on the principles of multidisciplinarity, personalization, and a stage-by-stage approach. In Germany, a three-stage rehabilitation model is in place: early, specialized inpatient and outpatient support [19]. In Germany, oncological rehabilitation is an integral part of the healthcare system and part of modern cancer treatment, which immediately follows surgery, drug therapy, or radiotherapy [20]. The United States is actively developing telerehabilitation platforms and programs for the care of survivors, “Survivorship Care” [21, 22]. In Japan, the emphasis is on nutritional and psychoemotional rehabilitation of elderly patients; in Scandinavia, rehabilitation centers are organized based on oncology clinics and offer physiotherapy, art therapy, and support groups [7, 8].

Based on literary data, the following basic principles of the integrative model of rehabilitation of cancer patients are described :

1. Physical activity. Systematic reviews demonstrate significant improvements in fatigue, physical function, and quality of life in patients who have undergone physical rehabilitation [23, 24]. Exercise programs are effective even during chemotherapy or before surgery [4]. With increasing cancer survival rates, there has been an increased need to support people living with cancer to have a good quality of life, including physical activity [25]. Exercise training is safe during and after cancer treatment and results in improvements in physical functioning, quality of life, and cancer-related fatigue in cancer survivors [26]. Physi-

cal activity has also been shown to be effective in improving overall quality of life in breast cancer survivors, either through direct physiological effects or indirectly by reducing the side effects of cancer treatment [27].

2. Psychological support and the SOC approach. Both the CaSUN tool and programs based on the "sense of coherence" (SOC) have proven their effectiveness [28, 29]. Inclusion of psychotherapy and social support in the post-treatment period reduces anxiety levels and improves adaptation [12, 13]. Art therapy can help reduce symptoms of anxiety and depression, as well as improve the quality of life of adult cancer patients [30].

3. The role of nursing staff. An integrative review highlights the important coordinating role of nurses in the rehabilitation process, especially in outpatient and telemedicine environments. Patients report them as a stable point of support during long-term follow-up [31].

4. Pelvic and sexual rehabilitation. Pelvic floor muscle rehabilitation, especially in patients with colorectal cancer, has a significant impact on restoring quality of life [10, 16].

5. Telemedicine and digital platforms. Home-based programs based on a multidisciplinary approach can effectively support patients in settings with limited access to clinics [32, 33]. Case studies have shown that such approaches are comparable in effectiveness to face-to-face programs [34]. Advances in telemedicine have revolutionized the delivery of health services, which is particularly important for cancer rehabilitation. The integration of telemedicine into cancer rehabilitation services is being explored from diagnosis to survivorship, taking into account the unique challenges and opportunities at each stage [35].

6. The diet also improves quality of life in breast cancer survivors [27].

Discussion: The results of the review confirm that effective rehabilitation of cancer patients requires a comprehensive, multidisciplinary, and personalized approach. Physical activity has demonstrated a significant impact on improving physical condition, reducing fatigue, and increasing the quality of life of cancer patients [23-27]. Exercising is safe and beneficial even during periods of active treatment, including chemotherapy and radiotherapy [26]. This emphasizes the need to implement exercise programs not only during remission but also during treatment.

Psychological support also plays a key role in the successful adaptation of patients after treatment. Tools such as CaSUN, SOC programs, and art therapy have proven their effectiveness in reducing anxiety, depression, and improving the emotional state of patients [28-30]. These approaches are especially relevant for Kazakhstan, where the level of psychoemotional support for patients is still insufficient [12, 13].

One of the significant problems remains the availability of high-quality rehabilitation for rural residents and socially vulnerable groups, since these categories are more likely to need additional information and social support [18]. This requires the adaptation of international practices, taking into account regional and cultural characteristics, including digitalization and telerehabilitation.

Additional attention should be paid to the involvement of nursing staff in the coordinating and supporting role [31]. The importance of nutritional support, which contributes to improving quality of life, should also be emphasized [27].

International experience (Germany, USA, Japan, Scandinavian countries) demonstrates the successful implementation of models that include early and long-term rehabilitation, which may be useful for implementation in the healthcare system of Kazakhstan [19, 20]. The implementation of such a model requires not only organizational changes, but also personnel training, development of standards and protocols [36, 37].

Thus, the data presented in the article emphasize the need to revise approaches to the rehabilitation of cancer patients in the Republic of Kazakhstan, with a focus on international recommendations and local realities [38]. Reliance on the evidence base and successful practices of other countries will significantly improve the effectiveness of oncological care in general [39, 40].

Conclusion: Thus, the conducted literature review confirmed the need to introduce comprehensive, personalized, and interdisciplinary rehabilitation into the oncology care system. Effective rehabilitation not only helps restore the physical and psychoemotional state of patients but also improves their quality of life, reduces the risk of relapse, and facilitates social adaptation. International experience demonstrates the high effectiveness of systemic rehabilitation, including with the participation of multidisciplinary teams and the use of digital technologies [41-45]. For the Republic of Kazakhstan, it is important to adapt these approaches, taking into account local characteristics, increase the availability of rehabilitation, especially for socially vulnerable groups, and develop human resources. The results of the review emphasize the need to develop national standards and strategies in the field of oncology rehabilitation.

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АҢДАТПА

ОНКОЛОГИЯЛЫҚ НАУҚАСТАРДЫ РЕАБИЛИТАЦИЯЛАУДЫҢ ИНТЕГРАЦИЯЛЫҚ ҮЛГІСІН ӘЗІРЛЕУДІҢ БОЛАШАҒЫ: ӘДЕБИЕТКЕ ШОЛУ

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Өзектілігі: *Онкологиялық ауруларды диагностикалау мен емдеуде елеулі ілгерілеулерге қарамастан, реабилитация кешенді көмектің толыққанды бөлігі ретінде жеткілікті деңгейде интеграцияланбаған. Онкологиялық емнен кейін тірі қалғандар санының өсуі жағдайында тұрақты қалпына келтіру мен өмір сапасын жақсартуды қамтамасыз ететін жеке және мультидисциплинарлық реабилитациялық үлгілерді әзірлеу ерекше маңызға ие.*

Зерттеу мақсаты *– онкологиялық науқастарды реабилитациялаудың қазіргі заманғы тәсілдерін талдау және қалпына келтіруге жекелендірілген және мультидисциплинарлық көзқарасты қамтамасыз ететін интеграциялық модельді әзірлеуге бағытталған ғылыми зерттеулерді зерделеу.*

Әдістері: *2015-2024 жылдар аралығында Scopus, Web of Science, PubMed, Google Scholar және ScienceDirect деректер базаларында әдебиеттерге шолу жүргізілді. Іріктеу критерийлері: онкологиялық науқастарды физикалық, психологиялық, нутритивтік, әлеуметтік және телемедицина арқылы оңалтуға байланысты. Зерттеуден шығарылғандар: оңалтумен байланысты емес клиникалық белгілер мен асқынулар сипатталған жағдайлық есептер (кейс-репорттар). 94 жарияланым таңдалып алынды, олардың 42-сі талдауға енгізілді.*

Нәтижелері: *Қазақстанның 2023–2027 жылдарға арналған мемлекеттік стратегиясы онкореабилитацияға кешенді тәсілді енгізуді көздейді. Алайда стандарттаудың болмауы, кадр тапшылығы және қызметтердің қолжетімділігі мәселелері сақталуда. Германия, АҚШ және Жапонияның онкореабилитация модельдерінің әртүрлілігін көрсетілді.*

Интегративті модельдің алты негізгі компоненті анықталды: физикалық белсенділік, психологиялық қолдау, мейірбикелік сүйемелдеу, жамбас және жыныстық функцияларды қалпына келтіру, телемедицина және нутритивтік қолдау.

Қорытынды: *Онкологиялық науқастардың өмір сапасын жақсарту, мүгедектік деңгейін төмендету және әлеуметтік бейімделуді арттыру үшін мультидисциплинарлық онкореабилитацияны денсаулық сақтау жүйесіне интеграциялау қажет. Халықаралық тәжірибелерді ұлттық ерекшеліктерді ескере отырып бейімдеу Қазақстандағы қалпына келтіру бағдарламаларының тиімділігін арттыруға мүмкіндік береді.*

Түйінді сөздер: *онкологиялық реабилитация, мультидисциплинарлық тәсіл, өмір сапасы, қатерлі ісіктен кейін аман қалғандар, телемедицина.*

АННОТАЦИЯ

ПЕРСПЕКТИВЫ РАЗРАБОТКИ ИНТЕГРАТИВНОЙ МОДЕЛИ РЕАБИЛИТАЦИИ ОНКОЛОГИЧЕСКИХ ПАЦИЕНТОВ: ОБЗОР ЛИТЕРАТУРЫ

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Актуальность: *Несмотря на значительный прогресс в диагностике и лечении онкологических заболеваний, реабилитация остаётся слабо интегрированной частью комплексной помощи пациентам. В условиях роста числа выживших после онкологического лечения особую важность приобретает разработка персонализированных и мультидисциплинарных реабилитационных моделей, обеспечивающих устойчивое восстановление и улучшение качества жизни.*

Цель исследования *– изучение современных подходов к реабилитации онкологических пациентов и разработке интегративной модели, обеспечивающей персонализированный и мультидисциплинарный подход к восстановлению.*

Методы: *Проведен обзор литературы в базах данных Scopus, Web of Science, PubMed, Science Direct и Google Scholar за 2015-2024 гг. Критерии включения: публикации, касающиеся физической, психологической, нутритивной, социальной, телемедицинской реабилитации онкопациентов. Исключались: кейс-репорты, клинические симптомы и осложнения, не связанные с реабилитацией. Было отобрано 94 публикации, из которых в анализ включено 42.*

Результаты: *Государственная стратегия Казахстана на 2023-2027 гг. декларирует внедрение комплексного подхода к онкореабилитации, при этом остаются проблемы стандартизации, кадрового дефицита и доступности услуг. Описаны подходы Германии, США и Японии, демонстрирующие разнообразие моделей. Выделены шесть ключевых компонентов интегративной модели: физическая активность, психологическая поддержка, сестринское сопровождение, тазовая и сексуальная реабилитация, телемедицина и нутритивная поддержка.*

Заключение: *Интеграция мультидисциплинарной онкореабилитации в систему здравоохранения необходима для улучшения качества жизни, снижения инвалидизации и повышения социальной адаптации онкологических пациентов. Адаптация международных практик с учетом национального контекста позволит повысить эффективность восстановительных программ в Казахстане.*

Ключевые слова: *онкологическая реабилитация, мультидисциплинарный подход, качество жизни, выжившие после рака, телемедицина.*

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