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Review

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Advancing cancer rehabilitation in Qatar: A call to action

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Abstract

Objectives: In this review, we examine the current landscape of cancer rehabilitation in Qatar, evaluate its alignment with the national cancer strategies, and highlight key opportunities to advance rehabilitation as a core component of comprehensive cancer care.

Materials and methods: This narrative review synthesized epidemiological data, national cancer policy documents, and international evidence on cancer rehabilitation models, frameworks, outcomes, and implementation strategies, with specific contextualization to Qatar. Searches were conducted in MEDLINE (PubMed), EMBASE, CINAHL, and the Cochrane Library from 2000 to March 2026, supplemented by the World Health Organization and Qatar Ministry of Public Health repositories.

Results: There is strong evidence supporting the beneficial effects of rehabilitation across all cancer phases. Despite the availability of various cancer strategies in Qatar, the integration of rehabilitation remains limited and shows persistent gaps in implementation despite policy intent. The gaps exist in prehabilitation/early rehabilitation, dedicated cancer rehabilitation services, structured survivorship programs, community-based rehabilitation, and palliative rehabilitation. Functional outcomes and patient-reported measures are not routinely captured, restricting the system's ability to evaluate rehabilitation impact or plan services effectively. Workforce capacity, digital health integration, and cross-sector coordination require significant strengthening to meet rising rehabilitation demand.

Conclusion: Qatar is well-positioned to transition from an acute-focused oncology model to a function-focused, longitudinal survivorship model that embeds rehabilitation across the care continuum. Advancing this agenda requires institutionalizing rehabilitation within national cancer pathways, expanding workforce capabilities, integrating functional outcomes into routine care, and enhancing community and palliative rehabilitation services.

Keywords: Cancer, Qatar, rehabilitation, survivorship.

Cancer remains one of the leading causes of morbidity and mortality worldwide, and its global burden continues to rise. In 2022, an estimated 20 million new cancer cases and over 9.7 million deaths were recorded, reflecting the significant and growing impact of the disease on public health and the health system in general. The most frequently diagnosed cancers were lung (2.5 million), followed by breast (2.3 million cases), colorectal (1.9 million), prostate (1.5 million), and stomach cancers (1.0 million). Lung cancer continues to account for the highest number of

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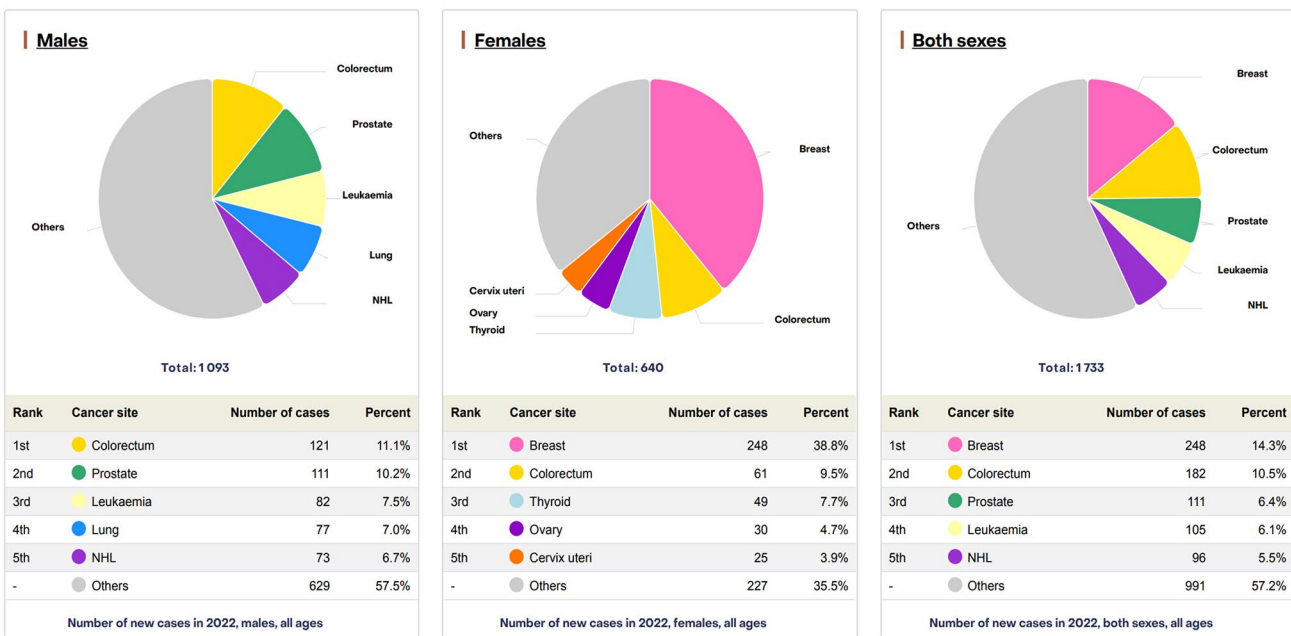
cancer-related deaths globally (cumulative 18.7% of total cancer-related mortality), followed by colorectal (9.3%) and liver (7.8%) cancers.[1] Based on current trends, the number of new cases is projected to reach 28.4 million in 2040, a 47% increase from 2020.[2]

In Qatar, the number of patients diagnosed with cancer has steadily increased over the past decade. According to the Global Cancer Observatory (which included data from the Qatar National Cancer Registry), Qatar reported 1,733 new cancer cases (1,093 males, 640 females) in 2022 alone, with an age-standardized incidence rate of 82.4 per 100,000 and a 9.2% risk of developing cancer before age 75. The most common cancers by incidence were breast (14.3%), followed by colorectal (10.5%) and prostate (6.4%). Figure 1 provides the top 5 most common cancers in Qatar (2022). There were an estimated 782 cancer-related deaths (527 males, 255 females), with an age-standardized mortality rate of 46.2 per 100,000 and a 5% risk of dying from cancer before age 75. The leading causes of cancer deaths were lung cancer, followed by colorectal cancer and leukemia. The 5-year cancer prevalence was 5,888 cases (3,540 males, 2,348 females).[3]

Qatar's key benchmarking indicators, including age-standardized incidence and mortality rates and the risks of developing or dying from cancer before age 75, remain lower than those of Western Asia and global averages, indicating comparatively favorable outcomes. Further, the top-ranked new cancer cases of breast cancer and colorectal cancer align with global patterns, while the incidence of lung cancer is lower compared to worldwide trends. Overall, despite rising numbers of Qatar's cancer cases, its incidence and mortality rates remain relatively lower than regional and global figures, likely influenced by younger population demographics, robust screening programs, and improved treatment infrastructure.[2] Table 1 provides a detailed overview of the cancer statistics of Qatar compared to Western Asia and the global data.

The number of cancer cases in Qatar is expected to rise in the coming decades, driven by population growth, demographic shifts, and enhanced detection through national screening programs. The achievements and progress made in the last decade have reflected on cancer survivorship in Qatar, with the overall three-year survival rate increasing from 65.6% in 2018 to 89.3% in 2020,



Rank	Cancer site	Number of cases	Percent
1st	Colorectum	121	11.1%
2nd	Prostate	111	10.2%
3rd	Leukaemia	82	7.5%
4th	Lung	77	7.0%
5th	NHL	73	6.7%
-	Others	629	57.5%

Number of new cases in 2022, males, all ages

Rank	Cancer site	Number of cases	Percent
1st	Breast	248	38.8%
2nd	Colorectum	61	9.5%
3rd	Thyroid	49	7.7%
4th	Ovary	30	4.7%
5th	Cervix uteri	25	3.9%
-	Others	227	35.5%

Number of new cases in 2022, females, all ages

Rank	Cancer site	Number of cases	Percent
1st	Breast	248	14.3%
2nd	Colorectum	182	10.5%
3rd	Prostate	111	6.4%
4th	Leukaemia	105	6.1%
5th	NHL	96	5.5%
-	Others	991	57.2%

Number of new cases in 2022, both sexes, all ages

Figure 1. Top 5 most common cancers in Qatar (2022).[3]

Table 1. Cancer statistics at Glance-Qatar compared to Western Asia and the World (2022)[3]

	Qatar			Western Asia#			World		
Variables	Male	Female	Total	Male	Female	Total	Male	Female	Total
Number of new cases*	1.09	0.64	1.73	243.1	224.1	467.1	10311.6	9664.9	19976.5
Age-standardized incidence rate	70.7	119.7	82.4	188.9	160.9	170.9	212.6	186.3	196.9
Risk of developing cancer before the age of 75 years (cum. risk %)	8.2	12.7	9.2	19.6	16.1	17.6	21.8	18.5	20.0
Top 3 leading cancers	CRC Prostrate Leukaemia	Breast CRC Thyroid	Breast CRC Prostrate	Lung Prostrate CRC	Breast Thyroid CRC	Breast Lung CRC	Lung Prostrate CRC	Breast Lung CRC	Lung Breast CRC
Number of cancer deaths*	0.53	0.26	0.78	149.7	105.9	255.6	5430.3	4313.5	9743.8
Age-standardized mortality rate	40.2	61.8	46.2	119.3	74.7	94.7	109.8	76.9	91.7
Risk of dying from cancer before the age of 75 years (cum. risk %)	4.5	6.8	5.0	12.6	7.8	10.1	11.4	8.0	9.6
Top 3 leading cause of cancer deaths	Lung Leukaemia CRC	Breast CRC Ovary	Lung CRC Leukaemia	Lung CRC Stomach	Breast CRC Lung	Lung CRC Breast	Lung Liver CRC	Breast Lung CRC	Lung CRC Liver
5-year prevalent cases*	3.54	2.35	5.89	615.6	675.5	1292.1	25747.3	27756.9	53504.2

*Total in 1000, includes non-melanoma skin cancer (NMSC); CRC: Colorectal cancer; # UN Regional Group, countries included: Armenia, Azerbaijan, Bahrain, Cyprus, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Gaza Strip and West Bank, Qatar, Saudi Arabia, Syrian Arab Republic, Türkiye, United Arab Emirates, Yemen

and the five-year survival rate increasing from 59.7% in 2016 to 80.2% in 2020. Further, the current Qatar Cancer National Plan prioritizes vulnerable groups, seeks to reduce inequities in access, and demonstrates a strong economic return, estimated at 4-10 QAR return for every one QAR invested.[2] These figures underscore the strong need for increased investment in both preventative and clinical services to sustain progress and to ensure the delivery of high-quality care for cancer patients in Qatar.

Ongoing impact of cancer and survivorship

Advances in early detection and effective cancer treatments have resulted in a significant increase in individuals living with and beyond cancer, bringing heightened attention to the long-term physical, psychological, and social consequences of the disease and its treatment. Many survivors experience persistent impairments that can significantly limit daily functioning and diminish quality of life (QoL). Evidence from literature indicates that nearly 60% of survivors report ongoing functional challenges, underscoring the need for structured survivorship care that incorporates comprehensive rehabilitation.[4,5]

Cancer remains a complex condition characterized by unpredictable trajectories and substantial morbidity.[6] Many cancer survivors continue to face neurological deficits, deconditioning, and a range of psychosocial burdens, including challenges with employment, financial strain, interpersonal relationships, and self-image.[7,8] The diagnosis itself carries substantial psychological impact, and treatment regimens may impose considerable adverse effects.[9,10] These cumulative effects extend beyond patients themselves, contributing to increased distress and caregiving demands among family members.[11,12] Effective management, therefore, requires coordinated, interdisciplinary care that addresses the multifaceted and evolving needs of survivors.

The International Classification of Functioning, Disability and Health (ICF)[13] provides a standardized framework for describing the impact of cancer at the levels of impairment, activity limitation, and participation restriction, while accounting for environmental and personal contextual factors. Within this framework, cancer-related impairments may restrict patients' functional abilities and limit participation in work or social roles.[14] The ICF offers a comprehensive assessment through which to understand the complex interactions that shape patient outcomes

and supports more holistic, patient-centered rehabilitation planning and enhances communication across interdisciplinary teams. This framework underpins the critical role of rehabilitation as an integral component of comprehensive cancer care. A conceptual illustration of the ICF model applied as an illustrative example to breast cancer is provided in Figure 2.[15-17]

Cancer care continuum

The World Health Organization (WHO) recognizes functioning as the third critical health indicator, alongside mortality and morbidity, reflecting its importance in understanding health and well-being across the lifespan.[18,19] Functional status is increasingly used to inform clinical decisions, particularly in rehabilitation medicine, where effective treatment planning requires an accurate understanding of patients' capacities and needs. Early identification of poor functional capacity is strongly linked to increased complication rates and higher mortality.[20-22] In response to the rising global rehabilitation needs, the WHO's 'Rehabilitation 2030' initiative and the World Health Assembly resolution on 'Strengthening Rehabilitation in Health Systems' call on Member States to ensure rehabilitation is integrated across all levels of healthcare delivery.[23]

Rehabilitation is an integral component of cancer care, addressing the heterogeneous spectrum of cancers and significant treatment-related complications/adverse effects that impact patients' functional and psychosocial well-being.[24] Cancer rehabilitation focuses on minimizing treatment-related complications, managing new or persistent symptoms, and enhancing participation and overall QoL through targeted, goal-oriented interventions.[25] It plays a critical role across the entire disease trajectory from diagnosis and active treatment to community-based survivorship, palliative care,

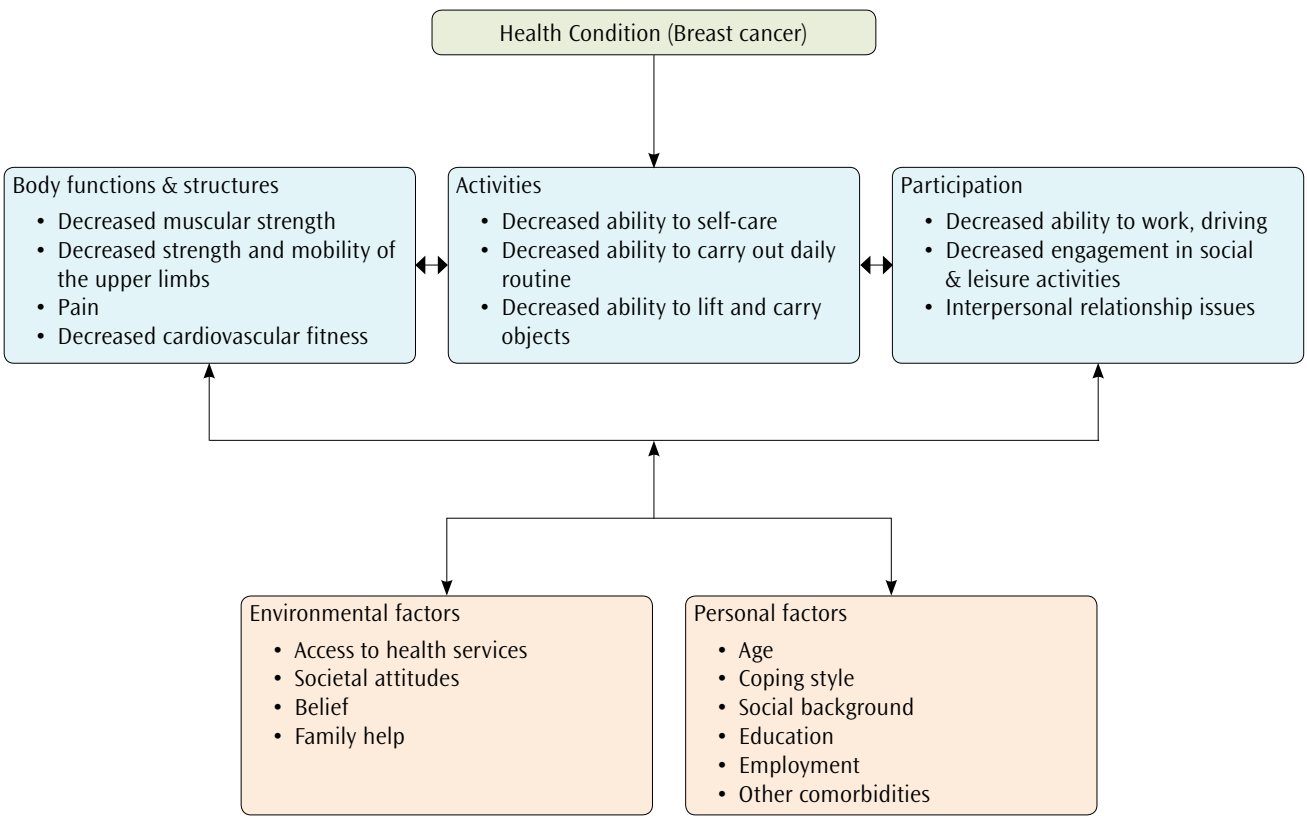


Figure 2. Interactions between the components of the ICF in breast cancer.[15-17]
ICF, International Classification of Functioning.

and end-of-life support.[26,27] Effective cancer rehabilitation is typically delivered through a coordinated, patient centered interdisciplinary approach involving two or more disciplines, including physiotherapy, occupational therapy, nursing, dietetics, social work, psychology, and other allied health disciplines. This study examines the current landscape of cancer rehabilitation in Qatar, evaluates its alignment with the national cancer strategies, examine systemic impediments to service scale up, and highlight future directions to strengthen rehabilitation as an integral component of comprehensive cancer care.

MATERIALS AND METHODS

A broad spectrum of rehabilitation interventions is currently used, targeting physical, functional, and psychological domains, with varying levels of impact and clinical significance. A rapid desktop review was conducted in accordance with established guidance on rapid review methodology,[28] to synthesize epidemiological data, national cancer policy documents, and evidence on cancer rehabilitation models, outcomes, and implementation strategies. The aim was not to conduct a comprehensive or comparative effectiveness assessment but rather to present a snapshot of the breadth, strength, and gaps of evidence in rehabilitation in cancers, with specific contextualization to Qatar.

Literature review methodology

A multipronged approach was adopted, including a literature search conducted from 2000 to March 2026 using major medical and health sciences electronic databases such as PubMed, Embase, and the Cochrane Library. Broad, iterative keywords and Boolean operators were used, combining terms related to rehabilitation and cancer. This flexible keyword strategy was adopted to capture a wide range of relevant evidence, consistent with rapid review methodology.[28]

Manual screening of the bibliographies of key articles and a targeted search of grey literature were undertaken using internet search engines such as Google Scholar and WHO Global Index Medicus to identify relevant reports, policy documents, and technical briefs. In addition, policy documents were retrieved from the Ministry of Public Health (MOPH, Qatar), WHO, and Hamad Medical Corporation (HMC) repositories.

The review focused primarily on recent systematic reviews or meta-analyses, clinical guidelines, implementation studies, and health policy documents relevant to adult cancer rehabilitation. Pediatric-only studies and non-English publications were excluded unless directly relevant to Qatar's policy context. Consistent with the scope of a rapid narrative review, a PRISMA flow diagram, formal study counts, and duplicate independent screening were not undertaken. Further, consistent with narrative review methodology, no formal quality scoring was undertaken beyond appraisal already reported in included systematic reviews, and study selection and interpretation were undertaken collaboratively by the author team rather than through a single blinded reviewer process. The overall findings were synthesized thematically using a narrative approach. Systematic reviews were prioritized for effectiveness data, and local policy documents were analyzed for alignment with rehabilitation integration.

RESULTS

The benefit of rehabilitation extends across the cancer continuum of survivorship, and a broad range of interventions, including unidisciplinary therapies and coordinated multidisciplinary programs, have been shown to optimize functional capacity, promote independence and adaptation, and improve QoL.[4,5,29] Multidisciplinary rehabilitation (defined as a coordinated program delivered by two or more disciplines with medical specialist input) has demonstrated efficacy in reducing both short- and long-term disability among survivors of brain and breast cancers.[11,25] Multidimensional programs that integrate physical and psychosocial components have been further shown to enhance physical functioning in adult cancer populations.[29] Physical therapeutic interventions, such as exercise, constitute a cornerstone of cancer care. Various systematic reviews and clinical guidelines demonstrate robust evidence for structured exercise therapy, particularly aerobic and resistance training, in reducing

cancer-related fatigue, improving muscle strength, and enhancing mental health in various cancer cohorts.[11,16,30-35] Further, there is strong evidence suggesting that structured physical activity improves functional outcomes, augments physiological parameters, and enhances QoL across diverse survivor groups.[36-39] Benefits span multiple HRQoL domains, including cancer-specific concerns (e.g., breast cancer), body image/self-esteem, emotional well-being, sexuality, sleep quality, social functioning, anxiety, fatigue, and pain.[38] Psychosocial interventions such as cognitive-behavioral therapy, mindfulness-based therapies, and compensatory cognitive strategies have been shown to have advantageous effects in mitigating treatment-related cognitive impairment and fatigue and reducing psychological burden.[31,40,41] Further, other non-pharmacological strategies targeting treatment-related cognitive impairment, such as computer-assisted cognitive training, compensatory strategy training, meditation, and exercise, show promise in preventing or mitigating cognitive sequelae following systemic therapy.[31] The evidence base has also expanded to support prehabilitation, which enhances physiological reserve before surgery, leading to shorter hospital stays and fewer postoperative complications.[42] Physical and occupational therapy programs have demonstrated significant improvements in work-related functional capacity, supporting return-to-work efforts as an increasingly important outcome for working-age survivors.[43,44] Home-based survivorship models further provide short-term gains in QoL and reductions in anxiety, fatigue, and insomnia, widening access to patients outside institutional settings.[45,46] Markedly, greater functional improvements predict longer survival.[8]

Despite high patient satisfaction and proven clinical benefits, rehabilitation remains underutilized and is often introduced too late in the care trajectory. Several barriers persist across the cancer care pathway, including a dynamic and unpredictable course of cancer, wide variability in functional impairments, and significant emotional and psychosocial burdens that may hinder engagement in rehabilitation.[47,48] Additionally, symptoms such as fatigue may be profound yet not readily apparent to others and can further hinder coping and engagement in rehabilitation. However, fragmentation of services and delays in accessing appropriate rehabilitation remain a common challenge, often compromising continuity of care. Seamless and timely interdisciplinary care across hospital and community settings is vital. Further, strengthening integration among services (neuro-oncology, medical, surgical, rehabilitation, palliative, and others) is therefore key to ensuring coordinated support, which is imperative to improve functional outcomes, QoL, and overall support for cancer survivors and their caregivers.[49]

Rehabilitation needs span across multiple phases of the cancer continuum: Prehabilitation, aimed at optimizing physical and psychological readiness before treatment; restorative rehabilitation, delivered during and after treatment to minimize decline and restore function; supportive rehabilitation, targeted at managing chronic or long-term cancer-related impairments; and palliative rehabilitation, designed to maximize comfort, independence, and QoL in advanced disease.[4,15,27,50,51] This comprehensive, longitudinal approach underscores the essential role of rehabilitation in addressing the multifaceted needs of individuals living with and beyond cancer. Figure 3 illustrates the cancer rehabilitation continuum and highlights the diverse range of rehabilitation interventions applicable across phases such as prehabilitation, active treatment, survivorship, recurrence, and palliative care.

Cancer care policies and strategic frameworks in Qatar

Over the past decades, Qatar has put in place a coherent policy trajectory for cancer control, beginning with the National Cancer Strategy (2011-2016),[52] followed by the National Cancer Framework (2017-2022),[53] and the current Qatar Cancer Plan (QCP, 2023-2026).[2] These documents execute the system for prevention, early detection, rapid diagnostics, high-quality treatment, and survivorship care within an integrated model.

The National Cancer Strategy 2011-2016 was Qatar's first comprehensive cancer strategy, establishing the foundational architecture for a

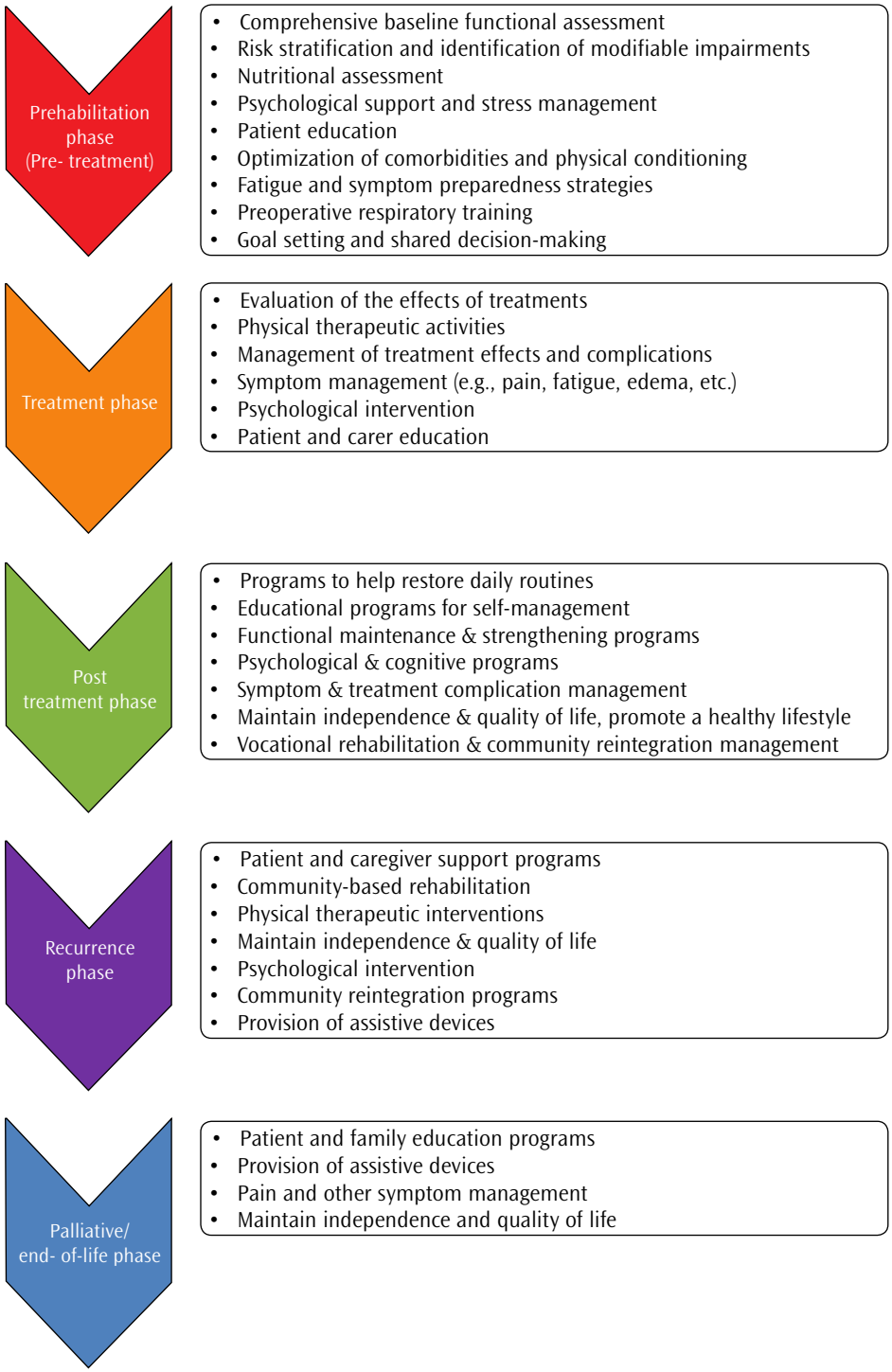


Figure 3. Cancer care continuum and potential rehabilitation interventions.[4,15,27,50,51]

modern cancer care system based on nine priority areas spanning prevention through to research and workforce development. Its primary aim was to reduce cancer burden and deliver world-class care aligned with international best practice, supported by national governance through the Ministry of Public Health and implemented by HMC (the largest public tertiary health center

in Qatar) and Primary Health Care Corporation (PHCC). The strategy guided major system-level achievements, including the introduction of population-based breast and bowel screening programs, multidisciplinary team models across 14 cancer types, advanced diagnostic and treatment technologies (e.g., positron emission tomography-computed tomography and minimally invasive surgery), and the establishment of the Qatar National Cancer Registry (QNCR). It also improved care coordination through the patient pathway and strengthened palliative care services.[52]

The National Cancer Framework 2017-2022 represents a transition from infrastructure development to a more integrated, pathway-based model of cancer care, which is structured around 9 domains, 61 guiding activities, and 25 success measures aligned to global indicators. It emphasizes the comprehensive cancer care continuum: prevention, early detection, diagnosis, treatment, and ongoing care, supported by enablers such as workforce, research, and performance measurement. The framework highlights key system advancements from the prior strategy, including the establishment of multidisciplinary teams, national screening programs, and the QNCR, while prioritizing improved early-stage diagnosis, reduced smoking rates, enhanced patient experience, and increased survival reporting. A major strategic focus of the framework was the strengthening of primary care and community-based services, particularly for survivorship and ongoing care, alongside expanded use of digital health and data systems to support performance monitoring and integrated care delivery.[53]

The most recent Qatar Cancer Plan 2023-2026 is a comprehensive, system-wide strategy that shifts cancer care from a primarily treatment-focused model to a preventive, integrated, and holistic care model, supported by strong governance, research, and investment. The plan outlines a comprehensive, system-wide strategy to deliver "Excellence for All" through integrated, patient-centered cancer care across the full continuum from prevention to survivorship, structured around seven strategic pillars, 23 objectives, and 87 deliverables. The plan prioritizes risk reduction (addressing obesity and tobacco use), expansion of screening and early detection, development of advanced treatment infrastructure, including a comprehensive cancer center, and strengthening of palliative, survivorship, and pediatric oncology services. It also emphasizes data-driven care through enhanced research, workforce development, digital health, and governance.[2]

At the service-delivery level, Qatar has established centralized specialist capacity at HMC, primarily the National Center for Cancer Care and Research (NCCCR), with urgent cancer care, advanced radiation technologies, genetic counseling, and accredited training programs. Rehabilitation capacity has expanded at the Qatar Rehabilitation Institute (QRI), the region's largest tertiary rehabilitation hospital, with oncology and lymphedema outpatient physiotherapy services now consolidated on the QRI campus to streamline patient pathways.[54,55] Qatar has also strengthened population-based screening (breast and bowel) through the MOPH, PHCC, and HMC referral pathways. In parallel, surveillance and data governance have been established via the Qatar Cancer Information Center and the QNCR, enabling evidence-informed planning and performance benchmarking.[2]

Positioning rehabilitation within Qatar's cancer policy landscape

Qatar demonstrates clear progression from system establishment to integrated, value-based cancer care across the National Cancer Strategies;[2,52,53] however, rehabilitation remains consistently insufficiently embedded within the oncology continuum. Despite increasing cancer incidence, improved survival rates, and a growing population with complex functional needs, there is limited corresponding expansion of rehabilitation services, workforce, or infrastructure. Crucial gaps include the limited availability of prehabilitation pathways, limited integration of rehabilitation professionals within multidisciplinary teams, limited structured survivorship and community-based rehabilitation programs, and nominal recognition of palliative rehabilitation. Additionally, the lack of functional outcomes and patient-reported measures restricts the ability to quantify rehabilitation impact and guide service planning. These shortcomings can

Table 2. Summary of Qatar Cancer Strategies and Rehabilitation Implications

Domain	Qatar National Cancer Strategy (2011-2016)[52]	National Cancer Framework (2017-2022)[53]	Qatar Cancer Plan (2023-2026)[2]	Implications for Rehabilitation Services
Strategic focus	Establish foundational cancer system; infrastructure, governance, MDTs	Transition to integrated, pathway-based care; quality & performance focus	Advanced, patient-centered, value-based care; full continuum approach	Progressive system development, but rehabilitation remains marginal, & not positioned as a core pillar across all phases
Cancer burden	Recognized growing burden; aging population projections (10× increase ≥ 65 by 2050)	Projected approx. 2,250 cases annually by 2025	2,024 cases (2020); projected 47% global rise by 2040	Increasing survivorship leads to higher rehabilitation demand, yet no proportional workforce or service planning, specific to rehabilitation
Care continuum	Focus on prevention, diagnosis, treatment; early palliative care development	Broader continuum including survivorship & community care	Full continuum: prevention, survivorship, palliative care	Rehabilitation not explicitly embedded across continuum, especially in prehabilitation & survivorship phases
Multidisciplinary care	MDTs introduced across 14 tumor streams	Strengthened MDT coordination & pathways	Advanced integrated, patient-centred MDT models	MDTs largely oncology-centric, with limited structured inclusion of rehabilitation professionals
Prevention & screening	National screening programs (breast, bowel) established	Expanded screening & early detection focus	Strong emphasis on prevention (approx. 40% cancers preventable)	Limited linkage between screening outcomes & early functional/prehabilitation pathways
Treatment infrastructure	Investment in diagnostics, surgery, oncology services	Optimization of care pathways & service delivery	Advanced cancer centre model; precision medicine	Rehabilitation infrastructure underdeveloped relative to acute oncology expansion
Survivorship care	Limited focus; emerging concept	Increasing emphasis on survivorship & community care	Strong survivorship programs	Limited inclusion of structured rehabilitation programs (fatigue, cognition, return-to-work & participation)
Palliative care	Established & expanded services	Further integration into care pathways	Integrated palliative approach	Palliative rehabilitation underrecognized, limiting function & HRQoL in advanced disease
Community & primary care integration	Early development phase	Stronger integration with primary health care & community services	Expanded community-based models	Community rehabilitation services remain fragmented/ limited, affecting continuity of care
Workforce development	Focus on oncology workforce capacity	Broader workforce & training strategies	Emphasis on specialized workforce & innovation	Limited dedicated oncology rehabilitation workforce strategy, leading to service gaps & delayed care
Data, research & outcomes	Establishment of QNCR	Enhanced performance metrics & reporting	Data-driven care, registries, research expansion	Limited information on functional outcomes research or data generation, limits measurement of rehabilitation impact
Digital health & innovation	Early-stage systems	Expansion of data systems & integration	Advanced digital health & analytics	Absence of telerehabilitation, remote functional monitoring, home-based care
System efficiency	Focus on service establishment	Improved coordination & efficiency	Strong value-based care & return on investment focus	Lack of rehabilitation integration results in increased LOS, readmissions, complications, long-term costs, reduced HRQoL

MDTs, multi-disciplinary teams; HRQoL, Health-related quality of life; QNCR, Qatar National Cancer Registry; LOS, length of stay.

have significant implications, including delayed or fragmented care, increased complications, prolonged hospital stays, higher readmission rates, overseas consultations/care, and reduced QoL and participation outcomes for patients. Table 2 presents the comparative summary of Qatar Cancer Strategies and rehabilitation implications.

DISCUSSION

Qatar's healthcare system, with its mixed public-private model that delivers primary and secondary oncology services, demonstrates robust performance in its preparedness and response to cancer care. Despite having one of the highest healthcare expenditures in the region and serving a rapidly growing and highly diverse expatriate population representing more than 90 nationalities, several systemic challenges remain for comprehensive cancer care delivery.[56] Rehabilitation services in Qatar are centrally delivered through the QRI in Doha, a specialist tertiary public facility operating under HMC. The QRI provides comprehensive inpatient and outpatient rehabilitation within a purpose-built facility and extends its services through off-site rehabilitation services to other hospitals, including the NCCCR. As of 2025, QRI has an approximate capacity of 132 inpatient beds and is staffed by over 35 rehabilitation physicians and more than 800 allied health professionals. Specialized services include the Oncology and Lymphedema Physiotherapy Service within the QRI and NCCR, which primarily delivers outpatient care. Between 2024 and 2025, this service received 2,053 referrals from multiple sources, including NCCCR, and delivered over 13,500 appointments, including 1,197 new cases (Source: QRI internal departmental report).[55,57]

Newly diagnosed cancer cases are distributed unevenly in Qatar, reflecting the demographic composition of the population. For example, in 2020, of the total new cancer cases, 19.4% were among Qatari nationals and 80.6% among non-Qataris. Further, the long-standing practice of facilitating overseas medic al care for Qatari citizens is an additional complexity and imposes substantial financial costs on the national system. While the quest for international expertise and treatment may benefit selected cases, many cancer patients could receive equivalent or superior care within Qatar, particularly with respect to timeliness and quality of clinical care and continuity of support services, as envisioned in the QCP.[2] Moreover, Qatar holds significant potential to position itself as a regional hub for oncology services and research capacity across the region and beyond, with growing international recognition of the quality of its cancer care infrastructure.[58] This can further reinforce the value of continued investment and system enhancement.[59,60]

The rising incidence and prevalence of cancer and the increasing number of people living with and beyond cancer demand a critical shift from episodic acute care to rehabilitation-inclusive longitudinal, function-focused survivorship care.[56,61,62] The QCP 2023-2026 embeds holistic support and ongoing care, while HMC's Oncology Rehabilitation Framework (2025), outlines impairment-driven assessment, early referral triggers, interdisciplinary care models, and outcome tracking.[63] This framework remains at an early developmental stage, underscoring the need for system-wide governance support (personal communication). Within Qatar's public healthcare system, the HMC oncology services are centralized through the NCCCR, which provides specialized oncology services for patients across Qatar. A specialized Oncology and Lymphedema Physiotherapy Department within the QRI provides outpatient rehabilitation and contributes to multidisciplinary care. While this model reflects strong alignment with patient-centered and team-based oncology care, a key gap exists in the absence of a dedicated inpatient cancer rehabilitation program. This limitation contributes to fragmented care pathways, delays in functional recovery, and extended lengths of stay in acute oncology settings for patients with cancer-related impairments. Further, most of the current services are not coordinated and fragmented. Crucially, the absence of cost and other patient-specific data is one of the key barriers.[55,64]

Key potential barriers

In line with global trends and commonly reported challenges, multiple interrelated barriers may influence the successful integration and

scale-up of cancer rehabilitation services in Qatar. These barriers are often multi-factorial, spanning form system-level constraints, to provider and patient-level factors. Further, evidence suggests that underutilization of cancer rehabilitation is frequently driven by inadequate coordination across disciplines, limited emphasis within clinical guidelines, and gaps in funding and policy prioritization, which hinder service development and access.[65,66] Some of the potential barriers outlined below are informed by the authors' professional experience and communication with local experts.

Structural and operational barriers:

The absence of a fully integrated care pathway between acute oncology and rehabilitation services contributes to fragmented transitions of care, particularly at the inpatient interface. The current lack of dedicated inpatient cancer rehabilitation facilities delays recovery for patients with complex needs. Further, limited structured referral pathways and care navigation mechanisms may hinder timely access to rehabilitation services, particularly across institutional boundaries.

Workforce barriers:

There is limited availability of rehabilitation professionals with specialized oncology expertise. This workforce gap spans medical, allied health, and nursing professionals, restricting service capacity and continuity across care settings. Workforce pipeline limitations, including training, credentialing, and retention challenges for oncology-focused rehabilitation specialists, further compound these issues. Further, insufficient incorporation of oncology rehabilitation into undergraduate and postgraduate curricula may perpetuate workforce limitations.

Financial barriers:

The limitation of dedicated or protected funding streams for rehabilitation within oncology budgets can limits the scalability and sustainability of services. Rehabilitation is often not prioritized within resource allocation frameworks, which leads to underinvestment in staffing, infrastructure, and program development.

Cultural and professional practice barriers:

Oncology care often emphasizes disease-directed treatment over functional recovery and QoL, which results in under-referral to rehabilitation services and limited awareness among oncology teams of the benefits of early rehabilitation integration. Further, patients' perceptions of rehabilitation, health literacy, and sociocultural beliefs about cancer recovery may influence engagement with rehabilitation programs.

Governance and policy barriers:

Lack of mandated rehabilitation indicators within national cancer quality frameworks can limits accountability and visibility of functional outcomes in routine oncology care. Furthermore, the limited availability of national evidence-based guidelines or standardized care pathways for oncology rehabilitation constrains consistency in service delivery.

Information systems and data barriers:

A gap exists in the routine collection and utilization of functional outcomes data (e.g., mobility, participation, QoL). The absence of integrated digital health systems impedes monitoring of patient trajectories, evaluation of service effectiveness, and data-driven decision-making. Further, limited locally generated data hinders context-specific program design and implementation.

Potential actions for future development

There is a critical need to reposition rehabilitation as a core, longitudinal component of cancer care to enhance patient outcomes, optimize system efficiency, and ensure sustainability of cancer services in Qatar. Addressing the aforementioned barriers will require a coordinated, system-level approach with the strategic goal of embedding rehabilitation as an integral component of comprehensive cancer care. The key areas that need to be addressed are listed below.

Embed rehabilitation across cancer pathways:

- Operationalize rehabilitation as a core standard across the cancer pathway:

prehabilitation, treatment-phase, survivorship, and palliative rehabilitation, with explicit deliverables and reporting lines under the QCP governance structure

- Implement Oncology Rehabilitation Framework by translating it into clinical bundles, staffing models, and outcome dashboards
- Utilization of the acute and sub-acute care partnership to co-design shared care pathways (e.g., tumor-site multidisciplinary teams with rehabilitation, standardized referral criteria, early risk stratification, setting long-term goals, etc.)

Standardize assessment and outcomes:

- Adopt a national ICF-informed functional assessment set (mobility, ADLs, cognition, fatigue, mental health, participation/ return-to-work) integrated into the electronic record, so that function and participation are tracked alongside tumor response and survival
- Use these data to enable benchmarking and service improvement
- Expand access points through primary care and digital modalities:
- Leverage existing screening and survivorship programs to triage rehabilitation needs early (e.g., physical therapy, fatigue management, psychosocial support)
- Develop tele-rehabilitation and virtual multidisciplinary team reviews to facilitate continuity for expatriate and working-age populations

Strengthen care continuum, including palliative rehabilitation and supportive care:

- Integrate palliative rehabilitation into supportive and palliative services to maintain function, symptom control, and dignity, with routine rehabilitation screening for patients seen by the palliative team and rapid access to mobility aids, caregiver training, and home-based strategies.

Build workforce capacity and competence:

- Scale interdisciplinary teams (rehabilitation medicine, physiotherapy, occupational therapy, speech and language therapy, dietetics, psychology, social work, lymphedema specialists, etc.) and create competency frameworks and fellowships

Align financing and incentives to drive uptake:

- Designate rehabilitation as an essential component of oncology care (not an optional add-on) and link provider incentives to functional outcomes, timely referral, and return-to-work/study where relevant
- Utilize QCP governance to monitor adoption and close equity gaps (e.g., language, gender, and culturally sensitive services).

Advance research and data collection:

- Use QNR from the rehabilitation perspectives that capture case-mix, interventions, and outcomes
- Publish annual dashboards/reports to inform service redesign
- Priority research domains include prehabilitation effectiveness in Qatar's demographic profile, culturally adapted rehabilitation models, and cost-effectiveness analyses

Maintain system-level alignment with national strategies:

- Position cancer rehabilitation as a value-added contributor to Qatar's broader National Health Strategy 2024-2030, Non-Communicable Disease agenda, and others to facilitate sustainable investment and cross-sector partnerships (e.g., workplace health, community activity).

There are several limitations to this review that should be acknowledged. This review follows a rapid narrative methodology without formal systematic appraisal, duplicate independent screening, or blinded reviewer processes, which may introduce interpretive bias and selective emphasis. The identification of current service gaps, potential barriers, and future recommendations presented in this review are informed by the

authors' collective professional expertise, practical service-level insights, and personal communications with relevant institutional and health system stakeholders. We acknowledge that this perspective provides important contextual depth and operational relevance; however, it also represents a methodological limitation. Further, reliance on local knowledge and stakeholder may limit reproducibility and generalizability beyond the Qatari healthcare context.

In conclusion, cancer rehabilitation in Qatar must be framed as a core, longitudinal component of cancer care, from diagnosis through survivorship, to address the complex physical, cognitive, psychological, and social sequelae that many patients experience. Qatar has the necessary policy framework and institutional assets to embed rehabilitation as a standard of care; the task ahead is to translate this into routine, measurable practice across pathways. Key priorities include the establishment of dedicated, institutionalized cancer rehabilitation centers for early, goal-oriented rehabilitation, capacity building (workforce and services), increasing awareness amongst oncologists/surgeons, other health care providers, and patients, and more locally relevant research and evidence. Integrating rehabilitation across Qatar's National Health policies, clinical pathways, and surveillance mechanisms will enable the delivery of equitable, patient-centered, and function-focused services that demonstrably enhance the outcomes and QoL for individuals living with and beyond cancer. "When function is restored, dignity, independence, and hope follow."

Declaration of Conflicting Interests

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Data Availability

No datasets were generated or analyzed in this study; as such, data availability is not applicable.

AI Disclosure

The authors declare that artificial intelligence (AI) tools were not used, or were used solely for language editing, and had no role in data analysis, interpretation, or the formulation of conclusions. All scientific content, data interpretation, and conclusions are the sole responsibility of the authors. The authors further confirm that AI tools were not used to generate, fabricate, or 'hallucinate' references, and that all references have been carefully verified for accuracy.

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